

*Williamstown Township and LEED Standards:
Planning for the Future*

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I. Executive Summary

Williamstown Township is one of several rural townships on the outskirts of the urban core of the Lansing/East Lansing area. The Township has been experiencing a rapid growth in population mainly due to the influx of non-farm households. Though it is not only residential development that is vying for the open space in the Township, the current demand for space in the area is expected to increase based on the projected growth rate of office development and new development in technology based industries (Master Plan, 2000).

In response to a concern that this new development might threaten the rural integrity of the area, Williamstown Township has sought to maintain its image and identity by promoting sustainable growth and development specifically along the Grand River Avenue Corridor. The Corridor is one of the most attractive areas for development in region and it is also one of the few remaining green sites from Lansing to Detroit. Most of the Corridor is zoned as Residential Estate, thus opening it up for potential development. This development if unplanned could result in urban sprawl, as witnessed in surrounding communities in the Greater Lansing Area (Master Plan, 2000).

Urban sprawl happens when farmland, forestland, or open space converts to low-density development that spreads across the landscape with little identifiable form (LULC, 2003). Some attempts to address the issue of sprawl in Michigan have been made. In February 2003 Governor Jennifer Granholm signed Executive Order No. 2003-4 and announced the formation of the bipartisan Michigan Land Use Leadership Council. The Executive Order charged the council with studying and identifying trends, causes, and consequences of urban sprawl. The council

determined three principal goals: economic prosperity, stewardship of the environment and cultural and natural resources, and equitable distribution of benefits to all residents.

At the national level the United States Green Building Council developed the Leadership in Energy and Environmental Design (LEED) Green Building Rating System to help guide developers concerned with sprawl and sustainable development. The system is a voluntary, national standard for developing high-performance sustainable buildings. There are four levels of certification: basic certification; silver; gold; and platinum. The LEED system rates buildings on a point system where every building and construction practice is given a certain amount of points.

LEED standards and sustainable development practices were adopted to reflect the need for more energy efficient buildings with reduced environmental impacts. This includes impacts not only produced during and after construction, but those produced during the manufacturing of building products. This design process has been termed “green building” because of its focus on environmental impacts. Several state, county, and city governments across the country are developing their own versions of green building programs. Some programs provide direct incentives such as New York and Arlington County, Virginia, while others are more aggressive like Boulder and the State of Michigan, and enact local building code ordinances to require a certain level of energy efficiency and environmental protection. Scottsdale, Arizona and Santa Monica, California utilize a combination of incentives and legislative action to promote sustainable development.

Based on these case studies and information on LEED standards we offer the following recommendations in which Williamstown Township can promote sustainable development:

- Require new development within the Grand River Corridor to meet LEED gold level certification

- Incorporate the LEED rating system into Master Plan for future developments
- Utilize overlay zones requiring LEED gold level certification for specific areas sensitive to development throughout the Township
- Research Conditional Zoning Act to determine applicability to Township goals.

Implementing these development standards and promoting sustainable development will cause Williamston Township to be viewed as a progressive innovator whose practices curb the negative effects of urban sprawl experienced by so many other communities, creating a more attractive place to live, and increasing the quality of life for all residents.

II. INTRODUCTION

Rising gas prices, threats of global oil shortages, and the increasing rate of land lost to urban sprawl have raised the issue of sustainability to a level of national importance and have many looking for possible solutions. One such solution being considered is sustainable development. Sustainable development practices can reduce automobile reliance, slow the rate of urban sprawl, and protect valuable farmland and open space (Portney, 2003). The United Nations World Commission on Environment and Development and the President's Council on Sustainable Development define sustainable development as the "ability to make development sustainable...to ensure that it meets the need of the present without compromising the ability of future generations to meet their own needs" (Kates et. al., 2005). A sustainable community aims at long term cultural, economic and environmental health and vitality. Sustainable development can secure a community's future by creating good jobs, improving the environment and quality of life, saving money, strengthening the economy, and building trust (Portney, 2003).

This policy brief was prepared by graduate students from Michigan State University (MSU) to provide information about the concept of sustainable development and the effects of

urban sprawl to the Williamstown Township Planning Commission. The policy brief will introduce the Leadership in Energy and Environmental Design (LEED) standards and provide case studies where they have been successfully applied to address the issue of high energy costs and loss of open space caused by over consumption and urban sprawl. Potential barriers and opportunities to adopt LEED standards in Michigan will be identified and recommendations will be provided to address Williamstown Township's goal of maintaining the area's rural integrity specifically along the Grand River Corridor.

III. WILLIAMSTOWN TOWNSHIP

Williamstown Township is one of several rural townships on the outskirts of the urban core of the Lansing/East Lansing area. Though it still retains some of the characteristics of a rural area, the Township has been experiencing a rapid growth in population mainly due to the influx of non-farm households. Based on this growth pattern the projected population by the year 2030 is approximately 7,300 persons (Master Plan 2005). This growth has resulted in a few new subdivisions on the west side of the Township and near the City of Williamston, with most of the growth being accommodated by lot splits for new homes in open space and agricultural land (Master Plan, 2000).

In response to a concern that this continued growth and development might threaten the rural integrity of the area, Williamstown Township has sought to maintain the image and identity of the Township by promoting sustainable growth and development in the area. The goals of the Township, as identified in its master plan, "are to retain the natural features of the land, maintain open space, and preserve farmland while allowing for well-planned, low-density, residential and commercial development." (Master Plan, 2000). One of the most attractive areas for

development in Williamstown Township is the undeveloped rural landscape along the Grand River Avenue Corridor.

The Grand River Avenue Corridor is approximately 3 miles in length and runs from the eastern edge of Meridian Charter Township to the western edge of the City of Williamston (See Appendix 1). Grand River Avenue is an important transportation corridor that connects Grand Rapids to Detroit. The Grand River Avenue Corridor in Williamstown Township is one of the few remaining green sites from Lansing to Detroit (URPP, 1999). The majority of land along the Corridor is agricultural or open space with some residential, commercial and industrial uses scattered throughout (See Appendix 2). While the dominant land use within the Corridor remains agricultural or open space, most of the Corridor is zoned as Residential Estate (Appendix 3) thus opening it up for potential development. A current limitation for development is the fact that public sewer lines only service the eastern corner of the Corridor from the City of Williamston to Zimmer Road. The Township has expressed no intent to extend these facilities.

The Corridor includes the 130 acre Williamstown Township Community Park that is used year round for sledding, soccer, and outdoor gatherings. A designated viewshed that requires a setback of 350 feet in each direction from the Grand River Avenue right of way has been proposed in the 2005 draft Master Plan for Williamstown Township. The viewshed is intended to maintain the Corridor's current rural open character. While development has not been completely excluded from the viewshed, it is proposed to be very limited with any new building constructed being LEED-certified.

IV. CURRENT DEMAND TRENDS

The present demand for commercial development in Michigan is expected to increase, based on the projected growth rate of office development. In the Lansing region an estimated 1,619 office jobs will be added to the region. Over a twenty-year period the total demand for new office space in the area could be up to 6.5 million square feet. There is a projected increase in office and technological development while the retail needs of the Township are being satisfied by current facilities and neighboring communities (Master Plan, 2005). Because of the availability of land in Williamstown Township, the historical competitive edge of the eastern Lansing metropolitan area over other communities, and the existing high concentration of highly skilled workers in the Williamston and Williamstown Township, the area could attract between 60,000 and 100,000 square feet of office space over the next 20 years (Master Plan, 2000).

The most transforming economic trend in Williamstown Township is predicted to stem from broadband and information technology. Since the 1990's the economy of the United States has increasingly focused on technology. Instead of competing with neighboring towns for jobs, communities are now competing for these opportunities on a global scale. This phenomenon is called the knowledge economy (Master Plan, 2000).

The knowledge economy allows for job mobility and creates new opportunities for local businesses and residents to compete in the global economy. Perhaps more advanced communications technologies broadband enable small businesses to take part in the global market place. This is particularly relevant because, according to the U.S. Small Business Administration, small businesses create between two-thirds and three-quarters of new jobs and employ more than half the workforce in the United States (Master Plan, 2000).

Williamstown Township's close proximity to Michigan State University, a major research institution, makes it an attractive place to locate businesses and technology based industries, while increased access to the Internet improves the competitiveness of small businesses. It is this probable increase in demand for technology based development that has the potential to negatively affect the rural character of Williamstown Township. (Master Plan, 2000).

V. URBAN SPRAWL

Urban sprawl happens when the land use pattern converts farmland, forestland, or open space to low-density development that spreads across the landscape with little identifiable form (LULC, 2003). To address urban sprawl and guide public and private investment decisions over the next two decades, the Tri-County Regional Planning Commission established an action plan to represent Clinton, Eaton and Ingham Counties as well as the Lansing, Michigan metropolitan area. The "Regional Growth: Choices for our Future" project was created to develop a shared regional vision of land use and future development patterns. The current Tri-County regional population is approximately 447,728 and is projected to increase by 22.8% to 549,647 by the year 2025. According to the Tri County Commission much of the land conversion to accommodate this growth in population is occurring in the more rural areas outside of existing urban areas. Commission studies show that rural residential land has increased by 63,930 acres or 97% from 1978 to 1999 and that for every 1 new acre of urbanized land, there was 5 acres of new rural residential land (TCRPC, 2002).

