2012

WALNUT CREEK WATERSHED PLANNING PARTNERSHIP

BALANCED GROWTH PLAN

morpc

Mid-Ohio Regional Planning Commission

The Mid-Ohio Regional Planning Commission (MORPC), 111 Liberty St., Columbus, OH 43215, 614-228-2663, in conjunction with the Walnut Creek Watershed Planning Partnership, prepared this report with funding from the Federal Highway Administration and the Ohio Water Resources Council. The report reflects the views of MORPC and the partnership, which are solely responsible for the content.

U.S. Department of Transportation

Federal Highway Administration

Ohio | Water Resources Council

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A number of community representatives, stakeholders and citizens contributed to the development of the Walnut Creek Balanced Growth Plan. A full list of the Walnut Creek Planning Partnership participants is on page 4. MORPC would like to thank everyone who participated in this planning process and recognize the following individuals for also volunteering to serve on the Walnut Creek Steering Committee:

Walnut Creek Steering Committee

Joy Davis, Violet Township

Marsha Hall, Village of Baltimore

David Schacht, Schacht Family Farms

Judy White, Southeast Community Coalition

Stephen Moore, Village of Groveport

Matt Brown, Franklin County

Kelly Thiel, Ohio EPA

Chris Yoder, ODOT District 5

Kelly Sarko, Violet Township

Gary Bumpus, Canal Winchester Street Tree Advisory Board

Eric Sandine, Village of Lithopolis

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GLOSSARY OF ACRONYMS

BGI – Balanced Growth Initiative

BGP – Balanced Growth Planning

BLLUP – Best Local Land Use Practices

BMP – Best Management Practices

CNS – Covenant Not to Sue

CO_2 – Carbon Dioxide

COTA – Central Ohio Transit Authority

CSCC – Columbus State Community College

CWA – Clean Water Act

DFIRM – Digital Flood Insurance Rate Map

ECBP – Eastern Corn Belt Plains

EPA – Environmental Protection Agency

FEMA – Federal Emergency Management Agency

FHWA – Federal Highway Administration

FPA – Facility Planning Area

GIS – Geographic Information System

HSTS – Home Sewage Treatment Systems

HUC – Hydrologic Unit Code

IMP – Integrated Management Plan

LID – Low Impact Development

MORPC – Mid-Ohio Regional Planning Commission

MPO – Metropolitan Planning Organization

MS4 – Municipal Separate Storm Sewer Systems

NFA – No Further Action

NHD – National Hydrography Dataset

NLCD – National Land Cover Dataset

NO_2 – Nitrogen Dioxide

NPDES – National Pollutant Discharge Elimination System

NPS – Nonpoint Source

NRCS – National Resource Conservation Service

NWI – National Wetlands Inventory

O_3 – Ozone

ODNR – Ohio Department of Natural Resources

ODOD – Ohio Department of Development

ODOT – Ohio Department of Transportation

OLEC – Ohio Lake Erie Commission

ORC – Ohio Revised Code

ORDC – Ohio Rail Development Commission

OSU – Ohio State University

OWDA – Ohio Water Development Authority

OWRC – Ohio Water Resources Council

PAA – Priority Agricultural Area

PCA – Priority Conservation Area

PCB – Polychlorinated Biphenyl

PDA – Priority Development Area

PRD – Planned Residential Development

PUD – Planned Unit Development

RR – Railroad

SO_2 – Sulfur Dioxide

SR – State Route

SWAP – Source Water Assessment and Protection Program

SWCD – Soil and Water Conservation District

SWMP – Storm Water Management Program

TBA – Targeted Brownfield Assessments

TDR – Transfer of Development Rights

TIP – Transportation Improvement Program

TMDL – Total Maximum Daily Load

TND – Traditional Neighborhood Design

USDA – United States Department of Agriculture

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

VAP – Voluntary Action Program

VMT – Vehicle Miles Traveled

WAG – Walnut Action Group

WAP – Watershed Action Plan

WCPP – Walnut Creek Planning Partnership

WMPI – Watershed Management Priority Indices

WMPI-CPI – WMPI Conservation Priority Index

WPP – Watershed Planning Partnership

WQS – Water Quality Standards

EXECUTIVE SUMMARY

Balanced Growth Initiative:

- Watershed scale planning
- Voluntary
- Incentive-based

The Planning Process:

- Identify issue(s)
- Form Walnut Creek Watershed Planning Partnership
- State goal(s)
- Define Priority Areas
- Select and weight criteria for identification of Priority Areas
- Local review of Priority Areas
- Identify implementation tools
- Local adoption of plan
- State endorsement of plan
- Implementation

Recommendations:

- Locally adopt plan
- Develop local comprehensive plan
- Update comprehensive plan every five years
- Incorporate Priority Areas into local community plans and zoning
- Integrate Implementation Tools where applicable and appropriate
- Continue participating in the Walnut Creek Watershed Planning Partnership

The Mid-Ohio Regional Planning Commission (MORPC), an association of local governments in central Ohio, worked with the Walnut Creek Planning Partnership (WCPP) to produce this Walnut Creek Watershed Balanced Growth Plan. Balanced Growth is a voluntary, incentive-based planning process designed to protect Ohio's watersheds and facilitate local and regional economic development. The WCPP is made up of 14 communities and many watershed stakeholders that voluntarily agreed to direct the development of the Balanced Growth Plan while MORPC provided technical and administrative guidance.

Land use decisions transform and shape our communities in multiple ways. The development of open space or farmland results in increased impervious surface coverage from roads and rooftops. This can negatively impact watershed health by causing greater quantities of stormwater runoff. Greenfield development can also place unnecessary financial burdens on communities if it requires substantial extensions of sewer, water, and road networks. In addition to requiring upfront infrastructure investments, the additional miles of roadway and added sewer and water capacity will be increasingly expensive to maintain over time. While growth and development are generally considered positive for many communities, they can become costly over the long term if not carefully planned to maximize the return on infrastructure investments and protect critical environmental areas. This plan addresses the following interrelated issues that influence the environmental and economic health of the Walnut Creek Watershed:

Water Quality: Walnut Creek has exceptional water quality that supports a diverse assemblage of aquatic life. Much of this aquatic

life diversity can be attributed to its proximity to the confluence of the Scioto River and Big Darby Creek and past efforts to eliminate pollution. Despite this general high water quality Walnut Creek is listed on Ohio's 2010 Section 303(d) list of impaired waters. Agricultural run-off, failing home sewage treatment systems, channel modification, and urban stormwater contribute to water quality impairment of the creek and its tributaries.

Growth Management: Population growth is projected in the watershed, particularly in the Fairfield County portion of the planning area and along Route 33 in Franklin County. Future development in the Walnut Creek Watershed should be planned to minimize harmful impacts to the watershed, minimize the loss of important agricultural or environmentally sensitive areas, and maximize the efficient use of infrastructure.

Need for Regional Collaboration: Land use decisions made in one community will have impacts that are felt in the surrounding area. Natural features like rivers do not follow political boundaries; therefore, it makes sense to take a multi-jurisdictional approach when planning for water quality protection. The same can be said of economic activity where what happens in one community can impact its neighbors. Working together to secure economic competitiveness stands to benefit every community in the region.

Limited Fiscal Resources: There will be increasingly limited fiscal resources to support future development demands. Communities are encouraged to consider the full lifecycle costs of new development, including but not limited to the costs to extend and maintain services into new areas of the community. Cost savings could also potentially be achieved by partnering with neighboring communities to address shared concerns or provide services.

The WCPP has worked to address the aforementioned issues by identifying areas across the watershed that are critical for protection (Priority Conservation Areas), particularly well-suited for development or redevelopment activities (Priority Development Areas), or ideal targets for continued or expanded agricultural use (Priority Agricultural Areas). The Priority Areas were identified using a two step process. First, MORPC identified and mapped potential priority areas based on an analysis of objective criteria selected by the WCPP. Following the initial analysis of criteria, each community was asked to review the potential priority areas in their jurisdictions and make adjustments as necessary. Based on this community review, MORPC created Priority Area maps which could continue to be reviewed through the public comment period. Thus, the Priority Area maps in this plan are the result of both a watershed-wide technical analysis and a localized iterative review process. MORPC facilitated partnership discussions during the local review process to encourage consistency and communication between the WCPP jurisdictions.

The WCPP Balanced Growth Plan also includes a suite of implementation tools to assist communities in their efforts to address the issues facing the Walnut Creek Watershed. This plan recommends that communities utilize these tools where appropriate in an effort to achieve watershed health, economic competitiveness, and agricultural productivity in line with this planning effort and the communities' wishes.

The designation of an area as a Priority Area does not mandate that the area be conserved, developed, or used for agricultural purposes. Incorporation of the Priority Areas into a community's comprehensive plan or local zoning is recommended but not required. When this plan is finalized, MORPC will work with the WCPP and the Ohio Water Resources Council to achieve state endorsement of the Walnut Creek Balanced Growth Plan. State endorsement requires local adoption of the plan by at least 75 percent of the Walnut Creek Watershed communities. Upon endorsement, participating

WCPP communities will be eligible to access state incentives which are designed to promote activities consistent with the designated Priority Areas.

BACKGROUND

Purpose

This Plan is one of five Balanced Growth Plans being developed in contiguous watersheds in central Ohio as part of a voluntary, local response to a state initiative. The Ohio Balanced Growth Initiative was developed to protect and restore Ohio's watersheds. The Balanced Growth Initiative utilizes a watershed-wide approach for developing a plan that reflects local priorities and achieves protection of shared resources. Balanced Growth Plans are intended to complement local watershed action plans that focus on improving and protecting the physical habitat and chemical water quality of watersheds and their diverse plant and animal communities.

Stakeholders and community representatives in the Walnut Creek Watershed have worked together to address the interrelated issues of water quality and economic competitiveness by carefully planning and designating Priority Areas that promote conservation efforts in areas that have significant ecological value, (re)development in areas that efficiently utilize and maximize return on existing infrastructure, and continued agricultural practices in the areas that are most valuable for agricultural activity due to historical, cultural, natural or human created traits.

> *"Balanced Growth is a voluntary, incentive based strategy to protect and restore [Ohio's watersheds] to assure long-term economic competitiveness, ecological health, and quality of life."*
>
> - Ohio Lake Erie Commission

Process

PARTNERSHIP FORMATION AND GOVERNANCE

In 2010, MORPC was awarded a competitive grant from the Ohio Water Resources Council (OWRC) to facilitate the development of a Balanced Growth Plan for the Olentangy Watershed. MORPC leveraged this funding with U.S. Department of Transportation Federal Highways Administration Surface Transportation Planning dollars to develop Balanced Growth Plans for four additional central Ohio watersheds, one of which was Walnut Creek. MORPC then organized the Walnut Creek Planning Partnership (WCPP) to provide guidance throughout the Balanced Growth Planning process (see next page for list of participants). The WCPP, consisting of community representatives and stakeholders, directed the development of this plan while MORPC provided technical assistance, scheduled and facilitated meetings, and developed materials for the partnership.

Each participating community was asked to elect a representative to attend partnership meetings and work with fellow delegates in creating the plan. The representatives were encouraged to share the progress made at the partnership meetings with colleagues and residents of their jurisdictions. Each community was given one vote for matters requiring a vote during the planning process. However, the partnership worked to reach consensus the majority of the time. Stakeholders were not afforded an official vote, but they were presented with opportunities to voice their expertise and opinions throughout partnership meetings and prior to any decisions being made.

WALNUT CREEK WATERSHED PLANNING PARTNERSHIP

Walnut Creek Community Representatives

While each community was granted only one vote for matters requiring a vote, communities were permitted to have multiple representatives attend and participate in meetings.

John Reef, Sr., Greenfield Township

Douglas Clark, Harrison Township

Keith Peters, Harrison Township

Paul Welsh, Harrison Township

Steve Morris, Village of Groveport

Stephen Moore, Village of Groveport

Richard Wilson, Village of South Bloomfield

Joseph Smith, Bloom Township

Susan Brobst, Madison Township (Franklin County)

Edward Dildine, Madison Township (Franklin County)

William Yaple, Violet Township

Kelly Sarko, Violet Township

Joy Davis, Violet Township

Joe Henderson, City of Pickerington

William Vance, City of Pickerington

Brenda VanCleave, City of Pickerington

Franklin Christman, Village of Ashville

Marsha Hall, Village of Baltimore

Andrew Dutton, City of Canal Winchester

Chris Strayer, City of Canal Winchester

Larry Craig, Village of Carroll

Carole Dreier, Village of Carroll

Eric Sandine, Village of Lithopolis

Ed Van Sickle, Village of Lithopolis

Jeffrey Derr, Madison Township (Pickaway County)

Brian Baker, Madison Township (Pickaway County)

Matt Brown, Franklin County

Walnut Creek Stakeholders

Cotton Randall, Ohio Division of Forestry

Jan Rice, Ohio EPA

Kelly Thief, Ohio EPA

Chris Yoder, ODOT District 5

Gary Bumpus, Canal Winchester Street Advisory Board

Gary Schmitt, Village of Canal Winchester Division of Water

Dick Miller, Walnut Action Group (WAG)

Holly Mattei, Fairfield County Regional Planning Commission

James Mako, Fairfield County Regional Planning Commission

Judy White, Southeast Community Coalition

Terry Frazier, Pickaway County

David Schacht, Schacht Family Farms

Perry Orndorff, Fairfield SWCD

Jill Snyder, Three Creeks Park

Early in the planning process, the WCPP agreed on a set of ground rules (see Appendix C) and determined the governance structure for the group, forming a steering committee to develop draft Priority Area criteria recommendations for the full partnership to consider.

Upon finalization of this plan and the associated Priority Area maps, all of the partnership communities will be asked to pass a resolution to adopt the Walnut Creek Balanced Growth Plan. If over 75 percent of communities in the Walnut Creek Watershed (by number of communities, population, and land area) adopt the Walnut Creek Balanced Growth Plan, the WCPP can seek endorsement from the Ohio Water Resources Council. If the plan receives state endorsement, all participating communities will be eligible for special state incentives that have been linked to the Balanced Growth Initiative (see Appendix B). More detailed information about the population and land area of the Walnut Creek Watershed by participating jurisdiction is available in the Recommendations section beginning on page 44.

PUBLIC INPUT

Throughout the planning process, the public was invited to participate in a variety of ways. The original invitation to join the WCPP was broad and sent to a large number of community organizations, institutions, and businesses throughout the watershed. MORPC maintained a website specific to Balanced Growth Planning where regular updates, including the times and locations of all meetings, were posted. MORPC also sent out press releases to inform the public about Balanced Growth Planning in the Walnut Creek Watershed and to invite broader participation in the planning process.

MORPC hosted public meetings at two key points in the planning process to gather input and feedback on the planning effort. The first key point was when the partnership agreed on goals, definitions, and the criteria that would be used to create draft Priority Area maps. The second key point was the completion of the WCPP Balanced Growth plan draft text. At these public meetings, MORPC staff presented information about Balanced Growth Planning and then invited attendees to comment and ask questions. More information about MORPC's public outreach process can be found Appendix C of this plan.

GOAL AND GUIDING PRINCIPLES

At their October 26, 2010 meeting, the WCPP developed and voted to approve the following goal statements to guide this planning effort:

"Work together as a watershed partnership to achieve common planning goals and to address shared social, economic, and environmental concerns through:

- Protecting environmental resources and improving access to green spaces, recreation, and natural areas where appropriate.
- Preserving the unique character of communities within the Walnut Creek watershed.
- Maximizing efficient use of infrastructure to promote economic development.
- Preserving prime agricultural land within the watershed."

These goal statements are supplemented by the following 10 Guiding Principles developed by the state to assist Watershed Planning Partnerships in their task of creating watershed-based Balanced Growth Plans:

10 Guiding Principles for Sustainable Ohio Watersheds

ATTAINING A LIVING EQUILIBRIUM BETWEEN A STRONG, DIVERSIFIED ECONOMY AND A HEALTHY ECOSYSTEM

Activities in Ohio's watersheds should:

1. Maximize investment in existing core urban areas, transportation, and infrastructure networks to enhance the economic vitality of existing communities.
2. Minimize the conversion of green space and the loss of critical habitat areas, farmland, forest, and open spaces.
3. Limit any net increase in the loading of pollutants or transfer of pollution loading from one medium to another.
4. To the extent feasible, protect and restore the natural hydrology of the watershed and flow characteristics of its streams, tributaries, and wetlands.
5. Restore the physical habitat and chemical water quality of the watershed to protect and restore diverse and thriving plant communities and preserve rare and endangered species.
6. Encourage the inclusion of all economic and environmental factors into cost / benefit accounting in land use and development decisions.
7. Avoid development decisions that shift economic benefits or environmental burdens from one location within a region to another.
8. Establish and maintain a safe, efficient, and accessible transportation system that integrates highway, rail, air, transit, water, and pedestrian networks to foster economic growth and personal travel.
9. Encourage all new development and redevelopment initiatives to address the need to protect and preserve access to historic, cultural, and scenic resources.
10. Promote public access to and enjoyment of our natural resources for all Ohioans.

ADAPTED FROM THE LAKE ERIE PROTECTION & RESTORATION PLAN, 2000

STATEMENT OF HOW THE WALNUT CREEK BALANCED GROWTH PLAN ADDRESSES EACH PRINCIPLE

1. Maximize investment in existing core urban areas, transportation, and infrastructure networks to enhance the economic vitality of existing communities.

Priority Development Areas encourage development in areas that are well served by existing infrastructure. Promoting development in these areas maximizes the efficient use of infrastructure and minimizes the need to extend infrastructure, which carries an upfront capital cost, as well as ongoing operations and maintenance costs. The criteria that were initially used to highlight these areas give greater weight to land in urbanized areas and land that is readily served by the existing sewer, water, and transportation infrastructure. Compact development and brownfield redevelopment are promoted in this plan as tools that can help communities make efficient use of existing infrastructure.

2. Minimize the conversion of green space and the loss of critical habitat areas, farmland, forest, and open spaces.

This principle is addressed through prioritizing areas for conservation due to the presence of environmentally sensitive features such as habitats or features that serve important environmental functions like forest and open space. The designation of priority development areas is also conducive to minimizing the conversion of green space by shifting the focus of development targets to areas where development already exists or there is supportive infrastructure. Conservation development is a recommended tool that encourages preservation of green space in development by clustering development on the site and maintaining areas in their natural state. Tools like transfer of development rights (TDR) recommended in this plan would allow landowners in an area that is not suitable for

development to sell their development rights to be applied to land in an area that is suitable for higher density development. This exchange would simultaneously promote the preservation of land unsuitable for development, such as many natural areas, and allow for more compact development in appropriate areas.

3. Limit any net increase in the loading of pollutants or transfer of pollution loading from one medium to another.

Tools such as low impact development, tree preservation, and stream setbacks (see Implementation Toolbox beginning on page 48) all seek to allow nature to filter, absorb, and sequester pollutants. The tree canopy protection tool in this plan provides a detailed background of the benefits of urban trees with regard to pollution sequestration and recommends that communities maintain a healthy tree canopy to reap, among other things, the benefits of cleaner air and water.

4. To the extent feasible, protect and restore the natural hydrology of the watershed and flow characteristics of its streams, tributaries, and wetlands.

PCAs seek to conserve or preserve natural features such as the floodplain, natural land cover, and wetlands that serve hydrologic functions. Recognizing the key role the streams play in the health of the Walnut Creek Watershed, the partnership included both the land adjacent to streams and the 100-year floodplain in the criteria that was used to help identify Priority Conservation Areas. Tools such as low impact development (see page 55) encourage the preservation of the natural hydrology of a site by promoting on-site stormwater management while stream setbacks and stormwater management seek to reduce the impact of impervious surface stormwater runoff on our streams and wetlands.

5. Restore the physical habitat and chemical water quality of the watershed to protect and restore diverse and thriving plant communities and preserve rare and endangered species.

The partnership considered sensitive habitats, parks, wetlands, floodplains as well as land cover in their analysis of areas to be prioritized for conservation efforts. They also included “soil permeability score” as a criterion that recognizes runoff potential as a function of slope, soil water-storage capacity, distance to ground water and other factors. Areas that scored high in the analysis are candidates for conservation efforts to improve water quality and to reduce runoff. The inclusion of wellhead zones in the criteria for selection of PCAs is intended to address the issue of land use change near groundwater intakes that can alter drinking water quality.

6. Encourage the inclusion of all economic and environmental factors into cost/benefit accounting in land use and development decisions.

The partnership selected a list of criteria for each of the three Priority Areas (PCA, PDA, and PAA). Through this process, the partnership considered a wide array of factors related to land use and development decisions. Ohio is a home rule state. That means land use decisions are locally controlled. Future land use decisions can use this information about priority areas, which already takes into account environmental and economic factors. Partnership members can accommodate growth while minimizing costs, benefiting their own utilities, the local and regional transportation system, and the health of the environment.

7. Avoid development decisions that shift economic benefits or environmental burdens from one location within a region to another.

The plan encourages cross-jurisdictional cooperation and information sharing to ensure that development decisions do not shift economic benefits or environmental burdens from one location within the region to another

while encouraging cross-jurisdictional collaboration to share economic benefits (see page 88) and jointly address environmental burdens. Communities were encouraged to work with their neighboring jurisdictions during the review process to enhance cross-jurisdictional cooperation and ensure that burdens and benefits were not simply shifted elsewhere.

8. Establish and maintain a safe, efficient, and accessible transportation system that integrates highway, rail, air, transit, water, and pedestrian networks to foster economic growth and personal travel.

This plan encourages joint consideration of land use and transportation decisions to promote coordination whenever possible. Tools such as complete streets, compact development, exactions and impact fees, and comprehensive planning all address issues related to fostering a comprehensive transportation network either directly or through land use decisions. The complete streets tool in this plan encourages a complete transportation network that is pedestrian, bike, and transit friendly.

9. Encourage all new development and redevelopment initiatives to address the need to protect and preserve access to historic, cultural, and scenic resources.

The partnership's goal statements specifically state a desire to protect environmental resources while also preserving the unique character of the watershed communities. The historic, cultural, and scenic resources all contribute to the uniqueness of each community.

10. Promote public access to and enjoyment of our natural resources for all Ohioans.

Balanced growth planning encourages investments in our existing communities and infrastructure networks to create thriving livable communities. By creating thoughtful, targeted development, communities can seek to preserve the natural resources the region has to offer by minimizing the impact of development. This plan also specifically designates many natural areas that communities would like to target for conservation so that both current and future generations will be able to enjoy what the watershed and the region have to offer.

INDENTIFYING PRIORITY AREAS

A major feature of Ohio's Balanced Growth Initiative is the identification of areas which are most critical for protection (Priority Conservation Areas) or particularly well-suited for development or redevelopment activities (Priority Development Areas). Communities engaged in this process may also identify areas that will be targeted for continued agricultural use (Priority Agricultural Areas) but it is not required. The WCPP decided to designate Priority Agricultural Areas due to the predominance of agriculture in the watershed. Generally speaking, the Priority Areas can be described as follows:

- Priority Conservation Areas (PCAs) are areas which are locally designated for conservation, protection, or restoration.
- Priority Development Areas (PDAs) are areas which are locally designated for development or redevelopment.
- Priority Agricultural Areas (PAAs) are areas which are locally designated for the preservation and continuation of agricultural use.

The identification of Priority Areas should consider the 10 Guiding Principles for Sustainable Ohio Watersheds and be consistent with Balanced Growth's purpose of protecting Ohio's watersheds while also ensuring economic competitiveness. The WCPP worked together to designate Priority Areas throughout the watershed based on a two part process that started with an analysis of objective criteria developed and adopted by the partnership. Following the initial analysis of criteria, each community was asked to review the potential

priority areas and make adjustments as necessary. An explanation of the criteria, the WCPP's Priority Areas definitions, and maps showing the designated Priority Areas begins on page 39 of this plan.

Regional Planning Context

OHIO'S BALANCED GROWTH PLANNING PROGRAM

This Walnut Creek Balanced Growth Plan is one of five Balanced Growth Plans being developed in contiguous watersheds in central Ohio as part of a local response to the state's Balanced Growth Initiative. Balanced Growth Planning is voluntary and incentive-based. The State of Ohio has aligned a variety of technical and financial assistance programs to encourage communities to participate in Balanced Growth Planning. These programs will support watershed partnership communities in their efforts to prioritize areas for conservation and development. Communities that have participated in and locally adopted a state-endorsed Balanced Growth Plan will be eligible for these incentives, which may include additional points on state grant applications and more favorable financial terms on state loan programs.

In 2005 and 2006, the Ohio Lake Erie Commission (OLEC) funded four pilot projects in northern Ohio. The original round of grantees developed state-endorsed Balanced Growth Plans for the Swan Creek (Toledo area), Chagrin River (Cleveland area), Chippewa Creek (Cleveland area), and Rocky River Upper West Branch (Medina) watersheds.

Due to the success of these pilot projects, the program was expanded statewide and is now managed by the Ohio Water Resources Council (OWRC). The OWRC was formed in 1993 and written into state law (ORC 1521.19) in 2001. The council was created to "provide a forum for policy development, collaboration, and coordination among state agencies, and strategic direction with respect to state water resource programs."[1]

MORPC'S STRATEGIC PLAN

MORPC developed a new strategic plan for 2011-2012 that seeks to provide a guiding framework for the work it does in central Ohio. The plan highlights the mission of the organization, which is to be the regional voice and a catalyst for sustainability and economic prosperity in order to secure a competitive advantage for central Ohio. The plan also emphasizes MORPC's role as a leader and resource to communities in central Ohio. The first of four strategic priorities identified in the framework is "Advancing Sustainable Prosperity." MORPC has several efforts underway, including Balanced Growth Planning, that address this priority. These efforts also include a multi-year planning effort called Shaping Our Future that will create a physical planning framework for the region. The following six goals have been established for the Shaping Our Future effort:

- Position central Ohio to attract and retain economic opportunity to prosper as a region and compete globally.
- Increase collaboration to maximize the return on public expenditures.
- Use public investments to benefit the health, safety and welfare of people.
- Create sustainable neighborhoods to improve residents' quality of life.
- Promote the reduction of per capita energy consumption and the production of energy from renewable local sources to increase affordability and resilience of regional energy supplies.
- Preserve and protect natural resources to maintain a healthy ecosystem.

[1] Ohio Revised Code. Title XV Conservation of Natural Resources. Chapter 1521: Division of Water. http://codes.ohio.gov/orc/1521.19

The Balanced Growth Planning effort will be drawn from to assist in developing a planning scenario for Shaping Our Future.

MORPC'S METROPOLITAN TRANSPORTATION PLAN

One of the other efforts at MORPC that will help develop the regional planning framework, "Shaping our Future," is transportation planning. As the metropolitan planning organization (MPO) for the greater Columbus area, MORPC is required to conduct a continuing, cooperative, and comprehensive transportation planning process with a 20-year horizon that results in a Metropolitan Transportation Plan (MTP).

The MTP identifies transportation deficiencies, projects and strategies. It is updated on a four year cycle under federal regulations. MORPC coordinates the development of the MTP with communities throughout central Ohio and with other local, state and federal agencies. The MTP makes the greater Columbus region eligible to receive a large amount of federal transportation funding to improve, maintain and operate highways, public transit, bikeways, sidewalks, and related facilities.

Transportation and land use are connected. MORPC anticipates land use changes to help determine where new transportation capacity will be needed over the next 20 years. This is accomplished through extensive monitoring of local land use plans, supplemented by demographic and land suitability data sets, followed by extensive modeling. These data sets provided much of the technical basis for Balanced Growth Planning.

The MTP does not suggest changes to local land use plans. Balanced Growth Planning, through its priority area designations, has the potential to influence where development happens. Consequently, some areas of the watershed may not need additional transportation capacity. With Balanced Growth Planning reaching many communities in Central Ohio, future MTPs may not need to account for as much new transportation capacity – a welcome trend in an increasingly constrained fiscal environment.

THE WALNUT CREEK WATERSHED

Territory Boundary and Size

The Walnut Creek Watershed is located in Central Ohio, situated between the cities of Columbus and Lancaster, covering portions of Fairfield, Franklin, Pickaway, Licking, and Perry Counties. The watershed covers approximately 286 square miles and encompasses 15 municipalities. [2] It is part of the larger Scioto Watershed and runs its 58-mile course westward from northwestern Perry County before emptying into the Upper Scioto River at the confluence in Pickaway County.[3]

The Walnut Creek Watershed is broken into two 10-digit Hydrologic Unit Codes (HUCs), consisting of the Upper Walnut Creek (05060001-17) and the Lower Walnut Creek (05060001-18). Early on in the planning process, the planning area was narrowed down from the entire Walnut Creek watershed (10 digits HUCs 05060001-17 and 05060001-18) to a smaller planning area consisting of six contiguous 12 digit HUCs within the watershed. This adjustment was made based on the interest of watershed communities to be included in the Balanced Growth planning process. The 12 digit HUCs that make up the Walnut Creek Balanced Growth planning area are depicted in Map 1.[4]

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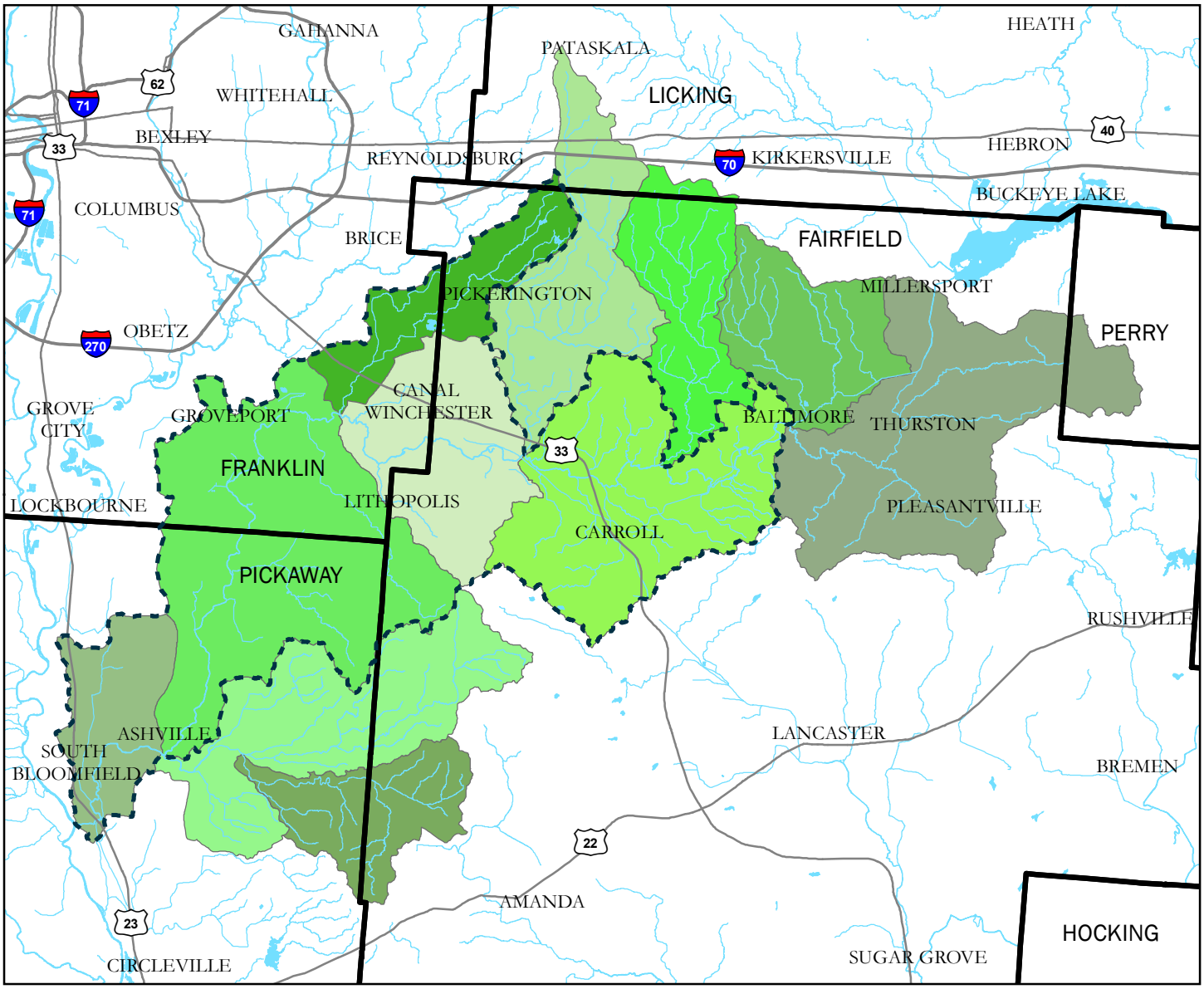
[2] Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water.
[3] Ibid.
[4] The TMDL report for Walnut Creek uses an older 11 and 14 digit HUC numbering system. The 11 digit HUCs correspond to the 10 digit current numbers.

