Center for COMMUNITY PROGRESS
Vacant Spaces into Vibrant Places

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OPEN SPACE IN DETROIT

Key Ownership and Funding Considerations to Inform a Comprehensive Open Space Planning Process

Center for Community Progress Report to
Detroit Future City Implementation Office
2015 Technical Assistance Scholarship Program (TASP) Recipient

A Center for Community Progress TASP Final Report

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AUTHORS:

Center for Community Progress: *www.communityprogress.net*
Danielle Lewinski, Vice President and Director of Michigan Initiatives
Laura Settlemyer, Assistant General Counsel for Michigan Initiatives
Payton Heins, Program Officer of Michigan Initiatives
Sara Toering, General Counsel
Tamar Shapiro, President and CEO

CH2M: *www.ch2m.com*
Mark Mittag, Water Resources Project Manager
Mike Matichich, Practice Lead for Financial Services Consulting

Natural Resources Defense Council: *www.nrdc.org*
Jay Orfield, Renewable Energy Analyst
Jennifer Grossman, Consultant
Sarah Dougherty, Welch Environmental Innovation Fellow

Farr Associates: *www.farrside.com*
Doug Farr, President
Steve Wilson, Senior Associate

Encourage Capital, LLC: *www.encouragecapital.com*
Alex Eidson, Analyst
Carolyn Mansfield duPont, Consultant
Eron Bloomgarden, Partner
Jane Silfen, Associate

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Center for Community Progress – National Office:
1001 Connecticut Avenue N.W. Suite 1235
Washington, D.C. 20036
(877) 542-4842
www.communityprogress.net

ABOUT CENTER FOR COMMUNITY PROGRESS

Founded in 2010, the Center for Community Progress is the only national 501(c)(3) nonprofit organization solely dedicated to building a future in which entrenched, systemic blight no longer exists in American communities. The mission of Community Progress is to ensure that communities have the vision, knowledge, and systems to transform blighted, vacant, and other problem properties into assets supporting neighborhood vitality. As a national leader on solutions for blight and vacancy, Community Progress serves as the leading resource for local, state, and federal policies and best practices that address the full cycle of property revitalization. Major support for Community Progress is generously provided by the Charles Stewart Mott Foundation and the Ford Foundation.

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PREFACE

This study was commissioned by Detroit Future City Implementation Office (DFC) to examine the viability of long-term open space options identified in the Detroit Future City Strategic Framework. The initial guidance included in this report is intended to help inform the planned development of a Comprehensive Open Space Plan for Detroit. This Open Space Plan should define a concrete long-range vision and implementation strategy and should be created with significant input from the public to ensure that the residents of Detroit benefit from their continued support of and investment in the city.

Open space development, improvement, and maintenance is a significant challenge for Detroit given its fiscal constraints, and implementing a plan will require creative and strategic financing decisions. The opportunity to create a valuable asset in the form of a multifaceted open space system, however, should not be passed up. Detroit will invest in itself, and in so doing, create a more stable, sustainable future. The city is poised to seize this challenge and reap the benefits of intentional green areas in the form of community open spaces, ecological areas, and working productive landscapes.

This study does not seek to provide a roadmap for the development of an open space plan. Instead, it aims to provide high-level guidance about the key factors that a range of decision-makers should consider during the open space planning process, related to open space uses, ownership models, and funding options. Specifically, while laying out several options, this report emphasizes a select number of uses highlighted in the Detroit Future City Strategic Framework that appear to bear particular promise or currently garner high levels of interest from Detroit residents and leaders. Final recommendations about which open space land uses are ultimately appropriate for Detroit can only be determined following an extensive open space planning process.

The two key questions addressed in this report are:

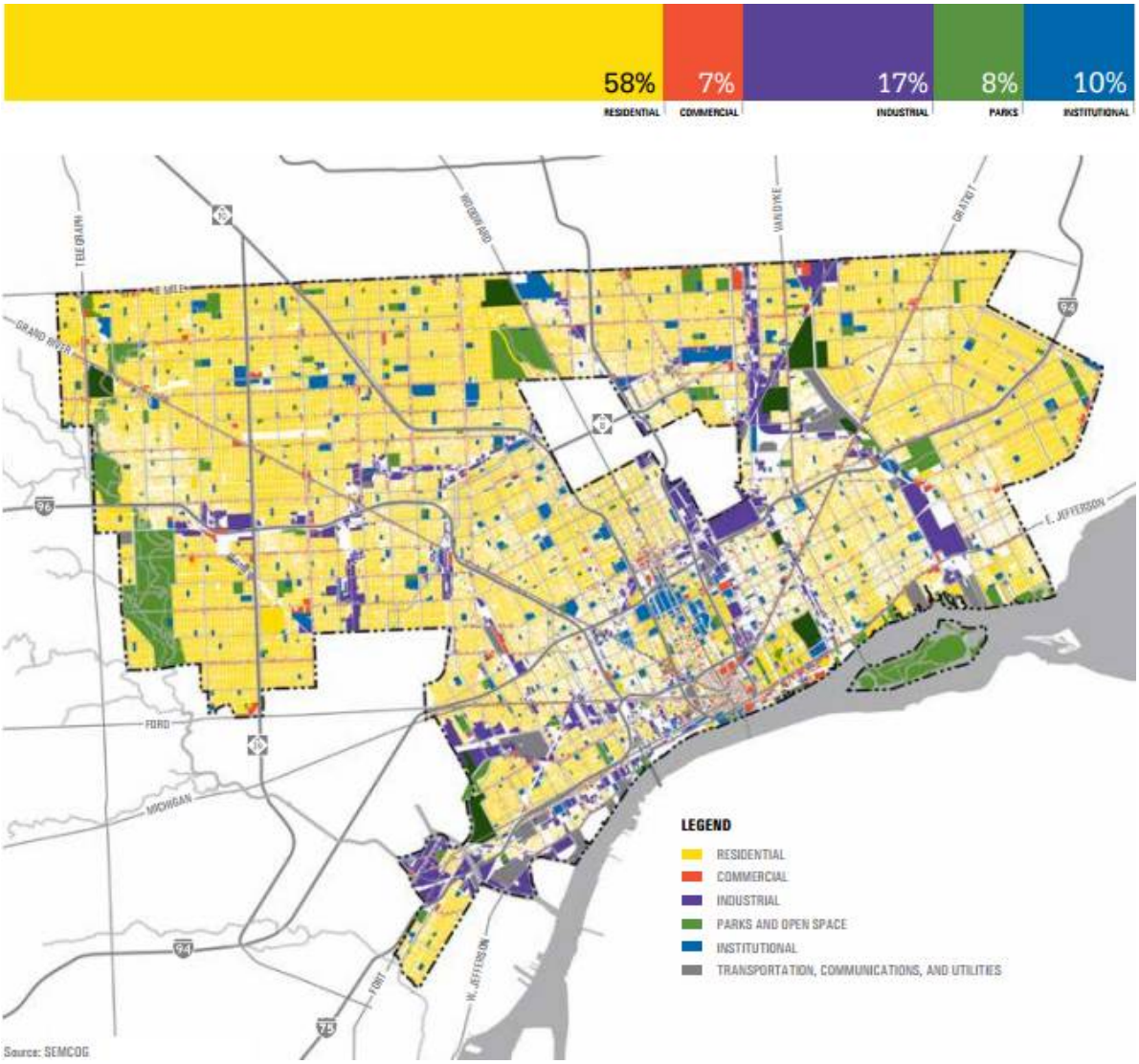
1. What are the range of ownership models that could be considered for open space, depending on type of use, permanence of use, scale, and location?

2. What are the funding needs for the types of open space uses examined in this report and what existing or creative funding tools may be available to address those needs?

INTRODUCTION AND CONTEXT

Large-scale, intentional open space is a powerful tool to support the stabilization and growth of Detroit. Open space in this report is defined as structure free land that is intentionally being used as one of the following different types of uses: productive landscapes, natural areas, green stormwater infrastructure, or parks and recreation.[1] These open space areas can function as an economically and environmentally productive landscape that produce revenue as well as significant cost savings. Furthermore, open space that provides opportunities for active or passive recreation as well as increased natural landscapes can help retain and attract residents in

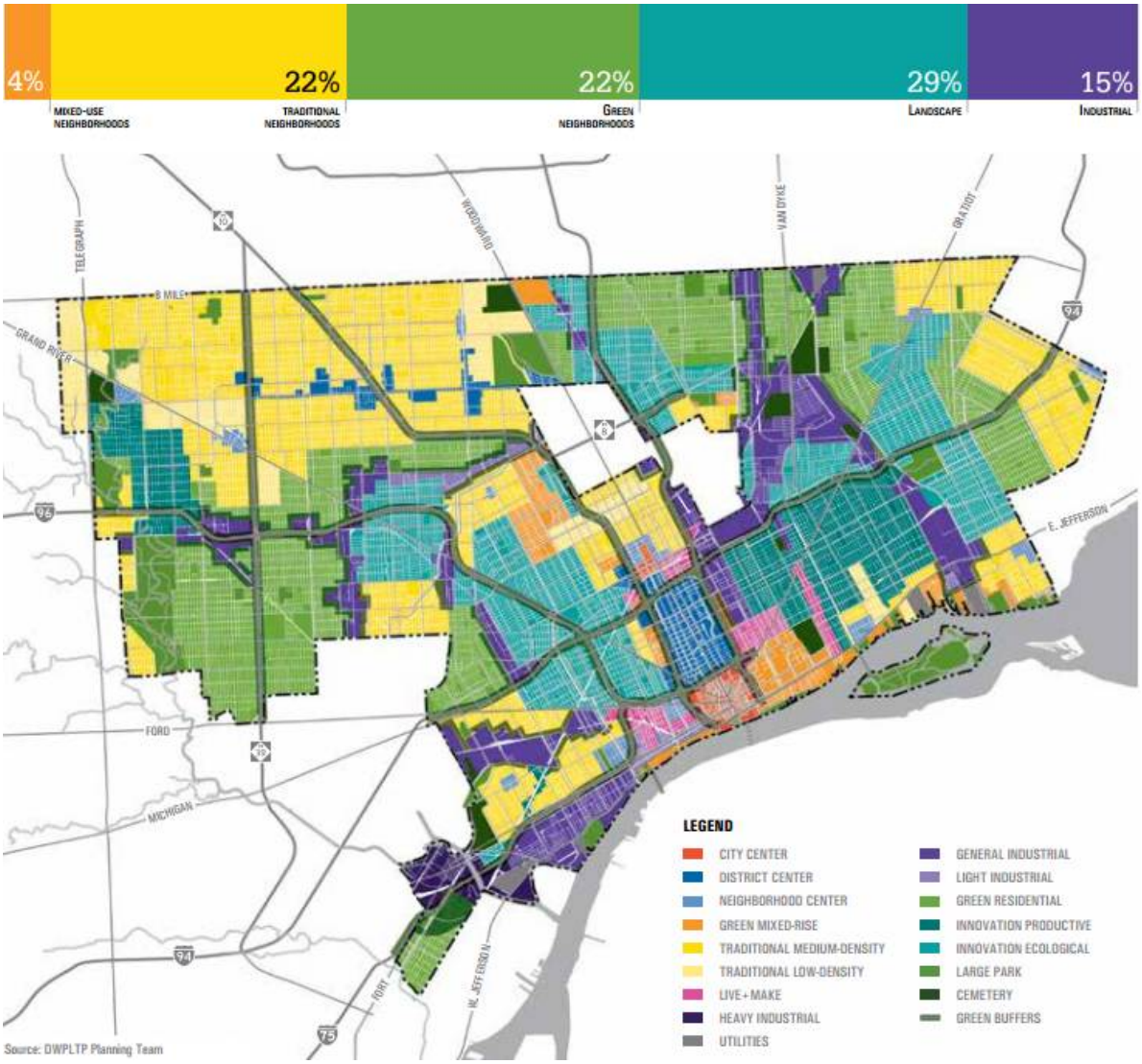
Figure 1: Current Land Use, Detroit



adjacent neighborhoods, contributing to increased density in key areas. There is also evidence to suggest that property values increase as open space amenities expand.

The 2012 Detroit Future City Strategic Framework created a comprehensive, 50-year vision and outline for addressing the city's economic and redevelopment challenges and opportunities.[2] A foundational element of that vision focuses on increasing the diversity of land uses in the city. The Framework recognizes that Detroit's homogenous, single-family residential landscape, as shown in Figure 1, in combination with the sheer scale of the city's geography, totaling 142 square miles, resulted in a sprawling, unsustainable built environment. In order to support a city that could attract and retain a wide range of businesses and residents, while delivering quality city services, the Framework outlines the need for increased diversity of land use and density.

Figure 2: Future 50-Year Land Use Scenario, Detroit

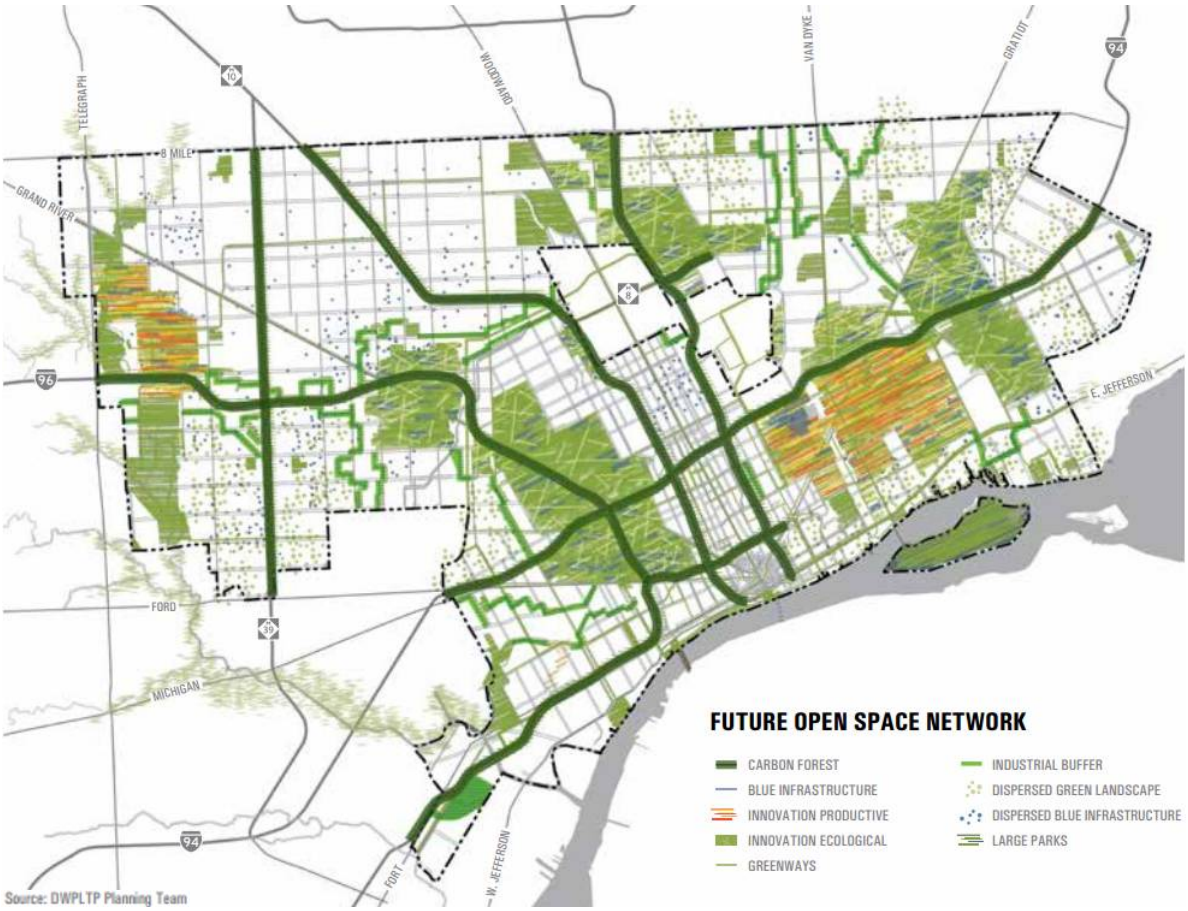


In order to realize that goal, the Framework calls for a significant portion of the city's vacant land to be transformed into an open space amenity, see the "Innovation Productive" and "Innovation Ecological" areas shown in Figure 2. These long-term open space areas would support a wide range of landscape uses that could be leveraged to create a new green and sustainable city unlike any other in the world. The Framework envisions these long-term open space areas as critical assets for the city as they would both create an interconnected ecological asset, see the envisioned open space network in Figure 3, and maximize the value of Detroit's large inventory of vacant land in the long run. One of the primary challenges to realize DFC's long-term open space vision is the cost of the physical conversion of vacant land to intentional open space given both the scale of planned open space, around 20 square miles, and the level of financial distress in the city.

Key open space implementation challenges

Currently, Detroit has an inventory of more than 100,000 vacant lots and around 80,000 vacant housing units. This degree of vacancy is the result of decades of economic and population decline and disinvestment. The city has suffered from a dramatic loss in both property value and property tax revenue generation, one of the key factors in Detroit's

Figure 3: Future Open Space Network, Detroit



municipal bankruptcy. While the city is showing signs of financial recovery as it emerges from bankruptcy, it will take years for the city to become financially stable. In this term, the City will continue to have constrained resources and as a result, will likely not have sufficient municipal funding nor capacity to solely implement a long-term open space vision. As DFC looks to support long-term open space implementation, it will need to identify new sources of capacity to assist the City, both in terms of open space ownership and management as well as funding given the City's ongoing financial constraints. This report seeks to offer initial ideas to assist DFC in addressing these two key open space implementation challenges. The ideas and concepts presented in this report position the city to become a leader in innovative ownership and funding mechanisms to implement the city's open space vision.

USING THIS REPORT

As mentioned in the Preface, this report does not seek to provide a roadmap for the development of an open space plan. In addition, while it emphasizes some open space use options highlighted by the Detroit Future City Implementation Office that seem to bear promise, this report does not provide recommendations on the specific application of those uses on Detroit's land. Those decisions will appropriately be made through a future comprehensive open space planning process, which will involve input from a wide range of community stakeholders and an enormous degree of research into and analysis of the parcel-specific features and context of future open space areas.

Instead, this report provides an overview of a number of different ownership models and funding mechanisms for large-scale, long-term open space reuse in the "Innovation Productive" and "Innovation Ecological" areas envisioned in the Detroit Future City Strategic Framework, shown in Figure 2. The intention is for this report to inform the open space planning process in Detroit.[3] It focuses on two key questions:

1. What are the range of **ownership models** that could be considered for open space, depending on type of use, permanence of use, scale, and location?

2. What are the **funding needs** for the types of open space uses examined in this report and what existing or creative **funding tools** may be available to address those needs?

In the **Ownership** section, readers will first find several **land ownership entities** that could acquire and manage a large inventory of land for the long term. These models include the Michigan Department of Natural Resources, land banks, City of Detroit, Metropolitan Districts, and not-for-profit corporations including land trusts, land conservancies, and land cooperatives. In addition, the section features a number of **land management tools**, including deed restrictions, conservation easements, leases, and development rights agreements, which could support long-term open space land use implementation and preservation. The final portion of the ownership section offers initial guidance on ownership considerations for the long and near term, which can serve as a starting point for future open space planning, conversations, and advocacy.

The **Funding** section opens with an overview of some of the unique funding challenges Detroit faces with regard to open space reuse and, in this context, offers considerations for the planning process to follow related to increasing the feasibility of open space, from a funding standpoint. It then dives into four different categories of open space: productive landscapes, green stormwater infrastructure, natural areas, and parks and recreation. For each category, the report offers an overview of financial considerations (such as costs and revenue potential), possible funding sources, and actions to increase financial feasibility. Each open space category also features "Type Spotlights," that offer a similar financial overview for specific types of open

space. For example, within Productive Landscapes, readers will find information on urban farming, solar, biofuel, and tree farms.

In the **Appendices**, readers will find a number of supportive reference pieces, including case studies examining two other cities' approaches to implementing a form of open space and tables summarizing this report's content on ownership entities and tools and open space use type funding considerations and tools.

The hope is that this report will be a resource in the open space planning process, aggregating information on land ownership models and funding options in a consistent, reasonably comparable format that will enable Detroit's stakeholders to make informed decisions to benefit the city's residents in the long term.

OWNERSHIP

One of the foundational goals of the Detroit Future City (DFC) Strategic Framework is to transform a significant portion of Detroit's land, totaling around 20 square miles, into a dynamic open space asset that contributes tax revenue, supports economic growth and job creation, and serves as a public amenity for Detroit residents and visitors.[4] Establishing productive and transformative uses for this portion of Detroit's land is a complex task that demands a comprehensive plan for assembling, maintaining, owning and operating open space on a large scale.

Figure 4: Open Space Parcel Detail, Occupancy and Ownership

	# parcels	Acres	Sq mi	Acre Pct	Pct Description
Total[1]					
In open space areas[2]	114,975	13,046	20	100%	Pct of total open space
Vacant lot	56,833	5,780	9	44%	Pct of total open space
Lot with structure	55,850	6,960	11	53%	Pct of total open space
Structure has vacancy indicator[3]	20,175	2,259	4	32%	Pct of total structures
Current Ownership - Public					
In open space areas	45,356	4,544	7	35%	Pct of total open space
Vacant lot	32,628	3,162	5	70%	Pct of total publically owned
Lot with structure	11,809	1,285	2	28%	Pct of total publically owned
Structure has vacancy indicator	9,633	943	1	73%	Pct of total publically owned structures
Current Ownership - Private					
In open space areas	69,619	8,503	13	65%	Pct of total open space
Vacant lot	24,205	2,617	4	31%	Pct of total privately owned
Lot with structure	44,041	5,675	9	67%	Pct of total privately owned
Structure has vacancy indicator	10,542	1,316	2	23%	Pct of total privately owned structures
Current Ownership – Private and in a stage of tax foreclosure					
In open space areas	35,096	3,997	6	31%	Pct of total open space
Vacant lot	9,784	1,058	2	12%	Pct of total privately owned
Lot with structure	24,678	2,838	4	33%	Pct of total privately owned
Structure has vacancy indicator	6,965	775	1	14%	Pct of total privately owned structures

Source: DFC, Motor City Mapping

[1] The counts in this table will not add up consistently because of incomplete data. Motor City Mapping is generally a very high quality data set, however there are some parcels that have no data or incomplete data (e.g. a parcel that is flagged as having a structure but does not have data on the condition or occupancy of that structure), and this results in some minor aggregation inconsistencies.

[2] Open space areas are inclusive of the Innovation Productive and Innovation Ecological DFC land uses

[3] Structure indicated as either "vacant" or "maybe vacant"

This section of the report identifies several land ownership models that could be employed by Detroit leaders to acquire and manage a large inventory of land for long-term open space uses, as well as for interim uses that complement the long-term uses.

These models include:
- Michigan Department of Natural Resources
- Michigan land banks
- City of Detroit
- Metropolitan Districts
- Michigan not-for-profit corporations including land trusts, land conservancies, and land cooperatives

This section also identifies and describes land management tools which could be employed to support long-term open space land use plans and goals, including:
- Deed restrictions
- Conservation easements
- Leases
- Development rights agreements

General Ownership Considerations

Since all of the potential ownership structures listed in this report are legally viable, the decision regarding which ownership structure to employ for different types and scales of open space must ultimately be guided by policy and planning considerations. This report highlights those features of each ownership structure that seem particularly relevant to this decision. A more complete description of each legal entity, including structure, governance, purpose, creation, legal authority, etc. is included in Appendix 3. Specifically, this report seeks to illuminate those features of each ownership structure that may impact the following considerations:

Considerations related to future authority over open space

The question of who will maintain authority or control over different elements of the open space outlined in the DFC Strategic Framework over the long-term must be understood and weighed as part of any decision on ownership structure.

Considerations related to acquisition and disposition

Any entity that takes on the responsibility of owning a portion of the open space will first need to be able to acquire land. Even the Detroit Land Bank Authority, which currently has much of the land in its inventory, will need the ability to acquire additional land to fulfill key goals related to open space. This report refers to acquisition in the broadest sense, to include not just purchase, but also other means of accepting ownership over property. Similarly, the ability of an entity to dispose of the land flexibly is relevant to an ownership decision. For example, an ownership structure with very limited flexibility may be desirable for those areas in which the type of open space will be consistent for decades. On the other hand, a greater degree of

flexibility may be desirable for those open space areas where the specific use type may shift over time, for example from a meadow to solar generation.

Considerations related to future tax revenue/liability

On the one hand, given the scale of vacancy in the city of Detroit, it is important that open space be developed in such a way as not to deprive the City of much needed tax revenue over the long term. On the other hand, the ability for land to be held tax exempt reduces the costs to the owner(s) of the land and thus increases the financial viability of maintaining long-term open space. These two considerations may be in tension with each other and must be thoughtfully balanced.

Liability considerations

The potential legal liability associated with owning land, particularly at a large scale, within the City of Detroit is clearly relevant to the choice of ownership structure. The main distinction in liability is between public ownership options and nonprofit or private ownership options, as described in the following sections. In all cases, it is possible to mitigate potential liability through appropriate insurance.

Funding opportunities

All legal entities discussed below have a variety of funding and/or financing opportunities that could be used to support the creation and maintenance of open space uses. It is important to identify funding opportunities that are politically viable, sustainable, and predictable, which the second half of this report will address in more detail.

OWNERSHIP OPTIONS FOR OPEN SPACE

PUBLIC OWNERSHIP OPTIONS

One land holding option for Detroit leaders to consider is the assembly and maintenance of some portion of the open space parcels in one or more publicly controlled and funded entities. Public land ownership, as a general matter, requires public and transparent management and oversight, and may allow for holding land in a tax exempt status. The Michigan Department of Natural Resources, Michigan land bank authorities, and the City of Detroit are existing and primary options available to Detroit for the public holding and maintenance of large inventories of land. Metropolitan Park Districts could possibly be utilized in Detroit but may require either passage of state enabling legislation or a citywide referendum, and would likely require additional taxation of existing Detroit land owners to fund operations.

THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES[5]

Overview

The State of Michigan has the ability through the Department of Natural Resources (DNR) to acquire, hold, manage, and dispose of land.[6]

Considerations related to future authority over open space

The DNR has powers to acquire, manage, and dispose of property, but the DNR's powers and activities are generally subject to review and approval by the state legislature. Decisions regarding any property that the DNR acquires, manages, or disposes of in Detroit, therefore, will rest with the state legislature, and while the DNR and the state legislature will likely seek local opinion and input regarding land in Detroit, the City will not have direct control over the land. Thus, having DNR acquire, hold, and maintain land in Detroit to preserve open space would mean inviting and allowing the state to hold and control potentially vast amounts of land within the city.

Considerations related to acquisition and disposition

As stated above, the DNR is an arm of the State government that has the power through State law to acquire, hold, manage, and dispose of land. The DNR currently manages over 4.5 million acres of land in the state of Michigan, including approximately 40 acres located in Wayne County.[7] As a result of the volume of land that DNR currently holds and the DNR's history in Michigan,[8] the DNR has significant experience in acquiring, holding, and managing land for the preservation of open space and is likely well positioned to acquire and hold more.

Considerations related to future tax revenue/liability

Property held by the DNR is not exempt from property taxes and so Detroit and other local units of government do not have to forego the property tax revenue collected on land owned by DNR, even if the land is open space. The DNR estimates property taxes on land it holds and makes a payment in lieu of taxes (PILOT).[9] A local taxing unit, however, has discretion to allow public lands held by the DNR to be exempt from its property taxes.[10]

Liability considerations

Like other governmental entities, the DNR is immune from tort liability[11] arising from the DNR's governmental functions. Generally, a governmental agency in Michigan is immune from tort liability if the governmental agency is engaged in the exercise or discharge of a governmental function.[12] Courts in Michigan, however, have held that not all operations and activities of the DNR are protected by governmental immunity.[13] Liability can arise regardless of whether the DNR or a private entity manages the land owned by the DNR. Governmental immunity from the liability depends on whether the activity is a governmental function. Generally, if a private entity is performing the activity, then the activity is by definition not a governmental function, and the private entity is not protected by governmental immunity. On the other hand, the government's performance of an activity does not automatically make that activity a governmental function. In fact, if a private entity could perform the activity, then a

governmental entity, like DNR, will not be immune from liability solely because the governmental entity performed the activity.[14]

The Michigan Court of Appeals has held that a distinction exists between maintenance and operation of a park system, which does qualify as a governmental function given its magnitude, and the operation of individual park programs, such as operating a public swimming beach which is managed and operated by a non-governmental entity.[15]

The statute governing creation and operation of the DNR does not expressly refer to insurance requirements, but the provision providing the DNR with authority to manage and control land likely confers authority to procure liability insurance where necessary and appropriate.[16]

Governmental immunity enables the DNR to perform its functions, including acquiring and managing land, at a relatively low cost to the DNR due to the reduced risk of legal claims against the DNR. Land banks in Michigan and the City of Detroit, as described below, also have governmental immunity in performing the same functions as the DNR.

Funding Opportunities

One attribute that makes the DNR an attractive candidate for acquiring and holding land to preserve open space is the DNR's access to funding for its activities.

Funding for the activities of the DNR, including the acquisition and management of land, comes from many sources. Through its power to enter into private contracts for the taking of coal, oil, gas, and other mineral products from State-owned lands, the DNR may collect royalties and other payments to fund department activities.[17]

The DNR also receives funds from several State funds, such as the Natural Resources Trust Fund,[18] the Michigan Game and Fishing Protection Trust Fund,[19] the Forest Development Fund,[20] and various accounts of the Michigan Conservation and Recreation Legacy fund, including the Game and Fishing Protection Account[21] and the Forest Recreation Account.[22] The DNR also receives grants from the federal government for specific activities.[23] While the DNR has access to funds that may be used to support open space activities, changes to state law may need to be explored to fully leverage these funds for open space in Detroit.

DNR Strategic Planning and Reporting Requirements

In recent years, the DNR has begun developing a strategic plan regarding land in DNR's inventory to present to the state legislature.[24] Given the state legislature's interest in studying the DNR's current policies and future strategies for acquiring, holding, managing, and disposing of land in its inventory, the DNR and members of the state legislature may be open to hearing from the City of Detroit as to how the DNR's current and future plans may make an impact locally.

MICHIGAN LAND BANKS

Overview

Michigan land banks are quasi-governmental entities created for the purpose of acquiring title to, managing, and disposing of tax-reverted property. The mission of land banks in Michigan is "to promote economic growth in this state through the acquisition, assembly, and disposal of public property, including tax reverted property, in a coordinated manner to foster the development of that property."[25] Due to their broad powers to acquire, hold, maintain, and dispose of property, Michigan land banks work closely with counties and local units of government to acquire and assemble tax-foreclosed property for the purpose of returning it to productive use.

Michigan land banks share some features with other governmental units, but land banks also have unique characteristics. Michigan land banks' activities are generally protected by governmental immunity to the same extent that the State or other local units of government are protected. Michigan land banks cannot, however, acquire property through eminent domain, despite their general broad powers to acquire property. Perhaps most significant for considerations of owning and managing open space, Michigan law grants land banks greater flexibility than the State (including the DNR) and local units of government in disposing of property to fulfill its mission and purpose.

Considerations related to future authority over open space

Land banks operate at the state, county, and city levels in Michigan. The ability to establish and manage a land bank at the county and local levels[26] provides counties and cities with more control over property in their local land bank's inventory than, for example, property in the State's inventory. In instances where greater flexibility and control is needed, a land bank may be a better option for acquiring and holding the land.

A local land bank's governance structure further demonstrates the ability of a county or city to direct the functions of its land bank. In order to establish a land bank, a county treasurer or a qualified city must negotiate and enter into an intergovernmental agreement (IGA) with the state land bank.[27] The county or city land bank is then governed according to the IGA with the state,[28] as well as by the land bank's articles of incorporation.[29] The IGA establishes the size and members of the initial governing board of the land bank, and the IGA provides the method by which the initial governing board will develop and adopt the land bank's articles of incorporation.[30]

Currently, there are three land bank authorities that can be engaged in acquisition, management, and disposition of land in Detroit, the State Land Bank Authority, Wayne County Land Bank Authority, and Detroit Land Bank Authority, with the DLBA being the most active in Detroit currently.

Considerations related to acquisition/disposition

Generally, state law confers broad powers and authority to land banks to acquire, maintain, and dispose of abandoned, vacant, and problem properties, which are often the types of properties used for open space. Land banks have the power to acquire real and personal property by gift, transfer, exchange, foreclosure, or purchase.[31] Land banks do not, however, have the power of eminent domain, or the ability to condemn property.[32]

One of the acquisition methods that may be most useful for implementing open space is a land bank's ability to connect to the property tax foreclosure system.[33] A land bank may work with the county treasurer or city government to acquire properties before any public tax auction. A land bank may also work with the county treasurer to bundle properties prior to a public tax auction. A land bank's ability to connect to the property tax foreclosure system is a unique tool that can enable the land bank to assemble larger pieces of land at a low or no cost, ensuring that open space uses requiring larger parcels, such as solar fields, can be more readily assembled.

Another acquisition method that may be useful for implementing open space is a land bank's ability to swap or exchange, land. This is not a unique characteristic of land banks, but it is significant feature because of the volume of property in Detroit that is currently owned by the Detroit Land Bank Authority. For the areas identified for open space, the Detroit Land Bank Authority owns much of the land. For residents living in these areas that may want to move to a location in the city with a denser concentration of services, depending on the land bank's policies, the DLBA can offer another property in their inventory to that resident in exchange for the parcel located in the open space area.

A land bank also generally has broad powers and discretion with respect to disposition of properties. A land bank may grant or acquire a license, easement, or option with respect to its property.[34] A land bank may "convey, sell, transfer, exchange, lease as lessor, or otherwise dispose of property" to any public or private entity or individual for an amount of consideration that the land bank considers "proper, fair, and valuable."[35] The amount of consideration does not have to be measured in dollars to qualify as "proper, fair, and valuable."[36] This increases the land bank's flexibility with regard to disposition for open space.

Considerations related to future tax revenue/liability

One unique right that land banks enjoy under state law is that the property of a land bank and its income and operations are exempt from all taxation by the State of Michigan and any of its political subdivisions.[37] A land bank, however, does not have the power to levy any tax or special assessment.[38]

Liability Considerations

State law provides that land banks are immune from tort liability arising from the properties in their inventories to the same extent as other governmental entities, including the state, county, and city governments. Most land banks in Michigan, however, procure and maintain property

insurance and general liability insurance to protect themselves and the properties in their inventories from damage, loss, or claims for damages or loss by third parties.

Funding Opportunities

Land banks in Michigan rely on various sources of funding. A common source of funding is an annual general-budget allocation from the city or county that created the land bank. Private, state, and federal grants and donations are also another source of funding for Michigan land banks.

Another source of funding for land banks in Michigan law is property tax revenue generated from what is known as the 5/50 tax collection. A land bank may collect 50% of the property taxes assessed on properties the land bank transfers to non-tax-exempt property owners for up to five years after the transfer.[39]

Despite these varied sources of funding, land banks in Michigan have generally been lacking an adequate source of consistent, predictable funding to manage and maintain their existing inventories effectively. Seeking new, dedicated funding streams would be key to a land bank's ability to manage large-scale open space in the long-term.

Land Bank Example in Detroit: The Detroit Land Bank Authority

The City of Detroit, as a qualified city, set up a land bank by entering into an IGA with the State Land Bank Authority. The Detroit Land Bank Authority (DLBA) has already acquired approximately 80,000 parcels and is prepared to acquire more as a result of property tax foreclosures in Wayne County in 2015. The DLBA operates many programs to manage properties in its inventory, such as the demolition of vacant and abandoned structures, as well as to dispose of properties in its inventory, such as public auctions and side-lot sales.

CITY OWNERSHIP

Cities and local units of government in Michigan generally have the ability to acquire, manage, and dispose of property for public purposes according to the state constitution, state statutes, and their home rule charters, if applicable. The City of Detroit currently owns around 5,800 acres for the management and operation of parks and recreational space throughout the city and may be a useful entity to hold land for open space implementation.[40]

Considerations related to future authority over open space

City ownership would legally provide the City of Detroit with the greatest possible degree of future authority over open space within city limits. However, the City faces constraints on acquisition and disposition, as described below, which could limit its ability to exercise this authority effectively in certain circumstances.

Considerations related to acquisition/disposition

A city in Michigan may acquire, own, establish, and maintain parks and other property and public works for public health and safety, within or outside of its city or village corporate limits.[41] Generally, the City of Detroit has the same ability to acquire, hold, manage, and dispose of property as other legal entities with the key exception that the acquisition and disposition of City property must be approved by City Council. The City of Detroit may acquire property through acceptance of a gift, bequest, or donation,[42] by the Mayor's acceptance with City Council approval, or through purchase for cash, in accordance with the ordinances, policies, and procedures established for procuring government contracts by the City Council.[43] The City of Detroit may also acquire property through eminent domain.[44]

With few exceptions, sale, lease, or other disposition of any City property must be approved by City Council and offered for market value through a public, competitive bid process.[45]

Because of the various requirements and political procedures attached to its ability to acquire and dispose of property, the City of Detroit, like any city government in Michigan, has limited flexibility in acquiring, managing, and disposing of land. As a result, the City of Detroit is perhaps most useful in the implementation of open space as the holder and manager of land designated for long-term use under one of the City's existing key functions. For example, the City's Recreation Department could continue to hold and manage land designated as parks and recreation in the open space plan according to existing ordinances.[46]

Considerations related to future tax revenue/liability

The City of Detroit has the power to levy property taxes,[47] and property tax revenue is the City's major source of funding for operations. Land that the City owns, however, is generally exempt from property taxes.[48]

Liability Considerations

Like other public entities, the City of Detroit benefits from governmental immunity from tort liability. Like all entities owning property, however, it is advisable to procure and maintain insurance. The City of Detroit has the power to procure insurance or self-insure.[49]

Funding Opportunities

The City has a number of sources of revenue to support City activities including income tax, casino tax and state revenue sharing. Property tax typically accounts for the largest source of a city's revenue, however given Detroit's low property values and payment rates, this is not the case for the City of Detroit. The City also has the ability to issue bonds, though that ability may be somewhat weak given Detroit's current bond rating.

METROPOLITAN DISTRICTS

Overview

Early in the twentieth century, the Michigan legislature authorized the creation of metropolitan districts, essentially public entities combining two or more cities, or parts of two or more cities, that can acquire, hold, maintain, and dispose of land for parks or public utilities, funded by an additional property tax on all other land within a Metropolitan District's boundaries.

Generally, Metropolitan Districts are created by the adoption of a resolution by each participating city's legislative body.[50] For Detroit to establish a metropolitan district for the implementation of open space, the City would likely have to seek state enabling legislation alone or in partnership with other local units of government. In addition, creation of a metropolitan district would likely require additional taxation of existing Detroit land owners to fund operations. This may be useful in implementing an open space plan if any of Detroit's neighboring cities, especially those with higher property tax values, are interested in partnering with Detroit to own and maintain open space in the partnering cities. Alternatively, Detroit might be able to use the existing Huron-Clinton Metropolitan Authority for this purpose, though this would require some organizational changes to enable the acquisition and maintenance of open space around the Detroit River.

Considerations related to acquisition/disposition

Generally, metropolitan districts have broad authority to acquire, manage, and dispose of property, subject to the provisions of its charter.[51] This includes the ability to condemn private property.[52]

Considerations related to future tax revenue/liability

As stated above, metropolitan districts are funded by an additional property tax on all land within the district's boundaries. The property owned and operated by a metropolitan district for a public purpose is tax exempt.[53] The revenue generated from the additional property tax goes to fund operations of a public utility or public open space owned and managed by the metropolitan district, imposing an additional burden on existing Detroit property owners without increasing the City's tax revenue.

Liability considerations

Generally, metropolitan districts, like the public entities that create them, benefit from governmental immunity from tort liability.

