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MANAGING VACANT AND ABANDONED PROPERTY IN THE GREEN ZONE OF SAGINAW, MICHIGAN

Office of Sustainable Communities

Smart Growth Program

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Executive Summary

Communities throughout the United States face the challenge of managing vacant and abandoned properties and returning them to productive use. This management challenge is often complicated by possible contamination of vacant and abandoned property and is particularly acute in older industrial cities that have experienced decades of population decline, job loss, and neighborhood disinvestment.

A small but growing number of communities, such as Youngstown, Ohio, and Philadelphia, Pennsylvania, are addressing this challenge by reusing vacant and abandoned property for parks, open space, community gardens, urban agriculture, and green infrastructure.[1] These communities recognize that green reuse of vacant and abandoned property can help reduce stormwater runoff, clean up contaminated property, increase the value of adjacent property, reduce neighborhood blight, and provide community amenities, and is often the most viable reuse option when population is declining and demand for new homes, offices, or industrial facilities is limited. Additionally, some older manufacturing communities are exploring the impact that large-scale property abandonment has on infrastructure delivery and investigating opportunities to reconfigure existing infrastructure to better align service delivery with population, save taxpayers money, maintain service quality, and provide essential services to existing residents.

This report focuses on the reuse of vacant and abandoned property in the city of Saginaw, Michigan. In 2010, the city requested assistance from the U.S. Environmental Protection Agency (EPA) to identify options for managing land use and infrastructure in the Green Zone, a 350-acre neighborhood in northeast Saginaw that has the largest concentration of vacant and abandoned property in the city. This report details the results of EPA's study, and is informative for the city of Saginaw, as well as other communities around the country that are facing similar development challenges.

The major conclusion of EPA's study is that the city could make the best-informed decisions after working with community stakeholders and neighborhood residents to develop a vision for development activity in the Green Zone that would guide medium- and long-term land use and infrastructure decisions. Without such a plan, it will be difficult to make strategic decisions about whether and where to use green infrastructure and decommission roads, water, and sewer. Other strategies the city could pursue include:

- Revising zoning codes to allow green reuse of vacant and abandoned property.
- Inventorying historic properties.
- Developing a plan for environmental testing of vacant and abandoned property.
- Pursuing partnerships to help maintain green uses.
- Piloting a green infrastructure project.

[1] Green infrastructure approaches mimic natural processes to capture, hold, and infiltrate stormwater where it falls. Examples include permeable paving, rain gardens, and bioswales (channels that treat stormwater as it flows along them). For more information, see EPA's green infrastructure website at http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm.

1. Introduction

Over the last 40 years, the population of Saginaw, Michigan, has declined by almost 50 percent. This population loss has contributed to neighborhood disinvestment and wide-scale property vacancy and abandonment. Approximately 25 percent of the city's land area is vacant.

In 2010, the city requested assistance from EPA to identify options for managing land use and infrastructure in the Green Zone. The Green Zone is a 350-acre neighborhood in northeast Saginaw that has the largest concentration of vacant and abandoned property in the city. Approximately 72 percent of the land area in the Green Zone is vacant or abandoned.[2]

Specifically, the city asked EPA and its team of national experts to help identify policy options the city can pursue to support green uses (e.g., open space parks and community gardens) of vacant and abandoned property; identify opportunities for green infrastructure in the Green Zone; and examine the potential for decommissioning or reconfiguring road, water, and sewer infrastructure.

The EPA team visited Saginaw in July 2011. During this visit, the team toured the Green Zone; met with city leaders, staff, and community stakeholders to better understand local development conditions and objectives; and discussed preliminary and potential policy options the city could pursue to manage land use and infrastructure in the Green Zone.

The team identified both positive policy and planning actions and critical challenges that impact the city's efforts to increase reuse of vacant and abandoned properties in the Green Zone. The city has already taken many positive actions, including targeting spending of funds from the U.S. Department of Housing and Urban Development's (HUD) neighborhood stabilization program (NSP) to the Green Zone. By concentrating available dollars, the city is increasing the likelihood that significant numbers of vacant, uninhabited, and blighted properties in the neighborhood can be reused. Additionally, in partnership with the Saginaw County Land Bank, the city has begun reusing vacant and abandoned parcels for open space, lawns, and side lots, demonstrating how parcels can be reused and their potential positive impact.

The most significant planning challenge facing the city in the Green Zone is the lack of a clear and consistent long-term vision for land use and development activity. During the site visit, the team heard varying opinions among community stakeholders and some city officials about the types of development activity that are desirable in the neighborhood. Some stakeholders felt that industrial development was a viable reuse option, some felt that green uses would be the most appropriate, and some emphasized the need to protect and restore historic properties and maintain the area as a residential neighborhood. The absence of a consistent vision makes it difficult for the city to determine how much vacant or abandoned land to reuse for open space, parks, and other green uses, and how much to reuse for new homes, shops, civic uses, or industrial activity. The city must also consider whether and how to reconfigure water, sewer, and road infrastructure.

By collaborating with neighborhood residents and other stakeholders, the city could develop a neighborhood plan that provides a 10- to 15-year vision for development activity in the Green Zone. Such a plan would provide the clarity needed to guide medium- and long-term land use and infrastructure decisions. Other strategies the city could pursue include:

- Revising zoning codes to allow green reuse of vacant and abandoned property.

[2] Abandoned property usually refers to property that has one or more unoccupied buildings on it. Vacant property usually refers to property without any structures.

- Inventorying historic properties.
- Developing a plan for environmental testing of vacant and abandoned property.
- Pursuing partnerships to help maintain green uses.
- Piloting a green infrastructure project.

Because of resource limitations, the EPA team was unable to determine conclusively if it makes sense for the city to decommission water, sewer, or road infrastructure in the Green Zone; however, it probably does not make sense at this time. This decision would best be made after the city has developed a long-term vision for development and determined the cost, engineering feasibility, and social and environmental impacts of infrastructure decommissioning.

1.1 Saginaw, Michigan: Background and Context

Saginaw, Michigan, is an older, manufacturing city that is experiencing the challenges of population decline, neighborhood disinvestment, wide-scale property vacancy and abandonment, and underutilized infrastructure. The economic history of Saginaw is familiar to observers of the industrial Midwest. Fueled by the rapid development of industrial and manufacturing facilities to support the automotive and defense industries, the city saw its population more than double from 42,345 in 1900 to 198,265 in 1960. Accompanying this growth were increases in tax revenue and commercial, residential, and associated infrastructure development in the city and the region.

During the latter half of the 20th century, the economic fortunes of Saginaw began to change. The manufacturing jobs that were the cornerstone of the Saginaw economy began to dwindle as automobile plants and supporting businesses closed and some jobs shifted to the surrounding county and region. Overall, the economy has transitioned from a labor-intensive, manufacturing base to a knowledge and service base. This new economy is characterized by fewer jobs overall and employment concentrated either in higher-paying knowledge sectors or lower-paying service sectors. This transition has contributed to significant population decline, property abandonment, and fiscal strain for the city. In 2010, the population of Saginaw was 51,508. Approximately 5,500 properties in the city were vacant or abandoned, equal to 25 percent of the city's land area. Decades of reduced tax and sales revenue added to the financial difficulties.

Despite these dire changes, city leaders are optimistic that a new economic future for the city is not only possible, but probable. The economy in the Bay City-Midland-Saginaw region (also known as the Tri-Cities Region) remains strong and is adding new jobs in emerging industries such as agribusiness, advanced manufacturing, medical technology, and health services. City leaders hope they will be able to continue to attract new businesses in these emerging industries. During the last 15 years, the South Washington

Exhibit 1-1: Recent Redevelopment in Downtown Saginaw. *The Savoy Bar & Grill (top) and the conversion of the Bancroft Eddy Building (bottom) into 150 units of luxury housing units are examples of recent redevelopment in downtown Saginaw.*

Source: EPA.

Avenue corridor (an area between Saginaw City Hall and downtown Saginaw) has been transformed into a health services corridor as new businesses such as the Michigan Cardiovascular Institute and Dow Corning Healthcare Industries have located there. Anchor institutions in the city, particularly Covenant Hospital, are investing in community and social services in city neighborhoods, and businesses and developers are slowly reinvesting in the downtown.

To build on these emerging opportunities, the city has strategically used its public funding to help create opportunities for new investment and growth in existing neighborhoods. In 2010, the city and the Saginaw County Land Bank received $17.4 million from HUD's NSP to address property abandonment in the three neighborhoods where the problem is most pronounced: the Green Zone (historically known as Northeast Saginaw), the Cathedral District, and the Covenant District (Exhibit 1-2).

The city has used NSP funds to rehabilitate and renovate vacant housing in the Cathedral and Covenant neighborhoods because property abandonment is relatively low there compared to the Green Zone. The proximity of these two districts to downtown and to the Michigan Cardiovascular Institute and Dow Corning Healthcare Industries along South Washington Avenue creates greater demand for housing rehabilitation, especially of historic properties. City leaders feel that rehabilitating housing in these districts could leverage the investments by these anchor institutions and help advance revitalization of these two neighborhoods.