Walnut Creek Watershed

Subdivisions



Legend

Walnut Creek Watersheds HUC-12

- 050600011701
- 050600011702
- 050600011703
- 050600011704
- 050600011803
- 050600011804

WCPP

- 050600011805
- 050600011806
- 050600011705
- 050600011801
- 050600011802

- County Boundary
- Major Roads
- Water

The information shown on this map is compiled from various sources made available to us which we believe to be reliable.
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January 2012

N

0 3.5 7 Miles

Political Composition

There are 14 political jurisdictions represented in the WCPP spanning across Fairfield, Franklin, and Pickaway counties. The nature of the communities in the Walnut Creek watershed ranges from southeastern Columbus area suburbs with burgeoning population growth to the rural communities of Pickaway and Fairfield counties where agriculture dominates. The watershed is most densely populated in the northeastern portion while the remainder is dotted by smaller villages and largely rural townships.

When forming the WCPP, MORPC invited any community that had 25 percent or more of its population or total land area within the planning area boundaries to join the partnership. The 25 percent threshold was selected because numerous communities straddle the watershed boundary and MORPC wanted to include as much of the actual watershed as possible, understanding that jurisdictions which only had a small portion of their land or population within the watershed may not have a meaningful stake in the planning process.

Two jurisdictions straddle the Big Walnut and Walnut Creek Watersheds. The City of Groveport and Madison Township (Franklin County) both met the 25 percent threshold for each of the two watersheds and therefore were invited to one or both watershed partnerships. Both jurisdictions joined both the Big Walnut and Walnut Creek Planning Partnerships, divided by the watershed line.

The population and land area data by jurisdiction for the Walnut Creek planning area communities can be found in the appendix. Map 2 illustrates the geographic location of each of the Walnut Creek Planning Partnership jurisdictions.

WALNUT CREEK WATERSHED JURISDICTIONS:

Village of Baltimore

City of Canal Winchester

City of Groveport

City of Pickerington

Village of South Bloomfield

Village of Ashville

Village of Lithopolis

Village of Carroll

Bloom Township

Greenfield Township

Harrison Township

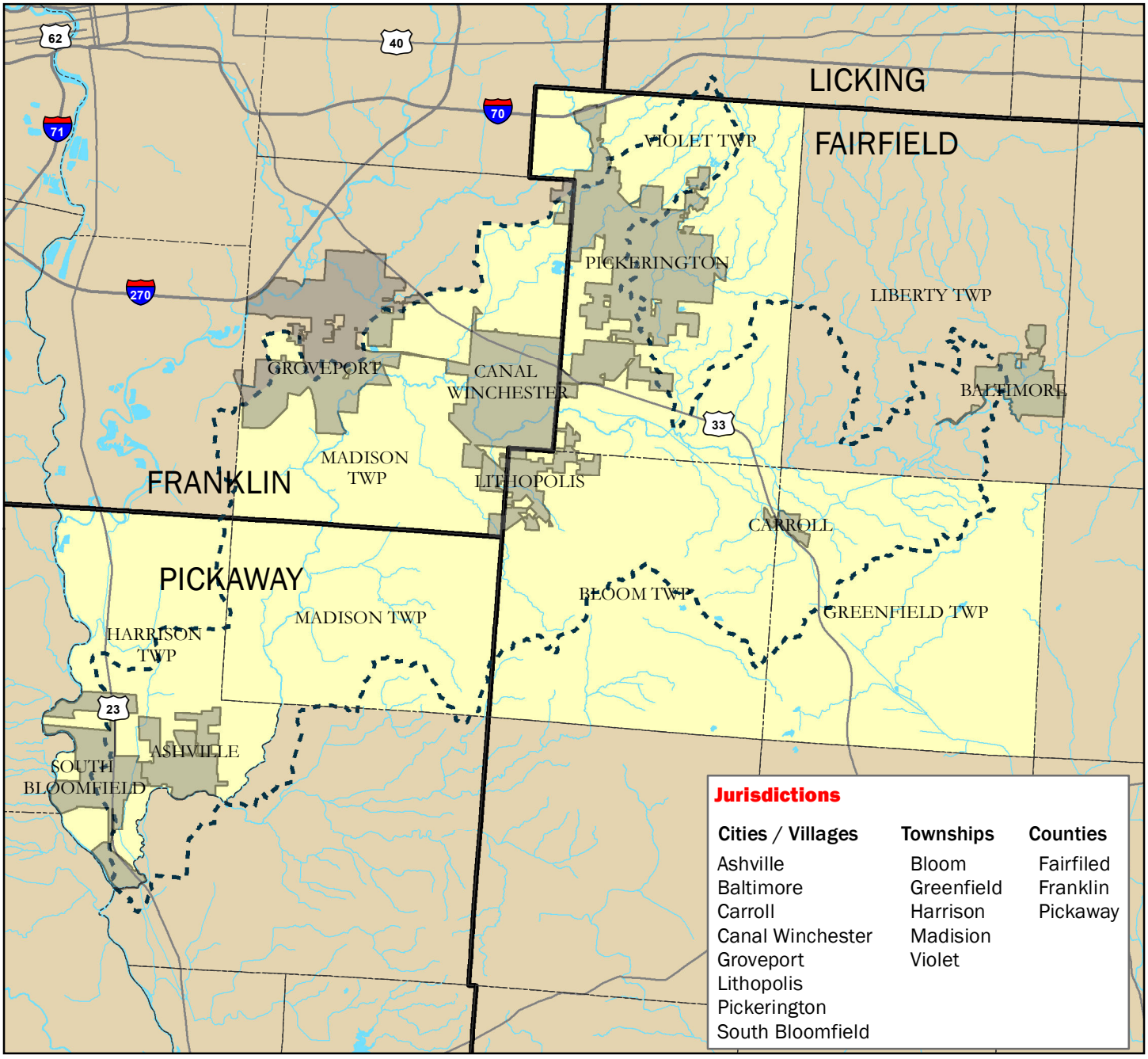
Madison Township (Franklin County)

Madison Township (Pickaway County)

Violet Township

Walnut Creek Watershed

Jurisdictions



Legend

- Walnut Creek Analysis Area
- Walnut Creek Watershed Area
- Walnut Creek City/Village
- Township Boundary
- County Boundary
- Major Roads
- Water

N

0 3 6 Miles

The information shown on this map is compiled from various sources made available to us which we believe to be reliable.
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January 2012

EXISTING CONDITIONS

Water Quality

The Ohio Balanced Growth Initiative was developed to protect and restore Ohio's watersheds. In order to achieve this goal, it is important to understand the current conditions of the Walnut Creek Watershed and to review some of the key recommendations that have been prepared by the Ohio EPA to address water quality issues.

The U.S. Clean Water Act (CWA) requires the preparation of a Total Maximum Daily Loads (TMDL) report for all impaired waterways on the Section 303(d) list. The TMDL report details sources of impairment and lays out a process for achieving full attainment of Water Quality Standards (WQS), allowing removal of the water body from the 303(d) list. The following background information on water quality in Walnut Creek is excerpted from the Ohio EPA's 2010 Total Maximum Daily Loads for the Walnut Creek Watershed[5]:

> *Walnut Creek flows almost 58 miles from headwaters in northwest Perry County to the mouth at the Scioto River. Walnut Creek joins the Scioto River approximately five miles upstream from the confluence of Big Darby Creek and the Scioto River in Circleville, Ohio. The nearness of the exceptionally diverse aquatic ecosystem of the Big Darby Creek watershed in conjunction with improved water quality in the Scioto main stem has allowed rare and sensitive species to recolonize historic ranges, including Walnut Creek, from the Big Darby.*
>
> *Principle tributaries to Walnut Creek include Sycamore, Little Walnut, George, Poplar, and Pawpaw creeks. Many tributaries in the watershed drain coarse glacial material, and consequently receive ground water that sustains ample base flow even during drier times of the year. Aided by the stabilizing effect of ground water, habitat quality is generally good and capable of sustaining healthy biological communities.*
>
> *There are no surface water intakes for public drinking water supplies, sizeable lakes for recreation, or any other type of resource that stands out from typical river and stream uses. Satellite imagery shows that wetlands account for less than one percent of the watershed area, amounting to about 1,000 acres.*

RECREATION USE ATTAINMENT

> *Twenty-five of the 55 sites sampled failed to the meet criteria for recreation use amounting to 45 percent of all sites. Fifteen sites (27 percent) did not meet the geometric mean criterion, and each of these also failed to meet the 90th percentile criterion. Ten other sites only failed in meeting the 90th percentile criterion. The upper 11-digit HUC (170) had substantially more recreation use impairment with 18 sites not meeting standards compared to only seven in the lower HUC (180). The impairment in the 170 HUC was distributed among five of the six 14-digit HUCs amounting to an area of 118 out of 135 square miles (83 percent). Only three of seven were impaired in the 180 HUC accounting for 50 out of 148 square miles (34 percent).*
>
> *Although fewer than five samples were collected during the recreation season, the data compiled between 2000 and 2005 show that the chronic (i.e., based on a geometric mean) recreation use criteria is met across a reasonably wide range of flow conditions. There is not enough data to determine if the acute (i.e., based on a ninetieth percentile) criteria are met within each subset of flow ranges, but the data points to this section of Walnut Creek being in attainment for the recreation season.*

AQUATIC LIFE USE ATTAINMENT

> *Aquatic life use attainment was assessed at 55 sites in the Walnut Creek watershed that ranged in drainage area from 0.6 mi² to 44 mi². Forty-three of the sites (78%) are in full attainment of their designated or recommended aquatic life*

[5] Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water.

use. Six of the sites (11%) are in partial attainment, and six of the sites (11%) are in non-attainment.

PUBLIC DRINKING WATER USE ATTAINMENT

There are no known entities within this watershed that are using surface water as a source of drinking water. Communities within this watershed obtain their drinking water supply from ground water wells.

HUMAN HEALTH USE (FISH TISSUE)

Walnut Creek has been sampled for fish tissue contamination by Ohio EPA twice in the past ten years, in 1999 and again in 2005.

In 1999, some of the fish sampled had levels of PCBs that were both above the threshold for a one meal per month advisory and above the threshold used in listing waters as impaired in Ohio's Integrated Report to U.S. EPA (303(d) list). Therefore, Walnut Creek is listed in Ohio's Integrated Report as impaired for PCBs in fish tissue and has a one meal per month fish consumption advisory for channel catfish due to PCBs.

Sampling conducted in 2005 resulted in no PCBs detected in eighteen samples of fish tissue. According to Ohio EPA's methodologies for determining advisories and impairments for fish tissue, another round of sampling is required to remove the current consumption advisory, or to delist Walnut Creek from the Integrated Report impairment list. PCBs are currently banned from use in the United States and are expected to decrease in streams over time. Therefore, no further action other than continued monitoring for PCBs in fish in Walnut Creek will be taken.

The only other contaminant found in fish in Walnut Creek in quantities of concern to human health was mercury. The concentrations of mercury were found in the two meals per week to one meal per month advisory range, depending on the species. The concentrations were below the listing threshold for mercury impairment for Ohio's Integrated Report.

Mercury is a ubiquitous contaminant in streams throughout the United States and its primary source is thought to be mercury deposited from the atmosphere. Mercury as a surface water pollutant is being addressed in a variety of ways outside of the traditional TMDL process, including limits on mercury emissions from air sources, mercury take-back programs, and legislation prohibiting the sale of most mercury-containing products. Unless there are known or suspected local surface water sources of mercury, mercury is best addressed outside of the individual watershed TMDL framework.

Several sources of impairment to the Walnut Creek watershed are mentioned in the 2010 TMDL report. Sources include nonpoint (crop land runoff and stormwater runoff from land development and urban/residential land uses), regulated point (wastewater treatment plants), household sewage treatment systems, livestock with stream access, sanitary sewer overflow, and ditch maintenance. The related causes of impairment to the Walnut Creek watershed include nutrient enrichment, sedimentation, habitat alteration, flow alteration and bacteria.

According to the Walnut Creek Watershed 2010 TMDL report, "Sediment degrading substrate habitats coupled with damaged larger structural habitats, woody debris, boulders, and pools is responsible for more impairment than any of the other causes. The sources for this include livestock use of the streams, ditching of channels, and cropland runoff."[6]

The Walnut Creek Watershed 2010 TMDL report identifies a number of actions that can be implemented to help the waterway achieve full attainment of Water Quality Standards. The recommended actions include:

- Limit stream access for livestock and seek alternative water access
- Promote the use of conservation practices in agricultural areas of the watershed

[6] Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water, p. 75.

- Promote alternative ditch maintenance BMPs, i.e. over wide channel
- Identify and improve failing Home Sewage Treatments Systems (HSTS)
- Ensure proper maintenance of HSTS through training and education
- Minimize impervious surfaces and improve onsite stormwater retention and infiltration
- Protect floodplains throughout the Walnut Creek watershed
- Encourage use of Low Impact Development (LID) techniques

The Implementation Toolbox in this plan (beginning on page 48) includes tools that address the recommended actions of minimizing impervious surface and improving onsite stormwater retention, protecting floodplains, and encouraging the use of LID techniques. Still, other tools address the preservation of farmland across the watershed while encouraging the use of programs geared toward minimizing the environmental and water quality impact of agriculture.

Table 1. Ohio Water Quality Standards Components

Components	Description
Beneficial Use Designations • *Aquatic life habitats* • *Recreational Contact* • *Water Supply*	• Existing or potential uses • Every water body is assigned a designation by the state • WQS for full attainment vary according to beneficial use designation
Numeric Criteria	• Estimations of chemical concentrations • Degree of aquatic life toxicity
Narrative Criteria	• General descriptions of water quality goals
Anti-degradation Provisions	• Description of conditions under which water quality may be lowered

Land Use

The following information about land use in the Walnut Creek Watershed is excerpted from the 2010 Total Maximum Daily Loads for the Walnut Creek Watershed[7]:

> *Land use within the basin is dominated by row-crop agriculture and residential development. Urban/suburban land use is concentrated in the northwest third of the catchment with the highest densities in southeastern Franklin County and in Violet Township in Fairfield County. Current land use trends have increased the potential for nonpoint source pollution of the stream system. Increased frequency in the number of construction sites, large lot development, horse and novelty livestock operations, and on-site home sewage treatment systems (HSTS) contribute to this potential.*
>
> *Although thinned out in areas, a well defined riparian zone can be seen along the lower Walnut Creek channel. Other forested lands are located on ridges and areas that are marginal for crop production or pasturing.*

There are four notable protected areas within the Walnut Creek Watershed. These areas are Slate Run in Pickaway County, Pickerington Ponds in Franklin and Fairfield Counties, Chestnut Ridge in Fairfield County, and the new Walnut Woods in Franklin County. These protected areas are all part of the central Ohio Metro Parks system.

[7] Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water.

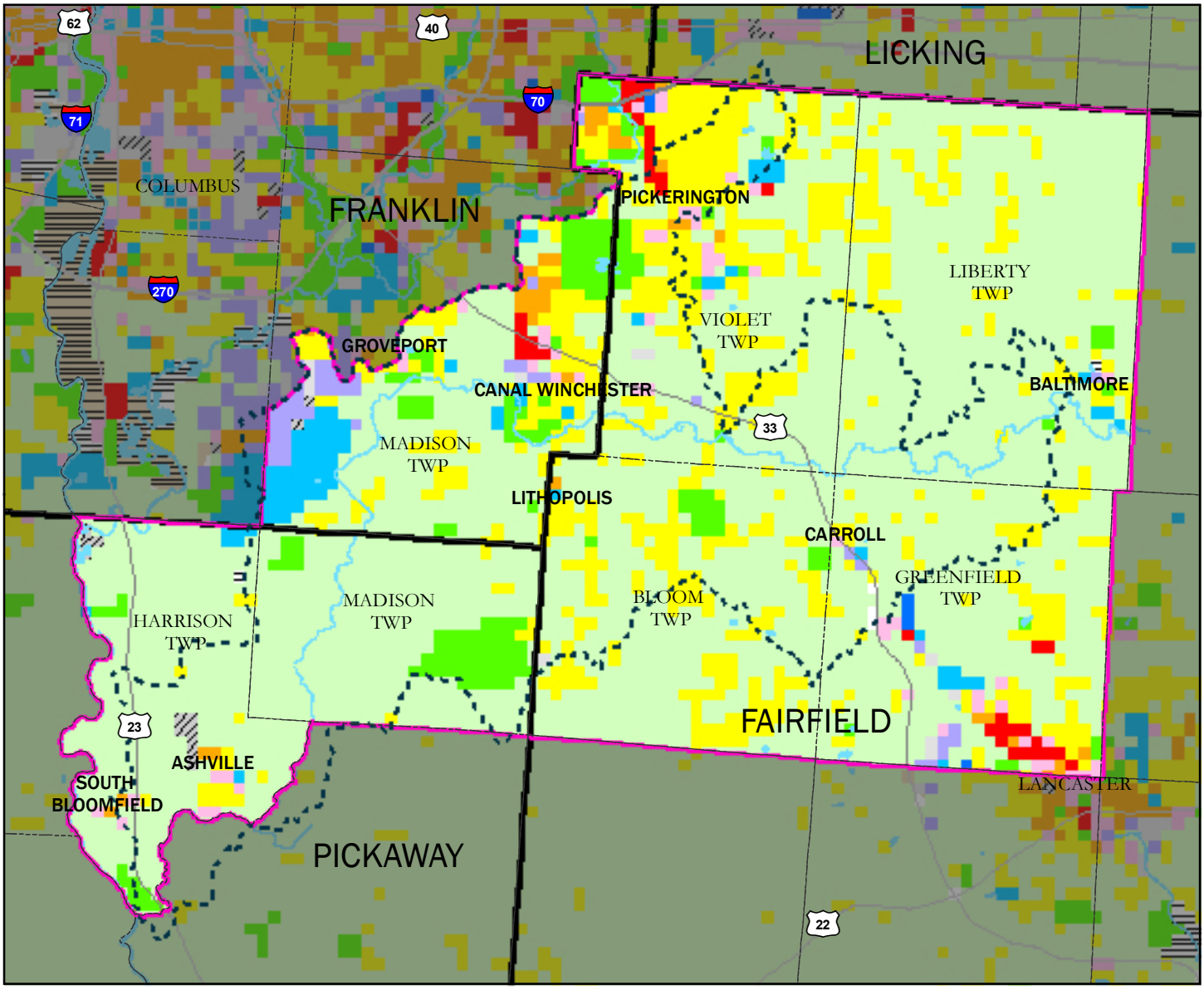
Table 2. Land Use in Walnut Creek Watershed Balanced Growth Planning Area

Land Use		Acres	% of Land
	Development Type		
Agriculture		61,840	69
Development	Public Use	2,600	3
	Commercial/Office	400	<1
	Residential	16,320	18
	Industrial & Warehousing	2,120	2
	Total Developed Land	*21,440*	*24*
Open Space & Parks		5,720	6
Total		89,080	

Source: MORPC Generalized Land Use Categories
Note: Uses summarized across 40 acre grid

Walnut Creek Watershed

Exisiting Land Use



Legend

- Agriculture
- Open Space
- Commercial
- Mixed Used Residential/ Commercial
- Light Industrial
- Industrial
- Quarry
- Warehouse
- High Density Residential
- Low Density Residential
- Public Service
- Office
- Walnut Creek Analysis Area
- Walnut Creek Watershed Area
- Water
- Major Roads
- County Boundary

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The information shown on this map is compiled from various sources made available to us which we believe to be reliable.
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January 2012

Natural Features and Resources

The following information about natural features and resources in the Walnut Creek Watershed is excerpted from the 2010 Total Maximum Daily Loads for the Walnut Creek Watershed[8]:

> *The Walnut Creek watershed lies within the Central Lowland physiographic region exhibiting an undulating topography intermixed with extensive flat areas. The bedrock underlying the Walnut Creek watershed is acidic sandstone or shale. The Cuyahoga fine grained sandstone interbedded with shale is found west of the Perry county line to approximately Pickerington Road, where Berea sandstone bedrock appears. Though sandstone and shale comprise the bedrock of the watershed, the stream itself flows over a mix of relatively deep, fine-grained calcareous till and outwash deposits of Wisconsinan origin overlaying lacustrine clays of Illinoisan origin. The clay acts as an occluding layer directing ground water to move laterally to stream channels that have eroded down to the clay. The major associations, all formed in till, outwash and or alluvium, are Bennington-Cardington, Brookston-Crosby, and Cardington-Bennington-Marengo.*
>
> *Surface soil deposits in the Walnut Creek basin are primarily Wisconsinan ground and end moraines overlying hardpan of Illinoisan origin. The former supplies gravel and cobble substrates to the streambed, and the later acts as a confining layer that supplies numerous ground water seeps to the stream. This combination of gravel-cobble substrates and sustained baseflow ameliorates the embedding silt and sand that tend to pervade intensively cropped drainages, Walnut Creek included.*

These geological traits contribute significantly to the high quality of water within Walnut Creek and its tributaries, helping to explain the 78 percent attainment of its designated aquatic life use. Water quality has improved to the extent that Ohio EPA recorded the presence of the spotted, tippecanoe, and state endangered bluebreast darters for the first time. These improvements in water quality are directly related to the cleanup of point source pollution. To protect and improve further on these water quality gains, it will be important to protect existing flood plains and greenways corridors as well as reduce the impacts from both agricultural runoff and urban storm water.

Like many of the streams in central Ohio, Walnut Creek and its floodplain are benefitting from the development of greenways corridors. These greenways and their associated trails help connect communities to the stream and provide opportunity for recreation and enjoyment of the water. Many of these trails have been developed in association with the Metro Parks found within the watershed. Pickerington Ponds is connected with the neighboring Blacklick watershed greenways trail and there is a new trail connecting Groveport with the latest Metro Park, Walnut Woods.

As previously noted in the Land Use section, several Metro Parks grace the Walnut Creek Watershed; Pickerington Ponds, Slate Run, Chestnut Ridge, and the new Walnut Woods. Each of these parks protect unique and critical natural areas within the watershed and provide valuable recreational opportunities that attract boaters, fishers, wildlife-lovers, hikers and more to the region.

In addition to the parklands located within the watershed, forest cover is also abundant near the waterways and within the riparian areas of the Walnut Creek Watershed. The Ohio Department of Natural Resources (ODNR) states that 31 percent of Ohio is forested; however, the majority of those resources are located in south and southeastern Ohio. According to the National Land Cover Dataset, approximately 14

[8] Excerpted from Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water.

percent of the entire Walnut Creek watershed is categorized as forested.[9] The Walnut Creek main stream riparian critical canopy coverage is 19%.[10] Woodlands are an important natural resource for a variety of reasons. They provide habitat for wildlife and rich recreational opportunities. They also serve the important function of cleaning our air and sequestering carbon, which would otherwise detrimentally impact our health and environmental well-being, from our atmosphere. Forests also permit greater water infiltration and pollution control. See the woodland and tree canopy protection tool on page 66 of this plan for more information on the economic benefits of this vital natural resource and the assessed monetized value.

The Walnut Creek Watershed, like much of Ohio, is fortunate to be home to fertile agriculture lands, producing vital crops like corn and soybeans. These fertile soils are essential to our local food economy. With an increased interest in local foods and a growing population in central Ohio, the value of fertile soils as a natural resource and asset that supplies a growing population with food is apparent.

Sanitary Sewer Infrastructure

Sewer infrastructure is a critical factor in determining areas suitable for development. Wastewater treatment is also a necessary consideration when addressing impacts to the health and quality of the Walnut Creek watershed. Planning for sewer service is part of the State's *208 Water Quality Management Plan.*[11] The following section describes the current sanitary sewer infrastructure in the Walnut Creek watershed. See page 27 for more information about future sanitary sewer infrastructure planning and projects and page 98 for using the 208 Plan as an implementation tool.

Most of the sewer infrastructure is concentrated in the developed north central portion of the study area with smaller sewer served areas in the villages of Baltimore, Ashville, and South Bloomfield. The Northwest corner of Fairfield county has several overlapping planning boundaries that have been the source of past conflict during the high growth period from 2000-2008. Fairfield County Utilities, Columbus, Pickerington, and Canal Winchester all provide sewer treatment services in this area. Canal, Pickerington, and the County have been working hard over the past few years to find agreement over service and planning boundaries that make sense from both economical and engineering perspectives. Most of the areas that still need agreement are in the overlap area between Canal Winchester and the Fairfield County Little Walnut Service Area. This entire area is within the bounds of the city of Columbus' Regional Facility Planning Area. According to the Fairfield County entities the City of Columbus has not wanted to be included in discussions of this area.

The Village of Ashville's waste water treatment plant is at or near capacity. The village is in the process of completing a facility study concerning updating and expanding the system. The villages of Baltimore and South Bloomfield have upgraded their waste water treatment plants in recent years and have capacity for growth.

Transportation

The planning area was once bisected by a major piece of transportation infrastructure: the Ohio and Erie Canal. This canal fell out of favor in the

[9] Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water.
[10] Source: Richard Miller, Canal Winchester Urban Forester (2010)
[11] Additional information about the *208 Water Quality Management Plan* including sewer service areas and local sewer prescriptions can be found at Ohio EPA's website: http://www.epa.ohio.gov/dsw/mgmtplans/208Final2006Plan.aspx

late nineteenth century and was eventually abandoned in the early twentieth century. Today, no major road bisects the planning area in the same way. All major routes, road and rail, facilitating travel and goods movement in and through the planning area radiate out from the middle of Franklin County. U.S. 33 may be the most important roadway for much of the planning area. Recent roadway upgrades have converted much of the route to a limited access expressway. Though a few intersections remain in the planning area, these improvements help provide a valuable link from southeast Ohio and Appalachia, through the planning area, to Columbus and points beyond via connections to the Interstate Highway System. In much the same way, State Route 256 connects the northern portions of the planning area to Interstate 70; U.S. 23 connects southern Ohio, through the far western portion of the planning area, to Interstate 270. While the value of these major routes through the planning area is clear, it is the county, township, and municipal roads that complete the roadway network by providing access to almost all destinations in the planning area.

Three public transit agencies use this roadway network in the planning area. Lancaster Public Transit System (LPTS) runs a demand response system in Fairfield County. “Demand response” refers to a system that dispatches transit vehicles to a destination upon request instead of a fixed schedule. Pickaway Area Rural Transit (PART) offers a similar demand response system in Pickaway County. The Central Ohio Transit Authority (COTA) is the most extensive transit system in the area. However, its coverage of the planning area is limited. Express routes offer morning and evening service for working commuters. Local and crosstown routes offer more frequent service with more frequent stops. Two express routes begin at points in Canal Winchester and stop at different points in Franklin County on the way to downtown Columbus. One crosstown route reaches the Rickenbacker area.

CSX and Norfolk Southern (NS) are the two dominant Class I railroads east of the Mississippi. Both have tracks that run through the planning area. NS has two lines through the planning area, including the Heartland Corridor, which has the capacity to carry doublestack container loads to and from ports of Virginia. Historically, a variety of businesses took advantage of direct access to rail for goods movement. However, many of those spurs and sidings are gone, or are no longer maintained. The split up of Conrail between NS and CSX has hastened the removal of these access points as system speed and efficiency are higher priorities. Depending upon the business model, larger users or a single point serving a collection of significant users combining for more frequent shipping needs may still find direct rail access possible and practical, especially as the cost of trucking goods increases.

The Indiana & Ohio Central Railroad, part of the Rail America holding company, maintains a line that parallels U.S. 33 through much of the planning area from Columbus to Logan. Unlike CSX and NS lines, businesses may have a much easier time obtaining access to this short-line for goods movement as there is less through traffic demanding speed and efficiency.

Intermodal facilities are designed to transfer goods between rail and truck. The Rickenbacker Intermodal Facility makes this transfer between Norfolk Southern’s Heartland Corridor and commercial vehicles (trucks). Both the intermodal facility and the cargo-dedicated Rickenbacker International Airport nearby utilize major investments in local roadways that support goods movement and connect to the Interstate Highway System.

The Rickenbacker International Airport is operated by the Columbus Regional Airport Authority, along with Port Columbus International Airport and Bolton Field. The Air National Guard maintains a presence at the airport, which was once solely a U.S. Air Force

Base. Two approximately 12,000-foot long runways accommodate significant aircraft operations. Because the airport authority operates Port Columbus primarily for passenger service, Rickenbacker can remain oriented to cargo traffic.

Economy and Employment

The Walnut Creek watershed includes an area of the region that includes a mixture of land uses and employment locations. In addition to the commercial retail establishments that serve local residents, the area contains the Rickenbacker Airport and surrounding Global Logistics Park, as well as development along the U.S. 33 corridor.