Funding Opportunities

Metropolitan Districts, like other entities, may solicit and receive funds through donations and grants from private, state, and federal sources. A metropolitan district may levy and collect taxes to carry out any of its objectives or purposes.[54] A metropolitan district may also borrow money through the issuance of bonds.[55] A metropolitan district may also collect rents and fees for the use of its property and services.[56]

Metropolitan District Example in Detroit: Huron-Clinton Metropolitan Authority

In 1939, the state legislature specifically authorized the creation of the Huron-Clinton Metropolitan Authority (Metroparks) to allow the five counties comprising the Detroit metropolitan area (Wayne, Oakland, Macomb, Washtenaw, and Livingston) to incorporate for the purpose of acquiring and maintaining land along the Huron and Clinton Rivers as park and open space.[57] Metroparks has the power to acquire, construct, own, develop, maintain, and operate parks as well as limited-access roads and highways that are necessary to connect the parks.[58] Metroparks also has the power to fix and collect fees for use of its facilities,[59] sell land,[60] levy and collect taxes,[61] and borrow money through issuance of bonds.[62]

PRIVATE OWNERSHIP OPTIONS

The research conducted for this report and the guidance provided by DFC and other partners indicates that most entities in Michigan and throughout the country that hold and manage large quantities of land for open space purposes are public or non-profit in nature. For that reason, this report focuses more so on public and private nonprofit legal entities that could be employed to acquire, hold, and manage land in Detroit rather than private for-profit entities. While examination of for-profit legal structures is beyond the scope of this report, a diversity of for-profit business structures are available in Michigan, including LLCs, sole proprietorships and other models. For-profit businesses could certainly work with public and non-profit entities in a variety of ways to manage or help generate revenue from open space land. Given the number of opportunities for revenue-producing open space uses, private for-profit ownership should certainly be examined as a viable ownership or management option for open space.

PRIVATE NONPROFIT OWNERSHIP STRUCTURES

LAND TRUSTS, COMMUNITY LAND TRUSTS, AND LAND CONSERVANCIES

Overview

Land trusts and land conservancies[63] are two private ownership structures that have been used throughout the state and country to own and manage large inventories of vacant land. Michigan state law does not appear to codify "land trusts" or "land conservancies" *per se*, but does provide broad authority for the creation of nonprofit entities that can be structured to focus on a mission of acquiring, maintaining, or disposing of land for particular purposes.[64] Existing Michigan land trusts and land conservancies are simply nonprofit organizations, set up as a nonprofit corporations under the Michigan nonprofit corporation act,[65] which can be structured for particular purposes with particular missions. They may be structured with limited or expansive land acquisition, maintenance, and disposition powers.

Commonly private individuals set up a land trust to acquire and own land they wish to preserve, and then set up a land conservancy to separate land acquisition from land management. When land conservancies and land trusts partner, typically the land trust acquires the land and holds the land in trust, and the land conservancy manages and operates programs on the land, usually through a lease with the land trust. The terms "land trust" and "land conservancy" are thus used to distinguish the activities of the two entities—both of which are simply Michigan nonprofit corporations organized for slightly different purposes.

Community land trusts are another type of ownership structure that has been discussed in Detroit. Community land trusts are typically set up to acquire, hold, and manage land for the use of affordable housing development and preservation. Similar to land conservancies and other land trusts, community land trusts are nonprofit organizations set up as nonprofit corporations under the Michigan nonprofit corporation act. Community land trusts are often structured to include some aspect of community management or stewardship of the land.

Considerations related to future authority over open space

Generally, any individual or entity may create a nonprofit corporation, and therefore, any individual or entity can create a nonprofit land trust or land conservancy. This flexibility to create a nonprofit land trust or land conservancy may be useful in implementing open space in instances where Detroit would prefer to create a new entity to acquire, hold, or maintain open space without amending state law or seeking a referendum.

Considerations related to acquisition/disposition

A private nonprofit land trust or land conservancy's powers to acquire, hold, manage, and dispose of property are generally governed by the entity's articles of incorporation and bylaws.[66] Including the name "land trust" or "land conservancy" in the name of a nonprofit corporation does not confer special powers or impose any special restrictions on an entity's ability to own, operate, and transfer property in its inventory. Both land trusts and land conservancies may be set up to acquire, hold, and manage property. There is no particular legal distinction between a private land trust and a land conservancy set up as nonprofit corporations. Any differences are contained within and governed by the articles of incorporation, including the established mission, and the board of directors of the nonprofit.

Considerations related to future tax revenue/liability

Depending on the purpose identified in its articles of incorporation and the use of the land in its inventory, a private nonprofit land trust or land conservancy may be exempt from property taxes. Nonprofit corporations in Michigan do not have to pay property tax on real or personal property owned and occupied by the nonprofit solely for the purpose(s) for which the nonprofit was incorporated.[67] In addition, a private nonprofit may lease property, and if a nonprofit leases land it owns to another nonprofit that occupies, or uses, the land solely for the purpose for which the lessee nonprofit was organized, then the land will likely remain exempt from the collection of state property tax.[68]

Liability considerations

Nonprofit corporations generally do not enjoy immunity under state law from liability for their actions or inactions. As a result, private nonprofit land trusts and land conservancies typically acquire and maintain various insurance policies to protect their property and other assets in the event of loss, destruction, or claims of negligence.

A land trust–land conservancy partnership, where land is owned by the trust but managed by the land conservancy, protects the land from asset seizure or other judgments in liabilities arising from activities managed on the land by the conservancy or other nonprofit or for-profit entity.

Funding Opportunities

Nonprofit funding sources are governed by the articles of incorporation and the bylaws for the nonprofit corporations. Generally, nonprofit corporations are set up to solicit and receive federal and state grants, as well as private donations.

A key benefit to nonprofit incorporation is that private donations are tax-deductible for the donor on his or her federal income tax. Also, incorporating as a nonprofit corporation usually exempts the corporation from federal income tax.

Land Conservancy Example in Detroit: Detroit Riverfront Conservancy

The Detroit Riverfront Conservancy (DRC), a private, nonprofit 501(c)(3) corporation, manages and operates the Detroit riverfront park. DRC initially acquired the park lands through donations of parcels and easements from property owners along the riverfront. Because the DRC is a nonprofit, 501(c)(3) corporation, the property donated to the DRC was exempt from federal and state income tax, and the donations qualified as tax deductions for donors. The DRC receives monetary donations from for-profit corporations and private individuals and grants from the state and local government for managing and operating the park.

The DRC initially owned the land on which it currently operates the park. The DRC sold that land to the DNR in exchange for $22 million dollars and a lease-back agreement, through which the DNR leases the land back to the DRC. The lease has a 99-year term.[69] This arrangement between the DRC and the DNR provided the DRC with an upfront payment of $22 million to finance development and operation of the park. The lease also acts to relieve the DNR of liability from managing the land. DRC is liable for managing the land and operating the park, and the DRC carries general liability insurance to mitigate this risk.

MICHIGAN LAND COOPERATIVES

Overview

Under Michigan law, a cooperative corporation is a type of nonprofit corporation governed and owned by members.[70] Land cooperatives in Michigan are generally small, tightly organized

entities that rely on both limited inventory and closely organized membership duties to maintain operations.[71]

Considerations related to future authority over open space

The key distinction between a land cooperative and a nonprofit land conservancy or land trust is that the members of a land cooperative, in exchange for paying dues or membership fees, or contributing services, may receive the right to occupy, use, and manage a parcel of land in the land cooperative's inventory. This feature may be helpful in implementing open space in instances where Detroit would like to promote individual stewardship of open space while maintaining a consistent use across multiple parcels.

Considerations related to acquisition/disposition

A cooperative corporation's powers and duties with respect to land acquisition, maintenance and disposition are generally governed by its articles of incorporation and bylaws. Those powers are broad and flexible, in line with the powers of all Michigan nonprofit corporations, including the power to acquire, maintain, lease and dispose of land.[72] Because of the diffuse ownership of cooperative corporation properties and assets, most cooperative models own relatively limited inventories of land which are then managed and maintained for limited and highly specific purposes.

Considerations related to future tax revenue/liability

As nonprofit corporations, cooperative corporations may be set up to qualify for exemption from state and local property taxes. Nonprofit corporations do not have to pay property tax on real or personal property owned and occupied by the nonprofit solely for the purpose(s) for which the nonprofit was incorporated.[73]

Liability considerations

The liability considerations of a cooperative corporation are similar to those of any other private nonprofit corporation that owns or manages land. A cooperative corporation, however promotes management of land by individual members, while insulating individual members from personal liability for the land since the land is held by the corporation.

Funding Opportunities

A Michigan land cooperative is funded in large part through member capital or membership fees, depending on how the corporation is organized under its articles of incorporation. Cooperative corporations may also receive state or federal funding and private donations.

ADDITIONAL LEGAL TOOLS TO MANAGE LAND

There are a variety of legal tools available under Michigan law that land holders may use, including any of the public or private entities described above, to assist in restricting land for

particular uses, or to protect and ensure certain rights to land over the long-term. Deed restrictions, conservation easements, leases, and development rights agreements are tools that may be employed by a land holder to meet long-term open space goals in Detroit.

DEED RESTRICTIONS

A deed restriction, or restrictive covenant, is simply a contract between the buyer and the seller of property.[74] Deed restrictions create a valuable property right,[75] and allow parties to preserve desired aesthetics, uses, or other characteristics of a neighborhood.[76]

Deed restrictions may provide that land sold to a private third party may never be developed, that land may be developed for only a particular purpose, or that the use of certain kinds of materials are restricted in development on the parcel. Deed restrictions may also restrict the kind of income that might be derived from the parcel or the uses of the parcel by the buyer. For example, deed restrictions may be used to ensure that a buyer uses purchased land for only wind farming or open space or agricultural purposes. Deed restrictions may contain a term that limits how long they are in effect, or deed restrictions may run with the land, encumbering future transactions.

Deed restrictions are generally enforced by Michigan courts exactly as they are written, unless the restrictions are contrary to law or public policy or have been waived by acquiescence to prior violations. An example of acquiescence might be where a church has been built in violation of deed restrictions requiring only residential buildings, and a neighboring property owner fails to challenge the church until that church decides to update its structures years later. Exceptions to the rule that courts will strictly enforce deed restrictions are technical violations that do not cause substantial injury (such as a house built 99.9 feet from a neighboring property line where a relevant deed restriction requires building at least 100 feet from a neighboring property line), violations that the enforcers do not challenge until after an unreasonable amount of time has elapsed, or changed conditions in the neighborhood or surrounding area that make the deed restrictions irrelevant.[77]

Courts in Michigan have strictly enforced deed restrictions in residential neighborhoods and subdivisions that dictate the features and placement of structures on a lot, but Michigan courts do not appear to have addressed deed restrictions that prohibit the placement of any structure on the land for the sake of preserving open space. A deed restriction imposed on a parcel requiring the land to be maintained as open space may be effective only as long as the owner and subsequent owners are willing to maintain the land as open space and to enforce the deed restriction. However, with each future transfer, the risk increases that a subsequent owner will fail to maintain the land as open space or enforce the terms of the deed restriction. Deed restrictions in any setting are only as good as their enforcement mechanism—either individual neighboring property owners or property owners' associations that monitor violations and challenge them consistently and constantly.

CONSERVATION EASEMENTS

An easement is a right to use all or a portion of an owner's land for a specified purpose.[78] To cancel an easement, ownership of the land must be concentrated again in one owner. In other words, a single owner must acquire both the easement and the remainder property to remove the easement.[79]

Conservation easements are easements, or restrictions on the use of land, negotiated by a landowner and the easement holder for land conservation.[80] The terms of conservation easements are entirely up to the landowner and easement holder to negotiate. The landowner may sell or transfer land subject to a conservation easement at will, so long as the land remains subject to the restrictions of the easement.

Conservation Easements and Michigan Law

A conservation easement under Michigan law is simply a type of easement.[81] Conservation easements can be held by private or public entities.[82] To be enforceable against a *bona fide* purchaser for value without actual notice of the easement, easements must be recorded with the register of deeds in the county where the land is located.[83]

For the purpose of implementing open space in Michigan, the use of conservation easements may be more useful than deed restrictions for the key reason that, if recorded properly, a conservation easement's owner (or enforcer) is known and has a valid property right and clear standing to challenge, including a potential trespass claim against, attempted third-party violators.

LEASES

All of the legal entities, both public and private, discussed in this report, generally have the right to lease property that they own. Leases can be important tools for implementing open space as they provide a mechanism through which the responsibility of land ownership can be separated from the responsibility of land management. For example, the DNR leases land and conservation easements it owns along the Detroit riverfront to the Detroit Riverfront Conservancy for the DRC to manage and operate the Detroit Riverfront Park. Similarly, often nonprofit land conservancies establish partner nonprofit land trusts so that one entity may acquire and own the land (land trust) and the other entity may manage the land (land conservancy) through a lease. This division of responsibilities enabled by leases may have tax benefits, generate revenue for either party to the lease, protect the land from liability arising from activities on the land, and promote individual stewardship of land while maintaining a consistent vision or use across multiple parcels.

DEVELOPMENT RIGHTS AGREEMENTS

A development rights agreement, or development rights easement, pursuant to MCL 324.36101, *et seq.* (both referred to here as "DRA"), in Michigan is similar to both a deed

restriction and a conservation easement.[84] A DRA is an agreement between a property owner and either the State or a local unit of government that grants the development rights of the owner's property (for either all or part of the property) to the public, through the state or local unit of government, and stipulates that the state or local unit of government may not develop the property. The grant of the development rights to the public body acts as an easement. The promise not to develop the land, or exercise the development rights, is a restrictive covenant, or deed restriction. In effect, when an owner and a public body enter into a DRA, they are both agreeing that the portion of the owner's land subject to the DRA will not be developed.

A key difference between a DRA and a deed restriction or a conservation easement, as described in this report, is that the DRA contains a defined term.[85] The term of a DRA must be at least ten years and may not be more than ninety years. [86]The ninety-year maximum applies to DRAs entered into after June 5, 1996.[87] Also, the state or local unit of government must follow certain procedures, including allowing time for public comment, before accepting or entering into a DRA.[88]

The state or local unit of government may not transfer its interest in the DRA without permission from the property owner.[89] The property owner, however, may sell or transfer the land that is subject to a DRA in accordance with the Farmland and Open Space Preservation Act.[90] Similar to conservation easements, the property owner who enters into a DRA may be eligible for exemptions from certain special assessments and taxes, including income and property taxes.[91]

In practice, DRAs are used primarily in agriculture as a way of preserving farms and farmland in Michigan.[92] DRAs, however, may also be used to preserve open space, riverfronts, and other environmental areas.[93]

OWNERSHIP CONSIDERATIONS

As previously mentioned, all of the ownership structures listed in this report are legally viable options for open space ownership. The decision regarding which ownership structure to employ for different types and scales of open space must ultimately be guided by broader policy and planning. To support DFC as it advocates for the planning and implementation of open space, this report offers initial guidance on ownership considerations for the long and near term in the section below, which can serve as a starting point for future open space planning, conversations, and advocacy.

As Detroit leaders consider various ownership models for large quantities of land there are two important factors that should inform their overall approach to examining ownership structures. First, no particular legal structure for holding and maintaining a large inventory of land will obviate the need for funding to acquire and maintain that inventory. Consolidating ownership

and maintenance of large inventories of land can prove financially efficient to the extent one or more owners can take advantage of economies of scale. Locating ownership of a large land inventory in certain public entities or nonprofit corporations that hold land tax exempt can eliminate some tax liability for the holding entity. Ensuring that large quantities of land for public use are held by a responsible, high-capacity, publicly accountable entity with a track record of success may minimize risk and inspire private or public financial support. But no particular ownership structure will itself generate funding—funding for acquisition and maintenance must come from public or private entities, or must be generated by the use or taxation of the land itself.

Second, and perhaps most important, **the particular legal structure of ownership and holding of currently vacant land in Detroit must flow from the planned use for that land—not the other way around**. Put differently, the legal structure for land holding and maintenance can be designed in response to goals for the land itself. For example, if a given set of vacant parcels are contiguous, currently held by the Detroit Land Bank or another public entity, and best used for a permanent forest, it may make sense to transfer those parcels into a legal entity designed to hold land tax exempt for perpetual use as open space. Conversely, if a given set of scattered vacant parcels are currently held by the Detroit Land Bank or another public entity, and those parcels are individually located next to privately held revenue-generating parcels, then a focus on side-lot transfers of those parcels to private land holders may be wise.

GENERAL CONSIDERATIONS

Of the entities and tools examined in this report, there is no single ownership structure that is inherently most suitable for every one of the potential uses in open space areas. DFC and other open space implementers should consider a range of ownership structures. As it works to develop a framework for long-term ownership and management, DFC could consider the following general guidance to maximize the potential for successful implementation of DFC's open space vision:

- **Limit open space ownership fragmentation, as much as possible**. In order to implement many of the large-scale open space uses envisioned by DFC, small, individual parcels must be aggregated into larger, contiguous spaces. In order to do that, generally speaking, a single owner must acquire the land. Further, as the specific type of open space use changes, the scale requirements will also likely change. To the extent there are fewer owners, the process of aggregation and disposition will be less cumbersome since fewer individual transactions will need to occur. For example, if a party was interested in developing a larger solar facility on 100 acres of vacant land that was comprised of smaller, individual lots owned by 200 different owners, the cost and time needed to simply gain access to that land may be enough to dissuade that party from implementing the solar project. Many of the potential open space uses already face a number of hurdles in order to make implementation and management successful, requiring implementers to navigate a complex

array of owners in order to assemble the needed land does not need to be one of those hurdles. Around 40% of the open space area is already owned by a public entity, the majority by the DLBA. DLBA could continue to acquire land, as discussed in the short-term considerations below, and make intentional decisions to transition ownership of larger aggregations of land in order to minimize fragmentation.

Limiting the number of individual owning entities does not mean that the number of implementers and managers needs to be limited. Long-term leases can be used to enable a wide variety of stakeholders to implement and manage open space uses. Many of the specific open space use types examined in this report could be successful with a lease agreement as long as the lease term accommodated the investment period for the use.

- **Single parcel or small-scale disposition should be avoided in open space areas**. Related to the consideration above, since many of the long-term open space use types require a minimum number of acres in order to be financially viable, even if the number of owners is limited, the scale of disposition should also be taken into consideration. Disposing of individual parcels or very small-scale aggregations of land in these areas, could impede implementation of larger-scale open space uses in the future. For this reason, disposing of small-scale parcels, particularly when they are located in an otherwise contiguous open space area should be avoided. Certainly disposition of individual and small-scale aggregations of land could be considered outside of these open space areas, such as in traditional residential areas, which are not discussed in the scope of this report.
- **As disposition or leasing occurs, ensure use consistency with DFC's vision**. When disposition or leasing does occur, the specific use should be taken into consideration to ensure it is consistent with DFC's vision. There are a number of ways use consistency can be ensured when transfer of ownership or management of a parcel occurs. Lease agreements can be structured to ensure the use of the parcel by an entity is restricted to open space uses consistent with DFC's vision. Conservation easements, deed restrictions, and development rights agreements can also be used, as described previously in this section, to limit the type of use on a property. Ultimately the local regulatory framework, including the Master Plan of Policies and Zoning Ordinance, should work to ensure consistent and appropriate use, however other legal tools can be employed to ensure long-term consistency with DFCs vision.
- **Enable some flexibility in ownership and disposition**. Many of the considerations above are focused on ways ownership decisions can increase certainty and ensure implementation of DFC's open space vision, however these considerations also need to be balanced with an understanding that local demands and markets will change. To the extent DFC seeks to realize a multifaceted system of open space, embedding inexorable rigidity in a specific use or ownership structure, say through very specific deed restrictions or by transferring the majority of the land to an entity that has significant restrictions on use and disposition, will likely jeopardize that goal. While there needs to be consistency and certainty about open space use, decisions about ownership should support some degree of flexibility in the

specific type of open space use or owner to accommodate shifts in local demands and the market. For example, current state and local policies and priorities impede the ability to make widespread solar generation on vacant lots a possibility, however, if those policies and properties change, solar generation could be a preferred use. If an ownership structure for open space had been established that limited or restricted solar generation based on current market dynamics, the city could not capitalize on that new demand. There must be a degree of flexibility built into the framework for open space ownership to ensure open space uses can be responsive to market and local demand shifts over time.

- **Consider property tax implications when transferring ownership of open space**. Given the large scale of land envisioned for long-term open space and the City's financial difficulties, from a revenue generation standpoint, it is unlikely that the City would support the implementation of an open space plan that would take a substantial portion of the city's land off the property tax rolls for decades. Some open space uses will likely not be able to financially support the payment of property taxes depending on their level of funding and potential for revenue generation. Other open space uses, particularly some productive uses, can generate enough revenue to financially support the payment of property taxes, though the payment may need to be structured in a way that is flexible and ensures compatibility with the use's return period. Assuming that property tax generation will be an important consideration for the local government, as disposition occurs, attention should be paid to the balance of properties shifted to an entity that holds property tax exempt. Alternatively, the City could explore ways entities that hold property tax exempt could support the City of Detroit through a payment in lieu of taxes or another special financial contribution to ensure a portion of open space uses continue to directly support the underlying property tax base for the City.

USE CONSIDERATIONS

There is not an open space use type examined in this report that necessitates a singular ownership entity or tool. The implementation and management of the open space uses explored here can function well under a variety of ownership structures based on how those structures are designed. There may be some ownership types that align more naturally with some of the needs or goals of specific open space use. DFC could consider the following general guidance as it seeks to develop a framework for the ownership and management of open space uses:

- **Natural areas and parks and recreation**. For open space that will be more passive in nature or publicly used and unlikely to have use changes (e.g. natural areas or parks and recreation uses such as forests or greenways), consider shifting ownership to a public entity that holds land long term, specifically the DNR or a Metropolitan Authority. These uses are generally consistent with the goals and capacities of these two entities and both have dedicated sources of funding to assist with acquisition, installation and/or maintenance costs. Land that is shifted into these entities will generally be more challenging to dispose of, so these entities may be a better fit when the public or natural use of the land is not desired to

change in the longer term. Management of this land could be led by a local nonprofit land trust or conservancy.

- **Productive landscapes**. For land that will be more actively used or privatively used (e.g. productive landscapes like urban farming, solar fields, biofuel production, or tree farms), consider offering longer-term leases from the DLBA or a land trust or conservancy. DLBA could also consider forming a nonprofit land trust or conservancy arm that would be charged with creating and managing the leases and activities in open space areas for their inventory. While DLBA can accomplish all of these activities without a separate arm, given the myriad of revitalization activities DLBA is currently or could be managing, having that degree of delineation and specificity of mission in a nonprofit arm whose sole focus is implementing open space may be helpful for funding and talent attraction and from a management standpoint.

  DLBA could also consider transferring its open space land inventory to a completely separate nonprofit land trust or conservancy that would create and manage leasing of this land. Given the large scale of current public ownership, this may not be preferable if there is a desire to retain some degree of public oversight over the land.

  In some instances, disposition to a private nonprofit or for-profit entity for a productive landscape project may be preferred. If there is a desire to ensure that the land remains as an open space use, regardless of future ownership changes, DLBA, or other owning entity, could consider transferring a conservation easement to a nonprofit land trust or conservancy when it transfers the title to the land to the private entity. In doing so, the DLBA generally ensures that the terms of the conservation easement will be upheld so long as the entity with the conservation easement monitors the activity on the site and does not sell the easement to the private entity that holds the title.

  Productive uses may offer the most opportunity to explore the applicability of land cooperatives for long-term open space. Given the collective nature of land cooperatives, productive landscapes that can be managed or benefit a broader range of stakeholders directly, such as urban farming or solar generation, may be a better fit for a cooperative model.

- **Green stormwater infrastructure.** Green stormwater infrastructure techniques could be employed on a variety of open space types, but for those uses that are exclusively green stormwater infrastructure, consider retaining ownership of the land in a public entity, such as the City of Detroit, particularly if the land is a dedicated part of the combined sewer overflow control infrastructure. Management of the green stormwater infrastructure could be leased out to another entity on a longer term basis.

SHORT-TERM CONSIDERATIONS

Though the implementation of DFC's open space vision will take decades, decisions made in the near term are critical as they can result in an ownership structure that may help or impede

the realization of that vision. DFC, as well as other open space implementers, specifically the DLBA, may also consider the following guidance as they make short-term decisions on ownership in open space areas. Specifically:

- **Proactively and aggressively assemble and hold land in open space areas using Detroit Land Bank Authority.** The DLBA is already functioning as a "first-responder" of sorts in the face of large inventories of vacant, abandoned, tax foreclosed and sub-standard parcels in the city. The DLBA currently holds well over 80,000 parcels and given the DLBA's title-clearing abilities, ability to connect to the property tax foreclosure pipeline, and relatively flexible powers to acquire, maintain and dispose of property, the DLBA can serve as a powerful platform for the aggregation of open space land.

  As the Funding Section of this report describes, one of the biggest barriers and costs to open space implementers is acquisition and assemblage of land. The DLBA is poised to help reduce, if not eliminate that barrier. As is shown in Figure 4, nearly two square miles of structure-free open space land is in the tax foreclosure process. Working with the Wayne County Treasurer, the DLBA could advocate for that land to be bundled at the tax auction to ensure that individual vacant lots are not purchased by speculators. After the tax auction, working with the City of Detroit, that land can be transferred to the DLBA where it can be assembled with the other vacant lots in the open space areas.

  Beyond the tax auction, DLBA can also work to proactively acquire other privately held lots in these areas through donation, purchase or land swap. DLBA's primary goal in the short term could be to aggregate as much land as possible in open space areas in order to create contiguous parcels for future open space use. Given DLBA's existing inventory and relatively broad acquisition and disposition authority, in many respects, it is the most influential open space implementer in the city. Its decisions to acquire, hold, and dispose of property can significantly help or impede the long-term goal of open space development and preservation.

- **Engage in shorter term leases for land uses in open space areas that are consistent with DFC's vision.** It's critically important that management and use of open space be supported in the short term, even as broader land assembly is happening. As is discussed in the Funding Section, in the near term a variety of diverse open space use type pilots should be implemented in open space areas to test out and refine the business models for many of these uses. Beyond the benefit of pilot projects, DLBA will likely want to shift as much short-term maintenance as possible to other parties to reduce their holding costs. Leases offer an opportunity to accomplish that goal and potentially bring in some revenue depending on the use type. DLBA could consider 2 to 5 year leases as a short-term opportunity for a variety of uses. This leasing process should be as flexible, accessible, and streamlined as possible to enable the broadest range of stakeholders to use this land in the short term.

- **Beyond limited side lot transfers, DLBA should not sell any land in open space areas until the Master Plan, Zoning Ordinance, and Open Space Plan are officially adopted.** While DFC's Framework identifies areas for long-term open space, it does not specify what open space use types should be located where in that area nor at what scale. That degree of specificity is appropriate for a Master Plan and comprehensive open space planning process that engages a variety of local stakeholders. Absent that level of engagement and planning, decision makers and implementers will be making long-term decisions about open space use and ownership in a vacuum. Further, many of the open space uses discussed in this report likely do not conform to local Zoning Ordinance regulations given that much of this land was originally zoned for residential use. In order to make strategic long-term ownership decisions in a manner that is consistent with local priorities and policies, DLBA should not sell any land in open space areas until the Master Plan and Open Space planning processes are completed and the Zoning Ordinance has been updated accordingly.

FUNDING

Given Detroit's fiscal constraints, realizing Detroit Future City's vision of large-scale, long-term open space development, maintenance, and preservation is a significant challenge. In the face of this challenge, the opportunity to create a valuable asset in the form of a multifaceted open space system should not be diminished. This report provides high-level guidance on the key factors related to funding that should be considered by a range of decisions-makers as they embark on an open space planning and implementation process. It serves as a starting point for future planning, conversations, and actions to address the open space funding challenge.

This section examines long-term open space specifically through a funding and financial feasibility lens. It is divided in two main parts. The first part of the Funding Section provides an overview of potential funding needs and funding sources as well as considerations to improve the financial feasibility of long-term open space broadly. The second part of the Funding Section provides a financial and funding overview for each of the major open space use categories highlighted by the Detroit Future City Strategic Framework and spotlights a number of open space types the DFC Implementation Office identified, which appear to bear particular promise or currently garner high levels of interest from Detroit stakeholders. These open space use categories and types are listed below in Figure 5. By no means does this list encompass the

Figure 5: Open Space Categories and Spotlighted Open Space Use Types

DFC OPEN SPACE CATEGORIES			
Productive Landscape	**Green Stormwater Infrastructure**	**Natural Area**	**Parks and Recreation**
Landscapes that are intentionally cultivated to produce food, energy, and other harvestable products	Use of land in a manner that promotes the natural storage and infiltration of stormwater into the ground	Landscapes that provide important ecological functions such as providing habitat for plants and animals and cleaning the air, water, and soil	Open space that is publicly used for recreation activities such as biking, walking, and playing sports
Spotlight Use Type		Spotlight Use Type	Spotlight Use Type
Urban Farm Solar Biofuel Tree Farm		Meadow Forest	Greenway

myriad of open space types that hold potential for Detroit's land, but rather it is intended to uplift a sample of potential use types.

In the second section, for each open space category and use type, the report breaks down the following:

- **Financial Summary**: Providing an outline of the implementation and maintenance costs as well as revenue potential and other financially related benefits
- **Potential Funding Tools:** Offering an overview of the potential applicability of a variety of funding tools
- **Actions to increase financial feasibility**: Providing an overview of ways DFC and other implementers can increase the financial feasibility or reduce the financial risk of long-term open space.

SUMMARY

The DFC Strategic Framework calls for 20 square miles of land in Detroit to be transitioned to intentional, long-term open space where traditional development would not occur.[94] That scale of open space is large, ambitious, and completely essential to realize a vision for Detroit that includes vibrant employment districts, diverse neighborhood types, sustainable City infrastructure, and improved ecology.

The cost of unintentional open space to the City – the do-nothing scenario

The conversion of this land from residential, commercial, and industrial buildings to an undeveloped state has been occurring in Detroit for decades, albeit in an unintentional, unplanned fashion, as a result of the erosion of the economic and population base of the city. Buildings have been demolished and land ownership has been reverting to the local government for decades. The reversion of ownership results both in a loss of revenue from property tax and an increased cost to the City from ongoing physical maintenance. The City's revenue loss is further compounded by the fact that this surplus of fallow land depresses property values throughout the city, resulting in a significant loss of total property tax revenue. In this respect, the City does not have a choice between incurring a cost to support open space, or not.

As shown in Figure 6, currently, the City (including the DLBA)[95] owns around 35%, or seven square miles, of the land within the long-term open space area. This land generates no property tax revenue and costs the City yearly maintenance costs, at the very least in the form of mowing and illegal dumping clean-up. Looking at mowing costs alone, and using a general estimate of $250/acre, it would cost the city around $1.2 million each year to mow its current land, in the open space areas alone.[96] There are around 4,000 acres that are in private ownership but in a stage of Michigan's three-year tax foreclosure process. If these properties all revert to City ownership, then the City's total yearly mowing costs, in open space areas alone, could jump to over $2 million per year in the next few years. Spread across DFC's 50-year time horizon, that

amounts to over $100 million simply in mowing costs, which doesn't account for the millions of dollars in demolition costs and illegal dumping clean-up costs. Meanwhile, this land will bring in no revenue for the City and will drag down the value and potential property tax revenue for privately held properties throughout the city, year after year.

Beyond the individual parcel costs, there are also system-level costs the City incurs as a result of this fallow land, including the cost of maintaining the spectrum of City services and infrastructure. As shown in other studies, these costs also extend past City-owned vacancy. For example, a study in Philadelphia showed that the 40,000 vacant parcels in the city led to over $20 million in direct costs to the City annually.[97] These parcel- and system-level costs will continue to accrue and grow exponentially, further impeding Detroit's economic stabilization and growth if the City chooses to not take action to support an intentional reuse of this land.

Figure 6: Open Space Parcel Detail, Occupancy and Ownership

	# parcels	Acres	Sq mi	Acre Pct	Pct Description
Total[1]					
In open space areas[2]	114,975	13,046	20	100%	Pct of total open space
Vacant lot	56,833	5,780	9	44%	Pct of total open space
Lot with structure	55,850	6,960	11	53%	Pct of total open space
Structure has vacancy indicator[3]	20,175	2,259	4	32%	Pct of total structures
Current Ownership - Public					
In open space areas	45,356	4,544	7	35%	Pct of total open space
Vacant lot	32,628	3,162	5	70%	Pct of total publically owned
Lot with structure	11,809	1,285	2	28%	Pct of total publically owned
Structure has vacancy indicator	9,633	943	1	73%	Pct of total publically owned structures
Current Ownership - Private					
In open space areas	69,619	8,503	13	65%	Pct of total open space
Vacant lot	24,205	2,617	4	31%	Pct of total privately owned
Lot with structure	44,041	5,675	9	67%	Pct of total privately owned
Structure has vacancy indicator	10,542	1,316	2	23%	Pct of total privately owned structures
Current Ownership – Private and in a stage of tax foreclosure					
In open space areas	35,096	3,997	6	31%	Pct of total open space
Vacant lot	9,784	1,058	2	12%	Pct of total privately owned
Lot with structure	24,678	2,838	4	33%	Pct of total privately owned
Structure has vacancy indicator	6,965	775	1	14%	Pct of total privately owned structures

Source: DFC, Motor City Mapping

[1] The counts in this table will not add up consistently because of incomplete data. Motor City Mapping is generally a very high quality data set, however there are some parcels that have no data or incomplete data (e.g. a parcel that is flagged as having a structure but does not have data on the condition or occupancy of that structure), and this results in some minor aggregation inconsistencies.

[2] Open space areas are inclusive of the Innovation Productive and Innovation Ecological DFC land uses

[3] Structure indicated as either "vacant" or "maybe vacant"

Note: This table is the same as the one included in Figure 4. The table was replicated for ease of the reader.

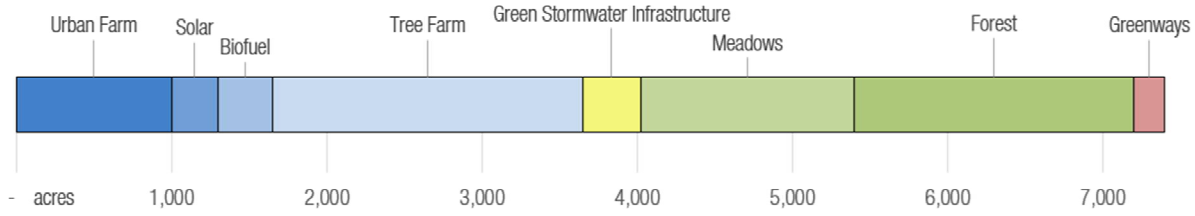
Cost to implement open space

Absent a clear plan, informed by a diverse range of stakeholders, that outlines the specific types and amounts of open space envisioned for Detroit, it is impossible to accurately calculate the cost of implementing and maintaining open space in the city and relatedly the cost savings and revenue generation from those open space uses. In the specific open space category and type sections below, this report provides general estimates for those potential costs and levels of revenue to assist DFC and other open space planners calculate the potential impact of open space as the comprehensive open space plan is developed.

For illustrative purposes, we looked at the potential costs to install the open space types explored in this report on the parcels in open space areas that either are currently vacant lots or likely to become vacant lots in the near term,[98] totaling around 7,400 acres. Looking at the potential demand for these use types and prioritizing productive landscapes due to their potential for revenue generation, we projected a mix of uses as illustrated in Figure 7. Using a rough back-of-the-envelope calculation, we projected the installation costs for these uses to be around $309 million with potential gross revenue for the productive landscapes over a 20-year period being around $348 million. If the lowest-cost open space type examined in this report, a meadow, was installed on all of the 7,400 acres, it would cost around $22 million to install. If the area was not converted to intentional open space and continued as a City-owned, grassy lot, mowing costs over the 20 year period would cost the City $37 million. Converting the land to intentional open space, while costly, offers the City an opportunity to transform the land into an asset that reduces City-incurred costs, generates economic value and property tax revenue, and improves quality of life by providing a productive amenity for City businesses and residents. The level of implementation and maintenance costs, revenue generation, and potential reduced costs to City maintenance or infrastructure will shift based on the allocation of use types and market dynamics. As open space planning efforts begin, stakeholders should be mindful of these factors when planning the scale of land designated for particular open space types.[99]

Looking from a purely financial lens, in order to maximize the potential benefit of open space for the City, DFC could consider prioritizing open space uses that have the greatest opportunity to attract private financing, minimize the level of governmental responsibility, generate property tax revenue, or minimize governmental maintenance. However there are a variety of other non-

Figure 7: Open Space Use Illustration



financial priorities that need to be balanced with financial considerations. That balancing needs to occur with widespread stakeholder engagement through an open space planning process. The cost of implementing open space does not need to be borne by the City alone. There are a variety of new funding sources, financing tools, and strategies emerging that will help to address these funding challenges, ranging from new forms of public-private partnerships to the development of a market for green bonds, all of which can attract a new range of actors that are particularly interested in supporting projects that help satisfy clean energy, sustainability, and other open space objectives.

There are a variety of funding tools that could be employed to fund or finance the installation and maintenance of open space throughout the city. Municipal general fund revenue, general obligation bonds, and special levies are common funding tools used by cities to support open space. While these tools are options Detroit should consider, they will not likely offer enough funding to fully support open space for two reasons:

1) **Financial health**. The City's financial health, while on a path of recovery, is still very weak. The City's revenue collection through property tax is quite low, despite having one of the highest property tax rates in the nation, largely as a result of weak property values and high nonpayment. Additionally, due to a lower municipal credit rating, borrowing will be quite costly in many instances, though Detroit's credit ratings have recently improved, which bodes well for long-term opportunities. Despite this improvement, in the near term, Detroit will likely need to continue to be more selective than most cities in deploying traditional municipal borrowing and taxing powers.
2) **Scale**. Detroit is a geographically large city and, accordingly, the scale of open space envisioned is also large. The total amount of funding needed to repurpose vacant land in open space areas, even for lower cost or revenue-generating uses, will likely be too high for conventional funding mechanisms in Detroit's market to generate adequate funding.

Further, while State and Federal funding and financing opportunities exist to support a variety of open space uses, these opportunities are also insufficient to fully fund the open space vision in Detroit. There is not one single funding source nor funding tool that can fully address the funding needs for open space in the city. For these reasons, **Detroit must aggressively and creatively explore and employ a range of open space funding tools that will engage the public, private, and philanthropic sectors.**

Appendix 6 offers a list of potential funding sources that should be considered to fund open space. The funding matrix in Appendix 6 provides summary detail on each tool, along with some additional funding tools that could be examined but may be less applicable. The matrix also identifies key characteristics of the funding mechanisms and includes commentary on potential open space applicability and how applicability may shift based on the use in the context of a Detroit application. For example, some options, such as green stormwater infrastructure, have readily identifiable repayment sources through user fee or tax programs

already in place, making them more likely candidates for public funding options, such as municipal bonding and public-private partnerships that include finance. Other options, such as greenways, do not necessarily have a current or likely future revenue source and, therefore, are most likely candidates for funding through general fund City revenues, foundation grants, or other outside funding sources. This report provides greater detail on the more promising tools for each open space use category in the sections below.

Achieving DFC's long-term open space vision will take decades. The financial approach for realizing this open space vision should consider near-term goals, as well as recognize that the financial conditions in Detroit will improve over time. Consequently, more financial tools available for public entities should become applicable over time as Detroit's finances improve. However, for the near term, the financial strategy will need to focus on financing that leverages the available public funding with private and foundation investments. Encouraging private investment, especially where value can be created by putting the land back into productive use, will help to stretch scarce public dollars.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While there is promising entrepreneurial and philanthropic interest in implementing open space uses locally in Detroit, along with burgeoning creativity in open space funding in a variety of cities across the nation, there are still a number of significant financial risks associated with the implementation and long-term maintenance of open space. DFC can work to make its vision of open space more financially feasible, generally speaking, by considering the guidance detailed below.

