PLANNING AND ZONING TO PROTECT WATER QUALITY IN THE SAGINAW BAY WATERSHED

Shiawassee Sub-Watershed

Feb 27, 2014 - Owosso
March 11, 2014 – St. Charles
March 13, 2014 – Fenton

A Great Lakes Restoration Initiative (GLRI) Project
Funding

- Great Lakes Restoration Initiative (GLRI) by U.S. Environmental Protection Agency (EPA)

Project Team

- Planning & Zoning Center (PZC) at Michigan State University (MSU)
- Friends of the Shiawassee River
- Flint River Watershed Coalition
• Saginaw Basin
• What is a watershed?
• Background of Saginaw Bay AOC
• Great Lakes Restoration Initiative (GLRI)
• Our GLRI Project
• Roles of Local Governments
• Local Planning and Zoning Best Practices Guidebook
Saginaw Basin

- Michigan’s largest watershed (8,709 square miles)
- Including a part of 22 counties
- Contains America’s largest freshwater coastal wetland system
- Drains approximately 15% of Michigan’s total land area
- One of Michigan’s most diverse areas
  - Agriculture
  - Manufacturing
  - Tourism
  - Outdoor recreation
  - Vast variety of fish and wildlife
Hydrologic Cycle

Water for drinking, irrigation, industry
Watersheds are key components of ecosystems. A watershed is an area of land that drains to a common outlet.
Why is it important?

• Everything upstream ends up downstream.
• What you and others do on the land impacts the quality and quantity of water and our natural resources.
• Healthy watersheds are vital for a sustainable environment and economy.
• Provides recreational activities.
• Our watersheds provide water for drinking, irrigation and industry.
In the past, the worst water quality problems were from **point-source pollution**. Legacy of this remains.

Today, **non-point source pollution**:

- Soil, fertilizers and pesticides that runs off crop land.
- Septic waste discharges.
- Storage of potentially contaminating elements in floodplains.
- Sediment from construction sites, drainage systems, and paved surfaces and rooftops.
- Warmed surface water from paved and un-shaded surfaces.

*Weak collaboration among responsible parties.*
So Why Should We Care?

These are Your Rivers, Your Streams, Your Bay!
Saginaw River/Bay Area of Concern (AOC)

- Includes all 22 miles of the Saginaw River/Bay
- Designated an AOC since 1988
- Of the 14 Impairments criteria, Saginaw River/Bay includes 10:
  1. Restriction on fish and wildlife consumption
  2. Eutrophication or undesirable algae
  3. Degradation of fish and wildlife populations
  4. Beach closings
  5. Degradation of aesthetics
  6. Bird or animal deformities or reproduction problems
  7. Degradation of benthos
  8. Degradation of phytoplankton and zooplankton populations
  9. Restriction of dredging activities
  10. Loss of fish and wildlife habitat
Background

Saginaw River/Bay Area of Concern (AOC)
Michigan’s Great Lakes AOCs

- Goal is delisting
- Objective is removing impairments and preventing future pollution
- Saginaw Bay AOC
  - Remedial Action Plans (RAPs) developed by DEQ to outline methods for correcting impairments
The program identifies goals, objectives, measurable ecological targets, and specific actions for each of the following five focus areas:

1. Cleaning up toxics and areas of concern;
2. Combating invasive species;
3. Promoting nearshore health by protecting watersheds from polluted run-off;
4. Restoring wetlands and other habitats; and
5. Tracking progress and working with strategic partners.

GLRI projects target Areas of Concern (AOCs).

Federal Funding
- 2010 - $475 million
- 2011/2012 – $300 million
- 2013 - $285 million
- 2014 - $300 million
Our GLRI Project

- Unlike other GLRI projects, our focus is on prevention, NOT restoration.

- Prevention strategies are targeted at local government and watershed based conservation organizations.

- Engage rural and urban populations on water quality issues in the Flint and Shiawassee Watersheds.
Shiawassee Sub-Watershed

- Shiawassee Sub-watershed overwhelmingly drains agricultural land uses and, to a smaller degree undeveloped and urban lands.
Helping Friends of the Shiawassee River strengthen efforts to protect water quality in Shiawassee River Subwatershed

Educating local government officials and other stakeholders on techniques to prevent future water pollution through local planning and zoning
**Outcomes**

- Clean water that is fishable and swimmable, with less sediment, fertilizers and pesticides.
- Happy users.
- Happy taxpayers.