Although the military maintains a presence at Rickenbacker Airport, the dominant use is warehousing and an international freight distribution center. The 130 acres site can accommodate approximately 29 million square feet of storage and it is equipped with rail, air, and highway access for intermodal transport of goods. With its foreign trade zone status and its proximity to the Heartland Corridor rail line, this facility is expected to funnel hundreds of thousands of containers from the Norfolk shipyards that connect the U.S. with Asia through the expanded Panama Canal, as well as accommodate European and African trade by way of trans-Atlantic east coast seaports, such as New York. This facility is truly international in scope, and serves as a major national logistics center. In addition, hundreds of acres around Rickenbacker are either developed as or zoned for warehousing activities.

In addition, the US 33 corridor traverses the area on a southeasterly diagonal route and a significant amount of coordination is being made between the city of Canal Winchester and Violet Township in Fairfield County to attract limited manufacturing jobs and supporting offices to the area. A mid-sized hospital is planned for this corridor which will undoubtedly spin off additional medical related services.

The area also has several major commercial corridors that serve the approximate 56,000 people that live in the watershed. A large commercial node is developing at Gender Road and U.S. 33. This interchange serves the growing Canal Winchester and Lithopolis areas. Further east, S.R. 256 is a primary commercial artery that serves the Pickerington area. Southeast Franklin and Northwest Fairfield Counties continue to be attractive areas for residential growth. Commercial services are expected to expand along with the population.

There are currently approximately 19,000 jobs currently located within the watershed. Retail, education and transportation industries, are the predominant employment sectors. Table 3 is a display of the percentage of employment by industry sector.

Table 3: 2010 Employment Profile of the Walnut Creek Watershed

Industry	% of Employment
Manufacturing	4%
Wholesale	8%
Retail	30%
Transportation	15%
Communications	0%
Finance, Insurance & Real Estate	3%
Service	6%
Education	21%
Medical	4%
Government/Non-Profit	3%

Source: 2009 QEW Employment File, Ohio Jobs and Family Services

MORPC prepares forecasts of employment for transportation planning purposes. It uses a land use model to distribute growth based on availability of transportation facilities and

utilities, environmental sensitivity of the land, economic incentives being offered, and land uses as anticipated from local land use plans. The forecasts were developed for a 25 year period, using 2010 as the base year and 2035 as the planning horizon year. Projections include an additional 25,000 jobs in the area by 2035. High growth areas include the Rickenbacker area and the U.S. 33 corridor.

While the Rickenbacker area is projected to add substantial amounts of development to accommodate the increase freight movement this industry is not employment intensive. It is however evolving as an international distribution and logistics industry hub and will continue to impact the transportation system and character of the type of development that occurs in the vicinity.

Much of the employment growth is expected along the U.S. 33 corridor where a new mid-sized hospital is expected to generate additional supporting medical services. Communities along the corridor have established Cooperated Economic Development Agreement, commonly referred to a as a CEDA. This agreement formally puts forward cross jurisdictional standards to ease the bureaucracy for development.

Table 4 is a listing of the amount of new employment growth expected in the area and Map 5 is a map of anticipated high growth areas.

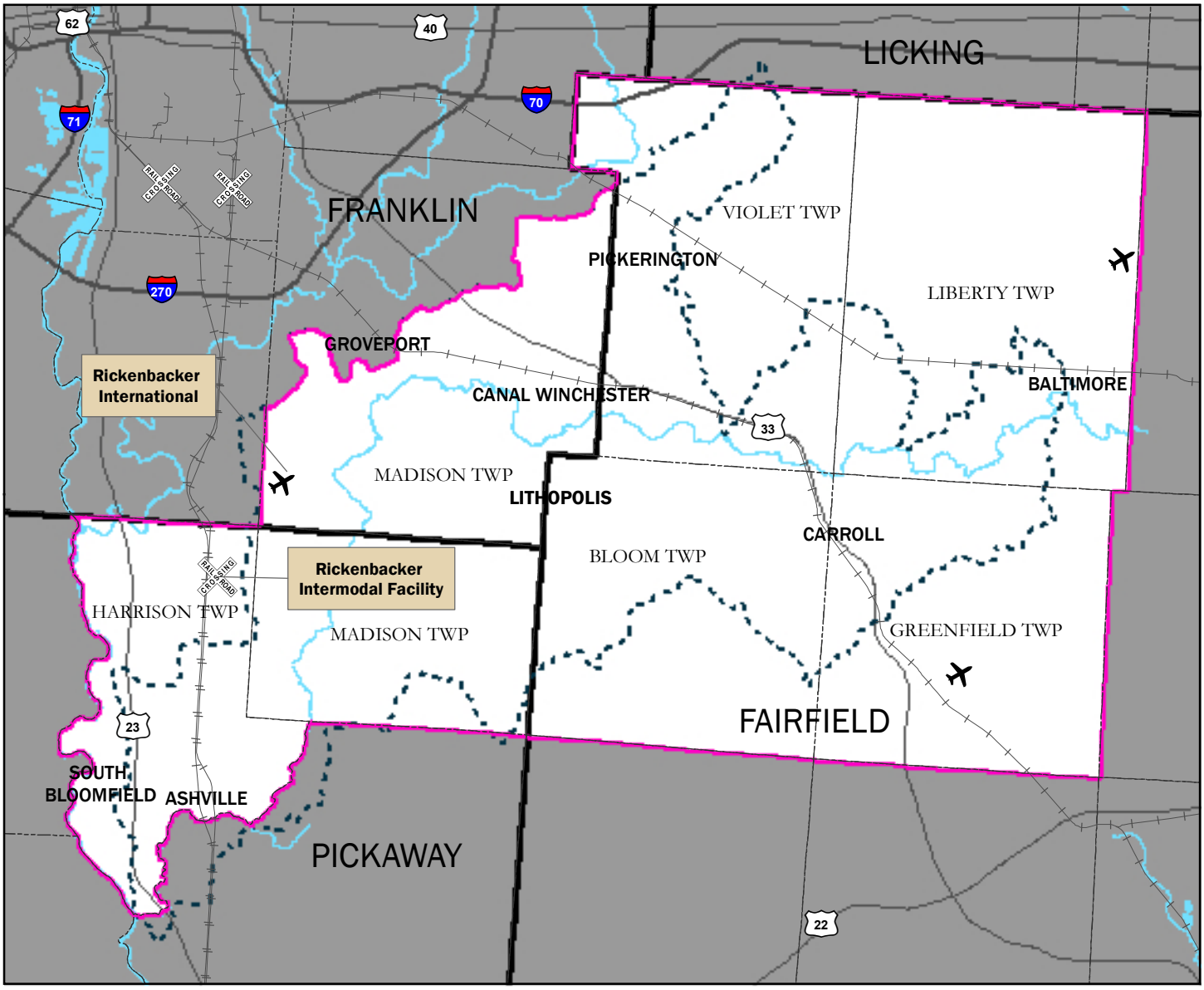
Table 4: 2009- 2035 Employment Forecasts of the Walnut Creek Watershed

	2010	2035	Change	Percent Change
Total Employment	19,485	44,511	25,026	128%
Office Employment	2,347	5,721	3,374	144%
Retail Employment	6,308	10,183	3,875	61%
Industrial Employment	5,021	11,301	6,280	125%
Other Employment	5,809	17,306	11,497	198%

Source: MORPC 2035 Metropolitan Transportation Plan

Walnut Creek Watershed

Transportation



Legend

- Walnut Creek Analysis Area
- Outside of Planning Area
- Walnut Creek Watershed Area
- Airport
- Intermodal Yard
- Railroad
- County Boundary
- Township Boundary
- Major Roads
- Water

N

0 3 6 Miles

The information shown on this map is compiled from various sources made available to us which we believe to be reliable.
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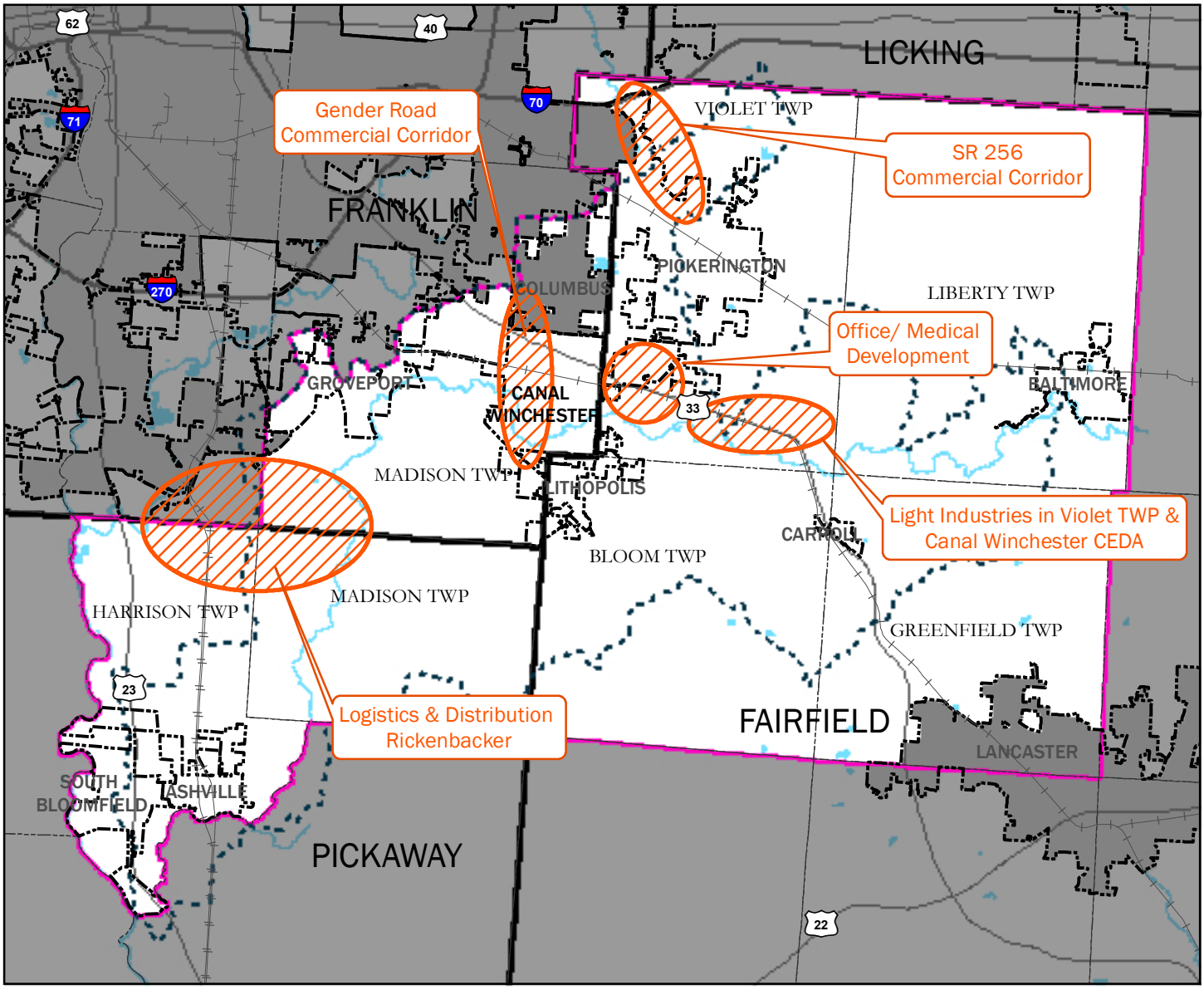
Walnut Creek Watershed

High Employment Growth Areas



Legend

- Walnut Creek Analysis Area
- Outside of Planning Area
- Emplyoment Growth Areas
- Railroad
- Major Roads
- Water
- Walnut Creek Watershed Area
- County Boundary
- Township Boundary
- Cities

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The information shown on this map is compiled from various sources made available to us which we believe to be reliable.
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January 2012

FUTURE CONDITIONS

Table 5. Population Projections for the Walnut Creek Planning Area

	Jurisdiction	Population in Planning Area 2010	2035	Change
Franklin Co.	Canal Winchester	6,055	8,579	2,524
	Columbus	10,625	13,765	3,140
	Groveport	2,165	2,885	720
	Hamilton Township	666	656	-10
	Lithopolis	26	77	51
	Madison Township	1,863	6,654	4,791
	Obetz	102	323	221
	Pickerington	83	137	54
	Sub-Total	**21,585**	**33,076**	**11,496**
Fairfield Co.	Baltimore	610	842	232
	Bloom Township	3,984	10,605	6,621
	Canal Winchester	1,114	2,190	1,076
	Carroll	475	610	135
	Greenfield Township	1,457	3,574	2,117
	Liberty Township	691	1,715	1,024
	Lithopolis	812	3,069	2,257
	Pickerington	8,267	12,933	4,666
	Violet Township	9,882	18,608	8,726
	Sub-Total	**27,292**	**54,146**	**26,854**
Licking Co.	Etna Township	138	217	79
	Sub-Total	**138**	**217**	**79**
Pickaway Co.	Ashville	3,694	6,691	2,997
	Harrison Township	1,157	2,033	876
	Madison Township	1,195	1,191	-4
	South Bloomfield	637	875	238
	Walnut Township	300	315	15
	Sub-Total	**6,983**	**11,105**	**4,122**
Watershed Total		**55,998**	**98,544**	**42,546**

Population Growth

Portions of the planning area are expected to experience strong population growth over the next 25 years. The population of Fairfield County within the Walnut Creek planning area is projected to nearly double, from around 27,000 residents to over 54,000 by 2035.

The table on this page shows the projected population changes within the planning area, including jurisdictions not participating in the WCPP. The 2010 population and 2035 projections are limited only to the areas within the Walnut Creek planning area, not the entire jurisdictions. Please note that the planning area is limited to the six contiguous 12 digit HUCS described in the *Territory Boundary and Size* section of the plan (page 10) and depicted in Map 1.

The data is organized to show growth trends across different segments of the watershed. While population growth is expected in most Walnut Creek communities, the trend will be most pronounced in Fairfield County. MORPC uses county level population projections by the Ohio Department of Development (ODOD) through the year 2035. MORPC allocates the ODOD-projected population increases to quarter mile square grids within each county based on local land use plans and other economic and environmental factors. This allocation process results in localized population projections based on the best available data.

Sanitary Sewer Infrastructure

To protect water quality and promote the efficient use of infrastructure, future development should be prioritized in areas that will have access to sanitary sewer service infrastructure. Below is a summary of some notable sewer infrastructure projects and developments in the watershed. See Map 6 for an illustration of current and projected sewer service areas.

FRANKLIN COUNTY

Waste water treatment for the Franklin County portion of the watershed is provided primarily by two entities, the City of Columbus and the City of Canal Winchester. Columbus provides service to the Village of Groveport and Canal Winchester has its own waste water treatment plant. Future plans by both Groveport and Canal Winchester show overlaps in service in the area between these two communities. These overlaps will need to be worked out before service can be extended to this area.

The City of Columbus is constructing a large sewer interceptor to provide service to the Rickenbacker Intermodal yard in Southern Franklin County and Northern Pickaway County. The sizing of this pipe insures the availability of sewer capacity for dense development in the area.

PICKAWAY COUNTY

The Village of Ashville shares a planning boundary with the Village of South Bloomfield. They have a Cooperative Economic Development Agreement (CEDA) that covers the areas north of the villages to Duvall Road. The original agreement went all the way to the Pickaway/Franklin County line but was super ceded by the JEDD agreement around Rickenbacker. This CEDA demarcates the expansion areas for each village and is being used as the FPA boundary for each.

The Village of South Bloomfield will provide planning for the area between the Scioto River and Ashville's planning boundary north to Duvall Rd and the JEDD boundaries. They are also in discussions with Ashville about providing service North of SR 752.

FAIRFIELD COUNTY

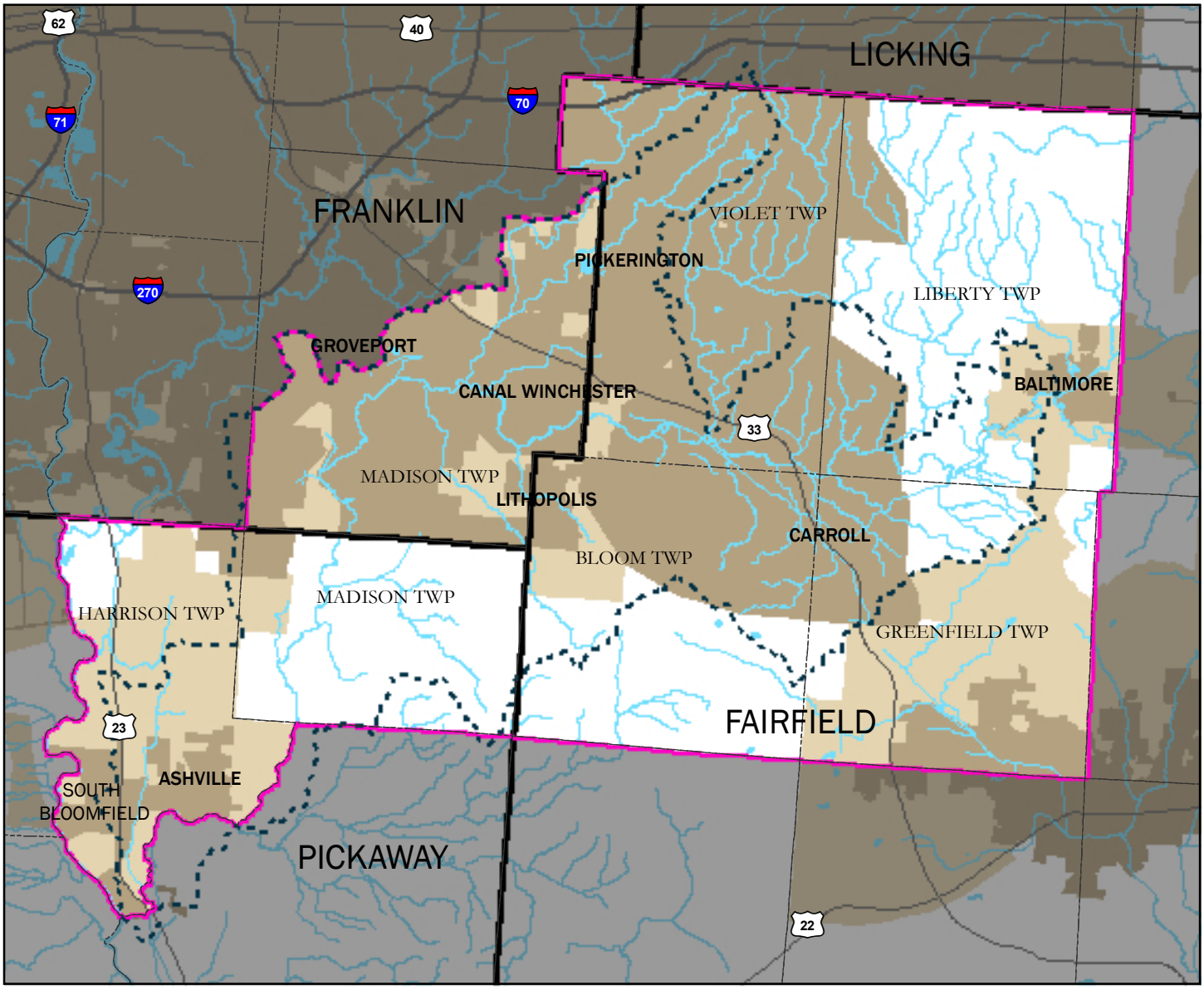
Pickerington is currently working on updating their utility plan. The City has negotiated agreements with both Fairfield County and Canal Winchester that have nearly eliminated overlapping planning boundaries. Some of the negotiations are intended to simplify billing because residents currently receive water from one entity and sewer service from the other. The remaining parcels have joint agreements based upon how and when the parcels are developed. They could be served by either entity depending upon who is closer with infrastructure.

Pickerington has also negotiated with Canal Winchester for Canal to provide service on the south side in their common growth area.

Lithopolis has a contract with Canal Winchester for sewer service. Renewal and details of this contract have been a source of conflict between both municipalities for several years but progress has been made recently with most of the details worked out. Final approval by elected officials is pending. The new 10 year agreement will expand Lithopolis' growth area. The eastern portion of this area is within the overlap planning area between Canal Winchester and Fairfield County. The mayor of Lithopolis has indicated that this area will be served directly by either the County or Canal Winchester when and if it is ever developed. The northwest portion of Lithopolis' growth area is a cooperative area that is still under discussion with Canal Winchester. The ultimate service provider for this area will depend on when and how the land is developed.

Walnut Creek Watershed

Sewer Service Area



Legend

- Walnut Creek Analysis Area
- Outside of Planning Area
- Walnut Creek Watershed Area
- Current Sewer Service Area
- Future Sewer Service Area
- Water
- County Boundary
- Township Boundary
- Major Roads

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The information shown on this map is compiled from various sources made available to us which we believe to be reliable.
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January 2012

Canal Winchester has experienced tremendous growth in the last decade and has been negotiating with surrounding communities to determine boundaries for sewer service areas as they work on updating their plan. Many of those negotiations are mentioned above with Lithopolis and Pickerington. Canal Winchester has also been in ongoing talks with Fairfield County Utilities to establish service boundaries on the east side of the village especially in the Hill Road area.

There is some overlap to the west with Groveport also. Groveport is a Columbus Contract community.

Fairfield County owns and operates several facilities around the county that include both water and sewer. The Tussing Road service area includes most of Violet Township and portions of Pickerington. The County is in the process of or has worked out agreements with the City of Pickerington in this area to trade areas of service for ease of billing as many homes and businesses along the border receive water from one entity and sewer from the other.

The County has expressed a willingness to adjust service boundaries if agreement can be found between Canal Winchester, Pickerington, and themselves for how best to serve the areas based on topography and economic considerations.

The Village of Baltimore has recently updated their plant with a design that allows for growth. The Village was under EPA findings due to overflows. They have had no overflows since the improvements were completed. The service boundary is the corporation.

Transportation

MORPC is the Metropolitan Planning Organization (MPO) for Columbus and some of its suburbs. This means that MORPC is responsible for carrying out a continuous, cooperative, and comprehensive (3C) transportation planning process for the Columbus urbanized area. MORPC's transportation planning area includes Franklin and Delaware Counties, Etna Township and the City of Pataskala in Licking County, and Bloom and Violet Townships in Fairfield County. As part of the 3C transportation planning process, MORPC prepares a Transportation Improvement Program (TIP) that covers a four-year planning cycle and is updated every two years.

The Ohio Department of Transportation (ODOT) carries out the 3C planning process in the areas of the state that are not served by an MPO. In the Walnut Creek Watershed planning area, the TIP for Pickaway county is prepared by ODOT District 6 and the TIP for the portions of Fairfield County outside of the MORPC MPO is prepared by ODOT District 5. The most recent TIP for the MORPC MPO and ODOT Districts 5 and 6 include projects scheduled for Fiscal Years 2012-2015 (July 1, 2012 – June 30, 2015). While there are various projects that reconstruct and maintain the existing transportation system, Table 6 provides a list of major capacity adding transportation projects that are planned for the Walnut Creek Watershed through June 30, 2015 and Map 7 shows the location of those planned projects within the watershed.

Table 6. List of major transportation projects planned for the Walnut Creek Watershed

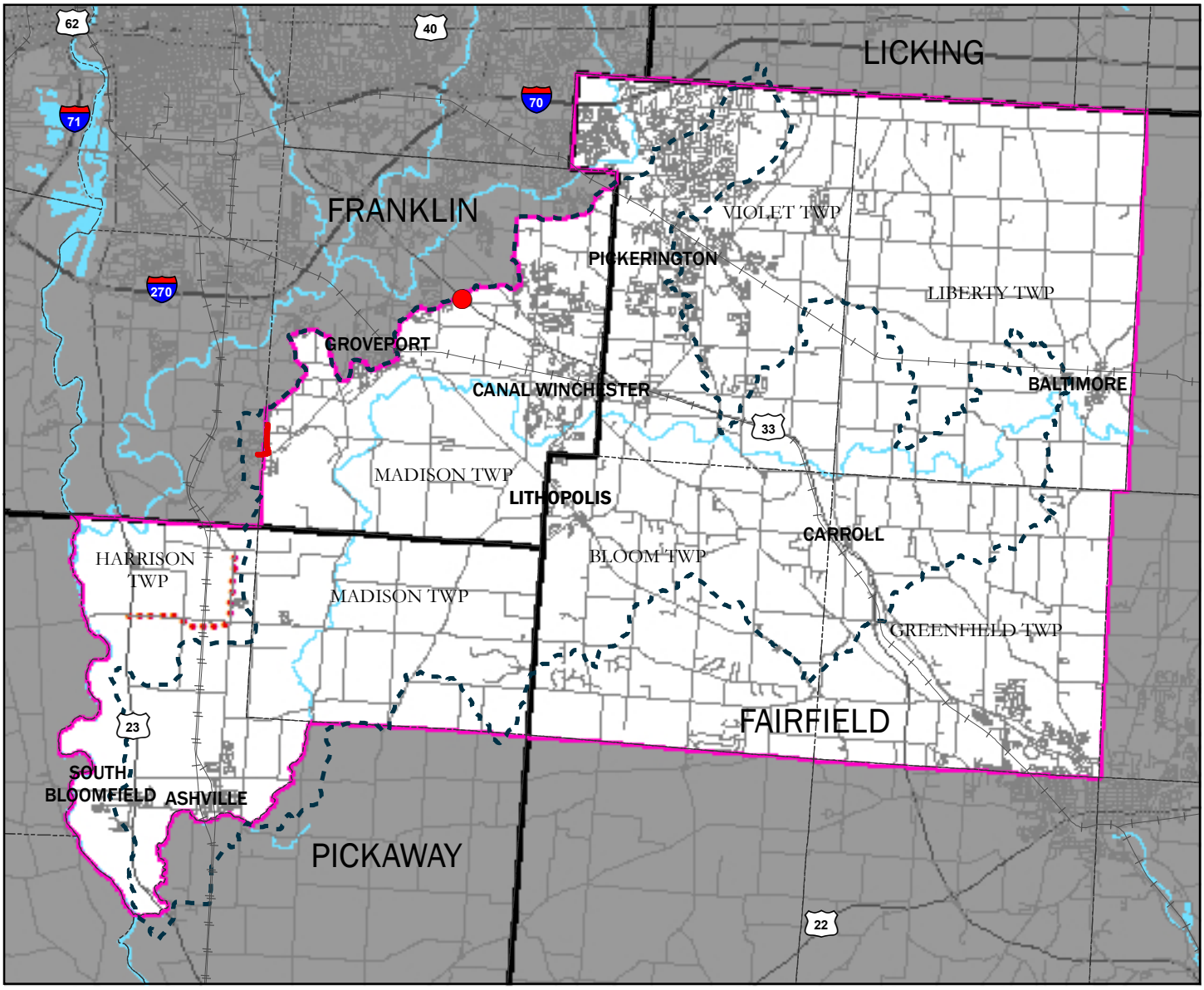
MORPC ID	ODOT ID	Project Description	Total Project Costs
562		US-33 at Bixby Rd, New Interchange	$39,592,000*
1882		Rickenbacker Pkwy (Phase 2B) from Second St to SR-317, Major Widening/Intersection Modification	$10,450,000
	83666	East-West connector between US-23 and Rickenbacker Port Authority	$43,600,000**

*Construction not part of TIP

**Construction not part of TIP

Walnut Creek Watershed

Major Transportation Projects



Legend

- Walnut Creek Analysis Area
- Outside of Planning Area
- Walnut Creek Watershed Area
- East West Connector
- Rickenbacker Pkwy
- US-33 at Bixby Rd Interchange
- County Boundary
- Township Boundary
- Major Roads
- Railroad
- Water

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January 2012

PRIORITY AREAS

About the Priority Areas

Priority Areas are areas that have been locally targeted for conservation, (re)development, or continued agricultural use. These activities are not limited to the Priority Areas or required within the designated Priority Areas. However, state incentives (see Incentives Inventory in Appendix B) will be available to encourage communities to make land use decisions that are consistent with their locally designated Priority Areas.

The WCPP designated Priority Conservation Areas (PCA), Priority Development Areas (PDA), and Priority Agricultural Areas (PAA) across the watershed. Early on in the planning process, the partnership drafted the following Priority Area definitions for the Walnut Creek Watershed Balanced Growth Plan:

Priority Conservation Area: An area designated by local communities for its ecological, cultural, recreational, or historical value and for the significant role these areas play in maintaining the integrity of the watershed. These areas are the focus of partnership efforts to protect, conserve, or restore because of the potential for negative impacts to the watershed due to land use change.

Priority Development Area: An area designated by local communities as a prime focus for development or redevelopment based on efficient use of infrastructure and the area's ability to accommodate development with minimal impact on the watershed in a manner consistent with our goal (see page 5 for goal).

Priority Agricultural Area: An area designated by local communities targeted for continued, expanded and/or intensified agricultural activities due to historical, cultural, natural or human-created traits which make it conducive to agricultural activities and associated practices that are in harmony with a quality watershed.

While protection of Priority Conservation Areas is critical, portions of sites with this designation may be appropriate for development. Engaging in conservation measures is not limited to the areas that are designated Priority Conservation Areas, nor does the designation of an area as a PCA preclude land use change and/or development. In fact, communities are strongly encouraged to consider conservation measures such as the tools included in this plan wherever they could be applied to allow growth in a way that is least harmful to the health of the watershed.

While development should be targeted to PDAs, portions of individual Priority Development Areas can and should be conserved. Many of the same conservation goals applicable to the watershed as a whole are relevant to more site specific locations. It is important to note that areas having the PDA designation often include a wide range of existing conditions, including sensitive natural areas and open space.

The designation of an area as a Priority Conservation Area does not mandate that the area be conserved through any law or regulation. Likewise, there is no requirement that Priority Development Areas be developed or that Priority Agricultural Areas continue to be farmed. As was communicated throughout the planning process, no laws or ordinances are created through this planning effort. Incorporation of the Priority Areas into a community's comprehensive plan is recommended but not required. Implementation

of the Balanced Growth Plan and any associated implementation tools is left to each community's discretion.

Criteria

The Priority Area maps are the result of both a watershed-wide technical analysis of objective criteria and a localized review process. The WCPP developed and adopted a list of criteria that were used to conduct the initial technical analysis. The criteria for identifying PCAs included features that the partnership considered important for determining the ecological, cultural, recreational, or historical value of a particular area. The PDA criteria included features that the partnership considered important for determining the development or redevelopment potential of an area. The PAA criteria list included features that the WCPP considered important for identifying areas conducive to continued agriculture and related practices.

The Partnership decided to use a simplified weighting system for the criteria analysis so that some features, like the 100-year floodplain, had more influence on the initial designation of Priority Areas than others. In two cases, criteria were included that were indicative of areas that should not be prioritized. For example, both stream buffers and the 100-year floodplain were included as inverse criteria for the Priority Development Area analysis. This means that points were subtracted from the Priority Development Area analysis totals for land that fell within the stream buffers and/or the 100-year floodplain, making those areas less likely to score high as potential Priority Development Areas.

The initial criteria analysis was conducted using ArcGIS software. Following the initial analysis, WCPP communities adjusted and refined the Priority Areas. MORPC assisted communities through this process.