While the opportunities for growth and investment in the Cathedral and Covenant Districts are apparent, the future of the Green Zone is less obvious. This once vibrant residential neighborhood has changed dramatically. As the factories located just north of the neighborhood closed, many of the residents left as well. Currently, over 70 percent of land in the Green Zone is

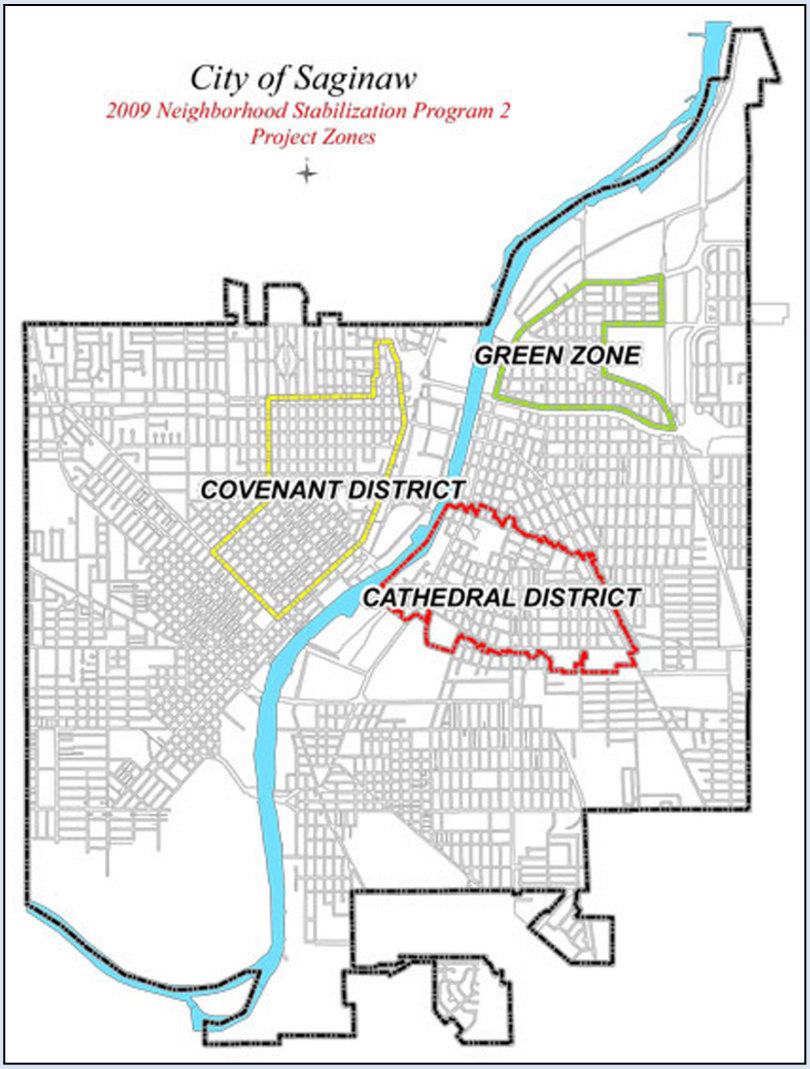

Exhibit 1-2: Location of Neighborhood Stabilization Zones in the City of Saginaw. *The city of Saginaw is targeting property abandonment and vacancy in the three neighborhoods where it is most pronounced: the Green Zone, Covenant District, and Cathedral District.*

Source: EPA.

designated as vacant or abandoned, meaning that the parcel includes a vacant structure, or that it did include a vacant parcel but the structure has been demolished and cleared.

The city is using a portion of its NSP funding to stabilize the Green Zone through property demolition and land acquisition. While this is a useful first step in helping the neighborhood, residents and city leaders are pondering what happens next. Despite losing significant numbers of residents, this neighborhood is still home to approximately 1,000 people and remains an important part of the cultural and historic fabric of the city. While the issues discussed in this report are applicable to all three areas, this report will primarily focus on the Green Zone as a laboratory for Saginaw and other cities to explore options and opportunities for future decision-making on reusing vacant and abandoned property.

1.2 EPA Assistance to the City of Saginaw

In spring 2010, the city of Saginaw, the Saginaw County Land Bank, and the Saginaw County Brownfield Redevelopment Authority requested assistance from EPA's Smart Growth Implementation Assistance Program (SGIA) to help identify strategies for managing land use in the Green Zone that would help stabilize the neighborhood and begin transitioning it to a new economic future. (See Appendix A for more information on SGIA.) Specifically, the city asked for assistance to:

1. Identify approaches and issues associated with reusing vacant and abandoned properties in the Green Zone for urban agriculture, community gardens, open space, parks, and other green uses.
2. Explore how the city could reuse vacant and abandoned properties for green infrastructure in the Green Zone.
3. Assess the feasibility of adjusting water, sewer, and road infrastructure in the Green Zone to meet current and future service demand.

Staff from EPA's Office of Sustainable Communities and EPA's Region 5 Superfund Program and consultants from SRA International, Inc., HDR Engineering, and Clarion Associates visited Saginaw from July 18 to 20, 2011. The consultants and EPA staff toured the Green Zone, met with city staff, community stakeholders, and elected officials and gathered data.

This report summarizes the team's observations and findings and presents policy options and next steps the city could consider for managing vacant and abandoned property and infrastructure in the Green Zone. While this report deals specifically with the city of Saginaw, it can be used by other communities that are seeking ways to manage land use and infrastructure in the face of shrinking population and fiscal stress.

1.3 The Green Zone: Background and Existing Conditions

Flanking the Green Zone (Exhibit 1-3) is Interstate 675 to the south, the Saginaw River to the west, North Washington Avenue to the north, and a rail yard to the east. A railroad crosses through the lower third of the neighborhood. Older and abandoned industrial development surrounds the Green Zone, especially along the Saginaw River. The Saginaw County Brownfield Redevelopment Authority, assumes that the majority of property sites in the Green Zone are contaminated because of the presence of the railroad and the neighborhood's proximity to industrial development. The number of parcels or percentage of parcels that are contaminated or suspected as contaminated is not known.

The Green Zone is a working class neighborhood that historically was home to workers at the General Motors Company and other manufacturers that fueled economic expansion in the city following World War II. The neighborhood is approximately 350 acres and today has a population of roughly 1,000 residents, which is significantly lower than historic population levels. Homes and residences are

scattered throughout the Green Zone, and several blocks of affordable single-family homes located in the northeastern portion of the Green Zone are owned and operated by the Saginaw Housing Authority.

Six churches are a distinguishing feature of the Green Zone. The largest is St. Joseph's Catholic Church. The churches continue to play a key role in the life of the neighborhood and are particularly active during the weekend. Other notable features are the First Ward Community Center; Potter Street Station, a rail depot that has been vacant and abandoned for a long time; a cluster of homes near the station; and a row of bungalows in the northwestern part of the neighborhood.

The Green Zone contains the highest concentration of vacant and abandoned properties in Saginaw. As of 2012, approximately 800 parcels, or 72 percent of the land area, are vacant. The Saginaw County Land Bank estimates that almost 90 percent of the parcels in the Green Zone will be vacant or abandoned in 2014. The Land Bank based its estimate on projections of which properties will be tax delinquent or foreclosed upon between 2012 and 2014.

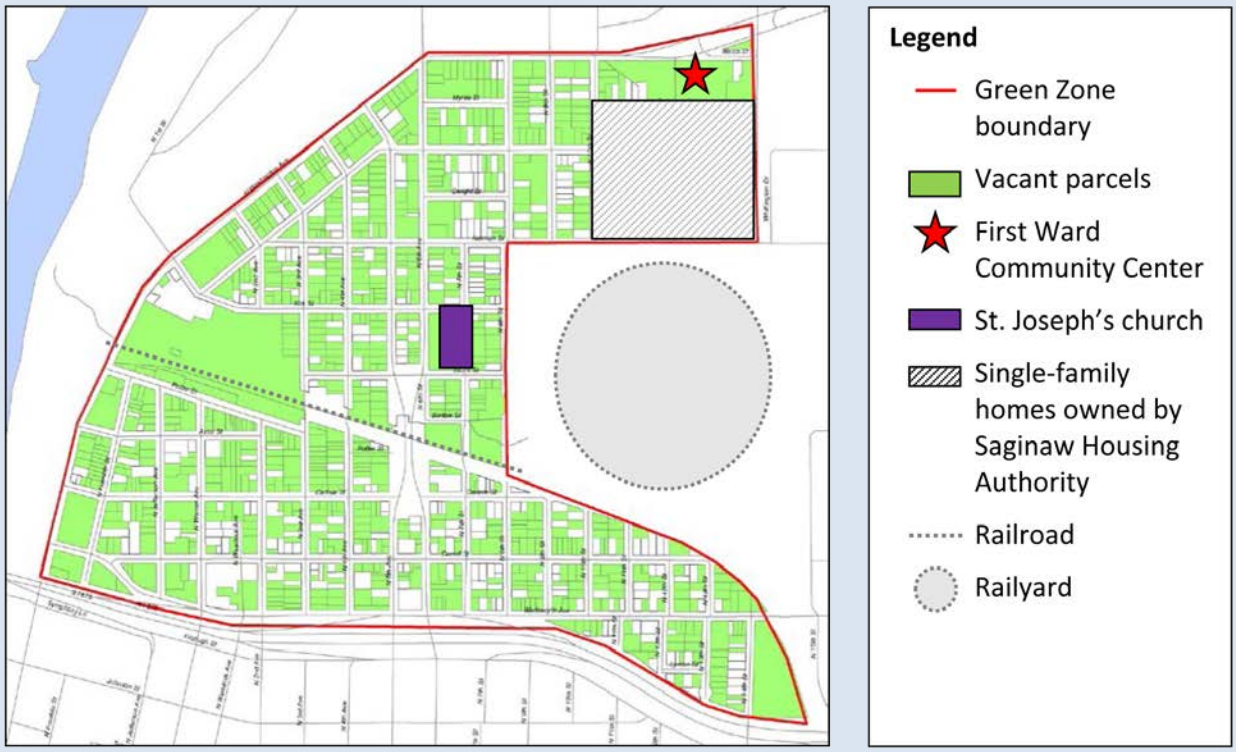

Exhibit 1-3: Vacant Properties and Key Landmarks in the Green Zone. *Vacant, abandoned, and uninhabited property (colored green) accounts for approximately 72 percent of the land area in the Green Zone. Exhibit 1-3 also shows the few civic and neighborhood institutions that remain in the Green Zone, including several churches, a community center, and recently built affordable, single-family homes.*

Source: EPA.

Exhibit 1-4: Vacant and Abandoned Properties in the Green Zone. *The Green Zone contains many vacant and abandoned properties that are uninhabitable in their current state and pose a potential risk to public heath and safety.*

Source: EPA.

The Green Zone was designated as a Green Reserve Area under the 2011 City of Saginaw Master Plan. This designation supports reuse of vacant and abandoned parcels for green space such as urban agriculture, community gardens, natural areas, or open space. The city and Saginaw County Land Bank support the reuse of vacant and abandoned properties for green space where such uses are appropriate and desired by the community, where reuse would not displace existing residents, and on vacant or abandoned parcels that are owned by the Saginaw County Land Bank. Land banks typically acquire vacant and abandoned property through direct purchase from a landowner for market value, or by obtaining title through the tax foreclosure process. Land banks are public entities and generally viewed among community development organizations as positive vehicles that can make it easier for communities to reuse vacant and abandoned property for the long-term public benefit and neighborhood interest.[3]

It is unclear if the city and Saginaw County Land Bank anticipate that green space will be an interim (1 to 5 years) or long-term (more than 5 years) use for vacant and abandoned parcels in the Green Zone. The EPA team heard differing perspectives among community stakeholders and the city about the long-term development vision for the neighborhood. These types of issues can be resolved with further community engagement and study.