Investors – in the broadest sense, from the individual urban farmer to the large financial institution providing a long-term loan – will not invest their resources, whether time and/or capital, in a longer-term, larger-scale endeavor without the certainty and security provided by a clear and affirmative local planning and regulatory framework. Investors must have direction and clarity about the type of uses that will be supported by the City, at what scale, and in what areas along with a strong degree of certainty that those guidelines will be upheld in the future. Absent the supportive local planning and regulatory framework for open space, securing the level and type of investment needed to fund open space will be impossible. **The single most critical action Detroit can take to increase the financial feasibility of long-term open space is to craft and adopt a comprehensive Open Space Plan, Master Plan of Policies, and Zoning Ordinance that detail and codify permanently designated open space areas.**

Specific Planning Considerations

As DFC works to support the creation and adoption of a comprehensive Open Space Plan, Master Plan of Policies, and Zoning Ordinance, it should consider ways that the planned type, scale, and location of open space uses could help to increase the financial feasibility or reduce the financial risk of implementing long-term open space uses. Specific planning considerations

are provided in the sections below looking at open space use categories and types. However, there are broad ranging considerations that apply to multiple open space categories. Specifically:

- **Encourage and allow for multi-functional open space.** There are a variety of open space categories and uses that could improve their revenue-generating potential and/or their funding potential by integrating multiple uses on open space sites. For example, park and recreation uses could also serve as vital green stormwater infrastructure projects, enabling the multi-use open space to seek funding both from green stormwater infrastructure and traditional parks funding sources. Within open space categories there are also a number of opportunities to combine use types. For example, in order to produce revenue streams in the near-term, tree farms can grow short-term harvestable crops, like lavender, in between planting rows. In order to enable the greatest degree of funding applicability and revenue potential, the local planning and regulatory framework should not take a siloed approach to designating open space uses; rather, it should allow for multi-functional open space uses.
- **Consider supportive uses when determining location for open space uses.** Most open space uses have a great degree of flexibility with respect to location given the generally homogenous landscape characteristics across Detroit's open space areas, e.g. there are not large swings in topography across the city. That being said, Detroit should consider locating particular open space uses next to other uses that could support the open space by reducing upfront costs or improving the likelihood of funding or revenue generation. For example, large-scale urban farming initiatives will need storage facilities that could be provided by existing light industrial or commercial buildings. If the urban farm is located next to those facilities, it will cut down on the upfront capital and transportation costs for the farm.[100] Solar generation is another example of an open space use that could benefit from commercial and industrial adjacency since it could provide energy generation for those uses, thereby increasing the potential for private investment.
- **Consider the need for scaled contiguity when determining location for open space uses.** While the DFC Strategic Framework calls for long-term open space to be focused in a few geographies of the city, as Detroit considers how to further delineate which types of open space uses will land in which specific geographies, it should factor in the minimum acreage needed by many open space uses to be financially viable, particularly for productive uses. For example, around 100 acres of land is needed to support utility-scale solar energy generation, otherwise the scale of installation is too small and will likely not bring in enough revenue to support the use. While there is some flexibility in how that is platted, that area should be generally contiguous to support the infrastructure needed for solar installation. Detroit needs to ensure that as it designates areas for specific uses, enough contiguous space is reserved to support the scale needed to make the open space use's business model viable.
- **Allow for open space use flexibility.** While the local planning and regulatory framework should provide reasonable guidance and certainty to entities looking to develop open space,

it should allow for some flexibility in specific use designation so the open space uses can shift with market conditions. This report provides guidance on the potential scale of particularly open space uses, based on current information and assumptions of market demand and funding. However, those assumptions will change based on a variety of broader market forces and regulations. For example, low fossil fuel prices suppress the need for larger-scale biofuel production in open space areas; however, those prices may change in the next decade, increasing the demand for biofuel in open space areas. If that occurs, some meadows could be converted to implement biofuel production. As market dynamics shift, the local planning and regulatory framework should be flexible enough such that the specific type of open space use can shift, within reasonable bounds, without having to frequently change the foundational plans and regulations.

General Guidance

Beyond the specific land use planning considerations detailed above, the following guidance could be considered to improve the financial feasibility of long-term open space. Specifically:

- **Support the implementation of a diverse range of pilot projects in the short term**. Many of the open space uses being considered have not been implemented at scale in urban contexts, or in markets similar to Detroit's. While this report provides some points of reference related to the cost and revenue of potential open space land uses, the uses need to be tested out to refine those assumptions. Public and private sectors in Detroit should work to install a full range of diverse open space uses in the immediate term to test the financial viability of scaled, long-term uses and to support future funding appeals. This work could be spurred by DFC and DLBA and perhaps supported by a pooled philanthropic fund.
- **Invest public resources in the clearance and physical site preparation of open space uses**. One of the largest variable costs for the installation of open space uses was the cost for site preparation and clearance. Many of the parcels in the open space areas have structures that need to be demolished, basements or other concrete surfaces that need to be removed, illegal dumping that needs to be cleaned up, and brush and other overgrowth that needs to be cut down prior to the installation of the open space use. These costs can be significant when looking at larger spaces and can make the installation of the open space too costly to be financially viable. Detroit can improve the financial viability of many of the uses, incentivize open space development, and catalyze increased private investment if it works to clean and prepare the sites for open space use. While this activity will result in higher upfront costs for the City or DLBA, it will likely lead to greater cost savings for those entities since they will be able to more rapidly pass maintenance responsibilities and costs onto another party.
- **Invest public resources to assemble and clear title to parcels in long-term open space areas**. As was previously mentioned, the cost of increased upfront capital costs for site preparation can be high enough to make open space uses with tight financial margins infeasible. Leveraging the DLBA's unique authorities, the costs an open space developer

would incur to assemble and clear title to parcels can be significantly reduced, thereby making an open space development more financially feasible. As mentioned in the Ownership Section, the DLBA should proactively and aggressively assemble land in the long-term open space areas to prepare it for open space development.

- **Offer flexible lease and disposition terms**. Disposition and lease terms on land in open space areas should be structured in a way that is flexible and can accommodate the business model of each use. Due to the different investment periods with each use, a stringent construct of lease terms, regardless of the type of use (e.g. if DLBA made all open space use leases 5 years), would make some uses less financially viable since some uses will take years to develop a return and others may never develop a monetary return. Relatedly, the sale price of land that is disposed for open space use should be flexible and take into account the planned use of that property. Allowing for this degree of flexibility will enable more open space uses developments to get off the ground and more rapidly shift the cost of long-term maintenance away from the DLBA or City.
- **Explore ways to provide flexibility in the payment of property taxes**. As additional open space business models are refined and the implementation of open space uses is scaled up, the City and DLBA should explore ways to provide flexibility in the payment of property taxes. Depending on the way that property values are assessed for improvements on particular open space uses and the use's return period, property taxes may be a financial barrier that prevents open space development. In these instances, the City could explore a special tax assessment or abatement mechanism. On the other hand, depending on the owner and use of the land, property taxes may not be levied despite that use's ability to financially support some form of property tax payment in exchange for using public infrastructure. In those instances, some form of payment in lieu of taxes or similar mechanism could be explored.
- **Encourage the creation and designation of a lead entity or position to attract or craft new, larger-scale funding opportunities.** Many of the funding sources described in this report could fund multiple open space uses types, particularly when there are multi-functional open space uses. Further, in order to draw the amount of funding needed to support open space in Detroit, there must be an intentional effort to pool multiple funding sources together and to seek large sources of funding. Much of the funding solicitation for open space development in Detroit has been led by single projects or has been siloed based on use type. In order to leverage the amount of funding needed to support open space in Detroit, there needs to be a collaborative, multifaceted, scaled effort to seek or craft new funding opportunities from all sectors – private, public, and philanthropic. While there are a number of local stakeholders individually seeking funding for specific uses or smaller-scale projects, there does not appear to be a clearly designated lead entity or position whose primary responsibility it is to ensure Detroit is aggressively seeking open space funding. This position could help to increase the level of funding and incentivize additional open space development.

CATEGORY: PRODUCTIVE LANDSCAPES

Productive landscapes are landscapes that are intentionally cultivated to produce food, energy, and other harvestable products. With the scale of vacant land that exists in Detroit, there are an abundance of productive landscape use options for open space. Some of these uses are urban agriculture, aquaponics, aquaculture, hydroponics, agroforestry, composting, solar energy production, biomass production, biofuel production, tree farms, tree nurseries (e.g. landscape, fruit, Christmas, ornamental), and plant nurseries.

This section provides a financial overview and guidance for productive landscapes, generally, then more specifically for a number of spotlighted uses, including:

- Urban farming
- Solar energy production
- Biofuel production
- Tree farms

SUMMARY

Implementation costs: **Variable**. Implementation costs for productive landscapes vary widely based on the specific use, more so than for any other type of open space use. Of the spotlight uses examined in this report, implementation costs run as low as $4,000/acre for a tree farm, to as high as $600,000/acre for solar energy production.

Maintenance costs: **Variable, but generally low.** As with implementation costs, maintenance costs for productive landscapes vary based on the specific use, however, generally speaking, they are on the lower end for open space uses. Of the spotlight uses examined in this report, yearly maintenance costs run as low as $100/acre for biofuel, to as high as $1,000/acre for solar energy production.

Revenue potential: High. Productive landscapes offer the highest potential for revenue generation of all the open space uses. Revenue potential and the investment periods for productive landscapes vary based on use but can be as high as $24,000/acre/year for solar. In terms of the investment period, some productive landscapes can produce yearly returns, as with agriculture, and others may take 15 years to generate a return, as with some tree farms.

Implementer or owner: **More likely a nongovernmental entity.** Productive landscapes likely hold the most opportunity for private, for-profit entities to manage and develop open space. There is also a tremendous opportunity for private, nonprofit entities as well. While governmental and quasi-governmental entities can choose to play a significant role in the ownership of this land long-term, providing long-term leases to private entities, they can also explore a more engaged role in the cultivation of the land to satisfy their productive needs, as with energy or tree production.

Other financially related benefits: There are a number of other financially related benefits for productive landscapes that may have broader implications beyond the individual implementation site. Specifically:

- **Job creation.** Of all the open space uses, productive landscapes likely hold the most opportunity for local employment and job creation through 1) the cultivation and maintenance of land and 2) the processing and distribution of products harvested on land. While the jobs per acre will be relatively low, as compared to a traditional employer, given the large amount of land used in production, the ability to generate opportunities for more Detroit-based industry through the productive reuse of land should certainly be capitalized on, particularly in the processing and distribution of goods.
- **Local wealth generation.** Given the opportunity for revenue generation through the use of land by non-governmental entities, productive landscapes offer a number of ways for local entrepreneurs, investors, firms, and individuals to generate wealth through the reuse of Detroit's land. The level of wealth generation may be relatively limited, as compared to other more traditional investments, given the level of upfront investment required for many productive landscapes, however, this is certainly an opportunity that should be leveraged.
- **Property tax generation.** Of all the open space uses, productive landscapes hold the most opportunity to support the local government through property tax payments. While the total revenue for the City would still be limited given the lack of assessed improvements on the land, there are still opportunities for the City to collect property tax or a payment in lieu of taxes (PILOT) on these parcels given their ability to generate some revenue and likelihood of being held by a non-governmental entity.

POTENTIAL FUNDING TOOLS

The potential funding sources for productive landscapes vary widely and more so than for other open space uses. Given the revenue potential of these uses, there are more opportunities to leverage private sources of financing. Ideally, each use would pay for itself via sales of generated resources. In practice, however, initial capital costs may pose a challenge, particularly for entrepreneurial ventures. Financing tools that reduce upfront land acquisition costs can attract additional capital to support fledgling entities and provide maintenance funding. Below are some observations about the potential applicability of funding source types for large-scale productive uses, generally, with a few spotlighted funding tools providing additional detail, including:

- Program-related investment loan fund
- Land bank ground lease financing
- New Market Tax Credits
- Private Activity Bonds

Appendix 6 provides additional specificity on funding applicability by use type.

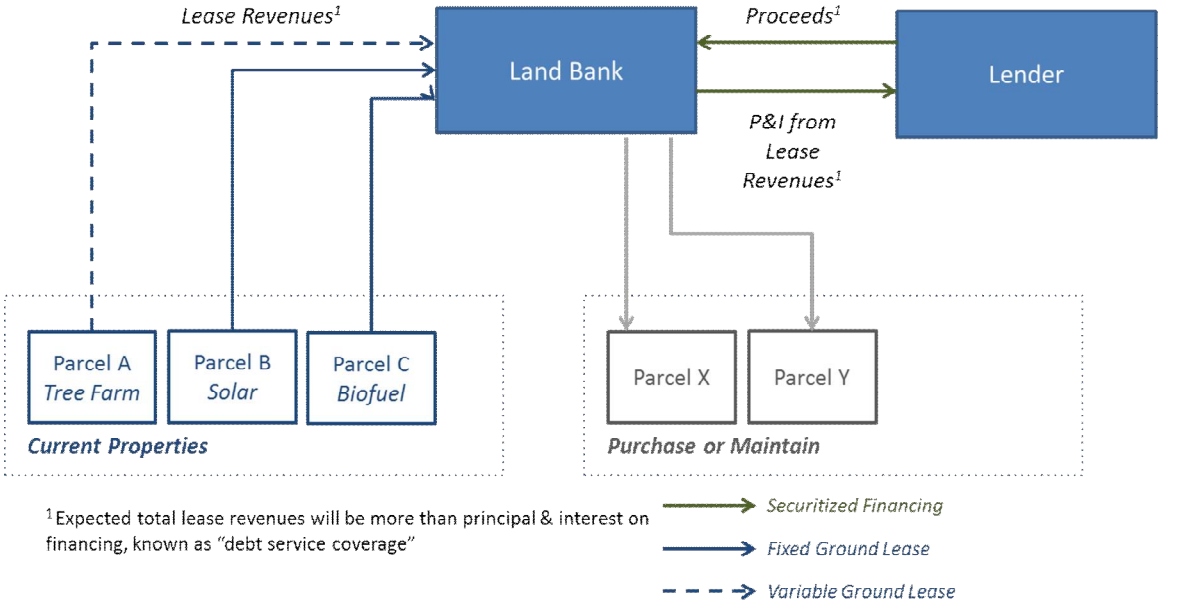
Direct Fees: **Medium applicability**. There are some opportunities to use types of direct fees to fund productive landscapes. Specifically:

- **User Fees**. Funding a portion of productive landscapes through user fees that are assessed for the use of the good or service generated on the land may hold the best opportunity for direct funding generation.

Debt Tools: **High applicability.** Given the revenue generation potential of productive landscapes, bonds and other debt tools are particularly applicable, however, since the financial margins for many of these uses are so narrow, more innovative or creative debt tools should be explored. Specifically:

- **Green Bonds**. Green Bonds may be particularly applicable if the productive uses are able to appeal to some of the "green" objectives of particular investors, e.g. generation of renewable energy.
- **Social Impact Bonds**. While relatively new, and largely untested specifically for productive landscapes, SIBs could be explored if measurable social benefits could be tied to the development of particular productive uses.
- ***Funding Tool Spotlight*: Land Bank Ground Lease Financing***: Since the cost and burden of acquiring property is a challenge to attracting privately owned and managed productive use of open spaces, the DLBA could use its tools to acquire, hold, and lease land to a project developer thereby reducing the developer's upfront cost and, likely, debt since the financial burden of acquisition would be eliminated. As described here, leasing property to a project developer can be an attractive option for both the lessor and lessee. The lessor is

Figure 8: Ground Lease Financing



relieved of the burden of maintaining the land, and derives revenues (even if modest). Potentially, these lease revenues may be used to finance other land purchases.

Some productive landscapes, such as solar power generation, are relatively proven business models frequently secured by an offtake agreement or other secure revenue source. These projects could likely sustain a fixed ground lease subject to periodic lease adjustments based on land value. Others, such as urban agriculture and tree farms, are relatively less proven. For this type of use, the lease amount could be variable based on a percentage of gross revenues. In the near term, this would allow the projects to benefit from low land costs as they commence operations. In the long run, this structure allows the DLBA to share in the potential upside of productive enterprise on the land (or increasing land values for future reuse.)

While each project's ground lease is likely modest, and many will be of uncertain credit quality, collectively the leases would create a revenue stream for the DLBA. This revenue stream could be used to maintain remaining vacant land or, as shown in Figure 8, securitized and used to pay acquisition costs for additional land purchases.

- ***Funding Tool Spotlight*: Private Activity Bond.** A Private Activity Bond (PAB) is a bond issued by a municipality and used to finance work done by a private entity. Frequently, the issuer is just a conduit while the private entity is responsible for paying principal and interest on the bonds. Interest on qualified PABs, focused on open space use, is tax-exempt. Though, PABs will not benefit from tax exemption if proceeds are used to purchase or acquire land, but could but used as a complimentary financing source to undertake open space improvements once land has been acquired. From the perspective of the private entity, PABs are similar to corporate debt, but the borrower benefits from the lower cost of tax-exempt debt. PABs are applicable for any proven business model expected to seek debt financing—such as a solar or biofuel facility. PABs may also be used to finance redevelopment of blighted areas and to finance facilities owned and utilized by 501(c)(3) organizations.

Credit Assistance: High applicability. Due to the somewhat untested nature of many of the productive landscapes in an urban environment and the market vulnerabilities in Detroit, these investments will be likely viewed as higher risk. Credit assistance mechanisms should certainly be pursued to help alleviate some of the associated risk to free up additional lending. Specifically:

- **Loan guarantees.** Loan guarantees could be issued by state or federal agencies, particularly for those uses related to energy production where there is a reasonable expectation of a return but where the market is relatively untested.

Equity/Private Sources: High applicability. Of all the open space uses, productive landscapes may have the best opportunity to leverage private sources of funding. Specifically:

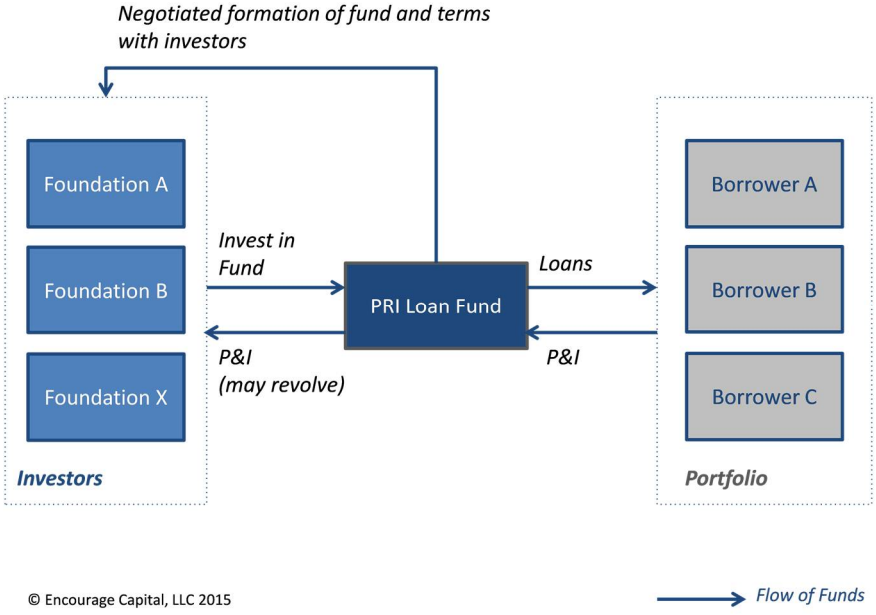
- *Funding Tool Spotlight:* **Program-Related Investment Loan Fund.** A program-related investment (PRI) loan fund could be formed and administered by the City, DLBA, DFC, or private for- or not-for-profit. The fund would pool low cost, revolving loans—most likely from foundations, but also potentially public grant funds—for the benefit of entrepreneurial ventures utilizing open space. The loans could be restricted to fund certain costs, such as job training, environmental protection, or neighborhood economic development, to align with the fund investors' objectives.

  A PRI loan fund has two key benefits over direct foundation PRIs: central administration and streamlined access to funding. The fund's administer would undertake the initial burden of fundraising and developing loan terms for the fund. This central administration allows for a portfolio approach, ideally increasing the fund's overall impact. Loan applicants benefit by seeking funding from one source, on consistent terms, rather than approaching multiple potential funding sources.

  A PRI loan fund could be organized into categories to support productive land uses, such as an urban agriculture fund or a fund for urban tree farms. This pool of low-cost loans could support pilot businesses with capital expenditures and other start-up costs, while creating some economies of scale in funding a broader range of smaller operations.

- *Funding Tool Spotlight*: **New Market Tax Credits**. The New Markets Tax Credit (NMTC) program was established to spur investment in low-income areas and has provided between $3.5 and 5 billion each year in funding.[101] It allows corporate or individual investors to receive a tax credit, totaling 39% of their initial investment over 7 years (5% for the first 3 years, 6% for the remaining 4 years), for investing in a Community Development Entity (CDE).[102]

Figure 9: PRI Loan Fund

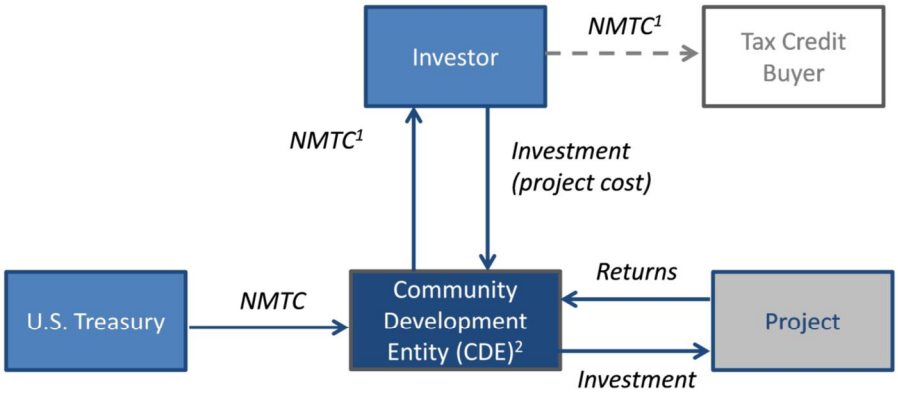


Using NMTCs to fund environmental projects is a proven concept, notably for biofuel and urban agriculture. Since NMTC projects must be in low-income communities, it should be an attractive mechanism for drawing additional public dollars to Detroit. NMTCs are notably flexible in what businesses can be funded, and could likely be used to partially finance energy production as well as urban agriculture and tree farm projects.

- **Public-private partnership (P3)**. P3s could be explored for those productive landscapes that would generate revenue and also provide a service for the public, particularly a use like solar energy generation.
- **Pay-for-performance**. As with P3s, a pay-for-performance agreement could have potential for those productive landscapes where there would be a public benefit.
- **Infrastructure investment funds.** Infrastructure investment funds could provide potential for those productive landscapes that have long-term income streams particularly related to utilities and energy.

Value Capture Mechanisms: **Lower applicability**. Looking at the potential open space uses, value capture mechanisms may be the least applicable for productive landscapes. While the productive use of land will increase the value of the particular piece of property, the potential value capture will likely be too limited to represent a significant source of funding given the general property market in Detroit. Relatedly, these uses are less likely to create a large value increase in surrounding property values, as compared to other open space uses. That being said, there will be some types of productive landscapes that may be more likely to increase surrounding property values. However, based on current market and property tax information,

Figure 10: New Market Tax Credits



[1]Investors may use NMTCs to offset own tax liability, or sell to another party
[2]CDEs can include institutions such as banks, 501c3s, state agencies, etc.

→ *Flow of Funds*

the potential value increase does not appear to be significant enough to fund the installation and maintenance of productive landscapes.

Grants: Medium applicability. Public and private grants certainly offer some funding opportunity for productive landscapes. However, given that many of these uses may be privately held and for-profit endeavors, there will likely be less applicability as compared to other open space uses that may be a better match for grants given their public or nonprofit nature. Further, while grant opportunities at the federal and state level should be explored, there are simply not enough government grant dollars to fully satisfy the large amount of funding needed.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While productive landscapes have the most financial opportunity of the open space classifications, there are still a number of financial risks associated with the implementation and long-term maintenance of these land uses. Open space supporters can work to make productive landscapes more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of open space uses could help to increase the financial feasibility or reduce the financial risk of productive landscapes. Specifically:

- **Maximize as much as possible the amount of open space planned for productive landscapes.** Given the limited funds available at the local and state level for the implementation and maintenance of open space, Detroit will need to fully leverage as much private investment in open space as possible. Productive uses offer the greatest opportunity to attract private funding and action and generate property tax revenue; for those reasons, from a planning standpoint, Detroit should consider preserving a significant share of the long-term open space for productive use.

  For the purposes of this report, we looked at a limited number of uses and, within known market realities, projected that potentially 40% of the long-term open space could be put toward productive uses. If capacity and demand for productive spaces grow, this number should be increased in order to leverage more private use of open space, given the minimal public resources available.

- **Concentrate locations of productive landscapes in areas with high parcel contiguousness.** In order for many of the productive landscapes to be financially successful in an urban environment, they need to be developed over large acreages. If there is not available land to meet those minimum thresholds, the yield of the land will not be great enough to pay off the cost of installation and/or maintenance. Further, many of the productive landscapes will require tools and machinery to cultivate the land and transport costs for that

equipment between productive landscape sites will need to be minimized in order to make many of the landscapes more financially viable.

- **Consider locating productive uses near related or supportive uses**. Many productive landscapes could utilize smaller-scale light industrial or commercial buildings for the storage and processing of goods as well as the storage of supplies and machinery; locating productive landscape areas adjacent to areas that are more industrial in nature should be considered. Further, while many productive uses may not be an ideal fit directly adjacent to a residential area, given noise and other concerns, there are some productive uses that may need to be closer in proximity to residential areas if the residents are intended to be a direct beneficiary or manager of that productive landscape, e.g. community solar production and urban farming.
- **Provide use flexibility within these areas**. As previously stated, there are abundant productive landscape use options for Detroit's open space. Some of those uses may make more financial sense today given current market demands and production costs. However, financial considerations and investor interests will assuredly shift over the course of the next 50 years, making some productive landscapes more profitable, and others less so. For that reason, while the designation of open space will remain constant during that term, there must be a degree of flexibility built into Detroit's plans and policies that enable the specific types of productive uses to shift with market demands.

General Guidance

Beyond the specific land use planning considerations detailed above, DFC, as well as productive landscape implementers, may also consider the following guidance as they look to improve the financial feasibly of productive landscapes. Specifically:

- **Maximize the cultivation of products with a local market or distribution mechanism**. From a financial standpoint, one of the compelling arguments for the adaptation of land for a productive landscape is the low cost of land in Detroit, as compared to the acquisition cost of prime farmland in rural areas. However the financial benefit of the ease of access to land is diminished by the fact that the land is broken up by roads, which impacts the economies of scale for cultivating vast acres of land, and many sites will incur higher site preparation costs.[103] For these reasons, in order to maximize the financial viability of these uses, other costs need to be minimized, such as the cost of product transportation and distribution. Landscapes that generate a product that could be sold and used locally or put into a local pipeline for distribution will likely have a greater potential for financial success.
- **Examine procurement needs for major local institutions, manufactures, and employers**. Working with major local institutions, manufacturers, and employers, identify opportunities for local production of goods where current transportation costs are high or projected to grow. Many recent local procurement conversations have focused on food production, however there are also a number of non-food based procurement

opportunities, such as energy production and landscaping products, which should be explored. Since large institutions are likely to have higher buying power and are unlikely to relocate in the short term, they could be a viable market for locally cultivated products on a larger scale in Detroit.

- **Explore co-location or secondary crops to maximize financial output**. Many of the potential productive landscapes have larger upfront costs with financial returns years down the line. To help develop shorter-term cash flows, secondary crops, which would be planted on the unused land between primary crops or during a crop's off season, should be considered. Relatedly, to diminish costs, for productive landscapes that are not crop-focused, such as solar, using low or slow growing ground cover to minimize maintenance should be considered. Additionally, co-locating smaller productive uses on large parcels could provide additional revenue (e.g. locating beekeeping on a lavender farm).

TYPE SPOTLIGHT: URBAN FARMING

Urban farming, as defined here as the growing of food in an urban setting,[104] has received, perhaps, the greatest degree of dedicated local support from a funding and implementation standpoint of the potential productive landscapes. While there are a variety of farm types that should certainly be explored for open space use, such as landscaping plants, cut flowers, woody ornamentals, and other specialty crops like lavender, this spotlight use focuses largely on farming fruits and vegetables.

This section provides a financial overview and considerations for larger-scale urban farming in long-term open space areas.

SUMMARY

Implementation costs: **Moderate**. Initial costs for labor, supplies, and equipment for the first year range up to $50,000/acre.[105] There are a variety of factors that influence startup costs for an urban farm, some of the more significant factors include:

- **Size**. While some economies of scale can be realized as the scale of farming activity increases, the degree of cost savings will eventually diminish given that larger farms will require more expensive heavy machinery. Generally speaking 5 acres is a cost threshold point, under which costs can be diminished, and over which costs can substantially rise due to machinery costs.
- **Site preparation**. Site preparation costs will vary based on the condition of the lots. Some of these costs include site grading, dumping and overgrowth clean-up, dangerous building removal, and remediation of soil contaminants.
- **Growth structures**. The nature of the farm or type of crop may require supportive structures for growing like raised beds, hoop houses, or green houses. Depending on the type of structure, for larger-scale farming efforts, these can significantly increase installation costs.

Maintenance costs: **Generally low.** Annual maintenance costs for seeds, re-planting, watering and supplies are relatively low. Property management costs associated with security, labor, taxes, etc. would be proportional to the scale of the operation.

Revenue potential: Moderate. Depending on the specific crop type, an urban farm can generate anywhere from $4,700[106] to $10,000[107] per acre each year. In terms of an investment period, with a successful business plan and hard work, revenue to repay start-up costs could reasonably occur within a 3-5 year period. In order to increase revenue potential, specialty or niche market products could be integrated to provide supply for specialty items that are more difficult to find.[108]

Implementer or owner: **Most likely a nongovernmental entity.** Urban farms hold the most opportunity for private for-profit or nonprofit entities to own, develop and manage open space. While governmental and quasi-governmental entities could play a role in the ownership of this land long-term, their involvement would likely be limited to providing long-term leases to private entities for the management and cultivation of urban farms.

Other financially related benefits: There are a number of other financially related benefits for urban farms that may have broader implications beyond the individual implementation site. Specifically:

- **Local wealth generation.** Of all the open space uses examined in this report, urban farming has the most opportunity to support direct local wealth generation, particularly at the individual entrepreneur and small business level. While the financial margins are relatively tight, urban farming provides opportunities for a broad range of local stakeholders to benefit financially from the cultivation from Detroit's land. One estimate places the total potential influx of investment into the local economy through local food production at $63 million per year.[109] That amount represents a significant opportunity to increase local wealth through reduction in household food costs and generation of income for urban farmers.
- **Potential to reduce medical-related costs.** Urban communities, particularly socio-economically challenged neighborhoods, are disproportionately affected by rising insurance rates, medical care costs and other fiscal challenges from public health impacts associated with poor nutrition and lack of access to healthy food. Michigan now has the 11th highest adult obesity rate in the nation[110] at 31.5%[111] and almost 15% of its school-age children are considered obese.[112] This now costs the state more than $3 billion a year for obesity related health care and in just three years, it is expected to rise to $12.5 billion.[113] Increasing the amount of locally grown foods through urban farming may lead to a reduction in medical costs related to poor health through the improved access to fresh produce and increased education and involvement of residents in the cultivation and importance of healthy eating.

POTENTIAL FUNDING TOOLS

Given the broad base of local nonprofit and philanthropic interest in urban farming, there is a strong likelihood that funding opportunities for urban farming will be present in the future. Many farming initiatives remain smaller-scale and decentralized in nature, which opens up a variety of investment opportunities for individual residents. If larger-scale, longer-term projects with year-round growing cycles and advanced distribution methods were developed, the chances of leveraging more and private funding will be increased. Private funding will be necessary to develop an increased scale of urban farming in open space areas. Below are some observations about the potential applicability of funding sources for urban farming, generally. Appendix 6 provides additional specificity on funding applicability by use type.

Direct Fees: **Medium applicability**. There are opportunities to use types of direct fees to fund urban farming given a customer's willingness to pay directly for the urban farm's crops. Specifically:

- **User Fees**. User fees can be structured in several different ways to support urban farming. Urban farms can be financed by pooling funding from a broad base of individuals in exchange for the right to use or cultivate a portion of the farm. User fees can also be generated through membership fees or purchases of "shares" that, after payment, ensure a customer receives a portion of the harvested crops. This model, commonly referred to as Community Supported Agriculture, is already being used in Detroit by City Commons CSA.[114]
- **Community Preservation Fund**. Community Preservation Funds (CPF) are tax programs implemented by states and municipalities to fund their open space protection and enhancement. While CPFs likely have more applicability for parks and recreation and natural area uses, CPFs have been used to support agriculture. For more on CPFs, see the Natural Areas section.

Debt Tools: Low applicability. Given the smaller scale and private nature of many urban farming projects, traditional municipal debt tools may not have as much applicability. However, DFC could explore:

- **Social Impact Bonds**. SIBs use private sector capital to scale up government financing of preventive social service programs, transitioning them from remedial efforts to high-impact less-costly preventive programs. SIBs combine performance-based payments and market discipline to improve program results, overcome barriers to innovation, and encourage continued investment in preventive services. This funding approach is very new and has not yet been applied to urban farming. However, given the measurable costs of poor diet and exercise, and the potential impact of increased access to fresh local produce, a SIB could be examined.

Credit Assistance: Low applicability. Access to certain types of credit assistance, specifically loan guarantees, could be further explored for larger urban farming initiatives. However, there likely stronger applicability for other open space uses, such as solar and green stormwater infrastructure.

Private Sources/Equity: **High applicability**. Given the broader benefits of urban farming, there are a number of opportunities to attract private financing that could be pursued. Specifically:

- **New Market Tax Credits**. NMTCs have been used to support urban food-based and agricultural projects.[115] While many of the NMTC deals have centered on developing retail outlets for food, e.g. grocery stores, NMTCs can support the development and growth of local produce.[116] Use of NMTCs would need to focus on larger-scale projects. Michigan

has an active NMTC fund that could be leveraged for urban farming called the Michigan Good Food Fund, which is managed by Capital Impact Partners. For more information on NMTCs, see the Productive Landscape Section.

- **Loan loss reserve funds (LRF).** A variation on this finance model could be applicable to get more urban farms up and running. A small loan could be guaranteed by an entity with a provision for loss in some cases, which could reduce the risk level of the loan.
- **Program Related Investment Loan Fund.** A PRI could be structured solely for an urban farming project with a strong business model, but the likelihood of attracting PRI funding could be increased by pooling PRIs into a fund that would support a number of productive landscapes, urban farming being one use in the PRI fund portfolio. For more information on PRI Loan Funds, see the Productive Landscape Section.
- **Peer-to-Peer Funding.** This emerging alternative funding broadly encompasses actions that pool monetary investments, loans or donations from a large number of private individuals. More commonly referenced as "crowd funding," "crowd lending," or "crowd investing," peer-to-peer funding can be structured as donations, equity positions, loans or investments receiving some form of return (product or monetary). This is an emerging field with many questions still unanswered in terms of regulation, but it has promise for open space funding.[117] Given urban farming's ability to produce a tangible good with a social benefit in a relatively short period of time, peer-to-peer funding provides a strong option for funding this use.[118] Larger urban farming projects are likely to be more successful, particularly with loans and investments. Across the nation there has been increasing interest and sophistication in peer-to-peer funding of urban farming initiatives, notably with the Slow Money movement.[119]

Value Capture Mechanisms: Low applicability. While the productive use of land will increase the value of the particular piece of property, the potential value capture on an individual urban farm will be limited. Additionally, the capture of increased value for properties adjacent to urban farming initiatives will likely be too limited to represent a significant source of funding.

Grants: High applicability. Of all the funding sources, grants may have the greatest current applicability for urban farming. Public and private grant dollars have largely supported local urban farming initiatives. Grants will continue to be an important source of funding, however, there will almost certainly not be enough public or private grant funding to fully fund the urban farming need in Detroit. Grant funds should be leveraged for early investments to help build and demonstrate urban farming business models so larger pools of private investment can be attracted.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

Detroit's formidable and organized urban agricultural community has been working for years to cultivate a robust urban farming movement.[120] The city supports 1,400 urban gardens, 1,600 urban farmers, amounting to 275 acres of land in active agricultural use. While urban farming can be a financially viable endeavor, as demonstrated in practice by market gardens throughout the city, there are still a number of financial risks associated with the implementation and long-term maintenance of larger-scale urban farming. DFC can work to make larger-scale, long-term urban farming more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of urban farming could help to increase the financial feasibility or reduce the financial risk of urban farming in long-term open space areas. Specifically:

- **Limit the scale of urban farming in long-term open space areas, instead, prioritize increased smaller-scale farming in areas planned for continued residential use**. If DFC wants to support a goal for the city to become more food sovereign, from a land use perspective, between 3,600 and 5,000 acres would be needed for farming.[121] The long-term open space areas could certainly accommodate that acreage. However, placing all, or the majority of, the urban farming activity in these areas will likely make this scale of farming less financially viable. Much of the local demand for farming is at the individual and community scale. These farms are located in or adjacent to the locations where residents work and live and provide produce largely for individual or small-scale use.[122] In order to capitalize on this demand, Detroit should support the designation of areas within the 50-year residential land uses, such as the Green Residential land use areas, for smaller-scale agricultural production. Ensuring that residents and entrepreneurs have access to land in their neighborhoods, as opposed to having to commute a distance to only a few places in the city, will enable a wider spectrum of stakeholders to invest in urban farming, therefore making the conversion of around 3,000-5,000 acres to urban farms more viable. In short, based on current farming patterns, the best way to achieve that acreage goal from a financial standpoint is to rely on a large group of farmers that invest smaller sums in smaller farms.

  That being said, DFC should still consider designating a portion of long-term open space areas for urban farming, with a priority on larger farming initiatives, given that smaller-scale initiatives should be located in close proximity to the residential community farming them. For the purpose of this report, an area of 1,000 acres of urban farming area was projected for the long-term open space areas. This would assume that around 2/3rds of the projected need for farming would be focused at a more residential geography. That share

can certainly shift based on the feedback of local stakeholders and to the degree that the market demand shifts more towards larger-scale, long-term farming.

- **Consider locating urban farming near related or supportive uses.** Designating urban farming areas adjacent to related or supportive uses will help to potentially reduce startup capital costs or transportation costs and may provide more flexibility for the type of crop grown or the manner in which that crop is cultivated and harvested. Larger-scale farming typically requires the use of additional storage and refrigeration facilities, locating these uses adjacent to areas where there may be light industrial or commercial facilities may help to reduce upfront capital costs.[123] Additionally, considering locations that would reduce transportation or distribution costs, e.g. near Eastern Market or transit hubs, could also help to improve financial viability. Finally, larger-scale urban farms will have more significant issues related to security and noise and odor control, and generally speaking, for those reasons locating these uses away from residential areas will enable these farms to operate the equipment needed to cultivate and harvest a larger crop. There may be some urban farms in open space areas where proximity to residential areas may be more of a benefit, particularly those with a lower maintenance or more aesthetically pleasing crop, or where the farm's business model necessitates resident or volunteer labor.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, may also want to consider the following guidance as they look to improve the financial feasibly of urban farming in long-term open space areas. Specifically:

- **Cultivate a broader base of funding for infrastructure that will enable year-round growing.** In order for larger-scale farming efforts to be more profitable in Detroit's climate many will need to invest in season extending infrastructure like hoop houses or greenhouses. However, the initial upfront cost of this infrastructure at a larger scale can be difficult to finance. Looking at the variety of funding sources mentioned above, Detroit could consider advocating for a pooled source of funding to offset some of these costs for growers.
- **Increase existing efforts to build a robust food processing and distribution network.** Any large scale up of food production, as outlined in this report, must be aligned with food processing infrastructure – from value added products[124] to food business incubation[125] to wholesale level packaging.[126] While Detroit has made strides to address these needs, e.g. via FoodLab and Eastern Market, the scale of food processing and distribution mechanisms is not robust enough to meet the need of substantially increased food production locally, thereby making expanded food production less financially feasible. Detroit needs to significantly invest in value-chain system support that connects producers to consumers and commercial growers to institutional purchasers and incorporate value-added processing, packaging, and distribution infrastructure into urban farm location strategies.

- **Support flexible land access scaled to the type of urban farming investment.** Those investing in urban farms need access to land in a way that provides a degree of certainty for their investment. Providing a yearly land lease to an urban farm that needs to invest $50,000/acre in startup costs does not address the level of certainty that farmer needs for their investment. A larger commercial farming operation investing significant and long-term funding will need a long-term lease or, potentially, title to the property in order to provide the certainty they need to recover the cost of their investment. Detroit should offer scaled programs for the lease and disposition of land that responds to the investment period of urban farms.
- **Explore the production of niche or specialty crops to enhance profitability**. While the growth of locally sourced produce will continue to be a priority in Detroit, opening up space for profitable specialty crops should also rise as a priority in order to increase farming cash flows, for example, lavender, woody ornamentals, herbs, mushrooms, poinsettias, and cut flowers, to name a few.
- **Support initiatives to explore and innovate new approaches to cultivation and distribution.** With the increased interest in socially-minded investing, there are additional opportunities to leverage funding for the testing and development of new farming techniques that would minimize costs of developing and distributing food.[127] Combining that venture capital interest with Detroit's local base of tech and engineering prowess could create fertile ground for new investment in Detroit-based initiatives. Targeting and marketing land and building sites in permanent open areas for this testing and incubation could help to minimize startup costs for untested ventures and create a niche investment interest in Detroit.
- **Consider urban farm incubation programs**. Beyond supporting a local food network, Detroit could leverage its land and expertise in urban farming to fund a state-based or national urban farm incubator program that could provide support, training business planning and technical resources to ensure that urban farming thrives in Detroit and other major cities.[128]

Examples

Detroit already has a well-known, robust network of local urban farmers supported by several local groups. For examples of urban farming initiatives outside of the state, Atlanta, Baltimore, Milwaukee, and Minneapolis provide additional examples of ways that communities have supported urban farming.[129]

TYPE SPOTLIGHT: SOLAR

Using vacant land for solar energy development presents a tremendous opportunity to help stabilize and potentially reduce utility costs for Detroiters in the long term and also offers the highest potential revenue generation of all the open space landscapes examined in this report.