The following section describes the criteria that were selected to initially highlight Priority Areas across the watershed. A technical description of the WCPP adopted criteria, including all data sources and weighting, is included in Appendix A.

PCA CRITERIA

Stream Buffer

Land along streams provides critical habitat for the plant and animal life of the watershed. When maintained in a natural way, these areas help protect surface water quality by intercepting, delaying, and filtering stormwater runoff.

100-Year floodplain

There is a one percent chance of a flood occurring in any given year within the 100-year floodplain. This area is mapped by the Federal Emergency Management Administration (FEMA). Land use change within the 100 year floodplain that results in increased impervious surface coverage can result in a greater possibility of flooding and decreased water quality from stormwater runoff and erosion.

Wellhead Protection Areas

The Ohio EPA has delineated protection areas around public and municipal groundwater wells. These areas were modeled based on the time it would take contaminants in the groundwater to travel to reach the wellfields. Within the 1-year wellhead protection area, potential contaminants in the groundwater could reach the wellfields within one year. It would take up to five years for potential contaminants within the 5-year area to reach the wellfields.

Natural Land Cover

The US Geological Survey (USGS) maintains data which shows the location of deciduous forests, grassland/herbaceous areas, evergreen forests, shrub/scrub areas, woody wetlands, and emergent herbaceous wetlands. Natural land cover along streams or riparian areas is important because it provides valuable wildlife

habitat and improves water quality by filtering out some of the contaminants in stormwater and agricultural runoff before the water reaches the streams.

Parks and Open Space

MORPC creates and maintains a standardized land use dataset based on the local community plans and zoning for its 12 county service area in central Ohio. This data would capture both existing parkland and also land that is planned or zoned to be used as a park in the future. The partnership wanted to include parks in the criteria list because these areas reflect local priorities for conservation. Conservation measures could be implemented in the future to improve water quality even in those parks which primarily serve recreational, rather than ecological, functions.

Wetlands

Wetlands provide valuable flood and stormwater storage, habitat for a number of plant and animal species, and a place to filter contaminants and sediments from stormwater or agricultural runoff. The data that was used for this criterion is the US Fish & Wildlife Service National Wetlands Inventory managed by the Ohio Department of Natural Resources which maps the location of wetlands based on data analysis and/or protection agency field surveys.

Habitats

The habitats data maintained by ODNR in their Natural Heritage Database contains information about locations where state and national-listed threatened and endangered species may have habitats. These areas are important to protect because they provide high-quality, unique ecosystems and support the continuing survival of threatened and endangered species.

Hydric Soils

The soils data used in this analysis collected and maintained by the USDA Natural Resources Conservation Service (NRCS). NRCS defines hydric soil as, “a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions on the upper part.”The presence of hydric soils indicates that wetland restoration would be possible.

Soil Permeability Score

The soil permeability score was calculated as a composite of slope, soil type, depth to groundwater, and distance to the stream because these factors all contribute to runoff. Areas scoring high using this index are important to consider for conservation efforts because of their ability to improve water quality and reduce runoff. These areas provide valuable ecosystems services which are costly and difficult to replicate if their natural functions are reduced or inhibited through land use change.

PDA CRITERIA

Major Roads

Close proximity to arterial and collector roads reduces the upfront development costs associated with connecting the site to the existing transportation network. On commercial sites, proximity to arterial roads can aid businesses by providing enhanced visibility and accessibility.

Airports

Proximity to an airport can provide alternative options for freight and passenger transportation.

Commercial & Industrial Land Use

MORPC creates and maintains a standardized land use dataset based on the local community plans and zoning for its 12 county service area in central Ohio. Areas that local plans have designated for office, commercial, industrial, or warehouse use would be captured by this criterion. These areas have already been locally identified as potential development and/or redevelopment sites and the OWPP included this information in the PDA criteria to reflect local priorities.

Freeway Interchanges

Freeways can provide high capacity access to and from development sites in the region and development near an interchange has better access to this system.

High Density Residential Land Use

This criterion includes areas that local community plans have designated for high-density residential use (eight or more dwelling units per acre). These areas have already been locally identified as potential sites for high-density development and were included in the PDA analysis to reflect local priorities.

Intermodal Freight Yard

Proximity to an intermodal freight yard can improve freight transportation access making these areas potentially more desirable for certain types of development like industrial or warehousing.

Public Transit

A walkable distance to public transit increases mobility options for workers and residents. Also, public transit access may reduce the overall parking needs of new development which could lower the ratio of impervious surface coverage on the site.

Sewer Service

Areas without sanitary sewer infrastructure are difficult to develop. They require additional upfront capital expenditures to provide independent service. The soils of the Walnut Creek watershed are not well suited for use as septic tank absorption fields, requiring additional controls on traditional home septic systems to ensure water quality.

Joint Economic Development District/Zone

One or more townships and one or more municipalities within the same or adjacent counties form a district to facilitate economic development within the specified area. A joint economic development district/zone may indicate intergovernmental agreement on the development of that area.

Community Reinvestment Areas

Community Reinvestment Areas are established to provide tax incentives for investing in real property improvements or new construction in areas where investment in housing has been discouraged.

Railroad

Proximity to rail lines can provide an alternative for freight transportation to and from a development site.

Urbanized Area

Developing in and near the urbanized area limits the cost of future public infrastructure extensions and public service delivery.

Improvement to Land Value Ratio in an Urbanized Area or Urbanized Cluster

A low improvement-to-land value ratio may indicate that the parcel is vacant or underutilized.

Stream Buffer (Inverse)

Development resulting in an increase in impervious surfaces near streams could negatively impact water quality. Development in these areas may also be more difficult to build due to setbacks included in subdivision regulations or other stormwater permitting processes.

100-Year floodplain (Inverse)

Development resulting in an increase in impervious surfaces within the 100-year floodplain could negatively impact water quality. Buildings within the floodplain are at greater risk of damage from flooding. Additional insurance is often required for financing, making development in these areas more costly.

PAA CRITERIA

Agricultural Easements

Agricultural easements are areas where landowners have sold or donated the development rights to their farm. By placing the land in easement, the landowner has indicated a desire to keep the land in agricultural production.

Agricultural Districts/Agricultural Security Areas

Agricultural Districts represent an individual farmer's intention to continue farming into the near term. This designation provides protection from some types of development-inducing actions. The OWPP decided to include both parcels that are enrolled in Agricultural Districts and parcels adjacent to Agricultural Districts on the PAA criteria list, giving enrolled parcels a higher weight. The rationale for including both was that farmland that is adjacent to protected farmland should also receive priority in future preservation decisions to ensure land use compatibility and preserve contiguous tracts of farmland.

Adjacent to Protected Farm Land

Farmland around protected farmland should receive priority in future preservation decisions to ensure continued land use compatibility and preserve contiguous tracts of farmland.

Prime Farmland

For the PAA criteria, the OWPP included Prime Farmland, Prime Farmland if well-drained, and Prime Farmland if well-drained and near surface drainage. The designation of prime farmland is based on soil type data that is collected and updated by the NCRS. Prime farmland was included in the PAA criteria because it is more likely to be productive farmland.

Agricultural Land Use

This criterion includes areas that local community plans have designated for agricultural use in the future. These areas have already been locally identified for continued agricultural use and were included in the PAA analysis to reflect local priorities.

Large Parcels

For this criterion, the OWPP included parcels greater than or equal to 50 acres in the PAA analysis.

Century Farms

Century farms have been maintained by the same family for at least 100 continuous years and are voluntarily registered with the Ohio Department of Agriculture.

Identifying the Priority Areas

The analysis area for the Walnut Creek Balanced Growth Plan extends beyond the boundaries of the six 12 digit HUCS included in the study. This is because several WCPP communities elected to have their entire jurisdiction included and mapped for this plan. In the cases that a community elected to have their entire community analyzed through the Walnut Creek Balanced Growth Plan mapping process, township or municipal boundaries were used; otherwise, the watershed boundary was used as the analysis area boundary.

As mentioned earlier, the maps are the result of both a watershed-wide criteria analysis and a local review of the maps by each of the 14 jurisdictions. The WCPP adopted the Priority Area criteria list and weighting in February 2011. In August 2011, MORPC distributed draft criteria analysis maps to each of the watershed communities. MORPC met with partnership representatives from each of the participating communities to initially distribute the draft maps and explain the review process. After the initial distribution, MORPC followed up with each of the communities to determine if additional assistance was needed. MORPC staff continued to meet with individuals or groups of staff to present the draft maps and work through the local review process with the communities.

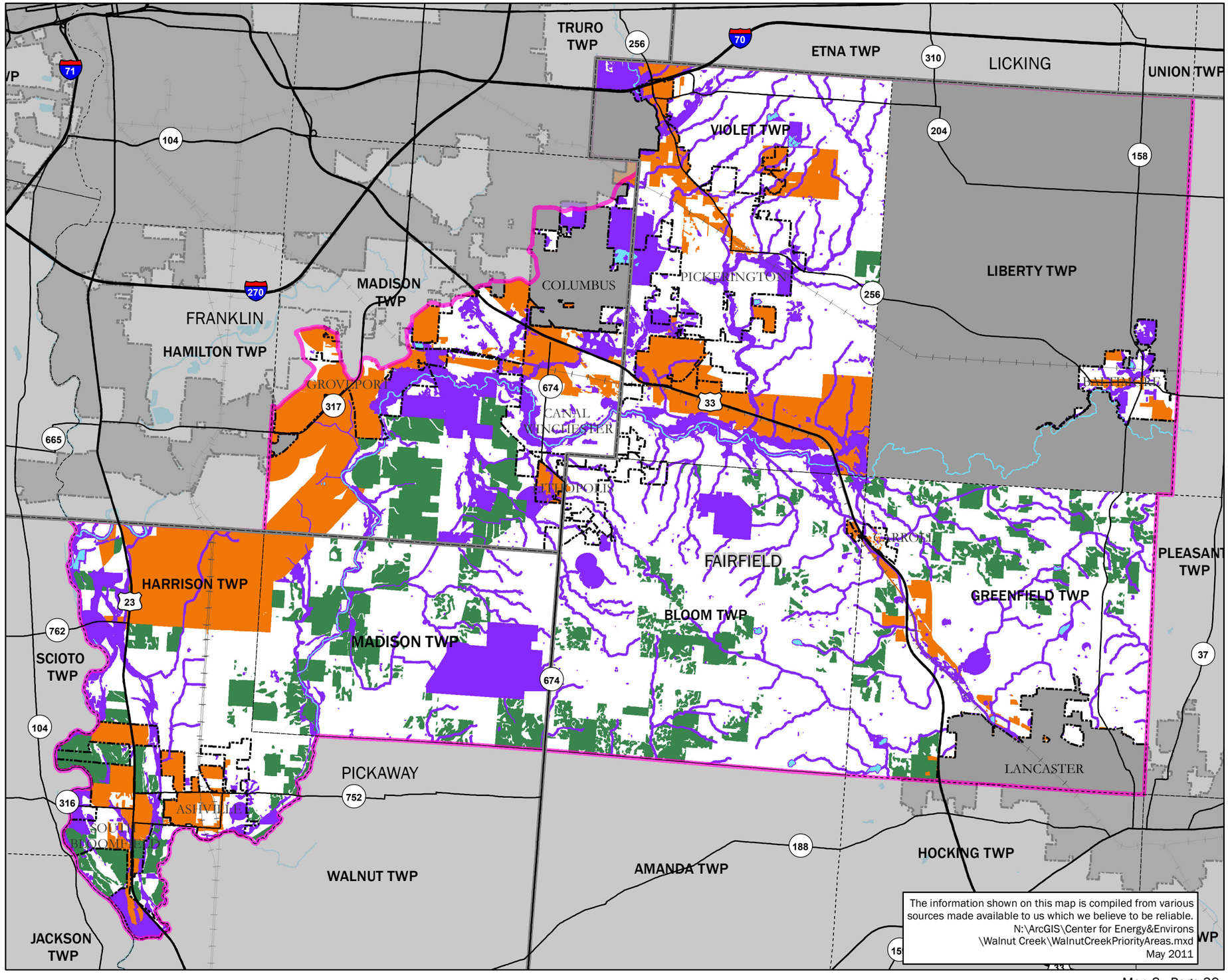
MORPC also provided draft maps to stakeholders and facilitated discussions about Priority Areas between stakeholders and jurisdictions when requested. Following a detailed review of the first round of draft maps, MORPC incorporated the suggested changes and distributed the updated maps to the Walnut Creek Planning Partnership.

WALNUT CREEK WATERSHED PRIORITY AREA MAPS

Priority Areas designated across the entire planning area are shown on page 39. The following four pages show the same Priority Areas at a larger scale. These maps show the Northwest, Northeast, Southeast, and Southwest sections of the planning area.

Walnut Creek Priority Areas

- Priority Agricultural Area
- Priority Conservation Area
- Priority Development Area
- Walnut Creek Analysis Area
- Outside Analysis Area
- Did not Participate
- County Boundary
- Historic Township Boundary
- City/Village
- Water
- Railroad
- Interstate
- US Route
- State Route



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May 2011

Walnut Creek Priority Areas

Northwest Quadrant

- Priority Agricultural Area
- Priority Conservation Area
- Priority Development Area
- County Boundary
- Walnut Creek Analysis Area
- Outside Analysis Area
- City/Village
- Historic Township Boundary
- Railroad
- Water
- Interstate
- US Route
- State Route
- Ramp
- County Road
- Township Road
- Municipal Road
- Connector
- Private Road
- Park Road

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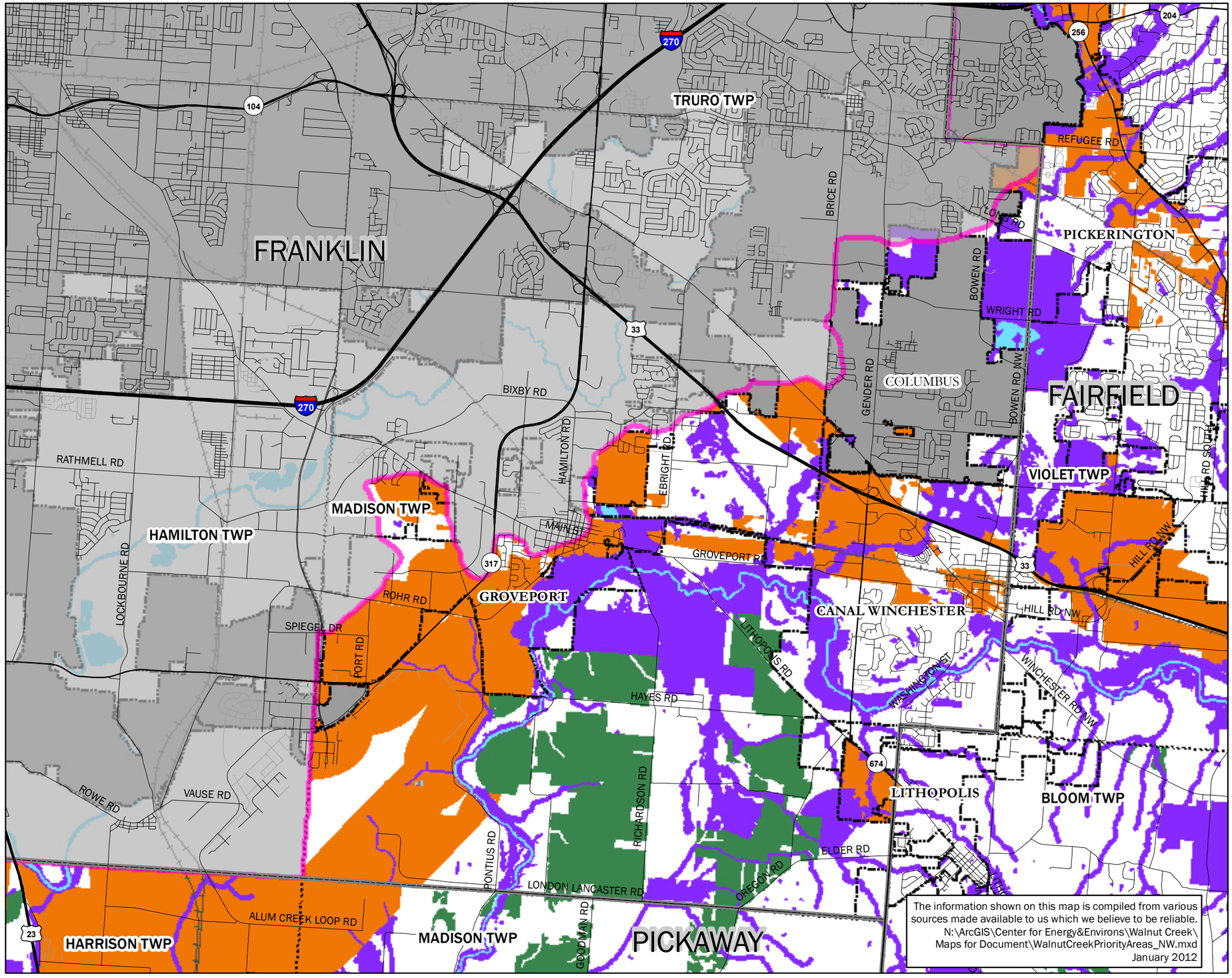

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January 2012

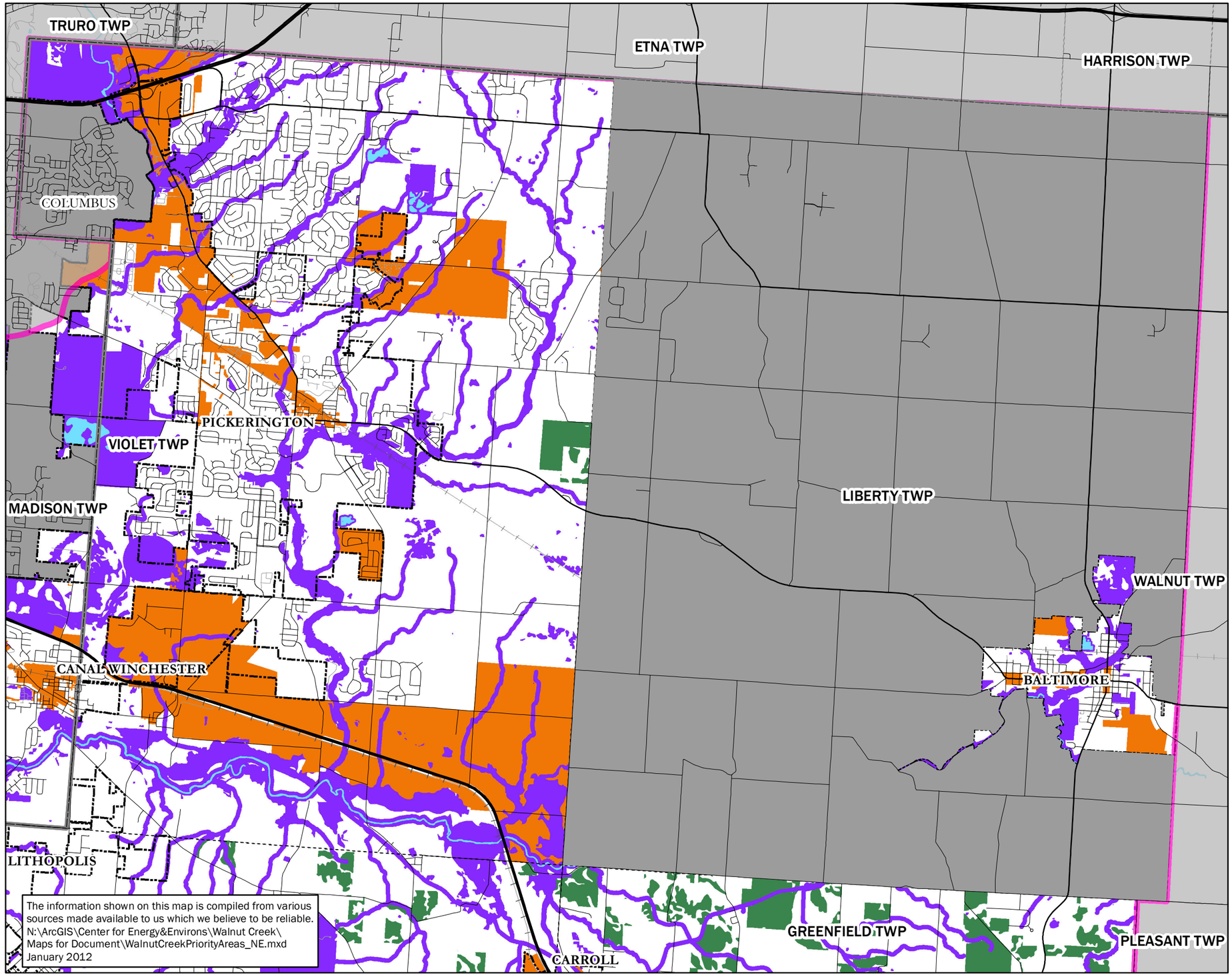
Walnut Creek Priority Areas

Northeast Quadrant

- Priority Agricultural Area
- Priority Conservation Area
- Priority Development Area
- Walnut Creek Analysis Area
- Outside Analysis Area
- Did not Participate
- City/Village
- Historic Township Boundary
- County Boundary
- Water
- Railroad
- Interstate
- US Route
- State Route
- Ramp
- County Road
- Township Road
- Municipal Road
- Connector
- Private Road
- Park Road

N

0 0.9 1.8 Miles



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January 2012

Walnut Creek Priority Areas

Southeast Quadrant

- Priority Agricultural Area
- Priority Conservation Area
- Priority Development Area
- Walnut Creek Analysis Area
- Outside Analysis Area
- County Boundary
- Historic Township Boundary
- City/Village
- Did not Participate
- Water
- Railroad
- Interstate
- US Route
- State Route
- Ramp
- County Road
- Township Road
- Municipal Road
- Connector
- Private Road
- Park Road

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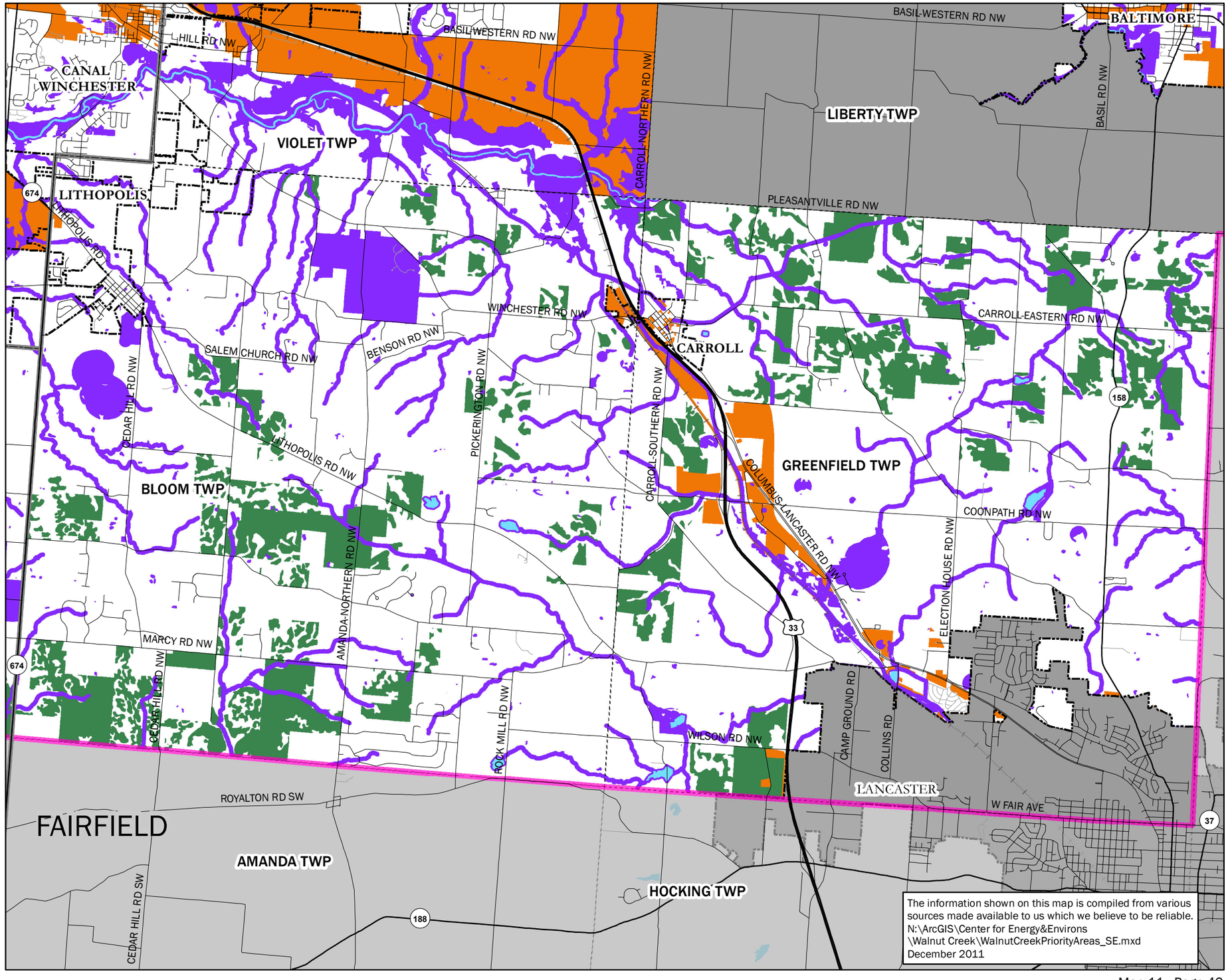

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December 2011

Walnut Creek Priority Areas

Southwest Quadrant

- Priority Agricultural Area
- Priority Conservation Area
- Priority Development Area
- Walnut Creek Analysis Area
- Outside Analysis Area
- City/Village
- Historic Township Boundary
- County Boundary
- Water
- Railroad
- Interstate
- US Route
- State Route
- Ramp
- County Road
- Township Road
- Municipal Road
- Connector
- Private Road
- Park Road

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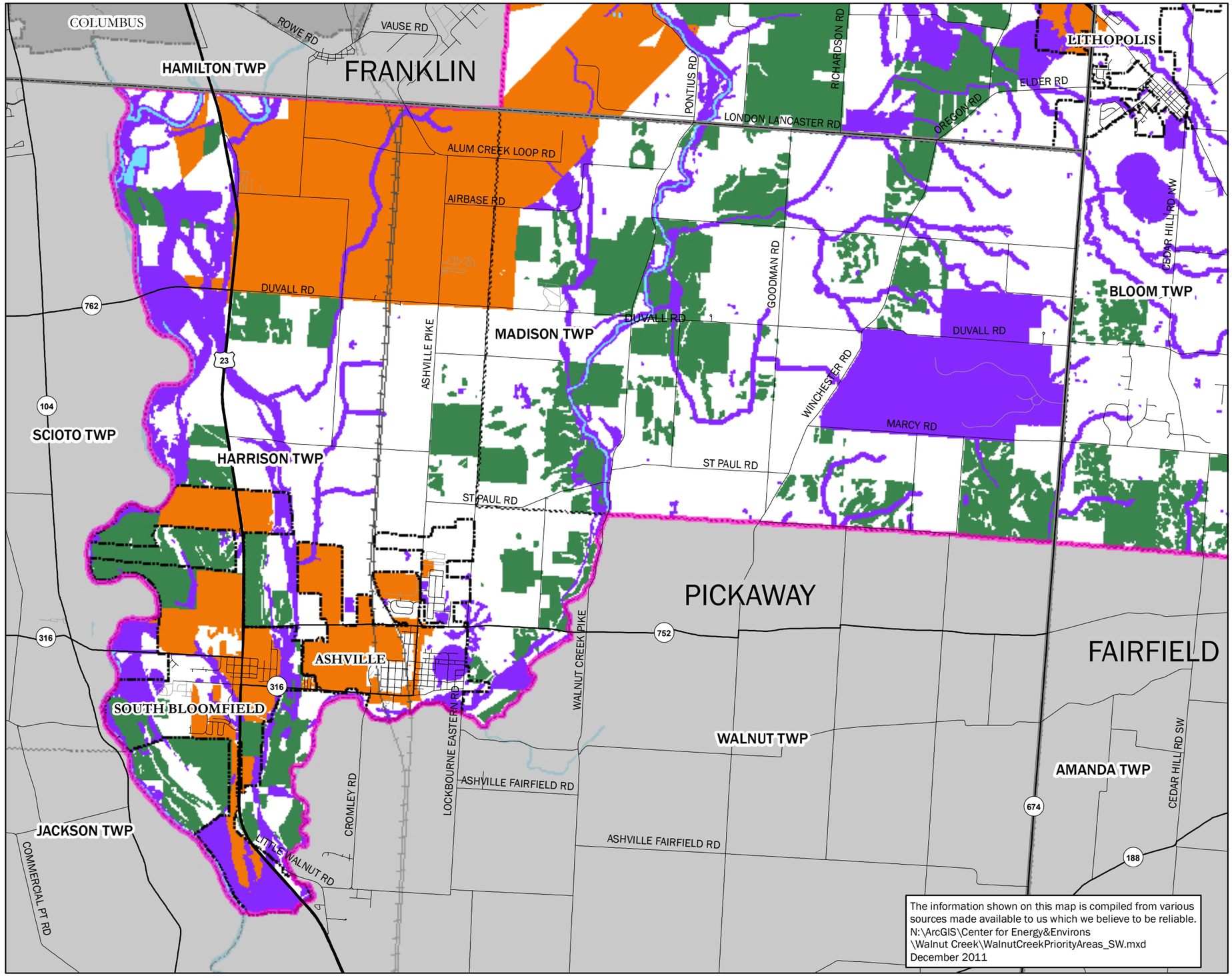

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\Walnut Creek\WalnutCreekPriorityAreas_SW.mxd
December 2011

IMPLEMENTATION

Recommendations

Most land use decisions in Ohio are made at the local level. Therefore, local governments play a vital role in the protection of water quality and the efficient use of land, natural resources, and infrastructure. MORPC recommends that communities consider the following actions for local implementation of the Walnut Creek Balanced Growth Plan:

1. Adopt the Walnut Creek Balanced Growth Plan.
2. Establish a local comprehensive plan if one does not exist for your community.
3. Update the community's local. comprehensive plan every five years.
4. Incorporate the designated Priority Areas into local community plans and zoning.
5. Integrate the recommended implementation tools (beginning on page 48) where applicable and appropriate.
6. Continue participating in the Walnut Creek Planning Partnership.

Cooperation Between Jurisdictions

A key element to the success of the Walnut Creek Balanced Growth Planning effort was the cooperative work of the communities and stakeholders in the WCPP. This continues to hold true for the future success of implementing the plan and enhancing the economic and environmental health of the Walnut Creek Watershed. This plan recommends that interested parties maintain the WCPP and its cooperative efforts following adoption of the plan for the purposes of implementation, cross-jurisdictional coordination, and updates.