The rapidity of urban sprawl in rural areas has raised some serious concerns about farmland preservation. Agriculture and food processing contribute \$15 billion directly to Michigan's economy. Michigan's agricultural products are the second most diverse in the

nation, after California (LULC, 2003). According to the Farmland Information Center, over 6 million acres of agricultural land was developed from 1992-1997, an average of over 1 million acres per year. In Michigan, rural land is developed at an average annual rate of over 73,000 acres while the rate for agricultural land is nearly 40,000 acres (FIC, 2005). Over the next 40 years, Michigan is expected to lose a quarter of its fruit-growing land (LULC, 2003).

The Michigan Department of Agriculture's Farmland and Open Space Program uses methods such as the Purchase of Development Rights and Local Open Space Easements to preserve the State's valuable agricultural land and open space. A Purchase of Development Rights agreement with a local government results in a permanent restriction on the land preserving it for agriculture in exchange for cash benefits, while a Local Open Space Easement is an agreement between the landowner and local government that results in a temporary restriction on the land preserving it as open space in exchange for tax benefits and exemptions for special assessments such as sewer, water, and lights (MDA, 2005).

VI. MICHIGAN LAND USE LEADERSHIP COUNCIL

In February 2003 Governor Jennifer Granholm signed Executive Order No. 2003-4 and announced the formation of the bipartisan Michigan Land Use Leadership Council (LULC).

"The Executive Order charged the council with studying and identifying trends, causes, and consequences of urban sprawl and providing recommendations to the governor and the legislature designed to minimize the negative effects of current and projected land use patterns on Michigan's environment and economy" (LULC, 2003).

The council determined three principal goals: economic prosperity, stewardship of the environment and cultural and natural resources, and equitable distribution of benefits to all

residents. It was stressed that these three goals are mutually dependent and will require government leadership in guiding the creation of public and private land use decisions and policies that reflect the importance of balancing these goals in achieving sustainability (LULC, 2003).

The Council's report states that in many areas, development of open spaces is altering the character of Michigan's rural landscapes, jeopardizing a highly valued tourism asset. It also declares the negative effect of encroaching development on the rural character of the state's many travel corridors, thus confirming Williamstown Township's fears for the Grand River Corridor. "As people move to destination resort areas to take advantage of the amenities and views, those areas may lose the very character and quality that originally defined them as a destination if current development patterns continue" (LULC, 2003).

Recommendations from the Council support the following smart growth tenets:

- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Create walkable communities
- Foster distinctive, attractive communities with a strong sense of place
- Encourage community and stakeholder collaboration
- Strengthen and direct development toward existing communities
- Take advantage of compact development design.

Specifically, the Council recommended: the state provide funding for planning and innovative zoning; local communities utilize large minimum parcel sizes as a tool to protect farmland, forestland, and open space as designated in the master plan; and provide local communities with the authority to avoid the wasteful cost, disruption, and visual degradation of landscape caused by redundant telecommunication infrastructure (such as utility poles, communication towers, fiber-optic lines) and suggested electrical and telecommunications lines be located underground (LULC, 2003).

VIII. ENERGY CONSUMPTION

In the 1970s, the United States established many land mark environmental protection acts, such as the Clean Air Act, National Environmental Policy Act, and the Clean Water Act. These acts inspired many such acts around the world making the United States the leader of a global environmental movement. Unfortunately, the rapid economic and industrial expansion over the next 20 years that solidified the U. S. position as a world superpower also created a corporate culture of ecological irresponsibility. This laissez-faire mentality is apparent in the continued dependence on coal and oil for energy and fuel as well as the rapid rate of consumption of open space (Wade, 2005).

In 2005, it is estimated that Americans will spend \$1.08 trillion on energy, an increase of nearly 24 percent from 2004 (Murray, 2005). A study by the federal Energy Information Administration (2005) predicts increases of up to 70 percent in areas of the Midwest. In Michigan alone, rising natural gas prices will mean an increase in the average monthly heating bill of 46 percent from last winter (Murray, 2005).

The availability of cheap gas, and other fossil fuels, underlines everything American's consider to be the staples of modern life: central heating, air condition, cars, airplanes, electric light, inexpensive clothing, recorded music, movies, and national defense (Kunstler, 2005). It will also affect how and where people live. As the affordability of gas decreases, suburbia, which is often miles away from jobs, grocery stores, and other necessities, will become an unsustainable way of life (Kunstler, 2004).

Successful regions in the 21st century will be ones with viable farming lands that concentrate on locally sustainable economies with a foundation of civic cooperation. Small towns, like Williamstown Township, will probably have better prospects than big cities

(Kunstler, 2004). The Township's goals for smart growth will foster the type of sustainability that will be necessary with the impending oil crisis.

VIII. GREEN BUILDINGS

Many cities are attempting to adapt existing building construction regulations to reflect the need for more energy efficient buildings with reduced environmental impacts. This includes impacts not only produced during and after construction, but those produced during the manufacturing of building products. This design process has been termed "green building" because of its focus on environmental impacts (Portney, 2003).

The financial benefit of building green has drawn greater attention with the escalation of energy prices and increasing loss of open space to development. Policies and incentives for green development in the private market help capture the financial, environmental and social benefits that are provided by using building green. By designing, constructing, and maintaining buildings to decrease energy and water usage and costs, longevity of building systems will improve in efficiency and decrease the burdens that buildings impose on the environment and public health (Urban Catalyst, 2005).

In his *Site Planning and Design Handbook* (2001), Thomas Russ writes that "...buildings once reflected an elegance of design, a thoughtful construction based on awareness of the environment. Buildings in this tradition were active working machines." Green development is "active" building that reminds us of our connection to a world larger than ourselves, a world to be inherited by our children. Our responsibility today is to create and maintain sound environmental, social and fiscal legacies. The practice of sustainable, green development is the crucial pillar of that responsibility.

Undertaking green development projects demonstrates a commitment to quality, permanence and stewardship that may improve an owner's or a developer's reputation in the community and the industry as a whole. Those involved with sustainability are viewed as innovators, exemplars and leaders in their field and good people to do business with in the future (Urban Catalyst, 2005).

In the past several years the demand for green or sustainable buildings has increased significantly. In 5 years, USGBC LEED-certified buildings have captured nearly 3% of the entire new building market in the United States and the number of projects registering for certification continues to grow. The USGBC has now set a target of 25% of the building market (USGBC, 2005). The market for these buildings is expansive and varied. Green buildings are located in all 50 states and appear in all building categories with commercial offices and educational buildings representing 1/3 of all LEED certified buildings. As these buildings continue to draw attention in the building industry and as their range of benefits are better understood, demand should continue to grow (USGBC, 2005).

IX. LEED STANDARDS

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a voluntary, national standard for developing high-performance sustainable buildings. The LEED system was created by the U.S. Green Building Council (USGBC) whose members represent all segments of the building industry, to define "green building" with a standard form of measurement to promote sustainable design practices, recognize environmental leadership in the building industry, stimulate green design, raise consumer awareness about the benefits of sustainable development, and transform the building market. LEED standards provide a

comprehensive framework for evaluating building performance and meeting sustainability goals. These standards are based on scientific principles and promote modern strategies for sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. The LEED system acknowledges achievements in sustainable development by offering project certification, professional accreditation, and practical resources (US Green Building Council, n.d.).

There are four levels of certification: basic certification; silver; gold; and platinum. The LEED system rates buildings on a point system where every building and construction practice is given a certain amount of points. The more points a building is given, the higher it is ranked in the certification process. LEED is a voluntary, national standard for developing high-performance sustainable buildings.

Currently there are design standards for:

- New commercial construction and major renovation projects (LEED-NC)
- Existing building operations (LEED-EB)
- Commercial interiors projects (LEED-CI)
- Core and shell projects (LEED-CS)
- Homes (LEED-H)
- Neighborhood Development (LEED-ND).

In order to ensure that new development in the area is in line with the sustainability goals of Williamston Township, buildings in the area should be built according to LEED standards. Based on the projected growth in the commercial and technological sectors of Williamston Township's economy and the fact that most of the development along the Grand River Corridor will be new development, new commercial construction and major renovation projects (LEED-NC) standards were determined to be most applicable to the area. By promoting sustainable

design in construction Williamstown Township demonstrates leadership consistent with its master plan objective to maintain a rural character while simultaneously supporting wise growth.

