

.....The City of Hilliard Sustainability Plan.....



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Student Team Members

STUDENT TEAM MEMBERS:

Brent Albrecht

Alexis Dunfee

Daniel Barbato

Christopher Germain

Rachel Beck

Melissa Lindsjo

Sarah Becker

Kyle May

Miaoyun Zhou

Nicholas Benson

Victoria Proehl

Erika Braunginn

D.W. Routte

Shaquitta Brookins

Edward Stockhausen

Timothy Brown

Joseph Wingefeld

Brady Carlucci

INSTRUCTOR:

Dr. Maria Manta Conroy

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Introduction

“Too often we think that the sole forces shaping our cities and suburbs are impersonal market factors or technical expertise, forgetting that the most important aspects of our lives are often the outcome of other social, political, psychological, or spiritual dynamics.”

~ Carl Anthony ¹

General Background

Sustainable development has deep roots in American culture. Its environmental foundation can be traced back to the works of Henry Thoreau, Walt Whitman, and other literary giants of the mid to late 19th Century who promoted reverence towards nature while the rest of the nation was buried in the business of urbanization and westward expansion. Though the establishment of the Sierra Club and the National Park Service around the turn of the 20th Century show that environmental protection was part of the public consciousness, it was not yet firmly cemented in public life until the 1962 publication of Rachel Carson’s *Silent Spring*. ² This book both inspired and infused the social movements of the next two decades with environmental concern. ³ Academics, practitioners, politicians, and the general public soon began to debate the visible conflict between environmentalism and traditional economic development.

In this context, sustainable development entered the world stage with greater recognition, legitimacy, and fanfare. In 1987 the United Nations’ World Commission on Environment and Development and its chairwoman, Norwegian Prime Minister Gro Harlem Brundtland, published *Our Common Future*. ^{4,5} The seminal report famously defined the term “sustainable development” as that which “meets the needs of the present without



INTRO & INDICATORS

compromising the ability of future generations to meet their own needs.” ⁶ This definition, as the Chairwoman made clear in her foreword to the report, did not limit sustainability to environmental issues. As she explained, “the ‘environment’ is where we all live; and ‘development’ is what we all do in attempting to improve our lot within that abode. The two are inseparable.” ⁷

The Brundtland Report also recognized that economic production must be accountable to protecting the environment and to issues of social equity necessary to minimize human suffering. These values have commonly been referred to as the “three Es” of sustainable development: environment, economy, and, equity. ⁸ Balancing them is a dynamic process with perennial

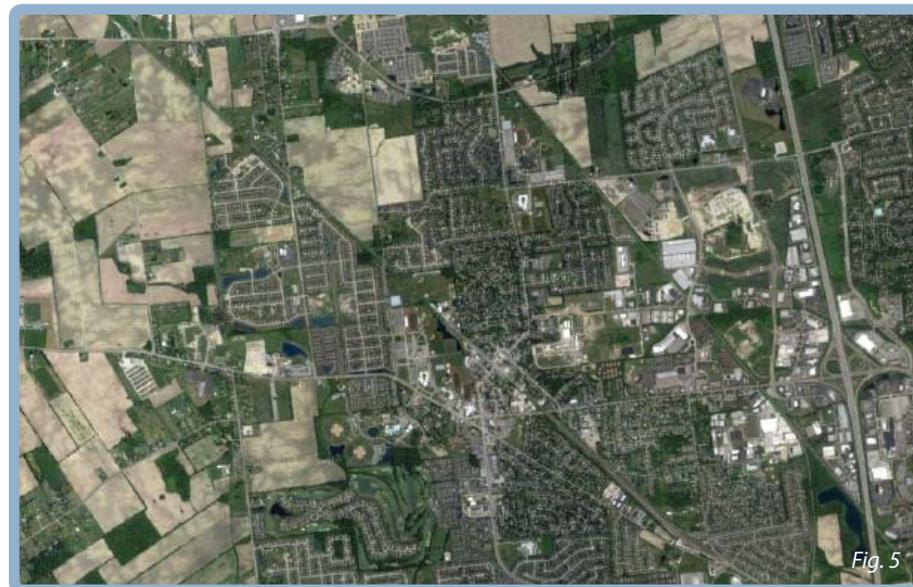


Fig. 5

» The City of Hilliard encompasses 11 sq. miles northwest of the City of Columbus. The following image is courtesy of Google.

complications, but it is achievable at all levels of government and society.

The objective of this document is to complement Hilliard’s Comprehensive Plan by adding a level of analysis that considers these three values. This, in turn, will empower the city’s residents, businesses, and government to realize a more sustainable Hilliard.

Study Purpose and Scope:

Hilliard was established in 1853 as a stop along the Piqua and Indiana Railroads. For nearly a century local agricultural goods were moved throughout the region via train, and the town thrived on agriculture and railroad business. The decline of train shipping and the construction of Interstate 270 in the 1960s and 1970s significantly altered the area’s focus of development. Commercial growth shifted away from Old Hilliard and towards Interstate 270. This shift represented Hilliard’s transition from an outlying agricultural community to a Columbus suburb.¹⁰ Development increased rapidly during the 1980s and 1990s, only to be cooled by the Great Recession and its lingering effects on the economy.

As government officials and residents consider the opportunities for future development in their municipality, they are actively seeking ways to make Hilliard a “lifelong community.” This sentiment was expressed to the study group by Mayor Don Schonhardt, Councilman Albert J. Iosue, and Environmental Sustainability Commission Chair Carrie Stanley Davis.^{11,12} Over the last several years, the City has been working to provide additional infrastructure and amenities to support and serve its established residential areas and commercial districts. Additionally, Hilliard’s elected representatives recently commissioned a Comprehensive

Plan to unify its visions for land use, thoroughfares, and sewer and water utilities. The Comprehensive Plan frequently refers to quality of life issues in the City, and it specifically notes that the lack of housing diversity provides few options for young adults and empty-nesters who would like to continue residing in the City but cannot secure homes that fit their needs and budgets.¹³ Sustainability neatly complements the theme of a lifelong community because it promotes community longevity. Balancing issues of ecology, economics, and equity will nurture the growth of a community that supports and provides for its residents at all stages of the life cycle.

In its role as an advisory body to the Hilliard City Council, the Hilliard Environmental Sustainability Commission asked Associate Professor Maria Manta Conroy to develop a sustainability action plan for the city. Professor Conroy and 18 graduate students from The Ohio State University wrote the sustainability action plan over a 10-week period in the winter term of 2012. To guide their efforts, the following definition of a sustainable Hilliard was crafted from existing literature and input from the community:

A sustainable Hilliard is committed to responsible land use, equitable social and economic development, and the mitigation of negative environmental impacts. Through building effective connections with residents, businesses, and the broader Central Ohio region, Hilliard will guide the community’s long-term development in a sustainable direction. Investing in sustainability will create jobs, enhance quality of life, protect the natural environment, and distinguish Hilliard as a leader in Central Ohio.

This document explores the outcomes of their research and analysis. The plan highlights the strengths and opportunities found in Hilliard, along with indicators for monitoring the community’s progress toward achieving sustainability and policy recommendations.



Fig. 6

» Hilliard residents have access to a number of quality park spaces including Homestead Park on the City’s western border.

A sustainable Hilliard is committed to responsible land use, equitable social and economic development, and the mitigation of negative environmental impacts.

Study Methodology

The 10-week study began with a discussion of sustainability and how it could be tailored to Hilliard's residents, businesses, and government. In order to conduct their research efficiently and within the constraints of time and labor resources, students were divided into three groups representing key areas of concern for the city: Land Use and Urban Ecology, Energy and Waste Reduction, and Economic Development and Social Equity. Mayor Schonhardt and John Hsu, a member of the Environmental Review Appeals Commission and Vice Chairman of the Hilliard Environmental Sustainability Commission, hosted a tour of the city for the students on January 11, 2012. During the tour, Mayor Schonhardt highlighted successful road and transportation projects, the location of Hilliard School District land and buildings, new residential development projects, and community amenities.

With these thoughts in mind, the three student teams formulated vision statements and related goals for each topic. These vision statements are rooted in the definition of a Sustainable Hilliard and provide insight into how each group's focus areas would be affected by the pursuit of sustainability.

The student groups also produced lists of indicators that would be used to track progress towards achieving sustainability goals and recommendations. These indicators were designed to be effective measures of communication for describing and quantifying changes in the community's behaviors.

On the evening of February 8, 2012, the students hosted a community forum at the Hilliard City Council Chamber to present their finalized indicators and to solicit community feedback. The forum was attended by 17 individuals, including Council members, the Mayor, City staff, members from the Environmental Sustainability Commission, and Hilliard residents.

This forum gave Hilliard residents a meaningful and direct way to interact with the students, and it helped the students tailor their research to the needs of the community.

Teams conducted opportunity assessments to research and analyze community strengths and existing conditions so that they could identify opportunities for improvement, while also recognizing the obstacles that could preclude advances toward sustainable development. Students' work combined information from the Hilliard Comprehensive Plan, surveys, reports, and utility data with the help and insight of elected leaders, City employees, and engaged citizens.

The completed opportunity assessments provided direction and guidance for each group as they began to write sustainability analyses for their respective areas of study. Each sustainability analysis contained recommendations that were linked to indicators, fiscal considerations, and real examples elsewhere in the country. Recommendations were categorized according to Hilliard's anticipated ability to achieve them in the short, medium, and long term.

» The city of Hilliard was settled along the Pique and Indiana railroad in the 1870's. The city has since grown to a more than 28,000 residents in 2010.



Fig. 7

In addition to the February 8th meeting, the community was invited to contribute insights through a survey, which was developed by the students and made available online for all Hilliard residents. Residents and civic leaders also reviewed and commented on the student's work through Basecamp, an online project management application. Information was often gathered from in-person interviews and conference calls with representatives from utility and service providers, community interest groups, and other stakeholders. A complete list of meetings and telephone conversations is detailed below:

1. January 25, 2012: Energy and Waste Reduction meeting with Hilliard Engineering Division.
2. January 25, 2012: Land Use and Urban Ecology meeting with Hilliard City Planner John Talentino.
3. February 1, 2012: In-class meeting with Hilliard Councilman Iosue, John Hsu of the Environmental Review Commission, and Carrie Stanley Davis, Chairwoman of the Hilliard Sustainability Commission.
4. February 8, 2012: Public Meeting at Hilliard City Hall to present initial findings and draft indicators.

Report Organization

This report is divided into four additional sections. The following three sections are dedicated to our topic areas of study: Land Use and Urban Ecology, Energy and Waste Reduction, and Economic Development and Social Equity. Each has been prepared in four parts: a vision statement, indicators, opportunity assessment, and sustainability analysis. The last section of this report contains our conclusions.

Indicators

In order to move our communities, the nation, and the world towards sustainability, we need tools that measure and communicate progress towards the social, environmental, and economic goals that we aim to achieve.¹⁴ These tools are known as indicators, and indicators of sustainability provide professionals and the public with evidence of current conditions or problems related to equity, the environment, and the economy.¹⁵ Just as they can help measure progress, they can also warn us of impending economic, social, and environmental problems.¹⁶

Since the Brundtland Report's publication in 1987, organizations at the international, national, regional, state, and local levels have been creating and compiling many lists and a variety of indicators to document and illustrate changes related to sustainability. There exists an entire literature of academic, professional, and civic entries dedicated to the study of sustainability indicators.

Academics and professionals often focus their discussion of indicators on characteristics. For example, indicators can be qualitative or quantitative depending on what they measure and how that measurement is recorded. Quantitative indicators measure precise quantities and variables, such as the average human's normal body temperature of 98.6° F (a sign of health and the body's ability to maintain homeostasis) and the number of pharmaceutical compounds found in drinking water (a sign of chemical pollution).¹⁷ Qualitative indicators, on the other hand, do not measure an exact quantity but are indicative of conditions. Qualitative indicators would include the suffocation of a canary in a mineshaft (as evidence of increasing levels of toxic gases) and the return of wild salmon to spawning areas in certain watersheds (as used by Sustainable Seattle to measure ecosystem

health).¹⁸

Another perspective on indicators advances the qualitative/quantitative dichotomy and classifies indicators according to top-down and bottom-up methodologies.¹⁹ Whereas top-down indicators are often developed by experts who are interested in quantifying the complex set of relationships that exist in dynamic systems, bottom-up indicators are developed in a participatory, community-based manner that emphasizes local context and the community's goals, priorities, and learning.²⁰

Neither system for classifying indicators, however, is mutually exclusive or exhaustive. With careful thought and planning, we can create indicators that combine qualitative and quantitative measures and that integrate the best elements of top-down and the bottom-up methodologies in order to better serve all stakeholders. One such example is the "sneaker index," which is used in Chesapeake Bay, Maryland. This index measures how deep water has to be until white running shoes are no longer visible.²¹ Community groups have used it for the last two decades, and it is part of a more comprehensive and technical watershed assessment that feeds into federal EPA monitoring.²²

Of course, there are a number of other ways to create, classify, and characterize sustainability indicators. Table 1 details many of the criteria that can be used to evaluate them:

» Old Hilliard, along Main Street, is the common center of the City. Several long-term small businesses serve as an anchor for growth.

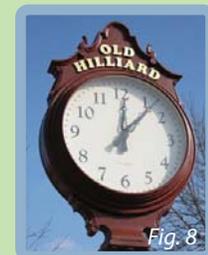


Fig. 8

Objectivity criteria	Ease of use criteria
Be accurate and bias free	Be easily measured
Be reliable and consistent over space and time	Make use of available data
Assess trends over time	Have social appeal and resonance
Provide early warning of detrimental change	Be cost effective to measure
Provide timely information	Be clear and unambiguous, easy to understand and interpret
Be scientifically robust and credible	Simplify complex phenomena and facilitate communication of information
Be verifiable and replicable	Be limited in number
Be relevant to the local system/ environment	Use existing data
Sensitive to system stresses or the changes it is meant to indicate	Measure what is important to stakeholders
Have a target level, baseline, or threshold against which to measure them	Be easily accessible to decision makers
	Be diverse to meet the requirements of different users
	Be linked to practical action
	Be developed by the end-users.

» Source: Reed, M. S., Fraser, E. D., & Dougill, A. J. (2006). *An Adaptive Learning Process for Developing and Applying Sustainability Indicators with Local Communities. Ecological Economics*, 59, 406-418.

Despite the work that goes into creating and managing indicators, their usefulness is limited. In its "Neighborhood Sustainability Indicators Guidebook," Minneapolis' Urban Ecology Coalition warns that "indicators offer a snapshot or a glimpse of a larger situation,

but don't offer absolute understanding... [They] can help measure change over time, but don't measure end objectives." 23 It is important to remember that indicators, like the odometer on a dashboard, are instruments that help measure and calibrate progress towards the destination of sustainability, but they are not the vehicles for arriving there.

For the Sustainable Hilliard Plan, Professor Conroy and the student teams chose to evaluate the community using locally relevant sustainability indicators. Each team (Land Use and Urban Ecology, Energy and Waste Reduction, and Economic Development and Social Equity) researched indicators that represented their particular areas of study. Preliminary lists of indicators were presented to Hilliard residents and elected officials at the February 8, 2012 meeting. Opinions and recommendations from that meeting were used to ensure that the final set of indicators would promote the community's vision for itself.

Indicators are described in three sections: background, measure, and description. The background section describes the indicator and its usefulness in measuring sustainability. Issues which may affect the success or failure of the indicator are also discussed in this section. The measure section details the definition, data, and actual measurement of the indicator. Some indicators may lack a quantitative measure at the time this report was prepared, so this section will describe the particular methodology used for preparing that indicator. Relevant information in this section includes where the data is gathered, who is or should be responsible for collecting and maintaining that data, and who should communicate with prescribed government agents regarding this indicator. The third and final section is for describing the indicator and its relationship to Hilliard. It includes how the indicator's measurement was taken, how it should be taken in the future, and its context in helping Hilliard achieve its sustainability goals.



Energy and Waste Reduction

A sustainable Hilliard promotes responsible energy use and reduces waste with innovative, cost-effective techniques. These techniques improve the environmental, social, and economic well-being of Hilliard in order to support a healthy community.

Hilliard will realize this vision by accomplishing the following goals:

- » Raise public awareness of conservation practices and renewable energy technologies to encourage sustainable behaviors.
- » Reduce waste and energy usage to expand capacity for growth.
- » Implement advanced stormwater management practices to lessen the impacts of runoff and the strain on existing infrastructure.
- » Facilitate large-scale composting and recycling efforts to reduce the total waste generated by residents



ENERGY & WASTE REDUCTION

EWR Indicators

Per capita electrical consumption Background

In the United States, as well as in many other industrialized societies, electricity has become essential to the operation of almost every activity. According to the U.S. Energy Information Administration, 45% of U.S. electricity is generated by coal, the most polluting power-generating resource.¹ Ohio ranks fourth in the United States in coal consumption, largely due to the State's energy-intensive industrial sector, which accounts for more than one-third of the State's electricity consumption.



» <https://www.aepohio.com/info/facts/Facts.aspx>

AEP Ohio, a subsidiary of American Electric Power (AEP) serves nearly 1.5 million customers in Ohio and the northern panhandle of West Virginia, as seen in the image to the right. In Ohio, more than 1,000 communities, including Hilliard, receive their power from AEP.² The Columbus District alone contains more than 11,000 miles worth of distribution lines. In addition, the Hilliard Carbon Footprint study showed statistics about the impact of electrical consumption of the city, stating that "58% of carbon dioxide emissions from city operations were a result of electric usage."³

Measure

The average yearly electricity usage measured in kilowatt-hours serves as an indicator to measure the effectiveness of energy conservation practices and the implementation of renewable resources by Hilliard residents. According to AEP Ohio's Manager of Regional Distribution Center Operations, the average Hilliard resident consumes approximately 800-1000 kilowatt-hours per month.⁴ Using this information, the average per capita electrical consumption in Hilliard is 9,600-12,000 kilowatt-hours. The estimated amount of carbon dioxide per kilowatt-hour is 2.02, meaning the average Hilliard resident produces approximately 20,200 pounds of carbon dioxide every year.⁵

Description

AEP Ohio creates and manages the data associated with Hilliard's electricity consumption. AEP provides energy calculators on their website which help give customers an idea of their personal energy consumption. These calculators include an Online Energy Checkup (helps manage home energy use and costs), Appliance Calculator (provides information on the operational costs for appliances), and the Lighting Calculator (shows how much money can be saved by switching to compact fluorescent bulbs).⁶ City officials can obtain monthly and yearly information from AEP to measure if residents are increasing or decreasing their electricity bills. Using the calculators mentioned above, residents can begin to track their electricity consumption themselves.

Per capita electrical consumption*Background*

Sending all waste generated by a community to regional land-

fills is no longer a cost-effective or environmentally responsible behavior. Though landfill regulations are designed to protect water resources and curtail impacts on air and human health, reducing the amount of waste that ultimately ends up in landfills has become a priority for many communities for multiple reasons.

Landfills require a large amount of space for operation, and communities often consider them undesirable as neighbors. The final dumping site for Hilliard's waste is the Solid Waste Authority of Central Ohio (SWACO) landfill, which is located on approximately 395 acres of land immediately west of Interstate 71 in Grove City and is already Franklin County's highest point of elevation.⁷ The landfill had 26.9 years of remaining capacity as of 2011.⁸ Efforts in Ohio to remediate and retrofit old landfills for new uses have proven to be difficult and, sometimes, dangerous.⁹ Attempts to remediate land in Garfield Heights, a suburb of Cleveland, and use it for large commercial development have led to the build-up explosive gases and the leaching of contaminated liquids into local streams. These problems have led to permitting confrontations with the Ohio EPA, and businesses have subsequently closed and left the new commercial district.^{10,11}

Further, the cost of placing waste in a landfill is increasing. In 2010, Hilliard signed a three-year contract with Rumpke Waste Removal & Recycling, switching from the previous service provider, Local Waste Services. The three-year contract provides a per-month, per-household charge of \$14.10 for the first fiscal year of the contract, \$14.45 for the second, and \$14.81 for the third and final year.¹² Each year also includes a 30-cent per household billing fee. Though Rumpke is responsible for providing waste removal for Hilliard residents, the company uses the SWACO landfill in Franklin County. SWACO increased its in-district solid waste rates by \$3.00 per ton in 2011, and an additional \$3.00 per ton beginning on January 1, 2012.¹³ Looking into the future, the use of alternate landfills would require increased funds

for the transportation costs of hauling waste farther distances. As municipal governments adjust to reduced revenues from local taxes and the state's Local Government Fund, diversifying waste disposal methods represents an opportunity to manage rising costs.

Measure

On July 1, 2010, Rumpke began providing curbside residential solid waste, yard waste, and recycling services to Hilliard residents.¹⁴ This contract does not cover the disposal of household hazardous wastes, scrap tires, bulk materials, or construction and demolition debris, nor does it serve commercial and industrial facilities.¹⁵ Individuals are personally responsible for moving or contracting the disposal of these items at appropriate waste facilities. Monthly and annual measures of waste can be used to determine how much waste is being generated by the residential community, how much is being generated per resident, and what percentage of total waste is being recycled. The annual tonnage can be divided by 28,435, Hilliard's population in 2010 according to the U.S. Census.¹⁶ This data can then be used to track and promote efforts to decrease per capita waste and increase per capita recycling. Subsequent population estimates and calculations from the U.S. Census and the Mid-Ohio Regional Planning Commission should be used to keep per capita data accurate.¹⁷

Description

Rumpke creates and manages the data associated with Hilliard's solid waste and recycling, and this data is reported to the Ohio Environmental Protection Agency and used in Re-TRAC waste reports. This data is free and available to the city through registration at the EPA WasteWise Re-TRAC website.¹⁸

The city of Hilliard generated a total of 11,787 tons of residential and commercial waste in 2011.¹⁹ Converting that to a more standard measure of

Pounds-Per-Person-Per-Day (ppppd), the measure comes out to 2.66. Of that total waste, 2,045.8 tons entered the Rumpke recycling program, which equates to 0.39 ppppd of recycled material. Hilliard's residential yard waste constituted the remaining 2,445.1 tons of the 2011 annual collection, showing 0.47 ppppd of yard waste.

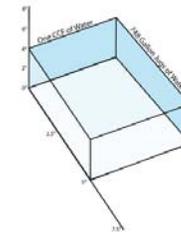
Per capita water use

Background

The economics of water are apparent in Hilliard and all of Central Ohio, as the City of Columbus controls the water supply in the region. In this case, water reduction on a citywide scale for Hilliard can be viewed as an economic benefit for businesses, residents, and the City itself. According to the 2011 City of Columbus Average Bill Chart for water use, a single family home with two adults and two children will use 3,200 to 4,000 cubic feet of water and pay \$300 to \$364 every 90 days. The rates for commercial water use are higher than those for residents.²⁰

Measure

The best measure at this time is water usage data obtained from the City of Columbus Department of Public Utilities (CDPU). Hilliard is not master metered meaning that the City itself does not manage water. Because of this, the CDPU is the only source for data.²¹ This data should be secured and kept on file by the city of Hilliard in spreadsheet form and given to the Sustainability Commission. Using Microsoft Excel, CDPU data can be easily used to calculate annual average use and costs for residents, busi-



» Graphic by Brady Carlucci

nesses, and other water users in Hilliard. This calculation should be performed annually.

When this data is calculated it will also be important to display it in a way that makes sense to the public. One CCF accounts for one hundred cubic feet of water. This equates to a total of 748 gallons of water or a square pool that is five feet wide on all sides and four feet deep. The annual data from the CDPU can easily be converted to gallons using the conversion of One CCF to 748 gallons of water ($X \text{ CCF} * 748 = y \text{ gal}$).²²

Another analysis should consider the economic impact of water usage in Hilliard. Such a study can be done by taking the current price of water in Hilliard in CCFs from CDPU and multiplying it by the amount of water in CCFs that was actually used ($X \text{ CCF} * \$ \text{ per CCF} = \text{Total Cost}$). This calculation will show the price tag of water usage at this scale. More detailed information would be needed to determine individual usage. This could be gathered by a resident survey, which would be used as a sample, or the City could try and request more detailed records of Hilliard's water usage from CDPU. Currently the only data available is annual usage data.

Description

The combined cost of water to residents in Hilliard is approximately \$2,628,804.76 to \$3,002,547.80 per month between the years of 2010 and 2011.^{23,24,25} This price was calculated by using data obtained from CDPU multiplied by information obtained and calculated from the City of Columbus. Hilliard has a total water use of 775,601.63 CCF, or 580,150,017.00 gallons, of water used by residential-type service code in 2011.²⁶ Hilliard residents use an average of 6.82 CCF, or 5,100.00 gallons, of water per month.²⁷ This

amount presents the opportunity to decrease water use by residents, thus lowering bills.

The City of Columbus's 2011 Average Bill Chart shows an average usage of 8-10 CCF per person every 90 days. This can be compared to data that was obtained from the CDPU Water Distribution and Engineering Division of Power and Water. This data shows annual water usage in CCF in nine service codes. In 2011 the city of Hilliard consumed a total of 1,218,725.93 CCF of water. In 2011 Hilliard consumed 1,090,063.83 CCF. This quantity shows a 10.56% net reduction of water usage from 2010 to 2011. Between these two years consumers with a residential-type service class code used a two-year average of 66% of the total water. This was followed by the commercial service code using an average of 21%. Interestingly the other seven service code classes all used less than 2% of the total water usage.²⁸ See EWR Appendix Calculation Sheet 1.

In 2011, Hilliard used a total of 815,367,741.85 gallons of water across all service codes. A total of 518,903,004.01 gallons of water was used in residential service class codes.²⁹ This data can easily be compared to the 2010 census figure of 28,435 Hilliard residents,³⁰ there would be an aggregate water usage of 2.27 CCF per person per month.³¹ This is only slightly different from the City of Columbus's estimate of 8-10 CCF per 90 days, or approximately 2.6-3 CCF per month.³² See EWR Appendix Calculation Sheet 2.

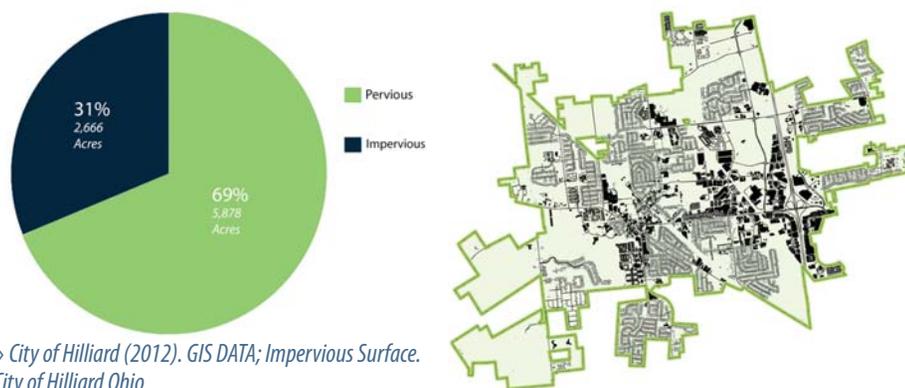
This means that the average resident of Hilliard uses a total of 20,402.67 gallons of water per year or an average of 1,700.22 gallons each month. Applying all of this to cost, each resident of Hilliard must pay between \$92.45 and \$105.59 per month,^{33,34} which would account for a range between \$2,628,804.76 and \$3,002,547.80 per month spent by all residents of Hilliard on water.³⁵ These types of calculations can be a good way to gauge and display water usage trends in Hilliard. Because water use is on a city scale, the

particular months of high usage is unavailable but should be incorporated in future calculations. A good goal would be to reduce residential water usage by 5 to 10%. This will account for a yearly reduction of 38,780.08 to 77,560.16 CCF of water. See EWR Appendix Calculation Sheet 3.

Percent pervious surface

Background

Impervious surfaces are simply ground covers that water cannot penetrate.³⁶ According to Geographical Information Systems (GIS) data provided



» City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio

by the City, there are approximately 2,666 total acres of impervious surfaces present within Hilliard.³⁷

This accounts for 31% of the 8,545 acres that makes up the city.³⁸ This classification includes most asphalt, most types of concrete, building rooftops, and highly compacted soils. Impervious surfaces have been shown to increase the amount of surface runoff generated in an area. This runoff causes excessive amounts of water to discharge into streams, reduces available groundwater resources, and



» City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio

increases rates of erosion.³⁹ The amount of impervious surfaces has also been shown to have a correlation to non-point source pollution in a watershed.⁴⁰ This relationship means that high levels of water pollutants such as sediments, salt, heavy metals, pesticides, acids, and nutrients wash off yards, parking lots, and other impervious areas and enter the watershed.⁴¹ The following chart and map show the amount of pervious and impervious land cover in Hilliard.

Measure

One measure of the amount of impervious surfaces in an area is a variation of what is known as a coefficient method. It involves determining a set percentage of impervious area by specific variables. For example, the rational runoff coefficient method sets basic parameters per standardized land use.⁴² This measure is permitted for use in assessing stormwater values in the City of Columbus,⁴³ but it has been criticized for its inaccuracy. The standard coefficient method for calculating the impervious surfaces in an area may fail to measure roadways.⁴⁴

However, using GIS software to make more accurate measurements of the percentage of impervious surfaces in an area may provide a suitable alternative.⁴⁵ This has been done in part by the city of Hilliard, but the data did not incorporate roadways, driveways, heavily compacted soils, and many parking lots.⁴⁶ Roadways alone account for approximately 1,220 acres of land in Hilliard.⁴⁷ This figure was created using ESRI Arc GIS spatial data processing and, though it gives a picture of the amount of impervious surfaces, is in no way a completely accurate figure. Roadways as well as parking lots and driveways will need to be made into polygons and incorporated into the current dataset that has been created.

Once the impervious surfaces have been made into polygons the next step would be to accurately measure the pervious surfaces. This can be done by simply subtracting the impervious area from the total area. With the current data there is a total of 5,878 acres of pervious groundcover.⁴⁸ To make this more accurate the same process of using a GIS to determine the impervious cover would be used to measure the pervious cover. It would be possible to also add a multiplier as some previous ground covers all differ. This measure will greatly increase the accuracy of any calculations based on this data.

Description

The City of Hilliard has a large quantity of impervious surfaces. This directly affects the amount of surface runoff that is generated. This surface water runoff from impervious surfaces has been identified as increasing the non-point source pollutant loads of a watershed.⁴⁹ Permeable surfaces also diminish the amount of groundwater in an area.⁵⁰ Hilliard has the opportunity to determine first how many impervious surfaces are present and how much water this puts into the stormwater conveyance systems. This can then be used to determine what areas of the built environment have fewer permeable surfaces. This information can be used to determine future action to reduce impervious surface in the city, thus improving the quality of the receiving waters. If less water runs off, then the City will need to spend less money to upgrade or create stormwater conveyance infrastructure. This in turn will lower the tax burden on the City's residents.

The first step for Hilliard will be to make a more accurate GIS dataset. This will involve adding roadways, parking lots, sidewalks, and any other impervious surfaces. Once this has been finished the City will be able to determine the amount of impervious surfaces in dif-

ferent sections of the City as well as overall. This knowledge can be used to developed goals to reduce the impervious or preserve the pervious surfaces in specific areas.

EWR Opportunity Analysis

The City of Hilliard and its residents are already making strides towards responsible energy use and waste reduction. Just as residents have been switching out incandescent light bulbs for newer, more energy efficient kinds, the City has been upgrading its properties to capitalize on savings from efficiency.

The Energy and Waste Reduction Opportunity Assessment provides a snapshot of how Hilliard and its residents consume and conserve energy and water resources and how they, in turn, produce waste. Trends and analysis from this Opportunity Assessment will be used in the Sustainability Analysis to identify areas of growth and improvement.

Energy

Energy prices charged by American Electric Power (AEP) are projected to rise in the coming years due to a shift from state-stabilized prices to market-rate prices.⁵¹ This means Hilliard consumers will be faced with a decision: to absorb increases in electricity costs or to reduce consumption so that they can keep payments at or below current levels. Currently, the average monthly electricity bill for Hilliard residents is approximately \$110.00.⁵² Additionally, several small businesses have already seen the impact of rising electric prices.⁵³

Recent federal regulations have instituted requirements that light bulbs use 25% less electricity for the amount of lumens used; these regulations began impacting 100-watt bulbs in 2012 and will impact lower wattage bulbs in coming years.⁵⁴ The regulations promote purchasing and use of innovative halogen incandescent, compact fluorescent lamp (CFL), and light-emitting diode (LED) bulbs, all of which reduce electrical consumption and save money over the long run. Under Ohio Senate Bill 221, enacted in 2008, electric companies provide technical and financial assistance to individuals and communities in order to reduce overall consumption.⁵⁵ The City of Hilliard

is currently working to decrease their energy consumption by using LED bulbs for streetlights and traffic signals.⁵⁶

Although renewable energy technologies have not yet become common in Hilliard, rising energy costs and a push for cleaner energy sources have brought them to the forefront in planning for the future. Solar panels are listed as a conditional use for all development in Hilliard's zoning code, meaning that the Planning and Zoning Commission must approve their use and the Zoning Inspector must issue permits for them.⁵⁷ The City does track these permits, and there is at least one solar installation within Hilliard's limits. See the "Solar Panels in Hilliard" Sidebar for more information. The zoning code does not mention wind, geothermal, or other renewable installations as permitted or conditional uses, and the City does not track their permitting or installation.

Apart from electrical production, Hilliard is also poised to gain ground on other renewable sources such as biofuels. Under the current administration, the City fleet has undergone upgrades and older, inefficient vehicles are being replaced.⁵⁸ Some of the new vehicles are hybrids,⁵⁹ although none are flexible fuel vehicles, which are required for the use of the biofuel ethanol. Ethanol can be found in quantities up to 5-10% in nearly half the gasoline sold today,⁶⁰ although higher blends such as E85 (85% ethanol, 15% gasoline) are less common and require these flexible fuel vehicles. The Kroger on Hilliard-Rome Road is the only gas station in Hilliard that sells E85.⁶¹ Biodiesel, which can be used at up to a 20% blend in nearly all diesel equipment, is not currently sold in Hilliard, although there is one location in Columbus that sells B5, B10, and B20.^{62,63} For information about the fuel efficiency and other benefits of roundabouts, see the "Roundabouts in Carmel, Indiana" sidebar.

Solar Panels in Hilliard

Dr. Sudhir Sehgal, DDS, is the owner of three dental practices in Central Ohio and what some may see as the trifecta of energy independence. Dr. Sehgal's practices—located in Columbus, Hilliard, and Reynoldsburg—are all outfitted with photovoltaic (PV) solar arrays that provide power to the many electrical draws of a busy medical office. Sehgal first added solar panels to his Columbus practice in 2010 to combat rising electrical prices, producing about 30,000 kilowatt hours annually and offsetting nearly 70% of his typical electric bill.ⁱ Once he saw the positive results of the first system, Sehgal said it "simply made sense" to proceed and add PV systems to his other two branches, including the one in Hilliard, in 2011.ⁱⁱ

In order to install these systems, Sehgal hired Athens, Ohio, based Third Sun Solar. Third Sun Solar and Wind Power was ranked as an Inc. 5000 company in 2009, 2010, and 2011, coming in at #543 overall and #16 in the energy industry for 2011.ⁱⁱⁱ They design solar power structures for commercial, institutional, and residential development and have had a three-year growth of 619% with an increase in revenue from \$2 million in 2007 to \$14.7 million in 2010.^{iv} Third Sun Solar and Wind Power serves customers across the state of Ohio and throughout the Midwest.



» Photos by: D.W. Routte

Fracking & Natural Gas

There is much discussion regarding the future of natural gas in the United States and in Ohio. With the rapid development and expansion of hydraulic fracturing of Marcellus and Utica Shales to release and capture natural gas reserves, the U.S. Energy Information Administration (EIA) projects that the U.S. will become a net exporter in 2021.^v It also projects prices for natural gas to remain stable until at least 2023 as production continues to climb from 5.0 trillion cubic feet in 2010 to 13.6 cubic feet in 2035.^{vi} EIA projections are based on continued energy efficiency gains in all sectors of the U.S. economy.

Ohio Governor John Kasich is committed to making Ohio's deposits of Marcellus and Utica Shale part of the state's energy production portfolio.^{vii} Though Marcellus Shale is not found in Central Ohio, Utica Shale with a thickness between 150 and 200 feet is present in Franklin County and the surrounding region.^{viii} To date, no permits have been filed with the Ohio Department of Natural Resources for drilling-related explorations in Franklin County.^{ix} Nonetheless, fracking is an important energy issue that continues to garner more attention here in Ohio and across the country. Hilliard can do no harm in being conscious of it.

Roundabouts in Carmel, Indiana

Roundabouts have been argued to be very useful to calm traffic as well as removing unnecessary long stops at traffic lights. The Mayor of Hilliard has begun replacing highly congested intersections with roundabouts. His inspiration: Carmel, Indiana, a city with a population of about 80,000, that has over 60 roundabouts in their community and has 35 more planned before the end of their project.^x This process started in the late 1990s and they now have the most roundabouts in any city in the United States.

Benefits of roundabouts include: calm traffic patterns, increasing safety, better aesthetics, and promote a more pedestrian and bicycle friendly community. The main environmental benefit is reduced fuel consumption due to less of idling. Roundabout construction costs are lower than that of traffic lights.^{xi} In Carmel researchers have found that roundabouts can save \$125,000 compared to traffic intersections with traffic lights. They are also more sustainable, even more so when using techniques like porous concrete for construction and utilizing the center of the roundabouts for green space or even rain gardens to help with storm water management. Hilliard is on the right path of following suit with Carmel, Indiana, however it is important that Hilliard considers the more sustainable ways of implementing roundabouts.



» <http://www.carmel.in.gov/index>.



» <http://www.carmel.in.gov/index.aspx?page=123>

Waste

In 1988, Ohio passed House Bill 592. The bill—established in response to dwindling landfill capacity and environmental issues—provided a framework for handling Ohio's solid waste from generation to end of life. It resulted in a plethora of data about solid waste activities and a push for future planning in the area. According to the Ohio Environmental Protection Agency (EPA), there were 42 publically available landfills in Ohio in 2010;⁶⁴ these landfills had an average remaining capacity of 34.4 years.⁶⁵ Hilliard's solid waste is designated by law to go to the Franklin County Sanitary Landfill located in southeastern Franklin County. As mentioned earlier, the landfill had 26.9 years of remaining capacity as of 2011.⁶⁶

The city of Hilliard generated a total of 11,787 tons of residential and commercial waste in 2011.⁶⁷ Converting that to a more standard measure of Pounds-Per-Person-Per-Day (ppppd), the measure comes out to 2.66, which is below the average rate of 4.43 nationally and 6.01 for Ohio as of 2010.^{68,69} Of that total waste, the 7,296.2 ton majority was residential solid waste, 2,045.8 tons entered the Rumpke recycling program, and Hilliard's residential yard waste constituted the remaining 2,445.1 tons.⁷⁰ Combining the recycling and yard waste tonnages into a singular measure of diverted waste reveals that Hilliard's residential diversion rate is an impressive 38.1%.⁷¹ For information about Hilliard's waste trends, see the "Total Tons Generated, City of Hilliard, 2004 to 2011" figure.

According to data kept and analyzed by the Re-TRAC Reporting system for 2011, most of Hilliard's waste, approximately 4,000 tons, was generated in Quarter 2. In May 2011 residents disposed of the most waste, approximately 1,549.1 tons, which was closely followed by June with 1,397.6 tons. On the other hand, residents generated the

least amount of waste in Quarter 4, when approximately 1,300 tons was collected by Rumpke.⁷² Unfortunately, no data was available for October and December 2011, which may have skewed the data. However, January 2011 had the lowest total waste collection at 907.2 tons.⁷³ For information about Hilliard’s waste trends, see the “Total Tons Generated, Grouped by Quarters, City of Hilliard, 2007 to 2011” figure.

Year	Residential Recycling (tons)	Residential Solid Waste (tons)	Residential Yard Waste (tons)	TOTAL (tons)
2004	2,129.9	10,328.1	2,276.1	14,734.1
2005	2,097.6	10,728.0	1,826.1	14,651.6
2006	2,231.2	11,525.9	1,991.9	15,748.9
2007	2,293.9	10,271.1	2,368.9	14,934.0
2008	2,426.0	10,642.8	2,634.3	15,703.0
2009	2,199.3	9,538.0	2,254.2	13,991.4
2010	2,129.8	8,351.3	2,189.8	12,670.9
2011	2,282.0	8,004.3	2,526.4	12,812.7

» Total Tons Generated, City of Hilliard, 2004 to 2011

Quarter	2007	2008	2009	2010	2011
1	3,142.7	2,981.5	2,823.7	2,645.7	3,143.9
2	4,204.5	4,665.7	3,957.7	4,091.7	4,037.2
3	3,733.5	4,094.4	3,583.3	3,283.0	3,326.3
4	3,853.3	3,961.4	3,626.7	2,650.4	2,305.2
Total	14,934.0	15,703.0	13,991.4	12,670.9	12,812.7

» Total Tons Generated, Grouped by Quarters, City of Hilliard, 2007 to 2011

Though Hilliard does not operate or contract for composting services, it does provide some yard waste services. For example, Rumpke provides curbside chipper and leaf collection services. Residents are required to bundle brush and other yard waste for collection on Mondays, when Rumpke collects them for disposal at composting facilities.⁷⁴ A call-in chipper service is also available for residents who are undertaking special projects, other than tree clearing, that require on-site service.⁷⁵

Credits are available to commercial facilities for the use and maintenance of retention and detention basins, which reduce water run-off during peak flows for 100-year rain events.⁷⁶ Credits range between 10 and 20% of the City’s stormwater fee. The total amount of all credits issued by the City to a piece of property is capped at 80% of the total imposed fee. No credits are available for residential property owners who implement stormwater runoff controls.

Water

The combined cost of water to residents in Hilliard is approximately \$2,628,804.76 to \$3,002,547.80 per month.^{77,78,79,80} Hilliard residents use about 6.82 CCF or 5,100.00 gallons of water a month⁸¹ costing \$98.03 to \$106.15 every 30 days.^{82,83} The average family will pay up to \$299.34 to \$316.43 each billing cycle.⁸⁴ Compared to what a family paying the inside Columbus water rate of \$243.54 to \$256.45 per cycle, a Hilliard family will pay \$55.00 to \$59.00 more each cycle.⁸⁵ This means each year the average Hilliard family pays \$221 to \$238 per year for water than if they lived in Columbus.⁸⁶ This presents the opportunity to decrease the amount of water used by residents thus lowering their bills and allowing some of this money spent on excessive water usage and put it into the local and regional economy.

In December 2009, the Hilliard City Council passed Ordinance No. 09-63,

creating a stormwater management utility as authorized under Ohio Revised Code Section 6119.⁸⁷ The utility is responsible for charging residents and businesses appropriate fees, depositing those fees in a special fund for use on stormwater management projects, and generally enacting the City's stormwater code. See the "Stormwater Management at Hilliard Bradley High School" sidebar for more information about best management practices being used locally.

The City also maintains a Storm Water Management Plan that is in effect through 2013.⁸⁸ This plan outlines the City's efforts to reduce the discharge of pollutants, to protect water quality, and to satisfy the appropriate requirements of the Clean Water Act in accordance with the Ohio EPA's National Pollutant Discharge Elimination System Phase II program. As required by Section 3745-39 of the Ohio Administrative Code, the plan addresses six minimum control measures:

- » Public education and outreach.
- » Public participation and involvement.
- » Illicit discharge detection and elimination.
- » Construction site storm water runoff control.
- » Post-construction storm water management in new development and redevelopment.
- » Pollution prevention and good housekeeping for municipal operations.⁸⁹

The City's Plan also offers a number of credits to non-single family residential units for activities that reduce the impact of stormwater runoff to the stormwater system.⁹⁰ Credits to schools may be issued for, but are not limited to, educational activities that involve participation of at least 35% of

Stormwater Management at Hilliard Bradley High School

Beyond the lessons being taught in its classrooms, Hilliard Bradley High School itself provides a lesson in smart environmental design. While its appearance at first glance is not much different from Hilliard's other two high schools, Hilliard Bradley features Low Impact Development (LID) techniques necessitated by its location in the environmentally sensitive Big Darby Watershed.^{xii} Stormwater that would typically flow from a rooftop or parking lot—first into a storm drain and then into a local waterway—now stays on site in retention basins. These basins both slow the flow of stormwater (reducing peak flows that can trigger floods) and allow for the runoff to permeate into the soil (filtering pollutants and mimicking the site's former farm fields). Rain gardens line the school's parking lot, allowing for additional runoff to soak back into the soil. Even the school's baseball diamonds are maintained without the use of chemicals.^{xiii} These techniques have minimized the impact the new school has had on nearby Hamilton Run, a tributary of the Big Darby. Sustainable site design, developed by Columbus-based Eco Design and Engineering,^{xiv} contributed only two percent to the \$65 million cost of the school's construction.^{xv}



» Bradley High School: <http://www.ecodesignltd.com/services/govt-and-institutional/>

enrolled students, public service involvement that includes at least 5% of enrolled students, and in-kind services as approved by the Hilliard Director of Public Service.⁹¹

ENERGY &
WASTE
REDUCTION

EWR Sustainability Analysis

The Energy and Waste Reduction Sustainability Analysis responds to the Opportunity Assessment with a variety of carefully crafted recommendations that will advance the City's efforts to achieve sustainability goals. Each recommendation is broken into short-, medium-, and long-term efforts that cumulatively build on previous success. These recommendations are detailed with information in order to make them as understandable and attainable as possible. Those details include the parties responsible for implementing the recommendations and costs and funding sources associated with each recommendation.

Energy Efficiency

Recommendation: Implement policies to increase the energy efficiency in Hilliard's municipal operations and throughout the community.

Energy usage spans a variety of sectors, including electrical use, thermal energy use, and fuel consumption in vehicles. Not only does this usage cost the consumers money, but it also has long-term costs for the health of the community and the environment. According to Hilliard's Carbon Footprint for the baseline year of 2007, 58% of the community's emissions came from electricity consumption, 13% from natural gas, and 20% from gasoline and diesel.⁹² Reducing the consumption of these goods, and increasing efficiency when using them, will decrease Hilliard's costs and emissions.

Short Term (1-3 years)

- » Perform an energy audit of all City-owned buildings and facilities. An energy audit would assess current practices and buildings in order to make recommendations that would improve the municipal government's consumption of energy. Additionally,

reducing consumption would save taxpayers' dollars spent on municipal facilities' energy demands. This audit could be done in-house or via a consulting/audit firm. *Parties responsible:* Hilliard Operations Division, the Mayor's Office, and the Environmental Sustainability Commission. *Cost:* Will depend on the extent of the audit and by whom it will be performed. The City should open the audit for bidding from various companies so as to receive a competitive price. This money could come from grants mentioned in the medium-term goal in addition to budgetary allocations from involved parties. Illicit discharge detection and elimination.

- » Draft and implement green building standards for all city-owned buildings built or renovated over 5,000 square feet. Similar standards exist in cities of all sizes across the country. Examples include Clayton, Missouri (population 16,076, requiring LEED Silver for new or remodeled city-owned buildings over 5,000 square feet); Kearny, New Jersey (population 37,295, requiring LEED Silver for all new municipal buildings); and Asheville, North Carolina (population 73,875, requiring LEED Gold for all new city-owned buildings over 5,000 square feet).⁹³ *Parties responsible:* City Council and the Mayor's office. *Cost:* Administrative costs covered under operating budget of entities involved.
- » Sign the U.S. Conference of Mayors Climate Protection Agreement, becoming the only city in Central Ohio other than Columbus to commit to aggressive goals for emissions reductions.⁹⁴ Under this agreement, the Mayor would be committing to strive to meet the Kyoto Protocol targets in their community, covering a range of sustainable topics.⁹⁵

Party responsible: The Mayor of Hilliard. *Cost:* None.