Implementation Strategies

The implementation strategies on the following page provide some additional guidance for continuing the work of the Walnut Creek Planning Partnership. These strategies are assigned a general time frame, ranging from short term (approximately one to two years), mid-term (approximately two to four years) to long term (four or more years). These time frames are goals and there is no requirement to implement the strategies or to do so within a specific time frame

Figure 1. Walnut Creek Watershed Balanced Growth Implementation Strategies

Implementation Strategy	Short Term	Mid Term	Long Term	Responsible Parties
Adopt the Walnut Creek Balanced Growth Plan				WCPP Communities
Establish a local comprehensive plan if one does not exist for your community				WCPP Communities
Update the community's comprehensive plan every five years				WCPP Communities
Incorporate the designated Priority Areas into local plans and zoning where applicable and appropriate				WCPP Communities
Integrate the recommended Implementation Tools into local plans and zoning where applicable and appropriate				WCPP Communities
Track implementation projects and submit progress reports to the OWRC				MORPC
Facilitate the continuation of the WCPP including organizing and hosting annual meetings				MORPC
Meet at least annually as a partnership to discuss implementation projects and other partnership updates				WCPP Communities, Stakeholders, and MORPC
Seek state endorsement of the Olentangy Watershed Balanced Growth Plan				WCPP Communities, Stakeholders, and MORPC
Seek grants to assist in funding Balanced Growth implementation				WCPP Communities, Stakeholders, and MORPC
Educate the public about the key planning concepts and implementation tools included in the Balanced Growth Plan				WCPP Communities, Stakeholders, and MORPC

State Endorsement

Following local adoption by WCPP communities, MORPC will seek state endorsement of the Walnut Creek Balanced Growth Plan. To be eligible for endorsement by the Ohio Water Resources Council, the Walnut Creek Balanced Growth Plan will need to be adopted by 75 percent of the Walnut Creek Watershed Planning Area communities (see page 3 for more information about partnership formation). In addition, at least 75 percent of the total watershed planning area population and land area must be represented by the endorsing communities. The following table provides more detailed information about the land area and population breakdown by jurisdiction.

Table 7. Population and Land Area in Walnut Creek Watershed Planning Area by Jurisdiction

Jurisdiction	Population in Watershed (2010)	% of Watershed Population	Area in Watershed (Acres)	% of Watershed Land Area
Village of Ashville	3,694	8.5%	1,509	2.0%
Village of Baltimore	610	1.4%	244	0.3%
City of Canal Winchester	7,169	16.5%	4,787	6.3%
Village of Carroll	475	1.1%	202	0.3%
City of Groveport	2,165	5.0%	2,253	3.0%
Village of Lithopolis	838	1.9%	1,292	1.7%
City of Pickerington	8,350	19.2%	2,766	3.6%
Village of South Bloomfield	637	1.5%	1,155	1.5%
Bloom Township (Fairfield County)	3,984	9.2%	12,919	16.9%
Greenfield Township (Fairfield County)	1,457	3.4%	6,347	8.3%
Harrison Township (Pickaway County)	1,157	2.7%	5,526	7.2%
Madison Township (Franklin County)	1,863	4.3%	12,636	16.6%
Madison Township (Pickaway County)	1,195	2.7%	14,307	18.8%
Violet Township (Fairfield County)	9,882	22.7%	10,290	13.5%
Total	43,476	100	76,233	100%

Source: US Census Bureau, 2010

Continuing the WCPP Following Endorsement

This plan recommends that the WCPP continue to meet at least annually following endorsement. Provided that funding can be secured, MORPC will host and facilitate the annual WCPP meetings. These meetings will provide partners with the opportunity to share information about implementation projects with fellow partners. Each partner community and all stakeholders will be invited to attend the annual meeting where the partnership may share updates in a discussion format.

MORPC will record the meeting and create a meeting summary to distribute to the WCPP. MORPC will also prepare and submit progress reports regarding implementation of the Walnut Creek Balanced Growth Plan to the OWRC. While the meeting format will be discussion-oriented and the partnership will be encouraged to share matters they feel are relevant to the Balanced Growth Planning effort, the following topics will be addressed at each meeting to guide the discussion in a productive manner:

- Share community and agency efforts within the past year to implement the WCPP Balanced Growth Plan
- Current and planned community efforts to implement the plan
- Discuss opportunities for collaboration and shared funding
- Alert partners to major infrastructure projects, including transportation projects
- Discuss any needed changes or adjustments to the Priority Areas maps
- Discuss available funding opportunities with partnership

Partnership communities are strongly encouraged to communicate with one another throughout the year as major projects that impact the watershed are slated and as opportunities for collaboration arise. The annual meeting of the partnership is intended to supplement, not replace, open lines of communication across jurisdictions.

Review of changes to local land use designations

At this time, MORPC is not aware of any proposed changes to local land use designations. If partner communities submit information about proposed local land use designation changes to MORPC, this information will be included in future drafts of the plan.

Unresolved Issues

At this time, MORPC is not aware of any unresolved issues. This section will be updated for the final draft of the plan if there are unresolved issues to report.

IMPLEMENTATION TOOLBOX

The following section provides information about selected tools that can assist Balanced Growth communities with implementing this plan. Many of these tools reference the *Best Local Land Use Practices (BLLUP)* document that was prepared by OLEC to provide guidance to local communities on land use practices that minimize development impacts to water quality. OLEC also created a toolkit featuring model zoning codes and ordinances to complement the BLLUP document. Where applicable, the tools below include links to the model regulations that have been compiled by OLEC.

The Best Local Land Use Practices document strongly recommends that "the model regulations **should never be adopted without careful local review** to assure that they are adapted to fit the needs of the specific local government. They will need to be adapted for use by the specific type of local government: city, village, township, or county. **The law director/solicitor or county prosecutor should be consulted prior to adoption of any land use controls.**"[12]

In order to integrate the appropriate implementation tools, it may be necessary for the community to revise components of their local zoning code to allow for or encourage the use of specific tools. Indicator boxes are displayed near the heading of each tool to provide guidance about what type of Priority Area(s) the tool is recommended for. The tools may be applicable outside of the recommended Priority Area(s) and the indicators are not intended to limit the use of the tools in any way.

[12] Ohio Lake Erie Commission. Linking Land Use and Lake Erie: Best Local Land Use Practices; Web: http://balancedgrowth.ohio.gov/BestLocalLandUsePractices.aspx

Comprehensive Planning

PAA PDA PCA

A comprehensive plan is a policy document that a community develops to convey its long-term vision.[13] These plans are generally prepared with a specific timeframe in mind and are based on assumptions about how the population of the community may change over time and how those changes will impact land use patterns and infrastructure demands into the future. Strong comprehensive plans are based on a thorough and inclusive public involvement process and address land use, transportation, housing, infrastructure, recreation, and any other elements relevant to the community's long term vision.

The comprehensive planning process generally starts out with an assessment of current conditions and an evaluation of economic and demographic trends impacting the community. The first phase of comprehensive planning is often focused on gathering information, both from reliable data sources like the U.S. Census and from people living and working in the community. The next phase of planning often involves working with the public and policymakers to establish a vision for the community's future and goals related to that vision. Next, the planners will work with the community to draft policies, objectives, strategies and implementation steps that will move the community from its current state toward the vision and goals that it has established for itself in the future. The final comprehensive plan, which should also include a process for regular updates, will need to be adopted by the community's legislative body at the end of the process (see Figure 2). There is some flexibility in the comprehensive planning process and each community may approach this process differently. However, the steps described above are generally included. Also, it is important to inform and involve the public early when developing a comprehensive plan in order to ensure that it will reflect the needs and priorities of the community.

The comprehensive plan, once adopted by a community's legislative body, provides a framework for updates of that community's zoning code. While the comprehensive plan does not carry legal authority on its own, it has the potential to shape the local zoning code which does carry legal authority. Zoning is a tool that is used to regulate land uses. Through zoning, local governments break up their jurisdictions into sections or "zones" and specify the types and intensities of land uses that can be located in each of those zones. While zoning is widely used in Ohio, it is not required.[14] However, a majority of the communities in the Walnut Creek Watershed currently have local zoning codes in place and many of them also have locally adopted community plans.[15] See Table 8 for a list of Walnut Creek Watershed communities with Comprehensive Plans in place.

The Ohio Balanced Growth Program recommends that communities have a comprehensive plan and that they update the plan every five years. Walnut Creek communities are also encouraged to consider the incorporation of Balanced Growth Plan designated Priority Areas into their local comprehensive plans. Also, WCPP communities are encouraged to consider the model regulations and land use codes that accompany

[13] Conglose, J. Comprehensive Planning Fact Sheet. Ohio State University Extension, Community Development; Web: http://ohioline.osu.edu/cd-fact/1269.html

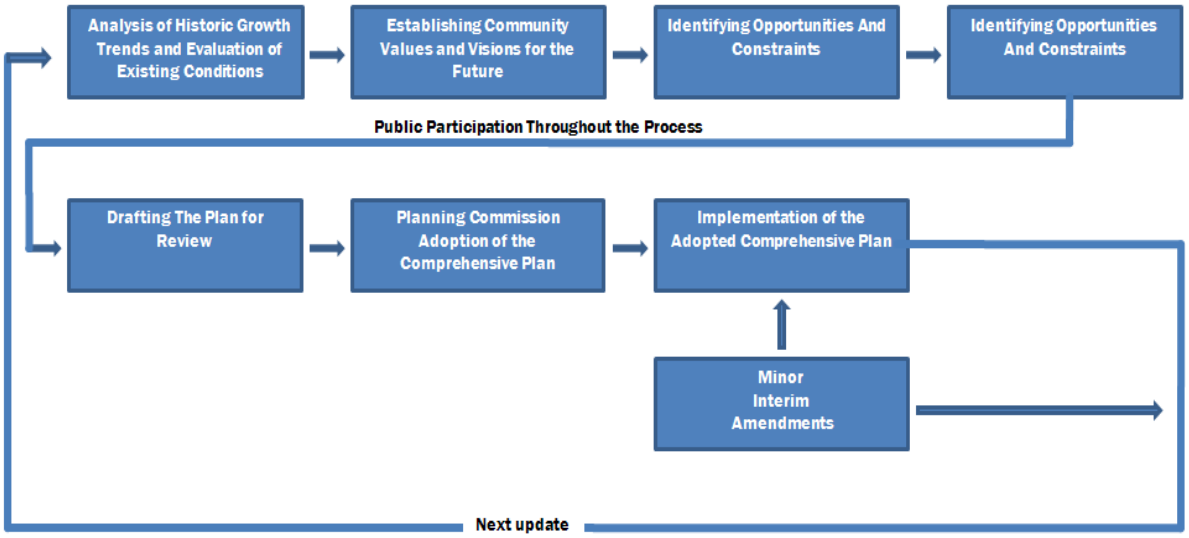
[14] Conglose, J. Comprehensive Planning Fact Sheet

[15] City of Lee's Summit, Missouri, Department of Development; Web: http://cityofls.net/Development/Comprehensive-Plan/General-Information.aspx

the other implementation tools. These tools can be incorporated into local plans and zoning codes where appropriate to assist with implementation of the Balanced Growth Plan. A strong comprehensive plan based on a thorough public involvement process serves as a foundation for a defensible local zoning code that that reflects the community's vision and priorities.

All of the communities in the Walnut Creek Watershed do not currently have comprehensive plans in place. The Balanced Growth Plan is not a substitute for local comprehensive planning. However, the Balanced Growth Planning process and the resulting plan can serve as a resource if communities that do not currently have a locally adopted comprehensive plan decide to create one.

Figure 2. Comprehensive Planning Process



Source: City of Lee's Summit, Missouri. http://cityofls.net/Development/Comprehensive-Plan/General-Information.aspx

Table 8. Comprehensive Plans for Walnut Creek Watershed Jurisdictions

Community	Plan	Year Adopted	Link/ Notes
Counties			
Fairfield	Yes	2002	http://www.co.fairfield.oh.us/rpc/dev_plan_files/PDFs/Fairfield%20County%20Development%20Strategy%20and%20Land%20Use%20Plan%202009.pdf
Franklin	No		Comprehensive plans are prepared for individual townships, villages, and cities.
Pickaway	Yes	1995	
Cities/ Villages			
Ashville	Yes	2002	http://www.ashvilleohio.net/Ashville%20Strategic%20Plan.pdf
Baltimore	Yes	2004	
Canal Winchester	No		
Carroll	No		
Groveport	Yes	2004	
Lithopolis	No		
Pickerington	Yes	2001	
South Bloomfield	No		
Townships (County)			
Bloom (Fairfield)	Yes	2002	
Greenfield (Fairfield)	No		
Harrison (Pickaway)	Yes	1998	
Liberty (Fairfield)	No		
Madison (Franklin)	Yes	2011	http://www.franklincountyohio.gov/commissioners/edp/planning/blacklick-madison/index.cfm
Madison (Pickaway)	No		
Violet (Fairfield)	No		

BENEFITS

- Establishes a desired vision for the community's future
- Encourages public involvement, participation, and input in local decision making
- Provides a framework to help communities achieve long-term goals and address potential threats
- Provides a framework for balancing private rights with public good
- Protects and enhances health and safety of community members
- Coordinates efficient use of existing infrastructure and prepares for future infrastructure needs
- Supports the defensibility of zoning[16]

RECOMMENDATIONS

1. Establish a comprehensive plan that reflects the priorities of the community.
2. Update the plan regularly, ideally every five years.
3. Incorporate the designated Priority Areas in this Balanced Growth Plan into the local comprehensive plan.
4. Reflect the designated Priority Areas in the local zoning code.
5. Examine your community's comprehensive plan and local zoning code to determine if there are barriers or disincentives in place that may prevent the use of recommended implementation tools.

[16] Ohio Lake Erie Commission. Linking Land Use and Lake Erie: Best Local Land Use Practices.

Stormwater Management Regulations

PAA PDA PCA

Stormwater management is the application of best management practices (BMPs) and design solutions to site development or redevelopment in order to manage stormwater more effectively with the goal of reducing run-off, decreasing sedimentation and pollution, and decreasing the potential for flooding.

Stormwater runoff is one of the primary sources of impairment to the Walnut Creek River Watershed. Stormwater runoff is a form of nonpoint source pollution, meaning that it does not come from a single source or follow a direct, identifiable route.[17] In an undisturbed ecosystem, stormwater falls onto open grasslands, forests, and other natural areas where it slowly infiltrates the soil and is filtered. In contrast, when stormwater falls on impervious surfaces, it is unable to penetrate through to the soil and instead runs off, often picking up pollutants and sediment along the way. Impervious surfaces are any surfaces that prohibit water from passing through. Examples of impervious surfaces commonly found in urbanized areas are paved roadways, parking lots, sidewalks, and rooftops. As the amount of impervious surfaces in an area increases, the volume and velocity of stormwater runoff increases with it.

Another large contributor of nonpoint source pollution from stormwater runoff is agricultural runoff. While agricultural land uses do result in lower total amounts of stormwater runoff (compared with developed, urban areas) due to the land's permeability, the runoff that does enter the stream often picks up sediment,

[17] D'Ambrosio, J., Lawrence, T., Brown, L. A Basic Primer on Nonpoint Source Pollution and Impervious Surface Fact Sheet. Ohio State University Extension. Web: http://ohioline.osu.edu/aex-fact/0444.html

nutrients, chemicals or bacteria that have been applied to the land. Agricultural runoff often results in increased levels of nitrogen and phosphorous in the waterways which may encourage the growth of certain types of algae that can be dangerous to humans and animals. A wide variety of practices, both structural and non-structural, are available to assist communities with managing stormwater. Several of the other tools recommended in this section are also designed to achieve stormwater management. For example, Low Impact Development, Riparian and Stream Setbacks, and Conservation Development can help communities achieve lower overall rates of stormwater runoff.

The Ohio Environmental Protection Agency and the Ohio Department of Natural Resources (ODNR) have developed a plan to assist communities with managing nonpoint source pollution. The *Ohio Nonpoint Source Pollution Management Plan, 2005-2010* includes a guide to existing stormwater management practices. The guide addresses issues ranging from agricultural runoff to drinking water protection to urban stormwater runoff and can be found on the Ohio EPA's website at http://web.epa.ohio.gov/dsw/nps/NPSMP/MM/mm.html.

The *Management Plan* recommends that communities identify the major cause(s) of stream impairment and water quality threats, identify target implementation areas and potential funding sources and review the applicability and effectiveness of various practices before selecting the stormwater management practices to implement locally.[18]

Under the U.S. EPA's National Pollutant Discharge Elimination System (NPDES) Storm Water Program, communities must ensure that their codes meet or exceed the U.S. EPA's requirements for managing stormwater runoff and pollution.[19] The NPDES program has been implemented in two phases. Phase I required operators of large and medium Municipal Separate Storm Sewers (MS4) to develop a detailed Storm Water Management Program (SWMP). Large MS4s serve over 250,000 residents and medium MS4s serve between 100,000 and 250,000 individuals. Under Phase II of the NPDES program, smaller MS4s that serve less that 100,000 and are located in urbanized areas were required to develop SWMPs. The SWMP must include information about how the community will conduct public education and outreach, incorporate public involvement, detect and eliminate illicit discharges, control stormwater runoff during and after construction, and prevent pollution.[20]

These are the basic requirements for stormwater and pollution control that must be met by communities in the Walnut Creek Watershed. However, jurisdictions are encouraged to consider stream and riparian setbacks and promote the use of Best Management Practices and Low Impact Development wherever it may be applicable and benefit the overall quality of the Walnut Creek Watershed.

[18] Ohio Environmental Protection Agency (EPA) and Ohio Department of Natural Resources (ODNR) (2005 – 2010). Getting the Point about Nonpoint: Ohio Nonpoint Source Pollution Management Plan; Web: http://wwwapp.epa.ohio.gov/dsw/nps/NPSMP/MM/mmdecisiontree.html

[19] ODNR Division of Soil and Water Conservation (2006). Rainwater and Land Development Manual, Third Edition. Chapter 1: Selecting Stormwater Management Practices. Ohio Department of Natural Resources; Web: http://www.dnr.state.oh.us/portals/12/water/rainwater/Rainwater2009-6-23/6-23-09RLDFiles/6-24-09RLDCh1.pdf

[20] Ohio EPA. MS4 Program Overview; Web: http://www.epa.state.oh.us/dsw/storm/ms4.aspx

BENEFITS

- Decreases sedimentation and pollution in waterways
- Decreases potential for flooding
- Prevents stream bank erosion channel incision
- Prevents infrastructure damage
- Protects critical habitats

RECOMMENDATIONS

1. Preserve existing critical features like wetlands, floodplains, steep slopes, tree cover and land cover, and ravines.
2. Minimize stormwater through better site design and the implementation of stormwater best management practices
3. Treat stormwater for quantity and quality

MODEL REGULATION & PLAN

Model Ordinance for Comprehensive Storm Water Management, Chagrin River Watershed Partners
http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=HcjXwlToMSU%3d&tabid=66

New Albany Village Center Storm Water Mitigation Strategy
http://www.newalbanyohio.org/wp-content/uploads/2012/02/VillageCenterStormwaterMitigationStrategy.pdf

Table 9. Impacts from increases in impervious surface coverage (U.S. EPA, 1997)

Increased Impervious Surface Coverage	Resulting Impacts				
Leads to:	**Flooding**	**Habitat Loss**	**Erosion**	**Channel Widening**	**Stream Alteration**
Increased Amount of Flow	X	X	X	X	X
Increased Peak Flow	X	X	X	X	X
Increased Peak Duration	X	X	X	X	X
Decreased Base Flow		X			
Sediment Loading	X	X	X	X	X

Source: OSU Extension, A Basic Primer on Nonpoint Source Pollution and Impervious Surfaces

Low Impact Development

PDA PCA

Low Impact Development is a design technique for managing stormwater on site. Traditionally, stormwater management has consisted of using a means of conveyance, like storm sewers, gutters, or culverts, to quickly transfer precipitation and stormwater runoff to a central location such as a water treatment plant or a retention pond. As an alternative, communities may consider encouraging property owners to manage the stormwater runoff on site to minimize the negative impacts that the traditional system can cause while reducing the need for traditional infrastructure and the associated costs. LID seeks to maintain to the greatest extent possible the natural hydrology of the site and the watershed through strategic planning and micro-management of precipitation and stormwater.

LID is a decentralized practice that controls stormwater through methods dispersed throughout a site that allow water to infiltrate, evaporate, and transpire as it would naturally prior to introduction of development and increased impervious surfaces. Utilizing these methods reduces the volume of stormwater runoff and the pollutant load contained within the runoff conveyed to waterways. This contributes to a reduction of negative impacts to streamways. Water quality can be improved through LID measures that permit water to infiltrate the ground to replenish groundwater which in turn slowly feeds into wells, aquifers, and waterways.

The Best Local Land Use Practices document developed by the Ohio Lake Erie Commission summarizes three key elements of successful Low Impact Development:

- Minimize storm water runoff impacts through preservation of existing landscape features, such as streams and wetlands, and their hydrologic functions.
- Maintain predevelopment time of concentration through strategic routing of flows.
- Disperse runoff and stormwater storage measures through a site's landscape with the use of a variety of detention, retention, and runoff practices.

LID is a viable alternative to traditional stormwater management in many circumstances. Not every site is suitable for LID. Soil permeability, slope, and other site characteristics need to be considered in order to make an informed decision as to whether LID is viable for a particular site. It is critical to consider LID measures early on in the development process. With proper planning, LID can be more cost-effective and require less maintenance than traditional methods of stormwater management..

The following table shows the cost differences between conventional stormwater management and LID. A majority of the comparisons demonstrate that LID measures are more cost effective, often due to the cost savings from the reduction in costs associated with grading and preparing the site.[21]

In addition to its financial and environmental benefits, LID can also provide aesthetic and recreational value to an area. LID facilities can be linked to form urban greenways that create alluring streetscapes and increase land values.

[21] U.S. EPA (2007) *Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices,* EPA publication number 841-F-07-006, December 2007.

Table 10. Cost Comparisons Between Conventional and LID Approaches

Project	Conventional Development	LID	Cost Difference	Percent Difference
2nd Avenue SEA Street	$868,803	$651,548	$217,255	25%
Auburn Hills	$2,360,385	$1,598,989	$761,396	32%
Bellingham City Hall	$27,600	$5,600	$22,000	80%
Bellingham Bloedel Donovan Park	$52,800	$12,800	$40,000	76%
Gap Creek	$4,620,600	$3,942,100	$678,500	15%
Garden Valley	$324,400	$260,700	$63,700	20%
Kensington Estates	$765,700	$1,502,900	–$737,200	-96%
Laurel Springs	$1,654,021	$1,149,552	$504,469	30%
Mill Creek	$12,510	$9,099	$3,411	27%
Prairie Glen	$1,004,848	$599,536	$405,312	40%
Somerset	$2,456,843	$1,671,461	$785,382	32%
Tellabs Corporate Campus	$3,162,160	$2,700,650	$461,510	15%

Source: U.S. EPA (2007) Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, EPA publication number 841-F-07-006, December 2007.

There are also potential health benefits to incorporating many of the LID facilities into site design. The incorporation and maintenance of trees and plantlife could also lead to improved air quality, particularly in urban areas. LID measures, particularly green roofs and trees, also contribute to urban heat island reduction by increasing evapotranspiration, providing cool shade, absorbing green house gasses, and reducing impervious surface areas that interfere with the natural thermal balance of the environment. The U.S. EPA states that, "heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality."[22] Implementing many of the LID measures can result in mitigation of the extreme health-threatening temperatures experienced by communities, particularly in urbanized areas.

Communities should consider implementing one or more LID measures as a means to promote the health and well-being of its citizens while managing stormwater and precipitation in a cost-effective and environmentally friendly manner. The actual measures that can be encouraged among communities as part of low impact development are often referred to as Integrated Management Practices (IMPs). The following information is not exhaustive, but provides a range of IMPs that can be used in concert to create low impact development.

INTEGRATED MANAGEMENT PRACTICES

Riparian and Wetland Setbacks

Please refer to Page 60, Stream and Wetland Setbacks, for more details.

Biofiltration Facilities

The nature of these facilities will vary in accordance with the soil type, land use, and site characteristics. Biofiltration facilities are vegetated areas that temporarily store stormwater allowing water to slowly infiltrate into the ground and also permitting the vegetation to filter pollutants from the stormwater.

For more information: http://www.stormwaterpartners.com/facilities/bioswale.html

Vegetated Swales

Swales are naturally occurring or artificially constructed broad channels that collect stormwater runoff in an area with (preferably) native vegetation. The stormwater is transported through the swale where it can infiltrate the soil, pollutants can be filtered out, and storm water speed can be slowed (especially when paired with "check dams", rocks or other natural materials placed in the swale to intersect the flow of water).

For more information: http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_vegswale.pdf

Cistern and Rain Barrels

Cisterns and rain barrels are rainwater collection systems that collect precipitation for reuse. These systems may also be used for stormwater collection, but there are limitations for the use of stormwater versus rainwater that has been collected as it tends to collect a higher content of pollutants. The collected water can be used in a variety of ways. For example, water collected may be used to water gardens, to add water to a pool, to wash a car, for toilet water (with the appropriate plumbing set up), or for washing clothes, etc.

For more information: http://www.lid-stormwater.net/raincist_home.htm

Infiltration Trenches-

[22] U.S. EPA (2011). Heat Island Effect. http://www.epa.gov/heatisld/

Infiltration Trenches are shallow excavated channels that are filled with stones created for the purpose of stormwater runoff retention and to allow for the percolation and infiltration of water into the ground.

For more information:
http://www.metrocouncil.org/environment/Water/BMP/CH3_STInfilTrenches.pdf

Green Roofs

Green roofs are roofs that have been fashioned with vegetation and a layer of waterproofing for the purposes of intersecting and absorbing rainfall, reducing the amount of impervious surface, aesthetic appeal, and to reduce the urban heat island. A cost comparison of green roofs versus conventional roofs is on the following page. While green roofs cost more up front, they are competitive when compared over the long term due to a reduction in maintenance and replacement costs.

Table 11. Green Roof Cost Comparisons

	Conventional Roof	Green Roof
New Construction	$3-9/sq ft	$10-15/sq ft
Re-roofing	$5-50/sq ft	$15-50/sq ft

Source: Cascadia Green Building Council Green Roof Fact Sheet; Bureau of Environmental Services.

For more information:
http://www.epa.gov/heatisland/mitigation/greenroofs.htm

BENEFITS

- Preserve key elements of the natural landscape
- Effectively manage stormwater working with nature rather than against it
- Potential cost-savings when compared with traditional systems
- Enhanced water quality by allowing stormwater to slowly filter and infiltrate

RECOMMENDATIONS

1. Encourage Low Impact Development measures to promote environmentally-friendly stormwater management.
2. When comparing costs between traditional and low impact development, consider both upfront and ongoing maintenance costs.
3. Consider LID early on in the development process to ensure site viability and cost-effectiveness.
4. Consult your local Soil and Water Conservation District, planning staff, or other knowledgeable parties to learn more about local implementation of Low Impact Development.

Natural Areas Establishment

PCA PAA

Natural areas establishment and meadow protection encourage the maintaining of natural areas to provide stormwater control and filtering services. Many communities restrict the height of vegetation and grass through “weed laws” in an effort to curb property owner neglect. Unfortunately, these regulations subsequently prohibit property owners from leaving portions of their lawn in their natural “meadow” state. Meadow protection is coming to the forefront as alternate patterns of development, such as conservation development, are becoming more commonly explored. While areas in conservation developments are specifically designated as meadows and open space, weed laws would require the areas to be mowed.

The difference between a natural meadow and mowed lawn is not simply a matter of aesthetics, but also a matter of environmental benefit. Natural meadow areas provide water pollutant filtration, absorption and retention benefits as well as habitat for wildlife and a variety of plants. Typical grass lawns may create a thick mat that prevents adequate infiltration

and it may contribute to "sheet run off" or mass transport of water over land without a defined channel, during storm events. The amount of runoff can be similar to that of many impervious paved areas. Mowed lawns are often subject to fertilizers and other treatment that pollute the water runoff while providing very little habitat for wildlife.

The BLLUP guidebook developed by OLEC addresses a number of the issues facing Natural Area Establishment and Meadow Protection. These issues and recommendations are applicable statewide. The guidebook states that weed laws can be improved to prohibit and control noxious weeds without destroying beneficial plant species .

The guide explains that there are three categories of "weed laws" that allow for Natural Area Establishment. [23]

1) Permit Laws- These regulations require that a natural area/meadow management plan be submitted for approval and that the property maintain compliance with the plan.
2) Exclusion Laws- These regulations exclude specified native grass areas from being subject to the weed law as exemptions.
3) Proactive Laws- These regulations require that a percentage or other specified amount of native grass areas be incorporated into landscaping.

Permit and proactive laws tend to need a review board that can review, approve, and enforce the applicant's submitted management plan. These can be more difficult and costly to implement than the exclusion laws. Exclusion laws promote the use of a "weed expert" that can attest to the status of a grassy area as a meadow or neglected property. It is often the case that communities rely only on compliance with state laws to control noxious weeds and do not go any further. Public education on the value of established natural areas as a means to enhance water quality, rural character and habitat is a critical component of their success. Most Soil and Water Conservation Districts (SWCD) can provide communities with additional technical resources to assist in determining whether unmowed areas are in fact meadows.

Ohio's Noxious and Regulated Weeds

Noxious
Musk Thistle
Oxeye Daisy
Canada Thistle
Poison Hemlock
Wild Carrot
Purple Loosestrife
Wild Parsnip
Mile-a-Minute
Russian Thistle
Cressleaf Groundsel
Shattercane
Johnsongrass
Grapevines (abandoned)

Regulated
Multiflora Rose
Purple Loosestrife

Source: Linking Land Use and Lake Erie: Best Local Land Use Practices. Ohio Lake Erie Commission

[23] Ohio Lake Erie Commission. *Linking Land Use and Lake Erie: Best Local Land Use Practices.*

BENEFITS

- Natural stormwater management and filtering
- Preserve and enhance natural habitat for wildlife
- Enhance natural beauty of a property
- Creation of passive open space

RECOMMENDATIONS

1. Permit natural area establishment.
2. Include provisions for the maintenance of the natural area or meadow to ensure that enforcement can be conducted uniformly.
2. Have a mechanism for determining whether an area is a natural meadow or simply a neglected area.
3. Protect communities from noxious weeds.
4. Have a procedure in place to allow for hearings and appeals following enforcement.