X. LEED Certification Process (US Green Building Council, n.d.)

The first step to certifying a building is to register the project (See Appendix 4). Early registration maximizes the potential for project certification. Registration allows developers to establish contact with the USGBC and to gain access to important information, software tools, and communications. Project contacts receive an orientation letter through email, which explains the official LEED certification process (US Green Building Council, n.d.).

Once the registration process is complete the developer can begin preparing documentation to satisfy the prerequisites and credit submittal requirements. This should be done throughout the project. It is useful to have a LEED accredited professional, as the project contact. An accredited professional is someone who has passed the accreditation exam given by USGBC, which helps to ensure that the individual has the knowledge and skills necessary to participate in the design process. In the case that a question or problem arises, USGBC has established a review process called credit interpretation requests (CIRS). If a developer has a problem they should review the LEED Reference Guide and examine the LEED Credit Interpretations Rulings website page for previously asked CIRS concerning relevant credits. If these aforementioned solutions fail to answer any questions, the developer can submit a new CIR using an online form (US Green Building Council, n.d.).

The certification review process includes an application submittal and technical reviews. The application submittal must include a printed LEED letter and requested submittals for each prerequisite and credit, LEED registration information, the LEED project checklist/scorecard

indicating projected credits and totals for the project, and drawings and photos of the project area. The technical review process depends on which version of LEED standards is being used. This includes: LEED-NC version 2.0, LEED-NC version 2.1, LEED-NC version 2.0/2.1 Combination review, LEED-EB Version 2.0, or LEED-CI 2.0. Though each of these reviews are slightly different all application submittals are reviewed and within a month the USGBC will issue a preliminary LEED review and the project team has 30 days to provide corrections and/or additional supporting documents. The USGBC then conducts a final LEED review within three weeks of receiving the resubmitted application and notifies the project contact.

Once the team is notified of the LEED certification, the project team has 30 days to accept or appeal the award. If it is not appealed in 30 days the certification is final. The project team may appeal if they feel they have sufficient grounds to do so. The fee is \$500 dollars per credit appealed. A review will occur within 30 days at which time an Appeal LEED Review will be issued (US Green Building Council, n.d.).

XI. LEED-New Construction

The LEED Green Building System for New Construction (LEED-NC) was first published in 1999. Since its inception it has helped developers improve the quality of buildings and their impact on the environment. These standards help to reduce the amount of energy, water, and electricity buildings use while promoting land use practices that preserve open space (US Green Building Council, 2005). A building is rated on a point system. Every building and construction practice is given a certain amount of points. The more points a building is given, the higher it is ranked in the certification process. There are possible 69 total points projects under the LEED-NC standards. To achieve basic certification requires 26-32 points, the silver status 26-32 points,

gold 39-51 points and platinum 52-69 points (US Green Building Council, 2005). Before any credits can be obtained developers must meet the following prerequisites:

LEED-NC Prerequisites (US Green Building Council, 2005)

- **Construction Activity Pollution Prevention** - Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.
- **Fundamental Commissioning of the Building Energy Systems** – Verify that the building’s energy related systems are installed, calibrated and perform according to the owner’s project requirements, basis of design, and construction documents.
- **Minimum Energy Performance** - Establish the minimum level of energy efficiency for the proposed building and systems.
- **Fundamental Refrigerant Management** - Reduce ozone depletion.
- **Storage & Collection of Recyclables** - Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.
- **Minimum IAQ Performance** - Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants.
- **Environmental Tobacco Smoke (ETS) Control** - Minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS).

The MSU policy team suggests that Williamstown Township consider requiring a gold level certification for new developments. Practices necessary to achieve gold level certification offer a feasible plan for controlled community growth focused on environmental protection and energy conservation while allowing developers to go beyond this standard if desired. A minimum of 39 points must be achieved in order to meet the gold standard. Outlined below are suggestions for feasible credits that promote the goals of the Township and meet the gold standard of development. It should be noted that in cases where multiple points are possible, it is assumed the maximum point value will be achieved.

Modified LEED-NC Gold Level Certification for Williamstown Township

Site Selection

1 point

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

Development Density & Community Connectivity

1 point

Channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.

Site Development: Protect or Restore Habitat

1 point

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Maximize Open Space

1 point

Provide a high ratio of open space to development footprint to promote biodiversity.

Stormwater Design

1 point

Quantity Control - Limit disruption and pollution of natural water flows by managing stormwater runoff.

Regional Materials

1 point

10% Extracted, Processed & Manufactured Regionally - Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Innovative Wastewater Technologies

1 point

Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Light Pollution Reduction

1 point

Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.

LEED Accredited Professional

1 point

To support and encourage the design integration required by a LEED-NC green building project and to streamline the application and certification process.

Water Efficient Landscaping

1 point

Reduce by 50% - Limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site for landscape irrigation.

Water Use Reduction

1 point

20% Reduction - Maximize water efficiency within buildings to reduce the burden on water supply and wastewater systems.

Optimize Energy Performance**1-10 points**

Achieve increasing levels of energy performance above the baseline prerequisite level to reduce environmental and economic impacts associated with excessive energy use.

On-Site Renewable Energy**1-3 points**

Encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental and economic impacts associated with fossil fuel energy use.

Low-Emitting Materials**1 point**

Adhesives & Sealants - Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Low-Emitting Materials**1 point**

Paints & Coatings - Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Measurement & Verification**1 point**

Provide for the ongoing accountability of building energy consumption over time.

Green Power**1 point**

Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Construction Waste Management**1 point**

Divert 50% From Disposal - Divert construction, demolition and land-clearing debris from disposal in landfills and incinerators, redirect recyclable recovered resources back to the manufacturing process, and redirect reusable materials to appropriate sites.

Rapidly Renewable Materials**1 point**

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Increased Ventilation**1 point**

Provide additional outdoor air ventilation to improve indoor air quality for improved occupant comfort, well-being and productivity.

Construction IAQ Management Plan**1 point**

During Construction - Reduce indoor air quality (IAQ) problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Construction IAQ Management Plan**1 point**

Before Occupancy - Reduce indoor air quality (IAQ) problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Enhanced Commissioning**1 point**

Begin the commissioning process early during the design process and execute additional activities after systems performance verification is completed.

Controllability of Systems: Lighting**1 point**

Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (i.e. classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

Controllability of Systems: Thermal Comfort**1 point**

Provide a high level of thermal comfort system control by individual occupants or by specific groups in multi-occupant spaces (i.e. classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

Thermal Comfort: Design**1 point**

Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

Thermal Comfort: Verification**1 point**

Provide for the assessment of building thermal comfort over time.

Innovation in Design**1-4 points**

To provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED-NC Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED-NC Green Building Rating System.

Total Points**42 points****XII. LEED NEIGHBORHOOD DESIGN (US Green Building Council, 2005)**

The LEED neighborhood design standards (LEED-ND) were developed by the U.S. Green Building Council (USGBC), the Congress for New Urbanism (CNU), and the Natural Resources Defense Council (NRDC). These standards were founded on the principles of smart growth, urbanism, and green building. Unlike other LEED standards that focus on green building practices, LEED-ND standards concentrate on site selection and encourage design elements that bring a neighborhood together and relate it to the larger region and landscape. These standards were only recently developed and are in the draft stage, but it is the hope of the

USGBC that, like LEED-NC, these standards will promote smart growth, revitalize existing urban areas, reduce land consumption, reduce automobile dependence, promote pedestrian activity, improve air quality, decrease polluted stormwater runoff, and build more livable, sustainable, and enduring communities for people of all income levels (US Green Building Council 2005). There are a total of 114 points in the LEED-ND standard. Basic certification requires 46-56 points, the silver standard requires 57-67 points, the gold standard 68-90 points, and the platinum standard 91-114 points (US Green Building Council 2005). Like the standards for commercial development, LEED-ND standards have a set of prerequisites that must be met before any points can be obtained.

LEED-ND Prerequisites (US Green Building Council, 2005)

- **Transportation Efficiency** - Reduce air pollution, energy consumption, and greenhouse gas emissions generated by transportation by encouraging new development in locations that reduce automobile dependence. Promote public health by encouraging new development in locations that provide increased opportunities for walking. For Williamstown Township, development should occur close to the City of Williamston.
- **Water and Stormwater Infrastructure Efficiency** - Conserve natural and financial resources required for construction and maintenance of infrastructure. Encourage new development within and near existing communities, in order to reduce multiple environmental impacts caused by haphazard sprawl.
- **Imperiled Species and Ecological Communities** - Protect imperiled species and ecological communities.
- **Parkland Preservation** - Protect natural habitat.
- **Wetland & Water Body Protection** - Conserve water quality, natural hydrology and habitat through conservation of water bodies and wetlands.
- **Erosion & Sedimentation Control** - Reduce water pollution from erosion during construction.
- **Farmland Preservation** - Preserve irreplaceable agricultural resources by protecting prime and unique farmland from development.
- **Open Community** - Promote developments that are good neighbors to their surrounding communities. Foster a sense of community and connectedness beyond the development.
- **Compact Development** - Conserve land, promote livability, transportation efficiency, and walkability.
- **Diversity of Uses** - Promote community livability, transportation efficiency, and walkability.