This section provides a financial overview and considerations for solar energy generation in long-term open space areas.

SUMMARY

Implementation costs: High. A 20-megawatt solar development on 100 acres of vacant land would cost approximately $50 million to $60 million ($500-600,000/acre) and generate electricity to power more than 3,000 Detroit households.[130] While the implementation costs of solar are high compared to other open space uses examined in this report, rapidly declining hard and soft costs are quickly making solar energy cost competitive with both traditional and alternative energy sources across the country, spurring developments that attract significant sources of private capital without any subsidies. Residential and commercial photovoltaic system prices dropped by 12 percent from last year and 45 percent from 2010.[131]

Maintenance costs: Low. Maintenance on solar is almost strictly limited to landscaping issues associated with the site. For grid-connected photovoltaic systems that do not incorporate batteries, a good installer would typically not need to return to do maintenance. Regularly mowing could cost $500 to $1,000 per acre per year. These costs could be further decreased by creative landscaping with lower maintenance groundcover.

Revenue potential: High. A 100-acre solar development could generate more than 24 GWh of electricity annually, currently valued at approximately $2.4 million, amounting to $24,000/acre. The investment period for a solar installation of this size would be 20-25 years.

Implementer or owner: Varies. Smaller-scaled community solar[132] could be developed by a nonprofit entity. For large-scale, utility-scale solar,[133] the owner and implementer could be a for-profit entity. Perhaps the most advantageous ownership/implementation model for the City of Detroit though would be for the City to retain ownership of the land and lease it to private solar developers.

Other financially related benefits: There are a number of other financially related benefits for solar that may have broader implications beyond the individual implementation site. Specifically:

- **Stabilization or potential reduction in long-term utility costs for residents**. At present, Detroit households consume approximately 2,000 gigawatt-hours (GWh) of electricity

each year at a cost of $2 billion.[134] Traditional energy sources are projected to continue to rise. While the cost of solar comparatively is higher in the current environment, those costs will continue to decline and will likely result longer term in stabilized or lower utility costs for Detroiters than traditional energy sources. This is especially true for those residents for which utility costs represent a significant percentage of overall housing costs.

- **Revenue generation as well as potential cost savings for the City of Detroit**. Solar development and ongoing maintenance on vacant land could happen at no cost to the City of Detroit. In fact, it could generate revenue (via lease) and/or reduce electricity costs (via power purchase agreement) for the City. Detroit could lease vacant land to solar developers and contract to purchase electricity generated by the solar development at a rate below that offered by the local utility. Leases for 100 acres of land could potentially generate $100,000 to $300,000 annually in lease payments to the City of Detroit. If the City negotiated a power purchase agreement that reduced their electricity costs by 5 to 10 percent, then 100 acres could potentially save $120,000 to $240,000 annually.[135]
- **Local job creation**. The development of vacant land for solar energy production would provide a variety of opportunities for job creation during design and construction of the sites. However, that degree of job creation would not continue throughout the life span of the solar production, as maintenance of solar is far less intensive. That being said, if the development of solar fields is staggered across a number of years, the pipeline of jobs could remain relatively consistent until the full demand for solar construction is satisfied.

POTENTIAL FUNDING TOOLS

While solar has a high installation cost, given the opportunity for long-term, renewable energy generation and resulting strong and predictable revenue potential, there are a diverse range of funding tools that could be employed to help finance the cost of solar installation in open space areas. Below are some general observations about the potential applicability of select funding tools for solar. Appendix 6 provides additional detail and tools based by open space use type.

Direct Fees: **High applicability**. There are opportunities to use types of direct fees to fund solar generation given that solar generation produces a directly useable good. Specifically:

- **User Fees**. User fees would be generated from the use of the energy generated from solar installations and could then be used to repay debt service.
- **Public Benefit Funds**. Public benefit funds are generated by a small surcharge on a customer's electricity bills regardless of the customer's electricity provider. These funds can then be used for energy renewal projects. Michigan enables an opt-in surcharge that has been used largely to fund low-income energy efficiency improvements,[136] but could be expanded to also support renewable energy projects, prioritizing solar generation.

Debt Tools: **High applicability.** Given the revenue generation potential of solar, bonds and other debt tools are very applicable. Specifically:

- **Industrial revenue bonds**. These bonds could be repaid by user fees charged on utility scale solar, but are a largely untested as a form of financing for this type of infrastructure.
- **Green Bonds**. Green Bonds may be particularly applicable so long as solar generation as a form of renewable energy appeals to investor classes.
- **Qualified Energy Conservation Bonds** (QECBs). QECBs are designed specifically to fund qualified energy conservation projects such as reducing energy consumption in publicly owned buildings by at least 20% or financing demonstration projects and implementation of green building technologies. QECBs are a relatively new funding mechanism and have been generally slow to sell on the market, but could still be explored for applicability for solar projects.
- **Property Assessed Clean Energy (PACE) loans.** PACE loans could be explored for solar generation particularly solar generation that would serve adjacent industrial or commercial uses. The repayment of the loan is made as a special assessment via the property owner's property taxes.[137]
- **Private activity bonds (PABs).** PABs could be explored to support solar facilities being developed by private entities.

Credit Assistance: **Medium applicability.** Credit assistance mechanisms could be pursued to help alleviate some of the associated risk of larger-scale solar to free up additional lending. Specifically:

- **Loan guarantees.** Loan guarantees could be issued by state or federal agencies for solar production, e.g. by US Department of Energy. [138]

Private Sources/Equity: **High applicability**. In recent years, solar has clearly demonstrated the ability to attract private capital from well-established investors. There are a number of tools that could be used to attract private financing. Specifically:

- **Solar Investment Tax Credit (ITC)**. ITC is a 30-percent federal tax credit for both utility-scale and distributed solar projects in effect through December 31, 2016. The company that installs, develops, or finances the project uses the credit. The commercial credit will drop to 10% after 2016 unless Congress extends the deadline or changes the "placed in service" component of the law to a "commence construction" provision.
- **Public-private partnership**. A P3 is a highly applicable funding tool for solar where private capital would finance the solar development.
- **New Market Tax Credits**. NMTCs can support the development of solar facilities and should be explored.[139]

- **Program-Related Investment Loan Fund.** An individual PRI for a solar project could be sought or solar could be built into a pooled PRI loan fund that also supports a range of other uses.
- **Infrastructure Investment Funds**. An infrastructure investment fund is a pool of funds collected from many investors to invest in infrastructure. It could be explored as a financing tool that could pay for solar's capital cost under a public-private partnership.

Value Capture Mechanisms: **Low applicability.** Installation of solar on land could result in the increased value of that land but further exploration would be needed to determine if that increase in value could be leveraged in a meaningful way through a TIF or other value capture mechanism.

Grants: **Medium applicability**. Certainly grants focused on renewable energy production could help to offset some degree of initial capital costs. However, given the opportunity for future revenue generation, other funding tools like debt and private investment may be more applicable, particularly because of the high investment cost needed for larger-scale solar.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While solar energy generation has the most revenue generation potential of the open space uses examined in the report, there are still a number of financial risks associated with the implementation of solar. DFC can work to make solar energy development more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of solar could help to increase the financial feasibility or reduce the financial risk of solar. Specifically:

- **Dedicate a portion of future open space for solar energy development.** Detroit's residential electricity demands could be met entirely with a 1.7 gigawatt (GW) solar PV development, which would cover approximately 13 square miles.[140] The full amount of long-term open space in Detroit could be converted for the development of solar and supply nearly all of Detroit's residential energy needs. However, from a financial standpoint, there is not enough of a market incentive to convert that scale of land and have the investment be financially feasible at the present time. While there are ways to improve the financial feasibility, some of which are listed in the section below, even if that scale of solar was financially feasible, there are a variety of nonfinancial reasons why DFC may want to avoid having a single use dominate the entire long-term open space area in Detroit, which should certainly be explored through an open space planning process. The extent to

which vacant space is allocated for solar development is both a matter of timing and a tradeoff in benefits of alternative uses.

For the purposes of this report, an area of 300 acres of solar was projected for open space areas, which would generate enough electricity to power more than 9,000 Detroit households. As mentioned above, there is certainly theoretical demand for far more acreage than that, however, without more certainty and supportiveness from local, state, and federal policies, it is hard to predict if and how that demand is likely to expand at the present time.

- **Encourage a mix of solar scales, but ensure designated location of solar is responsive to scale and prioritize utility-scale solar in open space areas.** Detroit's vacant land lends itself to a mix of distributed solar[141] and utility-scale solar.[142] Solar photovoltaic development could span hundreds of contiguous acres or fit into small lots as desired. For that reason, from a land use planning perspective, solar developments can be flexible in location. However, in order to make different scales of solar more financially viable, location of the solar does make a difference.

  Utility-scale developments are best suited for large, contiguous, open areas. From a financial stand point, they do not need to be located adjacent to residential areas. However, community solar developments need to be located closer to areas that will continue be residential in nature. Further, community solar may be most successfully in areas with vacancy rates that allow for approximately 0.5 acre solar arrays to serve 15 households. For this reason, community solar will generally only make financial sense in long-term open space areas where there is an adjacent long-term residential community.

- **Consider locating some direct solar power generation adjacent to major power users, particularly along industrial cores.** Where there is vacant land in larger open space areas adjacent to large power users, there could be potential for direct solar power development for these power users on that land. This has a few financial benefits: a stabilization or reduction in long-term utility costs for the power user, a built in guaranteed market for the solar developer, so long as the user is likely to remain for a period of 20 years, and little government involvement is needed to repurpose the land given the likelihood of private developer interest. For these reasons, DFC could consider designating long-term open space land adjacent to major power users, particularly industrial cores for solar development.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, may also want to consider the following guidance as they look to improve the financial feasibly of solar energy development in long-term open space areas. Specifically:

- **Advocate at the state-level for a new, aggressive renewable portfolio standard and the prioritization of solar.** Michigan's Renewable Portfolio Standard (RPS), passed in October

2008, requires electric utilities to generate at least 10% of their energy from renewable sources, or to negotiate the equivalent using tradable renewable energy certificates, by 2015. While the vast majority of utilities in the state are on track to meet these standards, solar accounts for only 1% of the new renewable generation capacity – compared to 92% coming from wind. This disparity is due to the fact that wind was much cheaper to develop in Michigan than solar in the years immediately following the passage of the state's RPS. However, rapidly declining hard and soft costs are quickly making solar energy cost competitive with both traditional and alternative energy sources across the country, spurring developments that attract significant sources of private capital without any subsidies. Further, solar energy is growing in the state of Michigan. In 2014, 3 megawatts (MW) of solar capacity were installed in Michigan, a 33 percent increase over 2013. Of that, 2,120 kilowatts (kW) were residential, and 940 kW were commercial. The 25.5 MW of solar energy currently installed in Michigan ranks the state 28th in the country in installed solar capacity. Michigan now has enough installed solar energy in the state to power 3,850 homes. This growth is due to the rapidly dropping prices of residential and commercial photovoltaic system prices – by 12 percent from last year and 45 percent from 2010 – due to a 30-percent federal tax credit for solar systems on residential and commercial properties that remains in effect through December 31, 2016. Local advocates could advocate for the State to pass a new, more aggressive RPS and for it to prioritize solar given the declining costs of solar. This would create the market incentive needed for greater development of solar locally.[143]

- **Consider adopting a City renewable portfolio standard.** Despite what happens at the state-level, the City of Detroit could take an active role in catalyzing the development of solar. The City of Detroit could adopt its own renewable portfolio standard (RPS) that requires City facilities to utilize alternative energy resources. In this instance the City acts as the built in market demand for local solar, thus providing the certainty needed for private investment. One Michigan city that did this is the City of Lansing. Lansing adopted a renewable portfolio standard (RPS) that requires City facilities to utilize alternative energy resources. The City of Lansing committed to 20 percent renewables by 2020.
- **Explore State policy changes needed for net metering**. In order to support the development of community and utility-scale solar, State polices that cap net metering and prevent virtual net metering should be examined. Michigan's net metering policy currently allows for benefits to accrue to a single site utility user and is capped at 150 kW.[144] Virtual net metering allows multiple utility customers to share the electricity output from a single power project, typically in proportion to their ownership of the shared system. Enabling this would make the widespread adoption of solar much more feasible for all electricity consumers.[145]

Examples

There are a number of successful larger-scale solar installations that have engaged public facilities, land, or partnerships, a few of these are listed below:

- Brockton Brightfields is a 465 kW grid-integrated solar installation on the site of a former manufactured gas facility in Brockton, Massachusetts.[146]
- The City of New Bedford, Massachusetts, agreed to let ConEdison Solutions install solar panels on multiple city-owned sites, including schools, municipal buildings, and brownfields. ConEdison Solutions owns and operates five solar projects in the City of New Bedford, totaling 385 kW.[147]
- The Rifle (Colorado) Regional Wastewater Reclamation Plant made an exchange for land and a 20-year purchased power agreement. SunEdison designed and built single-axis, ground-mounted solar arrays totaling 2.3 MW on two tracts of land on the plant grounds. A 1.7-MW array powers the wastewater treatment plant, and a nearby 0.6-MW system runs a pumping station. The equipment can produce about 4,300 MWh of electricity per year; any excess is sold to the local municipally owned Glenwood Springs Electric System.[148]
- Exelon Power owns and operates a 10MW solar field in Chicago's West Pullman neighborhood which spans a 41-acre brownfield site.[149]
- In Cleveland, Ohio, a 1 MW urban solar field was installed last year on 5.5 acre brownfield site in partnership with local nonprofits and will help to power nearby University Circle Facilities.[150]

TYPE SPOTLIGHT: BIOFUEL

There are a few crops that could be explored for biofuel production in open space areas, such as switchgrass[151] and corn;[152] this spotlight focuses on the use of pennycress[153] since pennycress has been grown in a pilot project in Detroit and the potential plant height and equipment concerns fit within with local neighborhood consideration.

This section provides a financial overview and considerations for biofuel production in long-term open space areas.

SUMMARY

Implementation costs: **Low to Moderate**. The cost of pennycress installation varies based on the acreage of the installation. Pennycress implementation costs could range from $7,000 to $42,000 per acre when first starting out with 20 acres of production. As additional acres are added, the cost of pennycress installation declines, for example, per acre initial implementation costs for a winter pennycress crop on 350 acres could cost $500 to $700 per acre.[154] Initial equipment start-up costs have been estimated at $134,000 to manage 350 acres.[155]

Maintenance costs: **Low.** If a larger pennycress site is installed, maintenance costs are low. Ongoing costs of maintaining the land in biofuel production are estimated at $140 per acre per year (approximately $50,000 for 350 acres), with $17 per acre in labor costs.[156] This cost is comparable with maintenance costs for mowing turf grass or maintaining meadow landscapes. However, additional labor with higher costs may be required to realize a higher level of production.

Revenue potential: Low. Metro Ag Services has estimated potential revenue of $210 per acre per year for pennycress production.[157] With estimated costs of $140 per acre when planted at scale, $70 per acre would be net margin. To realize $20,000 in net margin, 285 acres would need to be planted and harvested. This would require at least 7 years to payback initial equipment costs, demonstrating the need to have other sources of income for the land, via a secondary crop, or to have other income generating uses for the equipment. Actual revenue will vary depending upon site specific costs and the market for biofuel feedstocks at the time.

As with most productive landscapes, revenue could possibly increase if pennycress is paired with another revenue source, such as a tree farm, where ongoing maintenance of ground cover would be needed until trees mature or other crops are grown on the same land when pennycress is out of season.

Biofuel economics are largely driven by renewable fuel standards and the cost of traditional fuels. Selling a biofuel feedstock crop could cover some land management costs, and if renewable fuel standard requirements change in the future, then the financial outlook for urban

biofuel stocks could improve. Recent lower fossil fuel costs have created challenges for biofuel economics, but that could change in the future given the long-term planning scope for open space. However, the World Bank predicts crude oil prices will be lower for the next 10 years compared to the previous 10 years[158]. Should ethanol prices change in the future, the financial outlook for biofuel feedstock production could become far more favorable.

Implementer or owner: **Most likely a nongovernmental entity.** Biofuel development offers opportunities for private for-profit or nonprofit entities to own, develop and manage open space. While governmental and quasi-governmental entities could to play a role in the ownership of this land long-term, their involvement would likely be limited to providing long-term leases to private entities for the management and cultivation of biofuel feedstock.

Other financially related benefits**:** Given current the current market dynamics, referenced above, for pennycress, there are more limited secondary financial benefits for this alterative land use, as compared to some of the other productive landscapes. There are opportunities for local wealth generation, however, it will be more constrained as compared to some of the other uses, until prices change. One particular benefit that may appeal more to the City for land maintenance is that pennycress:

- **Offers a more financially viable option for private maintenance of land via a lower profile landscape**. Contracting out land maintenance and allowing biofuel feedstock production could potentially allow for some income from land maintenance that would otherwise not occur and result in lower overall land management costs. Even if a substantial profit could not be realized, a limited return could at the very least offset some of the turf maintenance costs that exist on public land now. Although the crop may not be largely profitable given current biofuel prices, the reduced maintenance costs or leveraging other Michigan resources, such as research possibilities, may make pennycress planting a desirable option, particularly given its low height, as compared to other more profitable crops.

POTENTIAL FUNDING TOOLS

Many biofuel related funding tools are dedicated to the facilities that process feedstock into fuel, but there are some resources that could be applied to the growth of biofuel feedstock.[159] Below are some general observations about the potential applicability of select funding tools for biofuel. Appendix 6 provides additional detail and tools based by open space use type.

Direct Fees: **Medium applicability**. There are opportunities to use types of direct fees to fund biofuel generation given that biofuel feedstock produces a directly useable good.

Debt Tools**: Low applicability. B**onds and other debt tools are somewhat applicable for biofuel. Again, many of the available sources are for the production of biofuel rather than the feedstock. Specifically:

- **Industrial revenue bonds**. These bonds could be repaid by user fees charged from biofuel, but are a largely untested as a form of financing for this type of crop.
- **Green Bonds**. Green Bonds may be particularly applicable so long as biofuel generation as a form of renewable energy appeals to investor classes.

Credit Assistance: **Medium applicability.** Credit assistance mechanisms could be pursued to help free up additional lending for biofuel where the market is somewhat untested in an urban environment. Specifically:

- **Loan guarantees.** Loan guarantees could be issued by state or federal agencies for biofuel feedstock.

Private Sources/Equity: **Medium applicability**. Though relatively low fossil fuel prices may mean lower private interest for widespread biofuel growth in open space areas, as an emerging field in renewable energy, some private sources could be explored for biofuel projects. Specifically:

- **Program-Related Investment Loan Fund.** An individual PRI for a biofuel project could be sought or biofuel could be built into a pooled PRI loan fund that also supports a range of other uses.
- **New Market Tax Credits**. NMTCs could be explored for applicability for biofuel growth.
- **Infrastructure Investment Funds**. Infrastructure investment funds could be explored as a financing tool that could pay for biofuel's capital cost under a public-private partnership.

Value Capture Mechanisms: **Low applicability.** Installation of biofuel on land could result in the increased value of that land but it is unlikely that an increase in value could be leveraged in a meaningful way.

Grants: **High applicability**. Multiple grant programs exist around biofuels, but most focus on producing the fuel instead of the feedstock. A number of biofuel grant resources are offered by the EPA, U.S. Department of Energy, and the non-profit Advanced Biofuels USA. One source that may be particularly applicable is the United States Department of Agriculture's Biomass Crop Assistance Program that provides funds to assist farmers with growing, maintain, and harvesting biofuel feedstocks. A partnership could also be explored with Michigan State University given their recent $5 million grant to study how to increase biofuel yield.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While scaled biofuel production has potential for revenue generation, the crux of its financial feasibility lays with broader market forces. That being said, DFC can work to make biofuel development more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of biofuel production could help to increase the financial feasibility or reduce the financial risk of biofuel. Specifically:

- **Dedicate a largely contiguous area of future open space for biofuel development, but prioritize other open space uses unless market forces shift**. Based on a current analysis of biofuel production via pennycress, a larger, contiguous space of 350 acres would need to be reserved for pennycress production to make the endeavor more financially viable.[160] DFC could consider including that use in future open space planning. If the cost of traditional fuels significantly shift,[161] or if renewable fuel standards change, DFC could consider allocating more land for biofuel, but until that point, widespread cultivation of biofuel beyond the estimated 350 acres does not seem as financially feasible.

  Commodity agriculture production is geared towards large-scale farming. In Michigan, the average farm size is 182 acres.[162] Most biofuel today comes primarily from corn-based ethanol production. In Michigan, 27 percent of the 2014 corn harvest, or 96 million bushels, were used for ethanol production. With an average production of 161 bushels of corn per acre, approximately 600,000 acres in Michigan were used for corn used in ethanol.[163] For today's agricultural production environment, larger-scale farms are needed to be economically competitive.

  For the purposes of this report, an area of 350 acres of biofuel was projected for open space areas.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, may also want to consider the following guidance as they look to improve the financial feasibly of biofuel development in long-term open space areas. Specifically:

- **Explore research and demonstration collaboration opportunities with partners.** Michigan is a leader in biofuel research with the Great Lakes Bioenergy Research Center co-housed at Michigan State and the University of Wisconsin-Madison.[164] With the bioenergy research occurring in Michigan, even if at-scale biofuel production is not pursued in the short-term at scale in Detroit, the DFC could benefit from this continued research and potential future breakthroughs that could make biofuel production a bigger part of a long-term open space land use. Beyond research on the installation and use of the crop, furthering research that examines what future incentive or market conditions could make urban biofuel production more cost effective should be encouraged as well.

Examples

Locally in Detroit there is a pilot pennycress installation as part of the Mack Avenue Green-T project. The project was developed by the East Side Community Network to pilot better stormwater management coupled with growing a biofuel feedstock on vacant urban land.[165]

In Pittsburgh, Pennsylvania, a study examined biofuel production on vacant land using sunflowers planted on 0.25 to 2 acre plots. The study examined pollutant uptake in the plants and potential cost savings from conversion of land from traditional vacant land management to biofuel feedstock production.[166]

TYPE SPOTLIGHT: TREE FARM

With the amount of long-term vacant land available in Detroit, reforestation with the purpose of tree harvesting in planned long-term open space offers the opportunity to create value on the land over time as trees mature. The harvesting of trees could serve many needs such as wood pulp, biofuel, lumber, firewood, other valued added products, and landscaping. This report examines tree farms in the context of harvesting for lumber-related products.[167] Tree farms offer perhaps the largest-scale opportunity for revenue-generating reuse of all the open space landscapes examined in this report.

This section provides a financial overview and considerations for tree farms in long-term open space areas.

SUMMARY

Implementation costs: **Low**. Installing trees is estimated to cost $4,000 to $10,000 per acre, with actual installed costs depending upon site-specific conditions and local market conditions. The tree selection will also shift implementation costs, the assumption in this report is built off the installation of a fast-growing hybrid poplar, a model currently being developed by Fresh Coast Capital.[168]

Maintenance costs: **Low.** Maintenance costs could range from $100 to $1,000 per acre. Maintenance costs for trees are more intensive when first establishing due to watering needs and the need to maintain grass, meadow plantings, or even a harvestable crop planted between trees before they mature. Annual maintenance costs will depend upon site-specific conditions (such as frequency of trash removal needed) and the level of maintenance provided, such as weather conditions requiring tree watering, and whether tree pruning is needed for the intended forest product. Maintenance costs would be expected to decrease over time as trees become more mature and the need to water and mow between trees is reduced.

Revenue potential: Moderate. The revenue potential of tree farms depends a great deal on the type of tree being harvested and the operations costs. That being said, hybrid poplar could return $5,000-$10,000 per acre at harvest.[169] The investment period for a tree farm would be at least 15 years for rapid-growth hybrid poplar but would be longer, up to 40 years, depending upon the tree species and desired forest product. Value creation with tree plantings will occur, but revenue is difficult to predict[170] and depends upon many factors, some of which include implementation costs, fossil fuel costs, distance to wood processors, productivity, weather, and tree health.[171] With larger-scale implementation, economies of scale will come into play that would promote additional efficiencies and potentially change the economics by product transport by attracting a local wood-processing mill if sufficient acreage were planted.

Implementer or owner: **Most likely a nongovernmental entity.** Tree farms offer opportunities for private for-profit or nonprofit entities to own, develop and manage open space. While governmental and quasi-governmental entities could to play a role in the ownership of this land long-term, their involvement would likely be limited to providing long-term leases to private entities for the management and cultivation of tree farms. Looking more broadly at the cultivation of landscaping plants and trees, the City may want to consider more formal public-private partnerships particularly for growing landscaping stock the City would then use.

Other financially related benefits: There are a number of other financially related benefits for tree farms that may have broader implications beyond the individual implementation site. Specifically:

- **Reduction in soil remediation costs**. While growing prior to harvest, trees can assist with phytoremediation, meaning that they remove contaminants from the soil. This can reduce future financial costs on the site for reuse.
- **Potential reduction in longer-term medical costs**. While permanent, high-quality forests may have the most potential financial impact on medical costs, tree farms can also contribute to improvements to air quality and mental well-being thereby potentially reducing future medical costs for residents.[172]
- **Potential reduction in the burden on gray infrastructure**. Stormwater runoff reduction benefits of trees have been noted in several combined sewer and water quality initiatives, including the Chesapeake Bay[173] and Milwaukee's regional green stormwater infrastructure plans.[174] Reforestation through tree farms can change the runoff hydrology, especially if implemented at the largest scale possible on Detroit's vacant land.

POTENTIAL FUNDING TOOLS

Below are some general observations about the potential applicability of select funding tools for tree farms. Appendix 6 provides additional detail and tools based by open space use type.

Direct Fees: **Medium applicability**. There are opportunities to use types of direct fees to fund tree farms given that the harvested wood produces a directly useable good.

Debt Tools: Low applicability. Given the generally private nature of the cultivation and product use of many tree farming projects, traditional municipal debt tools, may not have as much applicability. However, to the extent the harvested product is then used by the City, as discussed in this section, applicability could shift.

- **Private activity bonds (PABs).** The applicability of PABs could be explored to support tree farms being developed by private entities.

Credit Assistance: Low applicability. Access to certain types of credit assistance, specifically loan guarantees, could be further explored for larger tree farming initiatives. However, there likely stronger applicability for other open space uses, such as solar and green stormwater infrastructure.

Private Sources/Equity: High applicability. Given the broader environmental benefits of tree farms in combination with their revenue potential, there are a number of opportunities to attract private financing that could be pursued. Specifically:

- **Carbon credits**. Urban reforestation, including tree farms, can generate credits according to California's protocol.[175] It is unlikely that carbon credit revenues could fully fund a project, but may provide valuable additional revenues to support larger-scale tree farms. For more information on carbon credit applicability, see the Forest Section.
- **Public-private partnership**. P3s could be pursued with individuals, businesses, or foundations willing to accept the risks of investing in a tree farm.
- **Loan loss reserve funds (LRF)**. LRFs work to expand the number of responsible lenders and products available in the marketplace. A variation on this finance model could be applicable to getting more urban farms up and running. A small loan that could be guaranteed by an entity with a provision for loss in some cases.
- **Program-Related Investment Loan Fund**. An individual PRI for a tree farm could be sought or tree farms could be built into a pooled PRI loan fund that also supports a range of other uses.
- **Peer-to-Peer Funding.** Given tree farms' broader environmental benefits, individuals may be interested in investing tree farms. A potential funding model could include creating an investment approach where individuals could invest in a share of a tree farm through crowd lending or investing.

Value Capture Mechanisms: Low applicability. Installation of trees on land could result in the increased value of that land and adjacent land but further exploration would be needed to determine if that increase in value could be leveraged in a meaningful way through a TIF or other value capture mechanism, particularly since the trees would eventually be harvested.

Grants: Medium applicability. Certainly grants focused on ecological improvements could help to offset some degree of initial capital costs. However, grants will likely need to be paired with private sources of financing in order to fully fund tree farm projects.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While tree farms have a strong potential for revenue generation, there are still a number of financial risks associated with the implementation of tree farms. DFC can work to make solar

energy development more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of tree farms could help to increase the financial feasibility or reduce the financial risk of tree farms. Specifically:

- **Prioritize the use of open space for tree farms**. Of the uses examined in this report, tree farms seem to have the most promise from a large-scale, revenue-generating perspective due to the fact that the implementation costs are somewhat low, maintenance costs are very low, and they generate revenue, albeit long-term, and they take up a large geography. Currently there is a strong market for lumber products; the market could support 50,000 acres of hybrid popular.[176]

  While this report looks at tree farms for the generation of lumber products,[177] there is a lot of opportunity for the cultivation of landscape trees and plants. In order to increase the tree canopy in the city to 30%, estimates show that over 1 million trees will need to be planted over the course of the next 10 years.[178] Trees are typically purchased for an average cost of $95 per tree.[179] With costs projected to rise to import trees for planting into the city, investors in tree production in the city have a built in market if those trees were cultivated on a wholesale basis in Detroit. The same is true for native plant species that will be purchased outside of the city of Detroit for use in green stormwater infrastructure projects and landscaping projects in the city. There is an untapped investment potential for larger-scale landscaping tree and plant farming in Detroit.

  For the purposes of this report, an area of 2,000 acres was assumed for tree farming, which was cited by Fresh Coast Capital as the low end of a more ideal acreage total. This could span up to 10,000 acres. The benefit of that scale of urban farming is the ability to potentially attract a mill, which would certainly generate jobs and keep more of the potential revenue within city limits. While this report assumes the lower end for tree farming, from a financial standpoint, Detroit could support the higher acreage for farming in the open space areas in addition to some land uses outside of those long-term open space areas. An open space planning process can help to balance the market potential with less financially focused interests like a desire for use diversity.

- **Encourage the location of tree farms throughout the open space area.** Of the productive landscapes examined in this report, tree farms offer the highest degree of location flexibility from a financial impact standpoint; they could be planted wherever other land uses, such as solar and urban farming, would not be more beneficial. Since tree farms do not need to be actively harvested each year, there is less of a need, from a cost savings standpoint, to aggregate all of the tree farms into a few areas within open space. Further, since there are not significant noise or other potential nuisance issues, tree farms could be interspersed

throughout a long-term open space area without significantly impacting the financial model, so long as the areas meet minimum acreage needs; smaller tree farms could be supported at 2-5 acres.[180]

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, may also want to consider the following guidance as they look to improve the financial feasibly of tree farms in long-term open space areas. Specifically:

- **Analyze and promote the purchasing power in the city of Detroit to catalyze investment interest for tree farming**. As mentioned above, Detroit will need to dedicate significant sums of money to purchase the trees and plants needed to increase the tree canopy and implement green stormwater infrastructure projects, along with a host of other uses. Those plants and trees are purchased from wholesalers from outside the city of Detroit. Detroit could capitalize on its own purchasing power to catalyze investment in farms in the city. DFC could help support work that quantifies the total dollar amount that could be spent in the city if tree and plant farms were cultivated in the city and use that information to develop private market interest in growing farms at scale in the city.
- **Examine the feasibility and benefit of attracting a wood mill.** Fresh Coast Capital estimates that a tree-processing facility that could bring additional jobs for valued added forest products could be drawn to an area if 10,000 acres could be planted for tree harvest. A local wood mill would also reduce transportation costs and improve the revenue potential of a tree farm model.

Examples

Planned reforestation of trees that could be harvested has already been actively occurring in Detroit with Hantz Woodlands, which planted thousands of trees over a square mile of land. This private investment to remove blight and manage previously unmanaged lands has brought visible change to the city.[181] The Hantz Woodlands reforestation effort to purchase and reforest lands included significant public discussion on what is an appropriate land use and process to obtain the vacant property. The intensity of public discussion on this topic emphasizes the importance of having a clear process for property sale or long-term lease, as well as planned long-term use of lands.

Fresh Coast Capital installed tree farms in Flint, Michigan and Gary, Indiana. By accessing private capital, they manage the planting of fast-growing hybrid poplar trees and seek to harvest the trees from the vacant property within 15 years.[182] Fresh Coast Capital is currently exploring a Detroit-based initiative.

CATEGORY: GREEN STORMWATER INFRASTRUCTURE

Green stormwater infrastructure uses land in a manner that promotes the natural storage and infiltration of stormwater into the ground. Green stormwater infrastructure use in urban environments has grown dramatically over the last 15 years, driven in large part by wastewater utility investment in cost-effective, above-ground infrastructure that not only provides water quality benefits, but also provides aesthetic and community benefits not available with buried, out-of-site sewers and storage tanks ("gray" infrastructure). With the scale of vacant land that exists in Detroit, as well as the increasingly expensive cost of managing and replacing traditional gray infrastructure, there is a great potential to develop green stormwater infrastructure in long-term open space areas.

Green stormwater infrastructure takes many forms and can include bioretention areas, rain gardens, green roofs, porous pavement, native landscaping, stormwater wetlands, rain barrels, cisterns, and other technologies. For a long-term open space, the primary technology considered in this report is bioretention; however, wetland green infrastructure is discussed below for specific situations, and native landscaping is addressed in its own section in the report.

Unlike other sections of this report, such as productive landscapes, there is not a single spotlight analysis for an individual type of green stormwater infrastructure. Since green stormwater infrastructure engineering can be applied to a variety of landscapes and bioretention covers a multitude of different green stormwater infrastructure techniques, this section provides a financial overview and guidance for green stormwater infrastructure generally. Future reports could analyze specific green stormwater infrastructure mechanisms in open space areas such as:

- **Site grading**. Green stormwater infrastructure ideas on vacant land or open space provide an opportunity for innovation and cost effectiveness. Besides traditional bioretention, the City could consider promoting shallow grading to safe depths, depending on planned usage, especially when blight removal and demolition is planned; this would allow cost-effective excavation and installation of stormwater storage. When combined with meadow plantings for site restoration, immediate maintenance cost savings could be realized.
- **Wetlands**. Other ideas for green stormwater infrastructure could include installing wetlands in low areas or where drainage inlets could be removed and some excavation for storage could occur. With so much open space available, excavated soils should be able to be placed cost effectively nearby or be used for other purposes like demolition fill. Some recent innovations include pilots to determine whether demolished basements can be filled with open graded rock and used for stormwater storage by providing cistern storage-type benefits with a BaseTern™.[183] Locating cisterns and other water-holding green stormwater infrastructure features that could be used for irrigation near community gardens is another potential strategy to reduce stormwater runoff. The amount of area needed for cisterns is

limited, with the above-ground area still conducive to many of the land uses considered in this report.

- **Native landscaping**. Other urban areas have used native landscaping as a green stormwater infrastructure technology. For example, Milwaukee's *Regional Green Stormwater Infrastructure Plan* calls for 8,600 acres of native landscaping to reduce runoff from turf grass areas.[184] Native landscaping reduces runoff, improves aesthetics, increases habitat value, and also costs less to maintain than turf grass once established. With more than 30 square miles of vacant land that needs to be maintained, Detroit could see significant long-term maintenance cost savings if green stormwater infrastructure planning is used to convert turf grass areas to native landscaping, especially where open space is the planned long-term land use (see additional discussion in the Natural Landscapes Section). With 70 to 120 acres of meadow potentially planted for the same cost as one acre of bioretention, and with meadows having lower long-term maintenance costs, green stormwater infrastructure spending on meadows within long-term open space could offer significant value to Detroit.

SUMMARY

Implementation costs: **High**. Costs for bioretention vary based upon the local conditions. Traditional urban systems not uncommonly cost $20 to $50 per square foot depending upon whether construction is coordinated with other planned capital projects. Prices this high could be unaffordable, and consequently, the Detroit area will have to look at lowering costs through standardized designs and reducing some features where appropriate for the conditions within long-term open space areas. For cost estimate purposes, $5 to $10 per square foot has been used for capital costs (approximately $218,000 to $436,000 per acre). Actual capital costs would be different, depending upon site-specific conditions, economic market at the time, and final design approach for green stormwater infrastructure in open space.

Implementation costs could be less expensive on open space by having fewer constraints from utilities and buildings, potentially larger area for implementation, as well as being able to dispose of excavated material nearby. Live plants have traditionally been used to provide quick aesthetic improvements and reduce weed growth through immediate mulching of the planting bed. Further cost reductions could be realized if lower cost seeds could be successfully implemented instead of live plantings. As a result, green stormwater infrastructure installation in long-term open space areas on vacant land may be able to be accomplished more cost effectively.

Maintenance costs: **Moderate.** Recent bioretention maintenance costs in other cities have been documented at approximately $0.60 to $1.00 per square foot per year or $26,000 to $44,000 per acre per year.[185] While these costs are for highly visible areas maintained at a high level of service, costs this high likely would be unaffordable in Detroit in long-term open space areas.

Sites having drainage predominantly from vegetated areas, limited trash accumulation, and in less visible, highly trafficked areas, however, could be expected to cost much less. Operation and maintenance costs have been assumed to be $1,000 to $5,000 per acre per year.[186]

Revenue potential: **None**. Unlike the productive landscapes that harvest a product with a monetary value, green stormwater infrastructure, in and of itself (that is not paired with a productive treatment), does not produce a product for revenue. That being said, the primary value proposition for green stormwater infrastructure, from a financial standpoint, is cost savings. Looking across the non-productive landscapes examined in this report, green stormwater infrastructure has the highest potential for cost savings.

Implementer or owner: **Likely a public utility or governmental entity.** Since green stormwater infrastructure, at scale would serve as an integral component of a stormwater management system, the local utility, in this case, Detroit Water and Sewerage Department, would be the most likely implementer. Governmental and quasi-governmental entities could play a significant role in the ownership of this land long-term, providing long-term leases to DWSD or other entities to manage green stormwater infrastructure. Private nonprofit and for-profit entities could also play a role in the implementation and management of green stormwater infrastructure.

Other financially related benefits: There are a number of other financially related benefits for productive landscapes that may have broader implications beyond the individual implementation site. Specifically:

- **Significant cost savings for the water utility**. Despite having the nation's largest wastewater treatment plant in North America, Detroit's combined sewer system becomes overwhelmed during significant rain events and discharges untreated sewerage into the Detroit and Rouge Rivers.[187] In 2011, Detroit discharged its overflow 36 times, amounting to 47.7 billion gallons of raw untreated sewerage, enough to fill 4,800 Olympic size swimming pools.[188] These CSO discharges combined with an oversized and aging gray infrastructure, will result in significant investment into new infrastructure – the cost to develop a traditional gray infrastructure holding tunnel to deal with the discharge is estimated at around $800 million.[189] At scale, green stormwater infrastructure can significantly minimize the future cost of expanding or replacing highly expensive gray infrastructure because it reduces the volume of stormwater piping into the combined sewer system.
- **Cost savings for individual residents**. Water customers will ultimately shoulder the future financial burden of costly infrastructure. To the extent green stormwater infrastructure can offset or lower some of those costs, it will help to stabilize or reduce the costs of CSO infrastructure that will be passed along to consumers. Beyond the water bills residents pay, green stormwater infrastructure's ability to capture stormwater has the potential to reduce the cost to residents from localized flooding that leads to costly property damage by reducing both the burden on the sewer system as well as redirecting surface water away

from homes if conveyance mechanisms, such as bioswales, are used to channel water to larger retention areas in long-term open space areas.

- **Job creation**. The installation of green stormwater infrastructure projects would provide opportunities for job creation, largely for landscaping oriented positions. Ongoing maintenance would generate some sustained employment opportunities, however the availably of positions would decline after initial installation.
- **Potential for increased property values**. Studies have found property values can increase near green stormwater infrastructure. A review in Milwaukee of prior studies found a median property value increase of 4 percent.[190] While increased property values are possible, they are more likely with the more aesthetically pleasing green stormwater infrastructure treatments adjacent to residential land uses.

POTENTIAL FUNDING TOOLS

Of the open space uses, currently green stormwater infrastructure has the most dedicated public funding to support its implementation. Detroit is obligated to spend $**50** million as part of its agreement with the U.S. EPA for combined sewer overflow control. Beyond that dedicated funding, since green stormwater infrastructure will benefit a system with an existing user base and relatively secure future revenue, there are a number of other opportunities to develop additional funding beyond the existing $50 million. Below are some observations about the potential applicability of funding source types for green stormwater infrastructure, generally, with a few spotlighted funding tools providing additional detail, including:

- Green bonds
- Green stormwater infrastructure credit trading
- Green stormwater infrastructure bank

Appendix 6 provides additional specificity on funding applicability by use type.