MODEL REGULATIONS

1. *City of White Bear Lake, Minnesota: Model Code* http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=H3C5UE6AIxI%3d&tabid=66

2. *City of Madison, Wisconsin: Model Code* http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=0E8KHOsaN6s%3d&tabid=66

3. *Village of Long Grove, Illinois: Model Code* http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=HWND71Xe18U%3d&tabid=66

Stream and Wetland Setbacks

PCA PDA PAA

Streams and wetlands are integral to the health of our watershed, environment, and wildlife. They provide critical habitat for the plant and animal life in our region, support recreational opportunities such as fishing and bird-watching, and convey our water as part of a larger hydrologic cycle that supports life. Protecting the natural hydrology of our waterways is a critical component of environmental and community health. Therefore, it is important to minimize the impact of impervious surfaces and land use change on the health of our waterways. One way to reduce or minimize the impact is through stream and wetland setbacks.

This tool could be alternatively referred to as stream corridor protection zones, riparian areas, or a number of other names. There is variation in the language used by communities that have established protection areas along streams and wetlands. Therefore, this plan recommends that communities wishing to implement this tool carefully consider the appropriate language that will both clearly communicate the intent and be consistent with the priorities of residents.

A setback is a specified distance from a feature of the natural or built environment. Features could include roads, waterways, or any number of landmarks. For this implementation tool, the setbacks are applied to water features, specifically to streams and wetlands. Setback regulations often limit new development or redevelopment within the designated setback area.

A stream or wetland setback is the area encompassed by a distance set aside through community ordinances, regulations, or recommended development guidelines. The distance can be measured from a number of starting points including from the edge of the

stream, a high watermark, or the center of the stream. For example, if a community enacted a setback of 25-feet from the edge of a stream, the setback area would be the area between the edge of the stream out to 25-feet along the length of the stream. Stream and wetland setbacks are sometimes referred to as stream buffers or riparian corridors.

The purpose of stream and wetland setbacks is to provide communities with a means to protect the natural flow of waterways, protect the riparian corridor that provides critical habitat and soil stability, create an area where stormwater can slowly filter into the waterways, and provide a buffer between development and the water to promote community safety. Streams store and convey water and provide a means for rich sediment to be deposited in our floodplains. The streams and wetlands themselves provide critical habitat to fish, frogs, insects, birds, and many other creatures. The corridor along the rivers and wetlands, particularly if well forested or complete with brush and other native plantlife, also assist in regulating stream temperature by moderating the amount of sunlight that reaches the waterways (particular stream temperatures support particular forms of life), and slowly filter storm water runoff. Vegetation in the riparian corridor also serves to absorb the force and volume of floodwaters, stabilize the stream banks from erosion, filter pollutants, and reduce floods by increasing absorption of floodwater into the soil.[24] Stream and wetland setbacks also promote groundwater recharge which is critical to maintain groundwater drinking resources and for recharging streams. There is also strong aesthetic value to maintaining a vegetated stream and wetland area.

When there is a rain event, some water may be absorbed into the ground or intercepted by vegetation and subsequently evaporated. Excess water will run off of an impervious surface like compacted soil or asphalt into storm drains and subsequently a waterway. Ideally, stormwater runoff would slowly percolate through vegetation into the soil and into our waterways. When impervious surfaces such as rooftops and parking lots are placed within the floodplain or riparian area, the volume and speed of the stormwater runoff increases, causing a number of issues including flooding, soil erosion (subsequent exposure of plant roots and ensuing damage to plantlife), and deep channel cutting. Generally, research shows that when ten percent or more of land in a watershed is covered by impervious surfaces, impairment to streams occurs.[25] This is further exacerbated by impervious surfaces placed close to waterways. Furthermore, research shows that upwards of 25 percent impervious surface coverage causes severe watershed impairment.[26] It has also been demonstrated that due to impervious surfaces a typical city block generates more than five times the stormwater runoff than a wooded area of the same size. Given the research and the demonstrated impacts of stormwater runoff, it is critical that communities seek to address these issues to protect and enhance the watershed and maintain the safety of its citizens from floodwaters. Figure 3 illustrates the impact of impervious surfaces on stormwater versus that of natural ground cover.

Stream protection and stormwater management are particularly relevant issues with regard to public health, safety, and welfare. Erosion of the stream banks leads to dangerous conditions for anyone nearby and structures close to the waterway. Stream and wetland setbacks also make prudent financial sense. While setbacks are often a reactive measure to protect our

[24] Ward, A., D'Aimbrosio, J., Witter, J. (2008). Floodplains and Streamway Setbacks. Ohio State University Extension, Agriculture and Natural Resources.

[25] U.S. EPA 2003. Protecting Water Quality from Urban Runoff.

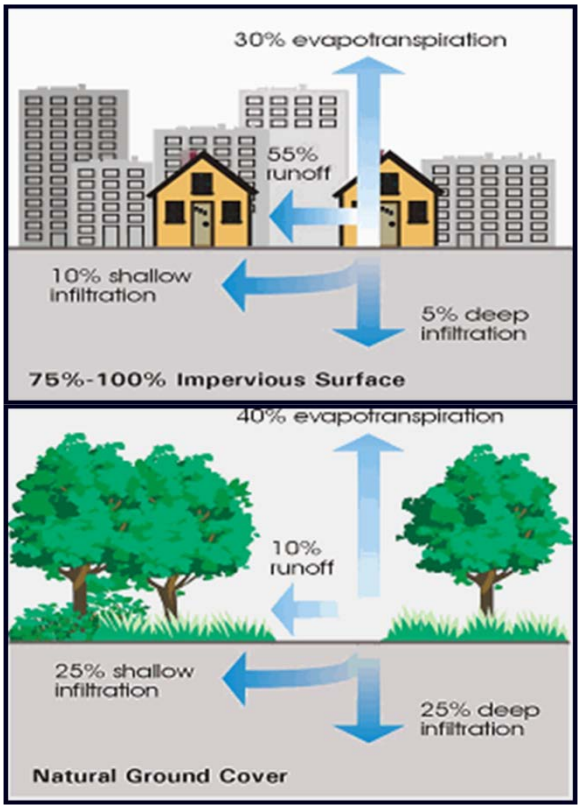
[26] The Impacts of Impervious Surfaces on Water Resources. (2007). New Hampshire Estuaries Project (NHEP), University of New Hampshire.

waterways and reduce flooding, they are also a proactive measure to accomplish the same means as future development occurs and to prevent stream/wetland degradation and flooding for existing development. By maintaining healthy streams and wetlands through setbacks, the need to engage in costly restoration or reconstruction is reduced. Setbacks may also allow a degraded or channelized waterway (depending on the level of degradation) to restore itself over time through natural processes as opposed to costly restoration.[27]

A common concern expressed among citizens is the impact that stream setbacks may have on private property values. Research shows that these tools *positively* impact property values. Analysis shows that home values appreciate faster near protected open space such as that created by setbacks.[28] A clean and vegetated stream near a property provides an attractive amenity to the property. Maintaining setbacks also contributes to property protection for the aforementioned reasons regarding floodwater. These setbacks can also function in tandem with the low impact development and natural area establishment/meadow protection tools discussed elsewhere in this plan for a comprehensive approach to stormwater management.

Stream and wetland setback regulations can vary widely from jurisdiction to jurisdiction, county to county, and across the range of experts' recommendations. Communities seeking to adopt stream and wetland setbacks ordinances or guidelines are encouraged to seek legal counsel, citizen input, and/or consult with the local Soil and Water Conservation District during the process from beginning to end.

Figure 3. Relationship between impervious surface and stormwater runoff



Source: Chagrin River Watershed Partners. Low Impact Development.
http://www.crwp.org/LID/low_impact_development.htm

STREAM SETBACKS

The following stream setback recommendations are from the Ohio Department of Natural Resources and the Chagrin River Watershed Partners. These recommendations both seek to achieve healthy waterways and wetlands, with a difference being a matter of technical analysis required. Partners should remember that as part of an endorsed Balanced Growth Plan, they may be eligible for technical assistance from the Balanced Growth program in drafting regulations. Should a community elect to adopt setback regulations or guidelines, the

[27] ODNR Division of Soil and Water conservation (2006). Rainwater and Land Development Manual, Third Edition. Chapter 2: Post Construction Stormwater Management Practices. Ohio Department of Natural Resources; Web: http://www.dnr.state.oh.us/water/rainwater/default/tabid/9186/Default.aspx

[28] Stream Setback Protection Areas Factsheet Brochure. Franklin County and Franklin County Soil and Water Conservation District (SWCD).

appropriate level of detail and analysis will bear heavily in the decision for which option is best for the community. In the event that a community has already adopted a setback ordinance, ODNR recommends that the larger of the two setbacks (established setback versus setback determined by recommended standards) be used.

The following are Ohio Department of Natural Resource Stream Setback Recommendations (2006)[29] for stream setbacks:

1. The setback area width is a total width, which crosses the channel and is calculated according to the drainage area (square miles).

2. The setback area shall be a combination of two overlapping areas, one streamway-based and the other based on a minimum distance from the channel bank, equivalent to 1 channel width.

3. The Streamway size appropriate to accommodate the area within which a stream periodically shifts its course, also known as the meander belt, is:
   Streamway width = 147 (DA) $^{0.38}$
   DA = Drainage Area in square miles.

4. At no point shall the distance between the setback boundary and the stream channel be less than:
   Minimum distance from stream channel:
   14.7 (Drainage Area in square miles) $^{0.38}$
   (Approximately 1 channel width)

Another set of stream setback recommendations that the WCPP may consider are those created by the Chagrin River Watershed Partners in northeastern Ohio. The stream setback recommendations range from 25 feet to 300 feet, varying as a function of waterway drainage area similar to the ODNR calculated method. These setbacks are to be applied to both sides of the waterway, with some flexibility allowed to account for natural resources, regional character, how buildable the affected lots remain, and so on. Coordinating setbacks across jurisdictional boundaries can create a stronger positive impact on the watershed health as a whole and is necessary to create significant differences at the regional and watershed level. Doing so can also provide greater predictability from one community to the next for residents and developers.

Table 12. Chagrin River recommended setbacks

Watershed Size	Minimum Setback Distance
< 0.5 square miles	25 feet
0.5 – 20 square miles	75 feet
20 – 300 square miles	120 feet
> 300 square miles	300 feet

Source: Community Riparian and Wetland Guidance: Putting all the Pieces Together. Cuyahoga Soil and Water Conservation District.
http://www.crwp.org/pdf_files/riparian_wetlands_guide_book.pdf

[29] *Ohio Department of Natural Resources (ODNR) Division of Soil and Water conservation. Rainwater and Land Development, Third Edition (2006). Chapter 2 Post Construction Stormwater Management Practices. Ohio Department of Natural Resources.*
http://www.dnr.state.oh.us/water/rainwater/default/tabid/9186/Default.aspx

WETLAND SETBACKS

As described previously, wetlands are the kidneys of our waterways. They provide valuable flood and stormwater storage, habitat for a number of plant and animal species, and a place to filter contaminants and sediments from water. Below are the three categories of wetlands established by the Ohio EPA, as defined in the Ohio Rapid Assessment Method User's Manual.[30]

Table 13. Ohio EPA Wetland Categorization

Wetland Category	Ohio EPA Description
1	"Wetlands with minimal wetland function and/or integrity. Wetlands which support minimal wildlife habitat, and minimal hydrological and recreational functions and as wetlands which do not provide critical habitat for threatened or endangered species or contain rare, threatened or endangered species. In addition, Category 1 wetlands are often hydrologically isolated, and have some or all of the following characteristics: low species diversity, no significant habitat or wildlife use, limited potential to achieve beneficial wetland functions, and/or a predominance of non-native species."
2	"Wetlands with moderate wetland function and/or integrity which support moderate wildlife habitat, or hydrological or recreational functions, and as wetlands which are dominated by native species but generally without the presence of, or habitat for, rare, threatened or endangered species; and wetlands which are degraded but have a reasonable potential for reestablishing lost wetland functions."
3	"Wetlands with superior wetland function and/or integrity superior habitat, or superior hydrological or recreational functions. They are typified by high levels of diversity, a high proportion of native species, and/or high functional values. Category 3 wetlands include wetlands which contain or provide habitat for threatened or endangered species, are high quality mature forested wetlands, vernal pools, bogs, fens, or which are scarce regionally and/or statewide."

Source: Mack, J. (2001). Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit, Columbus, Ohio.

The setbacks recommended by the Ohio EPA (Table 7) vary depending upon wetland class. Research indicates that these recommended setbacks may not adequately protect all types of wetlands, particularly vernal pools, and that a setback of up to 1,000 meters would provide more adequate protection. This plan encourages communities to establish wetland setbacks based on the Ohio EPA recommendations and/or the most recent scientific research available.

[30] Mack, J. (2001). Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit, Columbus, Ohio.

Table 14. Ohio EPA Recommended Wetland Setbacks

Wetland Class	Setback Distance
3	120 feet
2	75 feet
1	Protect and enhance

Source: Community Riparian and Wetland Guidance: Putting all the Pieces Together. Cuyahoga Soil and Water Conservation District. *http://www.crwp.org/pdf_files/riparian_wetlands_guide_book.pdf*

BENEFITS

- Preservation of stream corridors
- Enhanced water quality
- Reduction of stream bank erosion and flooding
- Retention of bank stability
- Consistency and predictability across the watershed
- Protection of natural habitat for wildlife

RECOMMENDATIONS

1. Protect the health and safety of residents and reduce the need for costly stormwater infrastructure, flood control, or flood damage repair by encouraging the preservation of the riparian and wetland areas that naturally address stormwater retention, infiltration, and conveyance.
2. Provide education on the benefits of stream and wetland protection to communities, property owners, and the public including the promotion of safety and increase in property values.
3. Allow a mechanism for some flexibility and creativity in site design such as grandfathering or a variance process when appropriate.
4. Communities may consider creating stream and wetland setbacks that are consistent with neighboring communities and at the watershed-scale to provide greater predictability for developers and streamlining between communities.
5. Passive recreation uses may be maintained in the setback but native vegetation and forest should be prioritized for preservation.
6. Discourage destruction or stripping of soil and vegetation within the stream and wetland setback area as a means of stream bank protection and to maintain the soil structure.
7. Encourage maintenance of natural hydrology to the greatest extent feasible to reduce disturbance of natural surface and ground water flow and reduce flooding incidence.
8. Coordinate stream and wetland protection with other tools such as low impact development and natural area establishment/meadow protection for a comprehensive approach to stormwater management.

MODEL ORDINANCE

Riparian and Wetland Setback Model Ordinance 1-27-06. Cuyahoga County Board of Health. http://www.noaca.org/ripwet12706.pdf

Woodland and Tree Canopy Protection

PCA PAA PDA

Woodlands are areas with natural cover that include trees, shrubbery, and other vegetation. These areas provide numerous social, economic, and environmental benefits, like critical habitat for an array of wildlife. A tree canopy consists of the collective layers of the leaves and branches of trees. They are an important element of the urban, suburban, and rural fabric, providing lush green respite to wildlife, cool shade for the residents, improved water quality and cleaner air. They also enhance property values significantly when compared to open, non-wooded sites.

In spite of these benefits, it is a significant challenge to maintain wooded areas throughout the development process and many woodlands are lost to suburbanization. Traditional development patterns often break up blocks of woodland, leaving only scattered trees. Often, the scattered trees that remain fare poorly due to various stressors and can be expected to have a very low long-term survival rate. Even when subdivisions are well designed to reserve blocks of wooded areas, little attention is given to evaluating the trees prior to design in order to prioritize the areas of varying woodland and habitat value.

Some communities have enacted regulations which attempt to address this problem. Tree canopy protection works in tandem with other tools described in this plan, such as stream setbacks, where vegetation like trees can be preserved to stabilize stream banks and assist in the slow infiltration of stormwater. The establishment, protection, and maintenance of street trees and parking lot landscaping trees is a way that transportation and the protection of the environment can be integrated to the benefit of both. Trees enhance the aesthetic appeal of our thoroughfares and parking lots and can provide additional buffer protection between pedestrian walkways and bicycling lanes and the cars on the roadway. This can enhance safety for all modes of transportation. The shade provided by parking lot landscaping and street trees also moderates the impact of pavement that retains heat and contributes to the urban heat island effect. As discussed earlier, the urban heat island effect contributes to high temperatures and associated health threats. It should also be recognized that street and parking infrastructure beautification can work toward achieving better water quality. Appropriate stormwater measures like infiltration areas paired with street tree landscaping can also intercept street and parking lot stormwater runoff. This not only helps to reduce the impact of the impervious surface on the waterway but also provides a great aesthetic. Research has determined that the average tree canopy coverage in urban areas across cities in the U.S. is at approximately 27 percent.[31] The USDA Urban

> "Trees make important contributions to society and are an integral part of urban infrastructure, as critical to the health and livability of communities as roads, sewers, and buildings. Community trees leverage the social, economic, and environmental value of cities, with forestry and related industries providing employment for over 1.6 million people and contributing $231.5 billion to the U.S. economy."- Tom Cochran, CEO of U.S. Conference of Mayors

[31] Dwyer and Nowalk (2000). A national assessment of the urban forest: an overview. Society of American Foresters.

Forest Data estimates that for the State of Ohio, the percent of tree canopy cover of urban land is at about 21 percent.[32].

The percentage of tree canopy coverage varies by community and communities are encouraged to invest in a tree canopy analysis to determine their own needs. There are a number of programs available for community forest analysis such as I-Tree (http://www.itreetools.org/index.php), a program developed by the USDA Forest Service for urban forestry analysis, Urban Forest Data (http://nrs.fs.fed.us/data/urban/state/?state=OH), and various GIS programs. While performing a tree inventory or canopy analysis is encouraged, it is not a prerequisite for adopting a tree protection ordinance. No matter the character of the community, the basic process for developing a tree protection ordinance is much the same.[33] Careful consideration should be given to the community's existing tree stock, future plans and vision, and citizen wishes.

Communities are encouraged to review the document Protecting and Developing the Urban Tree Canopy (http://www.usmayors.org/trees/treefinalreport2008.pdf) developed by the U.S. Conference of Mayors to learn about the urban tree canopy benefits acknowledged by officials surveyed from 135 communities and brief summaries of their current protection efforts. The document. details responses from a survey distributed to communities throughout the U.S. to gauge the tools being used for tree canopy protection, the connection between sustainability and tree preservation, trees as "green infrastructure", and the integration of tree preservation in land use plans.

As detailed thus far, trees have a great number of benefits, two of which are air quality maintenance and sequestering of greenhouse gasses. See Table 8 for Ohio-specific data on the pollution removal benefits of trees. Storing these gasses helps moderate atmospheric concentrations and global temperatures. There are also dollar values that can be attributed to the work that the trees and the tree canopy do to store or remove greenhouse gasses and other pollutants

There are comprehensive guidelines called *Guidelines for Developing and Evaluating Tree Ordinances* (http://www.isa-arbor.com/education/resources/educ_TreeOrdinanceGuidelines.pdf) available to assist communities seeking to develop, evaluate, and/or adopt a tree ordinance available through the USDA Forest Service through the National Urban and Community Forestry Advisory Council and the International Society of Arboriculture. These guidelines detail a number of key considerations for communities considering tree ordinance development or revision:

- Planning for an ordinance
- Developing a community forest management strategy
- Assess tree resources
- Identify needs and establish goals
- Tree inventory systems and GIS
- Community forest education

The preceding guidelines on developing tree ordinances highlight an important point related to the use of ordinances. It emphasizes the need for communities to develop or review their overall urban forest management strategy before considering a new or revised tree ordinance. The role of a tree ordinance is to facilitate resource management, and effective ordinances are part of a larger community forest management strategy.
Communities interested in learning more about key considerations regarding the tree canopy at

[32] USDA (2008). Urban Forest Data: Ohio http://nrs.fs.fed.us/data/urban/state/?state=OH Table 1. Statewide summary of population, area, population density, tree canopy and impervious surface land cover, and urban tree benefits in urban, community, and urban or community areas.
[33] Swiecki, T.J., and Bernhardt, E.A. (2001). Guidelines for Developing and Evaluating Tree Ordinances.

the watershed level can read more in the Urban Watershed Forestry Manual (http://www.forestsforwatersheds.org/storage/completePart1ForestryManual.pdf) to learn about tree planting guidelines for areas along streams, utility corridors, roadway-right-of-ways and much more. Partners are also encouraged to view a slideshow (http://www.slideshare.net/watershedprotection/formatted-uwf-slideshow-presentation?type=powerpoint) developed by the Center for Watershed Protection called Urban Watershed Forestry to learn more about the intersection of tree canopy protection and watershed health. Technical support on developing a community forest management program is also available through the Ohio DNR Urban Forestry program (http://www.ohiodnr.com/tabid/5547/Default.aspx).

Table 15. Urban tree benefits (2000)

	Urban Land and Community Land
Estimated number of trees	133,500,000
Carbon	
Carbon stored (metric tons)	25,500,000
Carbon stored ($)	$581,400,000
Carbon sequestered (metric tons/year)	840,000
Carbon sequestered ($/year)	$19,152,000
Pollution	
CO_2 removed (metric tons/year)	311
CO_2 removed ($/year)	$438,000
NO_2 removed (metric tons/year)	3,832
NO_2 removed ($/year)	$37,963,800
O_3 removed (metric tons/year)	9,157
O_3 removed ($/year)	$90,708,000
SO_2 removed (metric tons/year)	1,934
SO_2 removed ($/year)	$4,688,800
Total pollution removal (metric tons/year)	21,930
Total pollution removal ($/year)	$178,100,000

Source: Nowak, D.J. and Greenfield, E.J. (2010). Urban or community land is land that is urban, community, or both. Communities may include all, some, or no urban land within their boundaries. Urban land is based on population density and was delimited using the United States Census definitions or urbanized areas and urban clusters. Community land is based on jurisdictional or political boundaries of communities based on the United States Census definitions of incorporated or census designated places.

BENEFITS

- Moderates temperature on water and ground by providing shade
- Reduces stormwater runoff through rainwater interception and uptake
- Provides streambank erosion protection through healthy root systems
- Reduces flooding by managing stormwater
- Slows rate of stormwater runoff
- Economic benefits to mitigation of air and water pollutants, impervious surfaces, etc.
- Improves property values by providing an attractive aesthetic
- Filters pollution from the air and sequesters greenhouse gasses such as CO_2
- Improves appearance of the community to visitors and pride among residents
- Reduces noise pollution by intercepting and diffusing sound
- Increases recreational opportunities, such as bird watching
- Reduces heating or cooling costs due to temperature moderation
- Reduces urban heat island effect
- Reduces household energy costs
- Provides urban forestry and other related functions

RECOMMENDATIONS

1. Develop or review an overall community forest management strategy.
2. Work with residents to establish tree preservation goals.
3. Inventory trees in community using one of a suite of tools including GIS, resident survey, etc.
4. Establish a percentage threshold of tree cover acceptable to the community.
5. Prioritize areas where tree preservation and conservation are of high importance.
6. Prioritize areas for tree replacement.
7. Consider developing plans or ordinances to preserve trees and the tree canopy at the community level but consider the regional impacts of efforts. Consult with neighboring communities to promote regional consistency.
8. Utilize the comprehensive guidelines to assist policymakers in developing a tree protection ordinance.
9. Identify site-specific trees for protection during the development process.
10. Select healthy native trees for preservation and maintenance.
11. Protect undeveloped forests from encroaching development.
12. Utilize development or financial incentives to drive development away from sensitive forested areas and toward other areas deemed appropriate by the community.
13. Provide for re-vegetation and re-treeing of abandoned areas or untended open space.
14. Minimize disturbance of woodland areas and consider developing in a manner that disrupts woodland the least.
15. Prioritize protection of established mature woodlands or woodlands with recognized value (e.g., critical wildlife habitat, riparian forest buffers, PCAs).
16. When new areas are annexed to a community, recognize that some woodlands may be enrolled in a working forest easement program or the Ohio Forest Tax Law (OAC 1501:3-10-01 to 1501:3-10-07), both of which may require forest management activities. It is recommended that forest management activities can take place while protecting or enhancing other benefits from forests.

MODEL REGULATIONS

City Example

To supplement the comprehensive guidelines for developing a tree protection ordinance, consider an Ohio city example of a tree ordinance from the City of Olmstead Falls to further assist in exploring possible adoption of such an ordinance. A few key highlights from the city's ordinance include:

- Addresses protection of trees of a particular diameter or larger
- Establishes tree protection zones during construction
- Shows wooded areas upon application for subdivision and platting of land to ensure protection of trees to the extent practicable
- Fosters the planting of new trees in development and protection of existing large wooded areas where possible

Link to ordinance: http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=qoUOGBTYdRo%3d&tabid=66

It should be noted that these are illustrative examples to assist communities wishing to consider the adoption of a tree preservation ordinance.

ADDITIONAL RESOURCES

http://www.isa-arbor.com/education/onlineResources/treeOrdinanceGuidelines.aspx

http://www.forestsforwatersheds.org/urban-watershed-forestry/

Conservation Development

PCA

Conservation Development is an approach to site design that allows property owners or developers to achieve the maximum allowable density for a development while also setting aside permanent open space and protecting critical natural features. Conservation development is an alternative to traditional development patterns where homes are generally more dispersed across a site on larger lots and with less consideration of preserving or protecting continuous open space and critical natural features. This approach is similar to a Planned Unit Development (PUD) or a Planned Residential District (PRD), but with more stringent requirements for open space protection.

The basic elements of conservation development are the designation of a large portion of the site to permanent open space (40 to 50 percent of total site is recommended), an allowance for smaller lots and street setbacks to achieve "density neutrality," and the preservation of important and sensitive natural features to the greatest extent possible. Due to the resulting cluster of homes on the portion of the site that is developed, this design approach is also sometimes referred to as Cluster Development.[34] The Ohio Lake Erie Commission's *Linking Land Use and Lake Erie: Best Local Land Use Practices* notes that communities may decide to allow a modest density bonus (approximately 10 percent) as an added incentive for conservation developments.[35]

[34] Blaine, T., Schear, P. Cluster Development Fact Sheet. Ohio State University Extension, Community Development; Web: http://ohioline.osu.edu/cd-fact/1270.html

[35] Ohio Lake Erie Commission. Linking Land Use and Lake Erie: Best Local Land Use Practices.

This approach would be most applicable in areas that are most likely going to develop, but where the community desires that the potential impacts of land use conversion on water quality and other resources be minimized.[38] This approach may not be ideal for a highly urbanized environment where a compact, mixed-use approach may be of greater environmental benefit. It is, however, an effective way to preserve open space and protect critical natural features when land outside our urban centers is converted from agriculture or open space to other uses. If communities establish standards for conservation development through their local zoning codes, they could encourage or incentivize connectivity between different conservation developments that would allow for more continuous protected open space and linked pedestrian paths or bikeways.

Currently, conservation developments can be difficult to implement due to zoning regulations in many communities that favor traditional development. While they may still be proposed and developed, conservation developments often must undergo a longer review process in order to be granted a variance if they are not specifically permitted under local zoning code. This delay may encourage property owners and developers who could have been interested in pursuing conservation development to forego it in favor of a conventional development which is perceived as less risky due to the simplified review requirements.

Local examples of Conservation Development exist in central Ohio. The Delaware County Regional Planning Commission has actively promoted Conservation Development and encouraged townships to adopt a model subdivision regulation. To date, four Delaware County townships have adopted forms of the model regulation.

As a complement to the Best Local Land Use Practices document, the Ohio Lake Erie Commission has posted model regulations for Conservation Development to the state's Balanced Growth website. These model regulations can provide guidance to jurisdictions that want to modify their local zoning codes to allow for more readily approved conservation development projects. The model regulations are designed to create a Conservation Development Zoning District and to treat conservation developments as a permitted use in those districts, thereby minimizing the review time necessary to approve these types of projects. This means that property owners in the Conservation Development Zoning District could choose to develop their property, by right, either as a conservation development or as a traditional development without being subjected to a lengthier review process. The goal of these model regulations is to make conservation development no more difficult to build than conventional development. The model regulation and example ordinances for conservation development can be found on the state's Balanced Growth Planning website at the following link: http://balancedgrowth.ohio.gov/BestLocalLandUsePractices/ToolkitModelOrdinances.aspx

BENEFITS

- Maintain rural aesthetics and character of community
- Protect and preserve natural features
- Shared open space creates potential recreation areas
- Limits environmental impacts as a result of land use change
- Careful planning could "link up" adjacent conservation developments to form larger green networks throughout jurisdiction
- If properly designed, home values will be equal to or greater than those of comparable conventional developments

RECOMMENDATIONS

1. Work with local residents to determine how conservation development fits in with the community's priorities.
2. Determine if, and how much, of a density bonus will be granted locally for conservation developments.
3. Educate the public about the potential environmental and economic benefits of conservation development.
4. Modify local zoning code to ensure that conservation development is no more difficult to build than conventional development (see model regulations).

MODEL REGULATIONS

1. *Model Regulations for Conservation Development, The Country Side Program*
   - Part I – Introduction http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=ADDchKpgzno%3d&tabid=66
   - Part II – Township Regulations http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=UFhHzkZ9NLs%3d&tabid=66
   - Part III – County Subdivision Regulations http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=3PREks5_qiM%3d&tabid=66
   - Part IV – Guidelines for Adaptation and Use by Municipalities http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=g%2f04jIT8Rag%3d&tabid=66
   - Part V – Appendices http://balancedgrowth.ohio.gov/BestLocalLandUsePractices/ToolkitModelOrdinances.aspx

2. *Rootstown Ordinance* http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=Ys9iFCKrQyg%3d&tabid=66
3. *Delaware Ordinance* http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=PDtycGNh0U0%3d&tabid=66

Figure 4. Traditional dispersed development versus conservation development

Source: Conservation Design for Subdivisions by Randall Arendt

Compact Development

PDA

Compact development, also referred to as Traditional Neighborhood Development or Smart Growth, encourages communities to make efficient use of land, infrastructure, and financial resources by concentrating development when possible and appropriate. Concentrating development reduces the amount of roads and impervious surfaces needed to serve an area and allows for more efficient use of other types of infrastructure, like water and sewer, as well. Concentrating development also reduces the amount of land needed to accommodate population and economic growth, allowing for greater conservation of open space and agricultural areas. Compact development does not seek to limit growth. Instead, compact development promotes accommodating growth through thoughtful development that:

- Encourages infill
- Minimizes greenfield development
- Encourages mixed-use development
- Preserves open space and critical natural areas
- Revitalizes older areas
- Makes efficient use of transportation, land, and other infrastructure

It is strongly recommended that jurisdictions wishing to promote compact development consider the needs of their community and engage citizens in the process early on. Doing so ensures a better compact design fit for the community, educates citizens on the benefits of compact development, and garners support from the beginning. The following information is intended to provide a general overview on the elements of compact development. The specific details of compact development regulations will vary widely depending on the unique goals and needs of each community.

DESIGN

According to the Local Government Commission Center for Livable Communities, an analogy can be drawn between the often cited real estate adage of "location, location, location" and the key compact development element of "design, design, design".[36] Because each community has its own unique character, those considering compact development regulations are encouraged to consider including design guidelines that outline preferences for parking and building design, landscaping, and signage. This is an excellent opportunity to engage members of the public further in deciding how they would like to see their community take form aesthetically moving forward with more compact development.