**Roles**

All major players have a role to play, including:
- Conservation and watershed organizations
- Local governments
- Landowners
- County agencies
- State agencies
- Federal agencies

**AOC**

Major Watershed Pollution led to the USEPA designating the Saginaw Bay as a Area of Concern (AOC). This means that water quality is severely degraded and a large number of beneficial uses are impaired.

**RAP**

Saginaw Bay watershed Remedial Action Plan (RAP) describes methods for correcting impairments to beneficial uses, in the degraded areas.

**GLRI**

The federal government has a major initiative to restore and delist the Bay as an AOC through the Great Lakes Restoration Initiative (GLRI).

**Watershed Plans**

Watershed management plans for each of the rivers flowing into the Bay were prepared by local watershed groups such as the Cass River Rapid Watershed Assessment Technical Committee, Huron Pines, Ducks Unlimited, Inc., and MDEQ.

**Why are we doing this?**

The watershed plans detail restoration and protection efforts for each sub-watershed, which when implemented, helps reduce pollution and restore damaged parts of the watershed and Bay.
BIG PICTURE

• Clean water that is fishable and swimmable, with less sediment, fertilizers and pesticides.
• Happy users.
• Happy taxpayers.
Roles of Major Players

**Federal Agencies**
- EPA
  - Funded GLRI and other enhancement activities
  - Role in wetland permits
  - Education

**Land Protection Grants**
- NAWCA
- NCWC
- Costal Lands

**Army Corps**
- Dredging permits
- Wetland permits

**USDA**
- Fund conservation organizations and landowners
- Education of farmers and other landowners
- Rural housing funding programs
- Conservation innovation grants
- EQIP

**State Agencies**
- DEQ
  - Support cleanup and delisting
  - Provide technical assistance
  - Apply regulations
  - Education
  - Link stakeholder groups

- DNR
  - Manage State land
  - Education
  - Support cleanup partnerships
  - Natural Resource Land Trust Fund grant program

- Orphaned Well Resources

**Landowners**
- BMP implementation
- Consider long term preservation of sensitive habitats

**County Agencies**

- **Drain Commissioners**
  - Reviews Site Plans for new developments
  - Proposals for BMP implementation
  - Stormwater management

- **Health Department**
  - Septic tank and other environmental codes

- **Local Governments**
  - Education on BMPs and Low Impact Development practices
  - Local Master Plans
  - Local Zoning Ordinances
  - Enforce adopted regulations
  - Facilitate coordination and cooperation with public, private and non-profit groups

- **Road Commission**
  - Manages negative impacts from road crossings and use of de-icers
  - Road ditch impacts and improvements

**Watershed Organizations**
- Education on Best Management Practices (BMPs)
- Planning
- Permanent land protection
- Wetland and their sensitive land preservation and restoration
- Technical assistance

**Improving Water Quality of Saginaw Bay Watershed**
Role of Local Government

**Actions**

- **Educate:**
  - Best Management Practices (BMPs)
  - Low Impact Development Practices

- **Update:**
  - Local Master Plans
  - Local Zoning Ordinances

- **Enforce:**
  - Adopted regulations

- **Facilitate:**
  - Coordination and cooperation with public, private and non-profit groups
Soil Erosion: An Old and Ongoing Problem

Photo courtesy of Michigan State Archives
Saginaw Bay Sedimentation

These are Your Streams, Your Rivers, Your Bay!

And you CAN make a difference!

May 16, 2011

http://www.glerl.noaa.gov/res/glcf/sb/modis.html
Basic Water Quality Protection Principles

• Reduce impervious surfaces—allow maximum infiltration
• Keep soil and sediment out of streams and lakes
• Keep warmed stormwater out of streams and lakes
• Keep toxic materials out of streams and lakes
• Protect groundwater from toxic materials
Reduce Impervious Surfaces—Allow Maximum Infiltration

Pervious Surface

10% runoff

50%

Impervious Surface

55% runoff

15%
Waterway Health and Imperviousness

- Water Quality Degradation
- Watershed Imperviousness (%)

- Degraded
- Impacted
- Protected

Adapted from Schueler, et al., 1992
High imperviousness leads to abnormal stream flow—too high and too low
A look you need to encourage

Photo MSU LPI

Photo MDEQ
Soil, sediment & grit worn from roads and rooftops:
- Carries nutrients (reduces fertility of farm fields and increases plant growth in streams, lakes and bay)
- Can carry toxics (pesticides, heavy metals, etc.)
- Smothers aquatic life at beginning of food chain
- Reduces capacity of drains and impoundments.