<u>Direct Fees</u>: **Medium applicability**. There are some opportunities to use types of direct fees to fund green stormwater infrastructure. Specifically:

- **Drainage Fees**. Revenue from drainage fees could be used to invest in offsite green stormwater infrastructure. In Philadelphia, drainage fee discounts are offered to property owners who implement green stormwater infrastructure. A variation on such an approach could be to offer property owners a discount if they offset imperviousness on their property with green stormwater infrastructure implemented elsewhere. While increasing drainage fees may not be difficult, allocating a portion of the drainage fee to green stormwater infrastructure in the long-term open space area may prove cost effective to make current funding for drainage improvements go further.

Debt Tools: High applicability. Given that green stormwater infrastructure could serve as a vital component of the sewer infrastructure in Detroit, bonds and other municipal debt tools are particularly applicable. Specifically:

- ***Funding Tool Spotlight:*** **Green Bonds.** Green bonds provide an opportunity for issuers to fund environmental projects while also diversifying their investor base. Green bonds can be issued by various organization types, including corporations, municipalities, states, and multinationals. In the case of most green bonds for land conservation to date, bonds are issued as general obligation bonds and repayments are not tied to specific project revenue streams. This is mostly due to the fact that green bonds are still a relatively new asset class, and investors do not clearly understand how sustainable land use and conservation projects can generate reliable cash flows – so issuers get a lower interest rate when they issue as a general obligation bond. One such example of a land conservation bond is the 2013 Massachusetts green bond issuance, the proceeds of which went in part to land acquisition for ecologically-sensitive wetlands along the coast.[191]

  In the case of Detroit, issuing more public debt might not be an optimal or viable approach for financing acquisition, maintenance, or new projects on open land parcels. However, as discussed below, PABs may be a viable option in some cases, and could likely be issued as "green bond PABs." To take advantage of green bond investors, issuers will face two challenges: size and credit quality. Firstly, unlike the general PAB market which has demonstrated an ability to absorb relatively small bonds in the past, most green bond issuances are in excess of $100 million.[192] Green bonds are therefore most appropriate to fund portions of DFC's open space vision that can be aggregated into a larger project. Secondly, many of the investor types identified above are generally risk-adverse and prefer investment-grade credits. Both of these issues may be overcome through strategic use of other funding sources. For example, a foundation may agree to buy a small green bond issuance as a direct investment, or to provide credit enhancement for a project.

- **General obligation bonds**. General obligation bonds, secured by future property tax payments, could be used to fund green stormwater infrastructure, along with a number of other open space uses, however, due to the City's financial constraints and bond rating, this is not likely a near term funding option. Further, one of the issues is that green stormwater infrastructure life cycles are relatively new to the market. Consequently, the life cycle of the improvements is still being developed; term of the bonds may be limited to 15 to 20 years maximum.

- **Revenue bonds.** Revenue bonds, which are secured by a dedication of an identified revenue stream, could be an option for green stormwater infrastructure given the reliable revenue stream that could be generated from DWSD user fees.

- **Private activity bonds (PABs).** PABs could be explored for private entities to support the installation of green stormwater infrastructure.

- **Revolving loan funds**. A RLF could be developed to help support the execution of green stormwater infrastructure by a variety of entities local governments, special districts, state agencies, private corporations, or nonprofit organizations.

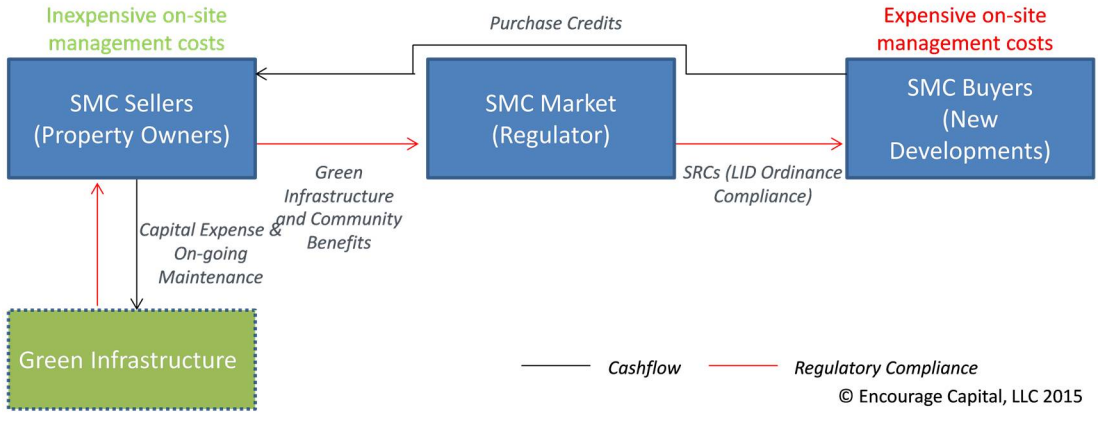
Credit Assistance: Medium applicability. Credit assistance mechanisms could be pursued to help alleviate some of the associated risk of green stormwater infrastructure to free up additional lending. Specifically:

- **Water Infrastructure Finance and Innovation Act Program (WIFIA)**. WIFIA was created to provide federal credit assistance (e.g. secured loans or loan guarantees) for large projects that face financing challenges due to their size or complexity. WIFIA provides secured loans and loan guarantees for up to 49% of eligible project costs and can only assist projects that exceed $20 million in total costs. WIFIA can support both governmental and nongovernmental agencies.
- **Loan guarantees.** Loan guarantees could be issued by state or federal agencies for green stormwater infrastructure to enable access to better borrowing terms and reduce financing costs.

Equity/Private Sources: High applicability. Given green stormwater infrastructure's ability to operate an integral component of a sewer system, which generates largely predictable future revenue, green stormwater infrastructure has a great opportunity to leverage private sources of funding.
Specifically:

- ***Funding Tool Spotlight*: Green Stormwater Infrastructure Credit Trading and LID Ordinance.** Certain stormwater regulations can shift the cost of green stormwater infrastructure construction and maintenance wholly to the private sector. One such regulation is a low impact development (LID) ordinance. LID ordinances require developers to retain a certain amount of stormwater on their properties, or otherwise to pay for that stormwater to be managed via offsite green stormwater infrastructure. Properties

Figure 11: Green Stormwater Infrastructure Credit Trading



that exceed the LID ordinance or voluntarily retrofit properties may benefit from reduced fees.

One challenge with implementing LID ordinances is the variable cost of compliance. Stormwater credit trading is one solution a regulator can employ to increase the level of green stormwater infrastructure investment in its jurisdiction. Under a credit trading system, developers subject to the LID Ordinance are allowed to meet all or some of their green stormwater infrastructure requirement offsite. These developers can buy credits from inexpensive green stormwater infrastructure projects. In aggregate, this reduces the citywide cost of meeting a LID ordinance, allowing the regulator to impose more stringent stormwater regulations. It also creates a revenue stream—in the form of credit purchases—to repay investment in low-cost green stormwater infrastructure.[193]

This system has recently been implemented in Washington, D.C.,[194] and the first commercial trades are just beginning to take place. Currently the Washington, D.C. market only operates between private developers and private green stormwater infrastructure projects. The system in DC would be stronger if the public sector also used the market to meet its green stormwater infrastructure requirements, though even the private market is experiencing investment and interest from developers.[195]

Introducing a LID ordinance in a city where it is not currently in place can present political challenges and requires careful engagement of developers in the area. These trading systems tend to work best in cities where there is a rapid pace of (re-)development and where there is a wide range of land values, for that reason, this may be a longer term funding strategy given Detroit's current market conditions. In assessing feasibility of a credit trading program, DFC may wish to consider a focused use of credit trading to incentivize green stormwater infrastructure retrofits to offset the stormwater impacts of new development in Detroit.

- ***Funding Tool Spotlight*: Green Stormwater Infrastructure Bank.** An alternative to credit trading could be the creation of a green stormwater infrastructure bank, taking advantage of the $15 million pledged to green stormwater infrastructure in Detroit. This funding, alone or coupled with additional private money, could be channeled into building large allotments of concentrated, cost-effective green stormwater infrastructure sites strategically placed throughout the City.

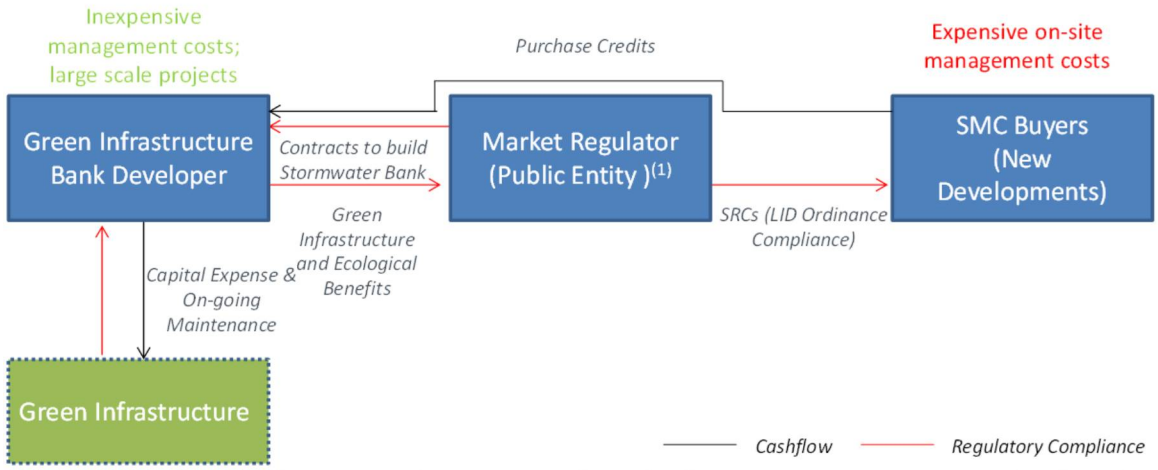
  As development and re-development continues, instead of building green stormwater infrastructure on site and trading to achieve least-cost retention, as under the trading program, developers required to manage stormwater from their sites could purchase retention credits from the green stormwater infrastructure bank. This purchasing program could be structured in the form of off-take agreements, in which developers would agree to buy a certain amount of credits in order to guarantee a regular revenue stream to the city. These purchases, which should increase in quantity over time as Detroit continues to recover, could be used to fund maintenance and expansion of the green stormwater

infrastructure bank, all while taking advantage of significant economies of scale for both construction and maintenance costs.

The benefit of this approach, in addition to the presumed cost savings from doing larger aggregated projects as opposed to smaller disaggregated ones, is that the city could target exclusively high impact ecological sites or pioneer new Best Management Practices (BMPs) that are most appropriate for Detroit. Either the City or a third party investor could manage this bank.

- **Public-private partnership (P3)**. Recently communities are considering third party investment through public-private partnerships to implement green stormwater infrastructure. One example is Prince George's County, Maryland[196] that is investing $100 million over three years in green stormwater infrastructure. The goal is that private funding and a high level of implementation would induce innovation to drive down implementation and maintenance costs. Fundamental to this model is an outside investor receiving dedicated compensation for this purpose over time through drainage fee assessments or other revenue sources. With Detroit recovering financially, this is a less likely implementation model, especially if only applied to open space. It could be more attractive in the future as Detroit recovers financially, if dedicated funding would be available long-term, and if quick implementation of green stormwater infrastructure at a large scale is desired.
- **Impact bonds/Social impact bonds**. An impact bond could potentially be structured around reducing the amount of CSO discharges into the Detroit River through the increased use of green stormwater infrastructure.
- **Pay for success**. A pay for success or pay-for-performance contract could be explored between Detroit and a private entity for green stormwater infrastructure centered on

Figure 12: Green Stormwater Infrastructure Bank



(1) Regulator and/or other public entities may also participate as a buyer of credits to meet their own compliance needs or the City's green infrastructure goals

improvements to the CSO system and repaid through related cost savings and drainage fees.

- **Infrastructure Investment Funds**. An infrastructure investment fund could be explored as a financing tool that could pay for green stormwater infrastructure capital cost under a public-private partnership.

Value Capture Mechanisms: Lower applicability. Depending on the manner of green stormwater infrastructure installation, some degree of property value increase could occur, but further exploration would be needed to determine if that increase in value could be leveraged in a meaningful way through a TIF or other value capture mechanism.

Grants: Medium applicability. Grant opportunities at the funding level needed to fully sustain green stormwater infrastructure implementation in open space do not currently exist, but grant funds could still play an important role. The Great Lakes Restoration Initiative has been a good source of green stormwater infrastructure funding in recent years. A compilation of Michigan green stormwater infrastructure grant and other funding sources has been compiled and illustrates the availability and limitations of grant funding.[197]

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While green stormwater infrastructure has the greatest potential for cost savings of the open space classifications, there are still a number of financial risks associated with the implementation and long-term maintenance of green stormwater infrastructure, particularly due to the high upfront costs. DFC can work to make green stormwater infrastructure more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of open space uses could help to increase the financial feasibility or reduce the financial risk of green stormwater infrastructure. Specifically:

- **Dedicate a portion of long-term open space for green stormwater infrastructure.** The bioretention design rule of thumb is that 1 square foot of bioretention can handle and treat up to 10 square feet of impervious area runoff. Highly urbanized areas may have an imperviousness of 50 percent or more. But in the long-term open space areas[198] where in the future, the only long-term impervious area would be roads, imperviousness may be on the order of 15 percent of the area.

  Using the 10-to-1 rule of thumb, a low-end area would be needed for bioretention of 1 percent. A reasonably high-end area that could be used for green stormwater infrastructure could be 5 percent of the available open space, which could then easily treat runoff from impervious as well as pervious areas. However, since much of the open space is

pervious, a bioretention garden could reasonably handle more than a 10-to-1 ratio area—perhaps one as high as 20. At this ratio, five percent of the area could theoretically treat runoff from all of the open space area.

For the purposes of this report, five percent of the open space area was projected as green stormwater infrastructure, corresponding to approximately 370 acres. The cost range offered earlier in this section provided a range of $218,000 to $436,000 per acre, which spread across 370 acres, gives an idea of the potential magnitude of costs involved with bioretention implementation.

- **Locate green stormwater infrastructure areas throughout long-term open space areas, with special priority on any lower-lying areas and areas adjacent to more impervious areas**. In order to relieve as much burden as possible from the sewer system, and thereby save as much money as possible, bioretention areas need to be planned for throughout long-term open space areas, as opposed to being concentrated in a single area. Green stormwater infrastructure requires hundreds of sites to capture runoff from open spaces. Bioretention is generally less than an acre in size, often smaller than a quarter acre. Environmentally sensitive areas that need environmental remediation, could be considered for larger-scale projects. For example, restored wetlands could provide riparian habitats for native species and capture contaminated stormwater directly before reaching vital bodies of water. Though there are opportunities for larger-scale green stormwater infrastructure projects, there still should be scale and geographic diversity in order to capture runoff throughout the long-term open space area.

  Green stormwater infrastructure would fit best in lower-lying areas and along periphery of open space areas adjacent to areas with greater imperviousness. The benefit green stormwater infrastructure implementation has on combined sewer overflow reduction will vary depending upon the characteristics of the sewershed making green stormwater infrastructure even more beneficial in some areas than others when only considering combined sewer overflow reduction. However, all areas could benefit from green stormwater infrastructure.

  Further, as compared to other land use areas, long-term open space areas provide unique, potentially low-cost implementation opportunities. Recent analyses have found significant opportunities for cost-effectiveness improvements in open space areas.[199] For example, low-lying areas could be targeted for constructing stormwater wetlands. Street corners where sewer inlets could be removed may be excavated to create areas that capture water and create a bioretention area or stormwater wetland at potentially very little cost. These wetland areas could be allowed to slowly drain to the sewer system or overflow to the system during larger events.[200] Finding appropriate locations would have to consider nearby inhabited areas, but with 20 square miles of open space, feasible locations are likely.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, as well as green stormwater infrastructure implementers, may also consider the following guidance as they look to improve the financial feasibly of green stormwater infrastructure. Specifically:

- **Maximize the geography of green stormwater infrastructure through low-tech installation and maintenance strategies.** As previously mentioned, the City of Detroit is currently spending $3 million annually on green stormwater infrastructure as part of an U.S. Environmental Protection Agency (EPA) agreement for combined sewer overflow reduction. DWSD has initiated some pilot green stormwater infrastructure sites, however, future implementation could span a much greater geography if more cost-effective green stormwater infrastructure mechanisms were used.
- **Explore ways to use storm water drainage fees, stormwater retention credits, and regulations supporting off-site mitigation.** Funding green stormwater infrastructure through drainage fees or stormwater retention credits and stormwater regulations that allow investment in off-site property should be considered, but further research is needed to outline the terms of those mechanisms.
- **Advocate for state policies that will support green stormwater infrastructure as a prioritized form of stormwater infrastructure.** While green stormwater infrastructure has been supported to a degree at the local level, state policy changes should be explored to enable green stormwater infrastructure to be considered a viable and prioritized component of a long-term CSO control plan.

Examples

Green stormwater infrastructure programs in Philadelphia and Washington, DC, have been previously mentioned for their innovative incentives for green stormwater infrastructure implementation. In addition, Onondaga County, New York, has implemented a "Save the Rain" program of green stormwater infrastructure, including on vacant lots[201] and Cleveland's Woodland Central green stormwater infrastructure implementation effort is repurposing a vacant brownfield property into a beautifully landscaped area providing stormwater benefits.[202]

CATEGORY: NATURAL AREAS

Natural areas are those natural landscapes that provide important ecological functions such as providing habitat for plants and animals and cleaning the air, water, and soil. Natural areas can include some passive recreation as a secondary use, but generally have minimal human impact. Examples of natural areas include wetlands, riparian corridors, meadows, or forests. With the scale of vacant land that exists in Detroit, there are an abundance of opportunities for intentional natural areas.

This section provides a financial overview and guidance for natural areas, generally, then more specifically for two spotlighted uses, including:

- Meadows
- Forests

SUMMARY

Implementation costs: **Low**. Implementation costs for natural areas are, generally speaking, the lowest of all the general categories of open space. Of the spotlight uses examined in this report, implementation costs average out at around $5,000/acre.

Maintenance costs: **Low.** Since natural areas are areas that are not traditionally maintained on a frequent basis, as opposed to uses that are primarily recreation uses, the maintenance costs are low. When installation first occurs, maintenance costs will be higher to get the natural area established, but once established, maintenance may be around $200/acre, or depending on the level of maintenance desired, could be $0, e.g. many established forests in northern Michigan are not actively maintained – nature takes care of that.

Revenue potential: **None**. Unlike the productive landscapes that harvest a product with a monetary value, natural areas, by themselves (that is not paired with a productive treatment), do not produce a product for revenue. That being said, the primary value proposition for natural areas, from a financial standpoint, is cost savings. Looking across the non-productive landscapes examined in this report, natural areas have the most potential to reduce costs in the largest geography.

Implementer or owner: **Likely a nonprofit or governmental entity.** Private nonprofit entities would likely play a role in the implementation, management, and potentially ownership of natural areas. Governmental and quasi-governmental entities would also likely play a significant role, minimally in the ownership, but also likely in the implementation of this land long-term, potentially providing long-term leases to other entities to manage natural areas.

Other financially related benefits: There are a number of other financially related benefits for natural areas that may have broader implications beyond the individual implementation site.[203] Specifically:

- **Significant long-term maintenance cost savings for the City**. Currently the predominant landscape in open space areas is turf grass, which requires indefinite yearly maintenance, amounting to a hefty financial burden on the City over time, as discussed at the start of the Funding Section. These future costs, spread across the expanse of future open space are an inefficient use of City resources. Natural landscapes provide a significant opportunity to minimize and nearly eliminate future maintenance costs in open space areas. While natural landscapes will have a larger upfront cost if brought to scale, those costs will be offset by the long-term future maintenance cost savings, as compared to turf grass.
- **Reduction in longer-term medical costs**. Installing long-term natural areas could be a mechanism to reduce future medical costs for residents given that they contribute to improvements to air quality and mental well-being.[204]
- **Potential for increased property values**. Properties adjacent to natural areas have the potential to realize an increase in property values as a result of the improved aesthetic as compared to an unkempt turf grass lot. Property value appreciation could vary based on the specific type of natural landscape.

POTENTIAL FUNDING TOOLS

Purely natural landscapes epitomize the inherent difficulty that all ecosystem investments face in converting environmental benefits into economic gains. In some cases, it is possible to articulate returns from preserving meadows, marshes, and forests in terms of ecosystem services provided, such as carbon mitigation, stormwater management through wetlands and riverbank preservation, habitat preservation, etc. The availability of funding for the installation of natural landscapes is very limited, however, natural landscapes could be integrated into green stormwater infrastructure projects thereby greatly increasing the sources of funding. Government and philanthropy are the most likely sources of funding for purely natural areas. Below are some observations about the potential applicability of funding sources for natural areas, generally. Appendix 6 provides additional specificity on funding applicability by use type.

Direct Fees: **Medium applicability**. Since natural areas are not intended to be frequently used or managed, there is lower opportunity to generate direct fees. Tax revenue certainly could be applicable, however with limited available revenue, this source will be constrained. As local municipal finances change, property tax revenue could be examined. Specifically:

- **General Fund**. Use of general funds through property tax generation for natural areas is a potential source of funding but is unlikely to be a significant funding source in the near term in light of the City's limited resources.

- **Community Preservation Fund**. Community Preservation Funds (CPF) are tax programs implemented by states and municipalities to fund their open space protection and enhancement, including natural areas. In New York, the CPF is funded largely by a real estate transfer fee. In return, CPFs enable municipalities to purchase land or development rights from willing sellers in order to protect community character.[205] In Massachusetts, the CPF is funded through a 3% property tax, typically applicable only for properties over a certain value, and at the state level through a fee on deed recordings. This funding is then used for a variety of uses including the acquisition, creation, and preservation of open space, recreation, historic properties, and affordable housing.[206]

Debt Tools: Medium applicability. Given the limited ability for natural areas to generate private sources of revenue and the intent of the natural areas to deliver a public benefit through the creation and protection of ecologically sensitive areas, public debt tools will be an important funding source.

- **General Obligation Bonds**. General obligation bonds could be examined as a source of revenue for natural areas particularly because the installation and preservation of open space as natural areas could lead to improved property values in the city and the public value of preserved ecological areas. [207]

Credit Assistance: Low applicability. Credit assistance mechanisms are not likely to be very applicable for natural areas given the limited potential for traditional lending.

Private Sources/Equity: **Low applicability**. Given the limited revenue generation potential of unmaintained natural areas, private funding is less applicable. However, as previously mentioned, if natural areas can be combined with green stormwater infrastructure uses, natural areas could leverage those private sources of funding.

Value Capture Mechanisms: Medium applicability. The installation of high quality natural areas has the potential to increase the property value of surrounding areas. The extent of that value increase will require further exploration. Further, since natural areas are not intended to be as intensively managed as parks and recreation uses, they will not likely reap as high of a property value impact as park and recreation uses. Special districts and TIFs could be examined to help support natural area creation through the impact of natural areas on property values.

Grants: High applicability. Of all the funding sources, grants may have the greatest current applicability for natural areas. Natural areas have a high degree of ecological value and given the difficulty of monetizing that value for traditional financing, grants will be critical to fund natural areas. Grant opportunities for natural areas could be pursued specifically related to reestablishing and/or preserving critical habitats. Additionally, grants from philanthropic sources are particularly applicable. Beyond those sources though, instances of urban space returning to nature may be appealing to university or government researchers. Grants from

these groups could supplant or complement a foundation's philanthropic support and provide an additional source of funding.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While natural areas may be the least expensive option to maintain large amounts of open space, as compared to the other open space uses, there are still a number of financial risks associated with the implementation and long-term maintenance of these land uses. DFC can work to make natural areas more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of open space uses could help to increase the financial feasibility or reduce the financial risk of natural areas. Specifically:

- **Maximize the amount of open space planned for natural areas where productive landscapes are infeasible.** Given the large scale of open space in Detroit and the relatively limited resources, at the private and public level, available for the installation and ongoing maintenance of that space a significant portion of land should be planned for open space, simply from a financial standpoint. As previously discussed, natural areas have the most potential to cover the largest geography for the least amount of money, however they will need to be largely supported through governmental and philanthropic means given that private funding is less likely. For this reason, the financially prudent action is to plan for natural areas at the scale that productive landscapes cannot financially cover.

  For the purposes of this report, an area of 3,100 acres was assumed for natural areas. This area was estimated by first looking at other land use needs and then allocating the remainder of the land to natural uses. Actual acreage could vary based on the scale of other uses.

- **Locate natural areas throughout long-term open space areas, with consideration for the specific type of use and environmentally critical areas**. Natural landscapes are perhaps the most flexible open space option from a location standpoint. They do not necessarily need to be aggregated in a specific area or at a specific level, from a financial standpoint, though that can vary depending on the funding source, e.g. grants for critical habitats. For this reason, they could be planned for throughout long-term open space areas. That being said, there are some natural area uses that are more costly and permanent in nature, e.g. a forest compared to a meadow, such that, special scrutiny should be given to area designation so as to not inefficiently use resources. Further, there are some environmentally critical areas in Detroit that planners may want to designate permanently as natural areas to ensure these habitats can be developed and preserved.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, as well as natural area implementers, may also consider the following guidance as they look to improve the financial feasibly of natural areas. Specifically:

- **Explore ways that natural areas could be integrated with green stormwater infrastructure**. Generally speaking, there is not a bright line between natural areas and green stormwater infrastructure. Natural areas can support the stormwater retention goals of green stormwater infrastructure. Given that there is more dedicated funding and funding opportunity for green stormwater infrastructure, combining green stormwater infrastructure with natural areas may provide the best opportunity to leverage and attract funding for natural areas.
- **Pursue a partnership with the Michigan Department of Natural Resources**. The DNR has a number of assets that could be tremendously beneficial both to fund and hold open space land, many of which are discussed in the Ownership Section. From a funding standpoint, their Natural Resources Trust Fund should be maximized to the extent possible to financially support natural areas.

TYPE SPOTLIGHT: MEADOW

Meadows offer a tremendous opportunity to reuse a large amount open space land in Detroit given their low installation and maintenance costs.

This section provides a financial overview and considerations for meadows in long-term open space areas.

SUMMARY

Implementation costs: **Low**. Installation costs for meadows are estimated at $3,000 to $4,000 per acre, with actual costs differing depending upon site-specific and local market conditions. If meadow installation occurred immediately when a property is demolished, little or no additional costs would be incurred to plant a meadow as opposed to turf grass.

Maintenance costs: **Low.** Maintenance will be required in the early years to ensure that the meadow becomes established and is not overgrown by undesirable species. After that point, maintenance levels depend on the desired manner of growth. Meadow maintenance costs could range from $100 to $200 per acre per year if annual mowing is desired. Burning techniques could also be used to further lower maintenance costs.

Revenue potential: **None**. As with natural areas in general, meadows, by themselves (that is not paired with a productive treatment), do not produce a product for revenue. The primary value proposition for meadows, from a financial standpoint, is future cost savings.

Implementer or owner: **Likely a nonprofit or governmental entity. As with natural areas in general, p**rivate nonprofit entities would likely play a role in the implementation, management, and potentially ownership of meadows. Governmental and quasi-governmental entities would also likely play a significant role, minimally in the ownership, but also likely in the implementation of this land long-term, potentially providing long-term leases to other entities to manage meadows.

Other financially related benefits: There are a number of other financially related benefits for meadows that may have broader implications beyond the individual implementation site.[208] These are consistent with the benefits mentioned in the previous Natural Areas Section, broadly: significant long-term maintenance cost savings for the City, reduction in longer-term medical costs, and potential for increased property values.

POTENTIAL FUNDING TOOLS

As with natural landscapes more generally, the availability of funding for the installation of meadows is very limited, however, meadows could be integrated into green stormwater

infrastructure projects, as was done in Milwaukee, thereby greatly increasing the sources of funding. Government and philanthropy are the most likely sources of funding for meadows. Below are some observations about the potential applicability of funding sources for meadows, generally. Appendix 6 provides additional specificity on funding applicability by use type.

Direct Fees: Low applicability. Since natural area meadows are not intended to be actively used or managed, there is lower opportunity to generate direct fees. Tax revenue certainly could be applicable, however with limited available revenue, this source will be constrained. As local municipal finances change, property tax revenue could be examined. Specifically:

- **General Fund**. Use of general funds through property tax generation for meadows is a potential source of funding particularly because City funding is currently being used for property maintenance of grassy lots in open space areas. Meadows can offer the City the potential for reduced future maintenance costs if the City was to divert its mowing costs on these lots to installation of meadows. However, the City would need additional sources of funding to offset the installation costs.
- **Community Preservation Fund**. Community Preservation Funds (CPF), mentioned in the Natural Areas Section, are a potential source of revenue if a CPF is established.

Debt Tools: Medium applicability. As with natural areas more generally, some municipal debt sources could be examined for meadows, such as general obligation bonds.

Credit Assistance: Low applicability. Credit assistance mechanisms are not likely to be very applicable for meadows given the limited potential for traditional lending.

Private Sources/Equity: Low applicability. Given the limited revenue generation potential of meadows, private funding is less applicable. However, as previously mentioned, if meadows can be combined with green stormwater infrastructure uses, meadows could leverage those private sources of funding.

Value Capture Mechanisms: Medium applicability. The installation of meadows has the potential to increase the property value of surrounding areas. The extent of that value increase will require further exploration.

Grants: High applicability. As with natural areas generally, grants will likely be critical to fund the installation of meadows. Grant opportunities for meadow installation could be pursued specifically related to reestablishing and/or preserving critical habitats. Grants can help to fund gaps in municipal revenue sources for the upfront costs of meadows.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While meadows provide substantial long-term maintenance cost-savings, there are still a number of financial risks associated with the implementation and long-term maintenance of meadows. DFC can work to make meadows more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of meadows could help to increase the financial feasibility or reduce the financial risk of meadows. Specifically:

- **Maximize the amount of open space planned for meadows.** Of the natural landscapes examined in this report, meadows have the lowest installation cost. For that reason, DFC should consider prioritizing meadows as a use in open space areas. Given the large amount of open space acreage and limited resources available to install and maintain that land, meadows offer a viable alternative to reduce future maintenance costs.

  For the purposes of this report, an area of 1,400 acres was assumed for meadows, this area was estimated by first looking at other land use needs and then allocating the remainder of the land to meadow or forest uses.[209] Actual acreage could vary based on the scale of other uses. Additionally, land awaiting other uses, such as future solar installations or urban farms, could be planted as meadows temporarily to reduce maintenance costs and keep trees from establishing, making a transition to these other land uses easier; this would increase the acreage of meadows as well, albeit temporarily.

- **Locate meadows throughout long-term open space areas, particularly where the nature of open space is likely to change in the future**. Meadows are incredibly flexible; they do not necessarily need to be aggregated in a specific area or at a specific level, from a financial standpoint. Further, meadows can be supported financially as an interim open space use which could be particularly helpful from a planning standpoint, as compared to say a permanent forest, where the installation costs are so great that changing the use after 10 years is probably not financially prudent. Though meadows can be used as a shorter-term open space use, if a meadow is established as a part of a critical habitat, it should be considered a permanent use.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, as well as meadow implementers, may also consider the following guidance as they look to improve the financial feasibly of meadows. Specifically:

- **Explore ways that meadows could be integrated with green stormwater infrastructure**. As with natural areas generally, meadows can function as green stormwater infrastructure. Given that there is more dedicated funding and funding opportunity for green stormwater

infrastructure, combining green stormwater infrastructure with meadows may provide the best opportunity to leverage and attract funding for natural areas.

Examples

Located only 10 minutes from downtown Ontario, Canada, the Ojibway Prairie Provincial Nature Reserve provides 230 acres of prairie and savanna for residents to enjoy from a limited number of trails.[210]

The Milwaukee region has employed the use of meadows as a green stormwater infrastructure strategy due to the reduced runoff from native landscapes compared to turf grass.[211]

TYPE SPOTLIGHT: FOREST

Forests offer a great opportunity to reuse a large amount open space land in Detroit given their lower long-term maintenance costs.

This section provides a financial overview and considerations for forests in long-term open space areas.

SUMMARY

Implementation costs: **Low to moderate**. Forest installation costs are estimated at $4,000 to $10,000 per acre, with actual installed costs differing due to site-specific conditions as well as tree type. If areas are allowed to naturally reforest, implementation costs could potentially be free; however, plant species would not be purposefully selected for habitat or plant diversity, potentially leading to undesirable species colonization. Invasive species would not provide the habitat benefits available from native Michigan trees but could still provide a buffer for residential areas.

Maintenance costs: **Low to moderate.** Maintenance costs for trees are more intensive when first establishing due to watering needs and the need to maintain ground cover. Annual maintenance costs could range from $100 to $1,000 per acre. Maintenance costs would be expected to decrease over time as trees become more mature and the need to water and mow between trees is significantly reduced. However, where pruning or thinning trees is required for forest management, maintenance costs would continue. Some areas may be appropriate for having minimal maintenance once established, if consistent with the expected goals of the open space.

Revenue potential: **None**. As with natural areas in general, forests, by themselves (that is not paired with a productive treatment or intended for harvest), do not produce a product for revenue. The primary value proposition for forests, from a financial standpoint, is future cost savings.

Implementer or owner: **Likely a nonprofit or governmental entity.** As with natural areas in general, private nonprofit entities would likely play a role in the implementation, management, and potentially ownership of forests. Governmental and quasi-governmental entities would also likely play a significant role, minimally in the ownership, but also likely in the implementation of this land long-term, potentially providing long-term leases to other entities to manage forests.

Other financially related benefits: There are a number of other financially related benefits for forests that may have broader implications beyond the individual implementation site.[212] These are consistent with the benefits mentioned in the section above for natural areas, e.g. reduced future maintenance costs, though forests may bring a higher level of those benefits, specifically:

- **Reduction in longer-term medical costs**. Installing long-term forests could be a mechanism to lower future medical costs for residents, perhaps to a greater degree than with other natural uses, given that trees can significantly contribute to improvements to air quality and mental well-being.[213]
- **Potential for increased property values**. Properties adjacent to forests have the potential to realize an increase in property values as a result of the improved aesthetic as compared to an unkempt turf grass lot. The potential to realize an increase in property values may be strongest with forests, as compared to other natural area types.

POTENTIAL FUNDING TOOLS

Of the natural landscapes examined in this report, forests may have stronger sources of funding given the broader ecological benefits of increased permanent trees and tree canopy, however sources of funding are still relatively limited. As with natural landscapes generally, forests could be integrated into green stormwater infrastructure projects, thereby greatly increasing the sources of funding. Below are some observations about the potential applicability of funding sources for forests, generally, with some additional detail provided for carbon credits as a spotlighted funding tool. Appendix 6 provides additional specificity on funding applicability by use type.

Direct Fees: **Medium applicability**. Since forests in natural areas (as opposed to parks and recreation uses) are not intended to be heavily used or managed, there is lower opportunity to generate direct fees. Tax revenue certainly could be applicable, however with limited available revenue, this source will be constrained. As local municipal finances change, property tax revenue could be examined. Specifically:

- **General Fund**. Use of general funds through property tax generation for forests is a potential source of funding, however, the City would need additional sources of funding to offset installation costs.
- **Community Preservation Fund**. Community Preservation Funds (CPF) mentioned in the Natural Areas Section, are a potential source of revenue if a CPF is established.

Debt Tools: **Medium applicability.** As with natural areas more generally, some municipal debt sources could be examined for forests, such as general obligation bonds.

Credit Assistance: **Low applicability.** Credit assistance mechanisms are not likely to be very applicable for forests given the limited potential for traditional lending.

Private Sources/Equity: **Low applicability**. Given the limited revenue generation potential of forests, private funding is less applicable. However, as previously mentioned, if forests can be combined with green stormwater infrastructure uses, forests could leverage those private sources of funding. Additionally, carbon credits could be explored.

- ***Funding Tool Spotlight*: Carbon Credits**. California is the first state in the U.S. to develop a comprehensive economy wide cap-and-trade system for greenhouse gas emissions. Since 2012, the State has imposed a limit on the amount of CO2 released by regulated industries, including large industrial emitters and electric utilities. As of January 1st, 2015, the regulation was expanded to include fuels, including gasoline, diesel and natural gas.[214] The market is regulated by the California Air Resources Board (ARB)[215] and supported by three registries that establish standards for carbon offset projects accepted by ARB. Projects within the U.S. can generate emission reduction credits that can be purchased by California emitters to be used to offset emissions.

  Urban forestry projects—which can generate credits from reforestation in urban areas—are one protocol accepted by the California market.[216] It should be noted that urban forests have not been a significant source of credits into the California market to date. Primary reasons for this include:

  - The protocol's requirement for a 100-year management plan for the project typically in the form of a conservation easement;
  - The high cost of planting, monitoring, and reporting urban trees and, as a related factor, the large scale required to generate cost-effective credits, 100+ acres of reforestation at minimum; and
  - The limited eligibility of applications, which must be from land owners with control over the property.

  While these factors have generally made carbon credit producing projects unfeasible in urban areas,[217] Detroit's potential for large reforested areas may create exceptional conditions. It is unlikely that carbon credit revenues could fully fund a project, but may provide valuable additional revenues to support forested areas and other components of the open space plan.

Value Capture Mechanisms: Medium applicability. The installation of forests, perhaps most of the natural landscapes examined here, has the potential to increase the property value of surrounding areas. The extent of that value increase will require further exploration given that these areas are not intended primarily for park and recreation use.

Grants: High applicability. As with natural areas generally, grants will likely be critical to fund the installation of meadows. Grants can help to fund gaps in municipal revenue sources for the upfront costs of meadows.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While forests provide long-term maintenance cost-savings, there are still a number of financial risks associated with the implementation and long-term maintenance of forests. DFC can work

to make forests more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of forests could help to increase the financial feasibility or reduce the financial risk of forests. Specifically:

- **Maximize the amount of open space planned for forests.** Forests offer a way to minimize long-term maintenance costs and may offer some of the strongest secondary financial benefits, for that reason, forests should be prioritized as an open space use.

  For the purposes of this report, 1,800 acres of forest, including those used as buffer, are assumed. This area was estimated by first looking at other land use needs and then allocating the remainder of the land to meadow or forest uses.[218] Actual acreage could vary based on the scale of other uses.

- **Locate forests throughout long-term open space areas, particularly where the nature of open space is not likely to change in the future**. Forests are fairly flexible in that they do not necessarily need to be aggregated in a specific area or at a specific level, from a financial standpoint, though that can vary depending on the funding source, e.g. grants for critical habitats. However, forests and forest buffers should be planned for in areas where the land use is not intended to change given that they require upfront installation costs and take several years to establish.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, as well as forest implementers, may also consider the following guidance as they look to improve the financial feasibly of forests. Specifically:

- **Explore ways that forests could be integrated with green stormwater infrastructure**. As with natural areas generally, forests can function as green stormwater infrastructure. Given that there is more dedicated funding and funding opportunity for green stormwater infrastructure, combining green stormwater infrastructure with forests may provide the best opportunity to leverage and attract funding for forests.

Examples

Forest buffers along transportation corridors are one of the forest uses examined by DFC. As an example, Houston, Texas, has a goal of planting 1 million trees, half of which would be along Texas Department of Transportation right-of-way to improve aesthetics and quality of life along transportation corridors.[219]

In terms of an urban forest use, Havenwoods State Forest, located entirely within Milwaukee, Wisconsin could serve as an example. The 237-acre State Forest is the only Wisconsin State

Forest located within a highly urbanized area. The site became a State Forest in 1980, originating from a vision of providing an environmental education center within Wisconsin's largest city.

CATEGORY: PARKS AND RECREATION

Parks and recreation open space uses would be publicly used land for recreation activities such as biking, walking, and playing sports. Given the scale of land in Detroit's open space areas, there are opportunities for park and recreation uses such as greenways, playgrounds, forested walking trails, soccer fields, campgrounds, skate parks, and large event space. Despite the availability of land in open space areas, traditional park and recreation uses generally should not be prioritized in open space areas since these areas are not intended to be residential in nature in the longer term.[220]

This section provides a financial overview and guidance for parks and recreation, generally, then more specifically for one spotlighted use:

- Greenway Trails

SUMMARY

Implementation costs: **Varies but high**. Implementation costs for park and recreation uses vary to a significant degree based on the nature of the use, however, as compared to other open space uses in the report, they are high.