Density is a key element of compact development design and the right density may vary according to the community's existing character, future vision, and its citizens' own wishes. This means that compact development can work in a number of different settings, not only in the core of an urban area. Consider reading Dense by Design (http://www.morpc.org/pdf/morpc_density_brochure_CS3.pdf)—a compact guide to compact development—for more information regarding the impact of quality design on quality density.

Generally speaking, density is the number of units (dwelling, office, etc.) per acre of land. While that is a quantitative assessment of density, there is also an equally critical qualitative aspect to density: the design element. Some of our most desirable all-American towns and urban neighborhoods are composed of six or seven homes per acre, a

[36] Compact Development for More Livable Communities. Local Government Commission. Center for Livable Communities. http://www.lgc.org/freepub/docs/community_design/focus/compact_development.pdf

density that can support public transportation. Consider places in central Ohio where development is more compact like German Village, Victorian Village, Old Town Worthington, or Downtown Delaware. These local examples all share two key elements of compact development; they are relatively dense neighborhoods and they share quality, visually interesting design. While those are older established neighborhoods, compact development also applies to new development as well. Victorian Gate condominiums are a new development in the Short North district of Columbus designed to integrate into the surrounding environment. There are 160 units on 3.2 acres of land with businesses on the ground floor near a city park and a plethora of local businesses, restaurants, and employment centers not to mention ready access to alternative modes of transportation.

Privacy, another concern in denser areas, can also be accommodated in compact development if the design is carefully considered. Appropriate landscaping and carefully planned access points, like sidewalks, can all contribute to a sense of privacy even in an area where homes and businesses are closer to each other than might be the case in typical suburban development. When guidelines are developed for compact development, communities should ensure that privacy issues are addressed to enhance the attractiveness and success of the development efforts.

It is also worth noting that both the established and new areas feature not only density, but also a mix of uses (residences, workplaces, food/entertainment destinations) so residents can live, work, and play within a short walking, biking, or busing distance.

PARKING

One commonly cited compact development concern that may be raised is the issue of parking availability given the concentration of development. While compact development is conducive to alternative modes of transportation which can alleviate congestion and parking needs, it can also readily accommodate automobiles, particularly if the proper measures are taken. One such measure is shared parking. In fact, compact development can readily support shared parking due to the proximity of a mix of land uses with varying parking needs and peak parking times. Indeed, compact mixed-use, pedestrian-oriented commercial nodes are the ideal areas to utilize shared parking.[37] The shared parking concept can be utilized in traditional compact neighborhoods as well as new compact development to accommodate parking needs.

Communities may encourage development to utilize pervious pavers in the established parking areas. Using pervious pavers reduces the impervious surface area and increases rainwater infiltration while simultaneously reducing the amount of stormwater runoff that would otherwise occur. Impervious surface area is the largest cause of stormwater runoff due to development.[38] Landscaping can be incorporated into the design to increase precipitation infiltration and to enhance the attractiveness of the parking areas, but alternatives to typical concrete or asphalt can greatly increase infiltration. These pavers can take many forms including latticed brickwork, permeable concrete mix, or spaced stonework.

Parking areas should also be walkable. The generally preferred parking space to door distance a person is willing to walk ranges from about 400 to 800 feet with the maximum

[37] Capitol Region Council of Governments (CRCOG) (2006). Best Practices Manual. Shared Parking: Fact Sheet. http://www.crcog.org/publications/CommDevDocs/TCSP/Ch08_FactSheet_Parking.pdf

[38] ODNR Division of Soil and Water conservation (2006). Rainwater and Land Development Manual, Third Edition. Chapter 2: Post Construction Stormwater Management Practices. Ohio Department of Natural Resources; Web: http://www.dnr.state.oh.us/water/rainwater/default/tabid/9186/Default.aspx

approximately 1,200 feet.[39] Distance is only one component of walkability; creating visual cues such as marked walkways, decorative pavers, and landscaping integrated into the parking areas can assist in the safe flow of pedestrian traffic. This is a critical component of creating safe, usable shared parking in a thriving, pedestrian-friendly compact development.

The various facets of compact development work in tandem to create an overall quality community. This certainly continues to be true of shared parking. For example, the compact design and mix of uses creates circumstances that may only require parking once and using alternative modes of transportation to make trips to a number of stores, entertainment venues, or restaurants. Careful planning ensures that efforts to create a quality neighborhood can be coordinated as best as possible. Communities are encouraged to investigate whether the zoning code in place prohibits the use of alternative pavement in parking lots or sidewalks, the number of parking spaces required for each use, and whether shared parking is an alternative available to developers and businesses.

TRANSPORTATION

The ways in which we get around bear direct relation to the ways in which our communities develop. In other words, land use development and transportation are inextricably linked. According to Robert Cervo, the director of the University of California Transportation Center, "How these places are developed and designed – their densities, mixture of uses, site layout, parking provisions, and so on - sets the stage for virtually all commuting behavior." [40]

Compact development is conducive to a population density that can support alternative transit options. Coordinating transportation and land use decisions can produce communities that maximize the efficient use of both land and infrastructure. It is important to integrate transportation options into the design of the development and the layout of the land use. For example, by adhering to the principles of compact development such as a well defined street hierarchy, you are also designing a community that is conducive to convenient bus transit routing by promoting navigable roadways where transit can be targeted to major thoroughfares while maintaining a walkable distance to other areas.

Another function of compact development is that it encourages a mix of uses. Public transit, bicycling, and ride-sharing are particularly suited to this kind of development because they are characterized by a range of uses like residences, employment, shopping, dining, and entertainment establishments with a common origin and destination point in an accessible compact area. This provides citizens with access to a variety of land use destinations with the potential for a greater number of transportation options. More transportation options also provide better access to community amenities for a greater number of people who may or may not have the option of utilizing a personal automobile or who elect to forego personal automobile use.

[39] Capitol Region Council of Governments (CRCOG) (2006). Best Practices Manual. Shared Parking: Fact Sheet. http://www.crcog.org/publications/CommDevDocs/TCSP/Ch08_FactSheet_Parking.pdf

[40] Cervero, Robert, America's Suburban Centers (Unwin Hyman, Boston MA: 1989), pg. 18. Planning and Development Guidelines for Public Transit—COTA

ECONOMICS

As communities look to do more with less money, more efficient use of infrastructure and service dollars is imperative. Compact development may offer a number of economic benefits to communities. Research shows that compact development can save taxpayer money and improve the regional economic outlook as well.[41] Research from The Brookings Institution Center on Urban and Metropolitan Policy shows the following economic benefits are possible due in part to more compact development patterns and other principles of smart growth:

- Public infrastructure and service delivery costs can be reduced through careful planning and design such as Compact Development.
    - 11.8 percent ($110 Billion) from 25-year road building costs
    - 6 percent ($12.6 Billion) from 25-year water and sewer costs
    - 3.7 percent ($4 Billion) from annual operations and service delivery
    - Reduced school construction costs
- Regional economy can be boosted and overall economic conditions can be enhanced because compact development, particularly mixed use, creates a strong sense of "place" with attractive urban centers and dense labor markets. Efficient transportation systems are also possible under compact development conditions.
- Suburbs also benefit from vibrant development cores.

Infrastructure includes sewer lines, water lines, electrical lines, roadways, trails, sidewalks, and more. Community services range from police and fire service areas, schools and school bussing, public transportation lines, and access to community facilities like libraries and senior centers. Compact development seeks to make efficient use of the existing community investment in infrastructure and services, a financially prudent policy.

Consider the financial costs of sprawling development versus more compact development. A well known example of sprawl and the associated economic blight can be found in Cuyahoga County of northeastern Ohio, home to the City of Cleveland. Over the course of 50 years, the amount of developed land in the county nearly tripled, while population increased by only 0.3 percent. Consider this example in terms of the amount of new infrastructure and new community service area required to accommodate expansive development over a larger geographic area in the face of a minimal increase in population. Community tax revenue that might otherwise be used to maximize investment in existing community services and infrastructure is instead required for both existing infrastructure and communities services *in addition* to new infrastructure and extension of community services into outlying areas of the county. Because the population stagnated, this also means that the per capita cost of providing public services rose significantly.

BENEFITS

- Reduction of overall watershed-wide impervious surface coverage
- Create compact, livable, and walkable communities
- Save on infrastructure and community service costs
- Create an environment conducive to a range of transportation options
- Preservation of open space and agricultural land

[41] Muro, M. and Puentes, R. (2004). Investing in a Better Future: A Review of the Fiscal and Competitive Advantages of Smarter Growth Development Patterns. The Brookings Institution Center on Urban and Metropolitan Policy.

RECOMMENDATIONS

1. Use the Balanced Growth Planning maps to assist in identifying development and redevelopment areas that would benefit from a compact development concept.
2. When updating comprehensive plans, consider incorporating elements of the Priority Area maps.
3. Consider the planning efforts of neighboring communities and the context of the compact development within a regional scope.
4. Look for ways to incorporate a mix of uses into districts that have traditionally been single-use, such as office districts and major retail uses.
5. Consider developing specific planning concepts for individual districts or neighborhoods that address land use; street hierarchy and parking; retail, office and residential markets; resource protection opportunities; and open space/recreation needs.
6. Develop a street design and parking strategy that incorporates a range of transportation options. Look for opportunities for shared parking. Ensure that adequate parking is provided for the typical condition rather than the peak. While making an effort to ensure that parking does not compromise pedestrian scale, short walking distances, and access to public transportation.
7. Encourage environments that are generally friendly to transit and pedestrians.
8. Appraise incorporating design guidelines to ensure visual interest and enhance architectural and building diversity. Develop design guidelines that enhance the vibrancy and quality of the development area. Consider historic preservation ordinances to preserve the historic nature of neighborhoods where appropriate.

MODEL REGULATIONS

Urban: Columbus TND ordinance
http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=WS8bxFsp8mk%3d&tabid=66

Urban: Columbus Urban Commercial Overlay
http://assets.columbus.gov/development/planning/UrbanCommercialOverlay.pdf

Urban/Suburban: Franklin County Smart Growth Overlay
http://www.franklincountyohio.gov/commissioners/edp/planning/smartgrowth/SGOapprovedBCC8-9-11.pdf

Small town: Wisconsin ordinance
http://www.balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=o5n97E3y%2boY%3d&tabid=66

Rural/village: Mantua Village ordinance
http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=HmFG7Fqk9qQ%3d&tabid=66

Major retail: South Euclid/University Heights ordinance
http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=X0Qfz9wgcyM%3d&tabid=66

Historic Preservation: Model ordinance
http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=FEj3Tca%2fjjU%3d&tabid=66

"Smart growth focuses growth in existing communities to avoid sprawl; and advocates **compact**, transit-oriented, walkable, bicycle-friendly land use, including neighborhood schools, complete streets, and mixed-use development with a range of housing choices. Its goals are to achieve a unique sense of community and place; expand the range of transportation, employment, and housing choices; equitably distribute the costs and benefits of development; preserve and enhance natural and cultural resources; and promote public health."

–Livability in Transportation Guidebook, U.S. Department of Transportation

Transfer of Development Rights

PDA PCA PAA

Transfer of Development Rights (TDR) is a voluntary, market based land conservation program that allows landowners in an area that is not suitable for development to sell their development rights to be applied to land in an area that is suitable for higher density development. This exchange would simultaneously promote the preservation of agricultural land and allow for more compact development in appropriate areas. There are many potential benefits associated with compact development patterns including reduced impervious surfaces, the efficient use of existing infrastructure, and the preservation of open space and farmland (see Page 73 Compact Development tool for more information).

A simple TDR program would set up a process and mechanism that allows landowners in areas that are prioritized for conservation, also referred to as "sending" areas, to sell the development rights to their property to landowners or developers in areas that are prioritized for development, also referred to as "receiving areas."[42] In some cases, a density bonus will be incorporated into TDR programs to provide additional incentives for participation. TDR does not replace zoning. In fact, to be successful, TDR relies on strong comprehensive planning and local zoning codes that designate "sending" and "receiving" areas.

The strengths of TDR programs are that they are market-based and voluntary. Land owners are free to decide whether or not they would like to sell the development rights to their property or retain them to potentially develop their land at some point in the future. The market-based approach is an attempt to make the land conservation process more equitable for landowners in areas that are not the most suitable for development. Despite these benefits, there are a number of challenges associated with implementing successful TDR programs. First, as mentioned earlier, strong comprehensive planning and/or zoning must already be in place to ensure the success of a TDR program. This is because it is necessary to have established "sending" and "receiving" areas in order to price adequately the development rights that are being transferred. Also, strong local planning and zoning are essential components because they provide an incentive for the purchase of additional development rights by capping the degree of density that is permitted in "receiving" areas without the purchase of those rights.

Another challenge to the local implementation of TDR programs is that they may encounter opposition from the public. This opposition could be related to a misunderstanding of the voluntary, market-based nature of TDR. It may, however, be necessary for communities to invest both time and resources in educating the public about TDR programs in order to achieve broad public support. Finally, implementing a TDR program can be difficult because it often requires additional administration beyond that of traditional planning and zoning.[43] Despite these challenges, however, a successful TDR program is a useful tool for encouraging the preservation of open space while also incentivizing more compact development.

The designation of Priority Conservation Areas (PCAs) and Priority Development Areas (PDAs) through this Balanced Growth Planning process could serve as a starting point for communities

[42] Ohio Lake Erie Commission. Linking Land Use and Lake Erie: Best Local Land Use Practices.

[43] Hanly-Forde, J., Homsy, G., Bieberknecht, K., Stone, R. Transfer of Development Rights Programs: Using the Market for Compensation and Preservation. Cornell Cooperative Extension; Web: http://government.cce.cornell.edu/doc/html/Transfer%20of%20Development%20Rights%20Programs.htm

that are interested in locally implementing TDR programs. A close examination of the designated PCAs and PDAs could help communities determine their designations for "sending areas" and "receiving areas". Currently, development rights can be exchanged within a single jurisdiction. A change to Ohio law would be necessary in order to have a TDR program that crosses jurisdictional boundaries.

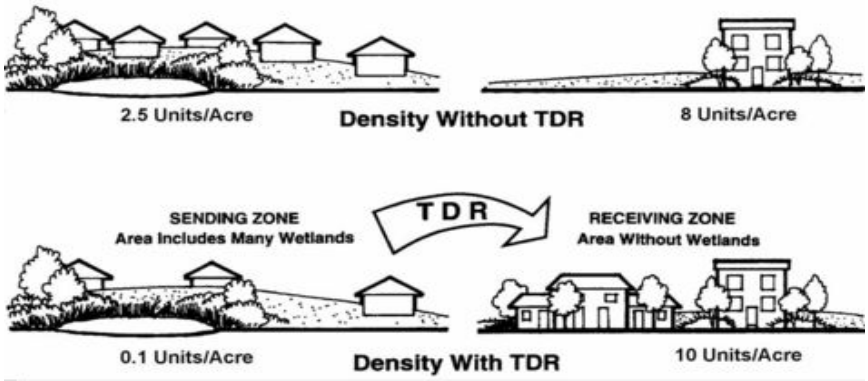
BENEFITS

- Voluntary approach to land conservation
- Permanent conservation of critical environmental areas, areas of cultural/historic significance, and/or critical habitats
- Preservation of agricultural land
- Allows landowners to be compensated for the development value of their land
- Higher density allowances in "receiving" areas allows more profitable development

RECOMMENDATIONS

1. Use Balanced Growth Priority Areas to designate "sending" and "receiving" areas.
2. Educate the public about the potential benefits and applicability of TDR programs.
3. Promote the adoption of state legislation in support of Transfer of Development Rights.
4. Encourage strong design for compact developments that are built in "sending areas" as a result of TDR programs.

Figure 5. Illustration of Transfer of Development Rights



Source: http://www.smartgrowthvermont.org/

Brownfield Redevelopment

PDA

Brownfield Redevelopment is the remediation and redevelopment of a site or group of sites that may have been contaminated by previous land uses or business activities. The U.S. EPA defines a brownfield as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant."[44]

Prioritizing development in areas served by existing infrastructure is a goal of the Balanced Growth Planning initiative. By their nature as previously developed sites, brownfields are generally located in such areas. Many brownfields are former industrial and manufacturing sites located in or near urbanized areas. The reuse of these sites allows development to occur without the conversion of open space or agricultural lands and limits the costly expansion of sewer, water, and transportation infrastructure. Also, the redevelopment of brownfield sites provides opportunities to incorporate transportation components that can improve overall mobility in existing communities.[45]

In addition, brownfield redevelopment can help communities support job creation near their existing population base, thereby increasing local tax revenues. Based on a 2000 survey of 231 cities, the U.S. Conference of Mayors estimated that 550,000 jobs and $2.4 billion in additional annual tax revenues could be generated as the result of brownfield redevelopment in urban areas.[46]

One of the greatest obstacles to brownfield redevelopment is the perceived risk of existing or continuing contamination and questions of related liability.[47] Uncertain standards for site remediation, complicated regulations, and a lack of funding or access to funding are other issues that can prevent the revitalization and reuse of brownfield sites. Businesses and developers are hesitant to locate in or develop a site if there is a potential for them to be held liable for past activities. Therefore, reducing risk is an important component of any programs that seek to encourage or incentivize the redevelopment of brownfield sites.

> *"As urban or town centers hollow out, commuting distances grow, expanding new construction takes farmland and open space, major investments in infrastructure are required to serve new areas while existing infrastructure in developed areas is underutilized and may deteriorate over time due to underfinanced and inadequate maintenance."*
>
> *Source: Public Strategies for Cost Effective Community Brownfield Redevelopment (p.5)*

The State of Ohio has created a Brownfield Redevelopment Toolbox to guide communities through the brownfield redevelopment process.

[44] U.S. EPA Brownfields and Land Revitalization; Web: http://epa.gov/brownfields/overview/glossary.htm

[45] U.S. Department of Transportation (2010). Livability in Transportation Guidebook: Planning Approaches That Promote Livability. U.S. Department of Transportation, 2010. (p. 15)

[46] McCarthy, L. (2002). The brownfield dual land-use policy challenge: reducing barriers to private redevelopment while connecting reuse to broader community goals. Land Use Policy 19, p. 287-296.

[47] VanLandingham, The Stormstown Group, W., Myer, B. (2002). Public Strategies for Cost-Effective Brownfield Redevelopment. University of Louisville Center for Environmental Policy and Management; Web: http://cepm.louisville.edu/Pubs_WPapers/practiceguides/PG1.pdf

While the target audience for the Toolbox is small and rural communities, much of the information and recommendations contained within the document are also applicable to larger communities.

The Toolbox can be accessed online at the following link:

http://www.epa.state.oh.us/portals/30/SABR/docs/Ohio%20Brownfield%20Toolbox.pdf

There are a variety of programs available to assist communities with brownfield redevelopment. The following programs are all designed to facilitate the investigation, clean-up, and redevelopment of brownfield sites in Ohio:

BROWNFIELD REDEVELOPMENT PROGRAMS

Targeted Brownfield Assessments

One of the greatest challenges to brownfield redevelopment is a concern over liability if environmental contamination persists after clean-up and redevelopment. The U.S. EPA Targeted Brownfield Assessments (TBA) program was developed to help address some of the uncertainties of contamination.[48] In Ohio, Targeted Brownfield Assessments are provided at no cost to local governments through a non-competitive program funded by federal and state sources. Local governments must apply to the Ohio EPA for this program and projects are funded on a rolling basis, depending on available funds. Through the TBA program, the Ohio EPA provides Phase I Property Assessments, Phase II Property Assessments, and Asbestos Inspections. For more information, visit the Ohio EPA's website at http://www.epa.ohio.gov/derr/ACRE/sifu/fieldtechasst.aspx.

Ohio EPA Voluntary Action Program

Created in 1994, the Voluntary Action Program (VAP) was established to provide a way for companies to investigate potential contamination on a site and clean up the site in exchange for assurance from the State of Ohio that no further cleanup would be required. The VAP seeks to reduce some of the risk that was associated with brownfield redevelopment prior to its adoption by releasing the redevelopers and future owners of liability related to past contamination that has been remediated.[49]

After site cleanup, a certified professional will investigate the site to determine if the U.S. EPA standards for remediation have been met. If the site meets U.S. EPA cleanup standards, the investigator will prepare a No Further Action (NFA) letter. The Ohio EPA will then review the NFA and, after confirming that cleanup standards have been met, issue a covenant not to sue (CNS).

Clean Ohio Assistance Fund

The Clean Ohio Assistance Fund is a discretionary grant program that is designed to provide financial assistance for brownfield site assessments and remediation in designated Ohio Priority Investment Areas. Through this program, grants of up to $300,000 are awarded for environmental site assessments and grants of up to $750,000 are awarded for remediation projects. The Ohio Department of Development (ODOD) accepts, reviews, and approves applications on an ongoing basis. As of December 2010, 176 projects had been funded (121 Phase II Assessments and 55 Cleanups) for a total of $63,561,613.[50]

[48] U.S. EPA. Brownfields and Land Revitalization; Web: http://epa.gov/brownfields/grant_info/tba.htm

[49] Ohio EPA (2009). Ohio's Voluntary Action Program Fact Sheet. Ohio EPA; Web: http://www.epa.ohio.gov/portals/30/vap/docs/fact1.pdf

[50] State of Ohio Clean Ohio Fund; Web: http://clean.ohio.gov/BrownfieldRevitalization/

Clean Ohio Revitalization Fund

The Clean Ohio Revitalization Fund is a statewide competitive program that provides financial assistance in the form of grants up to $3 million to assist communities with the purchase, cleanup, and improvement of infrastructure on designated brownfield properties. Applicants to this program must be a local government, port authority, or conservancy district. Communities that adopt a state endorsed Balanced Growth Plan will be eligible for incentives related to this program. Specifically, communities that locally adopt a Balanced Growth Plan can receive up to three points in the base calculation of the grant application if the proposed Clean Ohio Revitalization project is located in a Priority Development Area.[51]

OWDA Brownfield Loan Fund

The Ohio Water Development Authority (OWDA) Brownfield Loan Fund is a program that provides low-interest loans for the assessment and cleanup of brownfield sites. Eligible applicants for this program include both governmental agencies and private entities. The program provides loans of up to $5 million for cleanup activities or up to $500,000 for environmental assessments. The assessment and cleanup activities must meet the standards of the Ohio Voluntary Action Program (VAP) and result in economic development through the redevelopment and use of the site by a known end user.[52]

Green Columbus Fund

The Green Columbus Fund is a reimbursement grant program that uses financial incentives to encourage sustainable development and redevelopment. Private businesses and non-profits can apply for grants to either redevelop Brownfield sites or to build green in Columbus. As of July 2011 Columbus has awarded five grants for Brownfield assessment.

BENEFITS

- Potential to lower municipal costs through efficient use of existing infrastructure
- Reduces negative effects related to disinvestment in established communities and neighborhoods
- Limits sprawl or development of greenfield sites
- Creates jobs and increases tax revenues in established communities
- Improves environmental conditions

RECOMMENDATIONS

1. Work with landowners and developers to encourage and incentivize the redevelopment of brownfield sites.
2. Designate brownfield sites that have redevelopment potential and are located near existing infrastructure as Priority Development Areas in order to make these sites eligible for additional incentives through the state's Clean Ohio Assistance Fund
3. Consider area-wide impacts to prioritize potential brownfield redevelopment projects.

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[51] Ohio Balanced Growth Program (2011). Special Incentives; Web: http://balancedgrowth.ohio.gov/LinkClick.aspx?fileticket=As5V8T_ix-s%3d&tabid=56

[52] Ohio Department of Development, Urban Development Division. Brownfield Loan Program; Web: http://development.ohio.gov/Urban/BLP.htm

Exactions and Impact Fees

PAA PCA PDA

Exactions and impact fees are tools communities can use to influence local land use decisions by disincentivizing development in areas that are not served by existing infrastructure and services. Exactions allow local governments to impose conditions or financial obligations on a developer for development in areas that require an extension of infrastructure or services. To frame exactions and impact fees another way, they can be thought of as infrastructure and community service financing to account for an increased use of a public good due to expanded development. The authority to impose impact fees or exactions comes from the broad police powers granted to local governments to protect the health, safety, and welfare of its citizens and do so through protecting communities from the negative impacts of growth.[53]

Two landmark Supreme Court cases are critical to consider for communities seeking to impose exactions or impact fees on developers; namely, the Nollan v. California Coastal Commission case and the Dolan v. City of Tigard case. These cases taken together establish the necessary conditions in which exactions or impact fees are legal and appropriate. In these cases, the U.S. Supreme Court found that it was necessary to establish a nexus (a reasonable relationship) between conditions imposed on permitting development and the legitimate interests of the community and that the exaction must be roughly proportional to the impact caused by the development. [54]

There are several types of exactions that communities across the country utilize to pass part of the cost of providing public facilities and services on to the developer at the time of development rather than over time through bonds or taxes. While each exaction tool seeks to achieve similar ends, the means are slightly different. Key examples include:

- Dedication- Developer required to dedicate land or facility for public use on development site
- Tap Fees- Developer must pay for the cost of connecting new development into existing infrastructure network
- Fee-in-lieu- Developer pays a fee to the community to provide public facility elsewhere in lieu of providing an on-site dedication where providing such facility on site is impractical
- Impact Fee- One-time fees are paid by the developer as a means to off-set the cost of the need for the community to provide additional public services and infrastructure necessitated by the new development

For more specific instances of exactions in Ohio and the case law supporting the employment of such methods, please see Development Impact Fees: The Ohio Situation (http://ohioline.osu.edu/cd-fact/pdf/1558.pdf).

The appropriate method for exacting is to be determined by each community upon legal consultation and provided the necessity to adopt such methods is based on the growth the community is experiencing or is expected to experience. Exaction and impact fees can be excellent planning tools to promote thoughtful development with efficiency and fiscal responsibility at the forefront of the community's efforts. The adoption of exactions/impact fees should be very carefully considered by communities to avoid a "taking" of the property and subsequent legal action on behalf of the land owner or developer. While the prospect of legal action exists, communities

[53] Evans-Cowley, J. (2006). Development Exactions: Process and Planning Issues. Lincoln Institute of Land Policy.
[54] Freeman, B., Shigley, P., Fulton, W. (2007). Land Use: Exactions and Impact Fees. FACSNET Land Use. http://www.impactfees.com/publications%20pdf/nat9exactions.pdf

should not be deterred from exploring exaction and impact fees as viable planning tools, as the use of each has been upheld in Ohio court cases and can provide communities with a means to recover the costs of growth.

To learn more about the history of exactions and impact fees, legal considerations, examples, and other information, read Development Exactions: Process and Planning Issues (http://www.lincolninst.edu/subcenters/teaching-fiscal-dimensions-of-planning/materials/evans-cowley-planning.pdf) distributed by the Lincoln Institute of Land Policy.

BENEFITS

- Promotes thoughtful development efforts in the community
- Provides an additional way for the community to provide and finance necessary community services and infrastructure
- Engages the developer and the community in a discussion early on regarding the impacts of a development on the community as a whole

RECOMMENDATIONS

1. Communities are encouraged to assess their own need to impose exactions or impact fees on development as a means to recover infrastructure and community service expenses incurred from the new development.
2. Communities are encouraged to read the documents linked in this plan for a more detailed account of the history and purpose of exactions and for case law examples of exactions and impact fees to assist in the decision to pursue such regulations.
3. Communities should consult directly with their planning staff and legal attorney or consultant to assist in drafting appropriate ordinances and regulations for exactions.

Complete Streets

PDA

Complete Streets are streets that have been designed to accommodate all users safely and comfortably. Complete streets consider the needs of motorists, cyclists, pedestrians, transit and school bus riders, delivery and service personnel, freight haulers, and emergency responders, regardless of age and physical ability.[55]

The concept of complete streets has been gaining acceptance and popularity among a variety of different groups including planners, public health professionals, and advocates for the aging. This is because traditional transportation planning, with its primary focus on accommodating the automobile, has often failed to consider the needs and safety of other users of the transportation system. The goal of transportation planning and engineering for many years was to move as much motorized traffic as quickly as possible.[56] According to the U.S. Department of Transportation's *Livability in Transportation Guidebook,* this focus has resulted in the development of "one of the world's largest and best highway networks. However, we have not yet put the same efforts into completing a system that works as well for walking, wheeling, or taking transit in most communities."[57]

Complete streets is not a single tool, but a collection of tools and design elements that can

[55] Mid-Ohio Regional Planning Commission (MORPC) (2010). Complete Streets Policy; Web: http://www.morpc.org/trans/CompleteStreets_MORPC_CS_PolicyFINAL2010-03-31.pdf

[56] Smith, R., Reed, S., Baker, S. (2010)."Street Design: Part 1—Complete Streets." Federal Highway Administration. *Public Roads, Vol. 74 No. 1.* Web: http://www.fhwa.dot.gov/publications/publicroads/10julaug/03.cfm

[57] U.S. Department of Transportation (2010). Livability in Transportation Guidebook: Planning Approaches That Promote Livability (p. 1).

be applied to achieve the goal of making our streets safer and more comfortable for all users. Complete streets can be achieved through the inclusion of a variety of design elements including sidewalks, curb extensions, bike lanes or paved shoulders, designated lanes for public transit, traffic calming devices, and improved signage. A good complete streets policy will be flexible, allowing the elements incorporated to comply with the policy standards to vary from location to location. Different types of roads will call for different treatments. The National Complete Streets Coalition (http://www.completestreets.org/) is a strong advocate for complete streets policies and a great resource for communities that are interested in applying this tool locally. The following is a sampling of potential treatments that can be incorporated, depending on context, to improve the functionality of our streets for all users. For more information, visit the National Complete Streets Coalition's *Resources* page on their website at http://www.completestreets.org/complete-streets-fundamentals/resources/.

COMPLETE STREETS TREATMENTS

Sidewalks

Sidewalks improve mobility and safety for pedestrians by providing a place for them to walk that is separated from automobile traffic.[58] There are a number of design elements that can be considered to improve the functionality of sidewalks for all users. For example, wider sidewalks with planted buffer strips provide greater safety and mobility by protecting pedestrians from street traffic and allowing space for wheelchairs or multiple pedestrians to travel. MORPC's Complete Streets Policy recommends a minimum sidewalk width of 5 feet in order to accommodate two pedestrians walking side-by-side. The addition of street trees to the planted buffer strips can make walking a more pleasurable experience by providing shade and improving the aesthetics of the environment.[61]

Bike Lanes

Bicycling is once again gaining acceptance as a viable mode of transportation. Although bicyclists are allowed to use the full lane on most roads, except for those with limited access like freeways, providing dedicated space for bicyclists can increase the safety and comfort of riders. Bicycle lanes and paved shoulders provide space for people to ride their bikes along existing roads without riding in the same lane as automobile traffic. According to the National Complete Streets Coalition, "for typical U.S. cities with populations over 250,000, each additional mile of bike lanes per square mile is associated with a roughly one percent increase in share of workers commuting by bicycle."[59] This shift in transportation mode share can help reduce congestion and emissions in our communities by reducing the number of cars on the roads.