Medium Term (3-5 years)

- » Implement recommendations from the City’s energy audit, such as retrofitting buildings with modern windows, doors, and insulation to make them more energy efficient. *Party responsible:* Hilliard Operations Division. *Cost:* Will depend on extent of renovation and repairs. Grant sources change on a regular basis, but there have been numerous funding opportunities for energy efficiency measures in the past few years. Some of these include funding through the American Recovery and Reinvestment Act (such as the Energy Efficiency and Conservation Block Grant Program), the annual State Energy Program (SEP), the Ohio Advanced Energy Fund, and the Energy Loan Fund.⁹⁶
- » Evaluate the current city vehicle fleet and create a timeline for replacement and upgrades. The City has already begun to purchase hybrids to replace aged vehicles, and they should continue this trend. Within 10 years, the City should have planned to either replace or retrofit vehicles with technology to use biofuels. This timeline would allow the budgetary costs to be spread out over many years and allow for funds to be set-aside in advance. *Party responsible:* Hilliard Operations Division. *Cost:* Covered under operating budget of the entities involved.

Long Term (5-10 years)

- » Designate a City-owned model building that employs best management practices (BMPs) for energy efficiency. Using the recommendations from the energy audit, choose

one municipal facility that will go above and beyond to employ a range of BMPs that could be used throughout the community in businesses and homes. Publish information on the implemented strategies in the facility, the savings from their implementation, the process of replacement, and resources on how to translate the technologies to local homes and businesses. The City could also provide tours of the building as an educational tool for residents. *Parties responsible:* Hilliard Operations Division, City Council, and the Mayor’s Office, possibly with the assistance of an organization such as Destination Hilliard to organize tours and publicize their efforts. *Cost:* Renovation would be covered under funding from the medium-term goal; any costs for publications and tours would be included in the budgets of the involved entities, or possibly from similar energy efficiency grants.

- » Phase out all vehicles in the city fleet that are not hybrid-powered or fitted to use biofuels or other renewable sources (e.g. electric cars powered by wind or solar energy). These alternative vehicle options are available for a range of vehicle types, allowing Hilliard to implement them from small sedans to large SUVs and pickup trucks. Base the replacements on the timeline created, adjusting as necessary with technological advancements and price changes. *Party responsible:* Hilliard Operations Division. *Cost:* Will be comparable to prices spent on conventional vehicle replacement. Depending on the make and model of car, the flexible fuel option may be interchangeable. While hybrid vehicles are typically more expensive than their standard counterparts, this additional cost will be returned through reduced fuel costs.

Recommendation: Implement policies to increase the energy efficiency in Hilliard’s municipal operations and throughout the community.

Renewable Energy Options in Hilliard

Solar

Although solar power is not widely used in Hilliard, the area has enough solar potential to embrace this alternative energy (see map). In fact, Central Ohio has 4 to 4.4 hours of peak sunlight per day, which is only slightly lower than Miami, Florida with 5.3 hours of peak sunlight each day.^{xvi} Solar energy can be harnessed in many ways, although small-scale residential and commercial uses typically take the form of PV panels or solar hot water. Passive solar technology is also a way to drastically decrease the need for thermal energy through use of the sun and strategic building design.

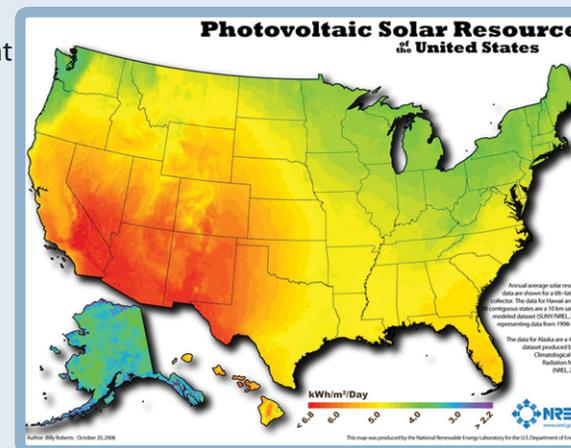
Photovoltaic cells are a common form of electrical production, converting sunlight into direct current electricity that can be used or fed back into the grid. These cells can be combined into arrays to provide electricity at a large scale and can be installed on both new and existing development. As of 2011, the average installed price of solar PV the U.S. was approximately \$5.00 per watt.^{xvii} A high quality PV module can convert at 15-18% efficiency, with the average module converting at approximately 12%.^{xviii}

Solar domestic hot water systems, or solar hot water heaters, offer another way to reduce energy and fuel use. In 2011, water heating accounted for 18% of an average American's home utility bill.^{xix} There are three types of solar hot water heaters that are commercially available, including flat-plate collectors, integral collector-storage systems, and evacuated-tube solar collectors.^{xx} Solar hot water heaters only require an un-shaded southern section of property, and they can cut costs, offset the use of electricity, and lower home gas emissions.^{xxi}

Wind

According to the National Oceanographic and Aeronautical Association (NOAA), the average wind speed over the past 53 years in the Columbus area ranges from 6.2 to 10.1 miles per hour, with the average wind speed being lowest in August and highest in March.^{xxii} This average wind speed may be low for installing small wind turbines, which require an average monthly wind speed of 14 miles per hour to be economical for homes spending over \$150 a month for electricity, although micro wind turbines would work well under these conditions.^{xxiii}

Micro wind turbines are small in size and can be attached to a home's roof. Some of the top rated turbines have energy output at 8 miles per hour, nearly half the speed needed for the standard small turbines.^{xxiv} With the advancement of micro turbine technology, Hilliard's businesses and residents can feasibly utilize wind power. These micro turbines have a generating capacity of anywhere from 500 to 1500 KWH per month dependent on wind speed,^{xxv} and they provide the opportunity to offset a large amount of electricity that is produced by non-renewable sources such as coal and gas.



» Solar Potential: www.nrel.gov



» Micro Wind Turbine: usawindgen.com

Renewable Energy Options in Hilliard, Continued

Geothermal

Although Hilliard is not in a location that makes it suitable for geothermal power generation or direct use, ground source heating and cooling via geothermal heat pumps can be done almost anywhere in the United States.^{xxvi} Geothermal heat pumps take advantage of the temperature beneath the Earth's surface, a constant 50 to 60°F (10-16°C), to act as a heat source during the winter and a heat sink during the summer.^{xxvii} These systems require much less energy than conventional heating/cooling systems, and they reduce air pollution. Ground source heating and cooling can be used for space heating and cooling as well as hot water.

While geothermal heat pumps are initially more expensive to install than conventional space heating systems, they deliver more energy per unit consumed and are less expensive to operate and maintain.^{xxviii} Because of their increased efficiency, typical annual energy savings with a geothermal system ranges from 30% to 60%, with many systems paying for themselves in two to ten years through lower energy bills.^{xxix} Systems can be installed on new construction or pre-existing development, although pre-existing buildings and areas with space restrictions may require vertical, rather than horizontal, ground loops.

Biomass

There are many types of biomass—such as plants, agriculture and forestry residue, and the organic compounds of municipal and industrial waste—that can be used to produce fuels, chemicals, and power.^{xxx} Biomass covers a wide range of products from wood and methane to biofuels like ethanol and biodiesel. Because of the heavy dependence on automobiles throughout Hilliard, biofuels are an excellent way to reduce emissions and usage of fossil fuels.

Ethanol is an alcohol-based fuel most commonly used as an additive to gasoline. In comparison to straight gasoline, ethanol and ethanol/petroleum mixtures reduce toxic air emissions by decreasing the use of fossil fuels. Today, nearly half the gasoline sold in the U.S. includes 5-10% ethanol.^{xxxi} Higher blends such as E85 (85% ethanol, 15% gasoline) are increasingly available, but require flexible fuel vehicles. E85 has about 27% less energy per gallon than gasoline, although it is typically priced lower so that the cost per mile is comparable.^{xxxii}

Biodiesel is a diesel fuel replacement that can be manufactured from vegetable oils, animal fats, or recycled restaurant greases. A 20% biodiesel blend (20% biodiesel, 80% petroleum diesel) can be used in nearly all diesel equipment without engine modification.^{xxxiii} Pure biodiesel contains only 8% less energy per gallon than petroleum diesel, although it greatly decreases greenhouse gas emissions and improves air quality.^{xxxiv}

Although reducing energy consumption is important in a sustainable lifestyle, switching to renewable sources is an excellent way to limit the environmental and social impacts of the energy one does use. Renewable energy technology can be implemented at the utility-scale—such as wind and solar farms and hydropower stations—or on the individual-scale through infrastructure like residential photovoltaic (PV) arrays, solar hot water, geothermal heating and cooling, or small and micro wind turbines. See sidebar “Renewable Energy Options in Hilliard”. While utility-scale policy can be somewhat affected by the consumers, Hilliard is under contract with AEP Ohio and has the most control over individual-scale residential and commercial applications for renewable energy. The investment put into a wide range of this renewable infrastructure could pay environmental and financial dividends in the future.

Short Term (1-3 years)

- » Draft and implement a renewable energy zoning amendment, specifically outlining regulations and permitted uses for wind and solar and possibly creating an expedited review process for renewable projects. Model ordinances for municipalities can be found from the State of Oregon and the State of Massachusetts.^{97,98} *Parties responsible:* Drafting of these codes will go through the standard procedure for Hilliard zoning changes, including approval by the Planning and Zoning Commission. *Cost:* Should be covered under the operating costs of these entities.
- » Begin identifying opportunities for renewable energy installation by the City, including location, type, and size of the project. Springboro, Ohio provides a comparable example for solar installation by a municipality, as shown in the sidebar. *Parties responsible:* The application process should be managed by the Environmental Sustainability Commission, in junction with the

Solar in Springboro, Ohio

In 2011, the City of Springboro used a grant from the State of Ohio’s Advanced Energy Fund (AEF), and additional assistance from Waste Management, to install 125 solar PV panels on park shelters within the Springboro Parks System.^{xxxv} The total cost of the project was \$180,000, and it saved the City \$2,630.04 within the first six months (an 85% reduction in electric costs over the same period from the previous year).^{xxxvi} Additional savings came from Solar Renewable Energy Credits (SRECs), totaling \$2,031.63 in the same period.^{xxxvii} With these savings, Springboro expects to see a return-on-investment in only 5.2 years.^{xxxviii} Although funding for the AEF was not renewed as of December 31, 2010, it has been redeveloped as the Energy Loan Fund, a revolving loan program.

^{xxxix}



» www.ci.springboro.oh.us

GreenSpot Columbus

In order to increase people's awareness of the importance of being green, Mayor Coleman launched a first-of-its-kind program called "GreenSpot" in 2008 to inspire, educate, and recognize households, businesses, organizations, and community groups that make the efforts to be green.^{xi} Through the program's website, participants can learn about a number of small steps they can take to make an impact for a healthier environment. Under each commitment heading—such as "Conserve Energy"—there are mandatory commitments that the participants must make and a list of additional commitments participants can choose from. Some examples include, replacing regular incandescent light bulbs with high-efficiency compact fluorescent ones and purchasing foods, goods, and services that are grown or produced close to home.^{xii} After the participants pledge the actions they will take or the habits they will change by submitting their application, the Program will then review their application and send them an email with a copy of their GreenSpot commitments and a confirmation of their membership. A GreenSpot sticker will arrive to the participants so that they can display to attract more interest and awareness throughout the community.

As of 2010, more than 2,000 businesses, residents, and community groups had signed up as GreenSpot members.^{xiii} The program has also expanded outside of Columbus, serving as a public engagement model for other communities throughout Ohio and other states. Through previous research and an interview with Anita Musser, the GreenSpot program manager, she confirmed that the program is lacking in follow-ups. Once locations become a GreenSpot there is no follow-up to measure progress or prompt the setting of new goals. If Hilliard implements a GreenSpot Hilliard program, some considerations will be needed in order to make it successful. First, who will be in charge of tracking everything; if it is an online resource only then the city will need to invest in making a website that can handle data collection and make immediate summaries of the data. Hilliard will need to also make sure there is a way for more engagement, since that is a part of the Columbus program that lacks the most; this can be through educational events, e-newsletters, or annual meeting that showcases the results of the previous year.



» <http://www.columbusgreenspot.org/index.asp>

City Council and any departments related to the location of implementation, such as the Recreation and Parks Department or Hilliard City Schools. *Cost:* Using the costs for Springboro, estimated price per PV panel is approximately \$1500, although rapid technological advancement will change price over time. With such a quick return-on-investment, the Energy Loan Fund through the Ohio Department of Development is a feasible option for funding this venture in Hilliard.⁹⁹

- » Create a website through the Environmental Sustainability Commission to disseminate information to residents about renewable energy technologies and their benefits. This could evolve into a comprehensive website to provide resources on incentive opportunities, links to local suppliers and group discounts, and information on technology and maintenance. Renewable energy information could also be linked to Hilliard's GreenSpot program for additional coverage. *Party responsible:* Environmental Sustainability Commission. *Cost:* Implementation costs should be minimal and covered through efforts of the Environmental Sustainability Commission.

Medium Term (3-5 years)

- » Implement a comprehensive assistance initiative for residents and business owners who wish to install renewable systems. Examples of assistance could include waived fees for building permits and plan reviews, guides on where and how to apply for grants and loans, and resources for local suppliers and installers. Incentives and funding sources for renewable projects change on a regular basis and are thus difficult to predict, although DSIRE provides an overview of current incentives and policies at any given time.¹⁰⁰ *Party responsible:* Hilliard GreenSpot program. *Cost:* Financing would

only be needed for administrative costs handled within the GreenSpot program; they would be managing a database of incentives and subsidies that are funded through other entities.

- » Apply for funding and install a City-owned renewable energy project, as outlined in the short-term goal.

Long Term (5-10 years)

- » Set a long-term goal for energy independence, aiming to generate a certain percentage of the power for municipal buildings through renewable sources by 2020. Precedents for this can be found across Ohio and the rest of the nation. Specifically in Ohio, Senate Bill 221 requires all electric distribution utilities to supply 25% of their electricity from advanced sources, with half of that coming from renewable sources.¹⁰¹ Using the renewable technology already installed as a foundation, the City should aim to meet the percentage of its own electrical needs required to reduce emissions to 7% below 1990 levels (as outlined in the U.S. Mayors Climate Protection Agreement) within the next 10 years.¹⁰² *Parties responsible:* City Council and the Environmental Sustainability Commission. *Cost:* Renewable energy technology is a rapidly advancing field, making both cost and financial assistance opportunities difficult to predict over the long-term.

Waste, Recycling, and Composting

Recommendation: Encourage home and business composting through outreach, education, and example.

A campaign to boost home, business, and community composting could reduce the amount of yard and food waste that is unnecessarily sent by Rumpke to the Grove City Landfill, which is owned and operated by the Solid Waste Authority of Central Ohio (SWACO). Yard wastes such as grass clippings and dead leaves are excellent sources of nitrogen and carbon, respectively. Other waste such as newspapers, brown paper bags, and cardboard also offer sources of carbon for compost bins while reducing the amount of municipal solid waste and recyclables to be transported to recycling facilities or landfills.

Organic, compostable material constitutes significant portions of residential and commercial waste. For example, 25% of residential solid waste consists of leaves, yard debris, food scraps, and other compostable material.^{103,104} After recycling corrugated containers and plastics, between 60 and 75% of most supermarket waste consists of discarded food, waxed and wet cardboard, paper, meat renderings, and other biodegradable material.¹⁰⁵ Additionally, up to 90% of waste from restaurants is food scraps.¹⁰⁶

Expanding efforts to divert yard waste and kitchen scraps to composting facilities and at-home composting units would significantly augment Hilliard's efforts to achieve sustainability. Whether at home or at a larger facility, organic material that is composted improves soil by increasing its nutrient content, promoting microbiological life, improving soil structure, enhancing soil's ability to retain water, neutralizing pH, increasing microbiological diversity, and reducing the damage of toxins.¹⁰⁷

Furthermore, composting reduces costs for landscaping amendments such as soil, fertilizer, and indoor plant food.

The City should promote home composting among its residents, and it should provide businesses and restaurants by providing information about composting services, successful examples of business composting, and the city's commitment to composting as a sustainable practice. Building on previous years' efforts will allow the City to incrementally increase composting programs.

Short Term (1-3 years)

- » The City should partner with The Ohio State University Extension in order to develop municipal composting bins on city-owned properties. City Hall, the Phyllis A. Ernst Senior Center, and Roger A. Reynolds Municipal Park would all be ideal locations to install these bins because of their extensive public use and the amount of food scraps and yard waste that is generated at each location. Food waste from employees' and the seniors' "Hilliard Park Café" lunches should be composted in these bins, and other organic material, such as newspapers and yard waste, can be added based on site-specific availability. The City should advertise these bins in the local news and invite residents to contribute their food waste to the bins. Additional signage and information should be posted and made available at bin locations in order to encourage residents to construct their own. *Parties responsible:* The Mayor of Hilliard, Chair of the Environmental Sustainability Commission, Chair of the Recreation & Parks Commission, Director of the Recreation & Parks, and Director of Lands and Buildings should organize a meeting in order to realize this recommendation across the various municipal locations. *Cost:* Compost bins can be inexpensively built with snow fencing or woven wire, which can be purchased for as little as

\$50 for a 5 by 50 ft. section at a local home improvements store. Sturdier bins can be built with concrete blocks, which range in price from \$1.19 for concrete construction blocks to \$2 for decorative garden blocks, and wooden palettes, which can be secured for free from local businesses that are disposing of them.¹⁰⁸ Construction materials could be donated by contacting local home improvement stores and organizing a partnership between them and the City. Still, the city should use a variety of materials to build different types of compost bins in order to showcase diversity of aesthetic and cost.

- » City administrators should begin identifying products in their operational stream that have biodegradable replacements. The Biodegradable Products Institute maintains a list of approved products that safely decay in the environment and in composting. These products include bags, food service items such as coffee cups or plates, resins, and packing materials. A complete list is available at the Biodegradable Products Institute website.¹⁰⁹ Switching to biodegradable products that can be composted in the City's own bins or at a composting facility would reduce the amount of harmful plastics and other chemicals that enter the environment from Hilliard's own waste. *Parties responsible:* The Mayor and City Council should work with each division of municipal public service to identify ways that biodegradable products can be easily integrated into operations. *Cost:* There is no cost associated with identifying products that can be used in government operations. Compostable products may be priced higher than their non-compostable alternatives. For example, BioBag's package of 30-gallon heavy-duty garbage bags, which are made from corn, includes ten bags measuring 30" by 41", costs \$13.95,¹¹⁰ and could be used in trashcans across the City.

- » In print and electronic publications, the City should promote Franklin County's existing composting facilities, such as the Kurtz Brothers' Central Ohio facility located on 2850 Rohr Road in Groveport. *Parties responsible:* Mayor's Office, City Council, and the Environmental Sustainability Commission should do this through their print and online publications. *Cost:* The responsible parties should use existing resources to publicize the existence and benefits of composting facilities in order to minimize costs. These promotions should be integrated into existing communications strategies so that no new costs are incurred for printing or publishing. Aside from personnel costs associated with writing and editing these promotions, which may be eliminated with the use of volunteer writers, this strategy of promotion through existing resources will not require additional funds.

Medium Term (3-5 years)

- » Hilliard's Mayor and the Environmental Sustainability Commission should negotiate, partner, and collaborate with the Franklin County Agricultural Society to make food scrap waste containers and composting bins available at the Franklin County Fair. See sidebar "Franklin County Fairgrounds" for more information. Because the Fairgrounds is used year-round by a variety of groups, it should be equipped with indoor and/or outdoor disposal units that can be emptied into onsite composting bins. Biodegradable bags and liners should be used to make this process as clean and easy as possible. The Agricultural Society could then require County fair vendors to divert

Franklin County Fairgrounds

The Franklin County Fairgrounds, located near Old Hilliard, is owned and operated by the Franklin County Agricultural Society. Though the Society's website does not publicize a vision statement or mission, it does proudly note that the Franklin County Fairgrounds has been home to the County's 4-H affiliate for over 90 years.^{xliii} 4-H has extensive programming for youth on, among other topics, environmental science, recycling, and composting.^{xliiv} Tom Archer, Ph.D., is the State 4-H Leader, and he also serves as Assistant Director of The OSU Extension. As the local home of 4-H and with an OSU Extension connection to use, the Franklin County Agricultural Society and the City of Hilliard have many reasons to work together to promote composting at the Fairgrounds.

their food waste to these composting bins, and it could establish a system among its twenty members to service them so that composting does not stop because of inaction or disinterest. *Parties Responsible:* As the chief executive of the fair's host City, Hilliard's Mayor and the Chair of the Environmental Sustainability Commission should contact the President of the Agricultural Society's Board of Directors in order to begin this conversation and explore common interests in this goal. *Cost:* As explained in previous recommendations, the costs associated with constructing composting bins range depending

on the type of material used. Using volunteers to turn and wet the compost will minimize maintenance costs while reinforcing individuals' knowledge of and confidence in composting.

- » The Hilliard Environmental Sustainability Commission and the City's Department of Parks and Recreation should install composting bins in the City's three community gardens. The group should solicit donated materials and funds, and members of the Commission and of the community gardens should work together to construct the bins. The Commission's Chair and Vice Chair, respectively, should coordinate a team of Commission and garden members to facilitate the securing materials, construction, and ongoing use of composting bins at community garden sites. Organic waste, materials, and weeds can be placed in the composting bins in order to create rich soil to put back into the gardens. Compost will reduce and potentially eliminate the need for fertilizers and other soil amendments. The public demonstration of this project would also provide to community gardeners who are wary of installing at-home compost bins a place to ecologically and conveniently dispose of their household organic waste. *Parties responsible:* Leaders of the Environmental Sustainability Commission, the City Department of Parks and Recreation, and local leaders from their community garden networks should meet and delegate authority for securing materials, constructing the bins, and distributing informational literature about composting bins in the community gardens. *Cost:* As explained in previous recommendations, the costs associated with constructing composting bins range depending on the type of material used. Aside from staff time spent on these projects, no additional costs will be incurred. Volunteers should be recruited to turn and wet the compost in order to minimize maintenance costs.

Long Term (5-10 years)

- » In preparing for future three-year waste service contracts, the Hilliard City Council and Mayor's Office should require companies to submit composting plans as part of the competitive bidding process. They should establish procedural rules or pass an ordinance stipulating that only waste service contracts with composting components be considered in the City's competitive bidding process. San Francisco, California; Louisville, Colorado; Ottawa, Ontario and many other cities already have implemented municipal composting programs for residents, which increase participation because of convenience, and many others offer it as a service option. *Parties responsible:* The Mayor's Office and the Hilliard City Council are responsible for requiring potential waste service providers to provide composting components to their bid proposals. *Cost:* There is no cost in requiring companies to provide these bids. However, these companies may charge the City's residents a higher fee than in previous contracts in order to provide this extra service. However, depending on the contract and the amount of residential waste anticipated to be diverted from traditional solid waste collection, the increase may be only slightly higher than past fees. For example, Princeton, Massachusetts, offers a Curbside Food Waste Composting program with a variety of service levels. For \$20 per month, residents receive weekly pick-up of organic waste material, including yard waste.¹¹¹ For \$25 per month, the program provides complete waste collection, including weekly collection of organic and non-organic materials. The \$25 fee is approximately \$10 more than what Hilliard residents will be paying during the final year of their existing three-year contract with Rumpke.

Composting at Kroger

In 2009, Kroger expanded its trial food scrap composting program to Columbus-area stores, including the grocery at Hilliard Square Shopping Center on Cemetery Road.^{xlv} The pilot project was designed to gauge the logistical and economic feasibility of separating compostable wastes in the produce, floral, deli, bakery, and dairy departments. The study ultimately determined that it would be economically justifiable to divert food scraps to compost facilities.

- » The restaurants and stores along Avery Road and on Main Street in Old Hilliard should collectively purchase compost-hauling services. Owners and managers should meet with Kroger's general managers and its Columbus Division Programs Manager to understand the grocery store's success in composting. See the "Composting at Kroger" sidebar for more information about the grocery's program. Owners and managers of adjacent businesses should meet and try to arrange a joint contract for purchasing composting services, and perhaps they can secure Kroger's participation as a lead partner. Securing individual contracts with compost-hauling companies may seem daunting and economically impractical, but individual stores have successfully integrated composting and recycling efforts into their overall business plans. See "Burgerville Composting" sidebar for more information. However, coordinated composting

Burgerville Composting

Individual chains of restaurants have already implemented system-wide composting efforts to complement recycling and increase economic efficiency. In October 2007, Burgerville, a fast food chain in the Oregon and Southwest Washington that markets itself as providing fresh, local, and sustainable food, expanded its recycling and composting program to all of its restaurants.^{xvii} Initial waste analyses found that the fast food chain could divert 85% of its waste, and the company estimated that it generated 340 tons of waste each month.^{xviii} Then, on February 10, 2010, Burgerville began partnership with Coca Cola and the International Paper Company to provide and use compostable and recyclable packaging.^{xix} These additions made it the most comprehensive composting program in the fast food industry in the United States.

program involving multiple businesses have also proven successful. See "Cleveland Businesses Coordinate a Composting Campaign" for more information. A joint contract would allow multiple restaurants and stores to purchase compost hauling services together, at a rate that would be less than if each business had contracted individually. This arrangement would benefit the individual members by reducing the costs of compost hauling services, and it would benefit the contracted hauler by

increasing its number of clients and the amount received for services rendered. Working within Kroger's established composting program would give the group the added benefit of entering a system that already has rules, structure, and parameters regarding how and when services would be provided. *Parties responsible:* The City should contact stores' general managers and owners and bring them together in a meeting where this sustainability goal and efforts to realize it can be discussed. Ultimately, store managers and

Cleveland Business Coordinate a Composting Campaign

Other businesses closer to home have worked together to secure composting services. In 2009 Cleveland's Forest City Enterprises, Quicken Loans Arena, the Cuyahoga County Solid Waste District, waste-hauler Landmark Services, and composter Sagamore Soils began a coordinated composting plan.^{xix} Forest City and Quicken Loans Arena generated compostable waste that was transported by Landmark to Sagamore Soils' local composting facilities, where it is turned into soil amendments for local projects.ⁱ Other, smaller downtown businesses have joined this project, harnessing the economic efficiencies of aggregate purchasing power.ⁱⁱ

Additionally, the Cleveland Browns and Levy Restaurants, the team's catering and food service provider, have started their own composting program. During game weeks, the contracted waste-hauler Rosby's collects between 18 and 24 95-gallon totes from the Cleveland Browns' Stadium.ⁱⁱⁱ

owners will be responsible for participating and bringing this effort to fruition. *Cost:* It is difficult to estimate the cost of contracting composting service, especially when purchasing that service through a group. The number of participants will greatly determine the overall contract cost and each member's portion of it.

Recommendation: Work towards becoming a "Zero Waste" Community.

Hilliard already posts impressive recycling results overall—38.1% in 2011—which exceed both the state and federal EPA targets of 25% and 35% respectively.^{112,113,114} But recycling is only a small portion of the overall waste reduction picture. Hilliard could benefit from efforts adopt and pursue Zero Waste policies as a community. A sidebar introduces some guiding principles for Zero Waste Communities.

While the goal may sound lofty, in practice most businesses, organizations, and communities that adopt a Zero Waste goal aim to achieve extraordinarily high rates of reduction and diversion but will not meet 100%; most use a standard goal of 90% (such as Ohio State Stadium).¹¹⁵ Communities across the world have adopted a Zero Waste goal, such as San Francisco, California (population 805,235), King County, Washington (population 1,931,249), and Carrboro, North Carolina (population 19,582), and many more have adopted some of the guiding principles but not the official Zero Waste goal.¹¹⁶

There are several actions that the city of Hilliard can undertake to put the community on a path to becoming a Zero Waste community.

Short Term (1-3 years)

- » The city should adopt an official goal of becoming a Zero Waste community. Officially adopting such a goal will show leadership and a commitment to truly tackling the issue of waste in all areas of Hilliard. Furthermore, adoption of such a goal will bring attention

Zero Waste Communities: Guiding Principles

Organizations such as the Zero Waste Institute (ZWI) and the Zero Waste International Alliance (ZWIA) work with communities to achieve "Zero Waste" status. The ZWIA has crafted the following definition of zero waste:^{liii}

Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

To achieve the goal of Zero Waste, the ZWIA has adopted guiding principles for communities, including three overarching goals:^{liv}

- » Producer responsibility at the front end of the problem: industrial production and design.
- » Community responsibility at the back end of the problem: consumption, discard use and disposal.
- » Political responsibility to bring both community and industrial responsibility together in a harmonious whole.

to the city as well as increase the potential for additional resources from zero waste and environmental groups to the city to help pay for future initiatives or provide expertise in developing a customized plan for reaching this goal. *Party responsible:* City Council. *Cost:* Minimal costs associated with any resolution.

- » The City should join the State Electronics Challenge (SEC), a voluntary program that provides free support to state, tribal, regional, and local governments to help them better manage their electronic waste through the entire lifecycle, from purchase to responsible disposal.¹¹⁷ With only 25% of electronic devices being recycled as of 2009, electronic waste recycling will be a key area of growth in the recycling market in the coming years and Hilliard can help lead the way as a progressive local government.¹¹⁸ The Ohio EPA and Franklin County MetroParks both joined the SEC in 2011.¹¹⁹ *Parties responsible:* Mayor's Office & Procurement staff. *Cost:* Minimal costs associated with reporting (once per year) and changes in rules/procurement processes to meet SEC requirements. Disposal of electronic waste is generally free.
- » The City should request that SWACO offer specialized collection events, such as Household Hazardous Waste (HHW) events, in the City of Hilliard. SWACO's listing of 2012 HHW events does not include Hilliard, but does include Dublin, Columbus, Westerville, and Grove City.¹²⁰ Since SWACO often funds such programs, the cost to the city would be minimal. *Party responsible:* Hilliard Operations Division. *Cost:* Minimal.

- » Other options for specialized waste collection such as pharmaceuticals should also be explored. The U.S. Drug Enforcement Administration (DEA) sponsors "National Take Back" days twice a year (spring and fall) where residents can drop off pharmaceuticals at sponsored locations (over 5,000 nationally in October 2011) to ensure they are disposed of in a safe and environmentally friendly way.¹²¹ The Hilliard Public Safety Department should contract with the DEA to establish a Hilliard location. *Party responsible:* Public Safety. *Cost:* Will require the use of a space for collection and at least two staff members during the event. The actual collection and disposal of the pharmaceuticals will be handled by the DEA.
- » The City should undergo a waste stream audit to ascertain the composition of waste generated in Hilliard. This information will be valuable as the city plans for the future. Such an audit can be done by a contracted consultant (local options include GT Environmental and EnviroSource) and can vary dramatically in cost depending on the accuracy and scope desired. SWACO also offers assistance for waste audits, including a "Do-it-yourself" checklist.¹²² Such an audit should be undertaken approximately every five years to maintain up to date data for refocusing efforts and keeping up with SWACO's mandated 5-year updates to Ohio EPA. *Parties responsible:* Operations and Planning Divisions. *Cost:* Will vary based on level of accuracy desired and whether audit is done in house or contracted out. Funds should be secured from the Operations Planning Divisions.

Medium Term (3-5 years)

- » The City should develop a Zero Waste plan to guide the next 10-15 years of solid waste management within the city. The plan should

include the goals listed within this section of the Sustainability Plan. The city may wish to work with one of the many Zero Waste organizations active across the county or with another studio course from OSU. The Sustainability Commission should lead the process, with a final deliverable to the City Council. *Party responsible:* Environmental Sustainability Commission. *Cost:* Varies widely based on method of development, but most solid waste plans for small-sized districts in Ohio cost approximately \$20,000 and could be taken from the General Revenue Fund as a special project.

Pay-As-You-Throw

In the quest to reduce municipal waste fees and encourage sustainable behaviors, many cities have switched to “Pay-As-You-Throw” (PAYT) systems of solid waste collection. In such a system, residents pay solid waste collection fees based on the size of bin they request from the collector. Sizes are generally 48-, 65-, or 95-gallon bins. The City of Tucson, Arizona has an excellent explanation of their program.¹⁴ This system is widely considered to be the future of waste reduction as it provides a financial incentive for residents to dispose of less, and it is considered more equitable. It is also considered a serious first step towards achieving a “Zero Waste” community. Cities of all sizes, such as Tacoma (Washington, 194,000), Mount Vernon (Iowa, 3,400) and Wilmington (North Carolina, 75,800) have seen tremendous financial success (in reduced costs) and increased recycling rates.^{lv}

- » As the City budget outlook improves along with the economy, the City should consider providing financial incentives for residential recycling. Such incentives – while not common currently – could include discounts on garbage collection services for residents who consistently recycle or payments (randomized or criteria based) for recycling activities (such as a “Caught You Recycling!” program).¹²³ The City would need to work with Republic Waste to develop a tracking method for this type of program. This would be a temporary program to serve as an incentive while a Pay-As-You-Throw (PAYT) program is being developed and implemented; it would end upon full implementation of PAYT. Parties responsible: Environmental Sustainability Commission and City Council (develop incentives), Operations Division & Rumpke (track and award incentives). *Cost:* Depends on level of incentive. Example (random program): Awarding four \$50 gift cards each week to recycling households would cost \$10,400 each year (plus administrative costs). Example (participation-based program): Providing a discount on solid waste services of \$3 for each month that a household recycles would result in a maximum discount of \$31,911 each month with 100% participation. Taking the recycling rate of 38.1%, a more realistic cost estimate would be \$12,126 per month (\$145,514/year).
- » The City should review its procurement procedures to ensure they are buying as many recycled products as possible. As a leader in the push to become a Zero Waste community, the City should use its purchasing power to ‘close the loop’ in the recycling process by ensuring the

demand for recycled products remains; recycled products also use less energy to create.¹²⁴ *Party responsible:* Mayor's Office. *Cost:* Minimal costs associated with researching recycled options and revising purchasing policies.

Long Term (5-10 years)

- » The City should transition to a volume-based solid waste collection system – also known as Pay-As-You-Throw (PAYT). PAYT programs provide incentives for residents to recycle and reduce their overall waste generation by converting their collection services into a per-unit system (such as electric, fuel and natural gas); when individuals pay for any service by a unit, they will more actively pursue methods of conservation and reduction. PAYT programs provide economic savings for consumers and cities, are better for the environment, are more equitable and serve as a strong education tool for promoting more recycling.¹²⁴ Several states, including Iowa, Minnesota, Wisconsin and Massachusetts require incorporated communities to provide some type of PAYT program.¹²⁵ PAYT programs have also resulted in substantial savings for communities of all sizes and the U.S EPA provides a calculator for communities to determine how much they could save by transitioning to a PAYT program.^{126,127} These programs have also shown significant reductions in total waste generation ranging from 40-60%.¹²⁸ The Ohio EPA is actively promoting PAYT programs throughout the state as an efficient way to reach the statewide recycling goals of 25% residential/commercial and 50% overall.¹²⁹ The city would need to make PAYT a priority during contract negotiations with Republic Waste in order to make the transition. *Party*

responsible: Hilliard Operations Division. *Cost:* Varies widely based on level of infrastructure investment needed. For more information on cities that have implemented PAYT systems, please see the “Pay-As-You-Throw” sidebar.

Recommendation: Work to increase commercial and public space recycling

During initial phases of work on this sustainability document, city officials expressed a desire to increase recycling in the commercial and public sectors. While Hilliard has a recycling rate of 38.1% (2011), the City can undertake several initiatives in the commercial and public sectors to increase the rate of recycling for the community as a whole.

Short Term (1-3 years)

- » The City should conduct an audit of public spaces to ensure sufficient access to public recycling opportunities exist. Areas of focus should be event venues, public parks and the Old Hilliard District area. The audit should be a joint effort between the Hilliard Planning Department and the Parks and Recreation Department. *Parties responsible:* Planning and Parks/Recreation Divisions. *Cost:* Minimal; audit can be done with normal working duties.
- » The City should pass an ordinance requiring commercial businesses within city limits to participate in recycling activities. Several cities and counties across the nation have such ordinances, including 14 cities in California alone.¹³⁰ The Institute for Local Government (ILG) provides a plethora of resources on their website for developing such an ordinance.¹³¹ *Party responsible:* City Council. *Cost:* Minimal; normal costs associated with any ordinance and public hearings.
- » The City should approach the Hilliard Area Chamber of Commerce to identify specific industries to delineate and implement targeted

efforts to increase recycling activities by consumers at those businesses. While the initial efforts to bring parties to the table should be executed by the city, the Chamber and individual businesses should make the final decisions and cover the costs. Examples of places to target may include:

- Gas stations/Convenience Stores: Recycling bins for bottles and cans
- Snack shops/Restaurants: Small composting bins for consumers to place their organic waste in – they should be emptied every day by the business

Party responsible: Mayor's Office. *Cost:* Minimal; Chamber and businesses would cover implementation costs.

- » Engage the Hilliard Area Chamber of Commerce on the issue of commercial recycling. The City should work with the Chamber to establish a joint committee consisting of small, medium and large businesses as well as the President of the Chamber, the Hilliard Mayor and a representative from City Council, the Operations Department, the recycling industry and two consumers. The committee would be dedicated to helping commercial businesses recycle at higher rates. The committee should meet at least quarterly to discuss emerging ideas and issues. *Parties responsible:* Mayor's Office and Hilliard Area Chamber of Commerce. *Cost:* Minimal; Chamber should provide administrative support.

Waste, Recycling, and Composting

Recommendation: Work toward reduced indoor water usage.

According to the U.S. EPA, 30 to 70% of residential water is used outdoors. This includes watering lawns, washing cars, and watering gardens. Indoor use, on the other hand, accounts for the remaining 70 to 30% of water use. The remaining water use consists of toilets accounting for 19%, washing

machines using 15%, showers using 12%, faucets using 11%, and leaks and other uses accounting for the remaining 13%.¹³² A simple way to lower the overall water use in Hilliard is to incentivize water friendly yards and homes. For example, the City of Las Vegas, Nevada implemented a program to incentivize low to no water residential landscaping. This was done by offering cash for residents who landscaped their yards to require little water. This program was able to save 17% of the water being used in the city.¹³³ If Las Vegas was able to reduce its water consumption being in such an arid environment, then Hilliard, being in a temperate environment, has the opportunity to conserve even more.

A water efficient lawn incorporates multiple techniques. These include but are not limited to putting turf in useful areas, water efficient systems for lawn irrigation, application of mulches, plant selection, and lawn maintenance.¹³⁴ Some other techniques are mentioned by the Ohio Department of Natural Resources (ODNR). These include watering lawns before 10:00 am, measuring the amount of water that goes on to the yard, letting grass grow taller in the summer, and proper sprinkler placement. The practices presented by ODNR are rather simple and can save residents as well as businesses large amounts of water.¹³⁵ Another option is to promote the use of drought resistant slow growing grasses. These types of grass require less mowing and less water, and many are disease resistant and may not require as much fertilizer.¹³⁶

In the context of indoor water use, the EPA shows that most water is used in the bathroom.¹³⁷ Because this water use is dependent on fixtures, upgrades to toilets, faucets, and shower heads can many times significantly lower the amount of water being used. When this is paired with water saving behaviors, such as not running water continuously when shaving or brushing teeth, the water savings

in a home can be rather dramatic. An example of a municipality similar in size to Hilliard focusing on indoor water use is Ashland, Oregon. They implemented a program to give financial as well as technical assistance to residents for leak repair, shower head replacement, toilet replacement or retrofit, and water rates based on conservation. From 1992 to 2001, Ashland reduced its water demand by 395,000 gallons per day.¹³⁹ A more local example of a municipality having such a program is Villa Park, Illinois. Villa Park has a population of 22,517 people with 70% of their homes being owner-occupied. Their program, which started in 2010, was oriented mainly on fixing toilet leaks and other repairs, rain gauges for lawns, a water pledge, and rain barrels. The village hopes to reduce 10% of water use per person for a total of 22,517 gallons of water per day.¹⁴⁰

It would be recommended to use an approach to both encourage good behavior and discourage bad behavior. In tough economic times it may be hard to give large incentives to homeowners and, restrictions on water use would most likely only be permissible during drought events. Taking this into account, it would be logical to have a phased approach to curbing the residents' water usage. The first step would be to build public awareness of water use as well as tips they can easily utilize to decrease their water use. The U.S. EPA, ODNR, and Franklin County Soil and Water Conservation District are good sources of information on these topics. The first step would be to decide on a particular focus and use these sources to create a fact sheet for homeowners and businesses.

The next phase in this program would focus on incentives for homeowners to use less water. This should start with purchasing equipment mentioned in the educational fact sheets and giving them to homeowners who sign a pledge. This can be coupled with

other initiatives: for example, water and energy reduction. The specific items or materials that are donated to residents should be the ones that are both inexpensive and effective. Five-gallon buckets and rain gauges generally cost less than \$5.00 each^{141,142} and a toilet repair kit costs around \$10.00 from many home repair stores.¹⁴³ Fixture replacement would be slightly more pricy with low flow shower heads costing \$20.00 and up and low-flow toilets costing \$100.00 and up.¹⁴⁵ It would be best if equipment or fixtures could be purchased as bulk items so that the unit price would be lower. It would be worth also showcasing residents who sign the pledge, or partner with local businesses to get them a discount on specific items. Local businesses as well as a volunteer system could be a better approach for the distribution of expensive fixtures. If the program is successful in getting residents to sign on, then financial incentives for landscaping should also be considered. A program in Hilliard like the one in Villa Place, Illinois that aimed to decrease residential water use by 10% would conserve a total of 50,815,001 gallons of water or an approximate average of 18 gallons of water per person per day.¹⁴⁶

The final phase would be to instate some regulatory mechanisms to prevent water waste. As with current storm water regulations in Hilliard, new construction projects could be required, or incentivized, to incorporate water-friendly yards into their site designs. This would most likely benefit the person building as they would have less long-run costs as they would use less water. A more hard-line approach would be to instate regulations during summer months to conserve water. These could include penalties for sprinklers or irrigation systems that excessively water (for instance, spray during mid-afternoon), inefficient sprinkler systems, and poor pool maintenance (such as leaky or uncovered pools not in use). This could also be accompanied with a water audit program as implemented in Ashland, Oregon's program.¹⁴⁷ This program could give eligible residents a water conservation audit that will determine how much water they waste with

outdated or inefficient appliances. Participants would be eligible for a discounted rate for water efficient fixtures such as low flow showerheads and toilets.

Short Term (1-3 years)

- » Create and distribute a fact sheet for water conservation. This can be done digitally at first to reduce costs. The number of printed copies would depend on how they are going to be distributed. *Party responsible:* Environmental Sustainability Commission. *Cost:* \$0.25 per page to print.
- » Establish the administration behind the residential and commercial conservation pact. This can be done by Hilliard's Sustainability Commission with little effort. The administration would be people who would be in charge of receiving information from residents, recording it, and giving a quarterly report of the number of people in the pact. They will also be in charge of determining who is eligible for future incentive programs as well as distributing conservation materials to members of the pact. *Party responsible:* Environmental Sustainability Commission. *Cost:* Labor if not volunteer work.
- » Determine the criteria for residents to get assistance from the pact. This should be based on the price paid for utilities or on other predetermined factors. *Parties responsible:* Environmental Sustainability Commission and/or Conservation Pact Administration. *Cost:* Labor if not volunteer work.

Medium Term (3-5 years)

- » Talk with local businesses for an incentive package for pact members. This would give advertisement for businesses, who if residents are saving money on utility bills are may see more

business. *Parties responsible:* Sustainability commission and or Conservation Pact Administration. *Cost:* Labor if not volunteer work.

- » Begin advertisement and recruitment of residents to the conservation pact. Begin gathering information on their usage habits such as utility bills, composting, commuting, and local versus regional shopping with online or paper surveys as well as short interviews. *Parties responsible:* Sustainability Commission and/or Conservation Pact Administration. *Cost:* Labor if not volunteer work, \$0.10 per page if paper surveys are distributed.
- » Distribute tools or materials for water conservation to residents who are eligible. This would depend on the specific program. It would be best to stagger the distribution of materials dependent on need. A conservation audit should also be performed before any assistance is given for fixture repair or replacement. This would be done by looking at previous water bills and determining if the utility usage is above the normal. This could be done by the Conservation Pact with relative ease. Pact members should be showcased in community events. This could be accompanied by some form of contest that would give a non-monetary prize such as a name on a plaque at City Hall, or donated goods. *Parties responsible:* Sustainability Commission and Conservation Pact Administration. *Cost:* Carwash buckets and rain gauges would cost a total of \$4.40 per person. Home fixture replacement could cost \$120.00 and up if fixtures were bought outright. A cheaper way would be to reimburse residents in the program for some of the costs of the fixture. The Audit will be dependent on

labor costs if not volunteer work.

- » Propose water efficient landscaping for new construction as standalone ordinance or as section of storm water management requirements. This would just need an amendment to the current building codes. This could offer an incentive for a reduction of the storm water utility. *Parties responsible:* City of Hilliard as enforcement with the Sustainability Commission as the advisory body on the specifics of the ordinance. *Cost:* Labor for the composition and proposal of a City ordinance as well as research on the part of the Sustainability Commission.

Long Term (5-10 years)

- » Using data from conservation pact members determine effectiveness of the program to date. This will determine how effective the pact's efforts have been. This will also determine how close to the pact's original goal has been reached. Determine if ordinances during summer months to curb water use is viable. This would pertain only to outdoor water use. *Parties responsible:* Sustainability Commission and Conservation Pact Administration. *Cost:* Dependent on future rates.
- » Begin to offer assistance to residents for landscaping elements to lower their dependence on watering yards. This is best as a long term program as landscaping modification would have a higher cost, and the effectiveness of the lower-cost parts of the program should be considered first. *Parties responsible:* Sustainability Commission and Conservation Pact Administration. *Cost:* Dependent on future rates.

- » If water goals have been reached, then Conservation pact would begin to focus more on other conservation issues such as electricity, transportation, or storm water. *Parties responsible:* Sustainability Commission and Conservation Pact Administration. *Cost:* None.

Recommendation: Reduce the amount of water from Hilliard that enters the Columbus Public Sewer System and streams.

Stormwater management practices will be an important factor in Hilliard's efforts to achieve higher levels of sustainability. Using their existing 2009 Storm Water Plan as a foundation for growth will be key. Educational programming within the community will similarly be a key to success.

Many sustainable stormwater and water conservation practices are relatively easy to implement. The City should start by installing and promoting public examples to demonstrate different methods of stormwater control. Two examples include rain gardens and barrels placed in public parks and at public buildings. These devices retain rain water for alternative uses before returning the water to the watershed. Furthermore, rain barrels and gardens are easy to build, monetarily inexpensive, and aesthetically pleasing.¹⁴⁸ Rain gardens can require little maintenance when native species are used appropriately. Drought-resistant plants also conserve water resources because they require less watering than turf grass.¹⁴⁹

Communities such as South Euclid, Ohio have rain barrels and gardens written into their Codified Ordinances, and Columbus has a rain barrel program within the GreenSpot initiative. Worthington, Ohio has a demonstration garden that was installed in 2008. The garden was placed at the Worthington Service Complex where it is 300 square feet and collects rain from Worthington-Galena Road, Highland Avenue, and the service complex itself.¹⁵⁰ Worthington sought the expertise of Franklin Soil and Water, which will be a useful resource Hilliard when implementing one.

Another resource will be the Central Ohio Rain Garden Initiative who has several rain garden projects in the area. Hilliard could enact ordinances that define and permit the use of rain gardens, barrels, and green roofs in Old Hilliard, residential, and other commercial areas. City Staff should also work with homeowner associations that currently have covenants against the use of these sustainable stormwater management techniques. The City of Hilliard could offer rain barrels at a discounted rate as well as providing educational information how to use them.

Hilliard should enact ordinances requiring the use of porous pavements in all new construction and retrofitting. The City should consider implementing incentives and/or requirements for big box stores and other commercial uses that need overflow parking. Using porous concrete can decrease the need of retention and detention ponds for new development especially ones with large parking lots. Porous concrete can help residents and developers to lower their ERU fee in Hilliard. As stated in the Opportunity Assessment an ERU is 1 ERU per 2,000 square feet and the monthly charge is \$1.95 per ERU.¹⁵¹ Porous concrete has a significantly lower life cycle cost when compared to other asphalt.¹⁵² It may have more upfront costs associated with it but saves money on maintenance due to its high durability and needing fewer repairs. Porous concrete will provide many benefits to the community as well as help mitigate stormwater management issues.