[3] Alexander, Frank S. Land Bank Authorities: A Guide for the Creation and Operation of Local Land Banks. Local Initiatives Support Corporation. April 2005.

2. Reusing Vacant and Abandoned Property for Green Space in the Green Zone

The city asked the EPA team to provide guidance on reusing vacant and abandoned properties in the Green Zone for open space, green infrastructure, and other similar uses. This section discusses types of green reuse activities that communities can use to manage vacant or abandoned property and the potential benefits of those activities. It also covers activities already underway in Saginaw to support the reuse of vacant and abandoned parcels and possible additional actions the city could consider.

2.1 Types of Greening Reuse

Many communities are reusing vacant and abandoned properties as passive open space, parks and recreation areas, community gardens, sites for commercial agriculture, and green infrastructure facilities. These uses can help communities reduce blight and lessen the likelihood of illegal activity on vacant and abandoned property, such as dumping, arson, and vandalism. It can also yield economic and fiscal benefits. Studies confirm that proximity to maintained and accessible open space and parks can stabilize and increase property values, while neighborhoods with higher rates of unmanaged vacant land have lower property values.[4] Green reuse can also create job opportunities for neighborhood residents who can help construct, operate, and maintain the green facility on the reused property.

Reusing vacant and abandoned parcels within the Green Zone for agriculture, open space, and other similar uses has been discussed. For instance, faculty at Michigan State University have expressed interest in piloting efforts to develop low-maintenance turf on vacant or abandoned parcels, and officials from Saginaw Valley State University see an opportunity to reuse vacant or abandoned parcels for a tilapia farm. Other ideas raised by the community include reusing vacant and abandoned parcels for tree farming, turf farming, and recreational uses such as snowmobiling, community gardens, and large-scale commercial agriculture.

Passive Open Space

Passive open space is perhaps the least resource-intensive and easiest type of reuse to implement and maintain. This type of greening happens once structures on a site have been removed and commonly involves grading a site and planting grass or trees. Passive open space allows communities to choose whether to return cleaned vacant and abandoned land to a more natural state rather than planting grass or landscaping. This approach can reduce maintenance costs and allow the plot to be used as wildlife habitat or for biological research.

Communities usually create passive open space for a single vacant or abandoned property or multiple properties that are non-contiguous but in the same general vicinity. Often, the purpose of greening in this context is to reduce blight, remove hazards, and beautify a block, street, or neighborhood. Operation and maintenance requirements are relatively minimal and typically involve regular mowing of the parcel and landscaping.

[4] Wachter, Susan, M. and Gillen, Kevin, C. " Public Investment Strategies How They Matter for Neighborhoods in Philadelphia" The Wharton School, University of Pennsylvania, Accessed: July 10, 2014, http://community-wealth.org/_pdfs/articles-publications/state-local/paper-wachter-gillen.pdf

Parks and Recreation Areas

Communities with few parks and recreational spaces often reuse vacant and abandoned parcels for playgrounds, sports fields, or trails. This use makes sense particularly where vacant and abandoned parcels are contiguous and can be assembled to support larger recreational facilities. Because a large amount of publicly owned, contiguous vacant space is available in the Green Zone, reuse as recreational space or parks is an option.

Reusing vacant and abandoned space for recreation or parks might require construction of facilities such as roads, restrooms, lighting, or playground equipment. Because these spaces are for public use, they might require policing and maintenance as well. The need for facilities, maintenance, or policing could make this option more expensive than reusing vacant land as passive open space.

Community Gardens

As parcels of vacant and abandoned properties become available, the city and/or land bank can reuse parcels as community gardens. Community gardens are typically used by individuals or a group of neighborhood residents. In neighborhoods without ready access to grocery stores, community gardens can provide residents with fresh, healthy food.

There are several issues to consider in reusing vacant and abandoned properties for community gardens. First, many vacant and abandoned properties are potentially contaminated. Certain solutions can allow reuse of a potentially contaminated site for a community garden while reducing risk to residents, gardeners, and anyone that consumes the food. Other factors to consider include complying with construction standards for community gardens and establishing a maintenance plan that identifies who will be responsible for operation and maintenance.

Six Steps to Creating Community Gardens on Potentially Contaminated Property

EPA's Office of Brownfields and Land Revitalization (OBLR) provides resources to help communities reuse vacant and abandoned properties for community gardens. The OBLR website identifies six steps communities can follow:

1. Survey the property and identify potential risks and contaminants for testing.
2. Test your soil. Consider likely environmental contaminants, pH, organic content, and soil nutrients needed for healthy plant growth.
3. Clean contaminants and add soil amendments to create a safe growing environment.
4. Consider garden design, including location, crops, water, sunlight, lighting, and accessibility.
5. Construct the garden to accommodate children, the elderly, and people of all abilities. Consider using raised beds, wider paths, and benches to create a more usable space.
6. Plant a safe and healthy garden and enjoy your growing community.

Find further information at www.epa.gov/brownfields/urbanag/steps.htm.

Commercial Agriculture (Urban Forestry or Farming)

As the city or land bank acquires multiple and contiguous vacant parcels, they could be assembled into larger areas that can be used for commercial-scale agriculture. Commercial agriculture refers to large-scale farm or forestry operations focused on growing large amounts of crops to be sold in the broader marketplace. This is in contrast to community gardens, which are typically smaller operations focused primarily on providing fresh food and produce for consumption by residents living in or near the immediate neighborhood. Because of this difference in scale, commercial agriculture often makes most sense where larger parcels of vacant land are available. Because they are commercial operations, urban

farms or forests may have to comply with the same regulatory requirements (such as for stormwater management and pesticide use) as farms or forestry operations in rural settings.

Reusing vacant land in urban areas for commercial-scale agriculture is a new and largely untested idea in the United States. Detroit is one of the few cities in the nation that is exploring the idea. In October 2013, the Detroit City Council sold 150 acres of city-owned property to John Hantz for the creation of an urban farm. Known as Hantz Woodlands, this project will initially focus on timber production and then expand to fruits and vegetables. The owners anticipate that it will take 10 years to grow and harvest timber on Hantz Farm.[5]

Green Infrastructure and Stormwater Management Facilities

Stormwater management facilities vary widely in scale and can be constructed on vacant parcels, roofs, or rights-of-way to manage the stormwater that is generated onsite or accommodate runoff from adjacent parcels. If the city can capture and clean more stormwater onsite in the Green Zone, it could provide an overall benefit to the city by reducing the burden on the city's water and sewer system. The City requested a more detailed discussion of the opportunities and issues associated with using vacant and abandoned properties for green infrastructure and stormwater maintenance, including identification of possible locations within the Green Zone for Green Infrastructure. The use of vacant parcels for green infrastructure is covered in detail in Section 3.

2.2 Current and Possible Future Activities to 'Green' the Green Zone

Saginaw has already taken significant steps to manage vacant and abandoned parcels. To date, the Saginaw County Land Bank and the city have focused on cleaning up vacant and abandoned property and replacing it with lawns or open space. However, as the land bank has acquired more property and has been able to assemble land, stakeholders have shown interest in reusing vacant and abandoned land for other green purposes.

The city and land bank asked EPA to identify additional activities that they could take to encourage further reuse of vacant and abandoned property for green uses within the Green Zone. Potential options are discussed below.

Exhibit 2-1: Example of Historic Property in the Green Zone That Has Been Rehabilitated. *The Green Zone contains several historic properties that have been rehabed, such as these. An inventory of historic propeties in the Green Zone could help the city determine which properties might be able to be reused for new housing.*

Source: SRA International.

Develop a neighborhood plan for the Green Zone

The reuse of vacant parcels within the Green Zone has largely occurred parcel by parcel as the Saginaw County Land Bank and/or the city has acquired the property in a piecemeal fashion. This approach has been effective in beginning the process of blight removal and neighborhood stabilization. However, given that vacancy rates in the Green Zone are expected to reach 90 percent soon, a piecemeal approach may not be sufficient to address the extent of the property abandonment problem.

EPA suggests that the city consider a plan that articulates a cohesive vision for the Green Zone. The designation of this area as a Green Reserve Opportunity Area under the Saginaw Master Plan establishes a

[5] Dolan, M. "New Detroit Farm Plan Taking Root," *Wall Street Journal.* July 6, 2012.

foundation upon which to build. Additional detail about desired land uses or vision for the area under the Master Plan would help strengthen the policy document to guide public investments and action effectively.

Developing a neighborhood plan would help address one of the biggest challenges of reusing vacant and abandoned property: there is relative uncertainty about the community's vision and the aspirations that existing residents have for their neighborhood. A detailed neighborhood plan that is the result of active and authentic community involvement and that articulates a common vision for the Green Zone, as well as implementation actions that support that vision, could lead to future public investments and reuse decisions that align with the interests of residents, community stakeholders, the city, and the land bank.

During its visit, the EPA team heard that some stakeholders think the Green Zone has economic development potential because of its proximity to major transportation infrastructure, downtown Saginaw, and emerging nodes of clean industry located to the east of the Green Zone. Many of these same stakeholders believe that the large size of the Green Zone makes it a viable businesses location for advanced manufacturing, semi-conductors, medical technology, or health services that now comprise a growing portion of the regional economy. Other stakeholders expressed skepticism about this possibility and want a greater emphasis on retaining the largely residential character of the neighborhood. There is also an opportunity to engage existing residents in more robust discussions about what they want to see in their neighborhood. It appears that residents have not played a prominent role in determining the vision of the Green Zone thus far. While these differences in opinion about future development pose challenges, community engagement and facilitation could help channel ideas into a cohesive vision and strategy to improve the quality of life in the Green Zone.

Many of the actions proposed in this report have the promise to deliver greater amenities to residents, but without proper implementation, also pose the risk of detracting from a sense of community. Any future decision making, therefore, must actively engage and meaningfully consider the input of area residents, civic organizations, churches, and schools—all of whom will be directly impacted by actions that the city and land bank consider.