> "While nearly four-fifths of Federal transportation funding goes to highway projects, almost 85 percent of people and jobs are in metropolitan areas, which offer the potential for significant improvements in multimodal travel choices."
>
> *Source: FHWA, Livability in Transportation Guide (p.1)*

[58] Axelson, P., Chesney, D., Galvan, D., Kirschbaum, J., Longmuir, P., Lyons, C., Wong, K. (1999). Designing Sidewalks and Trails for Access. Beneficial Designs, Inc.; Web: http://safety.fhwa.dot.gov/ped_bike/docs/ada.pdf

[59] National Complete Streets Coalition; Web: http://www.completestreets.org/complete-streets-fundamentals/factsheets/change-travel-patterns/

Traffic Calming

Traffic calming devices are applied to streets to encourage drivers to slow down and be more aware of their surroundings. Traffic calming can be achieved in a variety of ways including the installation of traffic circles (or roundabouts), street trees, curb extensions, speed bumps, raised medians, and rumble strips.[60] Traffic calming devices discourage non-local traffic and slow vehicles down, resulting in a safer and more pleasant environment for pedestrians and cyclists. Traffic calming can also help improve retail environments and support local economic development.

Complete streets is a flexible tool that can be applied to improve mobility within all types of communities, from urban to suburban to rural. Some of the other tools that have been described in this toolbox will be more successful if complete streets treatments are included with implementation. For example, complete streets will provide multiple transportation options to people living in compact developments. Also, the increased density and mix of uses promoted in the compact development tool will encourage residents and visitors to walk or bike between destinations or take public transit if those options are available, accessible, and safe. The benefits of promoting complete streets in compact development include increased transportation options, public health benefits through promotion of active transportation, improved safety for pedestrians and cyclists, a reduced overall need for parking spaces, and the potential to decrease congestion by providing safe alternative forms of transportation.

In March 2010, MORPC adopted a Complete Streets policy for the Columbus Metropolitan Planning Organization (MPO) boundaries, which means that all project sponsors receiving MORPC-attributable transportation funding will need to comply with the policy when designing and building their roadway projects. The Columbus MPO includes Franklin and Delaware Counties, Etna Township and the City of Pataskala in Licking County, and Bloom and Violet Townships in Fairfield County. MORPC is currently in the process of developing a "Regional Complete Streets Toolkit" that will contain model policies, engineering, educational and enforcement strategies, and information on other resources to assist local communities in the development and implementation of their own complete streets policies.[61] When it becomes available, this Toolkit will be shared with the Balanced Growth Planning communities.

For the full adopted Complete Streets policy and an accompanying checklist, go to

http://www.morpc.org/transportation/complete_streets/completeStreets.asp.

BENEFITS

- Access for all users, regardless of age and physical ability
- Considers the safety and comfort of users
- Provides choice with regards to transportation mode
- Reduction in Vehicle Miles Traveled (VMT)
- Provides opportunities for physical activity

[60] Project for Public Spaces. Traffic Calming 101; Web: http://www.pps.org/articles/livememtraffic/

[61] Mid-Ohio Regional Planning Commission (MORPC) (2010). Complete Streets Policy; Web: http://www.morpc.org/trans/CompleteStreets_MORPC_CS_PolicyFINAL2010-03-31.pdf

RECOMMENDATIONS

The following recommendations are included in MORPC's Complete Streets Policy which was approved by the MORPC Board on March 12, 2010 through the passing of Resolution T-6-10:

1. All users should be considered during the entire life cycle of a project, including planning, design, construction, operations, and maintenance.
2. Street furniture, such as bike racks or benches, should be considered as part of all projects as long as they do not impede any user.
3. When designing a facility that includes or crosses an existing or future transit route, ensure that the appropriate pedestrian and wheelchair access is provided to and from the transit stops.
4. Traffic-calming elements including, but not limited to, landscaping, street trees, and narrowing of lanes, should be considered where safe and appropriate.
5. Project sponsors should consider including street trees and landscape components, with careful analysis of tree, site, and design considerations.
6. Special consideration should be given to future planned facilities or services.
7. Each project design should be coordinated with appropriate access management strategies. Access management strategies should consider the placement of sidewalks and ramps to eliminate sight distance issues.
8. Although this policy focuses on engineering projects, the project sponsor should provide education, encouragement, and enforcement strategies during or after the project. The education component should include government officials, developers, and the public. A toolkit designed by MORPC staff will provide best practices, ideas, and resources to help with these efforts (see Implementation section).
9. While this policy focuses on transportation, local governments should review their land use and zoning policies to provide for mixed land use developments and projects that provide direct nonvehicular connections within a given development.
10. Each local community should regularly update its project design standards and procedures and train its staff to adhere to them.
11. Local governments are encouraged to adopt their own Complete Streets policies, consistent with this regional policy and federal and state design standards. State governments should work with the local Metropolitan Planning Organizations to ensure consistency in polices at the state, regional and local level.

REQUIREMENTS

The following requirements are included in MORPC's Complete Streets Policy which was approved by the MORPC Board on March 12, 2010 through the passing of Resolution T-6-10. These requirements only apply directly to communities within MORPC's MPO planning area. However, they may be helpful for communities outside of the MPO that wish to locally implement complete streets policies.

1. Each project shall use the most appropriate design standards and procedures. For projects using MORPC attributable federal funding, it will be necessary to meet or exceed standards and procedures acceptable to the Ohio and U.S. Departments of Transportation, such as the Ohio Department of Transportation's Project Development Process and Location & Design Manual.
2. Designs shall include accommodation of all users and be sensitive to the context of the project setting. It is important to note that Complete Streets may look different for every project and road type. For example, wide lanes or paved shoulders may be

sufficient in a rural area, whereas sidewalks and/or bike lanes are needed in an urban setting. Also, when re-striping projects are considered, where the right-of-way will not change, options such as bike lanes, sharrows, and pedestrian crosswalks could still be implemented. More information and examples will be provided as part of the checklist and toolkit.

3. A systems approach shall be used in developing roadway projects, especially to ensure coordination with nearby jurisdictions, projects, and plans irrespective of the project sponsor.
4. If there is another project planned or in development near this project the two should be coordinated to ensure consistency in the facilities serving the corridor.
5. Logical termini should be chosen to include connections through "pinch points," such as overpasses, railroad crossings, and bridges. Logical termini should not be chosen so that the project ends before such a "pinch point" unless there is a compelling reason to do so.
6. If the project serves a destination point, such as a school, recreational facility, shopping center, hospital, or office complex, the project shall provide the opportunity for the destination to have access to the project's pedestrian and bicycle facilities.
7. Every project shall involve the local transit agency in the design process to ensure that sufficient accommodation of transit vehicles and access to transit facilities is provided. The project sponsor shall provide the local transit agency during Step 1 of the Project
8. Public transit facilities shall be designed with the goals of Complete Streets in mind, by including sidewalks, bicycle connections, or secure bicycle parking, among others.
9. Every project shall provide the opportunity for utility/telecommunications infrastructure to be appropriately accommodated to allow for existing and future growth. Efficient use of right-of-way during construction and maintenance should be considered to improve access to utility systems, including future broadband networks. This policy is not intended to create new rights for utilities outside those provided by existing law and contract.
10. Every project shall ensure that the provision of accommodations for one mode does not prevent safe use by another mode (e.g., a bus shelter should not block the clear walking zone on the sidewalk.

Economic Development Programs

PDA

There are several economic development programs and tools that could assist with implementation of the Balanced Growth Plan. Some of these programs, like Joint Economic Development Districts and Cooperative Economic Development Agreements, encourage collaboration between jurisdictions to achieve shared economic development goals. Other tools, like Tax Increment Financing, are generally implemented within a single community to target economic development investments to a specified area. All of the programs described in this section could be used to promote (re)development within designated PDAs and some of them may also be able to simultaneously promote the conservation of land in PCAs and PAAs.

The following is not a comprehensive listing of all available economic development programs and tools within the Walnut Creek Watershed. For more information on potential cross-jurisdictional approaches to implementing the economic development and conservation goals of Balanced Growth Planning, see the May 2010 report by Jill K. Clark and Peggy Kirk Hall of OSU Extension titled, "*Opportunity across Political Boundaries: Balanced Growth Watershed Plans and Cross-Jurisdictional Agreements.*"

Link to report:
http://cffpi.osu.edu/docs/Report051210.pdf

ECONOMIC DEVELOPMENT PROGRAMS

Cooperative Economic Development Agreements (CEDA)

One or more townships and one or more municipalities form an agreement to support economic development in a specified area. The agreement addresses service delivery and payment for services and designates a period of time during which annexation of the specified area cannot occur.

Joint Economic Development District (JEDD)

One or more townships and one or more municipalities within the same or adjacent counties form a district to facilitate economic development within the specified area. Within a JEDD, it is possible to impose a special income tax to produce additional revenue for infrastructure improvements within the district. The special income tax rate must be no higher than the highest income tax of any of the participating local governments. In many cases, residents from affected communities must vote in support of establishing the district, making it more challenging to establish a JEDD than a CEDA.

Community Reinvestment Area (CRA)

Established to provide tax incentives for investing in real property improvements or new construction in areas where investment in housing has been discouraged. A housing survey must be completed by the city, village, or county that seeks to establish a CRA. The survey is then submitted to the Ohio Department of Development to confirm that the identified area is one in which investment has been discouraged. Once established, the CRA allows property owners in the designated area to receive real property tax exemptions on qualifying improvements and new construction.

Tax Increment Financing (TIF)

An economic development mechanism that allows communities to fund local infrastructure improvements by locking the taxable value of real property when the TIF is established. Any payments that are made on increased assessed value of the real property within the TIF is directed to a separate fund that is used to fund infrastructure improvements within the TIF.

Special Improvement Districts (SID)

A single municipality or township or contiguous municipalities or townships develop and implement plans that benefit the district. These districts are formed to support the economic development efforts of neighborhood and downtown organizations. Section 1710 of the Ohio Revised Code states that a SID can be formed if the owners of at least 60 percent of the front footage of all the property within the district sign a petition to form the SID.

BENEFITS

- Allows jurisdictions to collaborate to achieve shared economic development goals
- Potential funding source for implementing compact, mixed-use development
- Could support Balanced Growth efforts by directing development to locally designated PDAs

RECOMMENDATIONS

1. Consider the utilization of economic development programs that promote shared economic development benefits.
2. Consider the utilization of economic development programs that support the direction of development incentives toward locations that can maximize the efficient use of existing infrastructure.
3. Consider potential impacts to water quality and locations of locally designated PCAs when developing economic development partnerships and programs in the future.

Farmland Preservation

PAA

Farmland preservation, or the act of retaining historically farmed land in production, is a key implementation tool for Priority Agricultural Areas designated by the WCPP through the Walnut Creek Watershed Balanced Growth Plan. The Ohio EPA identified the conversion of agricultural and forested land to residential, commercial, and industrial uses as one of the most serious threats to the biological integrity of the Walnut Creek. [62]

In addition to reducing major water quality pollution threats, conserving soil, and replenishing groundwater supply in the watershed, retaining agricultural land provides an economic development tool for surrounding residents. Land preservation scholar Lori Lynch reports that areas with preservation policies don't suffer from a shift from high-wage to low-wage jobs and communities with less farmland loss generally have higher employment rates and higher incomes than those that lose their surrounding farmland.[63] At the same time, agricultural land often produces more to a local jurisdiction in tax revenue than it costs in the farm's use of services.

Preserving agricultural land can reduce the cost of public services in relation to residential or commercial development to local municipalities. Second, the preservation of agricultural lands near urban areas provides an opportunity for farmers to contribute to the local food supply in the form of roadside stands, community-supported agriculture (CSAs), farm markets, and other direct farm sales (the central Ohio area

consumes approximately $7.5 billion per year on food). Third, preserving farmland indicates to local farmers that the surrounding community is committed to the agricultural industry, which has positive effects upon farmers' technological adoption, new skills development, debt reduction, and reinvestment in the farm for continuing, long-term production. Last, keeping land in farming helps to preserve the aesthetic of a "rural way of life," providing scenic views and wildlife habitat, which, according to Lori Lynch, are assets that people are willing to pay more for, with the highest values being in places where agricultural land is being lost most rapidly. These benefits can also attract tourists and new residents.

There are many farmland preservation methods that can support the partnership's efforts to target locally designated areas for continued, expanded and/or intensified agricultural activities due to their historical, cultural, natural or human-created traits which make them conducive to agriculture and related activities. Ideally, the following farmland preservation tools could be utilized across the watershed, particularly in Priority Agricultural Areas, to ensure the preservation of farmland and/or continued agricultural land use where communities have deemed appropriate.

[62] Ohio EPA (2010). Total Maximum Daily Loads for the Walnut Creek Watershed.
[63] Lynch, Lori (2007) Chapter 2: "Economic Benefits of Farmland Preservation" In The Economic Benefits of Land Conservation (pp. 13-23). The Trust for Public Land

Table 16. Farmland Preservation Programs

Farmland Preservation Tool	Description
Current Agricultural Use Valuation (CAUV)	CAUV is a financial tool that landowners with tracts of commercial farmland can utilize to assist in the continued use of their land for agriculture. This county auditor administered program allows enrolled commercial agricultural land to be assessed for taxes based on the current agricultural land use rather than how the land could be used in the future (i.e. actual agricultural value versus true market value). To be eligible, the agricultural land must have been used for commercial agriculture for the 3 years prior to application date and must either amount to 10+ acres or produce an average gross income of $2,500 dollars per year. To find out more, contact your county auditor. A list of county auditors can be found here http://www.caao.org/DIRECTORY/
Agricultural Districts	Enrolling land in an agricultural district ensures some protection against nuisance lawsuits in an effort to provide some safe-guard against development pressure for agricultural land. Agricultural Districts are County Auditor administered. The requirements to enroll in an agricultural district are the same as those specified to enroll in CAUV. Being enrolled in an agricultural district also allows cost assessment associated with the extension of utility lines to be deferred until the land is no longer enrolled in an agricultural district or land use is changed. For the Agricultural District definition as defined in Ohio State Code, visit http://codes.ohio.gov/orc/929 For additional information about Agricultural Districts, visit http://www.agri.ohio.gov/divs/FarmLand/Farm_AGDist.aspx
Agricultural Security Areas	Enrolling land in an Agricultural Security Areas (ASA) creates an area where agriculture is both encouraged and protected. A single entity or group of entities with 500 or more acres of contiguous farmland can apply to the county and board of trustees to enroll their qualifying land into an ASA for a 10-year period. These governing bodies and the applicants both agree to promote agriculture use of the enrolled land versus other land uses with a few exceptions permitted for single family residences. For an informational brochure, visit http://www.agri.ohio.gov/farmland/docs/Farm_ASA_Brochure.pdf
Agricultural Easements- Clean Ohio Agricultural Easement Purchase Program	Agricultural easements put deed restrictions on land that landowners voluntarily agree to in an effort to guard the land from development and to ensure continued agriculture use. The landowner maintains ownership of the land. Easements are legally binding and usually permanent arrangements. The Clean Ohio Agricultural Easement Purchase Program (AEPP) is administered by the Ohio Department of Agriculture (ODA). The ODA may purchase qualifying land to place in a permanent agricultural easement

	for the amount difference between market value and the agricultural value of the land. This tool is available to farms with 40+ acres of land where farmers are engaging in best management practices. For more information, visit http://www.agri.ohio.gov/farmland/Farm_AEPP.aspx
Estate Planning	To ensure that bequeathed farmland is smoothly transferred to the heirs, solid estate planning is required. The fate of the agricultural use of the land in the future depends on a number of factors including financial security, future agricultural planning, and transfer of agricultural assets. For more information on estate planning, visit http://ohioline.osu.edu/estate/
Farm and Ranch Lands Protection Program	The Farm and Ranch Lands Protection Program (FRPP) is a Natural Resources Conservation Service (NRCS) administered program to which proprietors of a working farm may apply working in conjunction with state and local government (or a land trust). The applying entities must secure at least 50 percent funding of the easement value of land in a fair market. The NRCS can match up to 50 percent of the funding to reimburse for the purchase of the easement if the land qualifies. In exchange, agricultural conservation easement is placed on the land. For more information visit: http://www.agri.ohio.gov/farmland/docs/FRPP_Information_20100709.pdf

Sources:
Ohio Agricultural Landowners Guide to Conservation and Sustainability. American Farmland Trust. 2006.
Ohio Department of Agriculture. http://www.agri.ohio.gov/ Retrieved September 2011.

BENEFITS

- Provides land owners and communities with a tool to preserve agricultural heritage and land use.
- Agricultural character of communities can be preserved for future generations.
- May provide compensation to the land owner in exchange for an agreement to keep land in agricultural use for a period of time.

RECOMMENDATIONS

1. Consider utilizing one of the farmland preservation programs as a tool to preserve agricultural where appropriate.
2. Target the use of the farmland preservation programs in areas designated as Priority Agricultural Areas.
3. Consult with community officials, the Ohio Department of Agriculture, and local Soil and Water Conservation Districts to determine whether one of the tools may be a viable option.

Agricultural Conservation Programs

PAA

It is critical that agriculture plays a role in the conservation effort to achieve balanced growth in the Walnut Creek watershed. As opposed to farmland preservation (keeping farmland in production), agricultural conservation programs seek to reduce the negative environmental effects of production (e.g. sediment loss). This often involves setting historically farmed land aside for the purposes of improving natural wildlife habitat and creating buffers between actively productive land and adjacent water bodies. According to water quality assessments by the Ohio EPA, agriculture is a major source of nutrient and sediment deposits into the Walnut Creek River.[64] Fortunately a number of conservation programs exist for farmers to help them reduce the transport of nutrient and sediment loads from their farm fields into surrounding water bodies. These programs, generally funded through the US Farm Bill, offer financial incentives for the conservation of historically farmed land.

For example, one federally funded, yet locally tailored conservation program, the Scioto River Conservation Reserve Enhancement Program (CREP) seeks to enroll up to 70,000 acres of "vulnerable riparian corridor and marginal farmlands into 15-year conservation set-asides."[65] The Walnut Creek watershed is included in the Scioto River CREP area.

There are a variety of federal cost share and dollar incentives for land set asides, and structural and management conservation programs that farmers in the Walnut Creek watershed are potentially eligible for. Table 10 features a variety of such programs.

These on-farm conservation programs are tools that the agricultural community should consider taking advantage of in an effort to enhance the physical environment and to further serve as good stewards of the land recognizing the value of the natural resources in the Walnut Creek Watershed. The main thrust of many of these programs is a coordinated effort to preserve vulnerable and valuable natural resources, acknowledging that agricultural production and environmental health are not mutually exclusive. The two can work together if carefully balanced and both agricultural productivity and environmental sensitivity factors are carefully weighed and considered when making land use decisions. The Ohio Agricultural Landowners Guide to Conservation and Sustainability produced by the American Farmland Trust provides a detailed description of many of these programs and can be accessed at: http://www.farmlandinfo.org/documents/31106/Final_AFT_OH_Guide.pdf

[64] Ohio EPA (2010). Total Maximum Daily Loads for the Walnut Creek Watershed.
[65] Ohio EPA (2010). Restoring and Protecting the Olentangy River.

Table 17. Selection of Major USDA Conservation Programs

Program	Description
Conservation Reserve Program (CRP)	The Conservation Reserve Program (CRP) provides annual rental payments and cost-share assistance to landowners in an effort to establish 10 to 15 year conservation covers on eligible farmland. CRP seeks to assist farmers in protecting environmentally sensitive land and surface water quality through the establishment of natural buffers, wetlands, and/or filter strips. Annual payments are valued based upon the agricultural rental value of the land, and provides cost-share assistance for up to 50 percent of the costs in establishing approved conservation practices. This program is administered by the Farm Services Agency (FSA). For more information contact your local FSA office or view the source below. Source: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp
Conservation Reserve Enhancement Program (CREP)	The Conservation Reserve Enhancement Program (CREP) stems from the CRP program described above. It is a federal-state partnership. CREP is based upon similar goals as CRP in terms of conservation covers and 10 to 15 year contracts with landowners. CREP differs from CRP in that it focuses on conserving environmentally sensitive agricultural land near streams, and provides generally higher rates and incentive payments. Land cannot be simultaneously enrolled in CRP and CREP, therefore landowners with an existing or pending CRP contract are not eligible for the CREP until the CRP contract expires. At present there is a CREP established specifically for the Scioto River watershed, which includes the Walnut Creek watershed. Source: http://www.mda.state.md.us/pdf/crepfaq1.pdf http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep
Conservation Stewardship Program (CSP)	The Conservation Stewardship Program (CSP) seeks to help landowners conserve land based upon conservation performance. It is based upon the notion of “the higher the performance, the higher the payment.” It provides two types of payments: 1) an annual payment for installing and adopting additional conservation practices, and improving, maintaining, and managing existing practices; and, 2) a supplemental payment for the adoption of resource-conserving crop rotations. This program is administered by the Natural Resource Conservation Service (NRCS). Source: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008

	143.pdf
Debt for Nature (DFN)	Debt for Nature (DFN), also known as the Debt Cancellation Conservation Contract Program, serves as a debt management tool while allowing for farmers to set aside land for conservation purposes. In exchange for conservation contracts of 10, 30, or 50 years, farmers can receive cancelation of a portion of their FSA indebtedness. To qualify a landowner must have an FSA farm loan in place. Highly erodible lands or those within a 100-year floodplain, wetlands, areas with important wildlife, cultural or aquifer recharge significance, and land adjacent to existing conservation areas are eligible for enrollment. The Farm Services Agency (FSA) administers this program. Source: http://www.fsa.usda.gov/Internet/FSA_File/debtfornature07.pdf
Mississippi River Basin Healthy Watersheds Initiative (MRBI)	As a part of the greater Mississippi River Basin, farmers within the Walnut Creek watershed are potentially eligible to enroll in a variety of conservation programs tied to the Mississippi River Basin Healthy Watersheds Initiative (MRBI). These programs include support for Cooperative Conservation Partnership Initiative (CCPI) projects, the Wetland Reserve Enhancement Program (WREP), and Conservation Innovation Grants (CIG). This program is administered by the Natural Resource Conservation Service (NRCS). For more information contact your local NRCS office or view the source below. Source: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcsdev11_023951.pdf
Environmental Quality Incentives Program (EQIP)	This NRCS-based program provides financial and technical support to assist farmers in planning and implementing conservation practices on their property. EQIP contacts provide financial assistance for up to 10 years. For more information contact your local NRCS office or view the source below. Source: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip

These on-farm conservation programs are tools that the agricultural community should consider taking advantage of in an effort to enhance the physical environment and to further serve as good stewards of the land recognizing the value of the natural resources in the Walnut Creek Watershed. The main thrust of many of these programs is a coordinated effort to preserve vulnerable and valuable natural resources, acknowledging that agricultural production and environmental health are not mutually exclusive. The two can work together if carefully balanced and both agricultural productivity and environmental sensitivity factors are carefully weighed and considered when making land use decisions. The Ohio Agricultural Landowners Guide to Conservation and Sustainability produced by the American Farmland Trust provides a detailed description of many of these programs and can be accessed at: http://www.farmlandinfo.org/documents/31106/Final_AFT_OH_Guide.pdf In addition, local Soil and Water Conservation Districts possess a wealth of knowledge in regard to current conservation programs. A list of contacts for the Soil and Water Conservation Districts serving portions of the Walnut Creek watershed is below:

Soil and Water Conservation District (SWCD) Contacts

Fairfield County Soil and Water Conservation District 831 College Ave., Suite B Lancaster, Ohio 43130	**Phone:** 740-653-8154 **Fax:** 740-653-1135 **Website:** http://www.fairfieldswcd.org
Franklin County Soil and Water Conservation District 1328 Dublin Road, Suite #101 Columbus, Ohio 43215	**Phone:** 614-486-9613 **Fax:** 614-486-9614 **Website:** http://www.franklinswcd.org/ **Email:** http://www.franklinswcd.org/contact-us/
Pickaway County Soil and Water Conservation District 110 Island Rd, Suite D Circleville, OH 43113	**Phone:** 740-477-1693 **Fax:** 740-477-3327 **Website:** http://pickawayswcd.org **Email:** pick@pickawayswcd.org

BENEFITS

- Provides agricultural land owners with opportunities to be stewards of the land by minimizing impacts on the environment and water quality.
- Educates land owners on methods to be proactive with regard to the environment while recognizing the value of the agricultural way of life.
- Financial incentives and technical assistance may be available to land owners

RECOMMENDATIONS

1. Consider utilizing one or more of the Agricultural Conservation Programs as a tool to reduce the impact of agriculture on the environment and water quality
2. Target the use of these tools in areas where land is used for agriculture and sensitive or significant natural features and waterways coexist in order to mitigate the impact of agriculture on the natural feature.
3. Work with the local Soil and Water Conservation District to investigate and implement best management practices to farm in an environmentally friendly manner.

Sewer Planning and the State 208 Water Quality Management Plan

PDA

The federal Clean Water Act requires each state to develop comprehensive water quality management plans. The first step in the process is basin planning (referred to as "section 303" planning) whereby a framework is developed to study water quality in an entire watershed. Ohio EPA oversees the State Water Quality Management (WQM) Plan. The State WQM Plan is a requirement of Section 303 of the Clean Water Act (CWA) and must include nine (9) discrete elements:

1. Total maximum daily loads (TMDLs)
2. Effluent limits
3. Municipal and industrial waste treatment
4. Nonpoint source management and control
5. Management agencies
6. Implementation measures
7. Dredge and fill program
8. Basin plans
9. Ground water

Many of the elements required by Section 303 of the Clean Water Act overlap with those of Section 208 of the Clean Water Act (elements 3-9 above). The term "208 plan" is short for Areawide Waste Treatment Management Plan, a plan prepared pursuant to Section 208 of the Clean Water Act. Other titles used interchangeably with "208 plan" are "208 water quality management plan" and "areawide water quality management plan." The 208 plans are prepared by the State of Ohio or one of six areawide planning agencies. Each of these plans must involve an inclusive planning process that incorporates the views and concerns of all affected parties in the area. By law, the U.S. EPA and Ohio EPA (OEPA) cannot provide funding for, or issue

certain discharge permits to, waste treatment facilities that are not built or operated by a designated management agency or not built or operated in accordance with the areawide (section 208) plan.

Since the presence of sanitary sewer infrastructure plays a prominent role as one of the criteria for identifying Priority Development Areas it makes sense to utilize sewer planning as a tool to direct development towards PDAs and away from PCAs and PAAs. Sanitary sewer infrastructure is closely associated with where, when, and how development occurs. Its presence generally insures additional development in an area and its absence limits the intensity of development that can be built, though plans for development can and often do drive the expansion of sewer service. It is for this reason that the process of updating the State's 208 can be a powerful tool not only for directing development to PDAs but adding layers of protection for PCAs and PAAs.

Ohio EPA is responsible for developing and maintaining the 208 plan for the central Ohio region which includes the Walnut Creek Watershed. A community working with their local waste water utility can identify the boundaries of where sewer service will be available and where it will not be extended to.

Since Ohio EPA and the U.S. EPA cannot issue permits for or help fund projects that are in conflict with the 208 plan a community can use the plan to promote PDAs and protect PCAs and PAAs.

BENEFITS

- Prioritize allocation of scarce infrastructure funds to projects that support PDAs
- Help protect PCAs and PAAs by limiting sewer availability in those areas
- Local control of sewer planning

RECOMMENDATIONS

1. Work with local sewer Management Agency to complete a 201 Facility Plan update following Ohio EPAs Facility Planning guidelines: http://www.epa.ohio.gov/dsw/mgmtplans/208FacilityPlanningGuidelines.aspx
2. Identify areas sewer service will be available
3. Identify areas sewer service will not be available
4. Submit updated plan to Ohio EPA to be included in the State's 208 plan

SOURCES

1. Ohio Revised Code. Title XV Conservation of Natural Resources. Chapter 1521: Division of Water. http://codes.ohio.gov/orc/1521.19

2. Total Maximum Daily Loads for the Walnut Creek Watershed. (2010). Ohio Environmental Protection Agency, Division of Surface Water.

3. Ibid.

4. Ibid.

5. Ibid.

6. Ibid.

7. Ibid.

9. Ibid.

10. Richard Miller, Canal Winchester Urban Forester (2010)

11. Additional information about the *208 Water Quality Management Plan* including sewer service areas and local sewer prescriptions can be found at Ohio EPA's website: http://www.epa.ohio.gov/dsw/mgmtplans/208Final2006Plan.aspx

12. Ohio Lake Erie Commission. Linking Land Use and Lake Erie: Best Local Land Use Practices; Web: http://balancedgrowth.ohio.gov/BestLocalLandUsePractices.aspx

13. Conglose, J. Comprehensive Planning Fact Sheet. Ohio State University Extension, Community Development; Web: http://ohioline.osu.edu/cd-fact/1269.html

14. Conglose, J. Comprehensive Planning Fact Sheet

15. City of Lee's Summit, Missouri, Department of Development; Web: http://cityofls.net/Development/Comprehensive-Plan/General-Information.aspx

16. Ohio Lake Erie Commission. Linking Land Use and Lake Erie: Best Local Land Use Practices.

17. D'Ambrosio, J., Lawrence, T., Brown, L. A Basic Primer on Nonpoint Source Pollution and Impervious Surface Fact Sheet. Ohio State University Extension. Web: http://ohioline.osu.edu/aex-fact/0444.html

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GLOSSARY OF KEY TERMS

Balanced Growth - A voluntary, incentive based strategy to protect and restore [Ohio's watersheds] to assure long-term economic competitiveness, ecological health, and quality of life.

Buffer - A zone of a specified distance around geographic features. In GIS (see below), buffers can be used in order to include the land surrounding a point (i.e. airport) or line (i.e. highway) in the analysis.

GIS (Geographic Information System) - A system that captures, stores, analyzes, manages, and presents data that are linked to location. GIS software was used to map and analyze data related to the selected criteria in order to highlight the initial Priority Areas (PAA, PCA and PDA) on the preliminary planning maps.

Priority Agricultural Area (PAA) - A locally designated area targeted for continued, expanded and/or intensified agricultural activities due to historical, cultural, natural or human-created traits which make it conducive to agriculture and related activities.

Priority Conservation Area (PCA) - An area designated by local jurisdictions for protection, conservation, or restoration because of its ecological, cultural, recreational, or historical value and for the significant role these areas play in maintaining the integrity of the watershed.

Priority Development Area (PDA) - A locally designated area defined by its potential for development or redevelopment in accordance with the area's infrastructure, development, or plan and the area's ability to accommodate development in a manner consistent with our goal.

Watershed - An area of land that drains into a common waterway. These waterways might be streams, lakes, wetlands, or the ocean.