Maintenance costs: **Varies but high.** As with implementation costs, the maintenance costs for park and recreation uses vary widely based on the nature of the use. Due to the ongoing maintenance and programming needs of park and recreation uses, even the less intensive uses are expensive, as compared to other open space uses, in the long-term.

Revenue potential: **Minimal**. Parks do provide opportunities for revenue generation, e.g. event rental, sponsorship, and vending. However, much of that revenue is folded back into the park to support the operations and maintenance costs.

Implementer or owner: **Likely a nonprofit or governmental entity.** Private nonprofit entities would likely play a role in the implementation, management, and potentially ownership of parks and recreation uses. Governmental and quasi-governmental entities would also likely play a significant role, minimally in the ownership, but also likely in the implementation of this land long-term, potentially providing long-term leases to other entities to manage park and recreation uses.

Other financially related benefits: There are a number of other financially related benefits for park and recreation uses that may have broader implications beyond the individual implementation site. Specifically:

- **Potential for increased property values**. Of all the open space uses, park and recreation uses have the most opportunity to increase adjacent property values. Numerous studies

have shown the measurable increase in property value due to proximity to parks.[221] Given the lower property values in Detroit, the total sum of economic impact of the parks is likely to be less than in stronger market cities, like New York City. In Philadelphia, all dwellings within 500 feet of a park realized an increase of 5% in value.[222] Any property value increase would only be meaningful if the park and recreation area is adjacent to occupied properties in residential or commercial areas.

- **Reduction in medical-related costs**. Of all the open space uses, park and recreation uses may have the most opportunity to reduce medical-related costs. As mentioned previously in the report, Michigan's obesity rate is 31.5%[223] and almost 15% of its school-age children are considered obese.[224] This costs the state more than $3 billion a year for obesity related health care and in just three years, it is expected to rise to $12.5 billion.[225] As demonstrated in numerous studies,[226] increasing access to quality recreation opportunities will help to improve resident health and therefore reduce the level of future medical costs. In addition to physical health, mental health and safety costs could also be diminished by greater access to parks and recreation opportunities. [227]

POTENTIAL FUNDING TOOLS

Park and recreation uses offer a wide range of benefits from potential property value to health benefits that can attract a broader range of potential funding sources. However, DFC and other open space planners will need to balance the funding needs of park and recreation uses in open space areas versus park and recreation uses outside of open space areas, as discussed at the end of this section. Below are some observations about the potential applicability of funding source types for park and recreation uses, generally, with a few spotlighted funding tools providing additional detail, including:

- Transfer fee funds
- Impact bonds
- Improvement districts
- PILOT bonds

Appendix 6 provides additional specificity on funding applicability by use type.

<u>Direct Fees</u>: **Medium applicability**. There are opportunities to generate funding for park and recreation uses from direct fees, though these sources may be limited in the near term. Specifically:

- ***Funding Tool Spotlight*: Transfer Fee Fund.** Transfer fees, often colloquially called "flip taxes" are private fees levied in certain real estate transactions. The fees are levied upon a transfer of property ownership, and are typically a percentage of the transaction price. Imposing a special tax of 1-2% on all real estate transactions to fund open space would allow the City to take advantage of increasing real estate values and, potentially, large transaction volumes as a result of speculation. These transfer fees could be used to fund

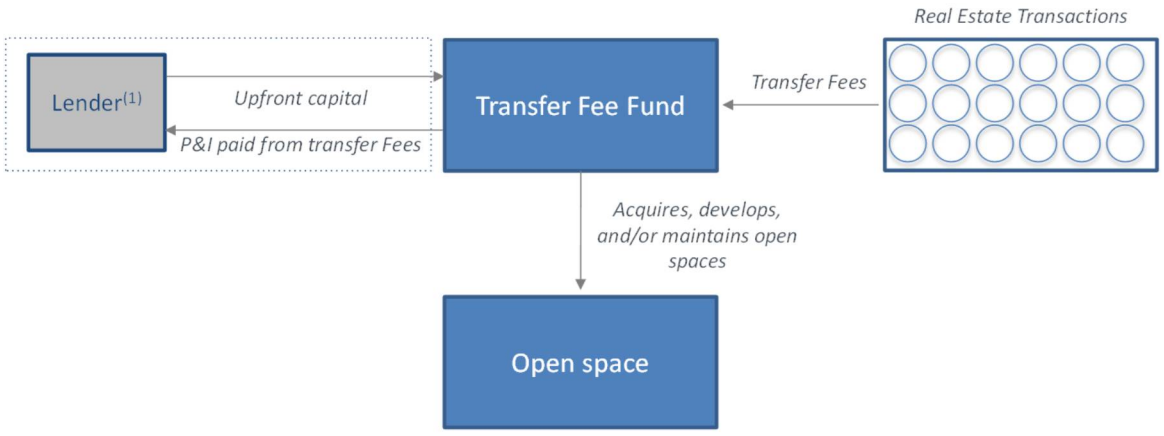
spaces that will ultimately help neighborhoods and residents as well as real estate investors. Furthermore, the fund could include carve-outs of discretionary revolving loan funds that could be used to support enterprises contributing to the open space plan.

This concept may face significant political challenges as developers and property owners in other cities have reacted negatively to what is perceived as an additional tax on the sale of property. This may be particularly true in Detroit where the current real estate market is particularly depressed, making development particularly costly. However, as market conditions change, a transfer fee could be more realistic. It is most likely to be palatable to developers and communities if it is clear that the proceeds will be used for public benefit.

- **User Fees.** There are opportunities for user fee generation for park and recreation uses depending on the specific use, e.g. renting out event space or bicycles rentals or entry fees into park spaces. However, these user fees likely will not be able to fully fund the installation of park spaces.
- **General Fund**. Use of general funds through property tax generation for park and recreation uses is certainly a potential source of funding, however, given the limited funds and number of existing park spaces, this is unlikely to be a significant source of funding for park and recreation uses in open space in the near term.
- **Community Preservation Funds.** CPFs mentioned in the Natural Areas Section, are a potential source of funding for park and recreation uses if a CPF is established.

<u>Debt Tools</u>**: Medium applicability.** Given the public benefits of park and recreation uses, more traditional municipal sources of funding could be applicable.

Figure 13: Transfer Fee Fund



(1) Fund could use transfer fees directly to pay for open space, or may be able to borrow against transfer fees to secure upfront capital for open space acquisition and/or development.

- **General obligation bonds**. General obligation bonds could be examined as a source of revenue for park and recreation uses given the public nature of the use and the potential positive impact on property tax revenue.

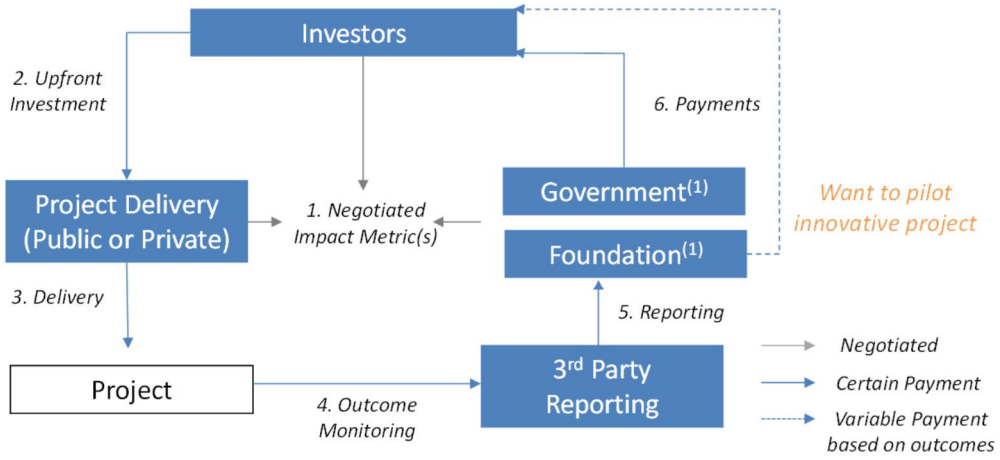
- **Revenue bonds.** Revenue bonds could be explored for park and recreation uses particularly if there is a specially designated source of revenue for park support like a transfer fee.

Credit Assistance: **Low applicability.** Access to certain types of credit assistance, specifically loan guarantees, could be further explored for park and recreation uses. However, there likely stronger applicability for other open space uses, such as solar and green stormwater infrastructure.

Private Sources/Equity: **Medium applicability**. Given the broader environmental and social benefits of park and recreation uses, private financing could be pursued. Specifically:

- *Funding Tool Spotlight*: **Impact bonds**. Impact bonds are gaining momentum in the social sector as a means of funding innovative services and projects. These impact bonds are an application of the Social Impact Bond (SIB) model to a broader range of public benefits, including environmental and economic development priorities. Impact bonds are structured so that an impact investor provides the upfront cost of the project and the city or a supporting foundation agrees to pay them back over time, but only to the extent which the project is deemed a success. This risk transfer drastically reduces the cost of capital for projects that do not meet all of their objectives or success measures. A particularly attractive element is that the 'success' of the project can be measured in a variety of ways – meaning that there are multiple types of public benefits from the development that occurs, including economic, social, and environmental outcomes.

Figure 14: Impact Bond



(1) Typically, impact bonds have one success metric, and one public sector payor. An evolution of this structure may include multiple success metrics, such as green infrastructure performance and real estate value capture. Such a structure may still have only one payor, or may include multiple payors, a foundation guarantee, or a combination thereof.

The City could explore an impact bond to finance a green stormwater infrastructure park that would both control stormwater and create recreational green space. Such an impact bond could allow for two different success payments—one based on the performance of the green stormwater infrastructure in managing stormwater and the other on the value of recreational space, for example on adjacent property values--creating a matrix of possible capital costs based on the performance of the intervention across a variety of metrics. Additional benefits to be measured could include access to open space for urban residents as well as health outcomes of access to parks and playgrounds.

Value Capture Mechanisms: **Medium applicability.** As mentioned earlier in this section, of all the open space uses, park and recreation uses likely have the highest opportunity to increase adjacent property values. Though since property values in Detroit are lower than some other cities that have leveraged increased property values for park and recreation development, this will likely not be a large enough source of revenue to fully fund park development in open space, though value capture mechanisms can be explored. Specifically:

- ***Funding Tool Spotlight*: Improvement Districts.** A well-tested model for funding green space is an Improvement District, where businesses within a certain geographical boundary pay a fee that is pooled and used to fund projects within that boundary. These pools of capital can also successfully leverage public and philanthropic funding sources. Perhaps the most notable example of a successful Improvement District is the Bryant Park Corporation (BPC), which was formed in 1988 in New York City with the assistance of the Rockefeller Brothers Fund. BPC subsequently renovated, reopened, and now manages Bryant Park. Over the last two decades, the park has served as an amenity for the surrounding neighborhood, mostly comprised of commercial office buildings. Rents in buildings adjacent to the park increased seven-fold without any interior renovations, and rental rates for offices bordering the park now command a 63% premium to buildings a block away.[228]

  Detroit could follow the example of NYC's Bryan Park Corporation to supplement public funding for parkland throughout the City. This approach is particularly attractive as it allows neighborhoods to invest in themselves and fosters hyper local character and community, while providing a sustainable source of long-term maintenance funding. The location of any park and recreation space would be critical to make this funding concept work given that open space areas are not residential or commercial in nature. The spaces would need to be immediately adjacent to high occupancy areas or would need to connect destinations.

- ***Funding Tool Spotlight*: PILOT Bonds.** Detroit could also consider payment-in-lieu-of-taxes (PILOT) bonds, which are a similar to the Improvement District, but more binding. The City would cede some or all property taxes for properties bordering major park developments to fund construction of parkland. Future tax revenues, taking into account the expected increase in value from an adjacent park, could be used to repay debt borrowed to fund the park's construction. Property owners would continue to pay based on an

estimate of the assessed value of their property, but these payments would become PILOTs and would go to service the debt used to build the park. PILOT payments are being used to fund, in part, Brooklyn Bridge Park in New York City, and are also frequently used to finance sports facilities and other large recreation projects.

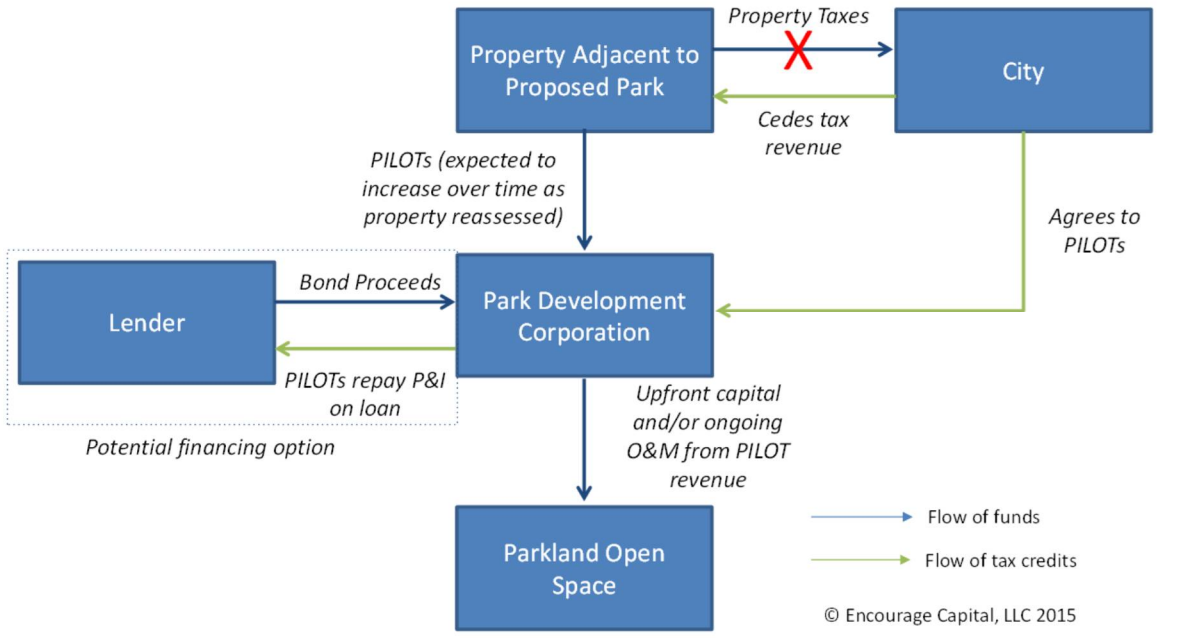
As with Improvement Districts, the location of any park and recreation space would be critical to make this funding concept work given that open space areas are not residential or commercial in nature. The spaces would need to be immediately adjacent to high occupancy areas. Further, given Detroit's municipal revenue constraints and the Plan of Adjustment developed through the municipal bankruptcy proceedings, there may be limits to the political feasibility of PILOTs in Detroit, given the cession of property tax revenue.

Grants: **High applicability.** Since park and recreation uses result in such a broad array of public and social benefits, these uses can appeal to a variety of philanthropic, public, and other corporate grant sources. However, given the high degree of funding need that exists with established parks throughout the city, sources for grant funds may be particularly competitive.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

While park and recreation uses have a number of benefits, given their higher costs, there are still a number of financial risks associated with the implementation and long-term maintenance of these land uses. DFC can work to make park and recreation uses more financially feasible, broadly speaking, by considering the following guidance.

Figure 15: PILOT Bond



Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of open space uses could help to increase the financial feasibility or reduce the financial risk of park and recreation uses. Specifically:

- **Limit the amount of park and recreation uses in long-term open space areas.** Given the current condition and limited resources for maintenance and operations of Detroit's existing park system – only 21% of Detroit's parks are in good condition[229] – the addition of any new parks space needs to be carefully planned from a financial standpoint. While Detroit certainly should look to increase accessibly to high quality park space for its residents, installing a large amount of park space into long-term open space areas, is unlikely to make financial sense given the high cost of installation and maintenance in addition to the financial support needed to maintain Detroit's existing park system.
- **For those park and recreation uses in open spaces, prioritize unique park uses or those park uses that play a connectivity role**. Of the park and recreation uses in open space areas, consider planning for those that serve as linkages to other amenities or offer a unique function. For the land that is planned for park and recreation uses in the long-term open space areas, DFC could consider prioritizing those park and recreation uses that adjoin to or connect with park and recreation uses outside of open space areas, e.g. a greenway or bike trail that connects with a regional trail. Additionally, park and recreation uses that require large amounts of open space, such as event venues, could be well suited given the lower site preparation costs, in open space areas. Both of these priorities would provide a stronger opportunity to attract increased funding or additional partnerships.
- **Locate natural areas throughout long-term open space areas, with consideration for networks and residential areas.** Parks and recreation uses are flexible with respect to location and scale, depending on the specific use. However, where more traditional park space is planned, it should be adjacent to areas that are residential in nature or highly trafficked to capitalize on the property value appreciation as well as to ensure their adequate use. Further, park and recreation uses that are more actively used, would likely garner more nonprofit or volunteer support to defray maintenance costs.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, as well as natural area implementers, may also consider the following guidance as they look to improve the financial feasibly of park and recreation uses. Specifically:

- **Evaluate the demand and suitability for specific park and recreation uses in open space areas**. This report looked broadly at park and recreation uses, with special attention on greenways. However, there could be unique park and recreation uses with high demand and revenue potential that would make strong financial sense in open space areas. For example, perhaps there's a strong regional demand for an urban campsite or large outdoor

concert venue. Further study is needed to determine what, if any, strong demand and funding resources exist for unique park and recreation use opportunities.

- **Continue and expand a partnership with the Michigan Department of Natural Resources**. As mentioned with natural areas, the DNR has a number of assets that could be tremendously beneficial both to fund and hold open space land, many of which are discussed in the Ownership Section. From a funding standpoint, the Natural Resources Trust Fund should be maximized to the extent possible to support park and recreation areas.

TYPE SPOTLIGHT: GREENWAYS

Greenways are low-maintenance paths of linear open space that can serve as recreation in and of themselves, but also link recreational opportunities together across the city. Given the width of many Detroit roads, there are a number of opportunities to convert existing road ways to better support multimodal transit. Since this report focuses specifically on the reutilization of vacant parcels in open space areas, it looks more specially at greenway trails that would repurpose multiple parcels along a roadway or alleyways.

This section provides a financial overview and considerations for greenways in long-term open space areas.

SUMMARY

Implementation costs: **Varies, but high**. Implementation costs for greenway trails vary based on the type of construction, but are generally high as compared to the other open spaces. Cost estimates range from $30,000-130,000/acre.

Maintenance costs: **Varies, but high.** As with implementation costs, the maintenance costs for greenways vary based on the type of construction. Maintenance costs of paved bike lanes is relatively high, because the lanes require frequent repainting at the full cost of installation ($20,000 per acre per year), however, if crushed stone was used, costs would be lower, about $8,000 per acre per year.

Revenue potential: **Minimal**. Greenways can provide opportunities for revenue generation, e.g. sponsorship and vending. However, that revenue is typically folded back into the park to support the operations and maintenance costs.

Implementer or owner: **Likely a nonprofit or governmental entity.** Private nonprofit entities would likely play a role in the implementation, management, and potentially ownership of greenways. Governmental and quasi-governmental entities would also likely play a significant role, minimally in the ownership, but also likely in the implementation of this land long-term, potentially providing long-term leases to other entities to manage the greenways.

Other financially related benefits: There are a number of other financially related benefits for greenways that may have broader implications beyond the individual implementation site. Specifically:

- **Potential for increased property values**. As with park and recreation uses, there is opportunity for adjacent properties to see an increase in value. Studies show that values of homes along greenways could increase 2 to 5 percent, leading to increased property tax revenue for the City.[230]

- **Reduction in medical-related costs**. As with park and recreation uses, greenways provide greater access to recreation opportunities and therefore can help to reduce future medical costs.
- **Potential increased commercial revenue**. If greenways are placed along routes with commercial businesses, there is the opportunity to increase the level of spending at those establishments. Case studies from two Detroit neighborhoods found that bike events and vacations produced $1.6 million in annual tourism and bike-related spending.[231] While it is not likely that these commercial establishments will be in the long-term open space areas, if open space areas can contribute to a creating a longer greenway or a convenient path to those establishments, increased commercial activity is possible.

POTENTIAL FUNDING TOOLS

As with other park and recreation uses, public funds and public or private grants would be the most likely sources for funding greenways. Below are some observations about the potential applicability of funding source types for greenway trails, generally. Appendix 6 provides additional specificity on funding applicability by use type.

Direct Fees: **Medium applicability**. There are opportunities to generate funding for greenway trails from direct fees, though these sources may be limited in the near term. Specifically:

- **User Fees.** There are opportunities for user fee generation for greenway trails through related services, like bicycle rentals and lease payments from vendors along greenway trails.
- **General Fund**. Use of general funds through property tax generation for greenway trails is certainly a potential source of funding, however, given limited funds this is unlikely to be a significant source of funding for greenway trials in open spaces in the near term.
- **Transfer Fee Fund.** Transfer fees, described in the Park and Recreation Section, could be explored as a future source for greenway trails.
- **Community Preservation Funds.** CPFs, if established, could support greenway trial development and maintenance.

Debt Tools: **Medium applicability.** Given the public benefits of greenway trails, more traditional municipal sources of funding could be applicable.

- **General obligation bonds**. General obligation bonds could be examined as a source of revenue for greenway trails given the public nature of the use and the potential positive impact on property tax revenue.
- **Revenue bonds.** Revenue bonds could be explored for greenway trails uses particularly if there is a specially designated source of revenue for trail support like a transfer fee.

- **Public activity bonds (PAB).** PABs may be particularly applicable for greenway trails since there are a number of related eligible uses such as bicycle transportation and pedestrian walkways along urban and rural principal arterial routes, and preservation of abandoned railway corridors.

Credit Assistance: Low applicability. Access to certain types of credit assistance, specifically loan guarantees, could be further explored for greenway trails. However, there is likely stronger applicability for other open space uses, such as solar and green stormwater infrastructure.

Private Sources/Equity: Medium applicability. Given the broader health and environmental benefits of greenways, private financing could be pursued. Specifically:

- **Impact bonds**. Impact bonds structured on improved health outcomes as a result of greenways could be explored. One study showed that a greenway that gets two percent of inactive people to become active, is cost-effective in terms of health alone (in that it saves disability-adjusted life years).[232]

Value Capture Mechanisms: Medium applicability. As a park and recreation use, greenway trails likely will likely increase adjacent property values. Though since property values in Detroit are lower than some other cities that have leveraged increased property values for greenway development, this will likely not be a large enough source of revenue to fully fund greenway trail development in open space, though value capture mechanisms can be explored. Specifically:

- **Improvement Districts.** Improvement districts, described in more detail in the Park and Recreation Section could be explored for greenway trail development, but may be harder to implement given the linear nature of greenways.
- **PILOT Bonds.** PILOT bonds could also be explored for greenway trail development. The location of the greenway trail would likely need to be along a key area or corridor in order to capture significant enough revenue.

Grants: High applicability. Since greenway trails result in a broad array of public and social benefits and also operate as a form of transportation, this use can appeal to a variety of philanthropic, public, and other corporate grant sources. There are a variety of State and Federal entities and grant programs that could support greenway development such as Community Development Block Grants, Federal Transportation Enhancements grants, TIGER grants, Environmental Protection Agency grants, Michigan Department of Natural Resources grants, and Michigan Economic Development Corporation grants, as well as philanthropic sources such as the Community Foundation for Southeast Michigan.

ACTIONS TO INCREASE FINANCIAL FEASIBILITY

There are a number of financial risks associated with the implementation and long-term maintenance of greenways given their higher costs. DFC can work to make greenways more financially feasible, broadly speaking, by considering the following guidance.

Specific Planning Considerations

As DFC supports a broader open space and master planning process in Detroit, it should consider ways that scale and location of greenways could help to increase the financial feasibility or reduce the financial risk of greenways. Specifically:

- **Dedicate a portion of long-term open space for greenways**. Only a small percentage of long-term open space may be needed for greenways, given their linear nature. Greenway trails ideally would be at least 1.5 miles long, although longer is better. To minimize maintenance costs, greenways would likely be contained in other open space land uses rather than a land use to themselves. Greenway trails could provide commuting and recreational corridors in and through urban farms, native landscape meadows, and reforested areas.

  This report assumed 200 acres for greenways, though that number could vary based on the desired form of greenways, e.g. on-street as opposed to on land.

- **Locate in strategic areas that connect to destinations**. Greenways are only as productive and successful as the areas they connect. Urban greenways should provide people with destinations – either in-and-of themselves in the form of wildlife and art installations along trails or in the form of existing Detroit recreational opportunities, such as Belle Isle.

- **Consider locating alongside key streets**. Locating greenways on parcels adjacent to key streets or boulevards may help to increase the visibility and use of the greenway and could help reduce installation costs since much of the signage and lights from the street infrastructure could be leveraged to support the greenway.

General Guidance

Beyond the specific land use planning considerations, detailed above, DFC, as well as greenway implementers, may also consider the following guidance as they look to improve the financial feasibly of greenways. Specifically:

- **Continue and expand a partnership with the Michigan Department of Natural Resources**. As mentioned previously, the DNR has a number of assets that could be tremendously beneficial both to fund and hold open space land, many of which are discussed in the Ownership Section. From a funding standpoint, the Natural Resources Trust Fund should be maximized to the extent possible to support greenway development.

Examples

There are a number of urban greenway examples such as Neutral Grounds in New Orleans, Louisiana, which offers medians for seating, walking, and public events, and Culver City, California which transformed part of its Culver Boulevard into a landscaped bike and pedestrian walkway. However, for a specific greenway trail that would be installed on land, as opposed to an adaptive use of street infrastructure, Detroit's Dequindre Cut offers a good example of trail use. The Dequindre Cut is a 1.35-mile below-street level path that runs between the Riverfront and Eastern Market and will connect to additional routes in the city via a planned greenway network.[233]

CONCLUSION

Realizing Detroit Future City's vision of large-scale, long-term multifaceted open space will require innovative approaches to address challenges of ownership and funding given the scale of open space envisioned and the City's fiscal constraints. These challenges should not deter city stakeholders from ardently pursuing a robust, integrated open space network that supports the stabilization and growth of the city, provides opportunities for revenue generation, and improves the quality of life, health, and ecology of the city. This report provided an overview of a number of different ownership models and funding mechanisms for large-scale, long-term open space reuse that can inform DFC and other Detroit leaders as they embark on a comprehensive open space planning process.

ENDNOTES

[1] Detroit Future City Implementation Office.

[2] Detroit Future City Strategic Framework, 2012. See http://detroitfuturecity.com/framework/

[3] As envisioned by the Detroit Future City Implementation Office, a comprehensive open space plan will allow Detroit to realize the vision of creating an open space network as a catalyst that provides environmental, economic, and social benefits to all Detroiters. An integrated open space network will not just happen on its own – a plan is needed to set policies, guide decision-making, and prioritize implementation strategies. A city-wide open space plan will provide certainty for how and where to invest land reutilization efforts. It will lay out where different types of open space are appropriate and desired and how they connect into a cohesive network. It will balance the different types of open spaces based on the needs and desires of community members, the ecological function, and economic opportunity. In order to make this happen, the community needs to be engaged in a robust planning process to ensure we are all working to achieve the same vision.

[4] Detroit Future City Strategic Framework, 2012. See http://detroitfuturecity.com/framework/

[5] This report focuses on the Department of Natural Resources as the main division of the state that acquires and manages open space land across Michigan and in Detroit. There are, however, other state entities that have the authority to acquire and manage land to preserve open space. Conservation districts are one example. (See generally MCL 324.9301, et seq.) Conservation districts are political subdivisions of the state (MCL 324.9301(h)) and exist in each county across Michigan (see http://macd.org/district-list). Conservation districts are connected to and work with the State of Michigan Department of Agriculture and Rural Development. (See generally MCL 324.9301, et seq.) A conservation district has the ability to acquire, manage, lease, or sell property necessary to carry out its mission and purpose under state law. (See MCL 324.9308(e).) More research is needed to determine whether any conservation districts in Michigan exercise this right. For example, the Wayne County Conservation District encompassing Detroit appears not to hold or manage land but instead offers programs and information to property owners on water conservation, soil erosion control, environmental contamination, watershed management, woodland management, and native plant and wildlife species. See http://www.waynecd.org/services.html

[6] See generally MCL 324.501, et seq.

[7] See generally http://www.michigan.gov/dnr/0,4570,7-153-67117-285534--,00.html and http://www.dnr.state.mi.us/spatialdatalibrary/pdf_maps/ownership_dnr/wayne_dnr_ownership.pdf.

[8] According to the DNR's website, the DNR's history begins in the 1800s, as part of a nascent effort by Michigan citizens to protect their natural resources, and the state created the Michigan Department of Conservation, the DNR's predecessor, in 1921. See http://www.michigan.gov/dnr/0,4570,7-153-10366-30400--,00.html.

[9] See MCL 324.503(2); MCL 324.2152, et seq.

The PILOT that DNR makes is calculated according to state law (see MCL 324.2152, et seq.), and is a way for the State Tax Commission to work with both the DNR and local assessors to determine the taxable value of land that DNR holds. Much of the land that the DNR holds (such as wilderness areas in the Upper Peninsula) had never been owned before and thus never previously generated property tax revenue. DNR makes a PILOT because it has historically had the resources to pay property taxes and there is no other way to calculate the property taxes owed. For Detroit, circumstances are different since property (vacant land) deeded to the DNR in Detroit was taxed at some point and has taxable value that can be calculated under state law.

[10] MCL 324.2153(4).

[11] The phrase "tort liability" refers to claims arising from injuries to people or property, such as a car being damaged by a fallen tree limb. Generally, immunity from tort liability will not protect a governmental entity from claims arising from a contract with the governmental entity.

[12] MCL 691.1407(1).

[13] See *Daugherty v Michigan*, 91 Mich App 658, 663; 283 NW2d 825 (1979) (holding that the operation of a recreational area does not qualify as a governmental function because it is not an activity which can be done by only the government

as is demonstrated by the fact that many private entities operate recreational areas).

[14] The Michigan Court of Appeals has held that the DNR was not immune from liability arising from the operation of a supervised swimming beach area in the Pinckney State Recreation Area because the "operation of a bathing beach where bath houses are provided for changing clothes and ropes and markers are set out to designate the area for swimming is a function commonly and effectively performed by private enterprise." Feliciano v Dep't of Natural Resources, 97 Mich App 101, 107; 293 NW2d 732 (1980). The fact that the DNR performed the activity instead did not afford the DNR immunity from liability. Id.

[15] *McNeal v Dep't of Natural Resources*, 140 Mich App 625, 628; 364 NW2d 768 (1985) (citing *Feliciano v Dep't of Natural Resources*, 97 Mich App 101; 293 NW2d 732 (1980)).

[16] See MCL 324.503(1).

[17] MCL 324.502(3).

[18] MCL 324.502(3).

[19] MCL 324.502(3).

[20] MCL 324.502(15).

[21] MCL 324.502(3).

[22] MCL 324.503(15).

[23] MCL 324.503(13).

[24] See MCL 324.503.

[25] Michigan Land Bank Fast Track Authority Website (http://www.michigan.gov/landbank).

[26] See MCL 124.773(3).

[27] MCL 124.773(3)-(4).

[28] MCL 124.773(6).

[29] See MCL 124.773(6)(e).

[30] MCL 124.773(6).

[31] MCL 124.755(1).

[32] MCL 124.754(8).

[33] See MCL 124.764(4).

[34] MCL 124.756(1)(a).

[35] MCL 124.757(1).

[36] MCL 124.757(1).

[37] MCL 124.754(5). The Act appears to exempt the property, income, and operations of a land bank from all property and income taxes levied in Michigan, by the state or any county or other local government unit. *See* MCL 124.754(5) and 124.763. Bonds and notes issued by a land bank and the interest and income from those bonds and notes are also exempt from all taxation by the state or a local government unit. MCL 124.763.

[38] MCL 124.754(7).

[39] MCL 211.1025.

[40] See https://www.tpl.org/sites/default/files/files_upload/2014_CityParkFacts.pdf

[41] Const 1963, art 7, §23.

[42] Detroit City Charter, Section 4-112.

[43] Detroit City Charter, Section 4-122.

[44] Detroit City Charter, Section 9-501.

[45] Detroit City Charter, Section 4-112; Detroit Code of Ordinances, Sections 14-8-6 and 14-8-7.

[46] Detroit Code of Ordinances, Section 40-1-4.

[47] Detroit City Charter, Section 8-401.

[48] Detroit Code of Ordinances, Section 16-1-5; *see also* MCL 211.7m (requiring that, for city-owned property exempt from property taxes collected under the state general property tax act, the property must be "used for public purposes" and, more specifically, parks must be "open to the public generally").

[49] See Detroit City Charter, Section 9-801.

[50] See MCL 119.6.

[51] See MCL 119.4.

[52] See MCL 119.4(g).

[53] See MCL 211.7m.

[54] MCL 119.4(a).

[55] MCL 119.4(b).

[56] MCL 119.4(d).

[57] See generally MCL 119.51, et seq.; see also http://www.metroparks.com/Metroparks-History.

[58] MCL 119.51.

[59] MCL 119.53.

[60] Id.

[61] MCL 119.57.

[62] Id.

[63] According to Black's Law Dictionary, a "land trust" is a "land-ownership arrangement by which a trustee holds both legal and equitable title to land while the beneficiary retains the power to direct the trustee, manage the property, and draw income from the trust." "Land conservancy" is not a term that appears to be defined in Black's Law Dictionary. A "conservation land trust" is "a nonprofit conservation organization under 26 USC 501(c)(3) that both includes as all or a substantial part of its mission, actively works to conserve land by undertaking or assisting in fee-land or conservation-easement acquisition through donation or purchase, or by stewardship of such land or easements;" and preserves land by "dedicating the land to agricultural, forest, recreational, open-space, or similar non-development uses." Black's Law Dictionary, 10th Ed. (2014).

[64] MCL 450.2251(1).

[65] MCL 450.2101, *et seq.* Property owners associations, including homeowners association and condominium associations are also set up and organized pursuant to the Michigan nonprofit corporation act. *See* MCL 450.2304(4)-(5).

[66] See MCL 450.2501.

[67] MCL 211.7o(1).

[68] MCL 211.7o(3).

[69] Because leases must have a defined term and cannot be perpetual in nature, a common way to make a lease effectively perpetual is to set the term at 99 years.

[70] See MCL 450.3100, et seq.

[71] For example, the Friends Lake Cooperative Community cooperatively owns and operates a 90 acre tract of land 3 miles northwest of Chelsea, Michigan. See http://friendslake.org/about.htm.

[72] See MCL 450.2501.

[73] MCL 211.7o(1).

[74] Bloomfield Estates Improvement Ass'n v Birmingham, 479 Mich 206, 212; 737 NW2d 670 (2007).

[75] *Thom v Palushaj*, unpublished opinion per curiam of the Court of Appeals entered Feb. 14, 2012 (Docket No. 301568), p 4.

[76] *Bloomfield Estates*, 479 Mich at 214.

[77] *See Thom v Palushaj*, unpublished opinion per curiam of the Court of Appeals entered Feb. 14, 2012 (Docket No. 301568), p 4 (citing *Cooper v Kovan*, 349 Mich 520, 530; 84 NW2d 859 (1957).

[78] *See McClintic-Marshall Co v Ford Motor Co*, 254 Mich 305, 317; 236 NW 792 (1931) (recognizing the existence of easements under Michigan law: "An easement is a right which one proprietor has to some profit, benefit or lawful use, out of, or over, the estate of another proprietor. It does not displace the general possession by the owner of the land, but the person entitled to the easement has a qualified possession only, so far as may be needful for its enjoyment."); Black's Law Dictionary, 10th Ed. (2014) (providing that an "easement" is "an interest in land owned by another person, consisting in the right to use or control the land, or an area above or below it, for a specific limited purpose (such as to cross it for access to a public road). The land benefiting from an easement is called the *dominant estate*; the land burdened by an easement is called the *servient estate*. Unlike a lease or license, an easement may last forever, but it does not give the holder the right to possess, take from, improve, or sell the land. The primary recognized easements are (1) a right-of-way, (2) a right of entry for any purpose relating to the dominant estate, (3) a right to the support of land and buildings, (4) a right of light and air, (5) a right to water, (6) a right to do some act that would otherwise amount to a nuisance, and (7) a right to place or keep something on the servient estate.").

[79] See generally *Dimoff v Laboroff,* 296 Mich 325, 328; 296 NW 275 (1941) ("The union of dominant and servient estates in the same owners extinguishes prior easements. One cannot have an easement in one's own land.").

[80] See MCL 2140(a).

[81] MCL 324.2140(a).

[82] MCL 324.2144(2).

[83] MCL 324.2141, MCL 324.2144(1).

[84] See MCL 324.36101(f)-(g). This section does not discuss or encompass the variety of development agreements that private parties may enter into for projects throughout the state of Michigan.

[85] See MCL 324.36103(1).

[86] MCL 324.36103(1).

[87] Id.

[88] See MCL 324.36104, MCL 324.36105, and MCL 324.36106.

[89] MCL 324.36103(2).

[90] MCL 324.36110(1); see also MCL 324.36111, MCL 324.36112, and MCL 324.36113.

[91] See MCL 324.36108, MCL 324.36109.

[92] See generally MCL 324.36104.

[93] See generally MCL 324.36105.

[94] Detroit Future City Strategic Framework, 2012. See http://detroitfuturecity.com/framework/

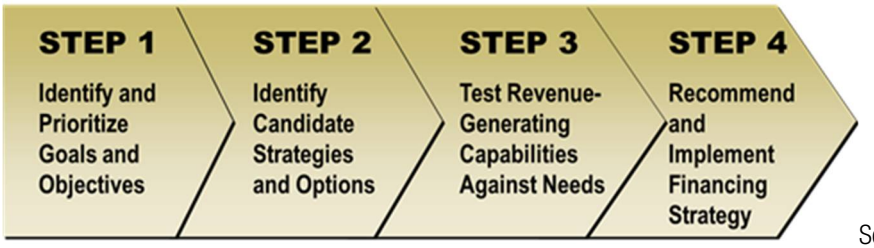
[95] Used in this section, "City" is intended to encompass the City of Detroit as well as the Detroit Land Bank Authority. While these are two separate entities, the term "City" is used for short-hand purposes.

[96] This is not the actual expense to the City but rather serves as an estimate. Due to limited resources at the City and DLBA, regular, full property maintenance does not occur on all publically-owned inventory. Further a significant amount of this cost falls to the local residents and nonprofits that maintain many vacant properties in Detroit due insufficient maintenance.

[97] Econsult (2010). Vacant Land Management: The Costs of the Current System and the Benefits of Reform. Full Report: http://planphilly.com/uploads/media_items/http-planphilly-com-sites-planphilly-com-files-econsult_vacant_land_full_report-pdf.original.pdf

[98] "Likely to become vacant" includes those parcels classified as a structure with condition "Suggest Demo" or classified as "unoccupied" with a condition of "Fair" or "Poor" and located in an area identified by Detroit Future City as "Traditional Residential" in the 10 year land use scenario.

[99] Planners could consider a process to develop a full funding strategy as a component of the planning process or as a subsequent implementation step. The funding strategy development could follow a four-step process, diagrammed below, that has been successfully implemented by a number of agencies as a means to organize the development of a financial strategy.



Source: CH2M

[100] Special attention will need to be paid to the soil quality for any urban farming initiative growing food in the ground, particularly when adjacent to a commercial or industrial use, to ensure there is no contamination that would threaten the safety of the food produced.

[101] Note, the NMTC program has provided $3.5 billion per year in funding, except for 2008 and 2009 when the program was increased to $5 billion in each year under the American Recovery and Reinvestment Act.101 The NMTC expired on December 31, 2014, although there is current legislation in the House and Senate to make the NMTC permanent.

[102] See http://www.cdfifund.gov/what_we_do/programs_id.asp?programid=5

[103] Commodity agriculture production is geared towards large scale farming. In Michigan, the average farm size is 182 acres. For today's commercial agricultural production environment, larger-scale farms are needed to be economically competitive; this will influence the contiguous size of land needed for commodity crops in Detroit.

[104] While also commonly referenced as "urban agriculture", urban agriculture generally defines a broader set of actions such as aquaculture, aquaponics, hydroponics and animal husbandry. This report only looks at food production to 1) narrow in on a specific funding model and 2) examine one of the most widespread applications of productive landscapes in Detroit currently.

[105] NRDC.

[106] University of Kentucky, Center for Crop Diversification, 2013 vegetable budgets; www.uky.edu/Ag/CCD/budgets.html

[107] Keep Growing Detroit estimate.