Short Term (1-3 years)

- » Expand educational and awareness efforts to the public about stormwater management. This would be obtained through consistently updating the website with new information and data that relate to stormwater management. Create and place brochures throughout the community that show steps for residents to take to address stormwater management issues. Once the brochure

is made it should be available on the website. The EPA provides good examples of brochures that show important information in regards to stormwater management.¹⁵³ A local example to use could be from the City of Upper Arlington, who has made a brochure highlighting the stormwater management plan for the city and the fees that will affect the residents.¹⁵⁴ Hilliard can partner with the Franklin County Stormwater Management Team. Promote the credit program more heavily through outreach since to date there has been zero applications. *Party responsible:* Hilliard Engineering Division. *Cost:* Time and printing of the brochures will be the cost, but can be free if Hilliard partners with Franklin Soil and Water.

- » Create a demonstration rain garden in an accessible area in the city, at the community center would be an ideal location since it will be close to the newly constructed community gardens as well as having the space to hold workshops. Another location that would work would be to locate it by the municipal building. Also, should connect the community gardens and rain gardens by providing the various locations on a map that is on a brochure as well as online. This will give more options for community members to visit one. Again a partnership with Franklin Soil and Water would be helpful in the planning process as well as providing grant opportunities. *Party responsible:* Environmental Sustainability Commission. *Cost:* A rain garden costs \$3 to \$5 per square foot when installed themselves and from \$10 to \$15 per square foot when professionally designed and installed.¹⁵⁵
- » Install rain barrels on all City buildings and track how

much water has been collected each week. *Parties responsible:* This would be the responsibility of the City to put the barrels on City buildings and up to the Environmental Sustainability Commission to collect the data on a volunteer basis. *Cost:* Columbus offers rain barrels at discounted price of \$45 after residents went to a stormwater management workshop.¹⁵⁶

- » Implement a “Clean Your Gutters Day” and provide incentives for residents to participate such as supplies. This program would happen once a year that truly tries to educate and bring awareness in a civic engagement activity. *Party responsible:* The Environmental Sustainability Commission to gain awareness and apply for grants. *Cost:* The only cost would be for brochures and any supplies to help incentivize residents to participate. This would depend on how many residents would participate and should secure funds through grants before implementing the program.

Medium Term (3-5 years)

- » Implement a new guideline that would have all new construction projects especially where stormwater management is a concern use porous concrete. This could be by providing incentives for the City and developers to use porous pavement on all roads, trails, and roundabouts. As well as provide incentives for private developers to use porous pavement by giving them credits or increasing their development rights like building height or parking spaces allotment. *Parties responsible:* The City of Hilliard and Hilliard Engineering Division. *Cost:* Porous concrete

can cost \$1.00-\$2.00 per square feet for both materials and installation.¹⁵⁷

- » Provide incentives and resources for community members to build their own rain garden on their residential properties. This would be through workshops and brochures. *Parties responsible:* This would be the responsibility of the City to provide the barrels to residents and up to the Environmental Sustainability Commission to gain awareness. *Cost:* Once the GreenSpot initiative starts have a rain barrel program similar to that of Columbus, Hilliard should work with various vendors or partner with the Columbus to provide the barrels at a reduce cost to residents.

Public Awareness

Recommendation: Increase public awareness of sustainable behaviors.

Public awareness and community participation campaigns can have a tremendous effect on the success of implementing sustainability measures. In recent years, little effort has been made to increase public awareness of these issues in Hilliard. However, the Environmental Sustainability Commission was formed in order to “review existing green policies and advise City Council, the Mayor, and City officials in the initiation or development of programs that will create or enhance sustainable practices within [the] community.”¹⁵⁸ The formation of this Commission is the first step in raising awareness of sustainable issues within the City entities of Hilliard. However, much more can be done to further engage the public on these issues.

Short Term (1-3 years)

- » While an initial “Sustainable Hilliard” survey has been conducted, a more in depth survey of awareness of sustainable issues in general would help determine local support for these concepts.

The initial survey was conducted online and focused primarily on walk-ability and transportation issues in Hilliard. However, a survey focusing on sustainable issues and ideas (such as those listed above) could help direct Commissioners, members of City Council, the Mayor, and other public leaders where and how to begin the implementation process. Examples of questions that would provide optimal information could be: "What is a rain barrel?", "What is the purpose of a green roof?", and "What does it mean to be a zero waste community?". This survey could be done using an online survey maker such as SurveyMonkey. The "basic" plan is free and includes 10 questions per survey with 100 responses available.¹⁵⁹ The "select" plan has unlimited questions and responses and is \$17 a month.¹⁶⁰ A paper survey would be an alternative way of gathering information from the public. The Environmental Sustainability Commission would be responsible for making and distributing the survey to Hilliard residents. *Party responsible:* Environmental Sustainability Commission. *Cost:* Free if basic online survey is used, \$17 a month if select online survey is used. Approximately \$0.10 a page if paper is needed.

- » Understanding the extent of discussion on sustainability issues in the Hilliard City School District would help indicate student exposure to these issues. A simple way to obtain this data would be to survey principals, teachers, and school children. This survey could also be done via SurveyMonkey. *Party responsible:* Environmental Sustainability Commission. *Cost:* Labor if not volunteer work.
- » Once the Commission is aware of where Hilliard residents, businesses, and schools stand, stronger efforts could be implemented to increase public awareness. Examples of these stronger efforts are public meetings, the creation of an environmental website for quick information, and the use of media

to relay information in different locations (flyers, bulletins, etc.). Currently, the City's website does not mention the Environmental Sustainability Commission other than the page which describes the Commission. In addition, the City's Facebook page is lacking information on the Commission and sustainability issues in general. *Party responsible:* Environmental Sustainability Commission. *Cost:* Labor, \$0.10 a page for flyers, the cost to create a website (free if designing own, starting at \$8.00/hour if hiring a personal designer).¹⁶¹

- » Finally, beginning a dialogue with the Hilliard City School District about implementing sustainability in the elementary, middle, and high schools would help increase the awareness of sustainability issues in Hilliard's schools. *Party responsible:* Environmental Sustainability Commission. *Cost:* Labor if not volunteer work.

Medium Term (3-5 years)

- » Use media to further engage the residents of Hilliard on sustainable issues. Specific ways would include bigger signage and commercials on the City's public broadcasting channel to encourage more sustainable lifestyles. *Party responsible:* Environmental Sustainability Commission. *Cost:* Signage and average commercial cost can be as low as \$1000.¹⁶²
- » Another way Hilliard could increase public awareness of sustainability issues would be to show how the City is being a leader in this field. Tours of City Hall would show people how the City is becoming more sustainable (for example, recycling bins, LED bulbs, automatic lights,

etcetera.). The local school district could also be engaged in this activity by taking yearly field trips to the City Hall. By demonstrating simple things that Hilliard is doing, people could see how easy living sustainably can be. Both the Environmental Sustainability Commission and the Director of Public Service would be involved in this recommendation. *Party responsible:* Environmental Sustainability Commission. *Cost:* Labor if not volunteer work.

- » A final way to engage the public and increase their awareness in the next 3-5 years would be an increase in public/demonstration gardens. In these demonstration gardens, the Environmental Sustainability Commission would inform the public on the purpose of community gardens, how growing your own food is a sustainable choice, and the purpose of rain barrels. These medium-term recommendations require organization, but can be accomplished with very little cost. *Party responsible:* Environmental Sustainability Commission. *Cost:* Labor if not volunteer work.

Long Term (5-10 years)

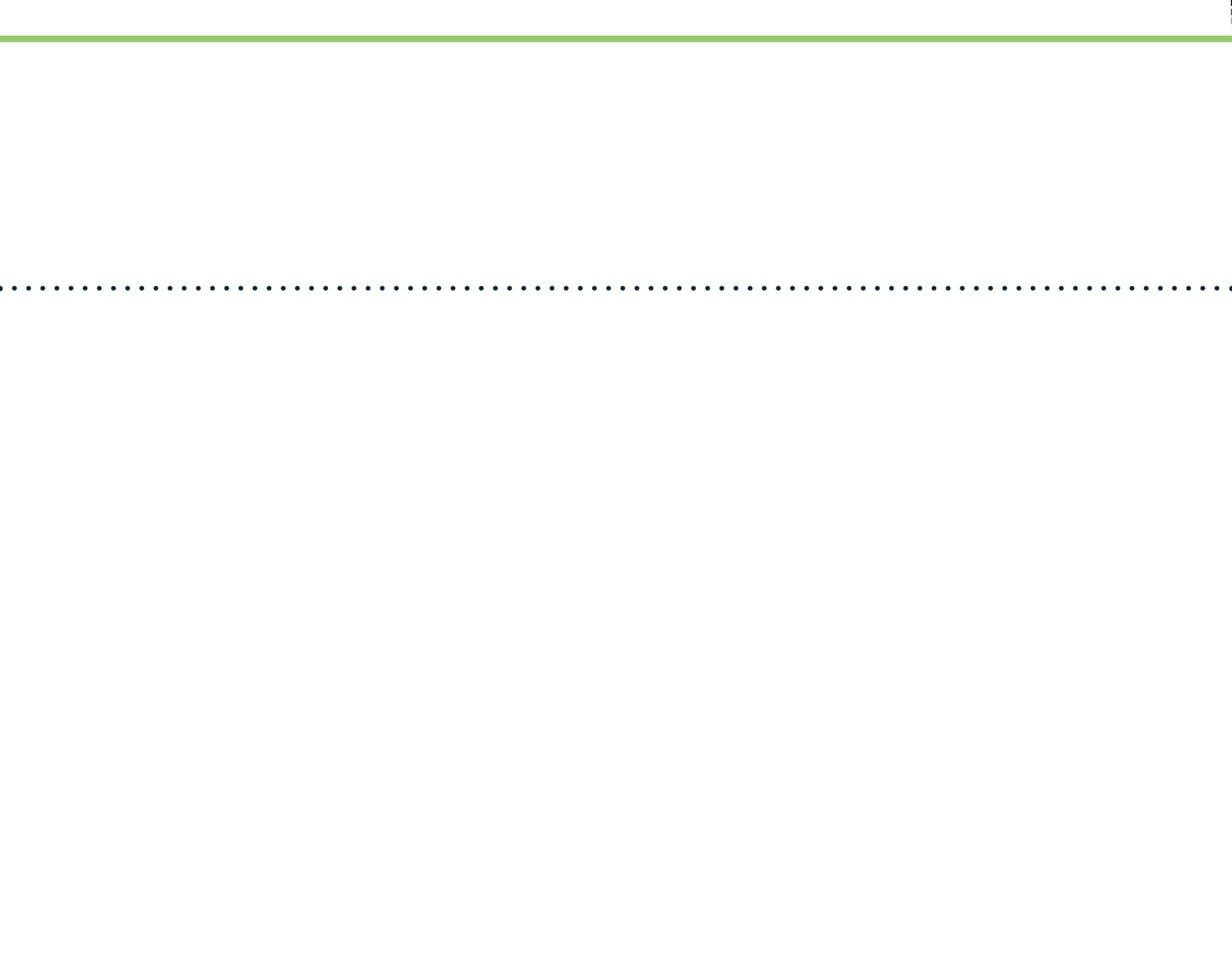
- » A long-term goal for raising public awareness in Hilliard would be to change the curriculum in the Hilliard City School District to include sustainability issues. The Environmental Sustainability Commission would meet with the Superintendent of the school district to discuss implementing sustainability principles into the curriculum for the elementary, middle, and high schools in Hilliard. Another step beyond the curriculum change would be to

Springboro, Ohio

Even small cities can take action in becoming more sustainable. For example, the city of Springboro, Ohio has approximately 18,000 citizens.^{lvi} However, the city has taken steps in becoming more “green.” Some of these examples include the Recycling Program, the Parks Solar Power Project and the Leaf Collection Program. Additional efforts include the making of a Bicycle and Pedestrian Advisory Committee and the Park Board.^{lvii}

mandate recycling bins in the schools as well as use recycled trays for in the cafeterias. *Party responsible:* Environmental Sustainability Commission. *Cost:* Dependent on future rates.

- » As public awareness in Hilliard increases, the City should increase its awareness too. The recommendations listed above are starting points. In 5-10 years, Hilliard would be able to implement larger, more sustainable ideas in the Municipal Building and throughout the City buildings. As steps towards a more sustainable Hilliard grow, the public awareness of these issues would also grow. Similarly sized cities, such as Springboro, Ohio, have started small and are increasing their efforts in awareness of sustainable issues.¹⁶³ Refer to sidebar “Springboro, Ohio.” *Party responsible:* Environmental Sustainability Commission. *Cost:* Dependent on future rates.
- » Upon implementing recommendations discussed in other sections of this report, another survey could be done to measure the increase in public awareness in Hilliard. *Party responsible:* Environmental Sustainability Commission. *Cost:* Dependent on future rates.





Land Use and Urban Ecology

LUUE Vision

As a city committed to sustainability, Hilliard's approach to development will both respect the natural environment and improve connectivity. By improving connectivity between its residents and places, Hilliard will reduce its reliance on automobiles, improve walkability, and increase access to common amenities such as retail centers, parks, schools, and work.

Hilliard will realize this vision by accomplishing the following goals:

- » Improve bike and pedestrian connectivity to provide safe and direct travel routes and encourage people to bike or walk as a mode choice.
- » Provide convenient access to parks to distribute open spaces and parks evenly throughout the City and provide healthy recreational opportunities to every resident.
- » Provide convenient access to retail centers to reduce the reliance on automobiles.
- » Encourage mixed-use, neighborhood-centered developments to create vibrant, walkable neighborhoods.



LAND USE
& URBAN
ECOLOGY

LUUE Indicators

Bike Path Connectivity

Background

Despite the recognition that bicycle travel is beneficial to the environment and health, the majority of bicycle travel in the United States is for recreational purposes.¹ The 2010 American Community Survey one-year estimates show that only 0.3% of the population in Ohio travel to work by bicycle.² Commuting data for Hilliard was not available from the 2010 3-year estimates; however, nationally, that number is only slightly higher than the Ohio population with 0.5% of the total population commuting to work by bicycle.³ Individuals who ride their bike to work can meet their recommended levels of physical activity and can reduce environmental impacts of automobile travel. However, to increase ridership, bicycle infrastructure must be available. A study in Portland, Oregon that tracked bicycle trips using GPS devices showed that riders commuting to work preferred to ride on streets with bicycle infrastructure, such as bike lanes, marked bike paths, multi-use paths, or low-traffic streets.⁴ Riders also linked trips together and made numerous stops going to and from work. Finally, the median bike trip length for utilitarian riders was three miles.⁵ This suggests that three miles is a rule-of-thumb distance for what the average person is willing to ride for utilitarian purposes.

These findings indicate that a well-connected network of bicycling routes (paths and lanes) will encourage individuals to ride their bikes more for utilitarian purposes, such as traveling to work or going shopping. If people

have easy access to bike paths or roads with bike lanes from their homes, and there are convenient neighborhood retail services or work options within three miles, some individuals may choose to ride their bike instead of driving a car. In Hilliard, the longest stretch of bike path currently is the Heritage Trail bike path, which is mostly used for recreation. Thus, a key sustainability indicator for Hilliard is to measure bike path connectivity.

Measure

Bike path connectivity measures how robust the bicycle infrastructure is in Hilliard. The indicator is measured using GIS data comparing the number of bicycle network links to the number of nodes. Links are the bike path or bike lane segments between intersections and nodes are the actual intersections. The unit of measure for segments is not relevant because the calculation is just using the total number of segments available, not the measured length of each segment.⁶ A higher index means there are more route choices or more routes available with dedicated bicycle infrastructure. A score of 1.4 is the minimum recommended for a walkable community,⁷ so the goal for this indicator is that Hilliard will maintain a bike connectivity index of 1.4 or greater.

Description

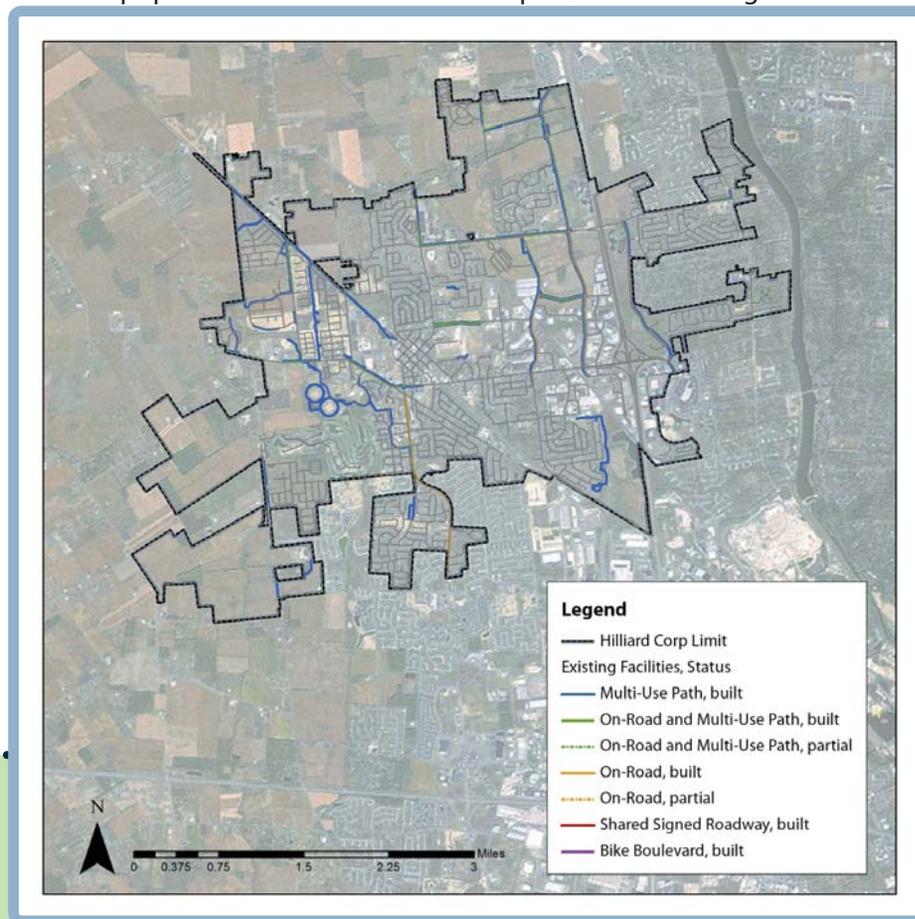
Currently, the City of Hilliard has 24.65 miles of bicycle or multi-use paths, consisting of 3.52 miles of shared lane markings (sharrows) and 21.13 miles of multi-use paths. Using the City’s GIS data, the current connectivity index is 1.17, which is less than the target measure. This analysis can be seen in Map 3.1 and includes all of the current streets with bike lanes, multi-use paths, and sharrows. The City GIS Coordinator can conduct this analysis using data that

the City currently maintains in conjunction with community plan updates to monitor the progress towards achieving the goal of improved bike path connectivity.

Percent of Streets with Pedestrian Infrastructure

Background

Like bicycling, walking provides a healthy alternative mode of transportation that reduces reliance on automobiles. However, in 2010 only 2.3% of the Ohio population walked to work.⁸ People are more willing to walk if



» Map 3.1: Existing Bike Facilities in Hilliard
Data Source: City of Hilliard, 2011

there are high-quality facilities for walking that are safe and direct to reduce the distance to destinations.⁹ If there are quality sidewalks or multi-use paths available, and if there are pedestrian features such as signalized intersections and striped sidewalk crossings, individuals will be more likely to walk to work or retail that is within a close distance. Hilliard should strive for sidewalks on 100% of their streets to improve walkability throughout the City.

Measure

This indicator measures how well Hilliard provides pedestrian infrastructure to encourage walking. This indicator specifically uses GIS data for sidewalks and multi-use paths to calculate the percent of streets with pedestrian infrastructure. For this measure, it is simplest to use a pure percentage of the streets with sidewalks, either on one or both sides of the street, since that data is already tracked by the City and can be calculated easily by the GIS Coordinator.

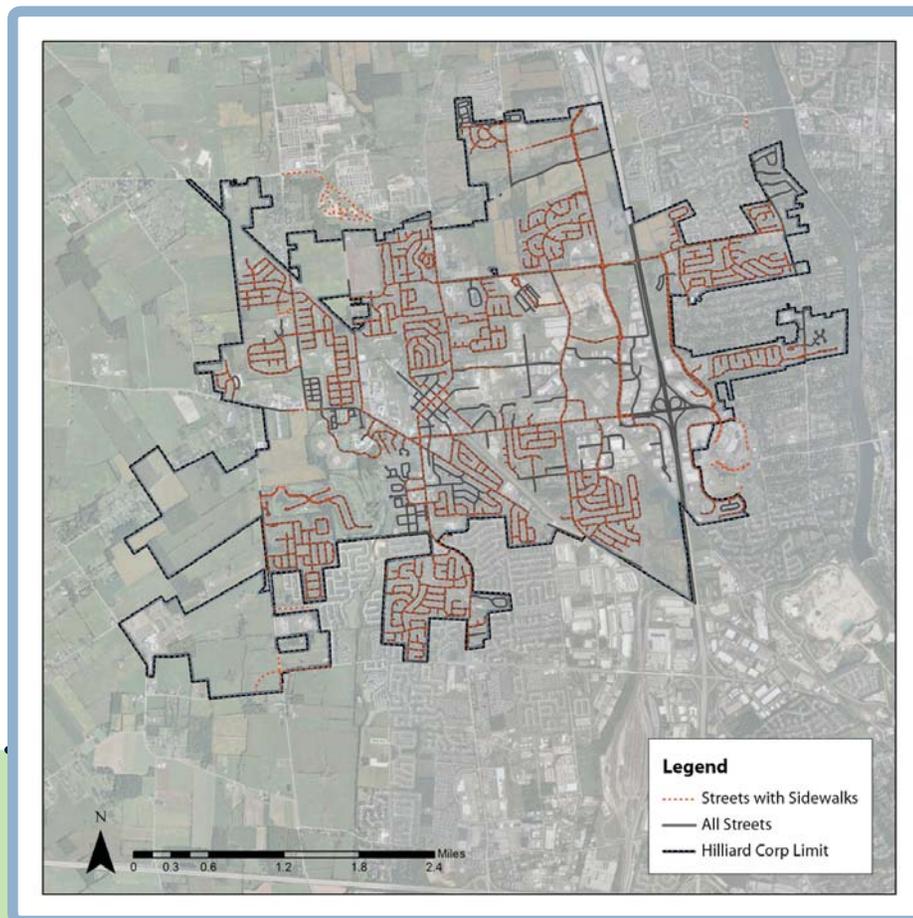
Description

According to analysis of existing conditions, the City of Hilliard has 21.13 miles of multi-use paths and 162.20 miles of sidewalk. Using the City's current GIS data for streets with sidewalks or adjacent multi-use paths, the City of Hilliard currently has 62.5% of its streets with pedestrian infrastructure (107.96 miles of streets with sidewalks out of 172.81 total miles).¹⁰ This analysis can be seen in Map 3.2. It does not include I-270 because it is a federally-maintained Interstate highway and pedestrians and bicyclists are prohibited from using the highway. The City GIS Coordinator can conduct this analysis in conjunction with community plan updates to monitor the progress towards achieving the goal of improving pedestrian connectivity and walkability throughout the City.

Access to Parks and Public Spaces

Background

The value of parks and other public spaces like libraries and schools to community health and sustainability has been established by numerous case studies. Research indicates that people who live in



» Map 3.2: Streets with Sidewalks in Hilliard
Data Source: City of Hilliard, 2011

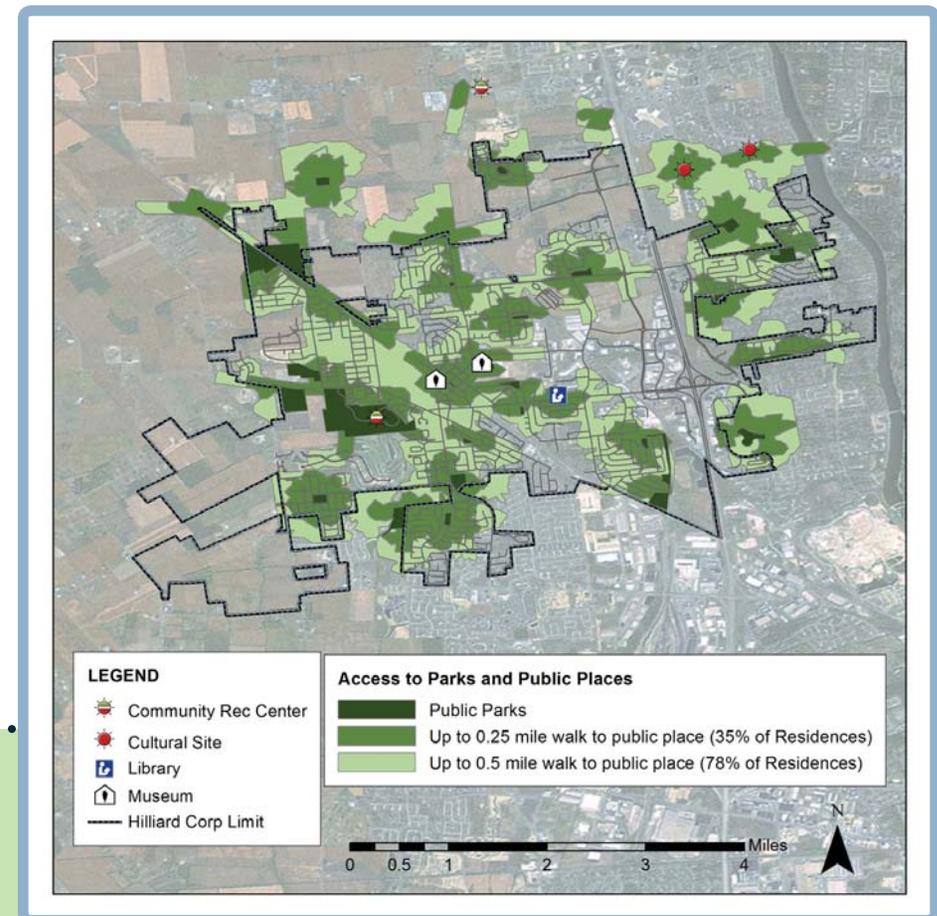
close proximity to a park are healthier than those who do not.¹¹ Walking and cycling to a school is correlated with increased physical levels of activity in school children.¹² There is also a correlation between the size of the park and physical health: those who live near large parks engage in more recreational activity than those who live near comparatively small parks.¹³ Park access is especially important given that people in the United States have become less physically active. A national study conducted in 2000 found that only slightly more than a quarter of Americans get the recommended level of weekly physical activity.¹⁴ Though many factors influence levels of physical activity, those who live in areas they consider attractive are more likely to engage in physical activity than those who do not, and proximity to open space increases attractiveness.¹⁵

Green spaces like parks also contribute to environmental sustainability. Recreational land uses like parks and open space help mitigate the urban heat island effect.¹⁶ While the urban heat island effect is most commonly associated with dense urban areas, it is also linked with the increased vehicle usage that occurs with low-density development patterns.¹⁷ The type of green space makes a difference: increased tree cover in developed areas captures pollutants, provides habitats, and mitigates the urban heat island effect even further.

Measure

This indicator measures how easy it is for Hilliard residents to access parks or public places such as libraries, museums, community recreation centers, or cultural sites. Specifically, this is a calculation of the percent of households that are within a quarter mile of a

park or public place. This distance is often used as an industry standard for the distance that most people are willing to walk for errands and to transit stops.¹⁸ This measure can be calculated by the City GIS Coordinator using existing street network data. The Network Analyst tool in ArcGIS calculates walking or biking distance along existing paths to the nearest park or public place for each residential parcel. By determining the percentage of households within a path distance of a quarter mile to public parks, the City will be able to evaluate how easy it is for residents to access parks without having to drive to them.



» Map 3.3: Park Accessibility Data Sources: City of Hilliard, 2011; MORPC, 2011

Description

The 2011 Comprehensive Plan evaluated half-mile and one-mile distances from public parks, which roughly translate into a 10 minute walk or three minute bike ride for a half mile and a 20 minute walk or six minute bike ride for a mile. Our calculation of the percent of households within a quarter mile of parks and public places showed that 35.1% of Hilliard residences are within a quarter-mile of a park or public place and 78.5% are within a half-mile. Additionally, 8.8% of residences in Hilliard within a quarter-mile of a school, and 42.3% of residences are within a half-mile of a school. This analysis, which can be seen in Map 3.3, also includes public spaces located outside of Hilliard that are within a quarter mile of households located within Hilliard.

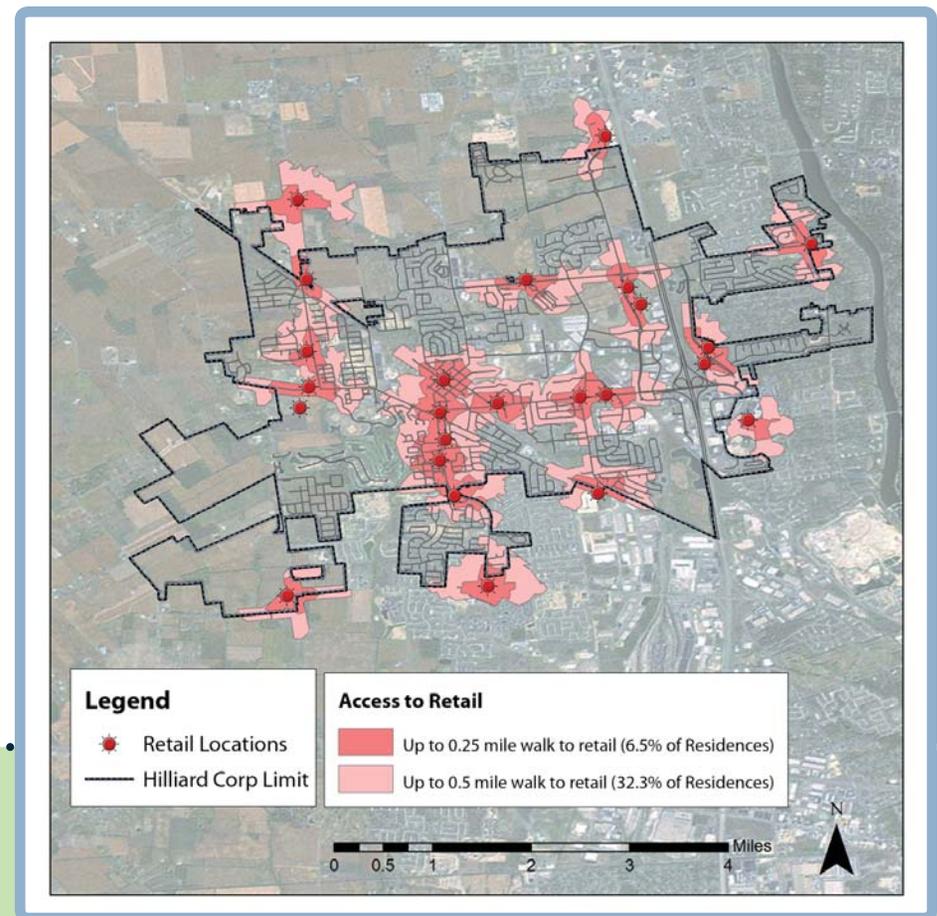
Access to Retail

Background

The planning literature is supportive of the argument that people make their choices about whether to walk places or not based on a number of local factors including the mix and density of land uses, connectivity, attractiveness of the area, safety, and quality walking infrastructure such as sidewalks.¹⁹ An important feature of mixed uses is proximity of residential uses to commercial and retail uses. One of the main factors contributing to neighborhood-centric development is whether or not it is possible for residents to access retail options without the use of a car. People need to access a variety of different services, including retail. If that retail is in walking distance, contributing to a local mix of uses where necessary services are nearby, residents will be able to walk or bike there. If the only practical way to get to retail centers is by car, then a great opportunity for vehicle trip reduction is missed.²⁰

Measure

The access to retail indicator provides insight on how easy it is to access retail in Hilliard. Specifically, this is a measure of the percent of households that are within a quarter mile of a retail center of any size. As noted previously, this distance is often used as an industry standard for the distance that most people are willing to walk for errands and to transit stops.²¹ By discovering what percentage of households are within a path distance (distance along the road, not as the crow flies) of a quarter mile to retail centers, one can judge



» Map 3.4: Retail Accessibility Data Source: City of Hilliard, 2011

to what extent the residents of Hilliard are encouraged or discouraged from walking based on distance.

Description

This measure can be calculated by the City GIS Coordinator using existing street network data. The Network Analyst tool in ArcGIS (or other similarly named tools in other GIS software) calculates walking or biking distance along existing paths to the nearest retail center for each residential parcel. A similar measure was used in the City's recent Comprehensive Plan to calculate half-mile and one-mile distances to retail centers. This measure includes major retail centers that are just beyond the Hilliard border that are still within walking distance of Hilliard residents. Currently, 6.5% of Hilliard residences (612 out of 9444) are within a quarter-mile of a retail center of any size, and 32.3% (3046 out of 9444) are within a half-mile of a retail center as shown in Map 3.4. As time goes on and the measure is repeated, Hilliard should strive to show meaningful progress each year. For comparison, Issaquah, Washington (a similarly sized city) has 25% of residences located within a quarter mile of retail.²² While it is difficult to come up with an exact number that would be appropriate for Hilliard to work towards, this example shows that cities of a similar size to Hilliard can achieve much higher percentages than the current values seen in Hilliard. Within the current economic climate, there may be slow progress on this indicator initially; however, the city should aim for constant gains in the percentage of households within walking distance of a retail center.

LUUE Opportunity Assessment

Urban ecology is the study of the natural environment and the ways in which the natural environment interacts with the urban environment.²³ Land use is the human alteration of the natural environment into built environment, and refers to everything from pasture and crop land to city developments. Land use has major impacts on urban ecology, and in a sustainable community, the two are balanced so that human development does not overwhelm nature. In turn, a robust urban ecology can help communities be healthier, more social, and more sustainable.

Current Development Patterns

Hilliard's development pattern was historically agricultural with a small village center surrounding its railroad station. This small village center is now Old Hilliard, and development in Hilliard has dramatically changed over the past 50 years. Connection to the Columbus regional sewer and water system in the late 1950s brought explosive growth to Hilliard, vastly expanding the city's footprint beyond Old Hilliard.²⁴ The City grew from a population of 610 in 1950 to 5,633 in 1960.²⁵ This resulted in the conversion of farm lots into new residential subdivisions, creating a patchwork of residential, commercial, and industrial developments.²⁶ This pattern included a strong separation of land uses, new centers of retail activity, an automobile-scale built environment, and low density development.²⁷ Hilliard's next major housing boom occurred between 1990 and 2000 sparked by the construction of I-270. During this period the population more than doubled from 11,579 to 24,230.²⁸ However, the development pattern stayed the same as more low-density housing subdivisions were created. Due in part to the recent recession, development in Hilliard during the past decade has slowed

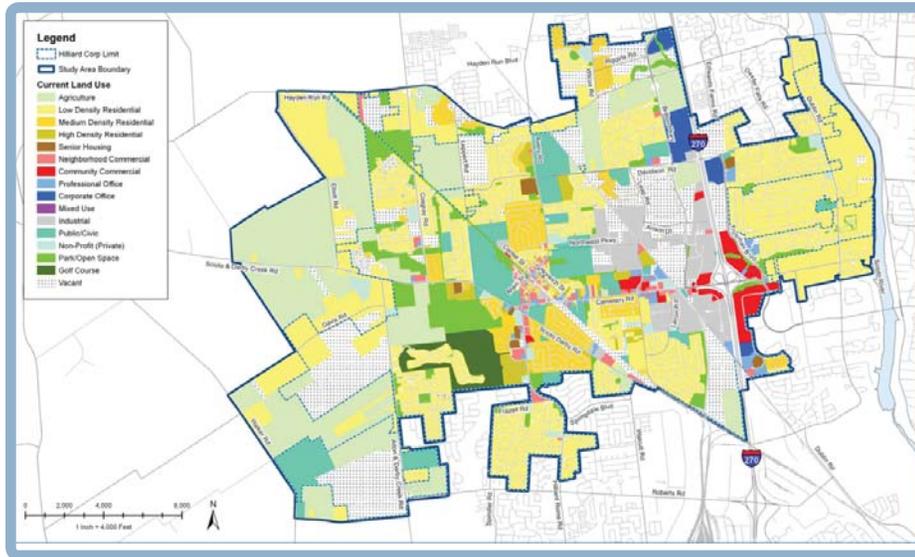


Figure 3.1: Hilliard Minimum Setbacks from the Right of Way

HILLIARD		
Usage	Lot area	Min. Ft from row
"Res. Uses & uses not on a major/limited access highway"	13,500 sq ft or above	30
"Res. Uses & uses not on a major/limited access highway"	10,000-13,500 sq ft	30
"Res. Uses & uses not on a major/limited access highway"	2,500-10,000 sq ft	25
"Comm./ indus. Uses on a major/limited access highway"	N/A	60

» Source: City of Hilliard Codified Ordinances (2012)

Figure 3.2: Dublin and Gahanna Minimum Setbacks from the Right of Way

DUBLIN		GAHANNA	
Type of road	Min ft from row	Usage	Min. Ft from row
Arterial	80	"res-1:low-density"	40
Collector	60	"res-2:moderate low-density"	40
Local	60	"res-3:medium density"	35
Cul-de-sac	60	Retail comm.	60
Minor	60	"professional/ corp. Office"	75

» Source: City of Hilliard Codified Ordinances (2012)

significantly with a population increase of only 4,205 from 2000 to 2010.²⁹ As development has slowed, the City has focused its efforts on providing adequate infrastructure to accommodate the development boom of the 1990s by constructing new parks, roads, and other vital infrastructure city-wide.

As seen in Map 3.5, low-density residential is the most prevalent land use covering 24% of the City.³⁰ This is second only to vacant land, right-of-way, and utilities, which account for roughly 30% of Hilliard's land use.³¹ Residential uses other than low-density single-family homes are limited throughout Hilliard. Medium-density and high-density residential account for only 6% and 2% of the land use, respectively.³² Senior housing is even less prevalent covering less than 1% of the City's land use.³³

» Map 3.5: Hilliard Current Land Use Data Source: Hilliard Comprehensive Plan, 2011

Professional office uses are largely concentrated near the center of town and along Cemetery Road and represent 1% of the existing land use.³⁴ Hilliard's neighborhood commercial and community commercial land uses represents 3% of the City's land use.³⁵ A large portion of the City's commercial development is concentrated along Main Street, Cemetery and Cosgray Roads, and around Hilliard's I-270 interchange, leaving large residential areas east of I-270 and large tracts of land in the western and northern portions of Hilliard without convenient retail options.³⁶ Finally, large areas of agriculture still exist in Hilliard.³⁷ They comprise 9% of the City's land use and are mainly concentrated in the western edges of the City in the Big Darby Creek area.³⁸

Zoning

Hilliard's current zoning ordinance establishes distinct use-based zoning classifications and requires large setbacks that result in auto-oriented development.³⁹

As seen in Figures 3.1 and 3.2, when Hilliard's minimum setback requirements are compared with other suburbs in the Columbus region, Hilliard setbacks are relatively small.⁴⁰ Yet, Hilliard's current setbacks are still large enough to promote very auto-oriented development patterns. The result of these setbacks in commercial areas is the location of parking in front of commercial structures, which provides convenient automobile access but not convenient access for pedestrians and bicyclists. If commercial buildings were placed up to the right-of-way, pedestrians and bicyclist would be able to access these stores directly from the sidewalk. Also, with the location of surface parking lots in the front of commercial buildings, pedestrians and bicyclist have to walk further to access the

building and have the added danger of walking through a surface parking lot.

Hilliard's current zoning laws make it challenging to integrate neighborhood retail or any other commercial use into residential areas because current residential zoning excludes any commercial uses in both permitted and conditional use regulations.⁴¹ Accessible neighborhood retail is beneficial because it can reduce the number of car trips and encourage more walking and biking trips. While this may not be appropriate for all residential neighborhoods, another important way to integrate neighborhood commercial uses into residential areas is the allowance of mixed-use development in the City's zoning code. The zoning provisions for Old Hilliard and the Planned Neighborhood District (PND) are the most accommodating provisions for a mix of uses. The Old Hilliard design provisions provide a mix of activities including business, public, cultural, social, and residential uses.⁴² Permitted uses in the Old Hilliard District include retail, office, and single-family dwellings, yet multi-family dwellings and mixed-occupancy units are only allowed as a conditional use, which creates a hurdle for mixed-use development in the district.⁴³ Additionally, Hilliard's Codified Ordinance states that "mixed-occupancy" requires re-approval from the zoning commission any time the ratio of mixed-uses changes which creates another barrier to mixed-use development.⁴⁴

The purpose of a PND as stated in Hilliard's zoning provisions is to encourage freedom of design, allow denser residential developments, accommodate a mixture of uses, and preserve and utilize natural topography helping to avoid natural drainage problems.⁴⁵ The PND also encourages placing buildings closer to the street. However, denser residential and taller buildings need special permission.⁴⁶ The Planned Unit Development (PUD) guidelines state that the maximum density for residential should be six units per acre or less except as provided for in development density incen-

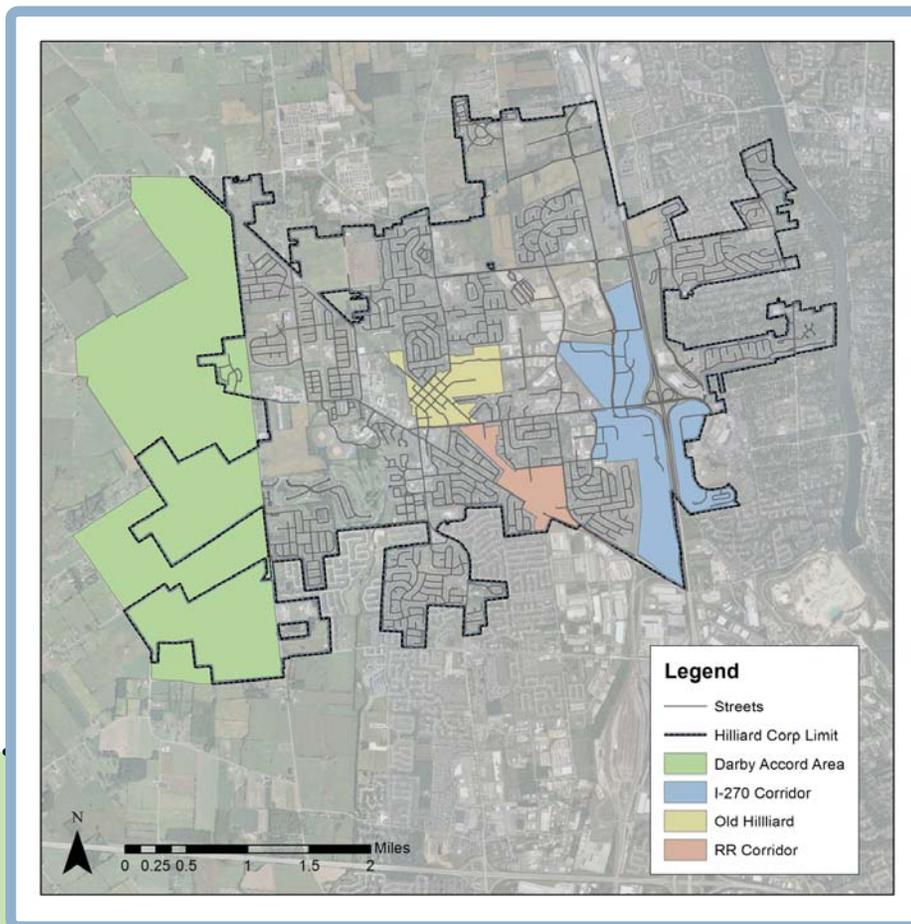
tives.⁴⁷ PUDs may be a possible avenue to implement denser, mixed-use developments but Hilliard could also consider more flexible zoning tools like a mixed-use district, overlay district, or form-based zoning.

Hilliard's Land Use Vision

Recently, Hilliard City Council adopted a new vision statement, which states that Hilliard will strive to be a lifelong community. The three goals of a lifelong community are to provide housing and transportation options, encourage healthy lifestyles, and expand access to services.⁴⁸ Hill-

iard's 2011 Comprehensive Plan begins to address these goals by evaluating the potential for infill development in underutilized and undeveloped areas already served with infrastructure, creating new transportation connections, encouraging walkable human-scale development, and bringing desired land uses and amenities closer to Hilliard's existing residents and businesses.⁴⁹ Through the Comprehensive Plan the City of Hilliard has decided to focus its redevelopment efforts on four focus areas: Old Hilliard, the I-270 Corridor, the Retired Railroad Corridor, and the Big Darby focus areas.⁵⁰ Old Hilliard, the I-270 Corridor, and the Retired Railroad Corridor were chosen since they have significant economic development potential. The Big Darby focus area, however, demands a development pattern that conserves open space and environmentally sensitive areas cooperatively planned through the Big Darby Accord.⁵¹

Intergenerational sustainability is another component of lifelong communities, and the City envisions a community that is attractive to residents from all stages of life. Currently, the development pattern and housing choices in Hilliard are attractive to households that have children and are in a position to own a home. Hilliard, however, is seeking to incorporate new options to attract young adults and empty nesters who typically desire smaller homes, rental options, and neighborhoods with close access to amenities. The Hilliard Comprehensive Plan addresses this challenge and suggests that Hilliard needs to include more apartments and more compact development patterns to accommodate for these demographic groups.



» Map 3.6: Focus Areas Map
Data Source: City of Hilliard, 2011

Opportunity Sites

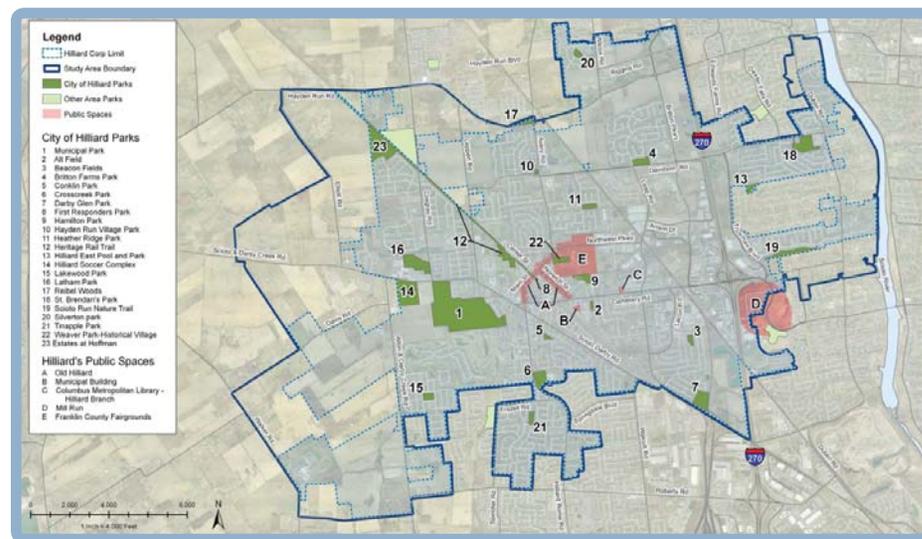
There are a number of areas in Hilliard appropriate for development that fulfills the City’s goals of being fiscally, socially, and environmentally sustainable. Since the City desires to develop infill projects close to the core first, it would be ideal to begin developing areas of vacant land just northeast of Old Hilliard. The first site is south of Northwest Parkway and west of Weaver Cut. The other site is north of Northwest Parkway and southwest of the railroad line. There are many other areas ideal for infill development in the northern and northwest sections of the City where large swaths of vacant land exist. However, the City should prioritize its development efforts within the four focus areas identified by the Comprehensive Plan.⁵² These areas are ideal considering the City’s wish to prioritize infill projects and that these four focus areas were identified by the Comprehensive Plan as the first areas to develop.⁵³ Large areas of vacant land intermixed with industrial and office space exist in the I-270 corridor. The best opportunities in this focus area are the locations with freeway exposure and access. This area is ripe for a number of extensive mixed-use developments that would incorporate mainly office, light industrial, and dense residential uses with small amounts of retail throughout.