As with the LEED-NC standards, we suggest Williamstown Township require gold level certification. A minimum of 68 points must be achieved in order to meet the gold standard.

Outlined below are suggestions for feasible credits that promote the goals of the Township and meet the gold standard of development. Like the LEED-NC standards, for credits with more than one point value it is assumed that the maximum credits will be achieved.

Modified LEED-ND Gold Level Certification for Williamstown Township

Reduced Automobile Dependence **2-6 points**
Encourage development in locations that exhibit superior performance in providing transportation choices or otherwise reducing motor vehicle use. For Williamstown Township this would be near the bus stop on the Corridor or through the encouragement of ride sharing (providing car pool lots?)

Contribution to Jobs-Housing Balance **4 points**
Encourage balanced communities with a diversity of uses and employment opportunities. Reduce energy consumption and pollution from motor vehicles by providing opportunities for shorter vehicle trips and/or use of alternative modes of transportation.

Light Pollution Reduction **1 point**
Reduce light pollution.

Access to Public Space **2 points**
Provide access to public gathering space in order to promote sense of community.

Support Off-Site Land Conservation **2 points**
Protect land that is important for natural or cultural resources from development in other areas of the Township.

Site Design for Habitat or Wetlands Conservation **1 point**
Conserve native wildlife habitat, wetlands and water bodies.

Steep Slope Preservation **1 point**
Minimize erosion to protect habitat and reduce stress on natural water systems by preserving steep slopes in a natural, vegetated state.

Minimize Site Disturbance During Construction **1 point**
Conserve existing natural areas and protect trees to provide habitat and promote biodiversity.

Minimize Site Disturbance Through Site Design **1 point**
Preserve existing tree canopy, native vegetation and pervious surfaces while encouraging high

density, smart growth communities.

Maintain Stormwater Runoff Rates

1 point

Reduce stormwater pollution, prevent flooding, and promote aquifer recharge.

Stormwater Treatment

2 points

Reduce surface water pollution from stormwater.

Compact Development

1-5 points

Conserve land, promote livability, transportation efficiency, and walkability.

Regionally Provided Materials

1 point

Promote selection of regionally available materials and resources to build local economy and reduce embodied energy.

Diversity of Uses

1-3 points

Promote community livability, transportation efficiency, and walkability.

Housing Diversity

4 points

To enable citizens from a wide range of economic levels and age groups to live within a community. This may encourage development of affordable housing in the Township.

Affordable Rental Housing

1-2 points

To enable citizens from a wide range of economic levels and age groups to live within a community. This may encourage development of affordable housing in the Township.

Affordable For-Sale Housing

1-2 points

To enable citizens from a wide range of economic levels and age groups to live within a community.

Community Outreach and Involvement

1 point

To encourage community participation in the **project** design and planning process and involve the people who live in a community in deciding how it should be improved or how it should change over time.

Applying Regional Precedents in Urbanism and Architecture

1 point

Promote energy savings, respond to regional climate, increase the life of buildings and materials, provide cultural continuity, and reinforce local distinctiveness.

Certified Green Building

1-5 points

Encourage the design and construction of buildings to utilize green building practices.

Energy Efficiency in Buildings

1-3 points

Encourage the design and construction of energy efficient buildings to reduce air, water, and land pollution, and environmental impacts from energy production and consumption.

Water Efficiency in Buildings	1-2 points
Encourage the design and construction of water efficient buildings to reduce the environmental impacts from water consumption.	
Infrastructure Energy Efficiency	1 point
Reduce air, water, and land pollution from energy consumption.	
On-Site Power Generation	1 point
Reduce air, water, and land pollution from energy consumption and production by increasing the efficiency of the power delivery system and increasing the reliability of power.	
On-Site Renewable Energy Sources	1 point
Reduce environmental impacts associated with fossil fuel energy generation by increasing the use of on-site renewable energy sources, i.e. solar, wind, geothermal, etc.	
Block Perimeter	1-4 points
Promote connectivity of neighborhood.	
Locating Buildings to Shape Walkable Streets	1 point
Encourage pedestrian-oriented streets.	
Designing Building Access to Shape Walkable Streets	1 point
Encourage pedestrian-oriented streets	
Comprehensively Designed Walkable Streets	1 point
Encourage pedestrian-oriented streets.	
Designing Buildings to Shape Walkable Streets	1 point
Encourage pedestrian-oriented streets.	
Street Network	1 point
Provide direct and safe connections, for pedestrians and bicyclists as well as drivers, to local destinations and neighborhood centers. Promote public health through increased physical activity.	
Pedestrian Network	1 point
Provide direct and safe connections for pedestrians to local destinations and neighborhood centers. Promote public health through increased physical activity.	
Maximize Pedestrian Experience	1 point
Provide direct, safe, and comfortable connections for pedestrians and bicyclists to local destinations and neighborhood centers. Promote public health through increased physical activity.	
Superior Pedestrian Experience	1-2 points
Provide appealing and comfortable pedestrian street environments in order to promote pedestrian activity.	

Anticipated Accredited Professional Innovation Credit(s)**1-2 points**

The LEED-ND Core Committee is considering having at least one credit (worth at least one point) available for the inclusion of a LEED Accredited Professional or other professional on the project team with specific credentials that would be particularly relevant and helpful to achieving LEED-ND certification.

Anticipated Innovation Credit(s)**1-4 points**

The LEED-ND Core Committee anticipates having a number of “Innovation” credits available, similar to other LEED rating systems. Project teams could potentially earn a limited number of such credits based on innovative designs, approaches, measures taken, technologies used, etc. that help meet the overall goals of LEED-ND but are not specifically credited in the LEED-ND Rating System.

It is suggested that under this allowance, Williamstown Township make a credit to provide access to Red Cedar River to offer a connection to regional river trail. This could possibly be worth one point but would need to be cleared with the USGBC first.

Total Points**69 points****XIII. LEGISLATIVE APPROACHES**

Several state, county, and city governments across the country are developing their own versions of green building programs (see Appendix 5). Many provide assistance and information to builders and designers to aid them in designing and building more energy efficient buildings. Some programs provide direct incentives such as New York and Arlington County, Virginia, while others are more aggressive like Boulder and the State of Michigan, and enact local building code ordinances to require a certain level of energy efficiency and environmental protection (Portney, 2003). Scottsdale, Arizona and Santa Monica, California utilize a combination of incentives and legislative action to promote sustainable development (City of Scottsdale, 2005; City of Santa Monica, n.d.). The following examples were chosen because they provide legislative initiatives that effectively promote green building by incorporating LEED standards in their local ordinances or master plan.

Michigan

In April 2005, Governor Jennifer M. Granholm issued an executive directive to make Michigan government more energy efficient and save taxpayers millions of dollars in energy costs. Executive directive No. 2005-4 directs the Department of Management and Budget (DMB) to reduce energy use in all state-owned and operated buildings by 10 percent by December 31, 2008 and to reduce grid-based state energy purchases by 20 percent by 2015. This requires the immediate adoption of an array of energy conservation improvements in lighting, heating, ventilation and air conditioning. Beyond mechanical improvements, this directive also requires that all new buildings for state agencies, universities, and community colleges with a cost of \$1 million or greater be LEED certified at some level (Executive directive, 2005-04). This effort is designed to ensure that state facilities are energy efficient in operation and maintenance and are designed to have minimal impact on the environment.

At the local level we see in Grand Rapids Mayor George Hartwell's "State of the City" address on January 15, 2005 a promise to request the City Commission adopt an ordinance requiring that all future municipal buildings be built to LEED certifiable standards and to explore the development of a LEED building code ordinance for non-municipal buildings to promote the construction of environmentally friendly buildings.

Boulder

The city of Boulder's Office of Environmental Affairs oversees the Green Points Program, which is similar to the LEED system in that it operates on a ranking system with points awarded for specific construction practices. The Program requires residential building permit applicants to earn green points for all new construction, additions, or remodeling projects greater than 500 square feet. Points are earned for practices exceeding the existing standards in Boulder's current

building code. The practices are grouped into ten main categories: Construction, Demolition, Use of Recycled Materials; Land Use, Water Conservation; Framing; Plumbing; Electrical; Windows, Insulation; Heating, Ventilating, and Air Conditioning (HVAC); Solar; Indoor Air Quality and Indoor Finishes; and Innovation Product or Design Points (City of Boulder, 2004). For more information contact the City of Boulder's Office of Environmental Affairs http://www.ci.boulder.co.us/environmentalaffairs/green_points/index.htm

Santa Monica

Santa Monica's Green Building Program outlines both recommended as well as required green building practices. The requirements apply to all institutional and commercial offices, light industrial buildings, commercial retail buildings, multi-family residences, hotels and motels and are outlined in two different City Ordinances, as well as the Municipal Code. The required and recommended practices were created to reduce life-cycle environmental impacts associated with the construction and operation of both commercial and municipal developments and major remodel projects in Santa Monica. They provide specific "green" design and construction strategies in the following topic areas: Building Site and Form, Landscaping, Transportation, Building Envelope and Space Planning, Building Materials, Water Systems, Electrical Systems, HVAC Systems, Control Systems, Construction Management, and Commissioning (City of Santa Monica, n.d.). For more information contact the Santa Monica Green Building Program <http://greenbuildings.santa-monica.org/index.html>.