EPA's Environmental Justice Collaborative Problem-Solving Model (CPS Model)

EPA developed the CPS Model to ensure that overburdened communities have access to a decision-making process that captures the collective vision of a community's stakeholders, reflects mutually beneficial goals, and mobilizes the support and resources necessary to realize stronger and more lasting solutions. The CPS Model consists of a number of steps to ensure successful stakeholder involvement and problem solving, including:

- Issue identification, community vision, and strategic goal setting.
- Community capacity building and leadership development.
- Consensus building and dispute resolution.
- Multi-stakeholder partnerships and leveraging of resources.
- Constructive engagement by relevant stakeholders.
- Sound management and implementation.

For more information about EPA's CPS Model, please visit: *www.epa.gov/environmentaljustice/resources/publications/grants/cps-manual-12-27-06.pdf*.

Determining the economic potential of the Green Zone was beyond the scope of this project. However, further studies could clarify the neighborhood's likely economic potential and the desire of residents or city leaders to increase economic activity. This information will be critical to making informed decisions about reuse of vacant and abandoned properties and how to manage existing infrastructure.

If the city decides that it is appropriate to develop a neighborhood plan, elements could include: detailed land use, infrastructure, transportation, and economic development goals, policies, and

implementation steps. A plan could map neighborhood assets, such as historic properties, community centers, and churches. These assets could be focal points for neighborhood stabilization and investments such as green infrastructure and brownfields cleanup. The plan could help decision-makers prioritize federal, state, and local funding to specific locations or projects within the neighborhood; make strategic infrastructure maintenance and improvement decisions; and phase the acquisition of vacant and abandoned properties to support the goals of the neighborhood plan and meet the desires of community stakeholders and residents.

The city planning commission and other agencies could partner with residents and other stakeholders to initiate a planning process. As part of this effort, the city would update its zoning codes and ordinances to be consistent with a neighborhood plan. This would ensure that land conservation and/or new development achieve the goals of the neighborhood, city, and county. A template for development of a neighborhood plan could be the Lower Eastside Action Plan (LEAP) in Detroit. LEAP is highlighted in the text box below.

Lower Eastside Action Plan

The Lower Eastside of Detroit has the highest concentration of aggregated vacant land in Detroit. In 2010, a diverse coalition of neighborhood residents, community stakeholders, city leaders, and civic institutions came together to begin a multi-year neighborhood planning process to establish a new development vision for the 15.5-square-mile area of Lower Eastside. The goal of this effort is to stem decline and blight in the neighborhood; reuse vacant land for more efficient and economically viable uses; and provide resident input and recommendations on relocation and depopulation of the neighborhood. Residents have been involved in surveying and assessing existing conditions within the neighborhood and identifying on a parcel-by-parcel basis possible reuse for vacant land. The community is considering a range of reuse options, including dense, commercial, and mixed-use centers; medium- and lower-density residential node green infrastructure; and natural green spaces, or naturescapes. In addition to plan development, this effort is also producing recommendations for plan implementation that Detroit is integrating into its rightsizing initiative.

The LEAP was an honorable mention recipient of the 2013, National Award for Smart Growth Achievement.

For more information on LEAP, visit https://sites.google.com/site/leapdetroit/.

Inventory historic properties in the Green Zone

Because Saginaw has not inventoried historic properties for many decades, experts lack information about the historic resources that still exist. The Michigan State Historic Preservation Office (SHPO) is leading an effort to conduct less intensive, lower cost informal “windshield” surveys, but much of this information is yet to be collected as volunteers need training to identify historic qualities. The city could work with the SHPO to identify the structures in the Green Zone with historic or cultural significance. The city could also examine property tax rolls to identify when properties in the Green Zone were built to help identify those that could be historic or have cultural significance.

An inventory of historic properties could be conducted as part of the neighborhood planning process. Through the inventory, the city would help determine the ownership status of historic properties and work with property owners to assess the feasibility of rehabilitation. Properties that can be rehabilitated might then be the focus of greening initiatives and potentially anchor future development. The viability of using these historic structures as the anchor for future development will depend in part on the conditions of the blocks and areas that are immediately adjacent to the historic structures and the degree to which private investors and owners can be engaged in decision-making. Therefore, the city might consider using an area-wide approach that would not only support reuse of specific structures, but also would support redevelopment of the immediate parcels and blocks that surround a historic

property. Given the overall condition of properties in the Green Zone, many of the historic or culturally significant structures the city identifies are likely to require major investment to restore.

Develop a plan for testing and cleanup of vacant and abandoned properties

Much of the industry in Saginaw was located next to the Green Zone. Because of older industrial practices, some of the land in the Green Zone may be contaminated. The Saginaw County Brownfield Redevelopment Authority is conducting an assessment of city properties to determine the extent to which they may be contaminated. EPA's Office of Brownfield and Land Revitalization is funding the assessment.

The Authority could consider directing brownfield assessment funding to parcels where the community wants to add green infrastructure, gardens, parks, or other open space. Based on the results of the assessment, the city might also consider developing a geographic information system (GIS) layer that identifies contaminated parcels. Public investment in assessment and remediation could help attract private or nonprofit investment.

Pursue partnerships to help maintain green uses

Operation and maintenance are critical considerations. Because of limited staff and revenue, it can be difficult for the city of Saginaw to maintain parks and open spaces. Therefore, the city is hesitant to commit to reusing vacant and abandoned property for some types of uses, such as parks, unless there are sufficient resources available for sustained operation and maintenance.

There are several approaches the city could pursue to obtain resources for operation and maintenance of parks, community gardens, and other green uses. The city could reach out to universities or businesses that might be interested in using property in the Green Zone for large-scale agriculture, forestry, or research. The city could also reach out to neighborhood residents and institutions such as churches to explore how they could help maintain reused properties.

In Flint, Michigan, the Genesee County Land Bank created an innovative program to partner with neighborhood residents who receive a small stipend in exchange for maintaining community greening projects.[6] Under the Clean and Green Program, the Genesee County Land Bank provides a stipend of $3,000-$4,500 to community groups that agree to help maintain properties owned by the land bank. Community groups compete to participate in the program and must manage at least 25 lots, have their own tools, and liability insurance. In 2011, 42 community groups in Flint participated in this program and were able to maintain 1,326 lots. Funding for the Clean and Green Program is provided by philanthropic organizations and the Genessee County Land Bank.

In Saginaw, the city and the land bank could also consider creating an entity to manage development and conservation activities in the Green Zone over the long term. Based on the EPA team's discussions with city and land bank officials, neither entity appears to have the capacity alone to implement a long-term land management or governance plan for the Green Zone.

[6] Genessee County Land Bank, Programs, September 27, 2012, http://www.thelandbank.org/clean_green_prog.asp.

3. Green Infrastructure in the Green Zone

Green infrastructure is an approach to managing stormwater that uses vegetation, soils, and natural processes to soak up, store, and filter stormwater. Unlike single-purpose gray stormwater infrastructure, which uses pipes to dispose of stormwater, green infrastructure uses design techniques and materials to help manage rainwater where it falls. Examples of green infrastructure include rain gardens,[7] infiltration trenches, constructed wetlands, and bio-retention swales.

Exhibit 3-1: An Infiltration Basin in an Existing Neighborhood. *This bioswale and infiltration basin includes plantings and trees that help collect and treat stormwater runoff that flows off the sidewalks and streets in this neighborhood.*

Source: EPA.

Exhibit 3-2: Stormwater Ponding in the Green Zone. *By using green infrastructure, which collects stormwater and helps filter it back into the ground, Saginaw can reduce the amount of water that collects on city streets.*

Source: EPA.

Green infrastructure can protect water quality by slowing the flow of runoff, filtering pollutants from runoff, and absorbing rainfall, which reduces runoff into surface waters. It can also make neighborhoods more attractive and help avoid costly expansions of sewer systems and water treatment facilities. Communities often use green infrastructure to reduce flooding and ponding in public areas and to ease the burden that stormwater flow can put on a city's combined sewer system and wastewater treatment facility.

There are two main categories of green infrastructure facilities: infiltration-based and non-infiltration based. Infiltration-based facilities such as bio-retention swales and rain gardens function by absorbing stormwater below the soil surface. Infiltration-based approaches work best in areas where the below-ground water table is low. Non-filtration-based facilities work best in areas where it is difficult for stormwater to be absorbed below ground because of the soil and hydrology. In these instances, green infrastructure can be used to hold stormwater above ground, filter it, and slow its release. Example of non-infiltration-based facilities include wetlands, green roofs, and rain barrels. Communities often use on-site stormwater collection systems, such as rain barrels, to capture rainwater and store it for non-potable uses.

[7] Rain gardens are concave landscaped gardens with specialized soil mixtures that infiltrate and clean stormwater.

This section describes possible sites for the use of green infrastructure techniques, options for implementation, and the potential impacts green infrastructure could have on Saginaw's stormwater volume.

3.1 Potential Locations for Green Infrastructure in the Green Zone

The city asked EPA to identify possible locations in the Green Zone where green infrastructure approaches could be used. To determine possible locations, the EPA team considered soil conditions, hydrology, typography, floodplain locations, and distribution of vacant and tax-delinquent parcels.

The Green Zone contains several uninhabited blocks with vacant homes and empty lots. Demolishing the vacant and abandoned properties on these empty blocks and replacing them with clean and green uses can reduce the amount of impervious surface and thereby help reduce the amount of stormwater runoff. As the city removes blighted, vacant and abandoned property, it can also reduce impervious surfaces by removing roads, sidewalks, and driveways on vacant blocks. The city would have to weigh carefully the cost of removing impervious surface areas in the public rights-of-way against the potential benefits discussed in Section 4.3.

Exhibit 3-3: A Block-Scale Rain Garden. *Reusing vacant blocks as rain gardens can help cities capture stormwater on site and reduce the amount of stormwater that enters the city's sewer system.*

Source: SRA International.

The city could further reduce stormwater volume by constructing block-scale rain gardens or wetlands on vacant blocks. Generally, block-scale rain gardens and other types of bio-retention work best where the soil and hydrology supports infiltration; constructed stormwater wetlands work best in areas where infiltration is difficult.