The Retired Railroad Corridor has potential for a mixed-use development considering its proximity to the City core and its areas of vacant land.⁵⁴ Another promising site for redevelopment is the 4.95-acre industrial site within the Old Hilliard district at the intersection of the abandoned railroad right-of-way and Cemetery Road. The last sustainable development opportunities identified are the large swaths of open space in the western portion of Hilliard more formally known as the Darby Creek area. Development

here should be particularly environmentally sensitive and clustered. This type of development, called Conservation Development, clusters residences within a small area of the developable land allowing more land to be preserved in its natural state.

Parks and Environmental Resources

Parks and environmental resources can greatly improve quality of life. In Hilliard, most of the current parklands are located in the western part of the City and serve as active parks with playing fields, courts, and other amenities. The Comprehensive Plan sets the goal for the City to become “a leader in offering quality parks, public spaces, and recreational opportunities for



» Map 3.7: Park Inventory in the City of Hilliard Source: Hilliard Comprehensive Plan

Figure 3.3: Inventory of Parks in the City of Hilliard

Park Name	Acreage	Connectivity	Facilities
Roger A. Reynolds Municipal Park	133	Bike Path, walking path	Eight Lighted Ball Diamonds, Basketball, Fishing, Grills, Lacrosse, Football, Playground, Pond, Pool- HFAC, Sand Volleyball, Shelter, Skate Park, Sledding Hill, Soccer, Tennis
Alt Field	4	N/A	Ball Diamond, Basketball, Playground
Beacon Fields	6	Bike path	Ball Diamonds, Basketball, Playground
Britton Farms Park	6.7	Bike path, Walking path	Fishing, Grills, Pond, Shelter
Conklin Park	2.2	N/A	Playground
Crosscreek Park	10	N/A	Grills, Football, Lacrosse, Soccer
Darby Glen Park	12	Walking path	Grills, Playground, Shelter
Estates at Hoffman	30	N/A	N/A
First Responders Park	0.681	N/A	Sculpture Art Exhibit, Reflection Pool, Plaza Fountain, Granite Engraved Walls, Trellis Gateways, Tree Planters, Iron Benches, Flag Podiums, Brick Pavers
Hamilton Park	5.3	N/A	Ball Diamond, Basketball, Playground
Hayden Run Village Park	3	N/A	Fishing, Playground, Pond, Shelter
Heather Ridge Park	2.7	N/A	Playground
Heritage Rails to Trails	7.7 mile	Bike path, Walking path	N/A
Hilliard East Pool & Park	8	N/A	Gazebo, Playground, Pool- Hilliard East, Sledding
HOSA Soccer Complex	30	N/A	Soccer
Lakewood Park	5.6	Walking path	N/A
Latham Park	19	Walking path	Pond
Reibel Woods	1	N/A	N/A
St. Brendans Park	16.2	N/A	Ball Diamonds, Basketball, Grills, Playground, Shelter, Soccer
Scioto Run Nature Trail	8	Walking path	N/A
Silverton Park	3.5	Walking path	N/A
Tinapple Park	3.5	Bike path, Walking path	Grill, Playground, Shelter
Weaver Park	5.3	N/A	Historical Village, Grills, Shelter

» Source: City of Hilliard

its residents, employees and visitors,⁵⁵ and requires the parks and public spaces to “be diverse, active and accessible while providing opportunities for physical activity, social interaction and education.”⁵⁶ The City of Hilliard is now encouraging the idea of developing parks into open public spaces to improve quality of life and economic development. Continued efforts are being made in Old Hilliard and other areas to make high-quality public spaces. The city is also now increasing the connectivity of the parks, creating more parks in the eastern part of the city, and protecting its environmental resources.⁵⁷

Parklands

The City of Hilliard has 23 parks on 331 acres, which equates to a proportion of about 11.5 acres per 1,000 residents.⁵⁸ Adding the parkland acres of the nearby Metro Parks, the acreage goes up to 2,228 and the average ratio goes up to 78 acres per 1,000 residents,⁵⁹ as seen in Figure 3.3 and Map 3.7. The options available in Hilliard’s parks include two municipal pools, three locations for community gardens, a golf course, and many playgrounds.⁶⁰ Apart from providing recreational activities to the residents and visitors, the parks also serve as places to protect the natural environment, although the park spaces in Hilliard are mostly programmed for active uses as opposed to passive uses.⁶¹ Additionally, the accessibility and connectivity of the parks pose a challenge. There are 11 parks that are not accessible by sidewalk or multi-use path. According to the park survey from the Comprehensive Plan, about 60% of the people drove to the parks and 85% of them indicated that they drove because of distance and lack of accessibility.⁶²

Top Five Parks and Public Spaces

After several public meetings, the Comprehensive Plan’s planning team and the city staff together identified the top five most important public spaces based on results of public meetings and an online survey: Old Hilliard, Weaver Park, The East Pool and Park, The Heritage Trail, and Municipal Park.⁶³ These places form a significant part of the image of the city and play a critical role in the city’s identity.

Old Hilliard (First Responder Park, Hilliard’s Station Park)

According to the Comprehensive Plan, Old Hilliard is the most important public space in the city. New development and amenities such as parks are being encouraged here to bring more people to the center of the city.⁶⁴ First Responder Park, a 9/11 memorial,⁶⁵ has proven to be a success in Old Hilliard. It has numerous amenities including sculptures, a reflection pool, a plaza fountain, granite engraved walls, and other aesthetic features. It also provides a place for people to relax and reflect. Hilliard Station Park is another proposed park for Old Hilliard to serve as a large public gathering space for community events.⁶⁶

Weaver Park

Weaver Park has a historical village, grills, and a shelter. It is operated by the Hilliard Historical Society.⁶⁷ The historical village includes Hilliard’s historic railroad station, signal lights, a one-room school house, log cabin, chapel, gazebo, granary, museum, barn, and covered bridge.⁶⁸ It is touted for its historical value, but the park is not directly connected to bike or walking paths.⁶⁹

The East Pool and Park

The East Pool and Park is the most heavily used park in the City.⁷⁰ The

Hilliard East Pool includes a 10-foot water slide and a wading pool. It also includes a gazebo, playground, and sledding in the winter.⁷¹ The park is a great asset for residents in the eastern half of the City; however, there are opportunities to improve the park's visibility and pedestrian connectivity.⁷²

The Heritage Rail Trail

The Heritage Rail Trail is a seven-mile multi-purpose trail that starts in Old Hilliard and ends in Plain City. The starting point of the trail is in the historical district of Old Hilliard. The Hilliard part of the trail is owned and maintained by City of Hilliard and is used for hiking, biking, skating, and walking.⁷³

Municipal Park

Municipal Park is the largest park in Hilliard. It has the Hilliard Family Aquatic Center (HFAC), which is one of the largest outdoor municipal complexes in Ohio. The HFAC includes two 30-foot water slides, a 25-yard competition pool, and interactive leisure pool with a play structure, a 450-gallon dumping bucket, a 560-foot lazy river with water attractions, and a nationally recognized main pool.⁷⁴ Apart from the HFAC, the park also includes eight lighted baseball diamonds, basketball courts, fishing, grills, lacrosse and football fields, playgrounds, a pond, sand volleyball, shelter, skate park, sledding hill, soccer fields, and tennis courts.⁷⁵ It also serves as a natural area preservation space.

Sidebar 3.1: Tree City USA

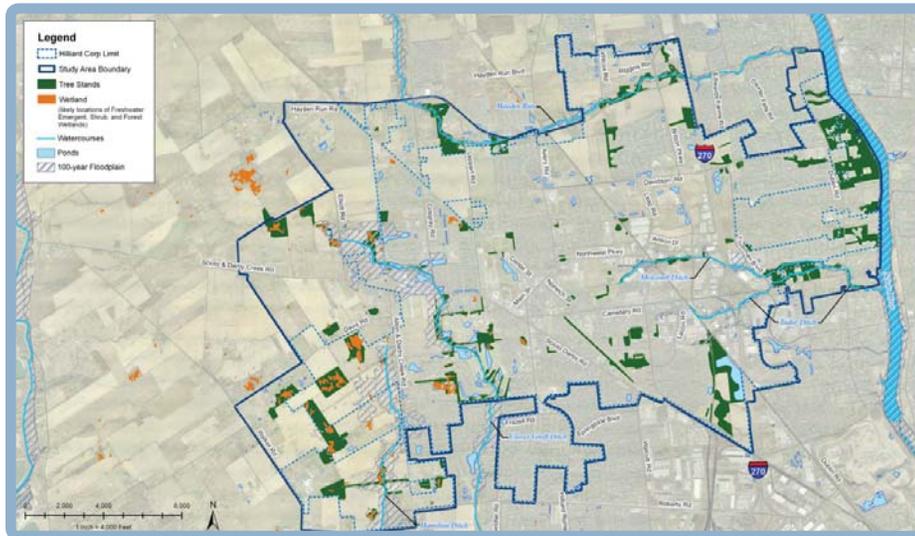
The Arbor Day Foundation's Tree City USA program is intended to improve community forestry initiatives across the United States. To qualify as a Tree City USA, the community must meet all of the following requirements:

Have a tree board or tree department,

- » Have an ordinance providing for the care of trees,
- » Have a proclamation and observance of Arbor Day, and
- » Have a community forestry program with a two-dollar per capita (or greater) budget.¹



» Image 3.1. Tree City USA
Source: Arbor Day Foundation



» Map 3.8: Environmental Resource Inventory in the City of Hilliard Data Source: Hilliard Comprehensive Plan, 2011

Environmental Resources

The City of Hilliard is rich in natural resources, as shown in Map 3.8. It has five waterways, including Tudor Ditch, Hamilton Run, Holcomb Ditch, Clover Groff Ditch, and Hayden Run. It has over 100 acres of wetlands and 800 acres of tree cover.⁷⁶ Seven percent of the City's area is covered by tree stands.⁷⁷ Hilliard has recognized the importance of these environmental resources, particularly its trees; its Shade Tree Commission meets monthly and acts as an advisory panel for tree selection in the city.⁷⁸ The Commission also publishes a Shade Tree Manual on an annual basis.⁷⁹ This manual provides information on street trees in Hilliard as well as planting and maintenance guidelines.

Hilliard's protection of public trees has been recognized by the Arbor Day Foundation, which has named the City a Tree City USA (see sidebar 3.1) for 29 consecutive years.⁸⁰ However, there are vulnerabilities for Hilliard's tree canopy. Fifteen percent of Hilliard's street trees are ash trees,⁸¹ which are susceptible to being severely damaged or killed by the Emerald Ash Borer.⁸² Additionally, the City does not have a formal forestry or tree department beyond the Engineering Department and no longer retains a full-time Certified Arborist on its staff; instead, one is contracted.⁸³ Thus, there are opportunities to improve the resilience of Hilliard's tree canopy by committing more resources to its protection. Parts of the City lie within the Big

Sidebar 3.2: Big Darby Accord

On April 28, 2008, Hilliard joined nine neighboring Central Ohio communities as a member of the Big Darby Accord. The Accord, which was completed in 2006, represents a partnership between these 10 member communities in the Big Darby Watershed to coordinate long-term economic and neighborhood development in ways that promote environmental stewardship.² Hilliard is located in the northern section of the watershed considered in the Accord. Alongside Hilliard, member communities include the City of Columbus; Grove City; Brown, Prairie, Pleasant, Norwich, and Washington Townships; the Village of Harrisburg; and Franklin County.

The Big and Little Darby Creeks are important natural assets for Central Ohio, and they are registered State and National Scenic Rivers. The creeks and their tributaries constitute one of the most biologically diverse watersheds in the Midwest.³ In order to protect and promote these unique ecosystems, the Big Darby Accord contains numerous development strategies, including:

- » Identifying and prioritizing environmentally sensitive areas,
- » Directing new development to a high-density, mixed-use town center,
- » Guiding the financing of new development, and
- » Helping Accord members take specific steps to implement the plan.⁴

Hilliard resident Jay Muether, a landscape architect and Vice President and Director of Transportation at URS Corporation, serves as Hilliard's appointed member to the Big Darby Accord Advisory Panel. This panel is charged with overseeing the zoning and site development of member jurisdiction, and it helps facilitate collaboration among them. In this way, the Panel ensures that zoning and site development occur in fair, consistent, and evenly applied ways.⁵



» Image 3.2. Big Darby Watershed
Source: wiseoutdooradventures.blogspot.com

Darby Watershed, and protection of the natural environment in this area is crucial to fostering a culture of multi-faceted sustainability.

The Big Darby Watershed

The Big Darby Watershed is the one of the most biologically diverse and healthiest aquatic systems in the Midwest and is one of the top five warm freshwater ecosystems in the United States.⁸⁴ It has over 40 species of fishes, 80 species of mollusks, and about 100 species of birds in the habitat.⁸⁵

The Big Darby Accord Watershed Master Plan was created and adopted in 2008 and the Hilliard Comprehensive Plan defines the Big Darby Area as a focus area to address the sensitivity of the natural environment.⁸⁶ Distinct and sustainable land use development was recommended in this area (see sidebar 3.2).

Transportation

Continuous population expansion during the 1990s has produced substantial travel demand on Hilliard's roadway network.⁸⁷ Likewise, the continuation of conventional suburban growth patterns and traditional separation of uses has reduced connectivity between where people live and where they shop or work. This two-fold problem has created a reliance on the automobile and has stifled the ability to utilize alternative methods of transportation. For some Hilliard residents, complete dependence on an automobile is not ideal due to constraints such as age, ability, or economic hardship, or it is simply no longer a preferred singular method of transit. Coupled with changing lifestyles and perceptions, Hilliard now seeks to support a community that embraces the idea of using alternative forms of transportation.

Bike Paths

Hilliard has several primary bicycle corridors that provide a good foundation for a continuous bicycle network. Currently, Hilliard has 45.78 miles of bike/multi-use path facilities and 3.52 miles of shared lanes (sharrows).⁸⁸ The diversity of bike path facilities (sharrows, bike paths, bike boulevards, et cetera) is important to address the dual nature of bike path users. Recreational riders will desire more casual, slow paced pathways, while experienced riders, who may be using the bike network for commuting, will require fast paced and direct routes. Providing for both types of riders is important to ensure future inclusive use. Additionally, most of the existing bike path miles are located in specific bike corridors located along Heritage Trail, Britton Parkway, Trueman Boulevard, Main Street south of Old Hilliard, and Davidson Road. While Hilliard has made significant efforts to incorporate bike facilities throughout the City, the current bike facilities are isolated, as shown previously in Map 3.1, resulting in poor connectivity between existing routes and destination places such as residential and commercial developments.

Overall, the creation of these bike networks has been well-received and the networks are used frequently for recreational purposes. For instance, The Heritage Rail Trail, Hilliard's longest stretch of multi-use path, is one of the most heavily used in the City and the Central Ohio region.⁸⁹ Moving ahead, Hilliard is focused on increasing the availability and connectedness of existing bike paths and pedestrian infrastructure. Having a good existing foundation of bike corridors and pedestrian facilities has allowed the City to focus on how these networks can be improved to guarantee future use, not only for recreation but also for transportation.

Pedestrian Infrastructure

A majority of Hilliard's street infrastructure incorporates a type of pedestrian facility, with 62.5% of its streets having a sidewalk or a multi-use path, as shown previously in Map 3.2. Aside from sidewalks and multi-use paths, these pedestrian facilities can also include other pedestrian amenities like street furniture, wayfinding signs, public restrooms, and drinking fountains.⁹⁰ While Hilliard has made the investment in providing more pedestrian infrastructure, some of the existing facilities are not well connected resulting in missing sections. Lack of connections can inhibit safe and frequent use of pedestrian infrastructure.

Public Transit

While Hilliard has made improvements to the pedestrian and bicycle networks over the past decade, efforts made to develop a diverse public transit system have been insufficient.⁹¹ To date, the only form of public transit available to Hilliard residents is bus service provided by the Central Ohio Transit Authority (COTA). COTA service in Hilliard currently consists of express bus services which travel to downtown Columbus and The Ohio State University. Although Hilliard residents can travel to a few locations within Hilliard on these express routes, the primary purpose of these bus routes is for a direct commute to work for residents of Hilliard who work downtown or at the University. Additionally, COTA offers two Park & Ride facilities in Hilliard, located near the intersection of Britton Parkway and Cemetery Road and near the intersection of Main Street and Scioto Darby Road.⁹² While these distinct bus lines and facilities exist for Hilliard residents, the limited frequency of trips and lack of variety of destinations does not support common and consistent use.

LUUE Sustainability Analysis

The Hilliard City Council adopted new goals in 2012, including the goal of becoming a lifelong community. Lifelong communities are "places where individuals can live throughout their lifetime," providing multiple options for housing, transit, and recreation to residents so they can age in place.⁹³ By increasing housing and transportation options to serve all generations, lifelong communities are also more sustainable. The Land Use and Urban Ecology recommendations for a sustainable Hilliard are directly in line with the principles of lifelong communities, which include connectivity, pedestrian access, transit, neighborhood retail and services, social interaction, and healthy living.⁹⁴ By striving to meet these principles, Hilliard will become a city where people of all ages, needs, and backgrounds can live healthy lives for as long as they want without leaving the community.

Land Use

In sustainable, lifelong communities, it is important to create smaller community hubs that provide neighborhood retail and services within a vibrant streetscape.⁹⁵ One of the principal ways Hilliard can become a more sustainable community is to address the pattern of development citywide. The land use plan within the Hilliard Comprehensive Plan recommends smaller nodes of activity that are located to serve existing residential neighborhoods.⁹⁶ The following are recommendations to help encourage a sustainable development pattern throughout the city.

Recommendation: Change the zoning regulations to encourage neighborhood-centered development in appropriate locations throughout Hilliard.

Common barriers to communities around the country to developing sustainable, neighborhood-centric patterns are the long-standing codes and ordinances governing their jurisdictions.⁹⁷ In some instances, development of undesirable character is allowed or even encouraged. On the other hand, potentially beneficial strategies such as mixed uses and higher densities might be discouraged or even prohibited. The following strategies, broken down over a long period of time based on ease of implementation, are meant as a way to combat this issue in Hilliard. Adopting these measures has the potential, over time, to move the measurements of all four proposed Land Use and Urban Ecology indicators (retail access, park access, pathway connectivity, and pedestrian infrastructure inventory) in a positive direction.

Short Term (1-3 years)

- » Amend the current zoning code to allow upper-story residences in commercial buildings as a conditional use in all existing commercial and mixed-use districts. Specifically, the B-1 Neighborhood Business, B-2 Community Shopping Center, and B-3 Institutions and Offices Districts should be amended.⁹⁸ Along the same lines, the city should amend the code so that small commercial operations are a conditional use in residential districts. These districts include R-3 Medium Density Residential, R-4 Two Family Residential, and R-6 Multi-Family Residential. According to an Environmental Protection Agency (EPA) report, this is a “modest adjustment,” which is a good first step towards cultivating a city with a desirable mix of uses.⁹⁹ Parties responsible: This action would be the responsibility of the City’s planning staff, perhaps in partnership with a city attorney. They would need to research and draft the proposed zoning amendments. The American Planning Association publishes model ordinances which would be a good start.¹⁰⁰ Subsequently, the changes will need to be adopted by City Council. Cost: A generous

Sidebar 3.3: Arlington County, Virginia Case Study

Officials in Arlington County, Virginia have made it a policy to incentivize sustainability within their jurisdiction’s built environment. In this particular case, they have decided that LEED certified construction is something they would like to encourage. In order to do this, the County has put into place a scheme where different LEED certifications of development projects allow for an increase in maximum density under the code (See figure 3.4).⁶ This type of incentive profile could be modified by Hilliard to encourage development within the Comprehensive Plan’s focus areas. See figure 3.5 for an example of a profile that could be adopted by Hilliard. These incentives can be tailored specifically to the sustainability goals of Hilliard’s Environmental Sustainability Commission, City Council, Planning Commission, and Mayor.

Figure 3.4: Arlington County, VA Incentive Levels

LEED Certification	Floor-to-Area Ratio (FAR) Increase
Certified	.15
Silver	.25
Platinum	.35

Figure 3.5: Example Hilliard Incentive Levels.

Development Type in Focus Area	Density Maximum Increase
Residential	10% increase over base allowable maximum in zoning district
Commercial	10% increase over base allowable maximum in zoning district
Mixed-Use	15% increase over base allowable maximum in zoning district

» Source: EDAW Incorporated

cost estimate would be 100 staff-hours plus any applicable fees charged by the attorney.

- » Draft and implement a policy of only subsidizing development in the near term inside the focus areas identified in the Comprehensive Plan. The Plan recommends stopping subsidization outside the focus areas as one of the first steps toward encouraging neighborhood-centered infill development in Hilliard.¹⁰¹ However, it is also important to approach this issue using an encouragement approach to go along with that discouragement policy. To do this, the City should implement an incentives program to encourage development within the focus areas. There are many

Davidson, North Carolina Case Study

Davidson, North Carolina and Hilliard have a lot in common. Davidson is a small town outside the growing metropolis of Charlotte. The development pressure came from an influx of mostly single-family residential projects.⁷ To ensure that the development that was coming to their community, elected officials implemented an innovative process for review design proposals, which their planning staff describe as “extremely important to ensure that the residents and all the relevant stakeholders have meaningful input into the development of their community.”⁸ After the normal preliminary meeting between developers and planning staff, applicants are required to invite all people living within one quarter mile of the site to a charrette meeting.⁹ At this meeting, attendees participate in a protracted design process where they indicate their preferences for issues such as aesthetics and form. Only after these meetings take place do developers invest in detailed plans for final submission.¹⁰ The city won an EPA National Award for Smart Growth Achievement in 2004 due to this and other efforts.¹¹

Charrette Definition

A charrette is a type of public meeting. Residents, business owners, and other citizens who have a stake in a proposed project are invited give and evaluate ideas regarding the design of that process. For example, they may be shown early rendering of a site plan or other images of the proposed project with different options. They are subsequently asked for their feedback on which choices they prefer and what things are important to them. In some instances, attendees are able to communicate with pens and markers etc. the types of things that that want right. The process is used to build trust between the developer(s) and the public.¹² Additionally, it allows all stakeholders to collaborate to try and find a design solution which is sensitive to the concerns of everyone who will be affected.¹³



» Image 3.3. Charrette Source: <http://northlakewharf.wordpress.com>

options for doing this that do not include direct monetary incentives that would put a large strain on the municipal finances. One such example is the scheme in Arlington County, Virginia where the government offers density multipliers to projects that utilize sustainable practices (See Arlington County sidebar 3.3).¹⁰² Parties responsible: The City Council and possibly the Mayor would be responsible to enact these changes through adopting the amendment. A report outlining the program in Arlington County notes that “the program did not require extensive policy research and development or stakeholder involvement prior to implementation...It had little effect on the existing permitting process.”¹⁰³ Further, the report states that “the initial program cost was negligible, as there was no additional staff hired to oversee the program.”¹⁰⁴ Cost: Since the program in Hilliard would not involve the determination of LEED certification and tracking of minute details of the project—only where it is built—the city can expect an equally small or even smaller amount of hassle and cost up-front than was experienced in Arlington County.

Medium Term (3-5 years)

- » Require a design charrette before approval of proposed new developments. Designing a Hilliard that is neighborhood-centered is just another way of saying resident-centered. An important way of ensuring that development in the city is desirable—and in keeping with the goals put forth in the Comprehensive plan as well as by elected officials and residents—is to put the power in their hands. Unchecked development begets undesired development. Davidson, North Carolina is an example of a community that pioneered a method for helping to achieve this goal (See sidebar 3.4, Davidson case study). In Davidson, all developers are required

to extend an invitation to a design charrette meeting to every neighbor within a quarter mile of a proposed development. The City will not accept detailed plans for application until after this process is completed¹⁰⁵ (See Charrette Definition sidebar 3.5). Hilliard should investigate the implementation of this type of requirement in their zoning code. Even if these exact stipulations would not be appropriate, the general principle should be written into an amendment to the zoning code. In Davidson, this is a requirement of all new developments no matter the size. This would be an appropriate starting point. However, if the process becomes overwhelming due to a high number of developments, the rule could be changed to include a low threshold. For example, purely residential developments of less than 10 units could be exempt. However, exemptions should not include any mixed-use, commercial, or large residential projects. Neighborhood input on these types of developments is crucial for this rule to have its desired effect. Even if the input from the charrette sessions is non-binding, at the very least this process will foster communication. Residents will have a chance to be more involved in and learn more about development in their city. Developers will learn what types of development is desired by the public and elected officials in the community. Parties responsible: The City Council and Mayor would be responsible for enacting the code amendments to require these meetings. The developers seeking to do business in Hilliard would be responsible to hold the meetings and schedule it, most likely in city or other public facilities. Cost: The first cost involved in this recommendation would be the staff time required to change the code. Secondly, the city

Comprehensive Plan Mixed-Use District

The 2011 Comprehensive Plan passed by the Hilliard City Council recommends that a mixed-use zoning district be created and integrated into the existing zoning code along with a host of other changes. The specifics of this district include:¹⁴

- » Net Density: 20,000 to 30,000 square feet per acre
- » Lot coverage: 30 to 40 percent
- » Front setback: 0 to 20 feet
- » Height: one to five stories
- » No use category should make up more than 60% of the total
- » Retail on the first floor and not more than 25% of the total area
- » Strong street presence
- » Built near the street with side or rear parking
- » Public gathering spaces should be included



» *Image 3.4. Mixed-Use Example*
An example of a mixed-use development project
Source: <http://info.aia.org>

will need to either allow the meetings to take place in the council chambers or else provide guidance to developers on other public areas open for meetings in the evening.

- » Establish a specific zoning district for mixed-use development. The most complete way to encourage mixed-use development within the city, using the existing zoning code system, is to have a specific zoning district dedicated to that type of development. The Comprehensive Plan recommends a new land use map that includes a new mixed-use zoning category, as opposed to an overlay (See Comprehensive Plan mixed-use district sidebar 3.6).¹⁰⁶ This type of zoning district typically mandates a minimum percentage of floor area to be dedicated to residential.¹⁰⁷ Additionally, it will often dictate a specific number or range for the density of both commercial and residential uses. For example, Cornelius, North Carolina's Neighborhood Mixed-Use district mandates that at least 50 percent of the floor area be residential

Form-Based Code

Form-based code (FBC) is a different approach to land use regulation than standard zoning. One difference between the two is that FBCs regulate according to form, while traditional zoning regulates based on use.¹⁵ FBC will legislate exactly what the buildings in different areas will look like.¹⁶ On the other hand, traditional zoning focuses on what uses are permitted in a district and deals with form by setting minimum and maximum values for things like setbacks, height, et cetera.¹⁷ One study outlining form-based codes identified its principal benefits as helping to "[create] a predictable built environment based on a community vision, [provide] flexibility of use within planning districts, and [streamline] the review process."¹⁸ It does this by telling developers exactly what kind of built environment the community wants to have. In this way, the review process can go quicker because developers know what to build; they are told what it needs to look like and how it is to be situated on the lot directly by the code. Many communities have implemented partial or full FBCs including at least nine cities in North Carolina;¹⁹ Lowell, Massachusetts;²⁰ Dublin, Ohio; and New Albany, Ohio.²¹

Gahanna's Creekside Case Study Side Box

Gahanna has a potential mixed-use development project for Hilliard to refer to with their Creekside development. Gahanna provides a good comparison since, like Hilliard; it is also an outer ring suburb situated outside of I-270 and contains a relatively small, centralized core area. As can be seen in Figure 3.6 Gahanna's demographic figures are relatively similar to Hilliard's.

Figure 3.6: Hilliard and Gahanna Demographic Comparisons)

	HILLIARD	GAHANNA
2010 Population	24,230	32,636
Medium Value of Owner-Occupied Housing Units	209,300	189,800
Medium Household Income	81,933	72,693

Gahanna has focused significant attention on redeveloping Olde Gahanna into a denser, mixed-use district and creating an area with a strong sense of place. Gahanna started this process with the Creekside development in the early 2000s. This \$55 million project includes 240,000 square feet of retail and office uses, condominiums, and park space.²² Broken out into detail, the project has 50,000 square feet of office and retail space, 71 condominiums, and a 24-acre central park.²³ The development project did go into foreclosure in 2011. However, this largely resulted from the economic downturn in 2008 which made it nearly impossible to sell the project's condominiums.²⁴ There are, however, a number of lessons Hilliard can learn from this project before trying to imitate it. First it is important that a development on this scale offer diversity of residential options. This would protect the development from market weakness in either rental or for sale housing and also bring a more diverse social-demographic group to the development. The second lesson is the need to keep retail rents at a reasonable rate. At least some of the retail and restaurant owners, including the owners of the Bread Basket Family Bakery and Wine Guy Wine Shop Wine Bar and Bistro, struggled to pay their rent rates.^{25,26} According to Craig Decker, the rents for the owners of the Wine Shop Wine Bar and Bistro were as high as \$24 per square foot.²⁷ It is important to keep in mind that since Gahanna and Hilliard are

still mainly auto-centric communities, high volumes of foot traffic are much more challenging to sustain.²⁸ To put this into perspective, property owners in the Short North district in Columbus quote retail rental rates per square foot ranging between \$20-24 and this is an area with much higher foot traffic than Olde Gahanna.²⁹

Image 3.5, 3.6. Bexley Gateway North



» Integrated into the project is an attractive public park



» Ground floor retail are located consistently throughout the project
 » Source: Nathaniel Kaelin, 2008

and limits individual commercial uses to 5,000 square feet.¹⁰⁸ Coweta County, Georgia, limits residential density to a maximum of eight units per acre and non-residential density to 15,000 square feet per acre in its mixed-use district.¹⁰⁹ Looking at cases like these, and taking into account the specially tailored recommendations provided to them in the Comprehensive Plan, Hilliard should work towards developing a specific mixed-use zoning district and put it into place in areas where this type of development is appropriate and desired. Considering the large scope of developing a mixed-use district the City would most likely hire consultants to assist. Parties responsible: The City Planner with final approval from City Council. Cost: \$50,000-\$100,000 (depending on the scope of the zoning district) and 50-75 staff hours.¹¹⁰ A mixed-use district will take between 1-2 years to develop and implement.¹¹¹

Long Term (5-10 years)

- » Experiment with and possibly implement a form-based code in some parts or all of Hilliard. (See form-based code sidebar 3.7). Rather than prescribing which uses belong where, the form-based code will simplify the development

» Image 3.7,3.8. Creekside

» Source: Nathaniel Kaelin, 2008



» Integrated into the project is an attractive public park



» Ground floor retail are located consistently throughout the project

review process. Developers will know what to build because the building types will be stipulated in the form-based code. Implementation of major code changes takes a large amount of time and effort. However, in the long term, City Council should commission a study to specifically outline what needs to be done to implement form-based code, at least in parts (if not all) of the city. Parties responsible: City Council to call for the process to begin and choose a consultant. City planning and engineering staff time to add input to the process. Cost: Fees charged by an outside consultant to study and recommend form-based code changes, as well as city staff time associated with a code change and large project undertaking.

Recommendation: Create zoning tools and provisions to implement dense, mixed-use, development in the focus areas as dictated by the Hilliard Comprehensive Plan.

As stated in the Comprehensive Plan, it is important for Hilliard to initially focus its development in areas close to existing development or more intensely redevelop existing development.¹¹² This is crucial to create a city that is more fiscally and environmentally sustainable since denser, compact development costs less for the City to service than low-density sprawl.¹¹³ Also this type of development permits the preservation of open space and environmentally sensitive areas, particularly the Big Darby Creek area, from encroaching low-density sprawl.¹¹⁴ The Comprehensive Plan directs initial development in Hilliard into four identified focus area: Old Hilliard, the Retired Railroad Corridor, I-270 Corridor, and the Darby Creek Area.¹¹⁵

Hilliard would not be the first suburb in the Columbus region to support compact, mixed-used developments. There already is a precedent for these types of projects in the Columbus region. The suburban cities of Gahanna

Carmel, Indiana Case Study Side Box

Looking outside of the Columbus region Carmel, Indiana is an excellent example of a suburban municipality dedicated to mixed-used and sustainable developments. While the City's population is significantly larger than Hilliard's there are a number of similarities between Carmel and Hilliard that make it a good comparison. Carmel is also an outer ring suburb and is adjacent to a highway. In this case, Carmel is located just north of I-465 which is roughly 20 miles from downtown Indianapolis. While the City of Carmel has a much larger population than Hilliard at 79,000 people, it was much closer to Hilliard's population in 2000 at roughly 37,000 people.³⁰

In the late 1990s the mayor of Carmel and other City officials decided to transition the City into a denser and more sustainable development pattern. This has led to significant redevelopment efforts throughout the City including the Arts and Design District, the West Clay Development, and the City Center project.³¹ The Arts and Design District is the most relevant as a case study since it is located in Carmel's historic core and provides a model and ideas for redeveloping Old Hilliard. To help foster redevelopment efforts in the Arts and Design District, the City of Carmel invested 10 million dollars constructing new brick sidewalks, street art, new historically themed street lights, and renovated numerous store

front facades.³² This money also created 14,000 square feet of new retail and renovated existing retail space.³³ The district has also witnessed several significant mixed-use, three-to-five story infill projects, which are highlighted below.

Old Town on the Monon:³⁴

- » Three story mixed-use building
- » 18,500 square foot of first floor retail
- » 91 loft apartments and townhouses

Sophia Square:³⁵

- » Five story mixed-use building
- » 440,000 square feet of mostly luxury apartments
- » First floor retail

Old Town Shops:³⁶

- » Three to four story mixed-use building
- » 49,000 square feet of galleries, boutique shops, and office suites

Image 3.9. Old Towne on the Monon



» A diverse array of stores line the first level of the project
Source: Randy Sims, 2008

Image 3.10. Sophia Square



» With 440 luxury Apartments this project greatly increases Carmel's Old Towne Population.
Source: Source: Juniper Communities

Image 3.11. Old Towne Shops



» Special attention was given in this project to appear historic.
Source: Century 21 Scheetz's

(see Creekside sidebar 3.8), Grandview Heights, and Bexley (see Images 3.5 and 3.6) have a number of multi-story, mixed-use projects located within their major commercial districts and Dublin has plans for an extensive mixed-use district in their Bridge Street Corridor.

One site which can act as a starting point for the City to create a mixed-use project is the 4.95 acre industrial site within the Old Hilliard district. This site has also been identified by City officials as be-



» Map 3.9. Potential Old Hilliard Infill Site
Data Source: City of Hilliard, 2011

Incentives for Mixed-Use Development—Case Study in Eugene Oregon

The planning department in Eugene, Oregon has put together a number of best practices for encouraging mixed-use development.³⁷ While Eugene is a much larger city than Hilliard (roughly 150,000 residents), these incentives are still highly relevant to creating mixed-use developments in Hilliard.³⁸ The City of Eugene is encouraging mixed-use as one of the most important components of their strategy for long-term growth management and community livability.³⁹ Their recommendations are broken down into financial incentives and regulatory relieve.⁴⁰

Financial Incentives: The purpose of financial incentives is to reduce development costs or increase the overall return on investment.⁴¹

- » Tax Abatements: Exempt property taxes for the entire development for an incremental change in property tax for a certain period of time
- » Public Investment in Infrastructure: Road improvements, transit service, bicycle and pedestrian pathways can all provide needed incentives for a project
- » Land Assembly: Cities can create large, developable tracts of land for developers by purchasing multiple parcels through voluntary negotiations with owners or through eminent domain; although that is the option of last choice.

Regulatory Relief: These incentives can provide the necessary finances that make development less expensive to build through adjustments in the regulating process.⁴²

- » Reduced Fees: Cities can reduce system development charges or wave permit fees in the mixed-use centers
- » Permit Processes: Assist developers by having “one-stop centers” for permit information and application. These centers can provide expedited review of higher density/ mixed-use developments.
- » Development Codes: Assure that local codes are flexible and encourage innovate mixed-use development
- » Design Standards: Provide bonuses that allow more land for building density which permit the development costs per square foot to decrease. This can be achieved through increased density and height allowances, or narrower streets.

ing ideal for redevelopment. There are a number of different ways the City could develop this site. One possibility is a mixed-use entertainment district which could serve as a large regional draw getting visitors from all over the Columbus region. The site could also be geared more towards senior residents who find walkable amenities attractive and necessary. This would further help the City fulfill its goals of being a community desirable by all ages and lifestyles. The final consideration is simply developing the site with a mix of apartments and condominiums, office and first floor retail.

As seen in Map 3.9, the site is located northwest of the intersection of the abandoned railroad right-of-way and Cemetery Road. What makes this area particularly attractive for a mixed-use development is the fact that it fronts one of Hilliard's busiest commercial arteries and is within the Old Hilliard District. Redeveloping this site would also set the precedent of mixed-use development near the intersection of Cemetery Road and Main Street which functions as an important crossroads in Hilliard. This would be a drastic change from an area currently populated with low density commercial uses.

Currently this 4.95-acre site has three different owners.¹¹⁶ In the aggregate these three property owners paid \$1.36 million for the properties.¹¹⁷ However, these sales transactions occurred between 2003-2007 meaning that the price to purchase all these properties up would likely be more.¹¹⁸

The steps in this recommendation are laid out in a manner to ease the City into creating mixed-used, compact developments. To achieve this, the "B-6" Old Hilliard zoning district should be modified and a new mixed-use district should be created to encourage this type of development. Finally, the City should create a form-based zoning code for the four focus areas.

Short Term (1-3 years)

- » The "B-6" Old Hilliard zoning district should be modified to allow two-family, multi-family dwellings, mixed occupancy, and entertainment uses as permitted uses rather than conditional uses. Also, the current procedure for mixed occupancy, which requires re-approval every time the use-ratio changes, should be removed for the Old Hilliard zoning district. Parties responsible: Hilliard's City Planner and Law Director. Cost: This would be a minor change to the zoning ordinance and would require City Council's approval, taking approximately 10 staff hours to prepare the modifications. The entire process from rewriting the zoning changes to final approval from City Council would take nine months.

Medium Term (3-5 years)

- » Begin developing mixed-use projects and other infill projects according to the mixed-used district (referenced earlier in the Neighborhood Center Development recommendation) to the Retired Railroad Corridor, I-270 Corridor, and possibly the Old Hilliard district. However, the City should first look to redeveloping the 4.95 industrial site in the Old Hilliard district as an impactful mixed-use development. The City can choose to apply the mixed-use district to the Old Hilliard district in developing the project. But this is not essential since the zoning modifications to the Old Hilliard district already accommodate mix-uses and denser development adequately. Parties responsible: Collaborated effort between city planner, building division, and city council. Cost: Approximately \$1.5 million in acquiring existing property on the site. Other undetermined

costs may exist to update infrastructure and entice developers.

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Long Term (5-10 years)

» None

Parks and Public Spaces

Park accessibility, the amount of parkland available to each resident, and the diversity of park amenities are all important factors to build a more sustainable community. As discussed in the Indicators section, accessible parkland promotes physical activity and improves the health of the community. The following recommen-

Figure 3.7: Comparison of Parkland in Central Ohio Cities

City	Popula- tion	Parkland (Municipal parks only)		Parkland (Municipal parks, nearby Metro Parks	
		Acres of parkland	Ratio (acres per 1,000 residents)	Acres of parkland	Ratio (acres per 1,000 residents)
Dublin	41,093	1,000	24	2,037	50
Gahanna	33,224	631	19	-	-
Grove City	31,537	565	18	-	-
Worthington	13,314	221	17	1,380*	104
Westerville	36,361	559	15	1,444	40
Hilliard	28,697	331	11	2,228*	78
Reynoldsburg	33,657	275	8	918	27
Upper Arlington	33,686	172	5	-	-

*Metro Parks within or near to city limits

Note: This analysis does not include land owned and maintained by local school districts

» Source: Hilliard Comprehensive Plan

Figure 3.8: Survey Results for Diversity of Park Facilities

	Rate	Most Important
Walking or multipurpose trails	1.56	66.7% (12 people)
Sports facilities	2.33	16.7% (3 people)
Natural preserves with viewing areas	2.56	16.7% (3 people)
Parks shelters and/or picnic areas	3.32	5.3% (1 person)

Note: The survey asked people to rank the importance of the park amenities with 1 being the most important and 7 being the least important.

» Source: Online Survey, The Ohio State University

dations are provided to continually improve these aspects of Hilliard’s parks and public spaces.

Recommendation: Increase the amount of parkland to create more public space for each resident and provide a greater diversity of amenities in public parks.

Currently in Hilliard there are 11.5 acres of parkland per 1,000 residents. This is relatively low compared to the other cities in Central Ohio. However, calculating the surrounding metro parks, Hilliard has 78 acres of parkland per 1,000 residents which is relatively high compared to other Central Ohio cities as listed in Figure 3.7. Therefore, Hilliard is not lacking access to larger parks and increasing the number of smaller neighborhood parks may be the next step towards improving park access in Hilliard.

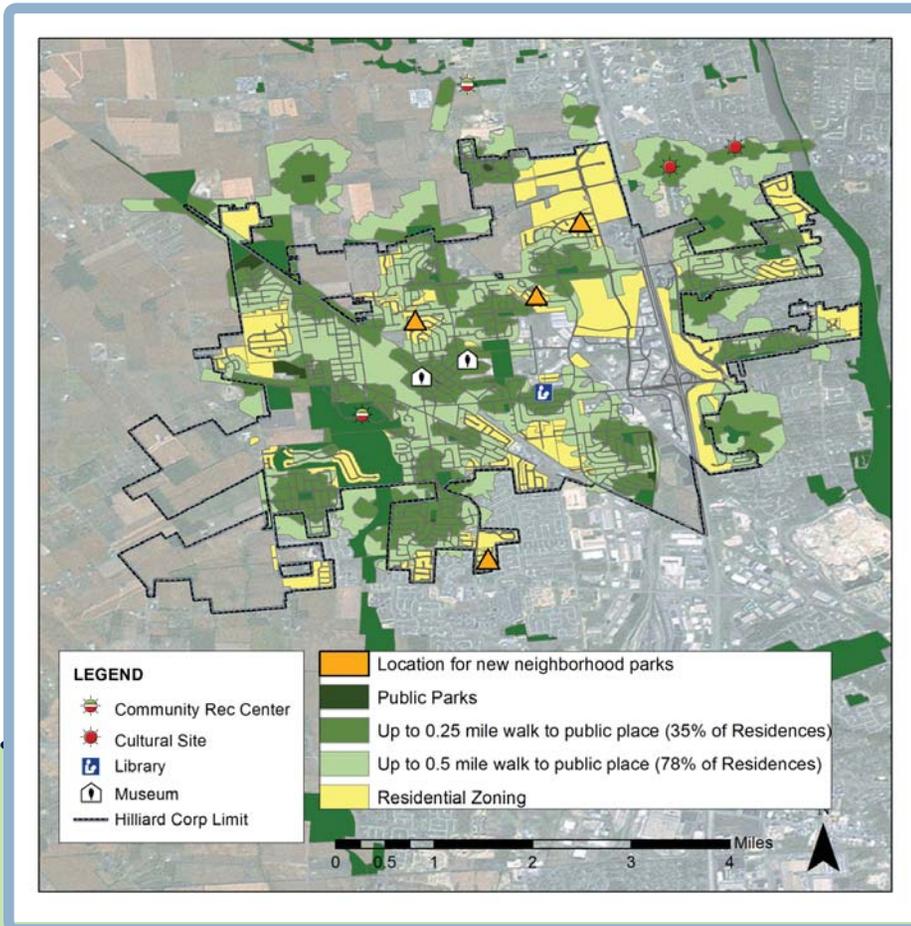
In addition, our survey of residents and public input during the development of the Comprehensive Plan indicated a desire for more programs, activities and amenities in the parks.¹¹⁹ The Land Use and Urban Ecology

team conducted an online survey about the community's preference for park facilities. Although the survey has limitations because of the small number of respondents and small window of accessibility, the number can still provide some insight for residents' preferences. According to the survey, walking and multipurpose trails are the most important park amenities for 66.7% of the respondents (see Figure 3.8). However, most of the parks lack pedestrian-friendly facilities. (This recommendation will be discussed in Transportation section.) As shown in Figure 3.3 in Opportunity Assessment, the amenities of the parks in Hilliard currently are limited with most of the parks in eastern Hilliard containing sports and play equipment and those

in the Big Darby Area containing passive uses. Small parks, such as community gardens or rain gardens, can provide sustainable alternatives to traditional parks.

Short Term (1-3 years)

- » Program open spaces in residential areas to create neighborhood parks. Based on the accessibility analysis of the parks, neighborhood parks serves as the walkable outdoor places for the residents. They can use for playground for children, playing fields, pocket parks, vegetable gardens, picnic areas.¹²⁰ They can provide equitable access of residents. Residents should be able to walk less than five minutes to get to a pocket park (0.25 miles) and less than 10 minutes (0.5 miles) to get to playing fields.¹²¹ As shown in Map 3.10, these locations for new neighborhood parks in Hilliard could include the Avery Road neighborhood (north of the intersection of Center Street and Northwest Parkway), the Ansmil West neighborhood



Sidebar 3.11: Case Study: Pocket Parks and Downtown Square of Savannah, GA

Pocket parks are small urban open spaces used for gathering, relaxing and enjoying the outdoor. The term was first used in 1960s, and they are also called vest pocket parks. These parks, although small in scale, can satisfy many community needs. They can be used as community event space, playgrounds for children, spaces for relaxing or meeting friends, and refuges from everyday work.⁴⁴

The small and pocket parks of Downtown Square of Savannah, Georgia are a series of small parks that distinguish the city's image. These parks are between 0.46 acres to 1.38 acres, which is larger than the traditional pocket parks. They are designed with city grid to shape the image of the city. As they are located in the center of the neighborhood, their location can attract more residents and visitors. They are also connected to bike and walking paths. The features of the parks includes seating, fountains, statues, mature trees, shade, monuments, gazebos, recreation areas, gardens, et cetera.⁴⁵

» Map 3.10. Parks and Residential Areas
Data Source: City of Hilliard, 2011

(west of the intersection of Davidson Road and Leap Road), the north part of the Britton Farms neighborhood (north of the intersection of Davidson Road and Britton Parkway) and the Schatz Estate neighborhood (northeast of the intersection of Hilliard Rome Road and Roberts Road). Parties responsible: Hilliard Recreation and Parks Department, Recreation and Parks Commission. Cost: 20 staff-hours to study the alternatives and finalize the proposal.

Medium Term (3-5 years)

Case Study: Indianapolis' Community Garden and Rain Garden

Community Garden

Name: Felege Hiywot Center

This park is located on a busy street, but there are not very many businesses in the surrounding. It is built on vacant land and used for relaxing and increasing community bonds. The vegetable garden provides youth education programs about environment, gardening, food, and nutrition, as well as increasing the sense of community by letting kids take their harvest home.⁴⁶

Rain Garden

Name: Indy Tilt

This is a large rain garden at the Double 8 Food Store. The rain garden reduces the number of impervious surfaces and collects water using a large cistern on the roof. This can help reduce the storm water runoff and also attracts birds and insects. An education program was developed to teach public about problems related to combined sewer overflows (CSOs) and ecological protection.⁴⁷

- » As part of the new mixed-use regulations recommended for the focus areas, encourage the use of small, pocket parks in the focus areas where there is more compact development. These pocket parks are small-scale urban open spaces that are surrounded by commercial buildings or small-lot housing (see Pocket Parks Case Study sidebar 3.11). These parks can be a very crucial part in the network of Old Hilliard's design features to provide a unique identity. Leftover spaces, such as vacant lots and parking lots, can be ideal places for building them. They should also connect to the bike paths and walking paths to encourage a pedestrian-friendly environment. Although the sizes of the parks are small, they can be used to accommodate different neighborhood activities, to provide a place for rest, relax and communicate. This will directly go towards increasing the value of the park access indicator. Parties responsible: Hilliard Recreation and Parks Department, Recreation and Parks Commission. Cost: Included in the code revision process.