Keep soil and sediment out of drains, streams, and lakes
Keep warmed stormwater out of streams and lakes

- Warmed stormwater (stormwater from paved surfaces, lawns & un-shaded stormwater detention basins):
  - Sometimes most biologically disruptive pollutant
  - Sometimes most prevalent nonpoint source pollutant.
  - Dramatically changes the biology of streams and lakes (fish and organisms fish feed on are adapted to certain temperature regimes, and die if water gets too warm)

Source: SEMCOG LID Manual and Macomb County Public Works
RURAL WATER QUALITY PROTECTION

a planning & zoning guidebook for local officials

December 2012

MICHIGAN STATE UNIVERSITY
Land Policy Institute

Great Lakes Restoration
Best Management Practices (BMPs) in Rural Areas

This chapter focuses on provisions that rural communities in the Great Lakes Region can use in Master Plans and Zoning Ordinances to better protect water quality by preventing pollution in the first place.

1. Water Quality Protection via Planning and Zoning
   - Low Impact Development
   - Environmental Inventory
   - Water Quality
   - Coordinated Permitting
   - Soil Erosion & Sedimentation Control
   - Accumulation & Disposal of Waste

2. BMPs tied to Low Impact Development (LIDs)

3. Specific Zoning Techniques

4. Public Education Measures for Master Plans
Best Management Practices (BMPs)

Water Pollution Filtering
• Vegetated Filter Strips/Buffer Strips

Sediment & Erosion Control
• Protect Riparian Buffer Areas
• Riparian Corridor Ordinance
• Streamside Management

Pollution Prevention
• Comprehensive Nutrient Management Plan
• Non-point Source Pollution Control Ordinance

Policy BMPs
• Conservation Easement
• Public Involvement and Education
• Riparian Waterfront Lot Use Regulations/Keyhole Regulations

Reduce Impervious Surfaces
• Subdivision ordinance

Improving Groundwater Recharge
• Protecting areas of high recharge
Figure 4-1: Key Elements of Low Impact Development

- **Conservation**
  - Preserves native trees, vegetation and soils.
  - Maintains natural drainage patterns.

- **Small-scale Controls**
  - Mimics natural hydrology and processes.

- **Customized Site Design**
  - Ensures each site helps protect the entire watershed.

- **Directing Runoff to Natural Areas**
  - Encourages infiltration and recharge of streams, wetlands and aquifers.

- **Maintenance, Pollution Prevention and Education**
  - Reduces pollutant loads and increases efficiency and longevity.
  - Educates and involves the public.

Amending MP/ZO To Encourage LID

- The **Master Plan** should include a goal and corresponding objectives for LID, as well as educational information or references to these techniques.

- Create zoning guidelines that encourage developers and landowners to consider LID approaches and help reduce water quality impacts.
Table 4-1: Essential Elements in Master Plan and Zoning Ordinance – Low Impact Development

<table>
<thead>
<tr>
<th>Essential Elements in Master Plan and Zoning Ordinance</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Impact Development</td>
<td>Encourage the use of LID approaches in new development and redevelopment projects.</td>
<td>Describe how LIDs handle stormwater management and give examples.</td>
<td>The “Better” approach may be the highest needed for this element.</td>
</tr>
</tbody>
</table>
“Use low-impact road crossing techniques to protect the riparian corridor and existing hydrology of rivers and streams.” - Springfield Township Master Plan, Action Summary for Shiawassee River, p. 73
Environmental Inventory

- Determine location and condition of existing environmental resources and include information in the MP
- Environmental Inventory should address:
  - Land Cover
  - Topography
  - Hydrology
  - Soils
  - Floodplains
  - Wetlands
  - High-risk erosion areas
  - Wildlife/habitat by type
  - Geology
  - Climate
  - Air quality
Soils

- Wet loamy soils (green) predominant; purple soils have more sand in them; all are well suited for agriculture if drained.