Exhibit 3-4 identifies a number of places where infiltration and non-infiltration green infrastructure might be appropriate in the Green Zone given the land uses and physical conditions. Exhibit 3-4 also shows that infiltration is most feasible in areas outside the Federal Emergency Management Agency (FEMA) 500-year flood zone and where groundwater is at least 3 feet below the surface. Infiltration, therefore, appears to be most feasible in the southern portion of the Green Zone. Non-infiltration-based green infrastructure is most feasible in the north side of the Green Zone where ground water is relatively high, and in the western edge of the Green Zone, which is within the FEMA 500-year flood zone.

Exhibit 3-4 shows two possible locations where the city could pilot a green street where green infrastructure facilities could be added to the existing street right-of-way and the street would continue to move cars and bicyclists. The first location is along North 6th Avenue between Norman Street and Kirk Street, adjacent to Saint Joseph's Parish. A green street in this location would likely require bio-retention in the street right-of-way. The bio-retention facility would help slow down and capture stormwater so that it could infiltrate into the ground.

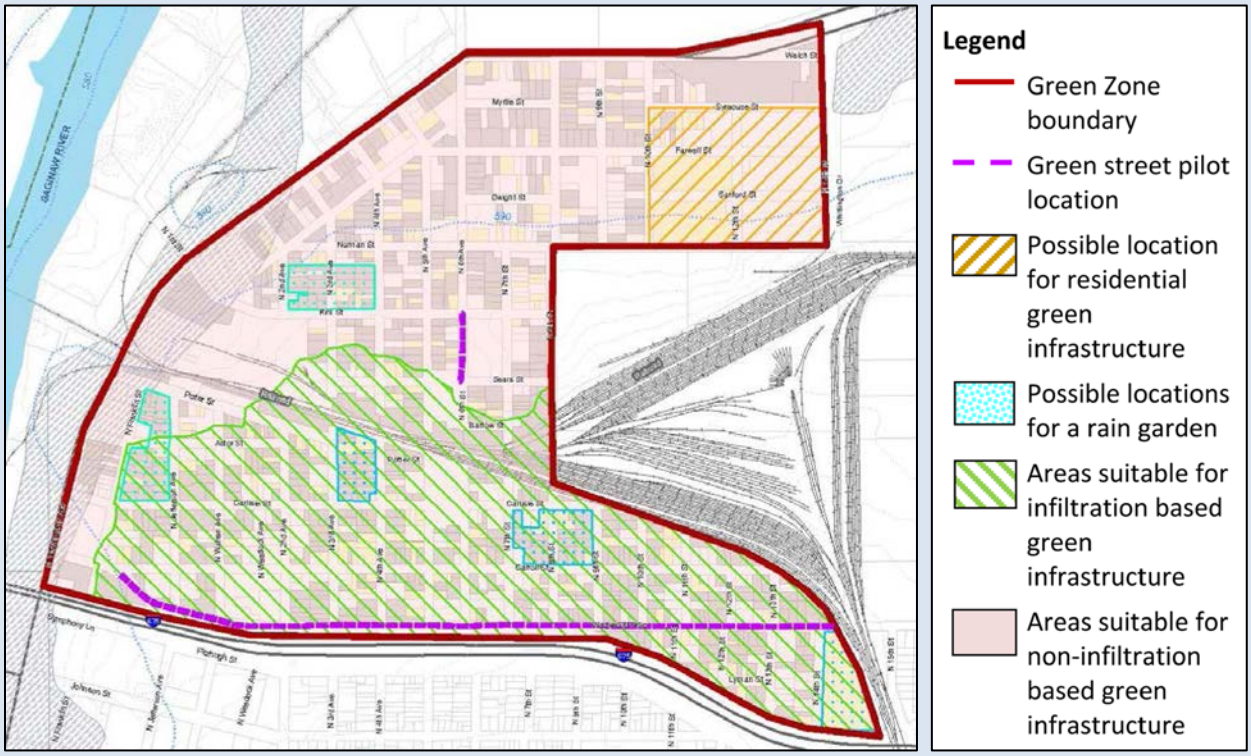

Exhibit 3-4: Potential Locations for Green Infrastructure in the Green Zone. *The EPA team identified several locations in the Green Zone that are suitable for green infrastructure. Infiltration-based green infrastructure is most appropriate in the southern portion of the Green Zone, whereas non-infiltration-based green infrastructure is more suitable in the northern portion of the Green Zone.*

Source: EPA.

Piloting a green street in this location makes sense for several reasons. First, there is sufficient right-of-way to allow for bio-retention without reducing the street's capacity to carry the same amount of traffic. Adding bio-retention could help narrow the right-of-way and thus slow traffic speeds, making this area safer for pedestrians and bicyclists. Second, the underlying soil conditions and hydrology will support infiltration-based green infrastructure such as a green street. Third, since this is a primary thoroughfare, the city would likely continue to maintain the street and could potentially integrate maintenance of the green street into regular street operations and maintenance. (This would require training for city staff.) St. Joseph's Parish might be willing to partner in maintaining the green street as the parish is located on North 6th Avenue. Piloting a green street in such a prominent location also could raise awareness of green infrastructure as a reuse option.

Another location to pilot a green street is along Wadsworth Avenue in the southern portion of the Green Zone. This part of Wadsworth Avenue has relatively little traffic and includes a high concentration of vacant and abandoned property. A swale would work well here because of the underlying soil and hydrology. The image at right shows an example of how a swale has been integrated into an existing roadway.

The single-family residential areas in the northeast corner of the Green Zone are another good area to pilot green infrastructure. The soil and hydrology conditions would support non-infiltration-based solutions that increase the capture and reuse of stormwater, such as rain barrels and rainwater harvesting. To encourage residents to use rain barrels and plant gardens designed to absorb rainwater,

the city could provide technical assistance and/or partial refunds on water bills. Piloting green infrastructure in a residential community could help reduce stormwater overflows and engage residents as environmental stewards.

These interventions have the potential to enhance the quality of life for existing residents by cooling the streetscape in hot summer months, providing natural beauty, and sheltering pedestrians from passing cars.

More pleasant and safe pedestrian areas are likely to increase walking and active uses, which will positively affect the health of area residents and visitors.

Exhibit 3-5: A Swale Integrated into a Roadway. *Some of the streets in the Green Zone, such as Wadsworth Avenue, could accommodate a roadway swale like the one pictured above. The swale would help capture and treat stormwater and also be aesthetically pleasing.*

Source: SRA International.

3.2 Green Infrastructure Implementation Options

These green infrastructure options are presented as possible actions the city could pursue, but before implementing them, a more detailed engineering analysis of potential pilot locations is warranted. Elements of the engineering analysis could include evaluation of soils, infiltration rates, and ground water levels, and more extensive field evaluation to determine actual infiltration feasibility. In addition, the city could consult with neighborhood residents and community stakeholders to help identify the most appropriate pilot locations.

Once the green infrastructure pilot projects are identified, they could be prioritized based on a number of factors such as cost, land availability, vacancy, and assessment of the costs and benefits of potential projects. It would be particularly valuable for the city to monitor the performance of the green infrastructure to measure its effectiveness and inform the design, installation, operation, and maintenance of future green infrastructure facilities. Factors that can help determine the costs and benefits of green infrastructure approaches include lifecycle costs, reduced maintenance costs, increased capacity and revenue for the water and sewer utility, and social and environmental benefits.

This framework could help the city and land bank implement the projects that would generate the most return for the city relative to the costs of implementation, operation, and maintenance, and help the city make critical decisions about how to spend scarce resources.

3.3 Potential Impact of Green Infrastructure on Stormwater Volume

The city of Saginaw has a combined sewer system, in which sanitary, industrial, and storm water flow into the same sewer lines. Under normal conditions, sewage and stormwater is conveyed to the wastewater treatment plant. During severe or sustained storms, excess sewage and stormwater flow is routed to retention treatment basins that provide primary settling and disinfection before discharging treated effluent to the river. According to the Saginaw Department of Public Service, stormwater accounts for about 30 percent of the average daily flows to the treatment plant.

Green infrastructure practices that reduce stormwater flow into the system could reduce flows to the treatment plant, reduce energy consumption by lift stations and plant operations, help meet the regulatory requirements for combined sewer overflow (CSO) control, and improve overall system reliability. Additionally, if stormwater flow is reduced, the wastewater treatment facility might be able to accept water and sewer from the county and other parts of the service area, potentially increasing revenue to the city.

The Saginaw Bay Watershed Initiative Network investigated the potential for using green infrastructure to reduce CSO volumes for the Fitzhugh sewer district, which contains a portion of the Green Zone. The study results indicated that using green infrastructure approaches could decrease CSO volume by as much as 20 percent for relatively small storms that occur more frequently than every 5 years. The study found that the most effective green infrastructure technique for reducing CSOs is to construct large, open areas for stormwater. For residential development, the study found that rain gardens can capture stormwater runoff effectively. Bio-retention swales, which are similar to rain gardens but long and linear, are effective at managing runoff from roads. The study concluded that green infrastructure approaches can be an effective part of a comprehensive solution to meet CSO regulatory requirements while reducing costs of operating the wastewater treatment plant, extending the life of infrastructure, saving money on retention basin maintenance and replacement, improving community aesthetics, and improving the overall health of the watershed.[8]

[8] The Spicer Group, "Low Impact Development (LID) in a Combined Sewer Overflow (CSO) District: Evaluating the Effectiveness of LID in Reducing CSOs." Undated.

4. Decommissioning Water, Sewer, and Road Infrastructure in the Green Zone

The city asked the EPA team to help determine if it was possible and prudent to consolidate or decommission existing road, water, and sewer infrastructure in the Green Zone. "Decommissioning" means scaling back infrastructure or structures that are no longer necessary because of population loss, and can include the outright removal of infrastructure or "mothballing," where infrastructure is taken out of service but not removed (e.g., roads are blocked off or sewer lines are capped). The city is considering decommissioning in areas where there is limited or no demand for public services because of widespread property abandonment.

The Green Zone's current network of roads, sidewalks, water, and sewer is designed to support a larger population than currently lives there, and the city has not yet scaled back infrastructure or public services to align with today's population.

In response to the city's request, the EPA team considered the existing literature, location of current water, sewer and roads, the engineering feasibility, the cost-benefit of decommissioning, and the possible social and environmental impacts of decommissioning infrastructure.