Scottsdale

In March 2005, the Scottsdale City Council unanimously approved Resolution No. 6644, which established the Green Building Policy for new city buildings and remodels (See Appendix 6). The policy requires all new city buildings to be designed and built to achieve LEED Gold

certification. This action makes Scottsdale the first city in the nation to adopt a LEED Gold policy (City of Scottsdale, 2005).

The city already has a Green Building Program to encourage environmentally responsible and energy efficient residential developments in the Sonoran Desert region. The Program uses various incentives to encourage participation such as hosting lecture series, workshops, and special events; recognizing builders and designers on the city website; and expediting the development planning process (City of Scottsdale, 2005). The Green Building Program is similar to the LEED system in that it is voluntary and uses a green building point rating system to qualify projects. The program rates building projects in the following six environmental impact areas: Site Use, Energy, Indoor Air Quality, Building Materials, Solid Waste, and Water. With over 150 building options, Scottsdale's Green Building Program offers a great deal of flexibility in design (City of Scottsdale, 2005). For more information:

<http://www.ci.scottsdale.az.us/greenbuilding/>

New York

Public policy for the promotion of green or LEED certified buildings in the private sector has largely come in the way of incentives. In May 2000, the State of New York became the first state to offer a tax incentive package to developers who build environmentally sound commercial and apartment buildings. This innovative tax law -- or "green building credit" -- is aimed at encouraging the housing materials and construction industries to adopt green practices on a large scale by providing tax credits to building owners and tenants who invest in increased energy efficiency, recycled and recyclable materials and improved indoor air quality.

The green building credit allows builders who meet energy goals and use environmentally preferable materials to claim up to \$3.75 per square foot for interior work and

\$7.50 per square foot for exterior work against their state tax bill. To qualify for the credit, a building must be certified by a licensed architect or engineer and must meet specific requirements for energy use, materials selection, indoor air quality, waste disposal and water use. In new buildings, this means energy use cannot exceed 65 percent of use permitted under the New York State energy code; in rehabilitated buildings, energy use cannot exceed 75 percent. Ventilation and thermal comfort must meet specified requirements and building materials, finishes and furnishings must contain high percentages of recycled content and renewable source material and cannot exceed specified maximum levels of toxicity. Waste disposal and water use must also comply with criteria set forth in the new law.

Ten percent of the cost of ozone-friendly air-conditioning equipment, 30 percent of the installed cost of fuel cells and 100 percent of the cost of built-in photovoltaics (PV) solar panels may also be recouped through the green building credit. Fuel cells, which emit only carbon dioxide and water, and PV panels, which convert sunlight directly to electricity with no emissions, both carry high up-front costs compared to conventional energy delivery technologies (Natural Resource Defense Council, n.d.). For more information visit:

<http://www.nrdc.org/media/>

Arlington County

Other creative legislation has been implemented in Arlington County, Virginia. To encourage projects to achieve formal LEED certification from the U.S. Green Building Council, Arlington County has established a green building density incentive program. The program allows developers to request a slightly larger building than would normally be allowed by County Code if the project receives official LEED certification from the USGBC at one of the four LEED award levels. The extra space allowed varies depending on the project and on the

LEED award sought. Originally adopted in October 1999, the green building density incentive program was revised and enhanced in December 2003. The program applies to all types of building projects (office, high rise residential, etc.) achieving any one of the four LEED awards. The density bonus ranges from a minimum of .15 floor area ratio (FAR) for a LEED Certified project to a maximum of .35 FAR for a platinum project (DES, 2005). For more information visit: <http://www.arlingtonva.us/>

XIV. LEED BUILDING EXAMPLES

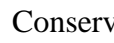
The LEED rating system offers a great degree of flexibility with its wide variety of ways to earn points toward certification. These examples were selected because they provide specific design activities that incorporate green building design standards. They were also chosen because elements of these design activities could be used by Williamstown Township.

Boston

The city of Boston has gone to great lengths to incorporate green building standards into public policy. Mayor Menino and the City of Boston not only intend to effectively foster an increase in green building, but to become a national leader in the field.

Several showcase models of green building achievements are now located in Boston. The Erie Ellington Homes is a new 50-unit, wood frame affordable housing development located in the Dorchester neighborhood. Through the team's unique systems approach, these energy-efficient high quality buildings were completed at an astonishingly low \$97 per square foot—or roughly 25% below typical area costs. After a year and a half of operation, actual data from occupants' utility bills show that the typical Erie Ellington home used 42% less space-heating energy, 27% less domestic water-heating energy, 40% less water, 59%

less electricity, and emitted 50% fewer air pollutants than comparable conventional homes (Green Building Task Force, 2004).

Boston's first municipal, green building was the George Robert White Environmental Conservation Center.  This 8,500-square foot building, leased to the Massachusetts Audubon Society for use as the base of operations for its Boston Nature Center and Wildlife Sanctuary, houses a variety of environmental and nature programs including an Urban Naturalist program for local Boston Public School students. From the beginning, the City of Boston wanted this project to address two complaints about green buildings: cost and architectural merit. The beautiful facility, now fully operational, was built for \$180 a square foot, well within the acceptable range for City projects. It utilized materials including: engineered wood timbers, wood from certified sustainable forestry operations, low volatile organic compounds (VOC) paints, low-emission recycled-content carpets, and locally quarried field stone. Photovoltaic roof shingles generate electricity, geo-thermal pumps create earth-generated heating and cooling, solar thermal panels heat water, and passive solar vine trellises provide summer shading (Green Building Task Force, 2004).

The cumulative effect of these technologies is a 40% energy savings as compared to traditional building operation. Indoor air quality benefits have proven better than anticipated. Because of the geo-thermal heating and cooling system, no hydrocarbons are burned on site. Within the tightly built structure, the lack of off-gassing from traditional carpeting and paints has resulted in an environment in which children with asthma report significantly improved breathing (Green Building Task Force, 2004).



Figure 1: George Robert White Environmental Conservation Center
http://www.massaudubon.org/Nature_Connection/Sanctuaries/Boston/green/index.php

Boston's continued support for promoting green building development is highlighted in its own 10-point action plan (See Appendix 7). As a result of this plan green building LEED training is available to city employees across 9 departments, technical assistance is provided in the development process and loan funding is made available in the predevelopment phase. Legislation has been supported requiring local utilities to meet new interconnection standards that allow projects to incorporate distributed generation such as photovoltaic cells and onsite combined heat and power generation units. The City continues to work with the Distributed Generation Collaborative and with the commonwealth's Department of Telecommunications and Energy to develop consensus on these standards and the role of distributed generation in the distribution of electric power (Green Building Task Force, 2004).

Michigan

Michigan is home to several examples of green building innovation. A variety of notable benefits are being realized through design practices and adoption of LEED standards. The Michigan Department of Environmental Quality (DEQ) completed its new Southeast District Office in Warren, Michigan in 2005. The simple actions the DEQ building utilizes include the use of natural daylight and lighting fixtures that use zoned automatic sensors and timers. The

open floor plan of the building with its minimal floor-to-ceiling partitions utilizes sunlight that penetrates the large windows on the exterior of the building. Other simple techniques for energy efficiency include automated controls for the Heating, Ventilating, and Air Conditioning (HVAC) systems and a tankless water heater that heats water only on demand, rather than continually. Stormwater is collected from the roof and parking lot and stored in an underground retention vault. Some of this stormwater is used for irrigating the landscape plants that have already been selected for their low requirement of irrigation and maintenance in hot dry summers.

A unique feature of the building is its white membrane-covered roof. The reflective nature of the white roof minimizes the need for air-conditioning on hot summer days by reflecting rather than absorbing the heat of sunlight. Although the uninformed visitor will not detect most of the energy efficient technologies utilized, the DEQ has already begun to see reduced energy usage and savings benefits. In total the DEQ expects to reduce their overall energy usage by 35% (Urban Catalysts, 2005).



Figure 2: MDEQ White Roof (Urban Catalysts, 2005)



Figure 3: MDEQ Open Floor Plan (Urban Catalysts, 2005)

Another successful approach in reaching higher energy efficiency is found at the Malletts Creek Library Branch in Ann Arbor. The building utilizes several energy efficiency techniques and technologies, ranging from simple methods to calibrated systems-monitoring devices. Principally, the building design capitalizes on its solar orientation for both solar heating and use of natural light. Several techniques fully capture these natural benefits; for example, dark-stained concrete floors in key areas capture heat from the winter sun to contribute to the building's thermal mass. To counter the intense heat from the summer sun and minimize traditional AC-unit reliance, motorized awnings and sunshades extend to shade the building's interior. Also, light level sensors minimize the use of artificial light when outside sunlight is at sufficient reading levels.