Long Term (5-10 years)

- » Encourage greater diversity of amenities within City parks. For the pocket parks created in downtown areas, additional facilities can include seating, fountains, statues, mature trees, shade, monuments, gazebos, recreation areas, flower and vegetable gardens, and climbing structures.¹²² Parks within neighborhood centers can serve as community gardens which can be used for education and agriculture.¹²³ The parks on the Hayden Run Road would be good locations for rain gardens or alternative stormwater management features (see Indianapolis Community Garden sidebar 3.12). The Hilliard Recreation and Parks Department can create a park-diversity workshop to further define the public needs for the amenities. Party responsible: Hilliard Recreation and Parks

Department. Cost: A few public meetings. Trail construction for community parks cost around \$30,000; playground equipment costs around \$50,000; pocket park facilities are \$50,000 per acre; site furnishings and interpretive facilities are around \$10,000; picnic areas and shelters cost around \$18,000.¹²⁴ The actual cost for construction will come from the City's parks and recreational budget.

Environmental Resources

Past development patterns have drastically altered Hilliard's land cover;¹²⁵ however, the Big Darby Watershed remains largely undeveloped. Hilliard has the opportunity to balance responsible development with the conservation of this valuable natural resource. While the Big Darby is a crucial environmental asset, Hilliard should also address environmental resources throughout the city. As noted in the Opportunity Assessment, tree stands cover only 7% of Hilliard's area. A robust tree planting program can complement existing initiatives and expand Hilliard's tree canopy.

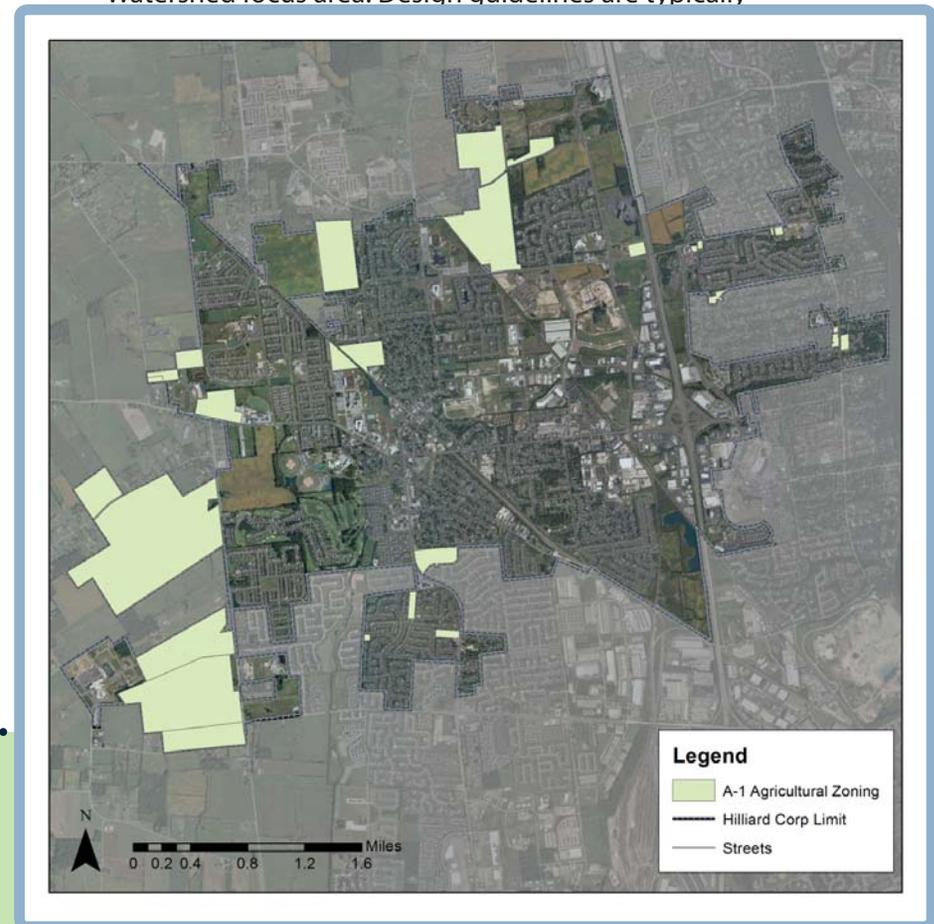
Recommendation: Strengthen conservation efforts in the Big Darby Watershed with environmentally conscious development standards.

As discussed, conservation development involves a balance between compact development and preservation of natural areas or open space. There are several zoning techniques that can encourage or require such a development pattern. Cluster development requires a certain percentage of open space to be preserved in new developments while limiting the number of lots.¹²⁶ Incentive zoning offers incentives to the developer for clustering developing by providing a lot "bonus" (an increase in the maximum number of lots) for preserving more open space.¹²⁷ Sliding scale zoning limits the number of lots that can be split from a parent lot of a given

size.¹²⁸ These techniques vary in their appropriateness to Hilliard. For example, though they have been applied successfully in other states, sliding scale zoning and incentive zoning do not currently have enabling legislation in Ohio.¹²⁹ Cluster developments, however, are enabled by legislation in Ohio.¹³⁰ As noted previously, zoning for cluster development in the Big Darby Watershed is recommended by the Hilliard Comprehensive Plan¹³¹ and the Big Darby Accord.¹³²

Short Term (1-3 years)

- » Establish temporary design guidelines in the Big Darby Watershed focus area. Design guidelines are typically



» Map 3.10. Agricultural Zoned Land
Data Source: City of Hilliard, 2011

Conservation Development

Numerous examples of conservation developments exist across the United States. These developments span a variety of styles and scales.⁴⁸ Hidden Creek at the Darby is a 600-acre development located just north of Columbus. Lot sizes range from two to five acres, with more than 200 acres set aside for a nature preserve.⁴⁹ Prairie Crossing, located in Grayslake, Illinois (outside of Chicago) covers more than 300 acres of land, has a mix of clustered single-family homes, condominiums, and commercial buildings, is serviced by a Chicago Metra commuter rail station, and features a 100-acre organic farm.⁵⁰ Conservation development can also occur on smaller scales. Meadow on the Hylebos, located near Tacoma, Washington, covers nine acres of land and features a dense cluster of houses near a nature preserve.⁵¹ Despite these different approaches, conservation developments generally feature minimal impervious surface cover, native landscaping, narrow streets, and provisions for scenic views.⁵² Additionally, conservation developments often provide for the long-term maintenance of open space through land trusts or conservation easements.⁵³



» Image 3.12. *Prairie Crossing*
Source: *National Building Museum*

advisory in nature and can supplement existing zoning in the focus area.¹³³ Since implementing new zoning takes some time and is often expensive, establishing design guidelines may be an easier first step in guiding development in the Big Darby Watershed. Design guidelines can help ensure that the desired development character (size and scale of buildings as well as their physical design) is consistent with the Comprehensive Plan. Party responsible: Depending on their level of detail, basic design guidelines may be developed by Hilliard planning staff. Cost: 80 staff-hours (approximately two weeks of authoring and reviewing a basic design guideline manual).

Medium Term (3-5 years)

- » Codify conservation development standards as an overlay district that conforms to the boundaries of the Big Darby Watershed focus area. These standards should include the recommendations made in the Comprehensive Plan, particularly preservation of at least 50 percent of open space and protection of important environmental features.¹³⁴ Design standards for buildings that are regulatory (rather than advisory, as with design guidelines) should also be included in this overlay district.¹³⁵ This goal would also likely include a public participation component to gather input from residents of the proposed overlay district. Parties responsible: Due to the limited number of Hilliard planning staff members, drastic code changes may be best left to consultants. This may change if the City's planning staff is expanded. Cost: Consultant fees and associated staff-hours, which will vary depending on the degree of involvement of planning staff in the process. Funding would be likely sourced from the City's operating budget.

Long Term (5-10 years)

- » Begin construction on a signature conservation development in the Big Darby Watershed area. This conservation development could be geared toward preservation of natural resources and features, preservation of farmland, or both. As shown in Map 3.11, there are several parcels of land that are zoned for agricultural use in both the Big Darby focus area and the fringes of the City. As with other conservation developments like Prairie Crossing in Illinois (see Conservation Development sidebar 3.13), this development could take advantage of the remaining agricultural land in Hilliard and cluster a mix of housing and commercial uses in proximity to a small working farm. Such a development could provide a degree of self-sufficiency, various learning opportunities, and aesthetic value (particularly if the farm is organic) to the community.¹³⁶ This goal is highly dependent on market conditions and availability of appropriate land. Parties responsible: City of Hilliard's Economic Development Department and private development companies. Cost: Will vary depending on cost of land, scale of development, and market forces. At present, a 100-acre agricultural tract at 3017 Alton-Darby Creek Road has a market value of approximately \$750,000 based on Franklin County Auditor estimates. The actual sale price of the land, if a sale were to occur, may differ from this value and the cost of developing the land would be a significant additional investment.

Recommendation: Expand and formalize community tree planting initiatives to improve Hilliard's tree canopy.

A healthy and extensive tree canopy provides numerous benefits to a community. Beyond quality-of-life benefits such as shade and aesthetic

value, trees capture and filter pollutants, reduce stormwater runoff, mitigate urban heat islands, and provide ecosystem functions.¹³⁷ Cost-benefit analysis demonstrates that cities can realize a positive rate-of-return on tree planting.¹³⁸ A number of communities across the United States have recognized the benefits of trees by implementing robust tree planting initiatives. A number of larger cities like Chicago and San Francisco have implemented such initiatives,¹³⁹ but smaller communities have also made substantial investments in their tree canopy. Davenport, Iowa enacted its Tree Planting Program in 1992. This program, funded through grants, private donations, and capital improvement funds, involves strong volunteer engagement and has led to nearly 9,000 trees being planted.¹⁴⁰

A number of communities in Central Ohio have forestry departments and several have street tree planting programs. Westerville offers a program that allows residents to purchase a street tree at full cost.¹⁴¹ Upper Arlington's Forestry Department¹⁴² and Worthington's Parks Department¹⁴³ both offer a cost-sharing program that allows residents to split the cost of a street tree with the City.

Short Term (1-3 years)

- » Implement regular volunteer tree-planting initiatives. Volunteers from the Hilliard general public, churches, and schools could be solicited to provide labor for street and park tree plantings throughout the City on a regular basis (rather than just Arbor Day-related events). As with schools across the United States, these tree plantings could be a community service opportunity for local high school students.^{144,145} Parties responsible: The Hilliard Shade Tree Commission and the Recreation and Parks Department would coordinate this effort with the cooperation of local

community groups and the Hilliard City School District (as well as any other willing volunteers). Cost: Varies depending on the scale of the initiative. Based on the City of Westerville’s tree planting program, costs (including the tree and its planting) are estimated at approximately \$250 per tree. Establishment of a tree planting fund could help finance these costs. For example, in 2009 Upper Arlington received nearly \$20,000 in donations through its Tree Planting Fund. By comparison, operating expenditures of the fund were approximately \$10,000.¹⁴⁶ Due to the volunteer-driven nature of this goal, labor costs would likely be minimal.

Medium Term (3-5 years)

- » As funding permits, rehire a full-time staff Certified Arborist. Party responsible: City of Hilliard. Cost: As with other careers, the salary of an arborist varies depending on experience. For example, city foresters employed by other municipalities in the Central Ohio Region are paid between \$60,000 and \$75,000 annually.^{147,148} As with Davenport, Iowa’s urban forestry initiative, funding could also be sourced from a small community forestry fee levied on Hilliard residents.¹⁴⁹

Long Term (5-10 years)

- » As funding permits, establish a dedicated Forestry Department with one or more foresters on staff. Party responsible: City of Hilliard. Cost: Budgeting depends on scale of the new department. As a point of comparison, the City of Dublin’s urban forestry budget is nearly \$500,000

annually.¹⁵⁰ This goal could be factored into the City’s operating budget over time. Like funding for a potential Certified Arborist, this goal could be funded in part through a community forestry fee.

Transportation

A major focus in the Hilliard Comprehensive Plan was on connectivity,¹⁵¹ which is also one of the seven principles of lifelong communities. Connectivity within Hilliard is achieved when the City can provide a diverse range of options for traveling from one place to another which reduces traffic and encourages multiple modes of transportation.¹⁵² Additionally, people want quality facilities for walking that are safe and direct.¹⁵³ In the February 8 public meeting to discuss sustainability with City residents, some residents were concerned about the safety of crossing some busy roadways such as Cemetery Road, which serves as a barrier between residential neighborhoods and one of the largest retail corridors in the City. Bike and pedestrian infrastructure improvements can encourage people to walk or bike in a safe environment. These recommendations will help Hilliard improve connectivity and increase transportation options throughout the City.

Recommendation: Develop an interconnected bike and pedestrian network that promotes multiple modes of transit and provides safe and reliable infrastructure.

As previously discussed, bicycle travel is beneficial to both the environment and health, but the majority of bicycle travel in the U.S. is recreational.¹⁵⁴ However, recreational riders have different infrastructure needs than those who ride their bike as a regular mode of transit, so a diverse biking infrastructure that is interconnected throughout the City will better serve the biking needs of the entire community. Hilliard has started to diversify their bike network by building multi-use paths throughout the City, and install-

» Image 3.13. Wayfinding Signs
This is an example of a sign that can be used to mark a bike path or multi-use path so users can navigate the system easier.
Source: Brad Crawford, 2009 (www.pedbikemages.org)



ing sharrows or bike lanes on new road projects. However, the City can continue work towards connecting the entire network to achieve a connectivity index of 1.4 as discussed in the Indicator section and provide multiple options for all levels of riders.

Short Term (1-3 years)

- » Establish a Bicycle and Pedestrian Advisory Group to take the lead in planning for bicycle and pedestrian infrastructure and implementing projects using the existing bicycle and pedestrian capital improvement plan (CIP) funds with the assistance of City Planning and Engineering staff. A non-profit advisory group will enable the City to apply for grants through more organizations than the municipality can use directly to help fund larger projects. One group that encourages local governments to align with bicycle advisory groups is the Bikes Belong Grants Program which is a national organization sponsored by the U.S. bicycle industry.¹⁵⁵ Parties responsible: City Council would be responsible for establishing the advisory group, and the advisory group would report directly to City Council. Cost: There would be minimal costs, and advisory group members would serve voluntarily.
- » Develop a comprehensive sign plan to improve wayfinding and provide directional assistance to multi-path users so they know where paths connect. Maps can be installed along the multi-

» Image 3.14, 3.15. Covered Bike Racks



» These pictures show examples of covered bike racks that protect bikes from weather when parked for a longer period of time.

» Source: Dan Burden, 2006 (www.pedbikeimages.org)
Dustin White, 2008 (www.pedbikeimages.org)

use paths, especially in public parks to help users navigate the system. Party responsible: The Recreation and Parks Department would be responsible for purchasing, installing and maintaining the wayfinding signs for multi-path trails and bike networks throughout the City. Cost: Signs cost approximately \$50 to \$150 per sign and can be paid for from the CIP budget for parks or the City could coordinate with local governments who have sign production facilities at a lower cost.¹⁵⁶ (Image 3.13)

Medium Term (3-5 years)

- » The Recreation and Parks Department should install bike racks in all public parks, and the Engineering Division should work with COTA to install covered bike racks at Park and Ride locations. COTA currently has several Park and Ride locations with bike lockers, and as of 2006 their long-term plan was to expand their bike locker program to provide secure storage.¹⁵⁷ While usage has been lower than expected and has resulted in plans to remove the lockers,¹⁵⁸ secure bike parking can still encourage individuals to ride more often and to ride to destinations because they know they will be able to safely lock their bike while they visit retail establishments or take the bus to their final destinations. Covered bicycle parking facilities should be located at Park and Ride Facilities and should provide weather protection, which can be accomplished by installing a canopy or roof over the bike racks. Parties responsible: The Recreation and Parks Department (with COTA's approval) and the City Engineering Division. Cost: The cost of installing standard bike racks ranges from \$150-\$300 for a rack that parks two bicycles, and bike lockers or bike storage shelters range from \$1,000-

» Image 3.16. Raised Crosswalks
Source: Dan Burden, 2009 (www.pedbikeimages.org)



» Raised crosswalks are striped to provide high visibility and they force drivers to slow down for pedestrians because they act as a speed bump.

» Image 3.17. High Visibility Crossings
Source: Mike Cynecki, 2009 (www.pedbikeimages.org)



» High visibility crossings use multiple bright signs, lights, and striping to draw attention to the pedestrian crossing so drivers will be more aware of their surroundings. Pedestrians can push a button to cross the street which activates the signal lights over the pedestrian crossing.

» Image 3.18. Pedestrian Awareness
Source: Sree Gagula, 2006 (www.pedbikeimages.org)

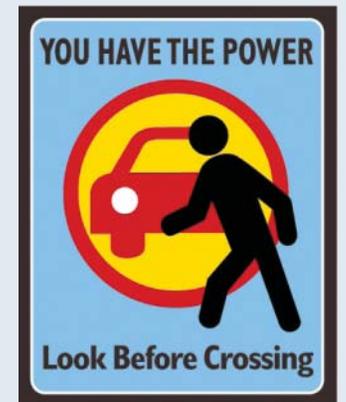
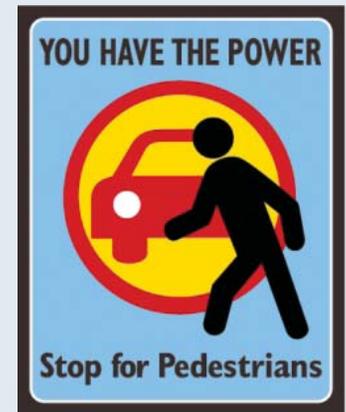


» Warning signs for pedestrians can also remind people to look for traffic before crossing the street.

Sidebar 3.14: Missoula Pedestrian Safety Campaign Insert

In Missoula, Montana, the city had a problem with motorists not stopping for pedestrians in crosswalks which resulted in 35 pedestrian-motorist accidents annually. To address this problem, in 2004 the Missoula Bicycle and Pedestrian Program, which is managed by the city's Department of Transportation, applied for a Congestion Mitigation and Air Quality (CMAQ) grant to fund their pedestrian safety campaign.⁵⁴ They took a multi-pronged approach and used their motto "You Have the Power, Stop for Pedestrians" on signs and in radio campaigns targeting both drivers and pedestrians. The primary target for the ad campaign was motorists, with 80% of radio and television spots directed at drivers. The Police Department also conducted "sting" operations where an officer in plain clothes walked into the crosswalk as a motorist was approaching. If the motorist did not stop, officers on motorcycles would pull him over and issue a ticket. The total campaign cost approximately \$90,000 over three years and used the following methods:⁵⁵

- » 300 large and small posters placed in highly visible locations around the city with the motto and logo
- » 2,700 paid radio spots
- » 7,000 free radio spots
- » News articles and announcements about pedestrian facility improvements
- » Distribution of pedestrian safety messages every six months to local pedestrian organizations who maintained membership newsletters



» Image 3.19, 3.20.

» These signs were used as part of Missoula's Pedestrian Safety Campaign. One is directed towards drivers while the other warns pedestrians to look for traffic before crossing the street.

» Source: Pedestrian and Bicycle Information Center, 2010

\$4,000 to park two to four bicycles under covered storage.¹⁵⁹ Through the Hilliard Bicycle and Pedestrian Advisory Group, apply for a grant through the Bikes Belong Grants Program or similar grant program which will fund facility improvements up to \$10,000. (See Images 3.15 and 3.16 for examples of bike racks and covered facilities)

- » Improve the safety of pedestrian crossings on Cemetery Road and Main Street, which were stated to be dangerous to cross at the February 8, 2012 public meeting. These improvements can include the installation of timed pedestrian signals, additional signs to warn drivers of pedestrian crossings, and pedestrian crossing islands in the medians on wide road sections that are four lanes or more (see Images 3.16, 3.17 and 3.18 for examples). This will increase driver awareness and make pedestrians feel safer. Parties responsible: The City Engineering Division is responsible for roadway design and should consider pedestrian safety measures for all new roadway projects and existing high-volume roadways. Cost: Pedestrian signals can cost \$20,000-\$40,000 for four legs of an intersection. Road signs that warn drivers to stop or yield for pedestrians typically cost \$50-\$150 per sign or the City could coordinate with other local governments in the region who have their own sign shops to produce the signs at lower cost.¹⁶⁰ A pedestrian crossing island can cost anywhere from \$4,000-\$30,000 depending on the design and materials used. Raised concrete islands with landscaping cost the most while asphalt islands are cheaper.¹⁶¹
- » The Bicycle and Pedestrian Advisory Group should develop a Bicycle and Pedestrian Safety and Education Program to educate drivers and pedestrians about new pedestrian improvements and reduce traffic accidents. The City of Missoula, Montana implemented a pedestrian safety campaign in 2004 which used informational signs throughout the city, a media campaign, and police enforcement.

This program improved driver awareness and reduced the number of accidents (see the case study on Missoula, MT in sidebar 3.14).¹⁶² Parties responsible: The Bicycle and Pedestrian Advisory Group in coordination with City staff, especially Engineering and Police. Cost: The City can apply for a Congestion Mitigation Air Quality grant through the Department of Transportation to fund this project or similar grants.¹⁶³

Long Term (5-10 years)

- » The City Recreation and Parks Department should extend the Heritage Rail Trail from Old Hilliard southeast to the Columbus corporation limit and work with adjacent communities and Metro Parks to connect the Hilliard bicycle network to other regional trail systems in Dublin, Upper Arlington, and Columbus. Parties responsible: Hilliard Recreation and Parks Department in coordination with Metro Parks. Cost: The cost of multi-use path construction varies based on the materials used and the amount of land that needs to be acquired. Asphalt trails cost around \$20 per linear foot for a 10 foot wide trail while concrete costs approximately \$35 per linear foot.¹⁶⁴ Hilliard could coordinate with other cities and Metro Parks for cost-sharing on regional projects.

Recommendation: Increase transit options within Hilliard and plan for future transit opportunities.

Currently COTA serves Hilliard with four bus routes, which primarily serve Hilliard residents who work in downtown Columbus and at The Ohio State University campus, but there is not an option for

travel within Hilliard itself or to other regional destinations. Hilliard's Comprehensive Plan discusses the need for expanding COTA services within Hilliard, but it does not provide any details of where the City needs new routes, bus stops or facilities.¹⁶⁵ COTA's Long Range Transit Plan acknowledges the need for more frequent and convenient services, more crosstown circulation, and suburb-to-suburb bus services as well as expanded services to accommodate second- and third-shift workers. COTA is planning to establish new crosstown routes along Cemetery Road and Hilliard-Rome Road

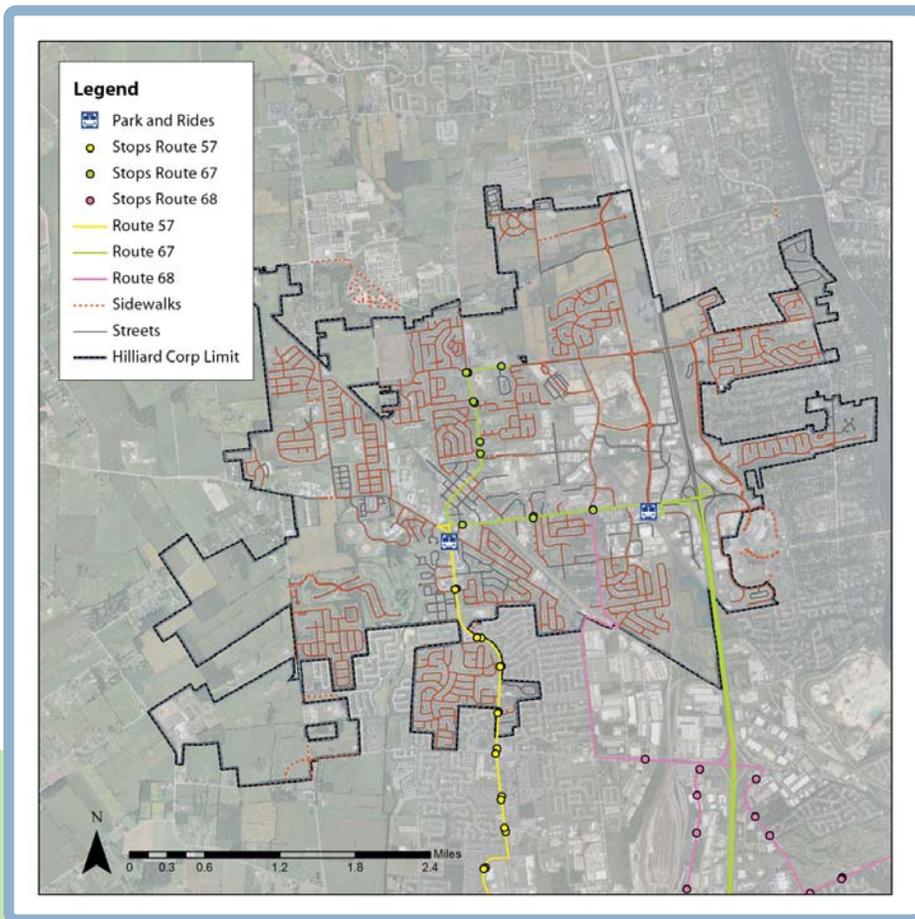
connecting to Dublin and Upper Arlington, but there are no plans for new local routes within Hilliard or any details on potential LINK routes which service the local community.¹⁶⁶ To accomplish their vision of being a lifelong community, Hilliard must consider providing alternate modes of transit to serve individuals who cannot drive or who choose not to use a car. Increasing public transit options will increase mobility for all residents and all types of people.

Short Term (1-3 years)

- » The City should continue to foster a good relationship with COTA through their board of trustee's member and City staff to facilitate open communication and cooperation on future projects. This could include attendance at any regional COTA planning meetings or one-on-one coordination meetings between the City and COTA. Parties responsible: Engineering and Planning staff. Cost: Negligible.

Medium Term (3-5 years)

- » The Engineering and Planning staff should conduct an in-depth transit study to determine what the demand for additional transit services is within the City. This should include a survey and charrette with residents, and the City can post fliers at all bus stop locations in addition to publishing the survey and charrette information through the local media to get maximum visibility of the study. The study should identify what time of day people commute to work, what time second- or third-shift commuters are traveling, where residents might want services to on weekends or for special events such as sporting events or concerts, where are services for the elderly and disabled lacking within Hilliard, and what other areas do residents commute to other than downtown Columbus. Parties responsible: The staff could conduct the study themselves and



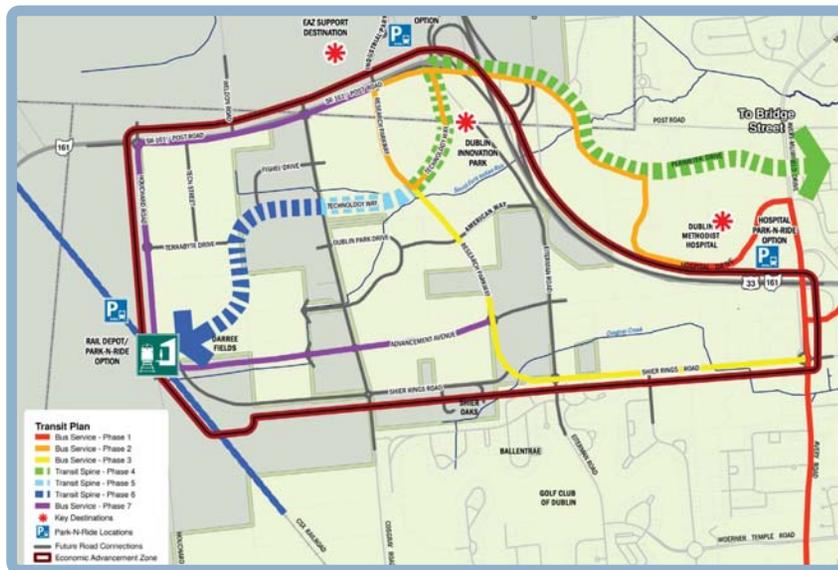
» Map 3.11. COTA Services in Hilliard
Data Sources: City of Hilliard, 2011; COTA, 2011

compile the data to enable them to work with COTA to implement additional bus routes based on demand. Cost: This project would take approximately 100 staff hours to complete.

- » Along with COTA, Dublin, Upper Arlington and other suburbs where many Hilliard residents commute to (based on information obtained from the transit study), investigate the feasibility of a local bus route between the two cities linking major employers, shopping areas, and other destinations. Parties responsible: Hilliard Engineering and Planning staff in coordination with COTA and other municipalities. Cost: Approximately 40-80 staff hours.

Long Term (5-10 years)

- » During the next update of the Comprehensive Plan, the Engineering and Planning staff should provide a Transit Plan in addition to the Thoroughfare Plan which shows long term visions for where additional bus routes, Park and Ride facilities, light-rail or inter-city rail stations should be located (see Image 3.22 for an example of Dublin's Transit Plan). Although there is no regional plan for additional transit options other than COTA, such as light rail or inter-city rail, the City should be prepared for future alternatives. Additionally, if Hilliard's Comprehensive Plan contains details about desired future routes, COTA will be able to use this information when they conduct their own long-term planning and incorporate the City's plan into their own regional plan. Parties responsible: City Engineering and Planning staff with the approval of City Council. Costs: This would be part of the normal process for updating the Comprehensive Plan and would not incur any significant additional costs.



» Image 3.21. Dublin Transit Plan
 This shows Dublin's Transit Plan which was included in their 2007 Community Plan to show future transit locations.
 Source: Dublin Community Plan, 2007

LAND USE
& URBAN
ECOLOGY



Economic Development and Social Equity

Hilliard strives to be an economically sustainable city committed to a future that promotes greater opportunity and social equity for all residents. By leveraging its human and financial capital, the city seeks to foster economic development on the foundation of a diverse economic portfolio, preserving the natural environment, enhancing quality of life, reinforcing a unique sense of place for the community, and committing to an approach to development that is built for long-term vitality and success.

Hilliard will realize this vision by accomplishing the following goals:

- » Promote greater opportunity and social equity for all residents.
- » Foster economic development on the foundation of a diverse economic portfolio.
- » Enhance quality of life and build a unique sense of place.



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Indicators

Percentage of housing units available in Hilliard at 30% metropolitan-region median income

Background

Measuring a community's progress toward a more equitable future is difficult in that there are few statistics that quantify this intention. The Center for Community and Economic Development outlines several factors that can contribute to a city's relative equity, including economic diversity, the affordable housing stock, and access to transportation, among many others. Many of these have limited relation to the actual borders of the city. For a community like Hilliard, accessibility in relation to housing options and/or amenities could help to gauge whether the city is moving closer to or farther away from its goal of becoming a more equitable community with greater opportunity for all of its residents.¹

Today Hilliard has 11% fewer residents between the ages of 20 and 30 than the City of Columbus.² While it seems clear that a number of young people leave the community to pursue other opportunities, this kind of trend is unsustainable. Without new residents to offset any outward migration, the city will lose population. Given the median home value and rent data available from the US Census, residents earning less than \$50,000 will likely find it challenging to find a mortgage or rent that is at or less than 30% of their household income. Taken together, these indicate that the city has very few housing options for these two demographics.³ If Hilliard is to

make up the deficit it now sees in its demographic profile, it must consider what types of housing development make sense today. Building a lifelong community means improving access for all ages and backgrounds.

Financial advisors typically advise clients that no more than 30% of their gross income should be reserved for housing.⁴ This guideline ensures that renters or home-owners have enough capital to deal with the related costs of housing and other necessary expenses. An equitable distribution of housing prices in a municipality would have affordable options that accurately reflect the socio-economic distribution of the larger region.

Measure

The planning division will be charged with calculating the percentage of housing units available in Hilliard at a cost of 30% of the metropolitan region's median income. The planner should first access census information from tables that show distribution within Hilliard of selective monthly owner costs. This table will allow the staff to compare the percentages indicated by the expenditures distribution to the median income of the metropolitan statistical area (MSA).

Description

According to the 2010 U.S. Census, 86% of the housing units in Hilliard are owner-occupied (see Figure 1). Based on regional comparisons, this number is high, especially when coupled with the relative cost of housing. Using the Columbus MSA's median income of \$52,324.00 as a figure for comparison, only 10.4% of the housing stock within Hilliard meets the 30% recommendation.⁵

Fig 1

Housing Affordability

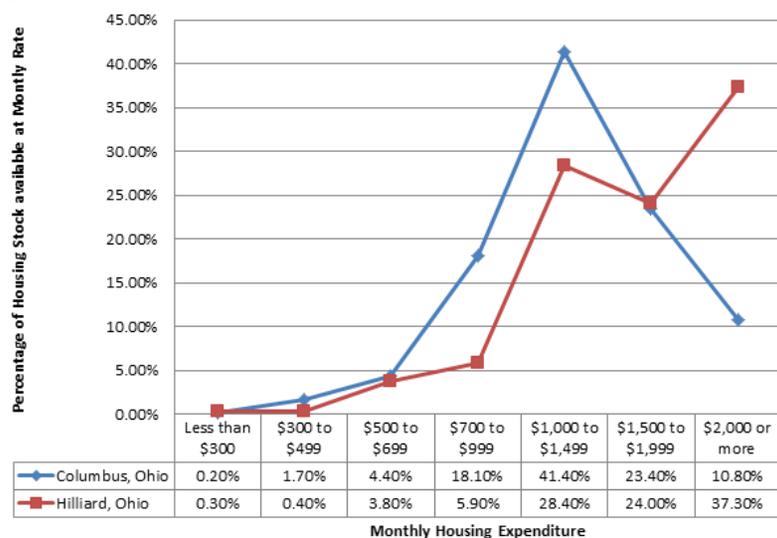
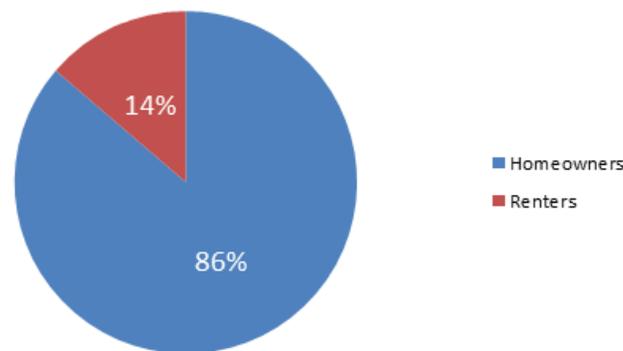


Fig 2 Homeowners vs. Renters



» Figure 1: U.S. Census Bureau. (2010, March 1). 2010 SF1 100% Data: Various Geographies Retrieved March, 2012

» Figure 2: U.S. Census Bureau. (2010, March 1). 2010 SF1 100% Data: Various Geographies Retrieved March, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/>.

Columbus, by the same measure, has approximately 24% of its housing at an affordable level. In short, the indicator reveals a serious barrier to entry that exists for potential residents of Hilliard. The cost of this housing is prohibitively high for half of Central Ohio residents. There are few options for affordable mortgages and relatively few rental options. Figure 2 illustrates the relative distribution of housing expenditures comparing Hilliard to the City of Columbus. The vertical line shows the affordable level of mortgage expenditure per month for a resident living at the MSA's median household income.

Annual change in the number of jobs; Annual change in the number of business establishments

Background

Hilliard seeks to become an economically sustainable place that offers strong incentives to large employers but also promotes a favorable growth environment for local businesses and entrepreneurs. To measure the city's progress toward this goal there are two available statistics that can be used: annual change in number of jobs and annual change in the number of business establishments. By tracking these two statistics and their relationship to each other, the City will be able to evaluate its progress towards this goal and measure its relative progress compared to similar cities.

Economic vitality cannot be measured solely by growth.⁶ There must be an appropriate level of jobs for a community with an appropriate mix of sectors. These two statistics will give insight into whether the community is growing employment while increasing the diversity of its economic portfolio.

Measure

The Department of Economic Development will measure the annual change in the number of jobs within Hilliard and the annual change in the number of business establishments. The numbers can be accessed through various online resources including Reference USA, the U.S. Economic Census, or U.S. County Business Patterns data.

Description

Based on the U.S. Economic Census, Hilliard added 26 establishments between 2002 and 2007, while at the same time losing 1,490 individual jobs.⁷ Taken together these two statistics demonstrate how employment patterns have changed in recent years. While new establishments have been created, they have not kept up with replacing jobs that have been lost. Although small, this may be interpreted as a sign that Hilliard's economic portfolio is becoming more diverse and less dependent on large employers.



This diversity is increasing in importance as volatile markets expose the consequences of singular investment at any scale.⁸ The city should do its best to foster small business growth and strengthen its resilience to market fluctuations. The fiscal health of the community will be strongly rooted in the growth of homegrown Hilliard businesses.

Annual number of community events

Background

It can be a challenge to measure residents' community pride, but great cities have assets that citizens enjoy and share with others. This emotional connection is critical to the sustainability of a place. Without this attachment, residents are not likely to feel invested in their community. Consequently, it is in Hilliard's best interest to foster a greater sense of place and strengthen its community's identity in order to enhance the quality of life for all of its residents.

Festivals and gatherings are an important aspect of a community's identity. These celebrations showcase the energy and creativity of a place, but also help to define the character that makes it special. The City is currently in the process of developing a signature event that will build on the community's identity.^{9,10}

Measure

A count of the annual number of community events in Hilliard.

Description

To better gauge Hilliard's progress towards its goals of enhancing quality of life while strengthening its sense of place, the Hilliard planning staff can work in conjunction with Destination Hilliard to track the number of community events taking place in the city throughout the year.

EDSE Opportunity Assessment

Economic development and social equity are critically important aspects of a community's sustainability. Integrating these issues into the planning process allows Hilliard to analyze the long-term ramifications of its current practices. Economic data can be used to create a model that will provide for long-term fiscal health and promote an equitable environment for current and future residents. This approach to sustainability has been likened to a three-legged stool. The three legs—environment, social equity, and economy—must balance in order for the stool to stand and the community to build policies for long-term health. A failure by local government to consider one of these factors would make for an unbalanced stool.¹¹

Presently, Hilliard is a proud community with extensive opportunities for young families and small businesses. Its strong school system attracts young families and fueled a residential building boom in the 1990s and early 2000s in and around the city of Hilliard. While this boom has been positive in terms of overall population growth, there is concern by city leaders that it has created a relatively homogeneous community compared to the larger metropolitan area, with few offerings for younger Central Ohio residents, residents with limited income, or elderly residents with differing needs. Spurred by regional discussions of lifelong communities, Hilliard's City Council and Mayor have expressed an interest in moving from this uniform demographic toward a more equitable lifelong community. By retaining young people and allowing older residents to age in place, Hilliard will achieve its goal of becoming a more equitable community.

Hilliard currently boasts a diverse collection of small and large businesses. Among these are large and small office employers, industrial uses, warehousing, service jobs, and number of other sectors.¹² This diversity

is a strength and should be a continued focus of their sustainable economic development model. The following outlines opportunities within the City relating specifically to sustainable economic development and social equity.

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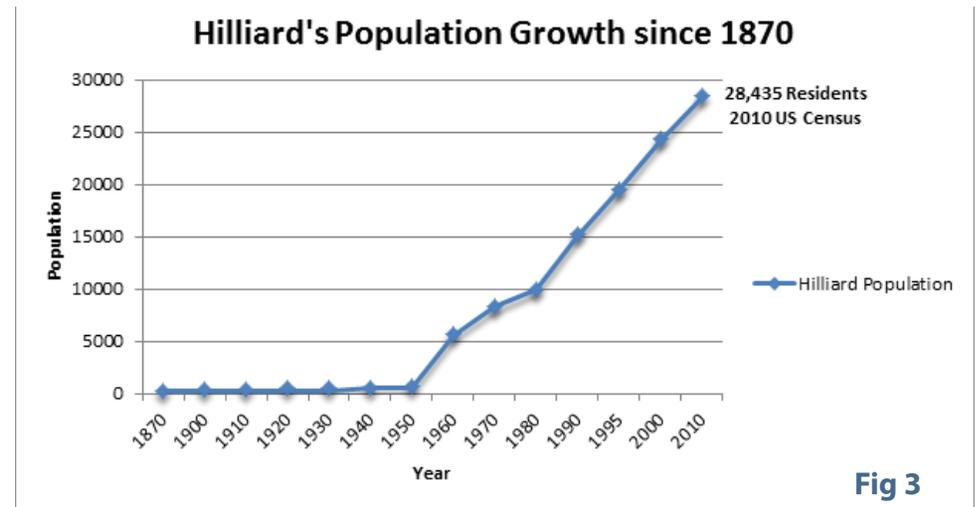


Fig 3

» Figure 3: U.S. Census Bureau. (2010, March 1). 2010 SF1 100% Data: Various Geographies Retrieved March, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/>.

Business Climate

The business climate in Hilliard is fairly diverse with the highest proportion of business within the Professional/Scientific, Retail, and Healthcare industries.¹³ As compared to the averages for Ohio and the U.S., Hilliard is slightly above average in the Scientific/Professional, Finance & Insurance, Healthcare, and Accommodations and Services industries.¹⁴ Hilliard is slightly below the averages of Ohio and the U.S. in the Construction and Retail Trade industries.¹⁵

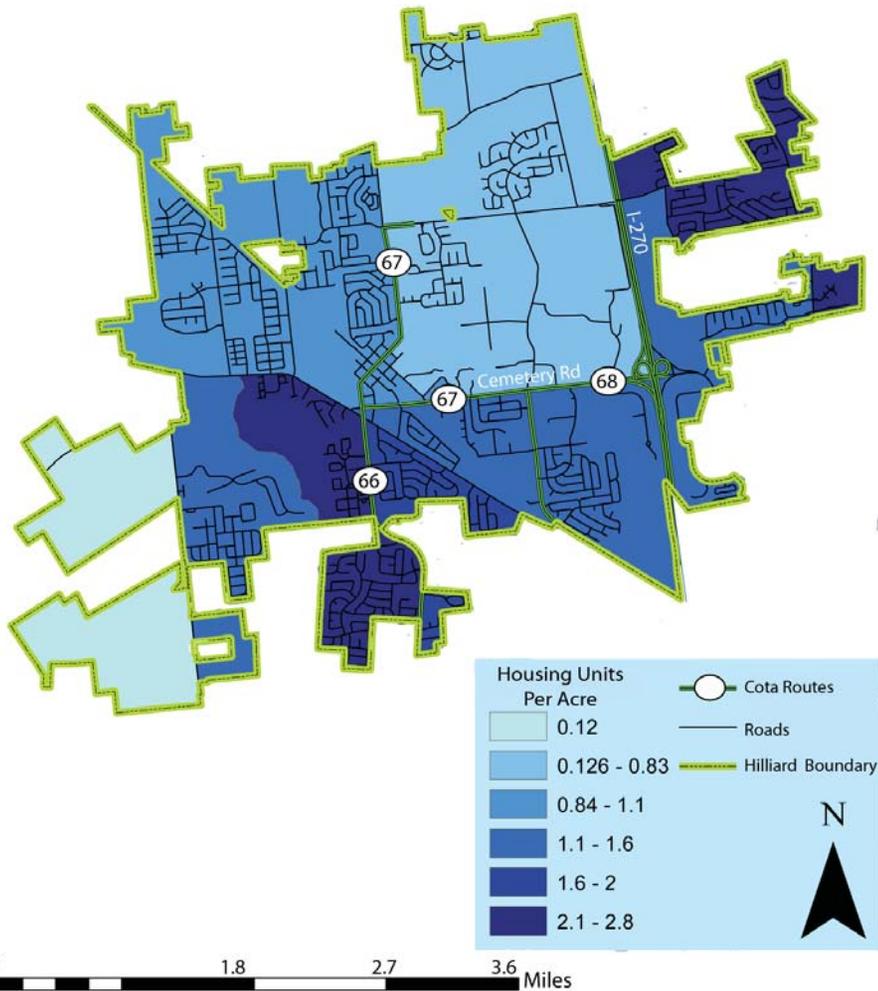
It is also interesting to note the breakdown of occupation by gender of Hilliard residents. As compared to Ohio, the proportion of males who work in the computer and sales representative industries is significantly greater for Hilliard.¹⁶ The concentration of computer and support staff can be attributed to the BMW Financial Services office and other similar offices within Hilliard. Other office, management, and business operations specialist positions are proportionally held by more women in Hilliard than the rest of Ohio.¹⁷

Fig 4

2010 Establishments by NAICS Code	Hilliard, OH		Ohio		United States	
Establishments, Total (by Place of Work)	602		270,227		7,700,385	
Forestry, Fishing, Hunting, and Agriculture Support	0	0.00%	273	0.10%	23,842	0.31%
Mining	0	0.00%	767	0.28%	25,112	0.33%
Utilities	3	0.50%	616	0.23%	16,658	0.22%
Construction	46	7.64%	24,842	9.19%	813,323	10.56%
Manufacturing	22	3.65%	16,178	5.99%	331,456	4.31%
Wholesale Trade	35	5.81%	15,339	5.68%	431,433	5.60%
Retail Trade	73	12.13%	39,866	14.75%	1,125,619	14.62%
Transportation and Warehousing	11	1.83%	7,663	2.84%	220,006	2.86%
Information	15	2.49%	4,231	1.57%	143,188	1.86%
Finance and Insurance	51	8.47%	19,214	7.11%	506,488	6.58%
Real Estate and Rental and Leasing	34	5.65%	10,844	4.01%	380,839	4.95%
Professional, Scientific and Technical Services	75	12.46%	25,579	9.47%	868,363	11.28%
Management of Companies and Enterprises	5	0.83%	2,203	0.82%	50,541	0.66%
Admin, Support, Waste Mgt, Remediation Services	39	6.48%	13,711	5.07%	383,618	4.98%
Educational Services	9	1.50%	2,911	1.08%	86,867	1.13%
Health Care and Social Assistance	65	10.80%	27,984	10.36%	785,864	10.21%
Arts, Entertainment and Recreation	12	1.99%	4,061	1.50%	125,329	1.63%
Accommodation and Food Services	58	9.63%	24,043	8.90%	634,204	8.24%
Other Services (Except Public Administration)	49	8.14%	29,902	11.07%	746,427	9.70%

» Fig. 4: CityData.com. (2012, January 30). Hilliard. Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>

Density of Housing along Hilliard COTA Lines



Transportation: Modes and Accessibility

Access to public transit in the city of Hilliard is limited. The Central Ohio Transit Authority has service to Hilliard with stops on the main streets. There are 10 COTA stops scattered along Cemetery Road and Main Street.¹⁸

There are four buses that go to Hilliard:

1. 57 Hilliard Express: three stops in Hilliard and five stops in downtown Columbus. It does not run on Saturdays or Sundays, and only runs in the early morning and early evening once in each direction.
2. 66 Hilliard/OSU Express: three stops in Hilliard and three stops on the OSU campus. It does not run on Saturdays or Sundays, and only runs in the early morning and early evening once in each direction.
3. 67 East Hilliard Express: two stops in Hilliard and six stops on the east side of downtown Columbus. It does not run on Saturdays or Sundays, only runs in the early morning and early evening once in each direction.
4. 68 Hilliard/Westbelt Express: seven stops in Hilliard and five stops on the west side of downtown Columbus. It does not run on Saturdays or Sundays, and only runs in the early morning once in each direction.

Riders can purchase single day, 7-day, or 31-day passes, and there are discounts for the elderly, students, and children. The infrequency of the COTA routes limits Hilliard residents' accessibility to other parts of Hilliard and to surrounding communities. With routes

only running through Hilliard early morning and late afternoon during the weekdays, residents are unable to access businesses and private residences without a personal vehicle during the days or weekends. For Hilliard to be a connected, lifelong community, resident accessibility throughout the city and between Hilliard and the surrounding community is essential.

For those who do have their own vehicle, the average daily commute time is between 10 and 35 minutes to work each way.

¹⁹ The number of Hilliard households with no vehicles is well below the state and national averages and the number of Hilliard households with two vehicles is well above the state and national averages.²⁰ This reliance on automobiles can be a challenge for households that cannot afford or do not wish to drive a car with respect to retail and employment access.