- Crops commonly grown: corn, sugar beets, field beans.
Purpose of Environmental Inventory

- Provide useful information to facilitate critical thinking and understanding
- Provide baseline for resource protection measures within a community

- MUST BE OBJECTIVE AND DESCRIPTIVE

Environmental Inventory will:
  - Allow for the protection and management of natural features
  - Guide development in ways that retain the value of the resource
  - Help community identify its environmental goals
Amending MP/ZO To Include An Environmental Inventory

- **Master Plan**
  - Include appropriate maps and text that identify natural and environmental resources in the community
  - Observations on the impact of development patterns
  - Goals and objectives for protecting these resources

- **Zoning Ordinance**
  - No changes are required
# Amending MP/ZO To Include An Environmental Inventory

## Table 4-2: Essential Elements in Master Plan and Zoning Ordinance - Environmental Inventory

<table>
<thead>
<tr>
<th>Environmental Inventory</th>
<th>GOOD</th>
<th>BETTER</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>The Master Plan’s environmental inventory should, at a minimum, identify existing conditions and issues for major water courses, minor and major drains, hydrologic soils, and other significant natural features.</td>
<td>All the elements of the “Good” category, plus the plan has a goal to consider natural features maps and maps of existing natural resources when planning areas for future land uses or public infrastructure, when considering proposed amendments to the Master Plan or Zoning Ordinance, and when considering any new public or private uses of land or public buildings.</td>
<td>All the elements of the “Better” category, plus the plan has objectives for how to accomplish the goal.</td>
</tr>
</tbody>
</table>
Water Quality

- Water is an essential natural resource that requires protection from contamination

- Protection must be prioritized in the Master Plan

- Both surface and ground water
Amending MP/ZO To Include Water Quality

- **Master Plan**
  - Include a goal and objectives
  - Sets stage for other elements, practices, and techniques

- **Zoning Ordinance**
  - Alter “Purpose” section to include water quality protection
  - Establishes community’s values about water quality
Amending MP/ZO To Include Water Quality

Table 4-3: Essential Elements in Master Plan and Zoning Ordinance – Water Quality

<table>
<thead>
<tr>
<th>Essential Elements in Master Plan and Zoning Ordinance</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Water Quality (Master Plan)</td>
<td>The local community has a goal to preserve and enhance its natural and environmental resources, including surface and ground water.</td>
<td>All the elements of the “Good” category, plus the Master Plan explains specific dangers to the community’s waterways and gives possible solutions.</td>
<td>All of the measures of the “Better” approach, plus the plan indicates what measures should be taken.</td>
</tr>
<tr>
<td>Water Quality (Zoning Ordinance)</td>
<td>Insert a statement into the Purpose section of the Zoning Ordinance on protecting water quality.</td>
<td>The “Good” approach may be the highest needed for this statement.</td>
<td>The “Good” approach may be the highest needed for this statement.</td>
</tr>
</tbody>
</table>
• **Give high priority to enhancing public use and enjoyment of the local river system by providing riverfront recreational facilities and walkways that link public-owned areas along both branches of the Bad River, and by encouraging efforts to improve water quality and aesthetics.** – Village of St. Charles Future Land Use Plan, Goals and Objective, p. 9
Coordinated Permitting

• Administrative process through which all relevant agencies – federal, state, county, and municipal – involved in the development permitting process stage their approvals efficiently and in a timely manner
  • Road Commission
  • Health Department
  • Drain Commissioner
  • MDOT
  • DEQ
  • Etc

• Results in shorter review and approval period without loss of public interest

• Necessary for optimizing permitting process and avoiding errors
Amending MP/ZO To Include Coordinated Permitting

- **Master Plan**
  - Include a goal and objective for the creation of a coordinated permit system for new land uses

- **Zoning Ordinance**
  - Requirement in the general provisions sector or zoning administration section that specifies a zoning permit shall only be issued upon proof that all relevant permits from other agencies have first been obtained
  - Removes burden from the zoning administrator and places it on the applicant
Table 4–4: Essential Elements in Master Plan and Zoning Ordinance — Coordinated Permitting and Coordinated Site Plan Review