The building also utilizes convection cooling with its four large chimney-like roof structures. These structures conduct the circulation of natural air into the operable windows, through the building, and out the top of the chimneys. This method of ventilation reduces the use of forced-air circulation systems and meets indoor air quality requirements. In winter when the chimneys are closed, motor fans located inside the chimneys re-circulate trapped heat.



Figure 4: Malletts Creek Library, Ann Arbor, MI (Urban Catalysts, 2005)

The building's heating system is a circulating hot-water radiant system in the flooring units. This highly efficient system produces consistent warmth for the entire building and eliminates the noise from a traditional forced-air system. The vegetated green roof contributes to thermal mass, insulating the building from extreme temperatures, thereby reducing the load on heating and cooling units. R-value is a unit of thermal resistance used for comparing insulating materials; the higher the R-value the material, the greater it's insulating properties. The R-value of a conventional roof is R-19; the Malletts Creek Library green roof has an R-value of R-30 (Urban Catalyst, 2005).

Going beyond cost cutting measures for energy use is the installation of energy harvesting equipment in green building design. Zeeland West High School in Zeeland, Michigan has a collection of equipment that decreases dependence on purchased electric and gas power. A geothermal exchange system under a practice field provides a consistent source of winter heating and summer cooling. Photovoltaic panels generate power from sunlight. A 10kw, 23-foot diameter wind turbine atop an 85-foot tower on the school's property converts wind power into electricity reducing electric cost for the school district by \$1,200 each year.

The combined measures have not only made Zeeland West H. S. a more comfortable facility than Zeeland East H. S. but have allowed them to shift many programs to this new building, extending the operating hours but still having 25% less energy consumption than other schools of similar use (Urban Catalyst, 2005).

Green buildings reduce the impact on the natural environment in several ways. Use of renewable wood and recycled content materials is encouraged as well as conscientious construction methods that divert tons of waste material from landfills and minimize site disturbance (Urban Catalyst, 2005).

Stormwater management is a major concern that green buildings address. The Mallets Creek Library mentioned earlier, not only employs a green roof as a way to add to the building's insulation or thermal mass but it aids in stormwater absorption. Eight varieties of sedum plants and 3.5" of growing medium reduce runoff by up to 50% with zero runoff in light rain. Careful site grading, a vegetated swale and bioswales reduce the risk of soil erosion and runoff. The grading of the site allows stormwater to travel the longest possible distance on the surface of the site along a vegetated swale before reaching the retention area. The stormwater that has not evaporated, infiltrated or been taken up by vegetation, will then flow into a bioswale (Urban Catalyst, 2005).

A bioswale is a depression in the land designed to capture and infiltrate the remaining stormwater by utilizing appropriate vegetation planted on the bottom and side slopes. Bioswales within the library parking lot collect stormwater and deal with the sediment and pollutants that parking lot runoff carries with it. They are designed to capture a maximum of 6" of stormwater runoff, which handles the first flush of most storm events. This first flush is the stormwater that falls at the beginning of a storm event and contains the most polluted water that flows into conventional systems. By capturing and cleaning this water, this system controls much of the overall water quality of stormwater that is discharged into Mallets Creek (Urban Catalyst, 2005).

Preservation of open space and effective site planning are other items on the list of green building priorities. With the large proportion of open space (greenfields) in Williamstown Township, this set of priorities would be of greater importance. Building practices that address these issues are exemplified in the Bailey's Grove development in Kentwood, MI, developed by Eastbrook Homes of Grand Rapids (Urban Catalyst, 2005).

This award winning, mixed-use community consists of 364 acres, 1000 homes and condominiums and 45 acres of wooded open space. The goal of this project was to develop and build a unique community with modern amenities that respected and incorporated the natural surroundings. Site planning and integrated design were crucial to Bailey's Grove. The development plan relied heavily on natural environment inclusion, and significant time was spent surveying the land and its natural features. As part of the preservation efforts a Natural Features Inventory was taken to determine what needed to be saved, with special attention paid to saving the existing trees on the site and moving those that would be in the way of houses elsewhere on the property. In total, 1,000 trees were uprooted and moved to other locations on the site. Preserving existing trees both saved money and preserved the rural atmosphere desired by the developers of Bailey's Grove. In 2003, Bailey's Grove won the prestigious "Building with Trees Award of Excellence," an award presented annually by the National Arbor Day Foundation to developers who employ environmentally friendly techniques to complement the natural surroundings.



Figure 5: Bailey's Grove Development, Kentwood, MI (Urban Catalysts, 2005)

Another important natural preservation goal was wetland protection. Originally, there were almost 10 significant wetlands on the property, all of which were integrated into the overall

design. In addition, the development team designed a massive wetland on the property to attract birds and create species habitat. The wetlands act as a natural stormwater system and their integration into the development assists in the overall goal of natural preservation (Urban Catalyst, 2005).

Compared to traditional new developments projects, Bailey's Grove incorporates proportionally more green space alongside smaller streets and more pedestrian-friendly sidewalks. This example of cluster development designed to have an average of 4 units per acre, placed more homes on less land than typical developments and saved on acquisition and infrastructure costs (Urban Catalyst, 2005).

Environmental preservation is often viewed as a hindrance to development, whether it is in an urban, suburban, or rural setting. The Bailey's Grove development demonstrates how environmental preservation and sensitivity can coexist with development. Furthermore, not only are they not mutually exclusive, but integrating components of nature and conservation as a marketing tool helps sell homes and retain customers (Urban Catalysts, 2005).

XV. RECOMMENDATIONS

A variety of approaches were discussed to illustrate the myriad of ways that wise growth and LEED standards can be utilized and implemented to address issues of urban sprawl and energy conservation. To aid Williamstown Township in achieving their goals to retain the natural features of the land, maintain open space, and preserve farmland while allowing for well-planned, low-density, residential and commercial development the MSU policy team offers the following recommendations:

- **Require new development within the Grand River Corridor to meet LEED gold level certification-** This will enable the Township to have a feasible option for development in the area, while allowing builders to increase the level of certification if they so desire.
- **Incorporate LEED rating system into Master Plan for future developments-** By incorporating the LEED gold level certification into the master plan, the Township is better able to steer development to areas with the least amount of environmental impact. Having the standards outlined in the master plan allows for future utilization of conditional zoning meeting Township goals by documenting the intent of the Township to promote sustainable development.
- **Utilize overlay zones requiring LEED gold level certification for specific areas sensitive to development-** Use of an overlay zone requiring LEED gold level certification developments along the Grand River Corridor would provide immediate protection of valuable open space. Once the benefits of green building are seen along the Corridor, the Commission may want to look into utilizing overlay zones in other environmentally sensitive areas of the Township.
- **Research Conditional Zoning Act to determine applicability to Township goals-** Recent laws now allow Williamstown Township to “approve rezoning subject to voluntary conditions offered by the applicant” (McKenna, 2005). This gives the Township the flexibility to tailor rezoning requests to specific projects in order to minimize the negative environmental impacts (McKenna, 2005).

XVI. CONCLUSION

Williamstown Township has demonstrated unique and innovative leadership in being an early adopter of open space preservation ordinances, providing for the Purchase of Development Rights program, and adopting a mixed use overlay district for the eastern section of Grand River Avenue. But more needs to be done to reduce sprawl and unsustainable growth in the area, particularly along the western portion of the Grand River Corridor.

The goal of the township is to promote sustainable development and maintain the natural beauty and environmental integrity of the area. As outlined in the brief, one way to accomplish this goal is through adopting LEED standards, which can be applied to new development in the area, both commercial and residential. These standards will attract businesses and developers

that share the goals of Williamstown Township and will help to keep the rural feel and sense of community in the area.

Incorporating them into the master plan of the entire township can augment the effectiveness of LEED standards. Williamstown Township could use overlay zones to require all development in that zone to adhere to LEED standards. These zones could be applied to the development along the Corridor as well as throughout the Township.

Promoting sustainable development in the area through the recently passed conditional zoning act would allow the Township to act as a gatekeeper, picking and choosing only desired development projects. Implementing these development standards and promoting sustainable development will cause Williamston Township to be viewed as a progressive innovator whose practices curb the negative effects of urban sprawl experienced by so many other communities, creating a more attractive place to live, and increasing the quality of life for all residents.