It is important to note that decommissioning infrastructure carries with it significant considerations for existing residents. The removal of sidewalks, roads, and other infrastructure can reduce access to destinations and the performance of existing water systems. Appendix B describes the social, legal, and environmental considerations, as well as cost-benefit considerations. As mentioned above, the city should consider any decommissioning in close consultation with existing residents, civic organizations, churches, and schools—all of which are likely to bear the immediate impacts of dramatic changes to their water, sewer, and road systems.

Because of resource limitations, the team was not able to conclusively determine if it made sense for the city to decommission water, sewer, or road infrastructure in the Green Zone. However, based on its review, the team concluded that it does not make sense for the city to actively pursue decommissioning at this time.

- First, decommissioning could be cost prohibitive for the city. The cost of infrastructure maintenance is relatively low. It costs approximately $1,500- $2,000 per year, per block to maintain roads in the Green Zone, but it could cost $25,000 to $35,000 per block to remove streets and sidewalks.
- Second, city engineers say the infrastructure in the Green Zone is in good shape. The complexity of the existing water and sewer system and the uncertain impact that removing infrastructure could have on the underlying performance of water and sewer infrastructure suggests that removing infrastructure may not make sense from an engineering perspective.
- Third, removing infrastructure could reduce access to essential public services for existing residents. A more through determination of the equity impacts of decommissioning infrastructure is needed before the city proceeds.
- Lastly, the absence of a clear development vision for the Green Zone, and thus lack of clarity about the future infrastructure needed, suggests that it is premature to consider decommissioning.

For these reasons, the city's current approach of repairing and upgrading infrastructure as needed appears to be the most cost-effective strategy. A more detailed discussion of the team's findings is found in Appendix B: Decommissioning Water, Sewer, and Road Infrastructure in the Green Zone.

5. Conclusion

By choosing to explore how to reuse abandoned and vacant property and working to create the Green Zone, the city of Saginaw joins a small but growing number of communities across the country that are trying to transform their futures. The city's efforts have the potential to change how other cities in the industrial Midwest manage land use and infrastructure in the face of significant population loss, vacancy, and property abandonment.

The city's strategic use of NSP funding and partnerships with the Saginaw County Land Bank and the Saginaw County Brownfield Redevelopment Authority to acquire and manage vacant and abandoned property in the Green Zone are valuable first steps to transforming the neighborhood.

The issue of paramount importance for the city is what the neighborhood could become. Opportunities abound within the Green Zone to reuse property for parks, open space, urban agriculture, community gardens, and green infrastructure. How these uses can fit together to create a new neighborhood fabric that meets the needs of existing residents and the broader community is not yet clear.

The absence of a cohesive vision for the Green Zone that articulates what neighborhood residents, city leaders, and the surrounding community want over the long term has made it difficult to address future land use and infrastructure decisions. Questions still remain, such as whether infrastructure should be reconfigured, how much property should be reused for green infrastructure or for parks or open space, and whether the city should invest in this neighborhood to support future economic development.

The next step is engaging neighborhood residents in the development of a neighborhood plan and identifying implementation actions. Until a cohesive vision is articulated, determining whether the city should reconfigure infrastructure is premature.

This report has identified many issues for the city to consider as it pursues further "greening" of the Green Zone. Implementation of any of the proposed actions will require community outreach and coordination across multiple city departments and between the city and the county in land acquisition, land use planning, and delivery of public services. Careful coordination among these groups can help build capacity in the city and among its partners so that Saginaw can move towards a more prosperous and sustainable future that ensures the quality of life for its existing and future residents.

Appendix A: EPA's Smart Growth Implementation Assistance Program

Communities around the country want to foster economic growth, protect environmental resources, and plan for development. In many cases they need additional tools and resources to achieve these goals. In response to this need, the U.S. Environmental Protection Agency's (EPA) Office of Sustainable Communities launched the Smart Growth Implementation Assistance (SGIA) Program in 2005, to provide technical assistance through contractor services to selected communities. EPA assembles teams of specialized consultants, bringing together expertise that meets a particular community's needs. While working with community participants to understand their aspirations for development, the teams bring experience from working in other parts of the country to provide best practices for consideration by the assisted community. The goal of the program is to help participating communities attain their goals, while also producing a resource (such as a report or set of guidelines) that can be useful to a broad range of communities facing similar challenges.

SGIA is designed to help communities achieve growth that supports economic, community, public health, and environmental goals. Communities around the country are seeking alternatives to development that gives them no choice about driving long distances between where they live, work, and shop; requires costly expenditures to extend sewers, roads, and public services to support new development; uses up natural areas and farmland for development while land and buildings lie empty in already developed areas; and makes it difficult for working people to rent or buy a home due to limited housing options. Smart growth strategies create new neighborhoods and maintain existing ones that are attractive, convenient, safe, and healthy. These strategies foster design that encourages social, civic, and physical activity, and protect the environment while stimulating economic growth. Most of all, they create more choices for residents, workers, visitors, children, families, single people, and older adults about where to live and how to get around. When communities undertake this kind of planning, they preserve the best of the past while creating a bright future for generations to come.

Find more information about the program, including information on how to apply and links to reports from past recipients at *www.epa.gov/smartgrowth/sgia.htm*.

Appendix B: Decommissioning Water, Sewer, and Road Infrastructure in the Green Zone

Appendix B discusses the U.S. Environmental Protection Agency (EPA) team's analysis on the literature, engineering feasibility, costs and benefits, and social and environmental considerations of decommissioning water, sewer, and road infrastructure in the Green Zone of Saginaw, MI. Table B-3 summarizes the team's findings.

B.1. The Existing Literature

There are few examples of successful efforts to decommission infrastructure. Planning to remove infrastructure in response to population decline is relatively new, and there is no literature on the longer-term implications. Additionally, few professionals are trained to remove infrastructure. Decommissioning requires new approaches and training for planners and engineers.[9]

From the literature that does exist, five key lessons emerged:

1. **Balance short- and long-term considerations**. The potential benefits of decommissioning infrastructure need to be balanced with the long-term economic outlook. For example, in cities where future growth and recovery is possible and desired, the city might need to retain its surplus infrastructure capacity to support future growth. The ability to offer large, clean sites that are ready to develop can help attract large facilities. Also, the maintenance costs saved by mothballing infrastructure (keeping it in place but allowing it to deteriorate) or removing it might not outweigh the future costs of rebuilding that infrastructure in the future.[10]
2. **Account for upfront costs and uncertain returns**. Because it is expensive to remove roads, sewer, and water lines, cities and regions that are struggling financially might be reluctant to spend already-scarce resources on decommissioning. If cities are performing minimal maintenance on infrastructure, decommissioning might not save money. Removing streets also might reduce support from state transportation agencies, which often use existing miles of roads to determine the amount of state road funding for localities.
3. **Consider whole system connectivity.** It can be hard to rightsize infrastructure because of the affect across the entire system, as water, sewer, road, and power lines often need to cross through depopulated areas to reach more populated centers.
4. **Avoiding rightsizing can lead to other problems.** If rightsizing does not occur in areas with shrinking populations, cities are likely to face increased per-capita infrastructure costs and reduced water quality and pipe service life due to reduced water flow through the system.[11]
5. **The size and amount of vacant land matters in cities with large population shifts.** Decommissioning might be most cost-effective in cities where there are large contiguous areas of vacant and abandoned property due to significant population loss.[12]

[9] Schwarz, T. and Hoorbeek, J. "Sustainable Infrastructure in Shrinking Cities Options for the Future." Center for Public Administration and Public Policy and the Cleveland Urban Design Collaborative at Kent State University. July 2009.
[10] Community Development Advocates of Detroit, *Resources*, September 15, 2010, http://cdad-online.org/resources/.
[11] Herz, R. "Buried infrastructure in shrinking cities." International Symposium, Coping with Shrinking Cities and Demographic Change: Lessons from around the World, 2006.
[12] Schwarz, T. and Hoorbeek, J. "Sustainable Infrastructure in Shrinking Cities Options for the Future." Center for Public Administration and Public Policy and the Cleveland Urban Design Collaborative at Kent State University. July 2009.

An issue that is not covered extensively in the literature, but that is critical to consider when making any determination of managing infrastructure, is what the impact of reduced infrastructure service would be on existing and future neighborhood and community residents.

B.2 Engineering Feasibility

First, the EPA team asked whether it would be feasible from an engineering standpoint to consolidate or eliminate road, water, and sewer infrastructure without harming the integrity of the city's current road, water, and sewer system. Of the three types of infrastructure examined, decommissioning roads is the most feasible given the built-in redundancy of the existing street network in the Green Zone.

Two key factors affect the engineering feasibility of decommissioning water, sewer, and road infrastructure: how critical infrastructure is and its condition. The city must ask how important the existing infrastructure is to the road, water, or sewer network and to meeting residents' and businesses' needs in the Green Zone, in the city of Saginaw, and in the region served by the city's water and sewer infrastructure.

System design affects how critical infrastructure is or can be. Water and sewer systems, for example, have complex system dynamics in which each part of the network depends on other parts. Therefore, it is difficult to remove one part of the network without affecting the entire network's function. In contrast, gridded street networks often have built-in redundancy (i.e., multiple ways of reaching a destination) so that decommissioning any single street within the network would not necessarily inhibit access to destinations. Parts of the infrastructure network that are not considered critical may be possible candidates for decommissioning.

Exhibit B-1: Wooden and water and sewer pipes found in the Green Zone. *Many of the water and sewer pipes in the Green Zone are over 80 years old. Despite the age of the system, city officials consider the system to be highly functional and safe.*

Source: SRA International.

Once a city determines which infrastructure is critical and which is not, it can then prioritize decommissioning of non-critical infrastructure based on its condition (i.e., infrastructure that is in poor or deteriorating condition would be decommissioned first). Several factors affect infrastructure condition and the likelihood of failure. For example, pipes made of steel can last longer than pipes made of plastic or concrete. However, maintenance history is often more important than age or materials in predicting the likelihood of failure.

The city of Saginaw's combined sewer system includes approximately 300 miles of underground sewer pipes. The water mains in the Green Zone are more than 80 years old and some are wooden. Despite the system's age, city officials consider the water and sewer system to be in good shape and functioning well.