Economic Development Incentives

Over the last eight years, 2,909 jobs have either been created or relocated to the city of Hilliard.²² The most notable employer is BMW, which has been responsible for creating 350 of these jobs. Of the 2,909 jobs that have been created since 2004, 1,251 of them are with companies that have relocated to Hilliard. Hilliard also faces many challenges when it comes to fostering economic development. Small businesses do not receive the same economic incentives and resources that are available to larger businesses. The incentives that are offered to companies like BMW are unavailable to small local businesses because the cost of monitoring them would be more than the incentive.²³ Economic incentives, Tax Increment Financing (TIFs), local organizations such as Destination Hilliard, and the Chamber of Commerce are all important tools that Hilliard has used to ensure the continued economic sustainability

of the community and the growth of small business.²⁴

If Hilliard wishes to sustain its economic growth, it is important that the City assists the growth of both small and large businesses. Although small businesses do not offer the same number of jobs as large companies, they are still important to Hilliard's economy. Small business helps to foster innovation and create economic competition. There will be a limit to the number of businesses that will relocate to Hilliard, making it important to also expand existing business. There is only one company with five employees that has been offered an incentive.²⁵ Companies with one to nine employees account for 64% of the businesses in Hilliard (the second smallest company has 15 employees).²⁶ Offering economic incentives such as reduced loans to small businesses would help these businesses expand and prosper.

There is sufficient evidence to suggest that Hilliard needs businesses that can provide entertainment opportunities for young adults. One indicator of this is Hilliard's population profile. Young adults ages 18 to 24 make up only about 6% of the city's population.²⁷ Both conversation with residents and a review of the City's Comprehensive Plan have acknowledged that this is an issue. Although it would be unreasonable for Hilliard to attempt to compete with Columbus, if Hilliard does not start providing entertainment options for young adults, they will have a difficult time increasing this population demographic.²⁸

Incentives are a critical component of economic development. According to Hilliard's Economic Development Director, the principle incentive the city offers is an income tax credit against a percentage of the payroll taxes collected by the city for new employees. Generally, these incentives are about 20% (of the 2% payroll withholding taxes) for a term of seven years. The city can offer real estate tax abatements but does not utilize this option as frequently. When the city offers a company an abatement, it is usually

offered for 10 years at a 50% rate. According to the Economic Development Director, there is no set formula for determining which businesses receive these incentives. Doing this allows the City to attract certain industries it is lacking, therefore ensuring the city is more economically diverse. However, when deciding if a business is eligible for these incentives, the business is usually compared to the average office tenant, which has four employees per 1,000 square feet with each employee earning a base pay of \$34,000.²⁹

Additional jobs created	Current jobs created	Annual average payroll	Annual average withholding
844	1564	\$86,349,520	\$1,238,512

The length of the city’s agreement with these companies ranges from five to 17 years. The following chart illustrates the combined benefits that these companies provide to the City along with the incentives they receive.³⁰

Local organizations, such as Destination Hilliard and the Hilliard Chamber of Commerce, are vital to ensuring the success of small businesses in Hilliard. These organizations provide businesses with networking opportunities and discounted rates that they would not otherwise receive. The city should do whatever they can to promote awareness of these agencies and to encourage more businesses to join them.

At the present time, approximately 400 businesses are members of the Hilliard Chamber of Commerce. The annual membership costs are shown in the table below.

In addition, there is a one-time registration fee of \$25.³¹ Adjusting rates based on the number of employees a business has allows small businesses equal access to the benefits offered by the Chamber of Commerce. By being a member of the Chamber of Commerce, a business also receives discounts on their health insurance premium. On average, businesses will receive

a 4% total discount on the premium they pay for healthcare.³² Ensuring employees have access to affordable healthcare is essential if the City truly wishes to promote social equality. By making Chamber membership more accessible to small businesses, small business owners will be better able to offer health insurance to their employees.

Destination Hilliard is another organization that provides important services to the community. One of the goals of Destination Hilliard is to promote events that help the community establish a unique sense of identity. Destination Hilliard provides free advertising for community events or events that offer catering. When large groups, such as conferences or meetings, come to Hilliard, they are provided with a list of participating local businesses that offer group discounts and specials. Last year Destination Hilliard promoted a total of 75 events.³³ Attendees coming from out of town accounted for a minimum of 10% and a maximum of 100% of the attendees at these events.³⁴ Last year, on average, Destination Hilliard promoted

Hilliard Chamber of Commerce Membership Costs

Number of Employees	Annual
1-3	\$149.00
1-3	\$149.00
4-9	\$189.00
10-25	\$241.00
26-50	\$361.00
51-100	\$424.00
101+	\$488.00
Associate/Individual	\$90.00
Civic/Fraternal	\$125.00

» Table 1: Meeks, David (Personal Communication from February 10th, 2012). E-mail

» Table 2: County Business Patterns. Retrieved February 29, 2012 from <http://censtats.census.gov/cgi-bin/zbpnaic/zbpsect.pl>

Tax Increment Financing

TIF is a method to use future gains in taxes to subsidize current improvements, which are projected to create the conditions for the financial gains for the community. The completion of a public project usually results in an increase in the value of surrounding real estate, which generates increased tax revenue. Sales-tax revenue may also increase, and jobs may be added, although these factors and their multipliers usually do not influence the structure of TIF.

When an increase in site value and private investment generates an increase in tax revenues, it is the “tax increment.” Tax Increment Financing dedicates tax increments within a certain defined district to finance the debt that is issued to pay for the project.

» *Source: Hilliard Comprehensive Plan 2012*

six events a month. The city should continue to promote and offer events such as these to help the city ensure a unique sense of identity.³⁵

Despite the fact that Destination Hilliard helped facilitate 75 events last year, Destination Hilliard and/or the City could do a better job of promoting these events. Nothing exists on the websites of Destination Hilliard or the City of Hilliard advertising upcoming events. If the city does not promote future events online, it is unlikely that many people outside of the community of Hilliard will know about what is coming.

Making improvements to existing infrastructure is another important aspect of fostering economic development. Infrastructure improvements will become more important as the city draws more people to the city through events such as Old Hilliard Fest and by expanding existing business opportunities. The City has a number of tools that they can use to address this.

Hilliard has made extensive use of TIFs to finance public infrastructure development. According to the Economic Development Director, the majority of TIFs in Hilliard are used to finance roads. TIFs function by enabling counties, municipalities, and townships to exempt from real property taxation the new value added to a parcel of land as a result of infrastructure improvements. As of 2009, Hilliard had 37 TIF districts that generated \$45 million in privately financed development. Debt services payments generated from active TIF districts totaled \$1.5 million in 2009. Briton Parkway is an example of one of Hilliard’s most successful TIFs.³⁶

Old Hilliard is a primary focal point of economic development for the City of Hilliard as stated by the City’s 2011 Comprehensive Plan. One of the main focuses of the economic portion of the plan is attracting businesses to Old Hilliard to make it a more vibrant business district. Despite longtime businesses such as Gun World being located in Old Hilliard, there appears to be only minimal growth. Over the last five years only a couple of new businesses have established residency in Old Hilliard.³⁷ According to the Economic Development Director, the primary incentives that will be utilized to ensure businesses locate in Old Hilliard will be property tax abatements and urban redevelopment TIFs. This will allow businesses to make a choice between having reduced property tax rates or receiving partial refunds on improvements that they have made to their businesses.

Social Equity

Social equity can be a difficult and somewhat intangible concept to measure for a city. This concept can be especially challenging to gauge in suburban communities with smaller populations and an existing homogeneous demographic profile. Often social equity is viewed through the lens of closing the gap between wealthy and upper-middle class constituencies and working class and lower-middle class groups. This perspective may not make sense in suburban communities such as Hilliard because they often have median incomes above average for their metropolitan statistical area (MSA) and less economic and ethnic diversity.

When examining social equity in Hilliard, it may be most important to consider building a more diverse community in a sustainable manner. Sustainable communities support a range of people and economic classes as opposed to enclaves of one particular social or economic group.³⁸ One of the most tangible measures in this area can be in terms of the housing stock offered in the community. Before a community can open its doors to different groups of people, there must be an available housing stock suitable to different needs.

If a community seeks sustainable growth, they must be open to being home to more diverse constituencies of people, including those of varying economic levels. In Hilliard, the average home value is significantly higher than average for the Ohio and the Columbus MSA.³⁹ The median value of a home in Hilliard is \$209,300, while the average for the state of Ohio is \$136,400.⁴⁰ While this can be viewed as an indicator of success, it is more likely that it is a product of self-selection. Rather than there being something tangible about Hilliard that makes its people more economically successful, it is more likely that Hilliard is a community that is more narrowly hospitable to one particular economic group considering both the above average median household income and housing prices in Hilliard as

compared to the rest of the MSA .

If Hilliard wants to be a vibrant city, it will have to offer a wider range of jobs and housing opportunities that make the city attractive to different groups of people.⁴¹ To accommodate this growth, one of the first ingredients will have to be a more diverse portfolio of housing opportunities. The larger, high-end homes that are currently the norm in Hilliard are in over-abundance and surveys show they are not as desirable for younger people.⁴² Unless Hilliard adapts now to this growing trend away from the predominant housing type in Hilliard, the city will risk sharp population decline in the future.

In order to compete for future residents, Hilliard must recognize now that two of the key demographics that can help maintain population and build the city's future are young professionals and young families. While it may be difficult for Hilliard to compete with Columbus in terms of securing young professionals who may be attracted to the social, entertainment, and cultural amenities that can only be offered by a large city, Hilliard could certainly be well-positioned to compete for young families because of the city's strong school district.⁴³ In order to successfully compete for young couples and families, it is important to offer a housing stock that is suitable for the incomes of young couples and families.

Providing housing options that are accessible to young couples with or without children is one way to attract residents who can move into the community and build a future in Hilliard. As it currently stands, the homeownership rate in Hilliard is 78%, well above the Ohio average of 69.2%.⁴⁴ While a robust homeownership rate is generally a positive, one reason for this high rate may be that the median household income for Hilliard residents is \$81,933

If Hilliard wants to be a vibrant city, it will have to offer a wider range of jobs and housing opportunities that make the city attractive to different groups of people.

as compared to the state average of \$47,358.⁴⁵ Homeownership and high incomes are generally not accessible to young couples, so finding housing opportunities that match their needs will be critical to sustaining Hilliard’s present health as a city. Once these young couples progress in their careers, their income levels may rise and there will be other housing options for them to grow into with their families.

Hilliard’s Housing Options

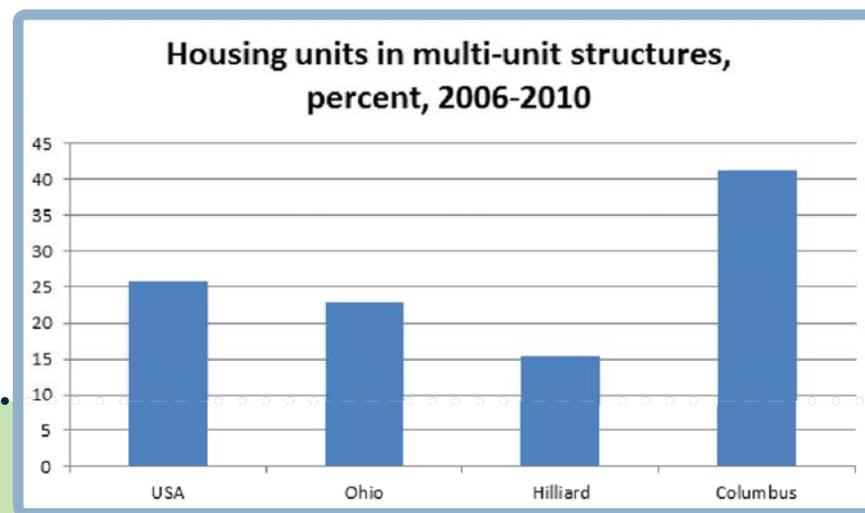
In examining Hilliard’s current housing options, it is clear that the Hilliard housing market has favored home owners due to the abundance of single-family housing options. The dominant homeowner demographic for their city has led to the current unsustainable model: in order to create a lifelong community, you must have housing for all stages of life. The owner-occupied residents for the country are around 59% and around 62% in Ohio the average is roughly 60%. Hilliard’s owner-occupied housing is around 73%, placing it well above the United States’ or Ohio’s standard. Once again, this data illustrates how the City of Hilliard caters to the homeowner demographic.⁴⁶

The monthly housing costs in Hilliard are a revealing set of statistics for a variety of reasons. The percentage of residents who live with a monthly housing cost of \$700 and under was drastically different in Hilliard when compared to Ohio and the United States. Roughly 25% of the population in both Ohio and the country live at this housing cost bracket, while Hilliard is only housing 7% of its residents in this bracket. This is important because it shows a drastic difference in affordable housing options and highlights the lack of economic diversity in the City of Hilliard. As previously discussed in the Social Equity section, this lack of diversity is an

unsustainable model and needs drastic changes if Hilliard wishes to continue to grow and thrive as a city in the future.⁴⁷

To further highlight Hilliard’s lack of housing and economic diversity, the percentage of residents who live with a monthly housing cost of \$2,000 and up is just as telling as the lower bracket, as referenced in Figure 15. Approximately 14% of Ohio residents live in this bracket and 30% of residents in the United States. This gives context and shows that Ohio is one of the more moderate or middle class states in terms of wealth, but this is a direct contradiction when compared to Hilliard residents. In fact, Hilliard houses approximately 42% of its residents in this high-end economic bracket. With almost half of the Hilliard population residing in this high-end economic class, it is clear that Hilliard suffers from a lack of affordable housing options.⁴⁸

In analyzing the data, the City of Hilliard is currently cultivating an unsustainable housing pattern; however, Hilliard is committed to addressing these issues. The solution is to embrace the true concept of a lifelong community and begin taking steps to bring housing opportunities to an equitable level.



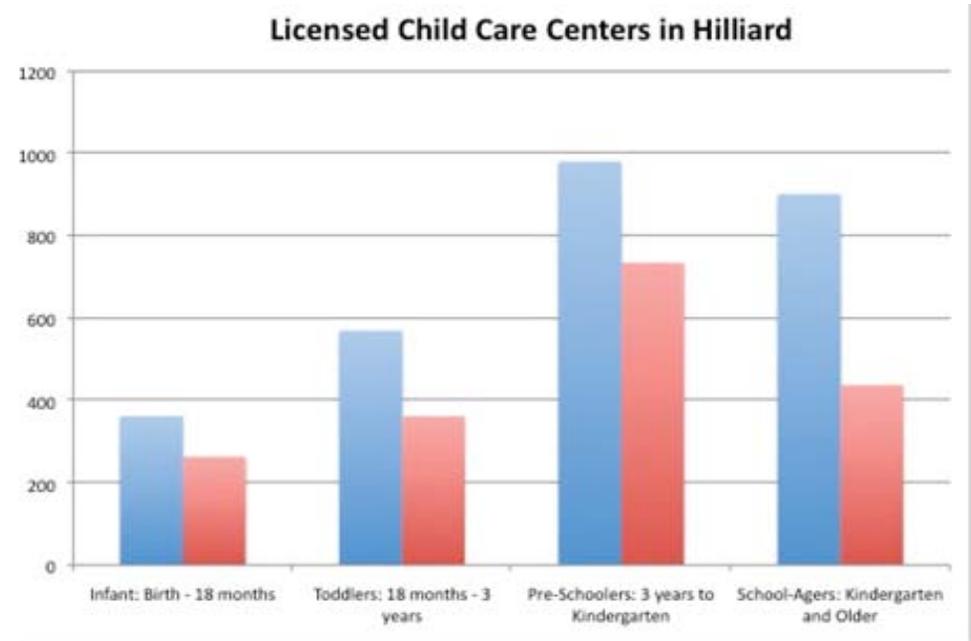
» Fig. 5: U.S. Census Bureau. (2010, March 1). 2010 SF1 100% Data: Various Geographies Retrieved March, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/>.

Assisted Living and Childcare

Hilliard is home to a variety of citizens in diverse stages of life: young professionals, families, and senior citizens. The various age groups in a city should influence an environment that has physical and social features that benefit all residents. The American Association for Retired Persons (AARP) defines a livable community as one that is safe and provides affordable, appropriate housing, adequate transportation, and supportive community features and services.⁴⁹ The City of Hilliard is experiencing a demographic transition similar to that at the national level with the oldest and youngest populations making up almost half of all residents. Based on the 2010 U.S. Census, residents 50 years or older and children under 14 total 50.2% the total population in Hilliard.⁵⁰

Providing residents with adequate childcare is the start to preparing an educated workforce. The American Planning Association has long recognized childcare as one of the missing links in community planning and economic development.⁵¹ The availability of childcare can affect other community development goals and activities including smart growth and sustainability planning initiatives.⁵² Almost 60% of the households in Hilliard have dependents under the age of 18.⁵³ Whether by necessity or choice, the majority of households in Hilliard with children under six years old include families with both parents in the labor force. Thus the availability and cost of affordable, quality childcare, especially for children under age five, is a major concern for parents. According to data from Ohio Department of Jobs and Family Services childcare database, the majority of the early childhood or daycare centers within Hilliard are run by private or nonprofit entities and supported largely by parent fees.⁵⁴

Hilliard is home to 30 full- and part-time licensed childcare centers that provided service to infants, toddlers, preschoolers, and school age children.⁵⁵ Enrollment for all age groups are below capacity at all sites. In terms



» Fig. 6: Ohio Department of Jobs and Family Services



of quality, none of the centers are accredited with the National Association for the Education of Young Children (NAEYC). There are five childcare centers that have received some form of recognition from Ohio's Step Up to Quality rating system, which recognizes the efforts of licensed early care and education programs that take incremental steps towards improving quality.⁵⁶ There are 16 centers in Hilliard that have contracts to provide publicly funded childcare.⁵⁷ According to data available from the Ohio Department of Jobs and Family Services, the majority of the early childhood or daycare centers within Hilliard are run by private or nonprofit entities and supported largely by parent fees.

The term lifelong community has already been applied to policies in Hilliard to attract young professional, but it should also include initiatives that assist the city's aging population. The concepts of lifelong communities and aging in place refer to an effort to provide policies that address the challenges and opportunities associated with the retirement of Baby Boomers.⁵⁸ According to the 2010 Census, Hilliard is home to 5,085 residents over the age of 55, totaling 17.7% of the entire population of residents.⁵⁹ In 10 years, if the total population remains the same, 16.9% of residents now between the age of 50 and 64 will have reached retirement age. As residents begin to age and approach retirement, it is often the case in that the surrounding community lacks the services and resources to meet their basic needs as senior citizens. This can include housing, medical care, and access to various services. Ohio's Long-Term Care Consumer Guide listed seven facilities in Hilliard that offer nursing home care and assisted living. The facilities vary in service, but the total available capacity does not meet the growing needs of residents. All the facilities in Hilliard are privately owned and vary in price, but most are above the

state's average in daily cost.⁶⁰ Ohio's Passport Medicaid waiver program helps Medicaid-eligible older Ohioans get the long-term services. Two of the senior's residential centers in Hilliard accept the Passport Medicaid Waivers.⁶¹

Case Study: Lifelong Community Mableton, Georgia

The Atlanta Regional Commission, Cobb county, neighborhood associations and developers are working to create lifelong Mableton, a place where individuals of all ages can live throughout their lifetime. The project is funded through a grant from the administration on aging, one of 13 demonstration grants nationwide to improve the quality of life for older Americans and sustain their independence.

Lifelong Mableton Goals :

- » Transform Mableton Into A Healthy, Attractive Community, Offering Services Residents Want And Need As They Age And Community Design That Addresses The
- » Physical Needs Of Older Adults.
- » Identify Barriers That Limit The Ability Of Individuals To Age In Place.
- » Help Implement Initiatives That Will Lead To Mableton's Transformation.
- » Ensure That Lifelong Mableton Serves All Community Residents, Including Starter Families, Empty Nesters And Everyone In Between

For More Information Regarding LLM Contact, Project Manager Cheryl Mayerik, At 404.463.3125 Or Cmayerik@Atlantaregional.Com

» Source: Atlanta Regional Commission, Lifelong Communities: Emerging Sites, Mableton.

EDSE Sustainability Analysis

Social Equity

Recommendation: Adopt an inclusionary zoning ordinance.

Inclusionary zoning involves requirements and/or incentives for new developments of a particular size to feature a minimum percentage of units that should be affordable. Often these requirements offer developers an incentive by permitting them to increase the density of their developments in exchange for offering a greater share of affordable units. This tool is a win-win solution that is attractive for developers while also yielding sustainable and equitable housing options for the city.

Short Term (1-3 years)

- » The Planning and Zoning Commission should conduct an assessment of the current housing stock in Hilliard to identify where gaps exist. The assessment will determine where limitations exist in housing types and price levels. Data on the value of properties can be pulled from the Franklin County Auditor's website as a potential starting point. Party responsible: Hilliard's City Planner in coordination with consultants hired to perform the assessment. Cost: Labor of any involved staff and/or consultants, approximately 10 hours of work. Funds will likely be sourced from Hilliard's operating budget.
- » Explore whether the gaps in the housing stock is a barrier to young people moving to Hilliard. Consider creative ways to survey key demographic groups, such as seniors at Ohio State University, young professionals, and children of Hilliard residents who attend other universities. Party responsible: Hilliard's City Planner in coordination with consultants hired to perform the assessment. Cost: Labor of any involved staff: two hours to prepare and post a survey online, 10 hours to promote the survey and solicit participation in the survey, and three hours to analyze the results.
- » Assess examples of inclusionary zoning ordinances that have worked effectively in communities similar to Hilliard and determine which model would be the best fit for Hilliard. One suburban city in the Midwest with a successful inclusionary zoning ordinance that could serve as a model is St. Charles, Illinois.⁶² Party responsible: Hilliard's City Planner in coordination with consultants hired to perform the assessment. Cost: Labor of any involved staff: three hours to identify and read existing ordinances and five hours of discussion amongst commission members about the merits of the options as they apply to Hilliard.
- » The Economic Development Council should begin to talk to developers about inclusionary zoning and what they stand to gain from a potential exclusionary zoning ordinance. Solicit the feedback of these developers and incorporate it into the zoning language. Parties responsible: The Economic Development Council and the Economic Development Director. Cost: Labor of any involved staff: five hours to solicit and meet with developers and two hours to discuss findings amongst Council members.
- » Draft an inclusionary zoning ordinance and begin the

process of holding public hearings. Parties responsible: The Mayor's Office and/or City Council. Cost: Labor of any involved staff: two hours to draft the language.

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Medium Term (3-5 years)

- » Secure passage of an inclusionary zoning ordinance. Parties responsible: The Mayor's Office and/or City Council. Cost: Labor of any involved staff. Varies based on public response and buy-in of council members.
- » Work with area developers to plan the first development under the new inclusionary zoning ordinance. This work will include providing technical assistance, proactively providing legal advice that is available to developers through the city, assisting developers with any concerns that arise, and making it clear that the city is committed to the developer's success. Strive to make the first instance of the use of the ordinance a success. Finalize the planning process and finish the construction of the first development. Parties responsible: The Planning and Zoning Commission and the Economic Development Council. Cost: Labor of any involved staff: 20 hours worth of discussions and planning.
- » Begin to solicit developers and start the planning process for at least two additional inclusionary zoning projects in the city. The City of Hilliard, through the Planning and Zoning Commission, should seek out area developers and try to identify those who would be interested in building units under the inclusionary zoning ordinance. During this time period, the City should secure commitments

for at least two developments and developers should try to get these projects at least to the planning stage. Party responsible: The Economic Development Department. Cost: Labor of any involved staff: 20 hours worth of discussions and planning.

St. Charles, Illinois Inclusionary Zoning Ordinance

St. Charles, Illinois is a suburb west of Chicago, Illinois with a population of 32,000 residents. The City of St. Charles adopted its inclusionary zoning ordinance in 2008 to meet the need of providing a greater variety of affordable housing in the city. Under the ordinance that was passed, the city defined affordable housing as housing with a price that amounts to no more than 30% of the income of residents with an income at or below 80% of the Area Median Income for for-sale units or at or below 60% of the Area Median Income for rental units.

In accordance with the ordinance, developers are required to include affordable units in their developments on a sliding scale based on the size of the development. The sliding scale is as follows:

- » 1-10 Dwelling Units: 5% must be affordable
- » 11-50 Dwelling Units: 10% must be affordable
- » More than 50 Dwelling Units: 15% must be affordable
- » When developers satisfy the affordable dwelling unit requirements, developers are able to seek a density bonus that, when awarded, allows them to develop at up to 120% of the base density.

The full text of the St. Charles ordinance is available online at:

- » *Source: www.stcharlesil.gov/sites/default/files/codebook/title-17/t17-ch18.pdf*

Long Term (5-10 years)

- » Complete at least three developments under the inclusionary zoning ordinance. Parties responsible: The Planning and Zoning Commission aiding area developers. Cost: Labor of any involved staff: 40 hours of work.
- » Assess how developments completed under this new ordinance have impacted housing in Hilliard. Specifically, the Planning and Zoning Commission should examine municipal tax records for individuals living in these units or otherwise survey these residents to gauge their economic profile. Based on this examination, determine whether the development(s) have resulted in a better mixing of residents of different income levels. Party responsible: The Planning and Zoning Commission. Cost: Labor of any involved staff: five hours to collect data and three hours to analyze the data.

Transportation

Recommendation: Increase availability of and information about transit within the community.

Hilliard can increase their community equity by providing greater access to transit. Over 85% of Hilliard residents commute between 10 and 35 minutes per day, each way to work in the surrounding communities.⁶³ Through partnering with other central Ohio communities and the Central Ohio Transit Authority (COTA), Hilliard can lead the way to create a more accessible and connected community.

Short Term (1-3 years)

- » It would benefit both the City of Hilliard and the Hilliard City School District to engage in monthly conversations to work collaboratively around issues of road infrastructure, school and city event planning, commercial and retail availability, and financial viability for both parties. Parties responsible: The Mayor of Hilliard and the Superintendent of the Hilliard City School District. Through this increase in communication, each party can hopefully better plan and execute future initiatives, which would decrease efforts in working in conflict, and will benefit the students, teachers, administrators, residents, and school and city leadership. The City of Hilliard can connect school students and staff with the surrounding community. This helps bring community residents together in casual, daily settings to enhance Hilliard's sense of place and increase the

sustainability of local businesses. These monthly meetings are meant to be brief to share information and build stronger working relationships. Cost: The only costs would be that of each party's time. This will be of no expense to the City or the School District.

Medium Term (3-5 Years)

- » The City of Hilliard and the Hilliard City School District should become involved with the Mid-Ohio Development Exchange (MODE). As members of MODE, Hilliard can benefit from MODE's extensive knowledge and talent base including transportation, quality of life, and business development. Currently, there are no school districts involved in MODE.⁶⁴ This collaboration will add value for the City of Hilliard and the Hilliard City School District. Both entities will have access to cutting-edge research on Central Ohio, economic development strategies, and information about workforce and education. Parties responsible: Hilliard's Mayor and the Hilliard City School District's Superintendent. Each would join as members of MODE, attend regular meetings, and collaborate as needed as opportunities arise. Cost: The only costs would be that of each party's time.

Long Term (5-10 years)

- » The Central Ohio Transit Authority (COTA) is a successful bus system, yet its reach into Hilliard is very limited.⁶⁵ This further isolates Hilliard residents from easy access to Columbus and vice versa. In 2006 COTA published their Long-Range Transit Plan. In this document, one of their goals is to extend service to Columbus suburbs including Hilliard. It would greatly benefit COTA and the City of Hilliard if the City of Hilliard worked in collaboration with COTA with this development.⁶⁶ Parties responsible: The City of Hilliard's City Planner. Cost: There will be a cost to increase service. As of the 2012 school year, school districts have to pay about \$47 per child to ride COTA.⁶⁷ This funding typically comes from the local tax base.

Economic Incentives

Economic incentives are a method utilized by the city of Hilliard to attract businesses. These are usually offered in the form of real estate tax abatements or the withholding of payroll taxes. However, these incentives can only go so far. Businesses that do not have a large enough payroll are not offered incentives because it would be unprofitable for the City.

Providing more opportunities for small businesses to develop in Hilliard would help to create more jobs and business establishments in the community. This would also diversify the city's economy. Small businesses make up a large portion of the business establishments in Hilliard. According to County Business Patterns data, in 2009 there were 491 establishments that employed between one and four people. This makes up 45% of the business establishments in the city of Hilliard.⁶⁸

Small business incubation and expansion is an indication of a city's economic vitality and health. While large companies, such as BMW, provide

significant benefits to the city of Hilliard, competing to attract these larger companies can also be very costly. Providing incentives to small businesses allows them the chance to expand and increase their salaries and the number of people they employ.⁶⁹

Recommendation: The City of Hilliard will provide reduced-interest loans to small businesses or companies planning to start up that would be ineligible for the economic incentives that the city currently offers.

Short Term (1-3 years)

- » The Department of Economic Development will determine the necessary criteria for businesses to qualify for these loans. The Department of Economic Development will base their small loan model on the Ohio State Treasury's Grow Now program. This will work by the City of Hilliard making a deposit at participating banks by using money generated from fees and services. The city will agree to take a reduced interest rate on the deposit. In return the bank will agree to provide a set amount of reduced interest loans to small businesses. A list of participating banks can be found on the Ohio State Treasury website. Party responsible: The Department of Economic Development.⁷⁰ Cost: None. The City still has access to the money, they are just receiving less interest on it.
- » The Economic Development Director will hire a web consultant to build a webpage that will help to promote awareness of reduced loan opportunities that are available for small businesses. This webpage will provide information such as what banks will provide these loans and the necessary criteria to qualify for a loan. The grow now web page can be used as a reference for what information

the city of Hilliard should include in their webpage Party responsible: The Department of Economic Development. Cost: Building a webpage will cost about \$90 an hour.⁷¹ The money for this will come from the Economic Development Department's budget.

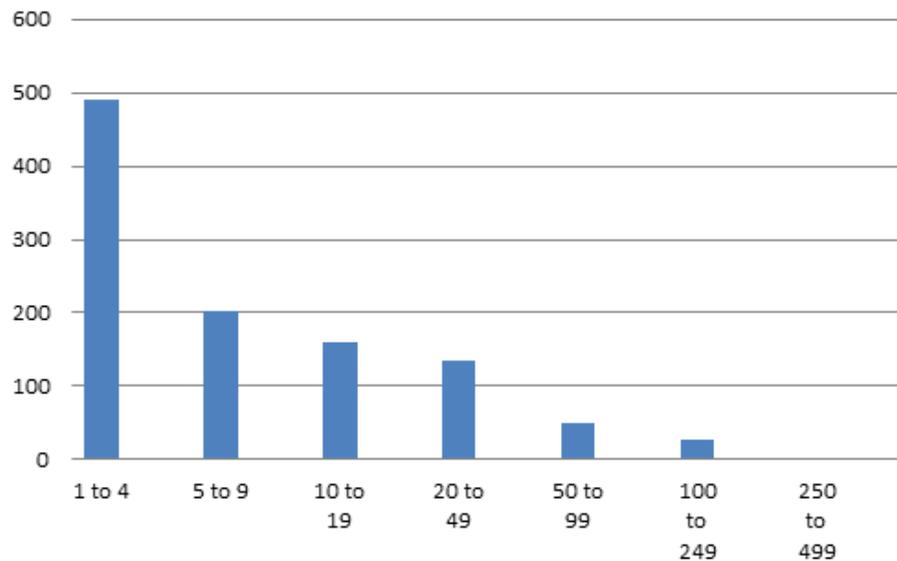
Medium Term (3-5 years)

- » The Department of Economic Development will establish a set of criteria to determine if businesses are complying with the agreements of their loans. This oversight will provide the department assurance that the conditions of the loan are being met and that the organization or business has contributed to the jobs and growth on which the loan was contingent. Party responsible: The Department of Economic Development. Cost: None.
- » The Economic Development Director will assess how small businesses have grown and expanded since the adoption of reduced income loans. This will be measured by how established companies have increased their employees and median wage since receiving these loans. By this time frame the city will seek to have expanded or created three existing business as a result of these loans Before any business is eligible to receive a loan they will be required to document relevant information, such as the number of current employees working for the company and median wages. This information will allow a baseline for future comparisons. The number of new businesses that have been established as a result of these loans will also be used to determine the program's success. Based upon these findings and recommendations the Economic Development Director

will reassess this program in order to ensure its future success. Party responsible: The Department of Economic Development. Cost: None.

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Firm Size in Hilliard



» Fig. 7: Community Business Pattern

Recommendation: Provide economic incentives to businesses that will provide entertainment options and attract young adults to Hilliard. Special consideration will be given to business choosing to locate in Old Hilliard

The citizens of Hilliard have indicated their desire to establish themselves as a lifelong community. Although Hilliard has been successful in attracting middle-aged adults, the city does not hold the same appeal for young adults who are in the 18 to 24 age range. This demographic makes up a little more than 6% of the city’s population.⁷² Several factors contribute to this drastic population decline of 18 to 24 year olds. However, one reason for this is because Hilliard does not currently offer many amenities or entertainment options that appeal to young adults. If the city wishes to become a lifelong community they must begin to establish and attract businesses that will draw in this demographic.⁷³

The city of Hilliard has established that they seek to increase the number of businesses in Old Hilliard and establish it as an economic hub for the city. Over the last five years, only a couple of new businesses have chosen to locate in Old Hilliard. However, for the city to establish an economic hub, they must first have the right population demographic. Establishing Hilliard as an economic hub will be difficult with such a minute percentage of young adults that live in the community. However if Old Hilliard starts offering amenities and entertainment options for young adults, it is likely to become a hub of economic activity.

Short Term (1-3 years)

- » Hire a market consultant to conduct an analysis of existing economic hubs such as Grandview and Old Hilliard. By focusing on these nodes, the market consultant will determine what businesses would help Hilliard to attract a younger demographic.

Upon the completion of this analysis the Economic Development will determine what incentives and special considerations will be granted to businesses, which will attract young adults to the city of Hilliard. Party responsible: The Department of Economic Development. Cost: \$15000-20000.⁷⁴ The money for this will come from the Economic Development Department's budget.

- » Hire one person at minimum wage who will measure foot traffic in Old Hilliard at peak hours for a period of one month. This will be used as a baseline for future comparisons to determine the success of this initiative. Party responsible: The Department of Economic Development. Cost: A foot traffic study would cost \$870 over one month. (This was figured by assuming that the person would be paid minimum wage, and work four hours a day for one month.) The money for this will come from the Economic Development Department's budget.

Grove City's Town Center

Grove City has made an extensive effort to target their town center. One tool that they have used is a Town Center Loan Program that provides loans to businesses planning to locate in Grove City's Town Center. To-date, this loan program has helped incubate about a dozen businesses within a three block radius, and it can be concluded that these efforts have been very successful. Hilliard currently does not have a similar loan program but is working on establishing one which should be up and running in two to three months.

- » Sources: Evans, Jeff. *City of Grove City, OH. (2012, February 5). Telephone interview.* Meeks, David. *Economic Development Director, City of Hilliard (2012, February 11). Telephone interview.*

Medium Term (3-5 years)

- » Increase foot traffic in Old Hilliard by attracting business to the city center that appeal to young adults this may include art galleries, bars, or coffee shops just to name a few. An identical foot traffic study will be conducted in the mid-term years. These results will then be compared to the previous survey conducted by the Department of Economic Development. Party responsible: The Department of Economic Development. Cost: \$870. The money for this will come from the Economic Development Department's budget.

Long Term (5-10 years)

- » Perform a demographic analysis of its age group census information. This information will be compared with the 2010 Census data. The city of Hilliard will implement these policies with the long-term goal of increasing their population demographic of 18 to 24 year olds. The city will seek to increase this population demographic by four percent. This will ensure that the population's age demographic is more evenly distributed and will help Hilliard make its transition to a lifelong community. Party responsible: Planning Division. Cost: None (using existing staff).

Assisted Living and Childcare

Recommendation: Promote quality childcare for Hilliard families.

Quality, affordable childcare in Hilliard is an important investment that will directly enhance the quality of life for residents. Hilliard is home to 31 licensed full-time childcare centers. Even at the 21 childcare centers with incentives or decrease rates for low-income families, the enrollment numbers are below the total licensed capacity. In some cases, centers may simply choose to accept fewer children than licensing regulations permit, even if demand for childcare services is present. Under-enrollment could also be caused by operations cost or lack of accreditation. Parents might also prefer childcare centers closer to their place of employment. In other cases centers may not be fully enrolled because they are simple unable to recruit enough children. These difficulties may reflect poor program quality, changes in population density as neighborhoods age, or parental preferences for a particular program type (e.g., religion, curriculum). Even so, the quality of life and human development are important to short- and long-term economic development.

Medium Term (3-5 years)

- » Improve the demand for quality childcare through consumer education and service improvement. As a policy initiative the Mayor’s office could develop a commission for the children and youth. The commission does not need to provide direct services but will act as a catalyst to mobilize and educate the community with regard to

issues involving the education and well-being of youth, with special emphasis placed on the 0-5 years age bracket. The commission could evaluate city services and designate a department or office to begin a needs assessment. Partnering with the Action for Children, the city of Hilliard could perhaps conduct citywide needs assessment through a series of targeted questionnaires sent to families, and childcare providers. For further assistance, Columbia Basin Trust created a toolkit for community’s conducting childcare assessments. The information from the needs assessment could then be used to provide parents with information about the quality of centers in the City, rather than just referring parents to licensed centers without quality information. Party responsible: The Mayor’s Office. Cost: The cost for initially starting the commission would be free, outside of the additional staff time for researching members, and setting up meetings. The cost of Partnering with Action for Children for citywide needs assessment could vary greatly depending on the depth and breadth of the study. A high quality, in-depth study can cost as much as \$100,000, although the cost is usually significantly less.

Long Term (5-10 years)

- » Provide incentives to increase childcare centers accreditation, training, and services to the community with federal funding. Childcare subsidies and funding for quality improvement can be a complex issue involving various levels of government. The City of Hilliard and community leaders add to several potential supporters for an effort to increase capacity and improve quality, but it should not be expected to play an exclusive role in that arena. Philanthropic organizations, county, state, and federal governments, local employers, regional colleges and universities,

volunteers, and parents are all potential partners that could assist the City in any effort to expand and improve childcare resources. As seen in the sidebar, the federal government has several grants that are designated for childcare centers. Party responsible: The Mayor's Office. Cost: After a commission has been established, if staff is available for completing grant applications, the cost would be minimal, but if a grant writer is required the cost can vary from \$15-75 hour.

Recommendation: Provide affordable housing and services for seniors.

If the senior population in Hilliard in future years maintains its current proportion of the total population, more affordable senior-friendly homes and assisted care homes will be needed in the area. The aging of baby boomers in the population will cause a shift in the next 20 years increasing the demand for senior housing options. While there are various housing options that could be developed for seniors, some might want to age in place, that is, to stay home. Others may not be able to do so, and alternative living arrangements could include assisted living communities, continuum of care retirement communities, adult care homes, living with family members, and federally subsidized housing. The choice will most likely be dependent upon an individual's needs, preferences, and financial status. If Hilliard is to become a lifelong community a variety of housing options and related incentives should be available to residents.

Short Term (1-3 years)

- » Develop and publicize a centralized resource for accessing information of interest to seniors including housing, health care, in-home supports, employment, and wellness and recreational

activities with the assistance from organization familiar with social services activities in the city, for instance the Hilliard Community Assistance Council. Ensure information is accessible to seniors through online, printed materials, and/or in key locations in the community such as the Phyllis A. Ernst, Senior Center and libraries. Party responsible: Hilliard Community Assistance Council. Cost: If volunteers were available from the Hilliard Community Assistance Council, there would be no cost outside of printing material.

Long Term (5-10 years)

- » Create a Lifelong Community Plan for seniors in Hilliard. In 2007 the Atlanta Regional Commission launched the Lifelong Communities initiative in collaboration with county-based stakeholder groups in the Atlanta region. The initiative developed guiding principles and several resources for communities all across the nation to developed plans to address a full range of needs and services for senior citizens. Party responsible: Hilliard Planning Division. Cost: According to the Kansas Department on Aging, an organization that has attempted to assist communities with implementing similar plans, the cost is driven by the scope of the lifelong community plan and action items. There could be action items that can be obtained free of charge or at a minimal fee. Larger items may need sizable capital funds and need to be put into community budgets to be completed and paid for over a number of years.⁷⁵

Community Pride

Recommendation: Increase awareness of community events, build on current events, and develop new programming to enhance pride within the Hilliard community and create better visibility in the metro region

To achieve its goal of enhancing quality of life while providing for greater sense of place for Hilliard residents, the City will work to highlight the robust calendar of community events it already enjoys and enhance these offerings and their exposure moving forward. Organizations (Hilliard Ohio Soccer Association or Chamber of Commerce) within Hilliard currently operate an impressive number of community events throughout the year. Whether its youth basketball in the winter or the 4th of July Fireworks in the summer, Hilliard has a number of ways for the community to celebrate and also become involved. This calendar could be greatly enhanced if one entity within the city were charged with collecting and disseminating this information to the public and larger metro region.

By collecting events the city will have a greater understanding of the organizations working throughout the city. These assets are actively creating the community Hilliard currently enjoys. By connecting their operation and the events they host to further resources the city will be achieving its goals of enhancing quality of life and providing for a greater sense of place.

The City can accomplish this goal by working through the following short-, mid-, and long-term recommendations:

Short Term (1-3 years)

- » The economic development team will be charged

with collecting a diverse set of events, programs, and initiatives underway throughout the community. With this information the team will partner with a consulting web developer to create a database of organizations and calendar of events. With this database the City in conjunction with a consulting web developer will develop a robust web component on the Hilliard city webpage to publicize weekly event offerings. Party Responsible: Economic Development team. Cost: The city will incur costs between \$2,000 and \$4,000 for the development of the events web component. These can be offset through advertising.

Medium Term (3-5 years)

- » The establishment of the final database of community events will provide an incentive to other organizations to join. Building this pool will help to economic development team identify opportunities for enhancement for current events by connecting related organizations to resources or larger groups operating in the Metro area. Party Responsible: Economic Development team. Cost: Covered under operating costs of parties involved.

Long Term (5-10 years)

- » Become a facilitator of community involvement in community events and attract new events and organizations to be listed on yearly calendar of events. Party Responsible: Economic Development team. Cost: None.

The Ohio Event Finder

The Ohio Event Finder is an online resource that is utilized by organizations in Ohio to publicize and catalogue events taking place throughout the year. The service allows users to filter results by location, theme, or date. This site has been utilized by the city of Columbus in its Bicentennial events calendar. By tracking events through a theme, in this case the theme of the Bicentennial, the 200Columbus non-profit organization was able to populate its own online calendar system through its website. This service has streamlined the collection process and created a quick dissemination tool for the organizers.

» Source: Ohio event finder. (2012, March). Retrieved from <http://www.artsinohio.com/>

Conclusion

Land Use & Urban Ecology

Since 1950, Hilliard has followed a low-density residential development pattern that boomed during the 1950s and again during the 1990s. Today, this low-density landscape accounts for approximately one quarter of the City's land use. Because the last decade was witness to stalled development and slow population growth, the City has concentrated its efforts on providing adequate parks, roads, and other vital infrastructure to accommodate existing residents and businesses.

Municipal zoning ordinances govern use-based classifications and require large setbacks that result in auto-oriented development. While this residential backdrop is an important characteristic of today's Hilliard, approximately 30% of the City's land is made up of vacant land, municipal right-of-way, and utilities, and the rest is composed of agriculture, professional office space, and commercial real estate. All of these land uses are important and contribute to defining Hilliard as a place to live and do work. Hilliard's current zoning laws prohibit the integration of commercial uses into residential areas. However, zoning provisions for Old Hilliard and the Planned Neighborhood District (PND) accommodate mixed development that combines business, public, cultural, social, and residential uses.

The City has a number of assets and resources to support its sustainability goals. Six parks are central to the City's identity and residential character: First Responder Park, Station Park, Weaver Park, the East Pool and Park, Heritage Rail Trail, and Municipal Park. Over 100 acres of wetlands and 800 acres of tree cover join five waterways, including Tudor Ditch, Hamilton Run, Holcomb Ditch, Clover Groff Ditch, and Hayden Run, to define Hilliard's



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environmental landscape.

Looking to the future, Hilliard and its leaders envision transforming Hilliard into a "lifelong" community, complete with a variety of housing options for residents at different stages of life. Expanded housing options will include smaller homes, more rental options, and neighborhoods with close access to amenities for young adults, empty-nesters, and seniors. In order to realize this vision, Hilliard's 2011 Comprehensive Plan focuses redevelopment efforts on four focus areas: Old Hilliard, the I-270 Corridor, the Retired Railroad Corridor, and the Big Darby focus areas. Opportunities also exist for in-fill projects along the Retired Railroad Corridor, on vacant land, and in areas adjacent to industrial sites.

Changing transportation options to mirror changing lifestyles and perceptions will help Hilliard become a community that embraces alternative forms of transportation for people who do not want to rely on automobiles. Pedestrian infrastructure, such as sidewalks, is not well connected, resulting in missing sections that can inhibit safe and frequent use. Current bike facilities are isolated, and improved connectivity between existing routes and destination places such as residential and commercial developments would greatly benefit recreational and commuting cyclists. Additionally, although Hilliard residents can travel to a few locations within Hilliard on COTA's express bus routes, their primary purpose is direct commuting to and from work for Hilliard residents who work downtown or at the University.

Energy & Waste Reduction

The City of Hilliard and its residents are already making strides towards responsible energy use and waste reduction. Just as residents have been switching out incandescent light bulbs for newer, more energy efficient kinds, the City has been upgrading its properties to capitalize on savings from efficiency. Currently, the average monthly electricity bill for Hilliard residents is approximately \$110.00, and the City of Hilliard is currently working to decrease their energy consumption by using LED bulbs for streetlights and traffic signals. Additionally, the City fleet has also undergone upgrades. Older, inefficient vehicles are being replaced with hybrids or other fuel-efficient alternatives.

The municipal zoning code does not mention wind, geothermal, or other renewable installations as permitted or conditional uses, but solar panels are listed as a conditional use for all development in Hilliard's zoning code, even though the City does not formally track them.

The city of Hilliard generated a total of 11,787 tons of residential and commercial waste in 2011. Of that total waste, 7,296.2 tons was residential solid waste; 2,045.8 tons entered the Rumpke recycling program; and Hilliard's residential yard waste constituted the remaining 2,445.1 tons. Hilliard's residential diversion rate for 2011 was 38.1%.

In terms of water consumption, the average Hilliard family pays between \$299.34 and \$316.43 each billing cycle. Compared to their counterparts living in the City of Columbus, the Hilliard family pays \$55.00 to \$59.00 more each cycle. This means each year the

average Hilliard family pays \$221 to \$238 per year for water than if they lived in Columbus.

The City also maintains a Storm Water Management Plan that outlines efforts to reduce the discharge of pollutants, to protect water quality, and to satisfy the appropriate requirements of the Clean Water Act in accordance with the Ohio EPA's National Pollutant Discharge Elimination System Phase II program. The Hilliard City Council passed Ordinance No. 09-63 in December 2009 in order to create a stormwater management utility responsible for charging appropriate fees, depositing those fees in a special fund for use on stormwater management projects, and generally enacting the City's stormwater code. Credits are offered to non-single family residential units and schools in order to promote conservation and best management practices.

Economic Development & Social Equity

Presently, Hilliard is a proud community with extensive opportunities for young families and small businesses. Its strong school system fueled a residential building boom in the 1990s and early 2000s that attracted many young families. Residential growth also buoyed a strong business climate, which claims a high proportion of professional, scientific, retail, and healthcare industries.

Over the last eight years, 2,909 jobs have either been created or relocated to the city of Hilliard since 2004. Approximately 350 of them were created by BMW, and 1,251 were created by companies that relocated to Hilliard. At the present time, approximately 400 businesses are members of the Hilliard Chamber of Commerce. In 2009, Hilliard had 37 Tax Increment Financing districts that generated \$45 million in privately financed development and \$1.5 million in debt service payments. The city occasionally offers real estate tax abatements for 10 years at a 50% rate to businesses that would increase

the City's economic diversity. Though a mix of economic incentives and local organizations play important roles in continuing Hilliard businesses' success, tax incentives available to large companies such as BMW are not available to small businesses.