[108] For example organic produce for higher return, Chinese medicinal herbs currently at $30MM year industry, hops and grains for craft beverage production, bee hives for pollination support and allergy control.

[109] Tom Philpot, "From Motown to Growtown: The Greening of Detroit", 8/25/10

[110] The State of Obesity: Better Policies for a Healthier America (2014) http://stateofobesity.org/states/mi/

[111] Up from 25.3% in 2004 and 13.2% in 1990. Like 20 other U.S. states with adult obesity rates at or above 30%, none had rates above 15% in 1980 or above 25% in 2000.

[112] The Obesity Epidemic and Detroit Students (2013 Detroit Youth Risk Behavior Survey), http://www.cdc.gov/healthyyouth/yrbs/pdf/obesity/detroit_obesity_combo.pdf

[113] Michigan Fights Obesity with a 4X4 (September 2012), http://www.governing.com/topics/health-human-services/gov-michigan-fights-obesity.html

[114] http://www.modeldmedia.com/startupnews/citycommonscsadetroit041514.aspx

[115] Healthy Food Financing Initiative Partnership between Departments of Treasury, Agriculture, and Health and Human Services to combat food deserts. Pennsylvania Fresh Food Financing Initiative (FFFI)—Statewide financing initiative program designed to attract supermarkets and grocery stores to underserved urban and rural communities. The Reinvestment Fund (TRF), a certified CDFI, is serving as the financial intermediary.

[116] The Michigan Good Food Fund, managed by Capital Impact Partners http://www.capitalimpact.org/michigan-good-food-fund/ and http://www.capitalimpact.org/wp-content/uploads/2015/08/MGFF_Brochure.pdf

[117] See http://www.nytimes.com/2015/06/04/business/smallbusiness/states-pass-crowdfunding-laws-for-small-businesses.html?_r=0

[118] General reference information on crowdsourcing for food businesses http://slowmoneynorcal.org/raising-funds-many-crowdfunding-options-food-businesses/

[119] See https://slowmoney.org. For an example of a Slow Money investment club, see http://www.slowmoneymaine.org/nsp/

[120] Already robust, the team of local urban farmers is a cohesive and capable group led by several groups that sprouted from funding through the Community Food Projects Competitive Grant Program (CFPCGP) - Detroit Agricultural Network (DAN) (1997), the Garden Resource Program (2004), and GROW – Growing and Retailing Opportunities in Wayne County (2006). Today, Greening of Detroit, Keep Growing Detroit, and a host of other local nonprofits provide necessary support from tools to technical advice on single family plots to market gardens that serve as the backbone for the city's future of food production.

[121] 3,600 estimate from Growing Food in the City: The Production Potential of Detroit's Vacant Land http://www.fairfoodnetwork.org/sites/default/files/growing_food_in_the_city.pdf; Keep Growing Detroit provided a ballpark range from 2,000-5,000 acres.

[122] Place-based networks of urban farmers are connected through Feedom Freedom Growers[122], Georgia Street Community Garden[122], Brightmoor Community Garden[122], Growtown Farm[122] and SEED Wayne[122].

[123] Special attention will need to be paid to the soil quality for any urban farming initiative growing food in the ground, particularly when adjacent to a commercial or industrial use, to ensure there is no contamination that would threaten the safety of the food produced.

[124] See Hot Bread Kitchen in NYC http://hotbreadkitchen.org/

[125] See Cornell Cooperative Extension EaT Kitchen in Sullivan County NY, http://sullivancce.org/food-nutrition/eat-kitchen

[126] See Farm to Table Copackers in Kingston NY http://farm2tablecopackers.com/

[127] See http://www.wsj.com/articles/silicon-valley-firms-plant-roots-in-farm-belt-1428348765. FreightFarms http://www.freightfarms.com/. FarmedHere http://farmedhere.com/. Green Spirit Farms (Detroit-location) http://www.greenspiritfarms.com/.

[128] See Intervale Center for Community Food Systems, http://www.intervale.org/, the Glynwood Center, https://www.glynwood.org/ and http://hawthornevalleyfarm.org/

[129] For examples of urban farming initiatives outside of Michigan, See Atlanta Georgia – Atlanta Local Food Initiative (ALFI) www.atlantlocalfood.org; See Baltimore, Maryland - Adopt-a-Lot Program www.baltimorehousing.org/vtov_adopt; See Milwaukee, Wisconsin – http://www.governing.com/blogs/bfc/gov-milwaukee-mayor-tom-barrett-home-grown-vacant-lots-urban-agriculture.html on HOME GR/OWN initiative; See Minneapolis, MN – Homegrown Minneapolis www.minneapolismn.gov/sustainability/homegrown/

[130] NRDC.

[131] NRDC.

[132] Community solar generally references when multiple individuals or organizations jointly purchase a solar facility—sometimes located on public land—which in turn provides widespread financial benefit.

[133] Utility-scale solar references when electricity is sold to wholesale utility buyers, not end-use consumers. Utility-scale solar plants provide the benefit of fixed-priced electricity during peak demand periods when electricity from fossil fuels is the most expensive.

[134] NRDC.

[135] Sources in Paragraph: NRDC.

[136] See http://www.michigan.gov/mpsc/0,1607,7-159-52493---,00.html

[137] For an example, see http://leanandgreenmi.com/uploads/PDFs/CaseStudy1.pdf

[138] See http://www.energy.gov/lpo/title-xvii

[139] For an example, see http://www.financefund.org/userfiles/files/News%20Archives/novogradac_jtc_2013-06_nmtc_pg56_5004.pdf

[140] NRDC.

[141] Distributed generation (DG) refers to electricity that is produced at or near the point where it is used. Distributed solar energy can be located on rooftops or ground-mounted, and is typically connected to the local utility distribution grid. States, cities and towns are experimenting with policies to encourage distributed solar to offset peak electricity demand and stabilize the local grid.

[142] What distinguishes utility-scale solar from distributed generation is project size and the fact that the electricity is sold to wholesale utility buyers, not end-use consumers. Utility-scale solar plants provide the benefit of fixed-priced electricity

during peak demand periods when electricity from fossil fuels is the most expensive.

[143] Source for paragraph information, NRDC.

[144] See http://www.michigan.gov/mpsc/0,4639,7-159-16393_48212_58124---,00.html and https://www.michigan.gov/documents/energy/Renewable_Energy_Question_28_response_from_DTE_Consumers_and_MEGA_418848_7.pdf

[145] For an overview of states' net metering policies, see http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx

[146] University of Illinois at Chicago. Institute for Environmental Science and Policy. Brockton Brightfield: A Sustainable Brownfield Revitalization Best Practice. 2013.

[147] See http://www.conedsolutions.com/news/newsview/13-09-06/New_Bedford_Sees_Energy_Initiative_As_a_Key_To_Its_Future.aspx#.VeTJZ_lViko

[148] See http://www.rifleco.org/142/Wastewater

[149] See http://www.exeloncorp.com/PowerPlants/exeloncitysolar/Pages/Profile.aspx

[150] See http://www.mcco.org/About-Us/In-The-News/MCCo-Solar-Generating-Facility.html

[151] Switchgrass: Switchgrass is a potential cellulosic ethanol feedstock that grows to be 3 feet or taller. Michigan State University has conducted research on switchgrass as biofuel feedstock in Michigan. The grass height may be less desirable in an urban context than pennycress because it may be perceived as unmaintained land. Additionally, full-scale cellulosic ethanol processing plants do not currently exist in Michigan and refining costs for cellulosic ethanol plants are estimated to be twice as expensive as corn-based ethanol. Based upon the potential plant height line-of-sight concerns and there being no cellulosic ethanol plants in Michigan, switchgrass as an ethanol feedstock is not evaluated further in the context of this report but could be further explored in the future.

[152] Corn-Based Ethanol: Corn is the dominant source of biofuel feedstock. Michigan has ethanol refineries that process corn into ethanol. As with switchgrass, plant height line-of-sight safety concerns may make this biofuel source less desirable in an urban context. Further, corn would need to be cultivated in a large expanse of land to be competitive with rural fields and would need to have heavy farm equipment for cultivation. For those reasons, corn was not explored in this report, but could be further explored in the future.

[153] Pennycress: Pennycress is a nonedible, short-height winter crop that can be planted in the fall or spring, whose seed can be crushed and refined into a biofuel. Pennycress has been grown in a pilot project in Detroit. The cost and revenue discussion will assume pennycress production because the potential plant height and equipment concerns fit within with local neighborhood consideration and because pennycress has already been used in a pilot project in Detroit. Costs references used for the analysis below are from those developed by Metro Ag Services for the Detroit pilot project. Metro Ag Services. For more see *Pennycress—A Unique Energy Crop*. Accessed at http://www.metroagservices.com/masfmm/index.php/about-pennycress. Accessed August 25, 2015.

[154] Metro Ag Services. Undated. Financial Evaluation for Pennycress.

[155] Metro Ag Services. Undated. Financial Evaluation for Pennycress.

[156] Metro Ag Services. Undated. Financial Evaluation for Pennycress.

[157] Metro Ag Services. Undated. Financial Evaluation for Pennycress.

[158] http://knoema.com/yxptpab/crude-oil-price-forecast-long-term-2015-to-2025-data-and-charts accessed September 8, 2015.

[159] The State of Michigan compiled a list of biofuel resources, see https://michigan.gov/documents/cis/CIS_EO_Funding_Opportunities_192768_7.pdf

[160] Metro Ag Services. Undated. Financial Evaluation for Pennycress.

[161] World Bank predicts crude oil prices will be lower for the next 10 years compared to the previous 10 years. http://knoema.com/yxptpab/crude-oil-price-forecast-long-term-2015-to-2025-data-and-charts accessed September 8, 2015.

[162] Michigan Department of Agriculture and Rural Development. 2011. *Michigan Agricultural Statistics 2010/2011*.

[163] Corn Marketing Program of Michigan and Michigan Corn Growers Association. Undated. *Michigan Corn: FAQs*. Accessed at http://www.micorn.org/corn-education/faq. Accessed August 24, 2015.

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[167] This was examined due to the fact that Detroit has a pilot in development from Fresh Coast capital and the report's need to focus on a specific funding model. The other industries related to harvesting of trees and other plants, and particularly those for landscaping purposes, should absolutely be explored for future uses in open space areas.

[168] See http://freshcoastcapital.com/

[169] Fresh Coast Capital cites a 5-8% return on investment for their hybrid poplar model.

[170] Another revenue production would likely be lower than the 5-8% cited here. Wood prices of $35 to $50 per cord with a yield of 3 to 5 cords per acre per year would result in revenue of $1,500 to $5,500 per acre over a 15-year period. See U.P. Biofuel. 2007. *Hybrid Poplar Forest Management Plan*.

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[172] See http://www.apa.org/monitor/apr01/greengood.aspx

[173] Chesapeake Bay Program. Undated. Forests. Accessed at http://www.chesapeakebay.net/issues/issue/forests. Accessed on August 21, 2015.

[174] Milwaukee Metropolitan Sewer District. Undated. *Fresh Coast 740*. Accessed at http://freshcoast740.com/. Accessed August 21, 2015.

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[176] Fresh Coast Capital.

[177] The forest product industry is very active in Michigan, with the state having 20 million acres in forest land use, ranking Michigan 11th in size in the United States for forested land. Having the support of a stronger state infrastructure for forest products could open up additional opportunities for the use of harvested wood. The forest product industry is estimated to provide $16.3 billion annually to Michigan's economy directly, and the industry indirectly supports 77,000 jobs with forest products, including wood pulp, lumber, firewood, and other valued added products.

[178] Detroit Future City and Greening of Detroit.

[179] Greening of Detroit. Costs per tree depend on the type of tree. $55 is the average low end and $150 is the average high end.

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[194] http://green.dc.gov/src accessed August 31, 2015.

[195] Holland, Craig and Jane Silfen, "Water Quality Credit Trading: Savings from Stormwater," Stormwater Solutions, September 16, 2015 http://www.estormwater.com/water-quality-credit-trading-savings-storm-water

[196] http://www.princegeorgescountymd.gov/sites/StormwaterManagement/Documents/CWP_FAQ.pdf accessed September 17, 2015.

[197] http://www.michigan.gov/documents/deq/Financing_Green_Infrastructure_in_Michigan_455013_7.pdf accessed September 17, 2015.

[198] Green stormwater infrastructure would also be beneficial on vacant land outside of the long-term open space area, it is not discussed in this report because the report is looking strictly only at the areas of long-term open space. If 1 to 5 percent of the 18.2 square miles (11,600 acres) of vacant land outside of the potential long-term open space were also set aside for green stormwater infrastructure, then another 116 to 581 acres of bioretention could be implemented.

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[200] Recent changes to definitions of "Waters of the United States" have been made to exclude stormwater control features constructed to convey, treat, or store stormwater; see EPA's Clean Water Rule: Definition of "Waters of the United States," Final Rule for planning of stormwater wetlands if wetland restoration is not intended.

[201] See http://www.ongov.net/sustainability/water/str.html

[202] See http://www.cleveland.com/metro/index.ssf/2015/05/neo_regional_sewer_district_wi.html

[203] There are a multitude of other benefits that would accrue from increasing the amount of natural landscape in the city, such as improved and increased natural habitat, increased education and value of nature for youth, reduction in the heat island effect and greenhouse gases. Many of the additional benefits are more environmental or ecological in nature, as opposed to immediately financial in nature, for that reason, this report does not focus on those other benefits. There are a number of other reports and studies that cover the additional social, environmental, and ecological benefits of increasing natural areas in the City.

[204] See http://www.apa.org/monitor/apr01/greengood.aspx

[205] CPA in New York State derives its support from a small real estate transfer fee, other gifts, and interest accrued from these assets. The transfer fee can be no higher than 2%, and may only be applied to the portion of a real estate transaction above the median price for the county in which the transaction occurs. A town might also use a CPF to establish a transfer-of-development-rights bank, or to manage land that is acquired (no more than 10% of a CPF may be used for the latter purpose). See https://nassaulandtrust.org/content/community-preservation-act

[206] See http://www.communitypreservation.org/content/cpa-overview and http://www.communitypreservation.org/content/chart-allowable-uses

[207] One example is the 2004 issuance in Detroit through Proposition R that supported conservation projects. "Trust for Public Land, LandVote. See https://tpl.quickbase.com/db/bbqna2qct?a=dbpage&pageID=8

[208] There are a multitude of other benefits that would accrue from increasing the amount of natural landscape in the city, such as improved and increased natural habitat, increased education and value of nature for youth, reduction in the heat island effect and greenhouse gases. Many of the additional benefits are more environmental or ecological in nature, as opposed to immediately financial in nature, for that reason, this report does not focus on those other benefits. There are

a number of other reports and studies that cover the additional social, environmental, and ecological benefits of increasing natural areas in the City.

[209] 2,100 acres was assumed after splitting land with tree farm and forest land areas after considering likely needs for land from other land uses in the near term. A meadow landscape more easily allows expanding urban farming, solar, and biofuel uses more easily in the future should demand increase.

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[212] There are a multitude of other benefits that would accrue from increasing the amount of natural landscape in the city, such as improved and increased natural habitat, increased education and value of nature for youth, reduction in the heat island effect and greenhouse gases. Many of the additional benefits are more environmental or ecological in nature, as opposed to immediately financial in nature, for that reason, this report does not focus on those other benefits. There are a number of other reports and studies that cover the additional social, environmental, and ecological benefits of increasing natural areas in the City.

[213] See http://www.apa.org/monitor/apr01/greengood.aspx

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[222] See http://cloud.tpl.org/pubs/ccpe_PhilaParkValueReport.pdf

[223] Up from 25.3% in 2004 and 13.2% in 1990. Like 20 other U.S. states with adult obesity rates at or above 30%, none had rates above 15% in 1980 or above 25% in 2000.

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[225] Michigan Fights Obesity with a 4X4 (September 2012), http://www.governing.com/topics/health-human-services/gov-michigan-fights-obesity.html

[226] See https://www.planning.org/cityparks/briefingpapers/physicalactivity.htm and http://cloud.tpl.org/pubs/ccpe-econvalueparks-rpt.pdf

[227] See https://www.planning.org/cityparks/briefingpapers/saferneighborhoods.htm and http://www.apa.org/monitor/apr01/greengood.aspx

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APPENDICES

APPENDIX 1. OPEN SPACE CASE STUDY: ATLANTA, GEORGIA

INTRODUCTION

Atlanta, once considered one of the nation's most "under-parked" major cities set out to increase the amount of open green space available to its residents. In 2004, a number of studies[1] were conducted to measure the feasibility of the Atlanta Beltline, a network of trails and parks

Figure 16: Overview Map of Atlanta BeltLine

Source: ABI

[1] The studies included the Trust for Public Land's *Emerald Necklace* and a financial study of the proposed Tax Allocation District commissioned by Mayor Shirley Franklin.

to connect many of Atlanta's neighborhoods and reuse underutilized land, and in 2006 the entity charged with overseeing the BeltLine's plans was formed.

The City of Atlanta developed Project Greenspace in 2009, an element of the City's Comprehensive Development Plan that outlines the policies and actions to preserve and manage the City's greenspace, and the Strategic Plan for Parks and Recreation in 2013. The Atlanta BeltLine has served as a focal point of the city's open space, a major redevelopment endeavor championed by the City and Atlanta's civic leaders. Former Mayor Shirley Franklin and City Council President were instrumental in passing local legislation to establish the Atlanta BeltLine and the City's ongoing political and financial support made the Atlanta BeltLine plans become a reality.

This brief case study focuses on the Atlanta BeltLine, and how its management entity, Atlanta BeltLine, Inc. acquires, holds, funds implementation of its redevelopment plans and maintains the BeltLine.

MAIN ELEMENTS OF THE ATLANTA BELTLINE

The Atlanta BeltLine ("BeltLine") is a comprehensive redevelopment effort that aims to establish an open space network consisting of trails, greenways, street car lines, and public park space for art and other programming. Roughly 3,000 acres of underutilized land is being made available for public and private development along the BeltLine. The total BeltLine planning area encompasses approximately 15,000 acres, or 23 square miles of the city. By 2030, the expected completion date, the BeltLine will provide 22 miles of pedestrian friendly trails from land along the former rail corridor, 33 miles of multi-use trails, 1,300 acres of parks, all helping to connect 45 neighborhoods across the city. The BeltLine represents a major City- and community-supported effort to repurpose underutilized land, increase available greenspace, provide transportation alternatives, and encourage healthier, more active living.

OWNERSHIP AND MANAGEMENT OF ATLANTA BELTLINE

Ownership

Atlanta BeltLine, Inc. (ABI)

ABI acquires the land for the Beltline through market rate purchase, or in cases of existing City ownership, land acquisition may not be necessary. This has been true for several parks under the ownership of the City of Atlanta's Department of Watershed Management. For newly acquired parks and other green open space, ABI holds on to ownership of the land until all planned development is complete and all facilities are fully operational. It then transfers ownership of the park space to the City of Atlanta Parks and Recreation Department, who is then responsible for ongoing maintenance. Currently, it mostly holds on to ownership of the BeltLine's trailways.

ABI is currently exploring the possibility of working more closely with the Fulton County / City of Atlanta Land Bank Authority to help with the acquisition and holding of property for the BeltLine.

Management

Atlanta BeltLine, Inc. (ABI)

In 2006, Invest Atlanta (the City of Atlanta's Economic Development Authority) formed ABI to oversee the design and implementation of the BeltLine.

ABI must regularly report to all of the taxing authorities that authorized the Tax Allocation District (TAD) which helps to fund the BeltLine (see Costs and Sources of Funding below) and Atlanta's City Council. For a comprehensive list of these quarterly reports, visit: http://beltline.org/progress/progress/quarterly-briefings/

The fully operational parks that ABI transfers to the City's Parks and Recreation department are managed and maintained as a part of the City's park system.

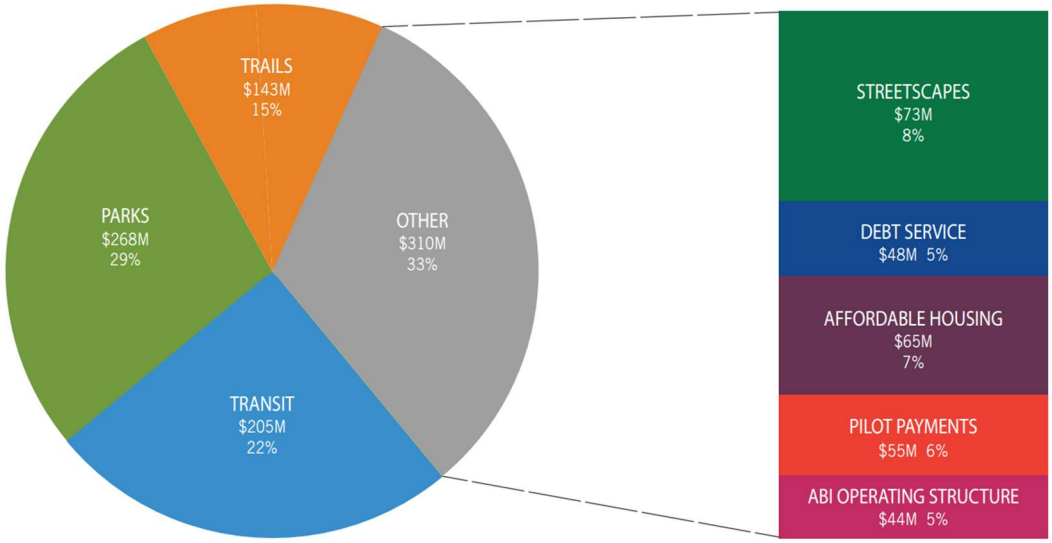
TAKEAWAY: It's important to have an entity tasked solely with the responsibility to oversee the successful implementation of an open space network.

COSTS AND SOURCES OF FUNDING

Costs

The total cost of the BeltLine is estimated at $4.8 billion, with roughly $3 billion allocated to all transit developments.

Figure 17: Atlanta BeltLine Cost Breakdown for FY 2014-FY 2018



Source: Atlanta BeltLine 2030 Implementation Plan

Sources of Funding

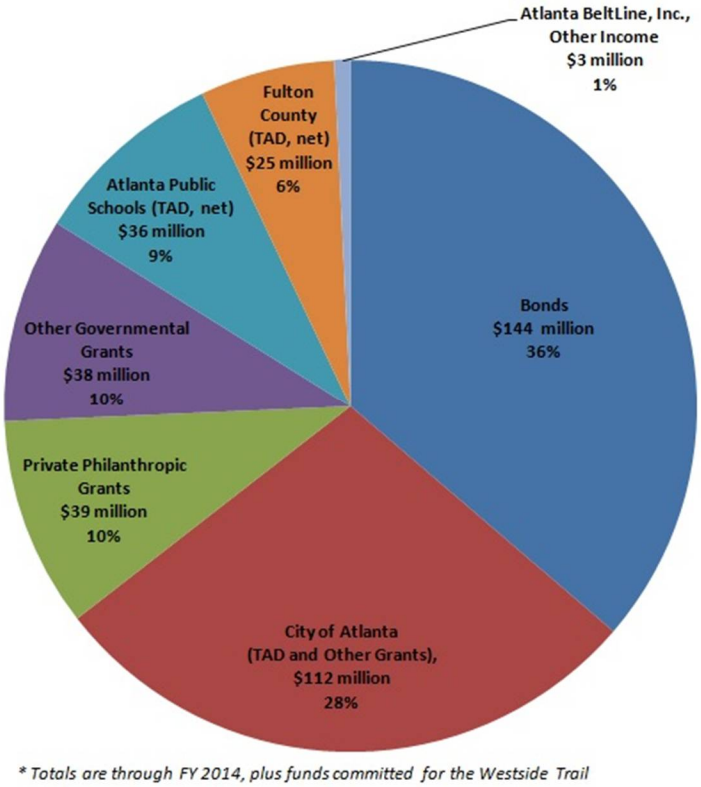
Public Sources:

- **Tax Allocation District (TAD).** To help pay for the BeltLine, the Atlanta City Council voted in 2004 to establish a TAD, and in 2005 the Fulton County Board of Commissioners and Atlanta Public School District agreed to participate as investors in the TAD. To generate funding for the BeltLine through a TAD, The City of Atlanta, Fulton County and Atlanta Public Schools agreed to forego all property tax revenue increases on property within the designated 6,500 acre TAD for a 25 year period. The once underutilized land, now with redevelopment is expected (and has shown) to increase the value of the land. This results in increasing tax revenue that are used to secure bonds to fund the BeltLine development.

  The BeltLine is expected to increase the taxable value of the land by $20 billion by the end of the 25 year timeframe of the TAD. After the 25 year period the tax revenue will go back to the City, County and Public Schools.

  The TAD provides ABI with the most flexible funding source to cover general management of the project. It is also used for required match funding to secure additional grants.

Figure 18: Atlanta BeltLine Project Funding



** Totals are through FY 2014, plus funds committed for the Westside Trail*

Source: http://beltline.org/about/the-atlanta-beltline-project/funding/

- **Federal Support**. Financial support for the Atlanta BeltLine has also come from a number of federal sources including the Environmental Protection Agency, the U.S. Fish and Wildlife Service, National Endowment for the Arts, and a TIGER grant from the U.S. Department of Transportation.

Private Sources:

- **Atlanta BeltLine Partnership (ABLP)**. The Atlanta BeltLine Partnership (discussed below) is charged with helping to raise private sector funding through its outreach efforts. Uses of this funding are generally limited, providing funds for specific uses like land acquisition, trail development and streetscape improvements.
- **Land Lease and Sale**. When ABI acquired the underutilized land a part of the historic 22 mile stretch of railroad, it found that there were a lot of business owners, landlords and other adjacent property owners who were using the land to expand side yards, add parking for their business, and more without having formal ownership or a lease agreement to use the land. Rather than simply denying these informal users access, in areas where these uses could continue without interfering with the BeltLine's development, ABI leased out or in some cases sold the land to users. This provided an important source of revenue to pay off bonds used for the Beltline, and ABI continues to seek out these lease and sale opportunities through the work of its dedicated real estate staff.

Figure 18 shows a breakdown of funding that has been provided to date for the BeltLine.

TAKEAWAY: Establishing a comprehensive open space network is costly and requires a diverse set of resources. Without a dedicated source of funding like TAD, supplemented by additional public and private dollars, the BeltLine would not be possible.

MAINTAINING SUPPORT FOR OPEN SPACE IMPLEMENTATION

The BeltLine has sustained support based in large part on having an entity dedicated to organizing community activities and exhibits, and demonstrating the BeltLine as a tremendous asset for the city of Atlanta. The Atlanta BeltLine Partnership (ABLP), a privately funded nonprofit organization formed in 2005 by former Mayor Shirley Franklin conducts outreach and raises financial support for the BeltLine. It works with a wide range of stakeholders to maintain support for the ongoing implementation of the BeltLine, and organizes programs like free guided tours, Adopt-the-BeltLine, Atlanta BeltLine Running Series, BeltLine Ambassadors and other special events. Money raised by ABLP is critical for supporting the BeltLine's programming and helping to cover land acquisition costs.

ABI staff also attributed strong community interest in the BeltLine to the incorporation of art throughout its trails and parks.

TAKEAWAY: Having a dedicated entity to develop programming along the BeltLine and raise awareness, has helped sustain community support.

OUTCOMES OF OPEN SPACE IMPLEMENTATION

The BeltLine, even only partially completed has demonstrated a great deal of success, with more than 20,000 people walking the repurposed rail corridor per week.

The BeltLine has also provided a significant return on investment. With only $400 million of public and private dollars invested, it has experiences a $2.4 billion dollar economic impact based on growing private development interest.

But with this economic success, came rising costs of land along the BeltLine. Investors saw opportunity in purchasing property that fell along plans for the BeltLine, which raised the costs of land for ABI when it wanted to acquire remaining pieces of land to continue BeltLine development. ABI staff described it as a "gold rush to the BeltLine." It also effectively raised rents for those living along the BeltLine, which ABI is trying to combat with the creation of over 5,600 affordable housing units.

The BeltLine when completed will also result in 1,100 acres of remediated brownfields and 1,300 acres of new park space, as well as 48,000 temporary construction jobs and 30,000 permanent jobs.

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Interview with Fred Yalouris, Atlanta BeltLine, Inc.

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APPENDIX 2. OPEN SPACE CASE STUDY: PORTLAND, OREGON

INTRODUCTION

In 2010 the city of Portland had a population of 583,776, translating to 4,389 for every one of it 133 square miles of land. Compared to Detroit's 5,142 people per square mile, Portland has a slightly lower population density overall. Portland however is rapidly growing, and is making a concerted effort to preserve and even expand its already impressive amount of open space across the city.

There are approximately 12,500 acres of developed parks and natural areas in the city of Portland. This accounts for approximately 14.6% of land as open space. Roughly 19% of land in Portland is zoned for open space. The open space zone in Portland is applied to all areas identified as "open space" in the City's Comprehensive Plan and currently includes a wide range of uses such as parks, natural areas, golf courses, cemeteries, and even streets. The City of Portland completed its Comprehensive Plan draft in August of 2015, to update its 1980 Comprehensive Plan. It will serve as the primary tool for implementing the City's 2012 Portland Plan, a strategic framework for the City's future development.

MAIN ELEMENTS OF THE OPEN SPACE MODEL

Portland has two main public actors involved in the provision and protection of open space: the City of Portland (particularly the Parks and Recreation Department) and the Metro.

The role of the City of Portland's Parks and Recreation Department in providing open space is not atypical, however the prioritization of open space in the City's history and its planned future development is, and has led to much more sustainable development that balances nature and urban living citywide.

Also unique to the Portland area is the existence of the Metro, a regional planning agency charged with managing cross-jurisdictional issues, such as the provision of open space and preservation of natural areas. The Metro is run by the Metro Council, an elected body, who appoints a chief operating officer to hire staff and oversee the operations of the Metro. The Metro is also responsible for managing the region's urban growth boundary required under Oregon state law to prevent urbanization, or sprawl, into the surrounding farm and forest land. It has regulatory and taxing authority over land that falls within its Metro political boundary.

OWNERSHIP AND MANAGEMENT OF OPEN SPACE

Acquisition and Ownership

Portland Parks and Recreation Department (PPR)

PPR acquires property for open space through market rate purchase (paid for primarily through System Development Charges, discussed further below) and occasionally donation of land to be used as natural area.

In flood plain areas, the City's Environmental Services department developed the Willing Seller Program to help residents move out of the flood prone areas to other parts of the city. The City offers to purchase the land at fair market value from property owners; places a deed restriction on the property after purchase, designating it as open space; and returns the area to its natural state in order to better manage future flooding and restore important wildlife habitats that were lost through development.

Metro

The Metro buys land in and around Portland at market value to provide for additional park space throughout the region.

Management

Portland Parks and Recreation Department (PPR)

PPR is responsible for managing 11,415 acres of parkland (public parks, wetland, butterfly naturescapes, urban forests, wildlife habitats, recreational trails and more) which accounts for approximately 12% of Portland's geographical area. This excludes over 200,000 street trees that the department is also responsible for maintaining. Even in cases where another City department, such as Water and Sewer, owns the park, Parks and Recreation will generally be responsible for its management. Between 60-65% of these parks are considered natural areas, not developed parks.

PPR also entered into a joint-use agreement with local school districts to share the use and maintenance of over 100 fields, golf courses and recreation facilities to expand accessibility of this open space and share in maintenance responsibilities.

Some of the City's more expansive open space is maintained with the help of conservancies. For example Portland's well-known Forest Park,[1] considered one of the largest urban forests in the country is owned and managed by PPR but maintained and operated by the Forest Park Conservancy, a 501(c)(3) nonprofit organization, under a formal partnership agreement. The

[1] In 1903, the Olmstead brothers recommended that what is now Forest Park be officially designated by the City as a "forest park."

Conservancy funds its operations and park improvements through public and private partnerships and donations, as well as significant volunteer support.

Many of the City's parks are also maintained through volunteer support from various Friends groups established for specific parks.

Metro

The Metro is currently responsible for managing over 13,000 acres of open space in the region, with approximately 500 acres falling within the City of Portland limits.

The Metro also supports the City's PPR department by co-managing some of its trails and other open space.

Oregon State Parks

Oregon State Parks owns and manages the Tryon Creek State Natural Area, which includes over 650 acres of natural areas with walking, bicycle and horse trails, wildlife habitat, and wetland, a large portion of which falls within Portland city limits. The State also owns some land around the Rocky Butte Natural Area, which in total leaves roughly 500 acres of open space under State ownership.

TAKEAWAY: The City of Portland's Parks and Recreation Bureau as the largest open space landowner in the city has sought out partnership opportunities and volunteer support to help with the ongoing maintenance of its parks.

COSTS AND SOURCES OF FUNDING

Costs

Portland Parks and Recreation Department (PPR)

Portland Parks and Recreation Department's average natural area land acquisition cost is $10,000 per acre. The cost of acquisition for land to be used as a developed park (including playgrounds, sports fields, restrooms, etc.) averages around $459,400 per acre, but is significantly higher in Central City, which is probably around $55-$95 per square foot, depending on entitlements.

The cost for operations and maintenance is $1,200 annually per acre on average for natural areas, and $6,500 per acre for developed parks. For developed parks that include major facility replacements (e.g. playground equipment, sports courts, restroom facilities), the cost averages out to $20,000 per acre.

Metro

On average, the Metro spends about $15,300 per acre for the acquisition of land for natural areas. Full restoration costs average out to $2,590 per acre and ongoing maintenance following restoration is estimated at $76 per acre annually.

Sources of Funding

Bond measures and levies

In 2014, over 70% of Portland residents approved the city Parks Replacement Bond measure which provided for a $68 million general obligation bond to cover urgent repairs and capital improvements for the City's park system. This bond replaced an expiring bond passed in 1994. Portland has a history of bond and levy measures to fund its growing park system.

In 2013, voters in the Portland metropolitan area voted for a five year levy that would provide $10 million per year[2] for the Metro to support natural area improvements and maintenance, park maintenance, and Nature in Neighborhoods grants for habitat restoration. The Metro continues to apply a 2006 metropolitan area bond measure for $360 million toward the Metro's regional parkland acquisition, a "local share" program that provides funds to city, county and other park providers for land acquisition, park improvements and trail development; and Nature in Neighborhoods grants.

System Development Charge

A park SDC, or one-time fee, is applied by the City of Portland to both new residential construction and some commercial development that add to the impact on existing city infrastructure. The additional funds help cover costs of acquisition and development of city park facilities. A reduced SDC rate is available in exchange for donating property or improvements to qualified park facilities in the city. Rates for SDCs can be found here: https://www.portlandoregon.gov/bds/article/166412

General Fund

The Parks and Recreation Department accounts for approximately 3% of the City's overall budget. This includes approximately $40 million in discretionary and $20 million in non-discretionary resources.

TAKEAWAY: Portland's success in creating and managing open space is a result of City and Metro investments, as well as public support to fund ongoing capital improvements and maintenance.

MAINTAINING SUPPORT FOR OPEN SPACE IMPLEMENTATION

The Portland region has a strong environmental ethos, which benefits arguments for preserving open space, especially when drawing a connection between the existence of open space, an improved environment, and healthier residents. Portland has an extensive history at the local, regional and state[3] level of prioritizing open space.

[2] This breaks down to 9.6 cents for every $1,000 of home value, for example, costing a homeowner of a $100,000 home $9.60 per year for five years.

[3] State legislation created the regional governance model, and urban growth boundaries to protect farm and forest land in Oregon.

Portland residents have come to expect this asset to remain in Portland, and therefore are willing to pay to protect its existence in the City. There continues to be support from residents for open space as demonstrated by both City of Portland and Metro residents voting for bonds and levies to fund the creation and maintenance of open space throughout the region. Bond measure campaigns have continued to argue that open space in the Portland region contributes to clean water, and voter polls have demonstrated that this works.[4]

TAKEAWAY: Regional and state prioritization of open space has allowed, and in some ways, required Portland to follow a more sustainable development plan that balances open space and urban development.

OUTCOMES OF OPEN SPACE IMPLEMENTATION

A 2000 study examining the impacts of open space, in this case, public parks, found a statistically significant increase on property values in Portland. Researchers found that homes within 1,500 feet of a 20 acre open space sold for between $2,262 more than a home sold beyond 1,500 feet of open space.

REFERENCES

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[4] The Trust for Public Land helped to tie an open space bond campaign in the Portland suburb of Tigard to the importance of clean water. This case study discusses the success of better aligning the campaign with voter interests: http://www.conservationcampaign.org/wp-content/uploads/2015/05/Tigard-case-study-link.pdf

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APPENDIX 3. SUMMARY TABLE: OWNERSHIP ENTITIES

	LEGAL ENTITIES							
	Department of Natural Resources	**Land Bank**	**City**	**Metropolitan District**	**Land Trust**	**Land Conservancy**	**Community Land Trust**	**Land Cooperative**
PURPOSE*	A department of the State of Michigan that protects and conserves Michigan's natural resources, providing and developing facilities for outdoor recreation, promoting the reforesting of forestlands, and preventing and guarding against the pollution of lakes and streams.	A quasigovernmental entity that promotes economic growth in Michigan through the acquisition, assembly, and disposal of public property, including tax-reverted property, in a coordinated manner to foster the development of that property.	A city or village in Michigan may acquire, own, establish, and maintain parks and other property and public works for public health and safety, within or outside of its city or village corporate limits.	A public entity that combines two or more local units of government for the purpose of acquiring, managing, and disposing of parks and public utilities.	A nonprofit entity that conserves land through ownership of full parcels or conservation easements. A land trust may manage the land it owns or may lease the land to a land conservancy or other entity for management.	A nonprofit entity that conserves land by managing land that it either owns or leases from a land trust or other entity.	A nonprofit entity that typically holds land to protect long-term affordability and stewards development on that land for affordable housing, community gardens, civic buildings, and other community assets.	A nonprofit entity that promotes consistent land management through individual members' contributions. A land cooperative typically owns land, and individuals manage a plot, or may use the land, as cooperative members.
FEATURES								
Public Entity	Y	Y	Y	Y	N	N	N	N
Private Nonprofit Entity	N	N	N	N	Y	Y	Y	Y
Governing Authority	Statutes, articles of incorporation, rules and policies promulgated by the board	Statutes, intergovernmental agreement with the State Land Bank, articles of incorporation	State constitution, State statutes, home rule charter, City ordinances	Statutes, resolutions adopted by the board	Articles of Incorporation, Bylaws	Articles of Incorporation, Bylaws	Articles of Incorporation, Bylaws	Articles of Incorporation, Bylaws
ACQUIRING, HOLDING, MANAGING, AND DISPOSING OF LAND								
Ability to Acquire Land	Y	Y	Y (for public health and safety purposes)	Y	Y	Y	Y	Y
Power of Eminent Domain	Y	N	Y	Y	N	N	N	N
Ability to Hold Land	Y	Y	Y	Y	Y	Y	Y	Y
Land Eligible for Property Tax Exemption	N	Y	Y	Y	Y	Y	Y	Y
Makes PILOT to Local Government Units on Land Owned	Y	N	N	N	N	N	N	N
Ability to Manage Land	Y	Y	Y	Y	Y	Y	Y	Y
Ability to Lease Property	Y	Y	Y (subject to City Council approval by resolution)	Y	Y	Y	Y	Y

APPENDIX 3. SUMMARY TABLE: OWNERSHIP ENTITIES

	LEGAL ENTITIES							
	Department of Natural Resources	Land Bank	City	Metropolitan District	Land Trust	Land Conservancy	Community Land Trust	Land Cooperative
Ability to Dispose of Land	Y	Y	Y (subject to City Council approval by resolution)	Y	Y	Y	Y	Y
Ability to Negotiate Sale or Sell for Less than fair market value	N	Y	N	N	Y	Y	Y	Y
Power to Dispose of Property without State or Local Government Oversight	N	Y	N	N	Y	Y	Y	Y
FUNDING MECHANISMS								
Power to Levy Tax	N	N	Y	Y	N	N	N	N
Ability to Issue Bonds	Y	Y	Y	Y	N	N	N	N
Eligible to Receive Federal and State Grants	Y	Y	Y	Y	Y	Y	Y	Y
Eligible to Receive Private Donations	Y	Y	Y	Y	Y	Y	Y	Y
Power to Direct Proceeds from Land Sales	N	Y	N	N	Y	Y	Y	Y
Typically Retain Program Income (e.g., Rental Payments)	Y	Y	Y	Y	Y	Y	Y	Y
LIABILITY CONSIDERATIONS								
Some Activities Protected by Governmental Immunity	Y	Y	Y	Y	N	N	N	N
Advisable to Procure Insurance	Y	Y	Y	Y	Y	Y	Y	Y

APPENDIX 3. SUMMARY TABLE: OWNERSHIP ENTITIES

	LEGAL ENTITIES							
	Department of Natural Resources	Land Bank	City	Metropolitan District	Land Trust	Land Conservancy	Community Land Trust	Land Cooperative
KEY DISTINCTIONS & IDEAL USES								
Key Distinctions	DNR is a statewide entity set up to own public lands and lease them back to local entities to manage. DNR has limited power in its ability to dispose of land quickly.	Land bank is already tied into the tax foreclosure system through existing agreements with units of local government to take ownership of and manage tax foreclosed properties. Land bank also has the unique ability to perform expedited quiet title actions on property in its inventory, and to generate revenue through leases, sales and its tax recapture powers on property returned to the tax rolls.	A city may acquire, own, hold, and maintain land for public parks or other uses for public health and safety. A city, however, has limited flexibility in disposing of land.	Metropolitan districts have the ability to levy taxes on property within their boundaries to fund the acquisition and maintenance of open space land that they own, either within or outside of their boundaries.	Land trusts are traditionally set up to acquire and hold land and lease it to a separate nonprofit entity, a land conservancy, to manage.	Land conservancies are traditionally set up to manage land that is owned by a separate nonprofit entity, a land trust.	Community land trusts are similar to land trusts and land conservancies in terms of their legal structure, authority, and powers to acquire, manage, and dispose of property. In practice, community land trusts have a community-driven mission such as increasing affordable housing or reducing blight.	A land cooperative is an innovative approach to owning and manage open space land. Individual members buy an ownership share in the cooperative. An ownership share grants a member the right to use a parcel of land owned by the cooperative, in accordance with the policies set forth by the cooperative.
Ideal Use*	Natural Areas, Parks and Recreation	Productive Landscapes, Natural Areas, Green Stormwater Infrastructure	Parks and Recreation, Natural Areas, Green Stormwater Infrastructure	Natural Areas, Parks and Recreation	Productive Landscapes, Natural Areas, Green Stormwater Infrastructure, Parks and Recreation	Productive Landscapes, Natural Areas, Green Stormwater Infrastructure, Parks and Recreation	Productive Landscapes, Natural Areas, Green Stormwater Infrastructure, Parks and Recreation	Productive Landscapes
Ideal Duration*	50+ Years	1-5 Years (longer if land is leased)	20-50 Years, 50+ Years	20-50 Years, 50+ Years	5-20 Years	5-20 Years	5-20 Years	5-20 Years
EXISTING ENTITIES								
Example of Entity that Operates in Detroit	DNR www.michigan.gov/dnr	Detroit Land Bank Authority www.buildingdetroit.org	City of Detroit www.detroitmi.gov	Huron-Clinton Metropolitan Authority www.metroparks.com	Trust for Public Land (Humbug Marsh on Detroit River) www.tpl.org/our-work/land-and-water/humbug-marsh	Detroit Riverfront Conservancy www.detroitriverfront.org	*	*
Example of Models Outside of Detroit	DNR www.michigan.gov/dnr	Kalamazoo County Land Bank www.kalamazoolandbank.org	City of Flint www.cityofflint.com	Midpeninsula Regional Open Space District www.openspace.org (California)	Land Trust Alliance www.landtrustalliance.org Philadelphia Neighborhood Garden Trust www.ngtrust.org	Southeast Michigan Land Conservancy www.smlcland.org	Dwelling Place (Kent County Community Land Trust) www.dwellingplacegr.org	Friends Lake Cooperative Community www.friendslake.org

*Notes: (1) The information contained in this chart is based on Michigan law. (2) "Ideal Use" and "Ideal Duration" for each ownership model are not statements as to an ownership model's legal ability, but rather recommendations based on the traditional use and suitability of each ownership model for the particular use or duration. (3) Community Land Trusts in Detroit: Various organizations in Detroit are committed to creating a community land trust, including Detroit Community Trust Coalition and the Community Development Advocates of Detroit (CDAD) (see cdad-online.org/community-land-trust). (4) Land Cooperatives in Detroit: Various cooperatives exist in Detroit, but using the nonprofit cooperative model for open space ownership and management would likely be an innovative approach in Detroit.