Roads

To determine which parts of the street network are most critical, the city could develop a map of essential roadways based on factors such as emergency access routes, freeway access, access to remaining businesses and homes in the Green Zone, and importance of the water or sewer infrastructure beneath. The city's Department of Public Services would need to analyze the street network to determine how critical these streets and others in the Green Zone are to system functionality and to meeting the mobility needs of the neighborhood's residents. Other roads in the network could be classified as non-critical; non-critical roads that are also in poor condition could be classified for decommissioning.

Exhibit B-2 shows a sample critical roadways map for the Green Zone. Here, critical roads provide emergency access, truck routes, and freeway access.

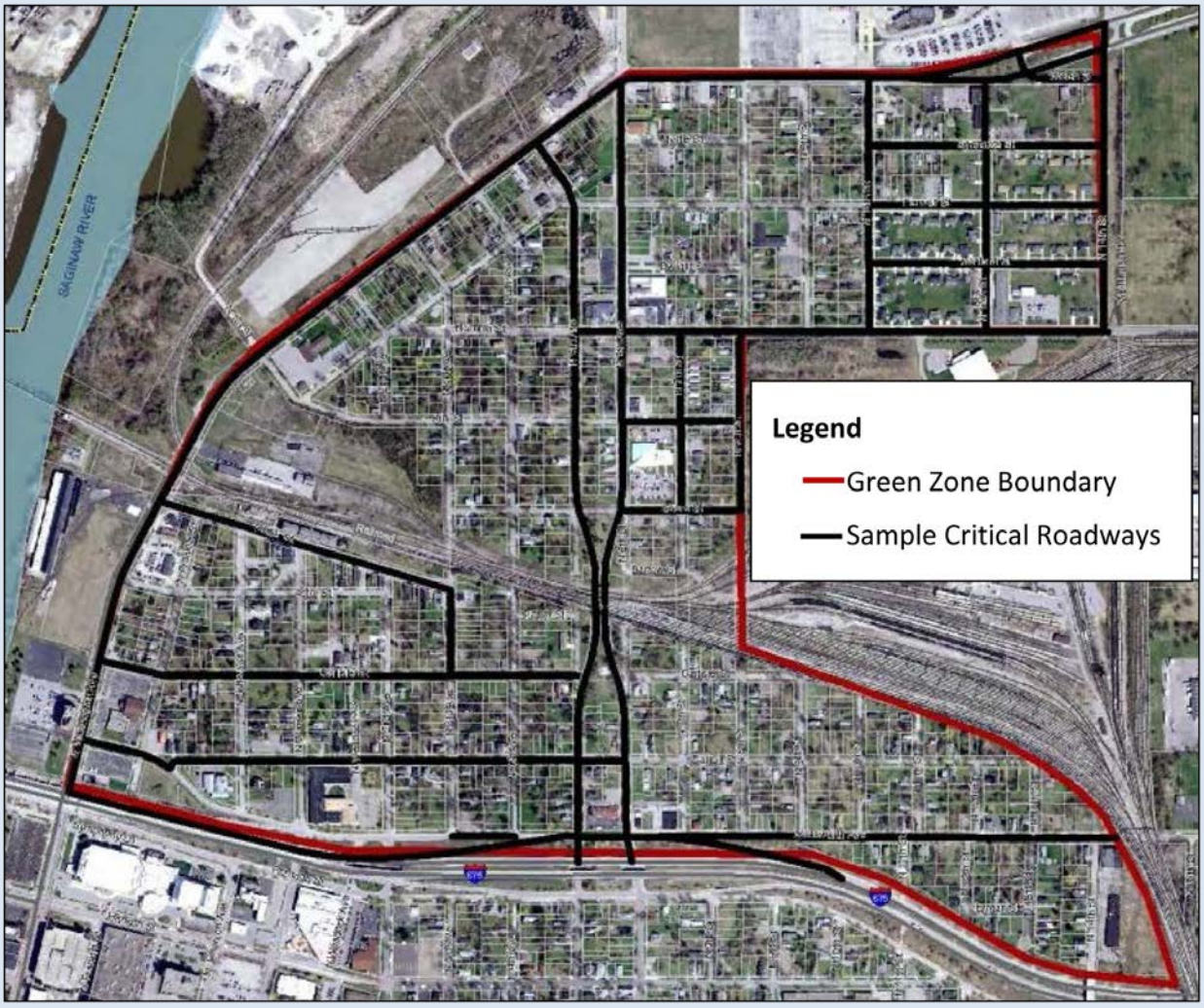

Exhibit B-2: Sample Critical Roadways. *To illustrate the concept of determining which streets are most critical to the Green Zone, the EPA team identified streets that provide access to existing residences and businesses, overlap with existing water and sewer infrastructure, provide needed access to freeways, or are needed for emergency response.*

Source: EPA.

Water

Determining which parts of the water network are most critical is more difficult. The water distribution network is complicated because the system is pressurized and looped, and water chemistry in a given pipe can be strongly influenced by the pressure and flow in other connected pipes. Water pipes can also degrade faster without flowing water. Determining critical versus non-critical mains requires detailed water distribution system modeling. The EPA team was unable to identify which portions of the system are most critical as such modeling was beyond the scope of this project.

Sewer

The team faced similar challenges in determining which elements of the city's sewer infrastructure are most critical. The system requires detailed modeling and analysis because of its complexity. However, certain elements of the sewer network should be considered in any decommissioning assessment. Much of the city's sewer system flows through interceptor pipes (i.e., sections connecting service to other sewer lines) that cross through the Green Zone. Because the system's integrity and function depend on maintaining these interceptor pipes, it will likely be difficult to decommission them. For the part of the sewer system that does not consist of interceptor pipes, the feasibility of decommissioning depends primarily on the location, the service area, and the number of remaining users for that portion of the system.

B.3 Cost-Benefit Evaluation

Decommissioning infrastructure makes sense when the cost of operating and maintaining infrastructure exceeds the funds or revenue available to manage that infrastructure. (Operating revenue for water and sewer infrastructure is often generated through user fees, whereas revenue for public road infrastructure is often generated through taxes). The costs of maintaining road, water, and sewer infrastructure depend on variables that can be uncertain from year to year due to weather, unanticipated failures and system demands, cost of materials, and frequency of repair. Treatment costs and system losses can also affect water infrastructure costs.

The cost of delivering infrastructure tends to be higher the further that infrastructure is from a road or main water or sewer line. Therefore, greater cost savings can be generated from decommissioning water and sewer lines or less travelled roads that are further from main sewer or water lines or major roads. Table B-1 lists the primary factors that affect infrastructure costs and revenues.

Table B-1: Factors Affecting Infrastructure Cost and Revenue

System	Typical Revenue Source	Factors Affecting Infrastructure Cost	Factors Affecting Revenue
Roads and sidewalks	• State or local funds (via taxes)	• Distance from main road • Material costs • Normal maintenance and resurfacing • Seasonal maintenance • Snow removal	• Increasing material costs • Long distance (average versus marginal cost) • Increasing deferred maintenance and higher repair or replacement costs

System	Typical Revenue Source	Factors Affecting Infrastructure Cost	Factors Affecting Revenue
Water and sewer	• User fees	• Distance from main line • Material costs • Normal maintenance and repair • Variable costs in water treatment and delivery • Water lost to leaks	• Capital budget allocations • Declining population, which can reduce amount of revenue and fees • Water main breaks and other unanticipated failures

In assessing the costs and benefits of decommissioning infrastructure, it is useful to consider future costs and expenditures. Future costs include continued operation and maintenance of water, sewer and road infrastructure, any analyses or studies the city may complete as part of continued operation and maintenance, and also the potential opportunity costs if the city has to rebuild infrastructure in a location where it had been removed.[13] This includes the lost value resulting from not being able to accommodate future development in the Green Zone because of a lack of infrastructure. To ensure that decisions made today do not require large capital expenses later or preclude valuable opportunities, the city may wish to consider the near-, medium-, and long-term development objectives for the Green Zone when making decommissioning decisions.

Revenue can also be highly variable. Factors that could contribute to a decline or shortfall in revenue include increased costs for operation and maintenance; declining revenue from user fees or road funding because of a smaller population or service area; unanticipated system failure that requires repair; shifts in capital budgets that reduce funds available for water, sewer, and road infrastructure; and higher costs of delivering services because of distance.

In determining the costs and benefits of decommissioning infrastructure, it is also useful to account for the potential change in property value that could result from demolishing abandoned and blighted structures. A study of the impacts of the side lot resale program operated by the Genesee County Land Bank found that replacing vacant homes with green space could increase the property values of adjacent parcels and property.[14] Over a large geographic area, this type of value creation could change the financial feasibility of decommissioning infrastructure. For instance, instead of removing or abandoning infrastructure, the city could use the increased tax revenue resulting from the conversion of vacant and abandoned property to green space to help pay for infrastructure maintenance.

It is also useful to consider the actual cost of decommissioning infrastructure and how it compares to the cost of continuing to operate and maintain that infrastructure over a given period of time. Decommissioning makes more financial sense when the cost of decommissioning is lower than the cost of continued operation and maintenance.

[13] Schwarz, T. and Hoorbeek, J. "Sustainable Infrastructure in Shrinking Cities Options for the Future." Center for Public Administration and Public Policy and the Cleveland Urban Design Collaborative at Kent State University. July 2009.
[14] Bozgo L., deWit, J., and Haradon, S. "Genessee County Land Bank: Side Lot Transfer Program Evaluation." Urban and Regional Planning Program, University of Michigan, January 2006.

For illustrative purposes, the EPA team estimated that the capital cost of decommissioning a block of infrastructure—including removing streets, sidewalks, and utilities; preparing the site; restoring the grade with clean fill; and planting grass to control erosion or erosion control seeding—would be approximately $240,000. Removing streets and sidewalks alone would cost about $35,000 to $40,000 per block.

The team based its cost assumptions on data from the city of Saginaw, as well as publically available data from the State of Michigan Department of Transportation (MDOT) and the Washington State (WSDOT). (The data provided by MDOT and WSDOT are general estimates of the cost of decommissioning an entire city block and not specific to Saginaw.)