To become a vibrant, lifelong city, Hilliard must broaden its portfolio of jobs and housing to make the city attractive to more groups of people. The median value of a home in Hilliard is \$209,300, while the average for the state of Ohio is \$136,400. The homeownership rate in Hilliard is 78%, which is above the Ohio average of 69.2%, and the median household income for Hilliard residents is \$81,933, compared to the state average of \$47,358. These and other statistics indicate that Hilliard's current residential base is better off financially than the average Ohio household, which has resulted in a lack of affordable housing in the City.

Children and adults in their 50s constitute important demographic components of the Hilliard population. Approximately 60% of Hilliard households include children, and the City is home to 30 full- and part-time licensed childcare centers. Sixteen of those centers are licensed to provide publicly funded childcare. According to the 2010 Census, over 5,000 Hilliard residents are over the age of 55. Already seven facilities in the City offer nursing home or assisted living care, and their current capacity would not support the current municipal population's needs in 10 years.

Destination Hilliard is a local promotional organization that provides free advertising for community events or events that offer catering. Last year 75 events were part of its catalogue of promotions. Despite this past success, the Destination Hilliard and City of Hilliard websites contain no information about advertising upcoming events.

Land Use & Urban Ecology Recommendations

Addressing citywide development is one of the principal ways Hilliard can become a more sustainable community. The land use plan within the Hilliard Comprehensive Plan recommends smaller nodes of activity that are located to serve existing residential neighborhoods, and changing the City's zoning regulations to encourage neighborhood-centered development will help accomplish this goal. The first recommendation contains municipal code changes, based on ease of implementation over an extended period of time, that have the potential to move the measurements of all four proposed Land Use and Urban Ecology indicators (retail access, park access, pathway connectivity, and pedestrian infrastructure inventory) in a positive direction.

The second recommendation complements the first by creating zoning tools and provisions that will promote the development of dense, mixed-use development in the Comprehensive Plan's four focus areas.

The third recommendation entails increasing the amount of parkland and public space for residents, and providing more amenities in each of these places of public gathering. Neighborhood programming pocket parks are two ways to increase the amount of park space for residents, and planning and appropriating funds for additional seating, gardens, and climbing structures will accomplish the latter half of this goal.

Because Hilliard is part of the environmentally sensitive Big Darby Watershed, the fourth recommendation involves strengthening conservation elements of residential, commercial, and park lands development. Creating temporary design guidelines in the

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Watershed focus area, codifying conservation standards, and constructing a signature development that highlights Hilliard's natural resources and farmland are options by which Hilliard can responsibly develop and conserve highlighting a harmony with nature approach.

Recommendation five improves the City's tree canopy by expanding and formalizing community tree planting initiatives. Volunteer staff should be used to build local support for this initiative, and the City should soon thereafter hire a certified arborist as a full-time municipal employee. This employee should be the first hire of what would become Hilliard's Forestry Department.

Developing an interconnected bike and pedestrian network that promotes multiple modes of transit and provides safe and reliable infrastructure is the sixth recommendation. This recommendation includes establishing a Bicycle and Pedestrian Advisory Group, developing a comprehensive sign plan for the City, and installing bike racks throughout City parks and COTA Park and Ride locations. Efforts should also be made to improve the safety of bicycle and pedestrian traffic at road crossings and through educational programming. Ultimately, Hilliard should work connect all of its walking, hiking, and biking pathways within City limits, and it should coordinate with other municipalities and organizations to integrate this alternative transportation network into regional systems.

Recommendation seven would both increase transit options with Hilliard and plan for future transit opportunities. This recommendation is designed to accomplish the vision of being a lifelong community in order to serve individuals who cannot drive

or who choose not to use a car. Maintaining good relations with COTA and performing an in-depth community survey to identify public transit needs and wishes are the beginning steps of this recommendation. Then, during the next update of the Comprehensive Plan, the Engineering and Planning staff should provide a Transit Plan to show long term visions for additional bus routes, Park and Ride facilities, and light-rail or inter-city rail stations.

Energy & Waste Reduction Recommendations

Recommendations from the Energy and Waste Reduction Sustainability Analysis are crafted to advance the City's efforts to achieve sustainability goals and to improve the City's reliance on natural resources. The first recommendation seeks to implement policies that continue and enhance energy efficiency in Hilliard's municipal operations and throughout the community. A municipal energy audit, developing green building standards for City-owned buildings, and signing onto the U.S. Conference of Mayors Climate Protection Agreement are the first steps in this recommendation. Acting on the recommendations of that audit, continuing the updating of the municipal fleet by retiring older vehicles with energy-efficient replacements, and designating a municipal building as a model for best management practices for energy efficiency constitute the efforts that should be pursued over the medium- and long-term.

Encouraging renewable energy alternatives is the second recommendation, because switching to renewable sources is an excellent way to complement reduced energy consumption. The City should begin by drafting and implementing renewable energy zoning, and the City should also identify opportunities for renewable energy installations. The Environmental Sustainability Commission should develop a website to easily disseminate information about how renewable energy can become part of the Hilliard landscape. Ultimately, the City should set a long-term

goal of energy-independence by 2020.

The City is responsible for the third Energy and Waste Reduction recommendation: encouraging home and business composting. Organic, compostable material already constitutes significant portions of residential and commercial waste, and efforts should be made to return waste that is rich in nitrogen or carbon, or both, to the soil. The City should begin by building model compost bins in public areas, and it should provide information about how compost bins are built, used and maintained. Though collaborative planning, composting efforts could then be extended to Hilliard's new community gardens, the Franklin County Fairgrounds, and clusters of businesses in the City. Ultimately, the City Council should require bidders on the municipal residential waste removal contract to include composting as part of their proposals.

Recommendation four entails working to become a "Zero Waste" community. Though it may seem nearly impossible, the standard goal of Zero Waste communities and organizations is the high rate of 90% waste reduction and diversion. After adopting a goal for itself, the City should join the State Electronics Challenge and collaborate with organizations such as SWACO and the US Drug Enforcement Administration in order to arrange collections of specialized materials such as electronic devices, household hazardous wastes, and medicines. Guided by a waste stream audit, the City should develop a Zero Waste plan that incentivizes waste diversion and maximizes purchasing of recycled products. Moving residential waste collection services to a Pay-As-You-Throw system will further incentivize residents to reduce the amount of waste they generate and increase the amount they divert to recycling and composting.

The fifth recommendation builds on city officials' express wishes to increase recycling in the commercial and public sectors. Recycling audits will help the city understand its own waste diversion stream, and passing

ordinances that target and help businesses will promote recycling activities as well. These ordinances should be crafted in consultation with the Hilliard Area Chamber of Commerce.

Reducing residential water consumption at home is the focus of the sixth Energy and Waste Reduction recommendation. A simple way to accomplish this recommendation is to incentivize water friendly techniques, such as putting turf in useful areas, using water-efficient systems for lawn irrigation, and carefully selecting mulches and plants. Many of the components of reducing water use involve making people and businesses aware of the simple habits and installations that reduce water consumption and water bills. Distributing informational pamphlets and recruiting members for a water conservation pact will aid in accomplishing this recommendation.

Recommendation seven focuses on reducing the amount of water from Hilliard that enters the Columbus Public Sewer System and streams. Stormwater best management practices, the City's 2009 Storm Water Plan, and educational programming will jointly be the foundation of success. The city should build demonstration rain gardens and it should install rain barrels to show residents the simple ways that can be used to slow or prevent the movement of water runoff into the sewer system. Educational programming, new stormwater management guidelines, and incentives for building rain gardens would promote the adoption of best management practices by residents and businesses.

The final recommendation from this section emphasizes public awareness of sustainable behaviors. This recommendation includes additional surveys of Hilliard residents and businesses, collaboration with the Hilliard City School District, and expanding

the Environmental Sustainability Commission's website and online materials. The City should organize tours of municipal property that include all of the sustainability examples mentioned in previous recommendations. In the long-term, the City should again assess its success in building a sustainable environment by surveying residents and businesses in order to gauge changes in behavior and thought.

Economic Development & Social Equity Recommendations

The first recommendation for Economic Development and Social Equity utilizes adoption of inclusionary zoning ordinances to increase the density of development projects in exchange for increasing the number of affordable units. The City should work with developers to craft an ordinance that benefits the developer while adding to the City's portfolio of housing options.

Recommendation two focuses on improving information about Hilliard's transit options. Engaging the Hilliard City School District and COTA in conversations and planning about road infrastructure and transit services will benefit the community by expanding awareness, exposing City plans to other perspectives, and increasing the number of interested parties committed to achieving the City's sustainability goals.

As part of the third recommendation, the City of Hilliard should provide reduced-interest loans to small start-up businesses and companies that would otherwise be ineligible for existing economic incentives. Based on the Grow Now Program operated by the Office of the State Treasurer, these loans should be tailored by the Director of the Department of Economic Development to

promote Hilliard's business assets. Loan recipients should submit requested data to the Department on an annual basis to track these municipal investments.

The fourth recommendation from Economic Development and Social Equity would provide economic incentives to businesses that bring entertainment options and attract young adults to Hilliard. Special consideration should be given to business that to locate in Old Hilliard, a focus area of the City's 2011 Comprehensive Plan. Quantifying foot traffic in Old Hilliard and re-evaluating after businesses have moved into the area will show progress on this front.

Recommendation five promotes quality, affordable childcare in Hilliard is an important investment that directly enhances the quality of life for residents. Improving demand for child care services through education and service improvement would help support existing childcare facilities. City leaders should make sure that these facilities are connected to whatever state or federal funds they seek in order to maintain licensure and support services.

Affordable housing for seniors is essential to making Hilliard a lifelong community, and as such it is the whole of recommendation six. The aging baby boomer population will cause a shift in the next 20 years that will likely increase demand for senior housing options and services. Though the City already operates the Phyllis A. Ernst Senior Center, it should make the facility a centralized resource for information about senior housing, healthcare, services, employment, wellness, and recreation. A Lifelong Community Plan for Seniors should be developed to provide principles and a vision for the City in this pursuit.

The last recommendation from this section would promote community pride by increasing awareness of community events, building on current events, and developing new programming to foster better visibility in the

metropolitan region. Collecting events into a unified database will reveal the number of organizations working throughout the city, which can be used in future years to promote the city as an exciting venue for other events.

Final Conclusions and Recommendations

Hilliard is an important member of the Central Ohio community, and it has chosen to be a leader in the effort to implement sustainable practices. This fact is proven by the multiple efforts already underway in Hilliard to expand awareness of sustainable behaviors and technology. The Sustainable Hilliard Plan builds on the foundations of Hilliard's Environmental Sustainability Commission, its Master Plan, and the ongoing efforts of local civic and business leaders. It analyzes Hilliard's current practices, behaviors, and trends in order to identify ways that the City, its residents, and its business community can continue coordinated action to achieve sustainability goals.

As shown in this plan, sustainability integrates and balances economic development, ecology, and social equity. This plan's recommendations have been created to complement and enhance those efforts. However, the plan and its recommendations are circumscribed by the limits of a ten-week study period and the fact that many of the authors are not residents of Hilliard. These constraints decreased the teams' time to comprehensively analyze social dynamics, knowledge of internal actions, and organizational structures. In this way, the outsider's perspective, though useful for identifying sustainability opportunities in Hilliard, also imposed its own limits on the plan. Nonetheless, all attempts were made to identify and contact persons, groups, and stakeholders who could inform our study and take action to implement these recommendations. The various stakeholders who have been considered and consulted in the development of this

plan should maintain their engagement in order to see its goals achieved.

Accordingly, local leaders and businesses should expand on the Plan and its recommendations. This type of local vision already emanates from City Hall and the Environmental Sustainability Commission, and their tangible efforts to lead by example provide a strong framework from which to continue building. The Environmental Sustainability Commission will take on a more important role based on the recommendations contained in this plan, and it will be responsible for preparing an Annual Indicators Report in order to show progress in achieving sustainability goals.

In requesting a Sustainable Hilliard Plan, the City has charged itself with a more holistic understanding of its history, its present, and its future. Under the aegis of sustainability, the City's current efforts and the plan's recommendations will elevate Hilliard's position as a leader among Central Ohio communities, and they will strengthen its long-term opportunities for growth.

Community Survey

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Hilliard Community Sustainability Studio survey

[Exit this survey >>](#)

2. Land Use and Urban Ecology Questions

1. Please rank the following park amenities 1 - 4 with 1 being the MOST important and 7 being the LEAST important.

	Most Important	2	3	4
Walking or multipurpose trails	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports facilities (e.g., tennis courts, soccer/baseball fields)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural preserves with viewing areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Park shelters and/or picnic areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. If there was a convenience store or grocery store within a 5 minute walk from your residence, how often would you choose to walk there versus drive?

- Often (every time or nearly every time I needed to go to the store)
- Sometimes (almost half the time I needed to go to the store)
- Rarely (less than a quarter of the time I needed to go to the store)
- Never

3. If you had easy access to a bike path/multi-use trail, what would be your primary use of that trail?

- Primarily recreation
- Primarily transportation (e.g., to work or to shopping destination)
- Balanced recreation and transportation
- I would not use it
- Other (please specify)

4. Please rank how you would feel about each of the following uses being constructed within your neighborhood:

	Strongly support	Support	Neutral	Oppose	Strongly oppose
Apartment building	<input type="radio"/>				
Shopping plaza	<input type="radio"/>				
Small offices	<input type="radio"/>				
Mixed use (apartments or offices above a storefront)	<input type="radio"/>				

Comments:

5. Please let us know to where you commute to work:

- Hilliard
- Columbus
- Dublin
- Upper Arlington
- Westerville
- Worthington
- Reynoldsburg
- Grove City
- Other (please specify)

3. Energy and Waste Questions

1. Please let us know your energy and waste habits.

	Yes	No
Do you recycle at home?	<input type="radio"/>	<input type="radio"/>
Do you use recyclables drop-off sites in Hilliard?	<input type="radio"/>	<input type="radio"/>
Do you know where recycling drop-off sites are located in Hilliard?	<input type="radio"/>	<input type="radio"/>
Do you compost at home?	<input type="radio"/>	<input type="radio"/>
Do you use energy efficient bulbs and/or EnergyStar appliances at home?	<input type="radio"/>	<input type="radio"/>
Do you know that electric utilities such as AEP offer financial incentives to help remove and replace old (and inefficient) appliance?	<input type="radio"/>	<input type="radio"/>

2. How interested would adding solar or wind technology to my home if there was technological or financial assistance from the City of Hilliard?

Very interested
 Interested
 Neither interested nor disinterested
 Not interested
 Not at all interested

3. Please estimate the time you spend per week (in minutes/hours) for the following transportation modes (not primarily for recreation):

Personal automobile	<input type="text"/>
Van or carpool	<input type="text"/>
COTA Bus	<input type="text"/>
Bicycle (as a means of transportation)	<input type="text"/>
Walking (as a means of transportation)	<input type="text"/>

4. What are the primary obstacles you face to bicycling, walking, or transit (bus) as a means of transportation? (choose all that apply)

Lack of convenient access to bus stop
 Time of travel too long for bus, bike or walking
 Lack of convenient access to bike path/walking trail
 Lack of connections to shopping and/or office destinations from bike path/walking trail
 Distance needed to travel to destination (e.g., office/shopping)
 Do not feel safe biking or walking to destination
 Prefer to take my car
 Other (please specify)

5. Please rank the following transportation-related improvements to Hilliard from 1 (Most Important) to 4 (Least Important).

	Most Important	2	3	Least Important
Walking (wider sidewalks, more sidewalks, safer streets with less car speeding).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biking (more connected bike paths, addition of bike lanes, better road/sidewalk condition for bikes).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Automobile (more parking, convenient parking, more connected roads)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mass transit (more bus stops/routes, more frequent pick up)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. How important is the promotion of environmentally friendly modes of transportation to you?

Very Important
 Somewhat Important
 Neither Important nor Unimportant
 Somewhat Unimportant
 Very Unimportant

7. How interested would you be in a "pay as you throw" waste collection? In this program, you would pay for trash disposal based on the volume of bin you select for trash service; recycling and composting programs would be free.

- Very interested
- Interested
- Neither interested nor disinterested
- Not interested
- Not interested at all
- Unsure - would want more detailed information on the program

4. Economic Development and Social Equity Questions

1. For what types of businesses do you shop "outside" of Hilliard? (please check all that apply)

- Restaurants/Bars
- Clothing
- Grocery
- Coffee
- Pharmaceuticals
- Health needs (Doctor or Dentist office)
- Barber or Salon Services
- Furniture
- Entertainment (Movies, Shows, Art, Music, Etc.)
- Auto-Related (Repair, Sales, etc.)
- Biking needs
- Recreation Related (sports and recreation goods, recreation sites, etc.)
- Pet needs
- Book Store
- Cooking Supplies
- Electronics
- Other (please specify)

2. How affordable do you feel the housing stock is in Hilliard?

- Housing is very unaffordable
- Housing is unaffordable
- Housing is neither unaffordable or affordable
- Housing is affordable
- Housing is very affordable

3. Which statement best matches your opinion of the housing stock diversity in Hilliard:

- Housing stock should be more diverse (type, size)
- Housing stock is desirable in its current state and does not need more diversity

References by Section

Introduction

1. Anthony, C. (2009). Forward. In M. P. Pavel (Ed.), *Breakthrough Communities: Sustainability and Justice in the Next American Metropolis* (pp. i-xxi). Cambridge, Massachusetts, USA.
2. Silveira, S. (2004). The American Environmental Movement: Surviving Through Diversity. *Boston College Environmental Law Review*, 8.
3. Silveira, S. (2004). The American Environmental Movement: Surviving Through Diversity. *Boston College Environmental Law Review*, 8.
4. WCED. (1987). *Our Common Future*. United Nations, World Commission on Environment and Development.
5. Portney, K. E. (2002). Taking Sustainable Cities Seriously: A Comparative Analysis of Twenty-Three U.S. Cities. *American Political Science Association* (pp. 1-39). San Francisco: American Political Science Association.
6. WCED. (1987). *Our Common Future*. United Nations, World Commission on Environment and Development. P. 16.
7. WCED. (1987). *Our Common Future*. United Nations, World Commission on Environment and Development. P. 7.
8. Conroy, M., & Berke, P. (2000). Are We Planning for Sustainable Development? An Evaluation of 30 Comprehensive Plans. *Journal of the American Planning Association*, 66 (1), P. 22.
9. Stanley Davis, Carrie, and Iosue, Albert J. (2012, February 1). Meeting with students at the Knowlton School of Architecture.
10. Schonhardt, Don. (2012, February 8). Public presentation at Hilliard City Hall.
11. The City of Hilliard. (n.d.) Comprehensive Plan: Executive Summary. Retrieved from http://hilliardohio.gov/assets/Documents/Engineering/Comprehensive%20Plan/HCP_Ch00_200dpi.pdf.
12. Reed, M. S., Fraser, E. D., & Dougill, A. J. (2006). An Adaptive Learning Process for Developing and Applying Sustainability Indicators with Local Communities. *Ecological Economics*, 59, 406-418.
13. Meter, K. (1999, February). *Neighborhood Sustainability Indicators Guidebook*. Retrieved from www.crcworks.org/guide.pdf.
14. Division for Sustainable Development. (2000). *Indicators of Sustainable Development: Guidelines and Methodologies*. United Nations, Commission on Sustainable Development. Retrieved from www.un.org/esa/sustdev/natlinfo/indicators/guidelines.pdf.
15. Meter, K. (1999, February). *Neighborhood Sustainability Indicators Guidebook*.

Retrieved from www.crcworks.org/guide.pdf.

16. Sustainable Seattle. (1998 йил 22-Апрil). Indicators of Sustainable Community. (K. Palmer, Ed.) Retrieved from Sustainable Seattle: <http://sustainable-seattle.org/1998IndicatorsReport.pdf>.
17. Reed, M. S., Fraser, E. D., & Dougill, A. J. (2006). An Adaptive Learning Process for Developing and Applying Sustainability Indicators with Local Communities. *Ecological Economics*, 59, 406-418.
18. Reed, M. S., Fraser, E. D., & Dougill, A. J. (2006). An Adaptive Learning Process for Developing and Applying Sustainability Indicators with Local Communities. *Ecological Economics*, 59, 406-418.
19. Reed, M. S., Fraser, E. D., & Dougill, A. J. (2006). An Adaptive Learning Process for Developing and Applying Sustainability Indicators with Local Communities. *Ecological Economics*, 59, 406-418.
20. Reed, M. S., Fraser, E. D., & Dougill, A. J. (2006). An Adaptive Learning Process for Developing and Applying Sustainability Indicators with Local Communities. *Ecological Economics*, 59, 406-418.
21. Meter, K. (1999, February). *Neighborhood Sustainability Indicators Guidebook*. Retrieved from www.crcworks.org/guide.pdf.

Intro Graphics

1. (2011). Touring Hilliard. (2011). [Print Photo]. Retrieved from <http://www.touring-ohio.com/central/hilliard/hilliard.html>
2. (2011). Olx houses. (2011). [Print Photo]. Retrieved from <http://hilliard-ohio.olx.com/house-homes-for-sale-4-bed-in-hilliard-ohio-usa-find-hilliard-properties-2016-friston-blvd-iid-257609446>
3. (2011). Touring Hilliard. (2011). [Print Photo]. Retrieved from <http://www.touring-ohio.com/central/hilliard/hilliard.html>
4. (2011). Touring Hilliard. (2011). [Print Photo]. Retrieved from <http://www.touring-ohio.com/central/hilliard/hilliard.html>
5. (2012). Google maps. (2012). [Print Photo]. Retrieved from <http://www.google.com/maps>
6. (2010). Heritage rails to trails . (2010). [Print Photo]. Retrieved from <http://www.heritagerailtrail.org/about.html>
7. (2011). Touring Hilliard. (2011). [Print Photo]. Retrieved from <http://www.touring-ohio.com/central/hilliard/hilliard.html>
8. (2011). Touring Hilliard. (2011). [Print Photo]. Retrieved from <http://www.touring-ohio.com/central/hilliard/hilliard.html>

EWR

1. ¹Energy Information Administration. (2012). Electricity in the United States. Retrieved http://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states.
2. ²American Electric Power Ohio. (2012). AEP Ohio Fact Sheet: Columbus District. Retrieved from <https://www.aepohio.com/global/utilities/lib/docs/factsheets/DistrictFactSheets6-2011.pdf>
3. ³MORPC, and Ameresco. (2008, November 10). Carbon Footprint Assessment for City of Hilliard, Ohio. P. 3.
4. ⁴Sloas, D., Manager of Regional Distribution Center Operations. American Electric Power (2012 February 17). Telephone Interview.
5. ⁵Energy Information Administration. (2012). Frequently Asked Questions: How much carbon dioxide (CO₂) is produced per kilowatt-hour when generating electricity with fossil fuels?. Retrieved from <http://www.eia.gov/tools/faqs/faq.cfm?id=74&t=11>.
6. ⁶American Electric Power Ohio. (2012). Calculate Energy Consumption. Retrieved from <https://www.aepohio.com/save/calculate/>.
7. ⁷SWACO. (2012). SWACO: Smart Communities. Retrieved from <http://swaco.org/SmartCommunities.aspx>.
8. ⁸Ohio Environmental Protection Agency (2012). 2010 Ohio Facility Data Report Tables. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=fY3qzpe6r14%3d&tabid=2615>.
9. ⁹Johnston, L. (2009, March 15). City View shopping center in Garfield Heights goes from fairy-tale development to nightmare. The Plain Dealer , p. A1.
10. ¹⁰Johnston, L. (2009, March 15). City View shopping center in Garfield Heights goes from fairy-tale development to nightmare. The Plain Dealer , p. A1.
11. ¹¹Johnston, L. (2009, March 15). City View shopping center in Garfield Heights goes from fairy-tale development to nightmare. The Plain Dealer , p. A1.
12. ¹²Corvo, Kevin. (2010, June 16). Rumpke Gets Trash Contract. Hilliard Northwest News. Retrieved from http://columbuslocalnews.com/articles/2010/06/22/hilliard_northwest_news/news/hltrash%206-20100616_1208pm_3.txt.
13. ¹³Mills, R. J., & Cahill, J. M. (2010, December 2010). SWACO Comprehensive Annual Financial Report. Retrieved from <http://swaco.org/CmsData/Site/Documents/CAFR/Solid%20Waste%20Authority%20of%20Central%20Ohio%20CAFR%2012-31-10%20final%20.pdf>.
14. ¹⁴Hilliard Northwest News. (2010, June 29). Rumpke to Begin Trash Collection on July 1. Retrieved from http://www.snponline.com/articles/2010/06/30/hilliard_northwest_news/news/hlrumpkene_20100629_0225pm_2.txt.
15. ¹⁵Rumpke. (2012). Rumpke – Home. Retrieved from <http://www.rumpke.com/>.
16. ¹⁶U.S. Census. (2012, January 31). Hilliard City Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>.
17. ¹⁷Mid-Ohio Regional Planning Commission. (2012). Demographics – Population Estimates. Retrieved from http://www.morpc.org/info_center/dataport/demographics_estimate.asp.
18. ¹⁸Re-TRAC. (2012, January 24). Re-TRAC Reporting. Retrieved from <http://www.epa.gov/osw/partnerships/wastewise/retrac.htm>
19. ¹⁹Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
20. ²⁰City of Columbus. (2011). 2011 Average Bill Chart (Residential) . Retrieved 2012, from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
21. ²¹Rausch, C., & Schamp, L. (2012 , January 25). Hilliard Engineering Division. Personal interview.
22. ²²District, M. W. (1998). How many gallons of water in a cubic foot. Retrieved from http://www.montecitowater.com/how_many_gallons_of_water_in_a_c.htm.
23. ²³City of Columbus. (2011). 2011 Average Bill Chart (Residential) . Retrieved from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
24. ²⁴U.S. Census Bureau. (2012, January 14). 2010 Population Profile by Place. Retrieved from <http://2010.census.gov/2010census/popmap/>
25. ²⁵Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus, Ohio: City of Columbus.
26. ²⁶Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus, Ohio: City of Columbus.
27. ²⁷Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus, Ohio: City of Columbus.
28. ²⁸Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus, Ohio: City of Columbus.
29. ²⁹Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus, Ohio: City of Columbus.
30. ³⁰U.S. Census Bureau. (2012, January 14). 2010 Population Profile by Place . Retrieved from <http://2010.census.gov/2010census/popmap/>
31. ³¹Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus , Ohio: City of Columbus.
32. ³²City of Columbus. (2011). 2011 Average Bill Chart (Residential). Retrieved from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
33. ³³City of Columbus. (2011). 2011 Average Bill Chart (Residential). Retrieved from

- http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_34.Library/Residential_Bills_and_Payments/2011_Rates_and_Information/Average-Bill.pdf
34. Library/Residential_Bills_and_Payments/2011_Rates_and_Information/Average-Bill.pdf
 35. ³⁴Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus, Ohio: City of Columbus.
 36. ³⁵U.S. Census Bureau. (2012, January 14). 2010 Population Profile by Place . Retrieved from <http://2010.census.gov/2010census/popmap/>
 37. ³⁶Ambrosio, D., Timothy, L., & Brown C, L. (n.d.). A Basic Primer on Nonpoint Source Pollution and Impervious Surface. Retrieved from <http://ohioline.osu.edu/aex-fact/pdf/0444.pdf>.
 38. ³⁷City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio
 39. ³⁸City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio
 40. ³⁹Ambrosio, D., Timothy, L., & Brown C, L. (n.d.). A Basic Primer on Nonpoint Source Pollution and Impervious Surface. Retrieved from <http://ohioline.osu.edu/aex-fact/pdf/0444.pdf>.
 41. ⁴⁰Sleavin J, W., Civco L, D., Sandy, P., & Giannotti, L. (1999). Measuring Impervious Surfaces for Non-Point Source Pollution Modeling. 2000 ASPRS Annual Convention , (p. 11). Washington D.C.
 42. ⁴¹Ambrosio, D., Timothy, L., & Brown C, L. (n.d.). A Basic Primer on Nonpoint Source Pollution and Impervious Surface. Retrieved from <http://ohioline.osu.edu/aex-fact/pdf/0444.pdf>
 43. ⁴²City of Columbus Utilities Department. (2006). Stormwater Drainage Manual . Columbus: City of Columbus.
 44. ⁴³City of Columbus Utilities Department. (2006). Stormwater Drainage Manual . Columbus: City of Columbus.
 45. ⁴⁴Sleavin J, W., Civco L, D., Sandy, P., & Giannotti, L. (1999). Measuring Impervious Surfaces for Non-Point Source Pollution Modeling. 2000 ASPRS Annual Convention, (p. 11). Washington D.C.
 46. ⁴⁵Sleavin J, W., Civco L, D., Sandy, P., & Giannotti, L. (1999). Measuring Impervious Surfaces for Non-Point Source Pollution Modeling. 2000 ASPRS Annual Convention, (p. 11). Washington D.C.
 47. ⁴⁶City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio
 48. ⁴⁷City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio
 49. ⁴⁸City of Hilliard (2012). GIS DATA; Impervious Surface. City of Hilliard Ohio
 50. ⁴⁹Ambrosio, D., Timothy, L., & Brown C, L. (n.d.). A Basic Primer on Nonpoint Source Pollution and Impervious Surface. Retrieved from <http://ohioline.osu.edu/aex-fact/pdf/0444.pdf>.
 51. ⁵⁰Sleavin J, W., Civco L, D., Sandy, P., & Giannotti, L. (1999). Measuring Impervious Surfaces for Non-Point Source Pollution Modeling. 2000 ASPRS Annual Convention. Washington D.C. p. 11.
 52. ⁵¹Public Utilities Commission of Ohio. (2012). AEP-Ohio's Electric Security Plan. Retrieved from <http://www.puco.ohio.gov/puco/index.cfm/consumer-information/consumer-topics/american-electric-power-ohioe28099s-electric-security-plan/>
 53. ⁵²Sloas, D., American Electric Power. (2012, February 17). Telephone Interview.
 54. ⁵³Gearino, Dan. (2012, January 27) "New AEP rates stun small businesses." The Columbus Dispatch. Retrieved from <http://www.dispatch.com/content/stories/business/2012/01/26/new-aep-rates-stun-small-businesses.html>.
 55. ⁵⁴U.S. Department of Energy. (2012, March 7). Energy Savers: Lighting Choices to Save You Money. Retrieved from http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=11975.
 56. ⁵⁵Ohio General Assembly. (n.d.) Amended Substitute Senate Bill 221 of the 127th General Assembly. Retrieved from http://www.legislature.state.oh.us/Bill-Text127/127_SB_221_EN_N.pdf.
 57. ⁵⁶Seidle, C., Director of Public Service/City Engineer. The City of Hilliard (2012 February 27). Personal Interview.
 58. ⁵⁷City of Hilliard, Planning Division (2012). Planning and Zoning Code. Retrieved from <http://hilliardohio.gov/Government/Departments/Service/PlanningDivision/PlanningZoningCode.aspx>
 59. ⁵⁸Schamp, L., Hilliard Transportation Engineer. (2012, January 25). Personal Interview.
 60. ⁵⁹Schamp, L., Hilliard Transportation Engineer. (2012, January 25). Personal Interview.
 61. ⁶⁰US Department of Energy (2012). Energy Basics: Biomass Technologies. Retrieved from http://www.eere.energy.gov/basics/renewable_energy/biomass.html
 62. ⁶¹E85Locator.net (2010). E85 Locations by State. Retrieved from <http://www.e85locator.net/E85locations.html>
 63. ⁶²US Department of Energy (2012). Energy Basics: Biomass Technologies. Retrieved from http://www.eere.energy.gov/basics/renewable_energy/biomass.html
 64. ⁶³National Biodiesel Board (2012). Biodiesel Retail Locations. Retrieved from <http://www.biodiesel.org/buyingbiodiesel/retailfuelingsites/>
 65. ⁶⁴Ohio Environmental Protection Agency, Division of Materials and Waste Management. (2011, July 6) 2010 Ohio Solid Waste Facility Data Tables. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=fY3qzpe6r14%3d&tabid=2615>.
 66. ⁶⁵Ohio Environmental Protection Agency, Division of Materials and Waste Management. (2011, July 6) 2010 Ohio Solid Waste Facility Data Tables. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=fY3qzpe6r14%3d&tabid=2615>.
 67. ⁶⁶Ohio Environmental Protection Agency (2012). 2010 Ohio Facility Data Report Tables. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=fY3qzpe6r14%3d&tabid=2615>.
 68. ⁶⁷Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
 69. ⁶⁸Environmental Protection Agency (2012). Municipal Solid Waste. Retrieved from <http://www.epa.gov/osw/nonhaz/municipal/>

70. ⁶⁹Ohio Environmental Protection Agency (2012). Annual District Review Form for 2010. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=8drGS3zBK6Q%3d&tabid=2615>
71. ⁷⁰Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
72. ⁷¹Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
73. ⁷²Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
74. ⁷³Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
75. ⁷⁴City of Hilliard (2012). City Services. Retrieved from <http://hilliardohio.gov/live/cityservices/chipperservice.aspx>.
76. ⁷⁵City of Hilliard (2012). City Services. Retrieved from <http://hilliardohio.gov/live/cityservices/chipperservice.aspx>.
77. ⁷⁶City of Hilliard (2012). City Services. Retrieved from <http://hilliardohio.gov/live/cityservices/chipperservice.aspx>.
78. ⁷⁷City of Columbus. (2011). 2011 Avarage Bill Chart (Residential) . Retrieved from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
79. ⁷⁸Bureau, U. S. (2012, January 14). 2010 Population Profile by Place . Retrieved from 2010 Census Interactive Population Map: <http://2010.census.gov/2010census/popmap/>
80. ⁷⁹Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus , Ohio: City of Columbus.
81. ⁸⁰Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus , Ohio: City of Columbus.
82. ⁸¹Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus , Ohio: City of Columbus.
83. ⁸²City of Columbus. (2011). 2011 Avarage Bill Chart (Residential) . Retrieved from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
84. ⁸³Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus , Ohio: City of Columbus.
85. ⁸⁴City of Columbus. (2011). 2011 Avarage Bill Chart (Residential) . Retrieved from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
86. ⁸⁵City of Columbus. (2011). 2011 Avarage Bill Chart (Residential) . Retrieved from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
87. ⁸⁶City of Columbus (2011). 2011 Avarage Bill Chart (Residential) . from http://publicutilities.columbus.gov/uploadedFiles/Public_Uilities/Document_Library/Residential_Bills_and_Payments/2011_Rates_and_Information/AverageBill.pdf
88. ⁸⁷City of Hilliard. (2012). Storm Water Utility Report. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/Stormwater/2011%20Stormwater%20Utility%20Report.pdf>
89. ⁸⁸City of Hilliard. (2009, December 15). Storm Water Management Plan. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/Stormwater/HILLIARD%20STORM%20WATER%20MANAGEMENT%20PLAN%202009-2013.pdf>. P. 3.
90. ⁸⁹City of Hilliard. (2009, December 15). Storm Water Management Plan. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/Stormwater/HILLIARD%20STORM%20WATER%20MANAGEMENT%20PLAN%202009-2013.pdf>. P. 1.
91. ⁹⁰Hilliard Department of Public Service. (2010, August 6). Rules and Regulations for Stormwater Utility Credit Program. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/Stormwater/017-RR%20Stormwater%20Utility%20Credit%20Program.pdf>.
92. ⁹¹Hilliard Department of Public Service. (2010, August 6). Rules and Regulations for Stormwater Utility Credit Program. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/Stormwater/017-RR%20Stormwater%20Utility%20Credit%20Program.pdf>.
93. ⁹²Ameresco. (2008). Carbon Footprint Assessment for City of Hilliard, Ohio. Retrieved from <http://www.morpc.org/pdf/HilliardCarbonFootprintAnalysisFinalReport>.
94. ⁹³U.S. Green Building Council. (2011). Green Buildings for Cool Cities. Retrieved from <http://www.usgbc.org/ShowFile.aspx?DocumentID=6445>
95. ⁹⁴U.S. Conference of Mayors. (2012). List of Participating Mayors. Retrieved from <http://www.usmayors.org/climateprotection/list.asp>
96. ⁹⁵U.S. Conference of Mayors. (2012). U.S. Conference of Mayors Climate Protection Agreement. Retrieved from <http://www.usmayors.org/climateprotection/agreement.htm>
97. ⁹⁶Ohio Department of Development. (2012). Ohio Energy Resources Division: Incentives. Retrieved from <http://www.development.ohio.gov/Energy/Incentives/GrantsLoans.htm>
98. ⁹⁷Oregon Department of Energy. (2005, July). A Model Ordinance for Energy Projects. Retrieved from <http://www.oregon.gov/ENERGY/SITING/local.shtml>
99. ⁹⁸Massachusetts Executive Office of Energy and Environmental Affairs. (2011, June). Model Amendment to a Zoning Ordinance or By-law: Allowing Conditional Use of Wind Energy Facilities. Retrieved from <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/wind/wind-energy-model-zoning-by-law.html>
100. ⁹⁹Ohio Department of Development. (2012). Ohio Energy Resources Division

- sion: Energy Loan Fund. Retrieved from <http://www.development.ohio.gov/Energy/Incentives/EnergyLoanFund.htm>
101. ¹⁰⁰DSIRE. (2012). Database of State Incentives for Renewables & Efficiency. Retrieved from <http://www.dsireusa.org/>
 102. ¹⁰¹Ohio Department of Development. (2012). Senate Bill 221 – Ohio's Commitment to Advanced Energy. Retrieved from <http://www.development.ohio.gov/Energy/Tools/AdvancedEnergyPortfolioStandard.htm>
 103. ¹⁰²U.S. Conference of Mayors. (2005). The U.S. Mayors Climate Protection Agreement. Retrieved from <http://www.usmayors.org/climateprotection/documents/mcpAgreement.pdf>
 104. ¹⁰³U.S. Environmental Protection Agency. (1994, February). Chapter Three: Waste Prevention Strategies. Retrieved at <http://www.epa.gov/epawaste/conserve/downloads/recy-com/chap03.pdf>.
 105. ¹⁰⁴Division of Recycling and Litter Prevention, the Ohio Environmental Protection Agency. (2012). Yard and Kitchen Waste Composting. Retrieved from <http://www.ohiodnr.com/Home/ToolsandResources/YardandKitchenWasteComposting/tabid/18025/Default.aspx>.
 106. ¹⁰⁵Ohio Grocers Association. (2009, January). Composting and Diversion Guide. Retrieved from http://bf9539ebdaab6e43218ac18fd1e4cdfcdbc18eaf.gripelements.com/pdf/green/composting_guide_part_1.pdf.
 107. ¹⁰⁶Ohio Environmental Protection Agency. (2012). State Solid Waste Management Plan 2009. Retrieved at http://www.epa.ohio.gov/ocapp/food_scrap/food_scrap.aspx
 108. ¹⁰⁷Ohio Environmental Protection Agency. (2012). Environmental Benefits \ Composting \ US EPA. Retrieved at <http://www.epa.gov/osw/conserve/rrr/composting/benefits.htm>.
 109. ¹⁰⁸The Ohio State University Extension. (2012). Composting At Home, HYG-1189-99. Retrieved from <http://ohioline.osu.edu/hyg-fact/1000/1189.html>.
 110. ¹⁰⁹Biodegradable Products Institute. (2012). Biodegradable Products Institute | Home. Retrieved from <http://www.bpiworld.org/BPI-Public/Approved/1.html>.
 111. ¹¹⁰The Greener Country. (2012). Retrieved from www.greenercountry.com.
 112. ¹¹¹Sustainable Princeton. (2011, July 27). Give Curbside Composting a Try! Retrieved from <http://sustainableprinceton.org/2011/07/give-curbside-composting-a-try>.
 113. ¹¹²Re-TRAC. (2012, January 24). Re-TRAC Report – Frankling County, State of Ohio. Retrieved from <https://my.re-trac.com/binary/DownloadReport.pm?id=28538&poll=1>.
 114. ¹¹³Ohio Environmental Protection Agency (2012). State Solid Waste Management Plan 2009. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=7dqcfOrOZg0%3d&tabid=2615>
 115. ¹¹⁴US Environmental Protection Agency (2011). Municipal Solid Waste. Retrieved from <http://www.epa.gov/osw/rcc/national/msw.htm>
 116. ¹¹⁵The Ohio State University (2012). Sustainability: Zero Waste at the Stadium. Retrieved from <http://sustainability.osu.edu/zerowaste>.
 117. ¹¹⁶Zero Waste International Alliance. Zero Waste Communities. Retrieved from http://zwia.org/joomla/index.php?option=com_content&view=article&id=14&Itemid=10.
 118. ¹¹⁷State Electronics Challenge (2012). Why Join? Retrieved from http://www.stateelectronicschallenge.net/why_join.html.
 119. ¹¹⁸US Environmental Protection Agency (2012). Statistics on the Management of Used and End-Of-Life Electronics. Retrieved from <http://www.epa.gov/osw/conserve/materials/ecycling/manage.htm>.
 120. ¹¹⁹State Electronics Challenge (2012). Current Partners. Retrieved from http://stateelectronicschallenge.net/current_partners.html.
 121. ¹²⁰Solid Waste Authority of Central Ohio (2012). Household Hazardous Waste. Retrieved from <http://www.swaco.org/SmartPeople/HHW.aspx>.
 122. ¹²¹US Department of Justice: Drug Enforcement Administration (2012). National Take-Back Initiative. Retrieved from http://www.deadiversion.usdoj.gov/drug_disposal/takeback/.
 123. ¹²²SWACO (2012). Conduct your own Waste Audit. Retrieved from <http://swaco.org/WasteAudit.aspx>.
 124. ¹²³City of St. Paul Park, Minnesota. Get Caught Recycling Program. Retrieved from http://www.stpaulpark.govoffice.com/index.asp?Type=B_BASIC&SEC={56AD6CE1-2C4E-40CE-B2C3-5315FB3EA27F}.
 125. ¹²⁴Earth911 (2012). Benefits of Recycling Plastic Bottles. Retrieved from <http://earth911.com/recycling/plastic/plastic-bottles/benefits-of-recycling-plastic-bottles/>
 126. ¹²⁵Brown, Kristen. "PAYT Is SMART." MSW Management. 31 October 2010. Retrieved from <http://www.forestermedia.net/MSW/Articles/12296.aspx>.
 127. ¹²⁶Canterbury, Janice and Sue Eisenfeld. "The Rise and ... Rise of Pay-As-You-Throw." MSW Management. 31 December 2005. Retrieved from <http://www.forestermedia.net/MSW/Articles/1520.aspx>.
 128. ¹²⁷Brown, Kristen. "The Recycling and Economic Benefits of PAYT." Waste Age. 29 April 2011. Retrieved from <http://www.pwmag.com/industry-news.asp?sectionID=772&articleID=1556045>.
 129. ¹²⁸US Environmental Protection Agency (2012). Smart BET Calculator. Retrieved from <http://www.epa.gov/osw/conserve/tools/payt/tools/smart-bet/>.
 130. ¹²⁹Brown, Kristen. "PAYT Is SMART." MSW Management. 31 October 2010. Retrieved from <http://www.forestermedia.net/MSW/Articles/12296.aspx>
 131. ¹³⁰Ohio Environmental Protection Agency (2012). State Solid Waste Management Plan 2009. Retrieved from <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=7dqcfOrOZg0%3d&tabid=2615>
 132. ¹³¹Institute for Local Government. Commercial Recycling Snapshot. Retrieved from http://www.ca-ilg.org/sites/ilgbackup.org/files/Commercial_Recycling_Snapshot_with_tables_only_0.pdf.
 133. ¹³²Institute for Local Government (2012). Sample Commercial Recycling Ordinance. Retrieved from <http://www.ca-ilg.org/samplecomrecycord>.
 134. ¹³³U.S Environmental Protection Agency. (2012, February 8). Water Sense. Retrieved from <http://www.epa.gov/watersense/outdoor/landscaping.html>

135. ¹³⁴U.S Environmental Protection Agency. (2012, February 8). Water Sense. Retrieved from <http://www.epa.gov/watersense/outdoor/landscaping.html>
136. ¹³⁵Agency, U.S Environmental Protection. (2012). Water Efficient Landscaping. Washington D.C: U.S. EPA.
137. ¹³⁶Ohio Department of Natural Resources. (2011, October 07). Water efficiency in your backyard. Retrieved from http://www.dnr.state.oh.us/water/pubs/fs_div/fctsh02/tabid/4082/Default.aspx
138. ¹³⁷Meggitt, J. (2012) Slow-Growing Grass Seed. E-How, Home. Retrieved from http://www.ehow.com/list_7413668_slow_growing-grass-seed.html
139. ¹³⁸U.S. EPA. (2008). Indoor Water Use in the United States . Washington D.C. : U.S. Environmental Protection Agency.
140. ¹³⁹U.S. EPA. (2002). Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs . Washington D.C. : United States Environmental Protection Agency.
141. ¹⁴⁰Village of Villa Park. (2012). Public Works Department: Water Conservation Program. Retrieved from http://www.invillapark.com/government/village_departments/public_works/pwassistance_waterconservation.asp
142. ¹⁴¹Village of Villa Park. (2012). Public Works Department: Water Conservation Program. Retrieved from http://www.invillapark.com/government/village_departments/public_works/pwassistance_waterconservation.asp
143. ¹⁴²Home Depot. (2012). Homer Bucket 5-Gallon Orange. Retrieved from http://www.homedepot.com/Paint-Paint-Accessories-Apparel/h_d1/N-5yc1vZ1xhmZboao/R-100087613/h_d2/ProductDisplay?catalogId=10053&langId=-1&storeId=10051
144. ¹⁴³Sears. (2012). Chaney Instrument Co: Chaney 5In Rain Gauge Glass. Retrieved from http://www.sears.com/shc/s/p_10153_12605_SPM470943701P?sid=IDx20101019x00001a&ci_src=14110944&ci_sku=SPM470943701
145. ¹⁴⁴Sears. (2012). Sears . Retrieved February 10 , 2012 , from Fluidmaster INC Toilet Tank Repair Kit : http://www.sears.com/shc/s/p_10153_12605_SPM2313472403P?sid=IDx20070921x00003a&ci_src=14110944&ci_sku=SPM594558801
146. ¹⁴⁵Google. (2012, February 10). Google Shopping Results: Low Flow Toilet. Retrieved from https://www.google.com/#q=low+flow+toilet&hl=en&tbs=cat:1921,p_ord:p&tbm=shop&prmd=imvns&ei=H5pGT7P3HaLX0QGcpbHuDQ&start=20&sa=N&bav=on.2,or_r_gc.r_pw.r_cp.r_qf,.cf.osb&fp=ee8b800afee5ec84&biw=1680&bih=946
147. ¹⁴⁶Google. (2012, February 10). Google Shopping Results: Low Flow Toilet. Retrieved from https://www.google.com/#q=low+flow+toilet&hl=en&tbs=cat:1921,p_ord:p&tbm=shop&prmd=imvns&ei=H5pGT7P3HaLX0QGcpbHuDQ&start=20&sa=N&bav=on.2,or_r_gc.r_pw.r_cp.r_qf,.cf.osb&fp=ee8b800afee5ec84&biw=1680&bih=946
148. ¹⁴⁷Clouse, M. (2012, January 31). Hilliard Consumption Data. Columbus , Ohio: City of Columbus.
149. ¹⁴⁸U.S. EPA. (2002). Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs . Washington D.C. : United States Environmental Protection Agency.
150. ¹⁴⁹The Ground Water Foundation (2012). Rain Gardens 101. Retrieved from <http://www.groundwater.org/ta/raingardens.html>
151. ¹⁵⁰EPA (2012). Green Building. Retrieved from <http://www.epa.gov/green-homes/ConserveWater.htm#stormwater>
152. ¹⁵¹Sustainable Worthington (2012). Demonstration Rain Garden. Retrieved from <http://www.sustainableworthington.org/rain-garden>
153. ¹⁵²City of Hilliard (2012). Stormwater Management Code. Retrieved from <http://www.epa.gov/greenhomes/ConserveWater.htm#stormwater>
154. ¹⁵³Pervious Pavement (2012). Pervious Pavement. Retrieved from <http://www.perviouspavement.org/benefits/economic.html>
155. ¹⁵⁴EPA, National Pollutant Discharge Elimination System (NPDSE) (2012). Stormwater Program. Retrieved from http://cfpub.epa.gov/npdes/home.cfm?program_id=6
156. ¹⁵⁵City of Upper Arlington (2012). Facts About Your Annual Stormwater Utility Maintenance Fee. Retrieved from http://www.uaoh.net/egov/docs/1326816933_245361.pdf
157. ¹⁵⁶The Ground Water Foundation (2012). Rain Gardens 101. Retrieved from <http://www.groundwater.org/ta/raingardens.html>
158. ¹⁵⁷Franklin Soil and Water Conservation District (2012). Columbus Rain Barrel Program. Retrieved from <http://www.franklinswcd.org/columbus-rain-barrel-program/>
159. ¹⁵⁸EPA (2012). Cool Pavement Product Information. Retrieved from <http://www.perviouspavement.org/benefits/economic.html>
160. ¹⁵⁹City of Hilliard, Environmental Sustainability Commission (2012). Environmental Sustainability Commission. Retrieved from <http://hilliardohio.gov/Government/BoardsandCommissions/EnvironmentalSustainabilityCommission.aspx>
161. ¹⁶⁰SurveyMonkey (2012). Plans & Pricing. Retrieved from http://www.surveymonkey.com/pricing/?ut_source=header
162. ¹⁶¹SurveyMonkey (2012). Plans & Pricing. Retrieved from http://www.surveymonkey.com/pricing/?ut_source=header
163. ¹⁶²Web Design Pricing (2012). How much does a website cost? Web designed pricing explained. Retrieved from <http://www.howmuchdoesawebsite-cost.com/>
164. ¹⁶³Resource for Entrepreneurs (2012). Cost of Advertising on Television. Retrieved from <http://www.gaebler.com/National-TV-Spot-Ad-Costs.htm>
165. ¹⁶⁴The City of Springboro, Ohio (2012). Go Green! Retrieved from <http://www.ci.springboro.oh.us/index.aspx>