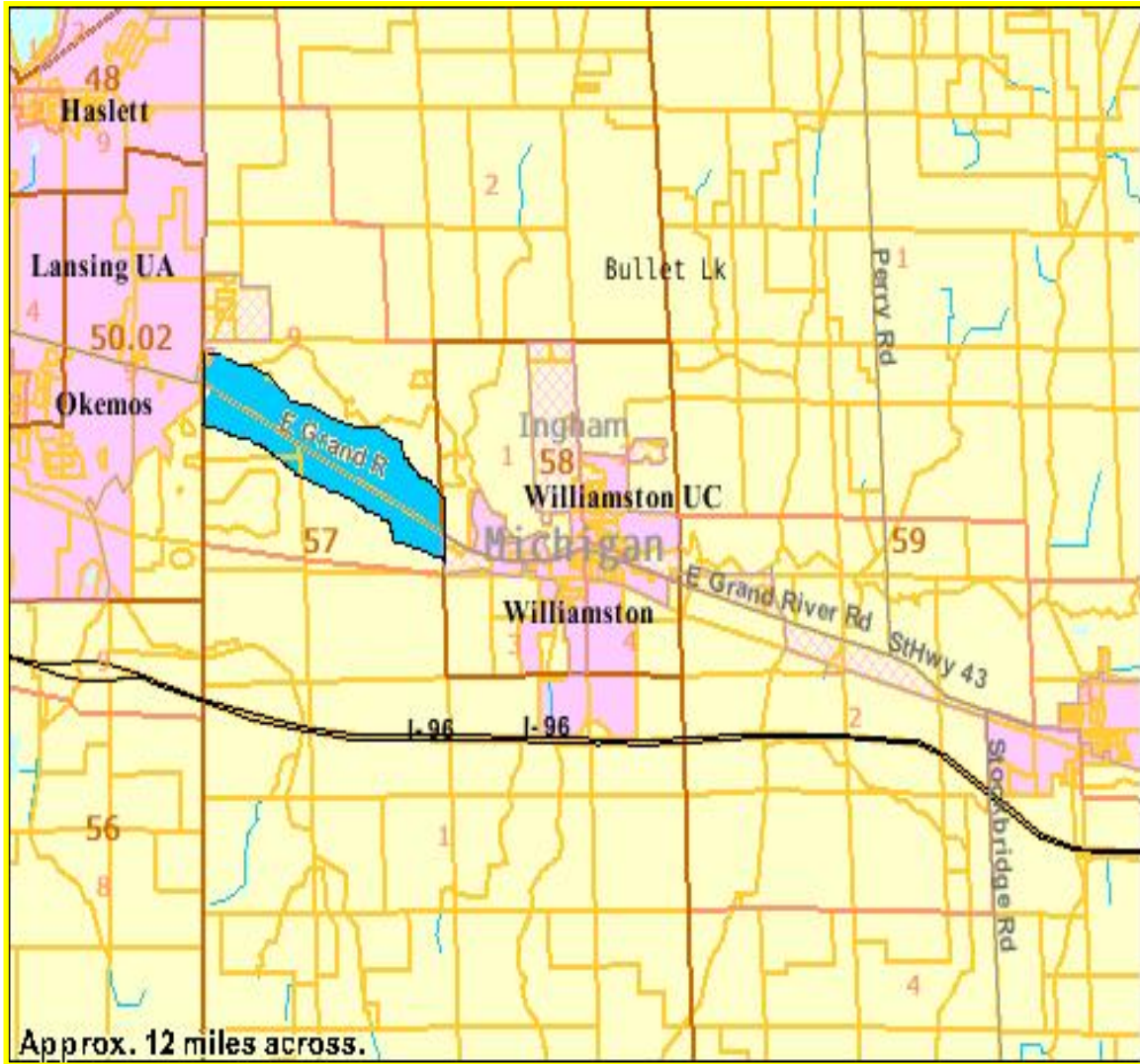
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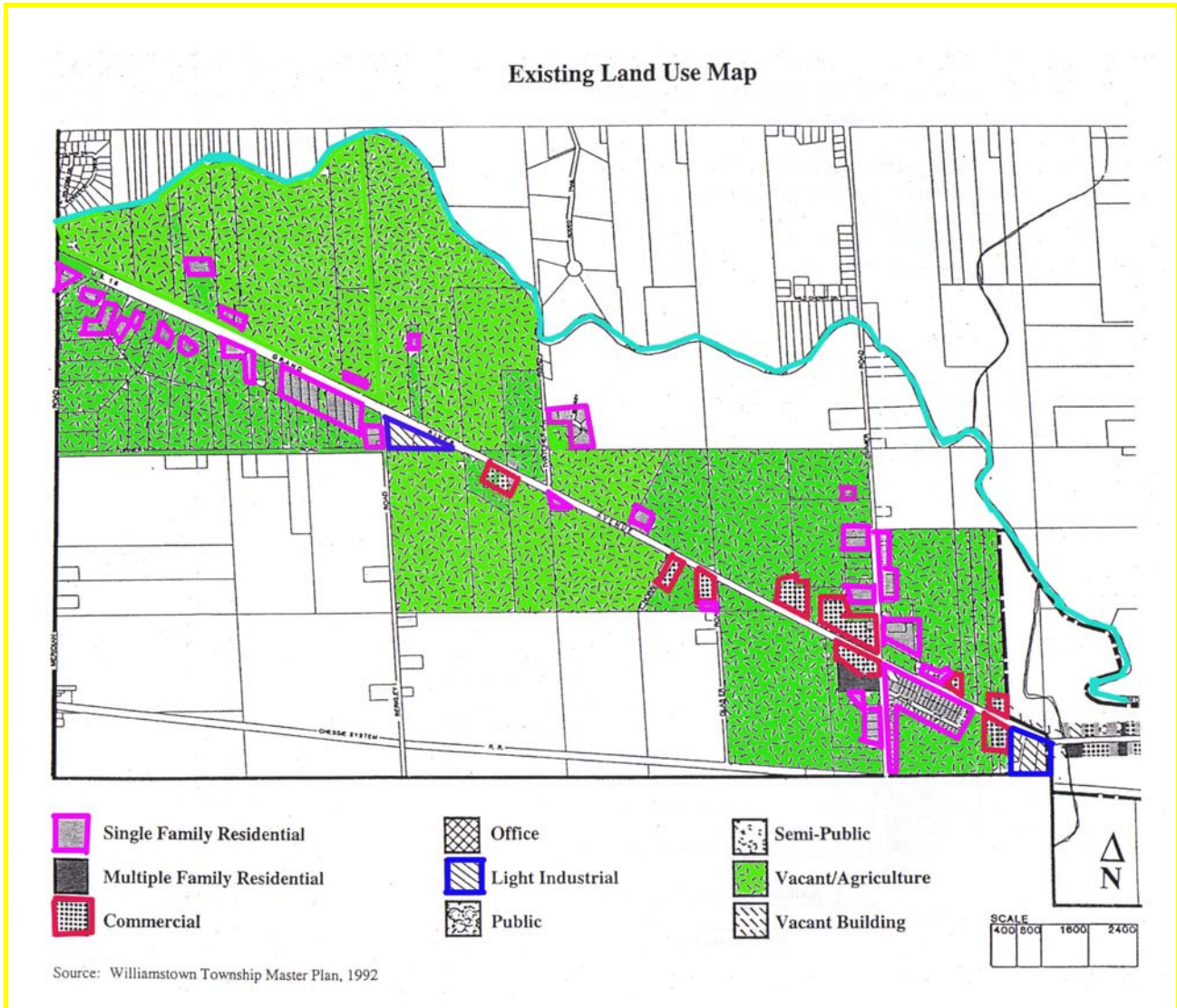
APPENDIX 1