Table B-2 provides a sample breakdown of these infrastructure costs based on current labor and material prices and the following engineering assumptions:

- The block is a typical north-south block with right-of-way dimensions of 440 feet long and 60 feet wide.
- Street infrastructure will be completely removed from the right-of-way boundaries.
- Removed roadbed will be backfilled with clean fill material.
- Finished landscaping will be limited to erosion control seeding.
- All utilities will be removed.
- No hazardous materials are present.
- Totals are rounded to the nearest $1,000.

Table B-2: City Block Decomissioning Breakdown

Item	Quantity	Unit	Unit Cost	Cost Source	Total Cost	Comments
Preparation						
Mobilization (people)	1	LS	$12,696	MDOT	$12,696	10% of total
Clearing and Grubbing	0.20	AC	$8,000	MDOT	$1,616	Area not currently paved
Tree Removal	13	EA	$1,000	Estimate	$13,000	Tree count from Google Maps
Roadway Removal						
Pavement Removal	1,467	SY	$10	MDOT	$14,667	6” of hot mix asphalt
Roadway Excavation	244	CY	$16	MDOT	$3,911	6” of base material
Curb Removal	80	LF	$10	MDOT	$800	Curb returns at end of street only
Sidewalk Removal	489	SY	$12	MDOT	$5,867	5’-wide sidewalk
Driveway Removal	200	SY	$14	MDOT	$2,800	Includes length of driveway from road to sidewalk

Item	Quantity	Unit	Unit Cost	Cost Source	Total Cost	Comments
Grade Restoration						
Fill Placement and Compaction	3,850	Ton	$10	MDOT	$38,499	Fill for hot mix asphalt and base removal
Erosion Control Seeding	0.61	AC	$8,000	WSDOT	$4,848	Seeding over entire fill area
Municipal Utility Removal						
Remove Sanitary Sewer Main	440	LF	$30	WSDOT	$13,200	12” main, length from GIS map
Remove Sanitary Sewer Manhole	5	EA	$700	WSDOT	$3,500	Count from GIS map
Remove Side Sewer	180	LF	$20	WSDOT	$3,600	6” side sewer, length and count from GIS map
Remove Water Main	440	LF	$25	WSDOT	$11,000	8” water main, length from GIS map
Remove Water Valve	3	EA	$250	WSDOT	$750	Count from GIS map
Remove Curb Stop	8	EA	$250	WSDOT	$2,000	Count from GIS map
Franchise Utility Removal						
Remove Utility Poles	5	EA	$400	Estimate	$2,000	Count from Google Maps
Remove Distribution Wiring	440	LF	$5	Estimate	$2,200	Length from Google Maps
Remove Service Wiring	180	LF	$5	Estimate	$900	Length from Google Maps
Remove TV Cable	180	LF	$5	Estimate	$900	Length from Google Maps
Remove Phone Cable	180	LF	$5	Estimate	$900	Length from Google Maps
	Construction Subtotal				**$140,000**	
	Conceptual Level Contingency (50%)				**$70,000**	
	Construction Total				**$210,000**	
	Construction Engineering (12%)				**$26,000**	
	Total (per block)				**$236,000**	

**Abbreviations: LS (lump sum); AC (acre); EA (each); SY (square yard); CY (cubic yard); LF (linear foot).*

An alternative to removing streets is to vacate or abandon them because they are determined to be less critical. Vacated or abandoned streets would be allowed to fall into disrepair and would be barricaded to prevent access. Barricades cost approximately $100 per street. Barricading less critical streets is a less expensive way for a jurisdiction to save on operating and maintaining non-critical streets while allowing flexibility to accommodate future development, recover the street if there is demand for it in the future, and maintain access to state transportation funds that are apportioned per road mile. Vacating streets could save the city of Saginaw an estimated $1,500 to $2,000 annually per block. (The annual cost of road maintenance in Saginaw is approximately $1,500 to $2,000 per block.)

B.4 Social and Environmental Considerations

Cost is one factor in determining whether to decommission infrastructure. However, decisions to remove, vacate, or abandon road, water, and sewer infrastructure also have social and environmental impacts. Possible impacts are discussed below.

Roads

The road network in the Green Zone is gridded with narrow streets, sidewalks, frequent intersections, and short blocks. This type of street network allows vehicle, pedestrian, and bicycle traffic to flow smoothly. Frequent intersections and street connections give travelers multiple routes to reach their destinations and tend to slow traffic. Narrow streets also slow traffic because they create a sense of enclosure that causes drivers to reduce their speed. When cars travel more slowly, streets feel safer for bicyclists and pedestrians. Sidewalks provide a safe place for residents to walk, and short blocks with frequent street crossings mean that residents have frequent places to stop safely.

Removing any portion of the street network in the Green Zone could make the neighborhood less appealing for walking and bicycling. The city might be less concerned in the near term because there is relatively little pedestrian activity now and traffic volumes and speeds are relatively low. However, if development picks up, maintaining the current road network would make it easier to encourage walking and bicycling. Converting non-critical roadways to walking paths could allow the city to continue to provide pedestrians convenient, safe routes. On the other hand, removing streets or limiting travel on them could also lessen the access of residents to services (e.g., mail delivery, street lighting, and trash removal).

Removing roads will likely reduce the amount of impervious surface in the Green Zone, assuming that roadways are filled with clean fill and landscaped with grass or other vegetation. Replacing streets with green infrastructure or open space could help reduce stormwater flow, filter stormwater, and divert it from retention treatment basins, thereby increasing the overall capacity of the city's water and sewer infrastructure. Additionally, converting streets to parks or open space could increase the amount of recreational space in the neighborhood.

Removing underused or less critical roadways and converting vacant and tax-delinquent property to green infrastructure can help meet regulatory requirements for CSO control and/or stormwater management, improve water quality, and reduce flooding of homes and businesses. For Saginaw, meeting CSO requirements through green infrastructure is less critical than it might be for other communities that face more stringent CSO regulations. However, for communities that have not yet invested in the infrastructure to meet their CSO regulatory requirements, converting vacant and tax-delinquent parcels and non-critical rights-of-way into green infrastructure facilities, such as constructed stormwater wetlands or bio-retention areas that add open space and habitats, could be the most cost-effective and environmentally sound approach to meeting those requirements.

Water and Sewer

Removing or abandoning water and sewer infrastructure is much more complex than removing or disinvesting in street infrastructure. Water and sewer systems are dynamic and connected, and the impacts of removing portions of the system are difficult to assess without detailed water modeling. However, removing portions of the water and sewer system would certainly affect water flow, water quality, and the integrity of the water and sewer pipes. These impacts would not be limited to the water and sewer network in the Green Zone, but would also extend across the city's entire water and sewer service area.

Social and Legal Considerations

The environmental impacts of removing infrastructure need to be weighed against the social impacts on existing residents. Any reconfiguration of infrastructure in the Green Zone has the potential of reducing residents' access to water, sewer, and roads. Removal of infrastructure could also have significant negative impacts on the development potential of the Green Zone. The lost potential of future shops or offices should be considered in the decision-making process, and is another reason for engaging neighborhood residents in a collaborative planning process to create a vision for the neighborhood.

While a thorough review of legal issues surrounding rightsizing was beyond the scope of this project, the city and county should be aware of certain issues with possible legal implications:

- Removing infrastructure could affect the civil rights of current residents and they might claim they were denied services based on race or class. While each case and claim is different, the courts have generally allowed jurisdictions to limit service to one part of a community if such action is rational, in the public interest, and not discriminatory by intent.[15]
- It is possible that the city may be legally bound by agreements with other jurisdictions to provide services. Such obligations may be set forth in agreements that govern the requirements associated with bond repayment.
- Ownership of vacated infrastructure may raise legal concerns. State laws often define whether ownership of a vacated asset (such as a road) goes to adjacent landowners or if jurisdictions maintain easement over the right-of-way.

[15] La Croix, Catherine, "Urban Agriculture and Other Green Uses: Remaking the Shrinking City," Case Research Paper in Legal Studies, Working Paper 09-29, October 2009.

Table B-3: Costs and Benefits of Removing Grey Infrastructure*

Options for Reducing Grey Infrastructure	Potential Issues			
	Performance	Social	Fiscal/Economic	Environmental
Roads				
Remove or abandon	***Costs*** • Reduced grid redundancy. • Removal of services, like trash pick-up, street lighting, and mail delivery. • Difficult to maintain the grid for possible future use.	***Costs*** • Reduced access to some homes and businesses in the Green Zone. • Legal considerations such as ownership of vacated roads.	***Costs*** • Reduced transportation funding from removing road miles. • High capital costs. • Higher costs later if roads are needed to support redevelopment. ***Benefits*** • Reduced maintenance costs. • Reduced cost of associated services, like trash removal, street lighting, and mail delivery. • Might be able to sell recycled pavement materials. • Relatively inexpensive. • Reduced maintenance costs comparable to costs of removal.	***Costs*** • Reduced impervious area. • Reduced stormwater runoff and pollutant loading to receiving water. ***Benefits*** • Easier to meet CSO control requirements.
Water				
Remove or abandon	***Costs*** • Reduced grid redundancy. • Reduced flow, water quality, and pipe integrity in other parts of the system.	***Costs*** • Legal considerations such as access to clean water for remaining residents.	***Costs*** • Additional cost if lines needed in the future. (Future additional costs would be greater if the infrastructure were removed rather than abandoned.) ***Benefits*** • Eliminates maintenance costs for removed or abandoned infrastructure. • Could reduce per-capita maintenance costs for rest of the city.	***Costs*** • Could harm flow, water quality, and pipe integrity in other parts of the system.
Combined Sewer				
Remove or abandon	***Costs*** • Feasible only in large areas of vacant and abandoned property and upstream tributary areas.	***Costs*** • Legal considerations such as access to sewer service.	***Costs*** • Additional cost if lines needed in the future. (Future additional costs would be greater if the infrastructure were removed rather than abandoned.) ***Benefits*** • Eliminates maintenance costs for removed or abandoned infrastructure. • Could reduce per-capita maintenance costs for rest of the city.	***Costs*** • Could harm flow, water quality, and pipe integrity in other parts of the system.

*Water infrastructure may be considered “grey” or “green.” Grey infrastructure refers to traditional practices for stormwater management and wastewater treatment, such as pipes and sewers. Green infrastructure refers to sustainable pollution reducing practices that also provide other ecosystem services.


Smart Growth
IMPLEMENTATION
ASSISTANCE