EWR Sidebar References

- ¹EcoSeed (2012, February 14). Area Dentist Goes Green in a Big Way. Retrieved from <http://www.ecoseed.org/press-releases/article/98-press-releases/12463->

- area-dentist-goes-green-in-a-big-way
2. ⁱⁱEcoSeed (2012, February 14). Area Dentist Goes Green in a Big Way. Retrieved from <http://www.ecoseed.org/press-releases/article/98-press-releases/12463-area-dentist-goes-green-in-a-big-way>
 3. ⁱⁱⁱInc. (2011). 2011 Inc. 5000. Retrieved from <http://www.inc.com/inc5000/profile/third-sun-solar-wind-power>
 4. ^{iv}Inc. (2011). 2011 Inc. 5000. Retrieved from <http://www.inc.com/inc5000/profile/third-sun-solar-wind-power>
 5. ^vUS Energy Information Administration. (2012). Annual Energy Outlook Early Release Overview. Retrieved from <http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282012%29.pdf>.
 6. ^{vi}US Energy Information Administration. (2012). Annual Energy Outlook Early Release Overview. Retrieved from <http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282012%29.pdf>.
 7. ^{vii}Guillen, Joe. (2011, July 29). "Governor Kasich Touts Economic Possibilities of Oil and Gas Reserves in Eastern Ohio." The Plain Dealer. Retrieved from http://www.cleveland.com/open/index.ssf/2011/07/gov_kasich_touts_economic_poss.html.
 8. ^{viii}Ohio Department of Natural Resources Geological Survey. (2011, April 6). Interval Thickness Map of the Utica. Retrieved from <http://www.dnr.state.oh.us/Portals/10/Energy/Utica/Interval-Thickness%20of%20the%20Utica%208x11.pdf>.
 9. ^{ix}Ohio Department of Natural Resources, Division of Oil and Gas Resources Management. (2012, February 13). Utica/Point Pleasant Shale Wells. Retrieved from <http://www.ohiodnr.com/portals/11/oil/pdf/Utica.pdf>.
 10. ^xCity of Carmel, Engineer Department (2012). Roundabouts. Retrieved from <http://carmel.in.gov/index.aspx?page=123>
 11. ^{xi}City of Carmel, Engineer Department (2012). Roundabouts. Retrieved from <http://carmel.in.gov/index.aspx?page=123>
 12. ^{xii}Hunt, S. (2007, September 17). Fish shouldn't even know of 1,800-student school. The Columbus Dispatch. Retrieved from http://www.dispatch.com/content/stories/local/2007/09/17/Darbyschool.ART_ART_09-17-07_B1_OH7U2L4.html
 13. ^{xiii}James, T. (2010, May 6). The natural: Near Big Darby Creek, Hilliard Bradley plays ball on eco-friendly diamonds. The Columbus Dispatch. Retrieved from <http://www.dispatch.com/content/stories/sports/2010/05/06/the-natural.html>
 14. ^{xiv}Eco Design and Engineering. (2012). Gov't and Institutional. Retrieved from <http://www.ecodesignltd.com/services/govt-and-institutional/>
 15. ^{xv}Hunt, S. (2007, September 17). Fish shouldn't even know of 1,800-student school. The Columbus Dispatch. Retrieved from http://www.dispatch.com/content/stories/local/2007/09/17/Darbyschool.ART_ART_09-17-07_B1_OH7U2L4.html
 16. ^{xvi}Barkoukis, Athan. (2010). Solar Thermal Energy Puts Ohioans to Work. Retrieved from <http://www.greenenergyohio.org/page.cfm?pageID=2727>
 17. ^{xvii}Solar Energy Industries Association. (2011). Solar Energy Facts: Q2 2011. Retrieved from http://www.seia.org/galleries/pdf/Solar_Energy_Facts_Q2_2011.pdf
 18. ^{xviii}SroeCo Solar. (2011, December 11). Most Efficient Solar Panels. Retrieved from <http://sroeco.com/solar/most-efficient-solar-panels>
 19. ^{xviiii}4th%20Qtr%202010.pdf
 20. ^{xxvi}City of Springboro. (2012). Parks Update – Solar Project. Springboro City Notes. Retrieved from <http://www.ci.springboro.oh.us/files/Springboro%20City%20Notes%201st%20Qtr%202012.pdf>
 21. ^{xxvii}City of Springboro. (2012). Parks Update – Solar Project. Springboro City Notes. Retrieved from <http://www.ci.springboro.oh.us/files/Springboro%20City%20Notes%201st%20Qtr%202012.pdf>
 22. ^{xxviii}City of Springboro. (2012). Parks Solar Project. Retrieved from <http://www.ci.springboro.oh.us/solar-project.html>
 23. ^{xxix}Ohio Department of Development. (2012). Advanced Energy Fund. Retrieved from <http://www.development.ohio.gov/Energy/Incentives/AdvancedEnergy-FundGrants.htm>
 24. ^{xxx}City of Columbus. (2012). "Columbus Green Spot." Retrieved from <http://www.columbusgreenspot.org/>
 25. ^{xxxi}City of Columbus. (2012). "Columbus Green Spot." Retrieved from <http://www.columbusgreenspot.org/>
 26. ^{xxxii}City of Columbus. (2012). "Columbus Green Spot." Retrieved from <http://www.columbusgreenspot.org/>
 27. ^{xxxiii}Franklin County Agricultural Society. (2012). History: Franklin County Fair. Retrieved from <http://www.fcfair.org/history>.
 28. ^{xxxiv}4-H. (2012). Environmental Science and Alternative Energy Programs | 4-H. Retrieved from <http://www.4-h.org/youth-development-programs/4-h-science-programs/environmental-science-alternative-energy/>.
 29. ^{xxxv}Golocochea, J. (2009). Ohio Supermarket Composting. BioCycle 50:10. Retrieved from http://www.jgpress.com/archives/_free/001963.html.
 30. ^{xxxvi}Burgerville. (2012). The Business Case. Retrieved at <http://www.burgerville.com/sustainable-business/the-business-case/>.
 31. ^{xxxvii}Burgerville. (2012). The Business Case. Retrieved at <http://www.burgerville.com/sustainable-business/the-business-case/>.
 32. ^{xxxviii}International Paper. (2010, February 10). Burgerville Achieves Major Milestone in Industry-Leading Composting, Recycling and Sustainable Packaging System. Retrieved from <http://www.internationalpaper.com/documents/EN/Foodservice/NRBurgerville.pdf>.
 33. ^{xxlix}Khouri, A. (2009, October 14). Composting – it's happening! – Zero Waste Northeast Ohio. Retrieved from <http://www.zerowasteneo.org/profiles/blogs/composting-its-happening>.
 34. ^lKhouri, A. (2009, October 14). Composting – it's happening! – Zero Waste Northeast Ohio. Retrieved from <http://www.zerowasteneo.org/profiles/blogs/composting-its-happening>.

35. ⁱⁱKhouri, A. (2009, October 14). Composting – it’s happening! – Zero Waste Northeast Ohio. Retrieved from <http://www.zerowasteneo.org/profiles/blogs/composting-its-happening>.
 36. ⁱⁱⁱKhouri, Annabel. (2009, October 14). Composting – it’s happening! – Zero Waste Northeast Ohio. Retrieved from <http://www.zerowasteneo.org/profiles/blogs/composting-its-happening>.
 37. ⁱⁱⁱⁱZero Waste International Alliance. Global Principles for Zero Waste Communities. Retrieved at http://zwia.org/joomla/index.php?option=com_content&view=article&id=10&Itemid=8.
 38. ^{lv}Zero Waste International Alliance. Global Principles for Zero Waste Communities. Retrieved at http://zwia.org/joomla/index.php?option=com_content&view=article&id=10&Itemid=8.
 39. ^{lv}United States Environmental Protection Agency. Pay-As-You-Throw. Retrieved from <http://www.epa.gov/epawaste/conserves/tools/payt/index.htm>
 40. ^{lvi}City-Data (2012). Springboro, Ohio. Retrieved from <http://www.city-data.com/city/Springboro-Ohio.html>
 41. ^{lvii}The City of Springboro, Ohio. (2012). Retrieved from <http://www.ci.springboro.oh.us/index.aspx>
- ## LUUE
1. Dill, J. (2009). Bicycling for transportation and health: The role of infrastructure. *Journal of Public Health Policy*, 1(30), 95-110.
 2. U.S. Census. (2010). American FactFinder. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>
 3. U.S. Census. (2010). American FactFinder. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>
 4. Dill, J. (2009). Bicycling for transportation and health: The role of infrastructure. *Journal of Public Health Policy*, 1(30), 95-110.
 5. Ibid.
 6. Victoria Transport Policy Institute. (2012, January 5). Roadway connectivity: Creating more connected roadway and pathway networks. TDM Encyclopedia. Retrieved from <http://www.vtpi.org/tdm/tdm116.htm>.
 7. Ibid.
 8. U.S. Census. (2010). American FactFinder. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>
 9. Frank, L. D., Engelke, P. O. & Schmid, T. L. (2003). Health and community design: The impact of the built environment on physical activity. Washington: Island Press.
 10. City of Hilliard (2011). Sidewalks and Streets shapefiles.
 11. Payne, L. L., Orsega-Smith, E., Roy, M. & Godbey, G. C. (2005). Local park use and personal health among older adults: An exploratory study. *Journal of Park & Recreation Administration*, 23(2), 1-20.
 12. Roth, M.A., Millett, C.J., & Mindell, J.S. (2012). The contribution of active travel (walking and cycling) in children to overall physical activity levels: a national cross sectional study. *Preventative Health*, 54(2), 134-139.
 13. Sugiyama, T., Francis, J., Middleton, N. J., Owen, N. & Giles-Corti, B. (2010). Associations between recreational walking and attractiveness, size and proximity of neighborhood open spaces. *American Journal of Public Health*, 100(9), 1752-1757.
 14. Frumkin, H., Lawrence, F., & Jackson, R. (2004). Urban sprawl and public health: Designing, planning, and building for healthy communities. Washington, DC: Island Press.
 15. Ibid.
 16. Rinner, C. & Hussain, M. (2011). Toronto’s urban heat island: Exploring the relationship between land use and surface temperature. *Remote Sensing*, 3(6), 1251-1265.
 17. Clinton, A. J. (2008). Greenhouse gas emissions along the rural-urban gradient. *Journal of Environmental Planning & Management*, 51(6), 847-870.
 18. Mid-America Regional Council. (n.d.)
 19. Ibid.
 20. Cervero, R. (1996). Mixed land uses and commuting: Evidence from the American housing survey. *Transportation Research A*, 30(5), 361-377.
 21. Mid-America Regional Council. (n.d.) Transit Supportive Development. Retrieved from http://www.marc.org/transportation/pdf/TSD_Guidebook.pdf
 22. City of Issaquah, Washington. (2010) Indicators: Walkability. Retrieved from http://www.ci.issaquah.wa.us/Files/Indicators_walkability.pdf
 23. Rebele, F. (1994). Urban ecology and special features of urban ecosystems. *Global Ecology and Biogeography Letters*, 4, 173-187.
 24. City of Hilliard. (2011). Chapter 3: Existing Conditions. Hilliard Comprehensive Plan.
 25. Ibid.
 26. Ibid.
 27. City of Hilliard. (2011). Chapter 4: Land Use. Hilliard Comprehensive Plan.
 28. City of Hilliard. (2011). Chapter 3: Existing Conditions. Hilliard Comprehensive Plan.
 29. Ibid.
 30. Ibid.
 31. Ibid.
 32. Ibid.
 33. Ibid.
 34. Ibid.
 35. Ibid.
 36. Ibid.
 37. Ibid.
 38. Ibid.
 39. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning Code. Chapter 1179.04.
 40. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning

- Code. Chapters 1179.04.
41. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning Code. Chapter 1123.01.
 42. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning Code. Chapter 1119.04.
 43. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning Code. Chapter 1123.01.
 44. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning Code. Chapter 1123.02.
 45. City of Hilliard (2012). Codified Ordinances of Hilliard: Planning and Zoning Code. Chapter 1157.01
 46. Ibid.
 47. Ibid.
 48. Atlanta Regional Commission (n.d.). Lifelong communities handbook: Creating opportunities for lifelong living. Retrieved from <http://www.atlantaregional.com/aging-resources/lifelong-communities-llc>
 49. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan
 50. Ibid..
 51. Ibid.
 52. Ibid
 53. Ibid
 54. Ibid.
 55. City of Hilliard (2011). Chapter 7: Parks and Public Space. Hilliard Comprehensive Plan.
 56. Ibid.
 57. Ibid.
 58. City of Hilliard. (2011). Chapter 3: Existing Conditions. Hilliard Comprehensive Plan
 59. City of Hilliard (2011). Chapter 7: Parks and Public Space. Hilliard Comprehensive Plan.
 60. City of Hilliard. (2012). Facilities and Hours. Retrieved from <http://hilliardohio.gov/play/facilitiesandhours/parks.aspx>
 61. City of Hilliard (2011). Chapter 7: Parks and Public Space. Hilliard Comprehensive Plan.
 62. Ibid.
 63. Ibid.
 64. City of Hilliard (2011). Chapter 7: Parks and Public Space. Hilliard Comprehensive Plan.
 65. City of Hilliard. (2012).First Responder Park Memorial. Accessed February 6, 2012 from <http://hilliardohio.gov/live/firstresponderspark.aspx>
 66. City of Hilliard (2011). Chapter 7: Parks and Public Space. Hilliard Comprehensive Plan.
 67. Ibid.
 68. Discover Ohio. (n.d.). Historical Village in Weaver Park. Retrieved from [http://](http://consumer.discoverohio.com/searchdetails.aspx?detail=77001)
 69. City of Hilliard. (2011). Chapter 7: Parks and Public Spaces. Hilliard Comprehensive Plan.
 70. Ibid.
 71. City of Hilliard. (2012). Hilliard Municipal Pools. Retrieved from <http://hilliardohio.gov/play/facilitiesandhours/pools.aspx>
 72. City of Hilliard (2011). Chapter 7: Parks and Public Space. Hilliard Comprehensive Plan.
 73. Heritage Rail-Trail Coalition. (n.d.).About the trail: Heritage Rail Trail. Retrieved from <http://www.heritagetrail.org/about.html>
 74. City of Hilliard. (2012). Hilliard Municipal Pools. Retrieved from <http://hilliardohio.gov/play/facilitiesandhours/pools.aspx>
 75. City of Hilliard. (2012). Facilities and Hours. Retrieved from <http://hilliardohio.gov/play/facilitiesandhours/parks.aspx>
 76. City of Hilliard. (2011). Chapter 3: Existing Conditions. Hilliard Comprehensive Plan.
 77. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan.
 78. City of Hilliard. (2011). Shade Tree Commission. Retrieved from <http://hilliardohio.gov/government/boardsandcommissions/shadetreecommission.aspx>
 79. City of Hilliard. (2011). City of Hilliard Tree Manual. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/2011%20CITY%20OF%20HILLIARD%20TREE%20MANUAL.pdf>
 80. Hilliard Northwest News. (2011, April 12). Hilliard declared Tree City USA for 29th year. Retrieved from http://www.columbuslocalnews.com/articles/2011/05/06/hilliard_northwest_news/news/hltree%20cit_20110412_0618pm_3.txt
 81. City of Hilliard. (2011). City of Hilliard Tree Manual. Retrieved from <http://hilliardohio.gov/assets/Documents/Engineering/2011%20CITY%20OF%20HILLIARD%20TREE%20MANUAL.pdf>
 82. U.S. Forest Service. (n.d.). Forest Health Protection: Emerald Ash Borer. Retrieved from <http://na.fs.fed.us/fhp/eab/>
 83. Budzak, G. (2012, February 15). Committee OK with amending building code, tree manual. ThisWeek Community Newspapers. Retrieved from <http://www.thisweeknews.com/content/stories/hilliard/news/2012/02/14/committee-oks-amending-building-code-tree-manual.html>
 84. City of Hilliard. (2011). Chapter 3: Existing Conditions. Hilliard Comprehensive Plan.
 85. Ibid.
 86. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan.
 87. City of Hilliard. (2011) Chapter 3: Existing Conditions. Hilliard Comprehensive Plan.
 88. City of Hilliard. (2011) Chapter 6: Transportation. Hilliard Comprehensive Plan.
 89. City of Hilliard. (2011) Chapter 6: Transportation. Hilliard Comprehensive Plan.
 90. City of Hilliard. (2011) Chapter 3: Existing Conditions. Hilliard Comprehensive Plan.
 91. City of Hilliard. (2011) Chapter 6: Transportation. Hilliard Comprehensive Plan.

92. Central Ohio Transit Authority. (2012, February 15). Cota. Retrieved from <http://www.cota.com/>
93. Atlanta Regional Commission. (n.d.). Lifelong communities handbook: A framework for planning. Retrieved from <http://www.atlantaregional.com/aging-resources/lifelong-communities-llc>
94. Atlanta Regional Commission. (n.d.). Lifelong communities handbook: Creating opportunities for lifelong living. Retrieved from <http://www.atlantaregional.com/aging-resources/lifelong-communities-llc>
95. Ibid.
96. City of Hilliard. (2011). Chapter 4: Land Use. Hilliard Comprehensive Plan. Retrieved from <http://hilliardohio.gov/Government/Departments/Service/Engineering/ComprehensivePlan.aspx>
97. United States Environmental protection Agency. (2009). Essential Smart Growth Fixes for urban and suburban zoning codes. Retrieved from http://www.epa.gov/smartgrowth/pdf/2009_essential_fixes.pdf, p. 2.
98. City of Hilliard. Zoning Code. Section 1123.01 Use Regulations.
99. United States Environmental protection Agency. (2009). Essential Smart Growth Fixes for urban and suburban zoning codes. p. 2. Retrieved from http://www.epa.gov/smartgrowth/pdf/2009_essential_fixes.pdf, p. 2.
100. American Planning Association. (2003) Smart codes: Model land-development regulations. Retrieved from <http://www.planning.org/research/smart-growth/>
101. City of Hilliard. (2011). Chapter 4: Land Use. Hilliard Comprehensive Plan. Retrieved from <http://hilliardohio.gov/Government/Departments/Service/Engineering/ComprehensivePlan.aspx>
102. EDAW Incorporated. (2008). Seattle new building energy efficiency policy analysis: Arlington density bonus case study. Retrieved from http://www.seattle.gov/environment/documents/GBTf_Arlington_Density_Bonus_Case_Study.pdf.
103. Ibid, p. 2.
104. Ibid, p.2.
105. Lambe, W. (2008) Small towns, big ideas: Case studies in small town community economic development. p. 206. Rural Economic Development Center, UNC School of Government. Retrieved from http://www.sog.unc.edu/programs/cednc/stbi/pdfs/stbi_final.pdf
106. City of Hilliard. (2011). Chapter 4: Focus Areas. Hilliard Comprehensive Plan.
107. York County, South Carolina. (2009). White paper: Mixed use. Retrieved from http://www.jig.com/yorkcountyudo/Documents/Mixed_Use_White_Paper_20097144853.pdf
108. Ibid, p. 10.
109. Ibid, p. 10.
110. Interview with an employee at MSI Design, February 20, 2012.
111. Ibid.
112. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan.
113. City of Hilliard. (2011). Chapter 4: Land Use. Hilliard Comprehensive Plan.
114. City of Hilliard. (2011). Chapter 4: Land Use. Hilliard Comprehensive Plan.
115. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan.
116. Franklin County Auditor. (2012). [Property Search through Ortho Photographs taken in 2007]. Retrieved from <http://www.franklincountyoh.metacama.com/perlSearch.jsp?opt=M>
117. Franklin County Auditor. (2012). [Property Search through Ortho Photographs taken in 2007]. Retrieved from <http://www.franklincountyoh.metacama.com/perlSearch.jsp?opt=M>
118. Franklin County Auditor. (2012). [Property Search through Ortho Photographs taken in 2007]. Retrieved from <http://www.franklincountyoh.metacama.com/perlSearch.jsp?opt=M>
119. City of Hilliard.(2011). Chapter 7: Parks and Public Spaces.Hilliard Comprehensive Plan.
120. The City of Santa Barbara. (2005). Neighborhood Parks. Retrieved from http://www.santabarbaraca.gov/Parks/parks_neighborhood_main.html
121. Healthy Spaces & Places. (2009). Neighborhood Parks. Development Types. Retrieved from http://www.healthyplaces.org.au/site/open_space.php
122. Blake, A. (n.d.). Pocket Parks. Urban Parks. Retrieved from http://depts.washington.edu/open2100/pdf/2_OpenSpaceTypes/Open_Space_Types/pocket_parks.pdf
123. Keep Indianapolis Beautiful, Inc.(2009). Pocket Parks. Retrieved from http://www.kibi.org/2010_pocket_park_projects
124. Northern Arizona University.(2001). Cost Analysis & Financial Strategies: On-line Lesson. Retrieved from http://www.prm.nau.edu/prm423/cost_analysis_lesson.htm
125. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan. Retrieved from <http://hilliardohio.gov/Government/Departments/Service/Engineering/ComprehensivePlan.aspx>
126. New Jersey Department of Transportation. (n.d.). Conservation zoning. Retrieved from <http://www.state.nj.us/transportation/works/studies/rt57/pdf/ConservationZoning.pdf>
127. New Jersey Department of Transportation. (n.d.). Conservation zoning. Retrieved from <http://www.state.nj.us/transportation/works/studies/rt57/pdf/ConservationZoning.pdf>
128. Clearwater Conservancy. (n.d.). Agricultural preservation models. Retrieved from http://www.clearwaterconservancy.org/Vision%202020%20Web%20Final%20Plan/Strategy5-Agriculture_Preservation.htm
129. Henry County Planning Commission. (2003). Land use and development techniques. Retrieved from http://www.clearwaterconservancy.org/Vision%202020%20Web%20Final%20Plan/Strategy5-Agriculture_Preservation.htm
130. Henry County Planning Commission. (2003). Land use and development techniques. Retrieved from http://www.clearwaterconservancy.org/Vision%202020%20Web%20Final%20Plan/Strategy5-Agriculture_Preservation.htm

- 2020%20Web%20Final%20Plan/Strategy5-Agriculture_Preservation.htm
131. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan. Retrieved from <http://hilliardohio.gov/Government/Departments/Service/Engineering/ComprehensivePlan.aspx>
 132. Big Darby Accord. (2006). Land use plan. Retrieved from http://www.bigdarbyaccord.org/accorddocuments/LowResolution/03_Chap%203%20Land%20Use_Final_LowRes.pdf
 133. The Cecil Group. (2012). Conventional zoning vs. form-based code. Retrieved from <http://www.cecilgroup.com/wordpress/news/article-conventional-zoning-vs-form-based-code/>
 134. City of Hilliard. (2011). Chapter 5: Focus Areas. Hilliard Comprehensive Plan. Retrieved from <http://hilliardohio.gov/Government/Departments/Service/Engineering/ComprehensivePlan.aspx>
 135. Rangwala, K. (2010, December 22). Why design guidelines, on their own, don't work. Retrieved from <http://bettercities.net/news-opinion/blogs/kaizer-rangwala/13778/why-design-guidelines-their-own-don%E2%80%99t-work>
 136. Sands, M., Kirley, K., & Ranney, V. (2010). Building communities with farms. Retrieved from <http://www.prairiecrossing.com/libertyprairiefoundation/LPF-Publication9-10.pdf>
 137. Hirowaka, K.H. (2011). Sustainability and the urban forest: An ecosystem services perspective. *Natural Resources Journal*, 51(2), 233-259.
 138. Foster, J., Lowe, A., & Winkelman. (2011). The value of green infrastructure for urban climate adaptation. Retrieved from http://www.ccap.org/docs/resources/989/Green_Infrastructure_FINAL.pdf
 139. Foster, J., Lowe, A., & Winkelman. (2011). The value of green infrastructure for urban climate adaptation. Retrieved from http://www.ccap.org/docs/resources/989/Green_Infrastructure_FINAL.pdf
 140. The Home Depot Foundation. (n.d.). Davenport, Iowa tree planting program. Retrieved from http://www.homedepotfoundation.org/pdfs/davenport_3.pdf
 141. City of Westerville. (2011). Urban Forestry Division. Retrieved from <http://www.westerville.org/index.aspx?page=145>
 142. City of Upper Arlington. (2012). Street trees. Retrieved from <http://www.uaoh.net/department/division.php?fDD=87-476>
 143. City of Worthington. (n.d.). Street tree program. Retrieved from <http://www.worthington.org/index.aspx?NID=257>
 144. Casey Trees. (2011). School programs. Retrieved from <http://caseytrees.org/education/school-planting/>
 145. Benicia Tree Foundation. (2012). Benicia High School tree planting project. Retrieved from <http://www.beniciatrees.org/benicia-high-school-tree-planting-project>
 146. City of Upper Arlington. (2010). Proposed budget for 2011-2012. Retrieved from http://www.uaoh.net/egov/docs/1287774607_337097.pdf
 147. Collier, N. (2011, August 9). City of Dublin salaries. Retrieved from <http://www.bizjournals.com/columbus/datacenter/city-of-dublin-salaries.html>
 148. The Buckeye Institute. (2010). Local salary. Retrieved from <http://www.buckeyeinstitute.org/local-salary>
 149. The Home Depot Foundation. (n.d.). Davenport, Iowa tree planting program. Retrieved from http://www.homedepotfoundation.org/pdfs/davenport_3.pdf
 150. Sydnor, T.D. & Subburayalu, S. (2009). An analysis of public tree benefits for Dublin, Ohio. Retrieved from http://senr.osu.edu/urbanforestry/images/Dublin_3_23_09.pdf
 151. City of Hilliard (2011). Hilliard Comprehensive Plan.
 152. Atlanta Regional Commission (n.d.). Lifelong communities handbook: Creating opportunities for lifelong living. Retrieved from <http://www.atlantarregional.com/aging-resources/lifelong-communities-llc>
 153. Frank, L. D., Engelke, P. O. & Schmid, T. L. (2003). Health and community design: The impact of the built environment on physical activity. Washington: Island Press.
 154. Dill, J. (2009). Bicycling for transportation and health: The role of infrastructure. *Journal of Public Health Policy*, 1(30), 95-110.
 155. Bikes Belong (2012). Who we are. Retrieved from <http://www.bikesbelong.org/who-we-are/>
 156. Pedestrian and Bicycle Information Center. (n.d.). Signals and Signs. Engineer Pedestrian Facilities. Retrieved from <http://www.walkinginfo.org/engineering/crossings-signals.cfm>
 157. Central Ohio Transit Authority. (2006, August). Long-range transit plan: 2006-2030. Columbus, OH.

LUUE Sidebars

1. Arbor Day Foundation.(n.d.).Tree City USA standards. Retrieved from <http://www.arborday.org/programs/treeCityUSA/standards.cfm>
2. Big Darby Accord. (2007, September 7). Big Darby Accord Update. Retrieved from <http://www.bigdarbyaccord.org/pdf/Big-Darby-Accord-update-2007.pdf>.
3. Big Darby Accord. (2006). Big Darby Accord Executive Summary. Retrieved from http://www.bigdarbyaccord.org/AccordDocuments/LowResolution/00_Executive%20Summary_Final_LowRes.pdf.
4. Big Darby Accord. (2007, September 7). Big Darby Accord Update. Retrieved from <http://www.bigdarbyaccord.org/pdf/Big-Darby-Accord-update-2007.pdf>.
5. Big Darby Accord. (n.d.).Big Darby Accord Advisory Panel. Retrieved from <http://www.bigdarbyaccord.org/updates/darbyd5.cfm>.
6. EDAW Incorporated. (2008). Seattle new building energy efficiency policy analysis: Arlington density bonus case study. Retrieved from http://www.seattle.gov/environment/documents/GBTF_Arlington_Density_Bonus_Case_Study.pdf.
7. Lambe, W. (2008) Small towns, big ideas: Case studies in small town community economic development. Rural Economic Development Center, UNC School of Government. Retrieved from http://www.sog.unc.edu/programs/cednc/stbi/pdfs/stbi_final.pdf, p. 206.
8. Lambe, W. (2008) Small towns, big ideas: Case studies in small town community economic development. Rural Economic Development Center, UNC School of Government. Retrieved from http://www.sog.unc.edu/programs/cednc/stbi/pdfs/stbi_final.pdf, p. 206.
9. Lambe, W. (2008) Small towns, big ideas: Case studies in small town community economic development. Rural Economic Development Center, UNC School of Government. Retrieved from http://www.sog.unc.edu/programs/cednc/stbi/pdfs/stbi_final.pdf, p. 206.
10. Lambe, W. (2008) Small towns, big ideas: Case studies in small town community economic development. Rural Economic Development Center, UNC School of Government. Retrieved from http://www.sog.unc.edu/programs/cednc/stbi/pdfs/stbi_final.pdf, p. 206.
11. Lambe, W. (2008) Small towns, big ideas: Case studies in small town community economic development. Rural Economic Development Center, UNC School of Government. Retrieved from http://www.sog.unc.edu/programs/cednc/stbi/pdfs/stbi_final.pdf, p. 206.
12. Charrette Center. (2003). Charrettes defined. Retrieved from <http://www.charrettecenter.net/articles/CharrettesDefined.pdf>
13. Ibid.
14. City of Hilliard. (2011). Chapter 4: Land Use. Hilliard Comprehensive Plan.
15. Dancy, S. (2007). A case study examination of form-based code in North Carolina.(Unpublished master's thesis). UNC Chapel Hill, North Carolina, p 8
16. Ibid, p. 8
17. Ibid, p.8
18. Ibid, p. 9.
19. Ibid, p. 2.
20. City of Lowell. (n.d.) Form Based Codes (FBC) Case Study. Retrieved From http://www.mass.gov/envir/smart_growth_toolkit/pages/CS-fbc-lowell.html
21. City of New Albany. (n.d.) Urban Center Code. Retrieved from <http://www.newalbanyohio.org/government/community-development/zoning/urban-center-code>
22. Woods, J. (November 10, 2007). Hoping for a hit: Several parts of long-anticipated Creekside project nearing their debut. The Columbus Dispatch (Business). Retrieved from <http://www.newslibrary.com/sites/colnp/>
23. Segaloff, M. (October 27, 2005). Ceekside Tenants lining up: Stonehenge expects to have more than half of spaces filed by end of March. Enterprise (Rocky Fork). Retrieved from <http://www.newslibrary.com/sites/colnp>
24. Rose, M. (February 26, 2012). Gahanna's Creekside development faces foreclosure. Columbus Dispatch. Retrieved from <http://www.dispatch.com/content/stories/business/2011/02/26/gahannas-creekside-development-faces-foreclosure.html>
25. Eaton, Dan. (February 25, 2011). Creekside tenant says rent too high for low-traffic locale facing foreclosure. Business First. Retrieved from <http://www.bizjournals.com/columbus/blog/2011/02/creekside-tenant-says-rent-too-high.html>
26. Rose, M. (February 26, 2012). Gahanna's Creekside development faces foreclosure. Columbus Dispatch. Retrieved from <http://www.dispatch.com/content/stories/business/2011/02/26/gahannas-creekside-development-faces-foreclosure.html>
27. Eaton, Dan. (February 25, 2011). Creekside tenant says rent too high for low-traffic locale facing foreclosure. Business First. Retrieved from <http://www.bizjournals.com/columbus/blog/2011/02/creekside-tenant-says-rent-too-high.html>
28. Eaton, Dan. (February 25, 2011). Creekside tenant says rent too high for low-traffic locale facing foreclosure. Business First. Retrieved from <http://www.bizjournals.com/columbus/blog/2011/02/creekside-tenant-says-rent-too-high.html>
29. Wingenfeld, J (Intervieweer) & Kern, J. (Interviewee). (March 2, 2012)
30. The United States Census Bureau.(2012). State and County Quick Facts [Data file]. Retrieved from <http://quickfacts.census.gov/qfd/states/18/1810342.html>
31. Carmel Redevelopment Commission.(2012). Carmel Arts and Design District. Retrieved from <http://www.carmelartsanddesign.com/>
32. Carmel Redevelopment Commission.(2012). Carmel Arts and Design District. Retrieved from <http://www.carmelartsanddesign.com/>
33. Carmel Redevelopment Commission.(2012). Carmel Arts and Design District. Retrieved from <http://www.carmelartsanddesign.com/>
34. Carmel Redevelopment Commission.(2012). Carmel Arts and Design District. Retrieved from <http://www.carmelartsanddesign.com/>
35. Carmel Redevelopment Commission.(2012). Carmel Arts and Design District. Retrieved from <http://www.carmelartsanddesign.com/>
36. Carmel Redevelopment Commission.(2012). Carmel Arts and Design District. Retrieved from <http://www.carmelartsanddesign.com/>

37. City of Eugene Planning Department. Incentives for Mixed-Use Development. Retrieved from http://www.eugeneor.gov/portal/server.pt/gateway/PTARGS_0_2_282989_0_0_18/Incentives%20for%20Mixed%20Use%20Development.pdf
38. U.S. Census. (2010). American FactFinder. Retrieved from <http://quickfacts.census.gov/qfd/states/41/4123850.html>
39. City of Eugene Planning Department. Incentives for Mixed-Use Development. Retrieved from http://www.eugeneor.gov/portal/server.pt/gateway/PTARGS_0_2_282989_0_0_18/Incentives%20for%20Mixed%20Use%20Development.pdf
40. City of Eugene Planning Department. Incentives for Mixed-Use Development. Retrieved from http://www.eugeneor.gov/portal/server.pt/gateway/PTARGS_0_2_282989_0_0_18/Incentives%20for%20Mixed%20Use%20Development.pdf
41. City of Eugene Planning Department. Incentives for Mixed-Use Development. Retrieved from http://www.eugeneor.gov/portal/server.pt/gateway/PTARGS_0_2_282989_0_0_18/Incentives%20for%20Mixed%20Use%20Development.pdf
42. City of Eugene Planning Department. Incentives for Mixed-Use Development. Retrieved from http://www.eugeneor.gov/portal/server.pt/gateway/PTARGS_0_2_282989_0_0_18/Incentives%20for%20Mixed%20Use%20Development.pdf
43. Keep Indianapolis Beautiful, Inc. (2009). Pocket Parks. Retrieved from http://www.kibi.org/pocket_parks
44. Blake, A. (n.d.). Pocket Parks. Urban Parks. Retrieved from http://depts.washington.edu/open2100/pdf/2_OpenSpaceTypes/Open_Space_Types/pocket_parks.pdf
45. Blake, A. (n.d.). Pocket Parks. Urban Parks. Retrieved from http://depts.washington.edu/open2100/pdf/2_OpenSpaceTypes/Open_Space_Types/pocket_parks.pdf
46. Keep Indianapolis Beautiful, Inc. (2009). Pocket Parks. Assessed on Feb 27, 2012, from http://www.kibi.org/2010_pocket_park_projects
47. Keep Indianapolis Beautiful, Inc. (2009). Pocket Parks. Assessed on Feb 27, 2012, from http://www.kibi.org/2010_pocket_park_projects
48. Milder, J.C., & Story, C. (2011). Conservation development practices, extent, and land-use effects in the United States. *Conservation Biology*, 25(4), 697-707.
49. Hidden Creek at the Darby. (2003). About Hidden Creek at the Darby. Retrieved from <http://www.hiddencreekdarby.com/about/>
50. Sands, M., Kirley, K., & Ranney, V. (2010). Building communities with farms. Retrieved from <http://www.prairiecrossing.com/libertyprairiefoundation/LPF-Publication9-10.pdf>
51. AHBL, Inc. (n.d.). Meadow on the Hylebos. Retrieved from <http://www.tpchd.org/files/library/1d269040968b3614.pdf>
52. Lady Bird Johnson Wildflower Center. (2006). Conservation development in Texas. Retrieved from http://www.wildflower.org/consdev/cd_consdev_in_tx.pdf
53. Lady Bird Johnson Wildflower Center. (2006). Conservation development in Texas. Retrieved from http://www.wildflower.org/consdev/cd_consdev_in_tx.pdf
54. Pedestrian and Bicycle Information Center. (2010, July). Missoula Pedestrian Safety Campaign. Pedestrian and Bicycle Information Center case study compendium, p. 11-12.
55. Pedestrian and Bicycle Information Center. (2010, July). Missoula Pedestrian Safety Campaign. Pedestrian and Bicycle Information Center case study compendium, p. 11-12.

EDSE

1. Center for community and economic development . (2012, March). Retrieved from <http://www.uwex.edu/ces/cced/communities/qualityoflifedataindicators-datasources.cfm>
2. U.S. Census Bureau. (2010, March 1). 2010 SF1 100% Data: Various Geographies Retrieved March, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/>.
3. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
4. Investopedia. (2012, march). Retrieved from <http://www.investopedia.com/>
5. U.S. Census Bureau. (2010, March 1). 2010 SF1 100% Data: Various Geographies Retrieved March, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/>.
6. Center for community and economic development . (2012, March). Retrieved from <http://www.uwex.edu/ces/cced/communities/qualityoflifedataindicators-datasources.cfm>
7. U.S. Census Bureau. (2010, March 1). 2002 Economic Census: Various Geographies Retrieved March, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/>.
8. Startup America partnership. (2012, March). Retrieved from <http://www.s.co/>
9. Buch, T., Milne, S., & Dickson, G. (2011). Multiple stakeholder perspectives on cultural events: Auckland's Pasifika Festival. *Journal of Hospitality Market & Management*, 40(3-4), 311-328.
10. Sinn, E., & Wong, W.L. (2005). Place, identity, and immigrant communities: The organization of Yulan Festival in post-war Hong Kong. *Asia Pacific Viewpoint*, 46(3), 295-306.
11. Willard, B. (2012, February 18). Bob Willard, speaker, and author of resource for sustainability champions. Retrieved from <http://sustainabilityadvantage.com/index.php>
12. Hilliard, Ohio City Data. (2011). Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
13. Hilliard, Ohio City Data. (2011). Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
14. Hilliard, Ohio City Data. (2011). Retrieved from <http://www.city-data.com/city/>

- Hilliard-Ohio.html
15. CityData.com. (2012, January 30). Hilliard. Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 16. Hilliard, Ohio City Data. (2011). Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 17. CityData.com. (2012, January 30). Hilliard. Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 18. COTA. (2012, January 2). Schedules. Retrieved from <http://www.cota.com/Schedules.aspx>
 19. CityData.com. (2012, January 30). Hilliard. Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 20. Hilliard, Ohio City Data. (2011). Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 21. CLRChoice (2010). Accessed February 12, 2012 from http://www.clrsearch.com/Hilliard_Demographics/OH/Establishment-Statistics-by-NAICS-Code
 22. Meeks, D. (Personal Communication from February 10th, 2012). E-mail
 23. Meeks, D. (2012 February 11th). Telephone Interview .
 24. Meeks, D. (Personal Communication from February 10th, 2012). E-mail
 25. Meeks, David (Personal Communication from February 10th, 2012). E-mail
 26. County Business Patterns. Retrieved February 29, 2012 from <http://censtats.census.gov/cgi-bin/zbpnaic/zbpsect.pl>
 27. Meeks, D. (Personal Communication from February 10th, 2012). E-mail
 28. County Business Patterns. Retrieved February 29, 2012 from <http://censtats.census.gov/cgi-bin/zbpnaic/zbpsect.pl>
 29. Meeks, D. (Personal Communication from February 10th, 2012). E-mail
 30. County Business Patterns. Retrieved February 29, 2012 from <http://censtats.census.gov/cgi-bin/zbpnaic/zbpsect.pl>
 31. Hilliard Chamber of Commerce. Personal Membership Application. Retrieved February 16th 2012 from <http://www.hilliardchamber.org/application.htm>
 32. The City of Hilliard. Comprehensive Plan. Retrieved February 2, 2012 from <http://hilliardohio.gov/government/departments/service/engineering/comprehensiveplan.asp>
 33. Clark, C. (2012 February 13th). Telephone Interview .
 34. Clark, C. (2012 February 13th). Telephone Interview.
 35. Clark, C. (2012 February 13th). Telephone Interview
 36. Meeks, D. (2012 February 11th). Telephone Interview
 37. Clark, C. (2012 February 13th). Telephone Interview
 38. Organisation for Economic Co-operation and Development. (2005, September). Measuring Sustainable Development. Retrieved 2 24, 2012, from <http://www.oecd.org/dataoecd/60/41/35407580.pdf>
 39. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 40. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 41. Organisation for Economic Co-operation and Development. (2005, September). Measuring Sustainable Development. Retrieved 2 24, 2012, from <http://www.oecd.org/dataoecd/60/41/35407580.pdf>
 42. Mims, C. (2012, 2 9). America has 40 million McMansions that no one wants. Retrieved 2 24, 2012, from Grist.org: <http://grist.org/list/america-has-40-million-big-houses-that-no-one-wants/>
 43. SellingColumbus.com. (n.d.). Columbus Ohio Schools Information. Retrieved 2 24, 2012, from SellingColumbus.com: http://www.sellingcolumbus.com/Columbus_Ohio_Schools.asp
 44. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 45. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 46. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 47. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 48. U.S. Census Bureau. (2010). State and County Quick Facts. Retrieved from <http://quickfacts.census.gov/qfd/states/39/3935476.html>
 49. AARP Public Policy Institute. (2005). Beyond 50.05: A Report to the Nation on Livable Communities. Washington, DC: AARP.
 50. U.S. Census Bureau. (2010). 2010 Census, Summary File 1, Table PCT12. Retrieved from <http://factfinder2.census.gov/>
 51. Hodgson, K. (2011). Child care and Sustainable Community Development. Family-Friendly Communities Briefing Papers. Retrieved from <http://www.planning.org/research/family>
 52. Anderson Kristen (2010). Childcare and Community Development. Family-Friendly Communities Briefing Papers. American Planning Association. Retrieved from http://government.cce.cornell.edu/doc/pdf/issue_child_care.pdf
 53. Communities Briefing Papers. American Planning Association. Retrieved from http://government.cce.cornell.edu/doc/pdf/issue_child_care.pdf
 54. U.S. Census Bureau. (2010). 2010 Census. Retrieved from <http://factfinder2.census.gov/>
 55. ODJFS, Ohio Department of Job and Family Services. (2011) Bureau of Child Care & Development. Retrieved from <http://www.odjfs.state.oh.us/cdc/query.asp>
 56. ChildcareCenter.us. (2012). Hilliard, OH Childcare Centers. Retrieved from http://childcarecenter.us/ohio/hilliard_oh_childcare
 57. ODJFS, Ohio Department of Job & Family Services. (2011) Step Up To Quality. Quality Achievement Awards (QAA). Retrieved from <http://www.odjfs.state.oh.us/cdc/Results1.asp>
 58. Ohio Department of Job and Family Services. (2012). Child Day Care. Retrieved from <http://www.odjfs.state.oh.us/cdc/>
 59. Greenhouse, E., Homsy, and G. Warner, M. (April, 2010). Multi-Generational Com-
 - 60.

- munity Planning: Linking The Needs Of Children and Older Adults. <http://economicdevelopmentandchildcare.org>. Cornell University: New York.
61. U.S. Census Bureau. (2010). 2010 Census. Retrieved from <http://factfinder2.census.gov/>
 62. The Long-Term Care Consumer Guide. (2010). Ohio Long-Term Care Consumer Guide. Retrieved
 63. <http://www.ltcohoio.org/consumer/index.asp>
 64. http://www.mayorscaucus.org/fileBroker/homegrown_2010_housing_development_firststreet.pdf
 65. The Long-Term Care Consumer Guide. (2010). Ohio Long-Term Care Consumer Guide. Retrieved
 66. <http://www.ltcohoio.org/consumer/index.asp>
 67. http://www.mayorscaucus.org/fileBroker/homegrown_2010_housing_development_firststreet.pdf
 68. CityData.com. (2012, January 30). Hilliard. Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 69. Mid-Ohio Development Exchange. (2012, February 28). Our Partners. Retrieved from <http://columbusregion.com/business-resources/our-partners>
 70. American City Business Journals Inc. (2012, Friday, January 27). New COTA CEO aims to keep agency on successful road. By Business First by Adrian Burns, Staff reporter. Retrieved on March 5, 2012 from <http://www.bizjournals.com/columbus/print-edition/2012/01/27/new-cota-exec-has-tough-act-to-follow.html?page=all>
 71. COTA. (2012, February 29). Retrieved from <http://www.cota.com/assets/Publications/Section%204.pdf>.
 72. Examiner.com. (June 28, 2010). Columbus City Schools is forced to cut transportation services for 2010-2011 school year, by Joi Cain. Retrieved March 6, 2012 from <http://www.examiner.com/high-school-in-columbus/columbus-city-schools-is-forced-to-cut-transportation-services-for-2010-2011-school-year#ixzz1oR9sJpvR>
 73. Ohio State Treasurer's Office. Grow Now. Retrieved February 29th, 2012 from <http://ohiotreasurer.gov/depositorybanks>
 74. Ohio State Treasurer's Office. Grow Now. Retrieved February 29th, 2012 from <http://ohiotreasurer.gov/depositorybanks>
 75. Ohio State Treasurer's Office. Grow Now. Retrieved February 29th, 2012 from <http://ohiotreasurer.gov/depositorybanks>
 76. Aldebar Website Design. How Much Does it Cost to Design A Website [Retrieved March 7th, 2012 from (<http://aldebaranwebdesign.com/cost.php>)].
 77. Hilliard, Ohio City Data. (2011). Retrieved from <http://www.city-data.com/city/Hilliard-Ohio.html>
 78. County Business Patterns. Hilliard, Ohio Retrieved February 29th, 2012 from <http://www.census.gov/epcd/cbp>
 79. . Danter, K.(2012 March 6).Telephone interview
 80. The Kansas Department on Aging. Lifelong Community. Retrieved February 12, 2012, from <http://www.agingkansas.org/SeniorSupport/LifeLong/lifelongcommunity.htm>