GRAND RIVER CORRIDOR (HIGHLIGHTED IN BLUE) MAP



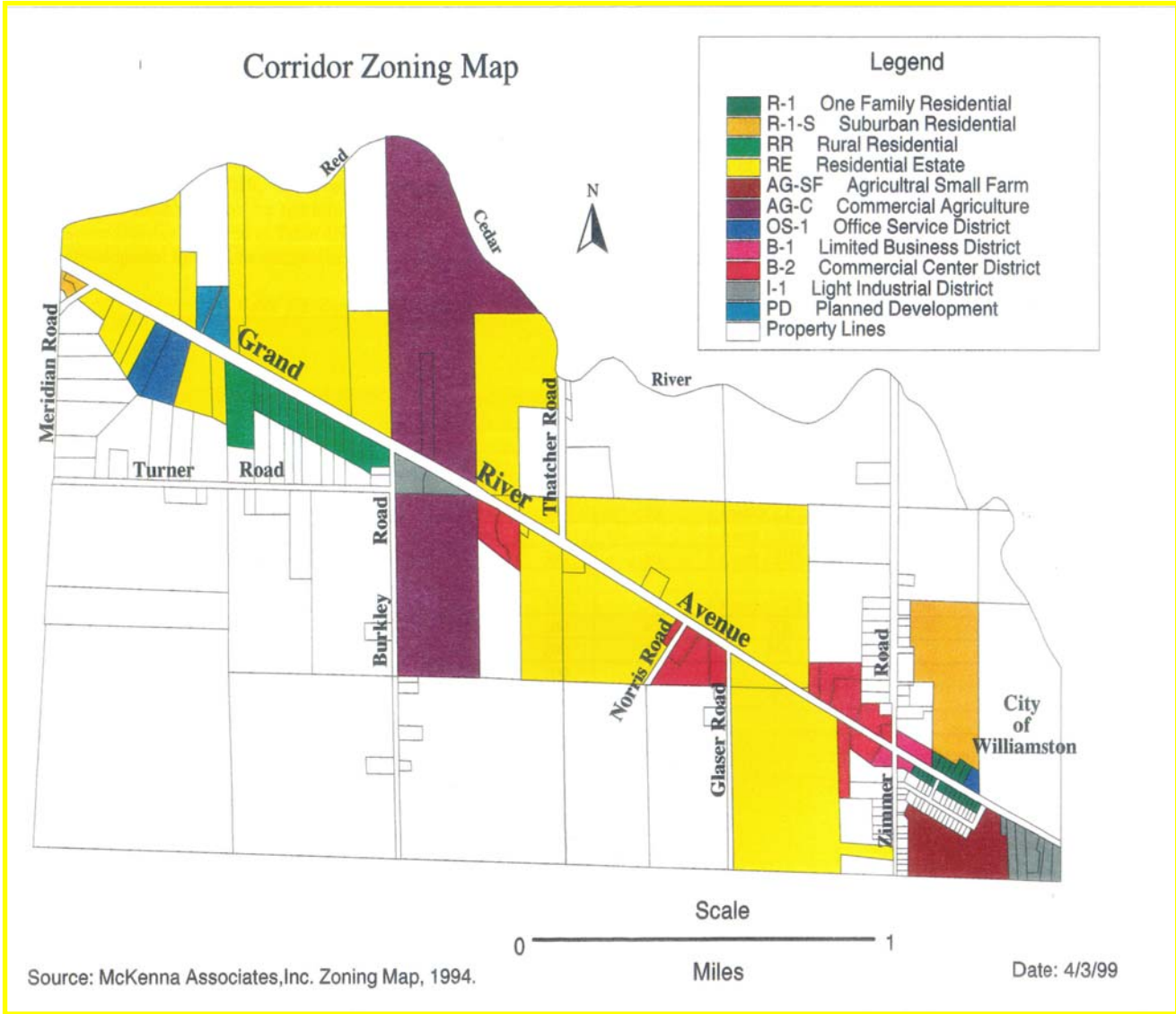
APPENDIX 2

GRAND RIVER CORRIDOR EXISTING LAND USE MAP



APPENDIX 3

GRAND RIVER CORRIDOR ZONING MAP



APPENDIX 4

LEED CERTIFICATION PROCESS (US Green Building Council, 2005)

Steps	Activity
Determine Eligibility	Commercial Buildings Unique Buildings use LEED Rating System checklist
Register Project	Perform during early phase of project design Establish contact with USGBC
Documentation	Compile three ring binder and/or compact disc Submit two copies and fee
Credit Interpretations For Questions	Consult LEED Reference Guide Review LEED Credit Interpretations Rulings page Submit new Credit Interpretations Request online
Certification	Satisfy prerequisites and minimum points for desired LEED rating

APPENDIX 5

U.S. GREEN BUILDING PROGRAMS

<p>ARIZONA Scottsdale, AZ</p>	<p>MARYLAND State of Maryland</p>	<p>NORTH CAROLINA State of North Carolina</p>
<p>CALIFORNIA State of California Alameda County, CA Berkeley, CA Chula Vista, CA Los Angeles, CA Morro Bay, CA Oakland, CA Orange County, CA Palo Alto, CA San Diego, CA San Francisco, CA San Jose, CA Santa Barbara County, CA Santa Monica, CA Sonoma County, CA Ventura County, CA</p>	<p>MASSACHUSETTS Boston, MA</p> <p>MICHIGAN State of Michigan Washtenaw County, MI</p> <p>MINNESOTA State of Minnesota Dakota County, MN Hennepin County, MN</p> <p>MISSOURI State of Missouri</p> <p>NEBRASKA Wahoo, NE</p>	<p>OREGON State of Oregon Portland, OR</p> <p>PENNSYLVANIA Commonwealth of Pennsylvania</p> <p>TEXAS Austin, TX</p> <p>UTAH State of Utah</p> <p>VIRGINIA Arlington County, VA</p>
<p>COLORADO Boulder, CO Denver, CO</p>	<p>NEW JERSEY State of New Jersey</p> <p>NEW MEXICO State of New Mexico</p>	<p>WASHINGTON State of Washington Clark County, WA King County, WA Kitsap County, WA Seattle, WA</p>
<p>FLORIDA State of Florida Dade County, FL</p>	<p>NEW YORK State of New York New York City, NY</p>	<p>WISCONSIN State of Wisconsin</p>

APPENDIX 6

SCOTTSDALE LEED RESOLUTION

RESOLUTION NO. 6644

A RESOLUTION OF THE MAYOR AND CITY COUNCIL OF THE CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA, ADOPTING THE CITY OF SCOTTSDALE GREEN BUILDING POLICY.

Section 1. That the Scottsdale City Council hereby adopts the "City of Scottsdale Green Building Policy." This policy reflects the City's commitment to encouraging environmentally sensitive construction practices in the City of Scottsdale by adopting construction practices inspired by both the Leadership in Energy and Environmental Design (LEEDTM) certification process and the City of Scottsdale Green Building Program.

Section 2. That the Scottsdale City Council hereby declares that all new, occupied (as defined by the City's building code) city buildings, of any size, will be designed, contracted and built to achieve the LEEDTM Gold certification level, and to strive for the highest level of certification (currently Platinum) whenever project resources and conditions permit.

Section 3. That the Scottsdale City Council hereby declares that all future renovations and non occupied (as defined by the City's building code) city buildings will be designed, contracted and built to include as many principles of both the LEEDTM program and the City's Green Building Program as are feasible.

Section 4. That the Scottsdale City Council, to maintain tight control over the cost of city building projects, qualifies the above Section 2 of this Green Building Policy to require a pay back period of no more than five (5) years for projects designed to the LEEDTM Gold Standard. Where the payback is anticipated to be more than five (5) years, City staff is directed to recommend to the City Council which level of LEEDTM certification is appropriate for that particular project. If no level of LEEDTM certification is feasible, then the project under consideration shall include as many principles of both the LEEDTM program and the City's Green Building Program as are feasible.

Section 5. The City Council may grant exceptions to this Policy when it deems appropriate.

http://www.ci.scottsdale.az.us/greenbuilding/LEED/LEED_ResNo6644.pdf.

APPENDIX 7

NEXT STEPS FOR BOSTON—A 10-POINT ACTION PLAN

LEED by example: The City of Boston should adopt LEED Silver as the design and construction standard for the renovation and new construction of all City facilities including USGBC Certification, thereby building on the success of its three existing high performance green buildings.

Require LEED Certifiable for City-supported projects: The City of Boston should require LEED Certifiable as the design and construction standard for all new construction and major renovation projects receiving City funding or land, including land disposition and RFPs. USGBC LEED Certification should be encouraged but not required.

Amend Article 80 to require LEED Certifiable: The City of Boston should amend Article 80 of the Boston Zoning Code to require LEED Certifiable as the design and construction standard for all projects undergoing large and small project review. USGBC LEED Certification should be encouraged but not required.

Craft a three year implementation work plan: To allow for public notice, staff development, and changes in professional and industry practice, the Task Force recommends that the City develop a work plan that brings these goals into full implementation within three years.

Provide training for City employees: The City of Boston should make Green Building LEED training available for City employees across nine different departments, including the BRA, DND, ISD, Schools, Mayor's Office, and Environment. This will allow these employees, and the City as a whole, to better assess and assist projects at every stage in the planning, design and review process.

Provide technical assistance: The City of Boston, in partnership with the Green Roundtable, should offer technical assistance to projects in order to help developers make good decisions at the earliest stages of planning their projects.

Provide predevelopment funding: The City of Boston should create a Green Building Pre-development Loan Fund to promote green project design and planning. Loans should be repaid at construction finance closing, and the program should sunset once common practice has shifted.

Residential assistance: The City of Boston should initiate efforts to bring the benefits of green building to both newly constructed and existing residential buildings by creating a "Green House Doctor" program to provide technical assistance to homeowners and residential contractors.

Residential recognition: The City of Boston should initiate efforts to increase public awareness about the benefits of high performance green building for residential buildings by establishing a signature City of Boston "Green Home" standard to recognize best practices and design innovation in residential construction and renovation.

Distributed generation: The City of Boston should support legislation requiring local utilities to meet new interconnection standards that allow projects to incorporate distributed generation such as photovoltaic cells and onsite combined heat and power generation units. The City should continue to work with the Distributed Generation Collaborative and with the Commonwealth's Department of Telecommunications and Energy to develop consensus on these standards and the role of distributed generation in the distribution of electric power.