APPENDIX 4. SUMMARY TABLE: OWNERSHIP TOOLS

	LEGAL TOOLS			
	Deed Restriction	**Conservation Easement**	**Development Rights Agreement***	**Lease**
PURPOSE	A private contract that is recorded in the public record and runs with the land that preserves desired aesthetics, uses, or other characteristics of the subject land.	A property right that is granted by a landowner to the easement holder (another individual or entity) for the use of part of the landowner's land. Conservation easements retain land, including any improvements, predominantly in the land's natural, scenic, or open condition, or in an agricultural, farming, open space, or forest use, or similar use or condition.	An agreement through which a landowner grants to a public body the development rights of a portion of all of the landowner's property, and both the landowner and public body agree not to develop the property for a certain period of time, between 10 and 90 years.	A grant of permission to possess or use the property of another in exchange for rental payment or other consideration. Property may include land, buildings, rooms, or movable property.
FEATURES				
Publicly Recordable Legal Instrument	Y	Y	Y	Y
Transferable Property Right (transfer may be subject to conditions under state law or the legal instrument)	N/A	Y	Y (for the landowner only)	Y
Possible Income and Property Tax Benefits	N	Y	Y	N
Must Provide Defined Term	N	N	Y (between 10 and 90 years)	Y
Available for any Legal Entity to Grant	Y	Y	N (granted by private entity)	Y
Available for any Legal Entity to Receive (or be subject to)	Y	Y (in practice accepted by nonprofit corporations only)	N (granted to State or local unit of government only)	Y
KEY DISTINCTIONS & IDEAL USES				
Key Distinctions	Deed restrictions limit the use of property and enable private ownership of land while maintaining consistent use or vision across all of the parcels.	Conservation easements can be a way to preserve and maintain a portion of a parcel as open space land, for example a bike trail or riverfront.	Development rights agreements are similar to deed restrictions and conservation easements but are between a private landowner and the State or a local unit of government, have a defined term, and are primarily used for preservation of farmland.	Leases are one way to enable an entity to own the land while a separate entity manages the land. The entity that owns the land leases the land to the land-managing entity. Leases must have a set, definite term.
Ideal Use*	Green Stormwater Infrastructure, Natural Areas, Park and Recreation	Productive Landscapes, Green Stormwater Infrastructure, Natural Areas, Parks and Recreation	Productive Landscapes, Natural Areas, Parks and Recreation, Green Stormwater Infrastructure	Productive Landscapes, Natural Areas, Parks and Recreation, Green Stormwater Infrastructure
Ideal Duration*	5-20 Years, 20-50 Years	5-20 Years, 20-50 Years, 50+ Years	10-20 Years, 20-50 Years, 50-90 Years	1-5 Years, 5-20 Years, 20-50 Years, 50-99 Years

*Notes: (1) "Development Rights Agreement" refers to a development rights agreement, or development rights easement, executed pursuant to MCL 324.36101, et seq. (2) "Ideal Use" and "Ideal Duration" for each ownership tool are not statements as to an ownership tool's legal ability, but rather recommendations based on the traditional use and suitability of each ownership tool for the particular use or duration.

APPENDIX 5. SUMMARY TABLE: FUNDING OVERVIEW BY OPEN SPACE USE TYPE

	PRODUCTIVE LAND USES				VARIOUS LAND USES	NATURAL LAND USES		PARKS/REC
	Urban Farm	**Solar**	**Biofuel**	**Tree Farm**	**Green Stormwater Infrastructure**	**Meadow**	**Forest**	**Greenway**
Financial Considerations (summary)	Nominal City financial investment, but does require increased certainty that land can be used for urban farming. There is a lower return on this investment, but it does leverage farmers market, food processing and distribution successes in the city as well as potentially offset other health-related costs.	Has the potential for the highest revenue generation per acre. Requires significant up-front costs that would have to could come at no cost to Detroit from the private sector if sufficient solar demand can be developed.	Biofuel economics are driven by renewable fuel standards and the cost of traditional fuels. With recent lower fossil fuel costs, biofuel economics are less favorable unless renewable fuel standard requirements become beneficial for larger-scale urban biofuel stocks.	Tree planting up-front costs are more expensive per acre than grass or meadow but these costs can be offset by sale of the harvested product.	Green stormwater infrastructure has higher upfront costs but can tap into a variety of potential funding sources, such as required stormwater regulations, drainage fees, and combined sewer overflow reduction funding. Locating green stormwater infrastructure in long-term open spaces could allow for more cost effective implementation than in areas with homes or businesses remaining.	Planting meadows instead of turf grass could lead to significant maintenance cost savings over time while also bringing aesthetic improvements to blighted neighborhoods with meadow flowers.	Planting trees instead of meadow or grass can have higher up front initial planting and maintenance costs. Long-term maintenance costs would depending upon the amount of forest management that occurs. Without tree harvesting, third party investment is unlikely. Tree planting can bring aesthetic improvements to blighted neighborhoods.	Development of greenway trails on open space land will require high up-front costs. Greenways have the ability to connect to a variety of funding sources including transit-oriented funding. Greenway development may also help to offset other health-related costs and potentially increase adjacent land values.
Cost (initial implementation) *	Moderate Up to $50,000/acre Notes: Entry costs would vary depending upon farm size, soil quality and farm type with commercial scale costs paid for by commercial grower. Smaller-scale community or individual ag-operations would require significantly less startup cost while putting additional acreage per year into beneficial use.	High $500,000-600,000/acre Notes: a 20MW solar development (covering approx. 100 acres) would cost approximately $50M-$60M and generate electricity to power more than 3,000 Detroit households.	Moderate $7,000 to $42,000/acre Notes: Prior studies have envisioned a minimum pennycress biofuel initial start-up of $134k that would come from a private investor or grant.	Low $4,000-10,000/acre Notes: Tree farm planting is scalable and overall cost depends upon the level of implementation, local conditions and amount of site preparation required.	High $218,000 to $436,000/acre Notes: Actual cost will vary based on the specific type of green stormwater infrastructure installed.	Low $3,000-5,000/acre	Low $4,000-10,000/acre Notes: Reforestation planting is scalable and overall cost depends upon the level of implementation, local conditions and amount of site preparation required. Natural secession from vacant land to forests could occur at lower costs, but would not have the habitat benefits a planned and deliberate forest planting would realize.	High $30,000-130,000/acre Notes: Costs for greenways are dependent upon the amount of implementation. A greenway trail could cost $44,000/mile for 10' wide crushed stone multipurpose trail (based on Cheboygan to Alpena trail)
Cost (maintenance)*	Low Notes: Annual maintenance costs for seeds, re-planting, watering and supplies are relatively low. Property management costs associated with security, labor, taxes, etc. would be	Low $500 -$1,000/acre/year	Low $100 to $300/acre/year Notes: Maintenance costs reflective of larger-scale pennycress operation of 350 acres of more.	Low $100-$1,000/acre/year Notes: Maintenance costs are generally higher than turf grass in initial years to establish the trees, but become less after they are established. These costs	Moderate $1,000 -$2,000/acre	Low $100-$200/acre/year Notes: Maintenance costs will diminish as meadow establishes	Low $100-$1,000/acre/year Notes: Maintenance costs are generally higher than meadow or turf grass in initial years to establish the trees, but become less after they are established and	Moderate ~$8,000-$28,000/acre/year Notes: Generally to repaint bike lanes and replace a few signs

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	PRODUCTIVE LAND USES				VARIOUS LAND USES	NATURAL LAND USES		PARKS/REC
	Urban Farm	Solar	Biofuel	Tree Farm	Green Stormwater Infrastructure	Meadow	Forest	Greenway
	proportional to the scale of the operation.			can be covered by private investors.			depend upon the level of management desired.	
Revenue Generation (for implementer)*	Yearly revenue $10,000/acre/year Investment period of 3 to 10 years Revenue income to urban farmers could be as low as zero for subsistence agriculture to $10,000 per acre for high value crops at sufficient scale (3-5 acres). With a successful business plan and hard work, revenue to repay modest start-up costs could reasonably occur.	Yearly revenue $24,000/acre/year Investment period of 20-25 years A solar development on that 100 acres would generate more than 24 GWh of electricity annually, currently valued at approximately $2.4M. If Detroit negotiated a power purchase agreement that reduced the City's electricity costs by 5-10%, that 100 acres would save them $120k-$240k annually.	Yearly revenue $0 to $100/acre/year Investment period of 3 to 10 years Biofuels can be sold to generate revenue, but at current prices, not enough to cover the cost of planting, operation and maintenance. Outside subsidies would be needed to remain financially neutral. Potential challenges to revenue generation include that corn ethanol production costs are significantly less than other potential ethanol producing crops and that locally available refineries are required to avoid excessive transport costs.	Revenue after 15 to 40 years $1,500 to 5,500/acre Investment period of 15 to 40 years If trees are harvested, value increases over time. If trees are not harvested, no revenue occurs. Revenue generation depends upon arrangement and tree ownership. If the City plants the trees, planting and maintenance expenses continue and revenue does not occur until trees are harvested. Yearly revenue generation may be realized by planting yearly crops for harvest in-between the trees.	No Revenue $0/acre Investment period of 10 to 20 years No revenue generation would be expected with this land use. It is more focused on cost avoidance by providing a potential maintenance cost income source. One situation that could bring in revenue is if developers and land owners were allowed to pay a fee in lieu as a compliance option for stormwater regulations.	No Revenue $0/acre Investment period of 10 to 20 years No revenue generation. This use is focused more on cost avoidance by limiting the cost of ongoing maintenance.	No Revenue $0/acre Investment period of 15 to 40 years No revenue generation. This use is focused more on cost avoidance by limiting the cost of ongoing maintenance and providing buffers to transportation and industrial lands as well as native forest.	No Revenue $0/acre Investment period of 10 to 20 years No significant revenue payments anticipated to the implementer. Trails Contribute to Detroit's bike culture and related tourism. Case studies from two Detroit neighborhoods found that bike events and vacations produced $1.6M in annual tourism and bike related spending.
Project Scale	Scale would depend upon the farmer's need and could range from less than a lot up to 5 acres.	Likely a mix of utility-scale, commercial-scale, and community solar. Solar PV development can span hundreds of contiguous acres or fit into small lots as desired.	20 acres and higher.	Minimum 2-5 acres. Larger scale would bring even more economies of scale.	Implemented on small, dispersed parcels (generally less than half acre). Green stormwater can be made as an addition to other land uses, including meadows, tree farms, biofuels and parks. This can significantly reduce the cost per acre of stormwater managed.	Meadows can be installed on as small as a part of a lot to many acres.	Minimum 2-5 acres. Larger scale would bring even more economies of scale.	Trails should be ideally 1.5-mile stretch or more. Piecemeal assembly okay beyond that. Only works well with a trail length of several miles or more, or clear destinations.

*Notes: (1) "Cost" and "Revenue" sections are referencing the implementer of the open space use in a general sense, rather than a specific entity. An implementer could own the land or be leasing it. An implementer could be a private entity or a public entity. How the costs or revenue would be incurred and by whom entirely depends on how the project has been set up.

APPENDIX 6. SUMMARY TABLE: FUNDING TOOLS AND OPEN SPACE USE TYPE APPLICABILITY

FUNDING TOOL		GENERAL CHARACTERISTICS			APPLICABILITY FOR SPECIFIC OPEN SPACE USES								
					Productive Land Uses				Various	Natural Land Uses		Parks/Rec	
Type	Source	Likely Applicability to Open Space Funding	Explanation of tool[1]	Notes on applicability	Urban Farm	Solar	Biofuel	Tree Farm	Green Stormwater Infrastructure	Meadow	Forest	Greenway	Other Comments
DIRECT FEES	User fees and charges	High	User fees include the fees charged for the use of public infrastructure or goods (e.g., a toll road or bridge, water or wastewater systems, or public transit). Fees are typically set to cover a system's operating and capital expenses each year.	Public infrastructure or goods that can collect a user fee (e.g., a toll road or bridge, water or wastewater systems, or public transit).Fees can then be used to cover debt service for improvements to the system.	High	High	Medium	Medium	High	Low	Low	Low	
	Property taxes/general fund revenues	High	For uses that don't have revenue-generating potential, the City could devote some of its scarce General Fund revenues, generated from property taxes or General Fund operating reserves/surpluses, to help get activities started. With voter approval, special taxes could also be considered which could enable a dedicated source of funding. Examples include an open space millage structured around a Metropolitan District, or a Community Preservation Fund.	For current general fund revenue, uses that do not have revenue-generating capability. Special millages would have greater flexibility based on how they are structured.	Low	Low	Low	Low	Low	Medium	Medium	Medium	Likely limited funding available in the near-term, prospects could be greater in the longer term.
	Public benefit funds	Low	Public benefit funds are the collection of funds generated by a small surcharge on a customer's electricity bills, without regard to who the electric provider is.	Have mostly been used to support energy efficiency and energy renewal projects.	N/A	Medium	N/A	N/A	N/A	N/A	N/A	N/A	Typically used to support energy efficiency funds. Source is typically small surcharge on electric bills.
	Ground lease financing	Medium	DLBA would lease land for open space use and securitize future lease payments using any proceeds to acquire or develop future land.		Medium	High	High	Medium	High	Low	Low	Low	Applicability indicated references the likelihood of revenue generation via leases.
	Transfer fee fund	Low	Private fees levied in certain real estate transactions where a transfer of property ownership occurs, typically as a percentage of the transaction price. Community Preservation Funds (CPF) are tax programs implemented by states and municipalities to fund their open space protection and enhancement. New York's was established largely with a transfer fee. CPF is then used to purchase land or development rights from willing sellers in order to protect community character.	Likely will have greater support if it is framed around a use with a clear public benefit and one that may increase property value.	Low	N/A	N/A	N/A	N/A	Low	Low	Medium	

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Type	Source	Likely Applicability to Open Space Funding	Explanation of tool[1]	Notes on applicability	Urban Farm	Solar	Biofuel	Tree Farm	Green Stormwater Infrastructure	Meadow	Forest	Greenway	Other Comments
DEBT TOOLS	Industrial loan companies, industrial banks, Industrial revenue bonds	High	A debt instrument issued by a municipal agency or state, most commonly issued as part of an economic development initiative in which the municipal agency issues IRBs and then gives the proceeds to a private firm for development. The private entity is responsible to repay the debt over time.	Because IBs issue loans that must be repaid, they appear to be most applicable to infrastructure types that generate revenue, such as sewer or water projects that charge a user fee. However, IBs appear to be largely untested in financing infrastructure.	Low	High	Medium	Low	Low	N/A	N/A	N/A	Robust market demand required.
	General obligation bonds	High	Bonds issued by municipalities that represent an obligation of the full faith and credit of the property owners within the municipality.	Can also be used for projects that do not generate revenue; either for large projects or grouping several to many smaller project together as transaction costs are expensive.	Low	Low	Low	Low	High	Low	Low	Medium	One of the issues is that GI life cycles are relatively new to the market. Consequently, the life cycle of the improvements is still being developed; term of the bonds may be limited to 15 to 20 years maximum. Additional discussion would be beneficial for how debt tools with the Detroit credit rating could be applicable when re-entering the bond market.
	Revenue bonds	High	Bonds issued by municipalities that are secured by a dedication of an identified revenue stream (e.g., water and sewer system bonds are typically repaid through user fees from system customers).	Assets that will generate reliable revenue.	N/A	Low	N/A	Low	High	N/A	N/A	Medium	Applicable to general debt service.
	Green bonds	High	Bonds that are issued specifically to address projects that accomplish identified 'green' objectives, such as clean power and carbon reducing projects. There are various levels of green certification, with the most rigorous requiring independent certification and ongoing monitoring. Green bonds appeal to some classes of investors who are specifically interested to support sustainable solutions as part of their investment portfolio.	Projects that investors see as "green", but generally utilize underlying type of bond (aka, general obligation or revenue). Several utilities in the US have issued green bonds to address stormwater management issues.	Low	Medium	Medium	Low	High	Low	Low	Medium	Applicability would depend in part on how strictly "green" is defined and certified for any Detroit green bonds.
	Qualified energy conservation bonds	Medium	Qualified Energy Conservation Bonds (QECBs) are designed specifically to, as the name implies, fund qualified energy conservation projects such as reducing energy consumption in publicly owned buildings by at least 20% or financing demonstration projects and implementation of green building technologies.	Generally focused on energy conservation measures.	N/A	Medium	N/A	N/A	N/A	N/A	N/A	N/A	Relatively new funding mechanism, has been generally slow to sell on the market.

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					Productive Land Uses				Various	Natural Land Uses		Parks/Rec	
Type	Source	Likely Applicability to Open Space Funding	Explanation of tool[1]	Notes on applicability	Urban Farm	Solar	Biofuel	Tree Farm	Green Stormwater Infrastructure	Meadow	Forest	Greenway	Other Comments
DEBT TOOLS	Pooled bond financing	Low	States act as bonding agency on behalf of multiple municipal entities, typically for similar or related projects (e.g. water or wastewater projects, public building projects).	Likely limited applicability since the open space program is for the city of Detroit only.	Low	Low	Low	Low	Low	Low	Low	Low	Willingness of State of Michigan or other higher level entities to support use of this mechanism has not been verified.
	Private activity bonds (PAB)	High	Private activity bonds (PABs) are federal- and state-tax-exempt securities issued by state or municipal governments to provide financing for private entities. The federal government imposes a limit on how many PABs each state can issue annually based on the state's population. Frequently, the issuer is just a conduit while the private entity is responsible for paying principal and interest on the bonds. Interest on qualified PABs is tax-exempt. From the perspective of the private entity, PABs are similar to corporate debt, but the borrower benefits from the lower cost of tax-exempt debt.	For a private activity bond to be tax-exempt, 95% or more of the net bond proceeds must be used for one of the several qualified purposes such as: facilities for the furnishing of water, sewage facilities, and facilities for the furnishing of local electric energy or gas. PABs can also be used for bicycle transportation and pedestrian walkways along urban and rural principal arterial routes, and preservation of abandoned railway corridors.	Low	Medium	Low	Medium	High	N/A	N/A	High	Would need to be directed to a quasi-public entity where some of the City's funding could be directed. Contingent upon Detroit dedicating part of its PAB cap towards this use. Often used for school funding; could be used for some actions; needs dedication from Detroit to say money will be in part spent on these items.
	Certificates of participation	Low	Tax-exempt bonds usually secured with revenue from an equipment or facility lease; issued by state authorized entities (e.g. state public works boards, joint powers authorities, municipalities, or transit agencies).	Have been used in public finance to support a broad variety of projects and programs, including acquisition of land or equipment, transportation (e.g., light rail and toll bridges), water and wastewater treatment facilities, and real estate (e.g., parking facilities, public buildings). Not suitable for funding operations and maintenance activities.	Low	Low	Low	Low	Low	N/A	N/A	N/A	Where bonding might be a possibility; this could be part of an overall borrowing strategy. Highly dependent upon the financial conditions at the time when Detroit would go to the bond market. Seems more likely that bonding or some other debt instrument would be used in Detroit rather than COPs.
	Revolving loan funds	Medium	A revolving loan fund (RLF) is a pool of money dedicated to specific kinds of investments. The money used to repay loans replenishes the fund and is loaned out again.	RLFs can provide access to capital markets for projects that have poor risk profiles to meet economic development (e.g. new business development), environmental (e.g. safe drinking water), or other public policy goals. RLF financing can also be useful for projects where the revenue stream might be irregular. RLF customers can include local governments, special districts, state agencies, private corporations, or nonprofit organizations.	Low	Low	Low	Low	Medium	Low	Low	Low	Dependent upon the structure and coverage of the State of Michigan revolving loan program(s).
	Energy efficiency loans	Low	This source is discounted interest loans to individuals who want to finance capital improvements to their homes or other properties. The source of capital in the US has typically been state budget surpluses.	Generally applicable for energy efficiency.	N/A	Low	Low	N/A	N/A	N/A	N/A	N/A	Eligibility would likely need to be expanded to suit uses in open space areas.

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DEBT TOOLS	Linked deposit programs	Low	Below market bank loans subsidized by corresponding 'linked' state deposits. The source of capital is state tax surpluses.	Can be used for numerous things, including upgrade infrastructure; depends on the state for eligible uses.	Low	N/A	N/A	Low	N/A	N/A	N/A	N/A	Dependent upon state level surpluses that could be used to seed a fund.
	Property Assessed Clean Energy (PACE) loans	Low	Property owners borrow against their property taxes to fund energy efficiency improvements.	Clean Energy (energy efficiency and solar; varies by state on specifics).	N/A	Medium	N/A	N/A	N/A	N/A	N/A	N/A	Is dependent upon City of Detroit to have revenues to seed the program. For solar, more applicable to community solar than utility scale.
	Grant anticipation revenue vehicle bonds	Low	Federal-tax-exempt debt mechanisms (e.g. bonds, notes, certificates, mortgages, or leases) that are backed by future Title 23 federal transportation funding. GARVEE financing enables the state to use future federal transportation funds as the revenue stream to pay debt service.	Suitable when a state cannot construct projects using traditional pay-as you-go funding. GARVEE debt financing can fund projects (or programs of projects) eligible under U.S.C. Title 23 which include bicycle transportation infrastructure and pedestrian walkways, beautification of streets, construction of publicly owned intra- or intercity bus terminals, and environmental mitigation to address water pollution.	Low	Low	Low	Low	Low	Low	Low	Low	Availability of significant Federal or State grants is limited. As a result, the opportunity to leverage such funding is limited.
CREDIT ASSISTANCE	Credit assistance tools or loan guarantees	High	Credit assistance improves local agencies' creditworthiness and thus lets them access better borrowing terms and reduce financing costs. Federal and state agencies have developed a variety of financial tools to help local governments access credit to expedite projects. This credit assistance can take several forms.	For socially beneficial projects with reasonable expectation of private market success, but little history (Tesla is an example). When a project cannot get reasonably priced capital to get to scale.	Low	High	Medium	Low	High	N/A	N/A	Medium	Several programs exist for loan guarantees. USDOE precedent for solar guarantees is an example. Federal interest could direct loan guarantees could include the local Detroit area.
	On-bill financing	Medium	Utilities bill customers a monthly fixed charge to recoup costs of required property-level upgrades.	Energy efficiency and other improvement benefits that stay with the property, not the resident or current property owner.	N/A	Medium	N/A	N/A	Low	N/A	N/A	N/A	Most applicable where a utility or other entity pays for the project up-front and then bills customer for their asset over time.
	Water Infrastructure Finance and Innovation Act Program	Medium	Water Infrastructure Finance and Innovation Act Program (WIFIA) was created to provide federal credit assistance (e.g., secured loans or loan guarantees) for large projects that face financing challenges due to their size or complexity.	Can only assist projects that exceed $20 million in total costs. WIFIA can support both governmental and nongovernmental agencies.	N/A	N/A	N/A	N/A	Medium	N/A	N/A	N/A	Stormwater only likely eligibility.

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PRIVATE SOURCES/ EQUITY	Public-private partnership	High	(P3) is defined as "a contractual agreement between a public agency (federal, state, or local) and a private-sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public.	Projects that generate revenue and can write a strong contract for; parking facilities, toll roads, airports, and ports; schools, hospitals, or libraries; These bundled projects could involve parks; streetscaping; road, bicycle, or pedestrian improvements; sewer, water, storm drain, and other utilities; or parking.	Low	High	Medium	Medium	Medium	Low	Low	Medium	Opportunities are dependent upon more detailed evaluation of the potential scale and market interest. For example, how much GI could be implemented contiguously and how might it be paid back over time.
	Program-related investment (PRI)	High	Generally foundation or public investment offering longer and more flexible investment terms, as compared to tradition private financing. PRIs can be structured as debt tools or equity stakes.	Could pool PRI investment to a fund for the benefit of entrepreneurial ventures utilizing open space.	High	High	High	High	High	N/A	N/A	Low	
	Impact bonds/Social impact bonds	Medium	A bond instrument in which the payment is contingent on the outcomes agreed upon by the investor and issuer. Impact bonds have a broader range of public benefits, including environmental, social, and economic. Private investors assume the risk for improvement to outcomes. SIBs reference a category of investments focused more squarely on social impacts.	Require negotiated criteria for measuring success in determining funding; could have multiple measures of success.	Medium	Low	Low	Low	Medium	N/A	N/A	Medium	Requires metrics to measure success as established for a community. Is a new financial tool and has not been applied to these specific needs.
	Pay for success	High	Similar to social impact bonds. A pay for success or pay-for-performance option is a contractual relationship in which the private sector is engaged to accomplish a public objective, with incentives for the private entity for performance above an agreed-upon minimum performance level.	Could be adapted to quite a few of the open space options.	Medium	High	Medium	Medium	High	N/A	N/A	N/A	Opportunities are dependent upon more detailed evaluation of the potential scale and market interest. For example, how much GI could be implemented contiguously and how might it be paid back over time. Some uses are N/A because there is not a clear repayment mechanism.
	Pooled lease-purchase	Medium	A government agency purchases property or equipment on an annually renewable contract basis.	Particularly beneficial to states because smaller projects can be combined to receive longer loan terms and beneficial interest rates. However, forming a pooling agreement can be difficult when attempting to combine projects at the same time for financing.	Low	Low	Low	Low	Low	N/A	N/A	Low	Multiple leasers have not been identified. If there were regional solutions and multiple private entities that could be brought to the table, this would not be applicable. Requires multiple public entities.

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PRIVATE SOURCES/ EQUITY	Loan loss reserve funds (LRF)	Medium	LRFs improve under-banked consumers' small dollar loan options by expanding the number of responsible lenders and products available in the marketplace. The source of capital is a combination of the public sector and private banks.	Where financial institutions make a series of small loans for projects such as energy efficiency improvements or residential solar.	Low	N/A	N/A	Medium	N/A	N/A	N/A	N/A	A variation on this finance model could be applicable to getting more urban farms up and running. A small loan that could be guaranteed by an entity with a provision for loss in some cases.
	Infrastructure Investment Funds	High	A pool of funds collected from many investors to invest in infrastructure, often in the form of a public-private partnership. An infrastructure investment fund can be the financing tool that pays for a public project's capital cost under a public-private partnership.	Have supported projects in a broad range of sectors such as transportation (e.g. toll roads, airports, ports, and transit), regulated utilities (e.g. water and power), cable and wireless communication, and social infrastructure (e.g. schools, hospitals, public and military housing, and civic buildings); seek projects with stable, predictable, and long-term income streams.	Low	Medium	Medium	Low	Medium	N/A	N/A	N/A	This is an emerging, developing funding source. Market interest is being evaluated beyond Detroit.
	Securitization and structured funds	Medium	A "structured fund" is a loan fund that pools money from different investors with varying risk and return profiles. Structured funds have a very specific dedicated purpose, which is clearly defined prior to forming the fund, and are managed by professionals with fund formation and loan underwriting experience. Structured funds often combine both equity and fixed-income products to provide investors with a degree of both capital protection and capital appreciation.	Applicability for the open space options will depend in part on the types of investors that the City focuses on to support redevelopment of Detroit and their resulting level of interest in this program.	Low	Medium	Medium	Low	Medium	N/A	N/A	N/A	A private fund that appeals to investors in limiting risk and willing to accept lower returns. Increased opportunities for total capital may be created by appealing to different categories of investors. More applicable for uses with a reliable identified repayment stream.
	Greenhouse emissions allowance auctions	Low	States pool their total emission allowances and sell them in an auction format.	Market-efficient way to have polluters pay for pollution emitted.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Rated NA for all uses because Michigan currently does not participate in these auctions. This financial tool is enabled by regional greenhouse gas initiatives.
	Stormwater/ green stormwater infrastructure credit trading programs	High	Cities enable and administer a market in which developers who accomplish documented stormwater management objectives are allowed to sell credits to property developers who need to accomplish stormwater management objectives on site for new development.		N/A	N/A	N/A	N/A	Medium	Low	Low	Low	Depends upon the stormwater regulatory climate. Would require adapting the current stormwater regulations to promote these opportunities. For the identified open space solutions, this would primarily be applicable to green stormwater solutions.

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PRIVATE SOURCES/ EQUITY	Green Stormwater Infrastructure Bank	High	An alternative to credit trading, enables developers to purchase retention credits from the green stormwater infrastructure bank that invests in large green stormwater infrastructure projects.	Would be focused on larger sites being developed by a single entity.	N/A	N/A	N/A	N/A	Medium	Low	Low	Low	Would require additional regulations prompting developers to invest in GI.
	New Market Tax Credits	High	Allows corporate or individual investors to receive a tax credit for investing in a community development entity (CDE) in a low-income community.	Proven financing method for some open space uses, such as urban farming and biofuel, but has wider applicability.	High	High	Medium	High	Low	Low	Low	Low	NMTC expired in 2014, but there is legislation in the House and Senate to make the NMTC permanent.
	Carbon credits	Medium	Not specifically a funding mechanism, but may provide value for carbon capture in the future depending upon regulations.	Likely need to be for large, permanent projects, though tree farms could be applicable.	N/A	N/A	N/A	Medium	N/A	N/A	Medium	N/A	Carbon credits can be quantified and marketed. Changes in regulatory conditions could make this option more attractive in the future.
	Solar Investment Tax Credit	High	A 30-percent federal tax credit for solar systems on residential and commercial properties. In effect through December 31, 2016. The commercial ITC is used for both utility-scale and distributed solar projects. The company that installs, develops, or finances the project uses the credit.	Most relevant to open space through utility scale solar projects, however commercial credit drops to 10% after 2016.	N/A	High	N/A	N/A	N/A	N/A	N/A	N/A	After December 31, 2016, the commercial credit will drop to 10-percent unless Congress extends this deadline or changes the "placed in service" component of the law to a "commence construction" provision.
	Individual or peer-to-peer funding	Medium	Pooling monetary investments, loans or donations from a large number of private individuals. More commonly referenced as "crowdfunding" or "crowd lending/investing." These can be structured as donations, equity positions, loans or investments receiving some form of return (product or monetary).	Likely more successful when a tangible good can be returned in a short period of time or where there is some broader social or public benefit.	Medium	Low	Low	Low	Low	Low	Low	Low	
VALUE CAPTURE MECHANISMS	Developer fees and exactions or impact fees/tap fees	Low	Developer fees and exactions include: Impact fees, which include system development charges and connection or facility fees, and Negotiated exactions and agreements.	Impact fees impose a fee on developers to fund additional service capacity required by the development. The primary use of tap fees is to cover the cost of tying water meters for new connections to existing lines. Some jurisdictions also use tap fees to cover the cost of sewer line inspections.	N/A	N/A	N/A	N/A	High	N/A	N/A	N/A	Revenue-generating capability will depend upon the pace of development.
	Value capture	Low	Value capture is the identification and capture of increased land value resulting from public investment in infrastructure.	Most applicable for situations where substantial increases in land value are likely in response to public investment.	N/A	Low	N/A	Medium	Medium	Low	Low	Low	Opportunity for significant increased land value has not been identified. If land values could significantly change, then this financial tool should be revisited.

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VALUE CAPTURE MECHANISMS	Linkage fees	Low	A City charges developers a fee for new development, typically based on a percentage of the sales price.	Pay for the secondary effects of development. Examples might include charging housing developers to offset traffic increases or commercial developers to help fund affordable housing so the people who work in the new buildings can afford to live in the community.	N/A	N/A	N/A	N/A	N/A	Low	Low	Low	Low or no direct applicability with these proposed land uses. None of these uses are focused upon dense development that might create secondary public costs. Best prospect might be to connect some anticipated development with need for open space, recreation, meadows.
	Developer dedication requirements	Low	Where imposed, developers are required to donate land and/or facilities for public use.	Theory behind these requirements is that a City's existing residents should not subsidize developers who bring in new residents.	N/A	N/A	N/A	N/A	N/A	Low	Low	Low	Low or no direct applicability with these proposed land uses. None of these uses are focused upon density of development that might create secondary public costs. Best prospect might be to connect some anticipated development with need for open space, recreation, meadows.
	Special districts/ Improvement districts	Medium	A value capture tool that can include benefit assessment districts, business improvement districts, business improvement areas, business revitalization zones, community improvement districts, local improvement districts, special services areas, and special improvement districts, are formed to include a geographical area in which property owners or businesses agree to pay an assessment to fund a proposed improvement or service from which they expect to directly benefit.	Commonly used to fund infrastructure such as sewer, water, utilities, or streets. Special districts can be used either for pay-as you- go improvements or to finance the issuance of bonds backed by the assessment revenue; can be used to fund infrastructure that does not generate revenue, so the tool is applicable to a wide variety of uses. However, there must be a clear benefit to property owners who will be paying the assessment. Because assessments do not need to be tied to revenue-generating infrastructure, they are particularly useful for streetscaping and other beautification projects that provide benefits to an entire district.	N/A	N/A	N/A	N/A	N/A	Low	Low	Medium	Physical location of the use is incredibly important to make an improvement district work in an open space area.
	PILOT bond	Medium	Bond that is repaid by some or all property taxes for properties bordering major open space developments to fund construction of open space. These are similar to improvement districts but more binding.	Most applicable to uses with clear benefit to surrounding property owners, most often major parks.	N/A	N/A	N/A	N/A	N/A	Low	Low	Medium	Physical location of the use is incredibly important to make PILOT bond work in an open space area.

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VALUE CAPTURE MECHANISMS	Tax increment financing	Medium	Enables the public sector to "capture" growth in property taxes (or sometimes sales taxes) from new development and increasing property values. Tax increment is collected for a set period, usually between 15 and 30 years. It can be used either on a pay-as-you-go basis over time or can be bonded against to provide an upfront source of revenue.	Most common uses of TIF are for environmental clean-up, land assembly, or local infrastructure; to help pay for major development initiatives or infrastructure investments that catalyze private investment and increase property values; can be applied to infrastructure that does not generate revenue. Typical items financed include street improvements; sidewalks; street lighting; utilities, including water lines, storm and sanitary sewers, and plant expansions; parks and open space; and off-street parking.	N/A	Low	N/A	Medium	Medium	Low	Low	Low	Increasing property value with greenways, natural areas or green stormwater infrastructure could lead to TIF funding availability. However, there are competing interests for funding, so significant funding is not expected. Overall, applicability is similar as that for value capture, as many of the same considerations apply to this more specific application of using the increased value created by development.
	Joint development	Medium	A real estate development project undertaken by a public agency and a private partner; many joint development projects are designed to meet multiple goals such as providing affordable housing, local jurisdictions can also help finance aspects of the project; requires a strong real estate market and a specific development opportunity.	Could be applicable in specific contexts where a developer's interests in a specific project coincides with public agencies' interest to support the open space reuses such as parks and greenways or tree farms.	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	
GRANTS	Federal grants	High	Money made available by the Federal government, typically to address specific public purposes through a specific Federal Agency (e.g. sustainable community grants issued through HUD).		High	High	High	High	High	High	High	High	Overall, there are very limited Federal resources available, and the City should not expect a significant share of the overall costs of implementing open space solutions to come from Federal grants. However, there are opportunistic grants that should be aggressively explored for the limited available Federal funding. This mechanism is rated high because the attention related to Detroit's financial challenges may serve as a differentiator for some grant opportunities, particularly for programs designed to foster innovation by financially challenged communities.

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GRANTS	State grants	High	Money made available by the State government, typically to address specific public purposes through an aligned state agency.		High	High	High	High	High	High	High	High	Overall, there are very limited State of Michigan resources available, and the City should not expect a significant share of the overall costs of implementing open space solutions to come from State grants. However, there are opportunistic grants that should be aggressively explored for the limited available State funding. This mechanism is rated high because the attention related to Detroit's financial challenges may serve as a differentiator for some grant opportunities, particularly for programs designed to foster innovation by financially challenged communities.
	Foundation grants	High	Money made available test or implement solutions to public challenges by philanthropic entities.		High	Medium	Medium	High	High	High	High	High	Foundations have demonstrated their commitment to Detroit's future. They will play an important role implementing these issues. Foundation funding is not likely to fund a significant share of the total costs of addressing the City of Detroit's open space challenges. However, especially in the early years as new solutions are identified and tested, there is a strong probability that foundations will be willing to provide support to help the city test the most promising solutions. The solar and biofuel options are rated somewhat lower than the other potential uses, primarily because they seem somewhat less in alignment with the missions of some of the more prominent foundations.

[1] Taken or adapted in some cases from the TOD and Smart Cities Guides. Smart Cities Financing Guide (Smart Cities Council, 2014), http://smartcitiescouncil.com/resources/smart-cities-financing-guide. Infrastructure Financing Options for Transit-Oriented Development (US EPA, 2013), http://www2.epa.gov/smartgrowth/infrastructure-financing-options-transit-oriented-development