<table>
<thead>
<tr>
<th>Essential Elements in Master Plan and Zoning Ordinance</th>
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<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coordinated Permitting (Master Plan)</strong></td>
<td>The Zoning Administrator will not issue land use permits nor shall the Building Administrator issue building permits until evidence that other permits required from other agencies has been received.</td>
<td>All the elements of the “Good” category, plus the Master Plan includes a description of the MDEQ Environmental Permits checklist and explains how it is useful for applicants.</td>
<td>All the elements of the “Better” category, plus insert objectives as to how the Planning Commission will accomplish its goals regarding coordinated permitting.</td>
</tr>
<tr>
<td><strong>Coordinated Site Plan Review (Zoning Ordinance)</strong></td>
<td>The ordinance requires that all land uses and construction activities shall conform with the provisions of this Ordinance and all applicable local, county, state, and federal regulations including, but not limited to those listed. Also, all required permits must be submitted before obtaining a local building/zoning permit.</td>
<td>All of elements in the “Good” category, plus the ordinance lists the specific required permits and where to obtain them.</td>
<td>All the elements of the “Better” category, plus specific actions that the Zoning Administrator must take before approving a zoning/land use permit.</td>
</tr>
</tbody>
</table>
# APPENDIX V: PERMIT COORDINATION CHECKLIST

**DEQ**

**PERMIT INFORMATION**

The Department of Environmental Quality (DEQ) has prepared a list of key questions to help identify what departmental permits, licenses, or approvals of a permit-like nature may be needed for a project. By providing the appropriate offices listed below, you will help reduce the possibility that your project or activity will be delayed due to the unnecessary discovery of additional permitting requirements later in the process. While this list covers the existence of permits and approvals required from the DEQ, it is not a comprehensive list of all legal responsibilities (i.e., planning requirements and chemical storage regulations may apply).

### KEY QUESTIONS:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the project involve the discharge of any type of wastewater to a storm sewer, drain, lake, stream, or other surface water?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524, DEQ District Office, Water Division (MD) 517-373-4624</td>
</tr>
<tr>
<td>2. Does the project involve the discharge of septic tanks or septic sludge into or onto the ground?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>3. Does the project involve the transport of septic tank, cesspool, or dry well contents?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>4. Does the project involve construction or alteration of any septic collection or treatment facility?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>5. Does the project involve the removal of solid waste, such as gravel or sand, within a designated critical dune area?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>6. Does the project involve the discharge of hazardous waste into the ground?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>7. Does the project involve the on-site treatment, storage, or disposal of hazardous waste?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>8. Does the project involve the transport of hazardous waste or non-hazardous hazardous waste on the ground?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>9. Does the project involve the mixing, blending, or processing of any type of solid non-hazardous waste on the ground?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>10. Does the project involve the on-site treatment, storage, or disposal of hazardous waste?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>11. Does the project involve the construction of a sewer line?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>12. Does the project involve any work (dredging, filling, draining, construction) proposed in, across, or under (a) rivers, streams, creeks, ditches, drains, lakes, ponds, or swamps, (b) wetlands, or (c) floodplain (area that may be too fast flowing or flooding water)?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>13. Does the project involve any work (dredging, filling, draining, construction) proposed in, across, or under (a) rivers, streams, creeks, ditches, drains, lakes, ponds, or swamps, (b) wetlands, or (c) floodplain (area that may be too fast flowing or flooding water)?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>14. Does the project involve the placement of structures in water, wetlands, floodplains, or any work at the lake or river interface?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>15. Does the project involve an earth change activity within 500 feet of a lake, river, stream, or creek, or does the project disturb an area greater than one acre in size?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>16. Does the project involve the construction of a building or an accessway on a designated Great Lakes high risk erosion area?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
<tr>
<td>17. Does the project involve the removal of sand or other alteration of the soil, vegetation, or natural drainage, or placement of permanent structures in a designated environmental area?</td>
<td>Y</td>
<td>DEQ, WD, Environmental Health Section (EHS) 517-373-4524</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL ASSISTANCE CENTER: 1-800-662-9278**
Soil Erosion and Sedimentation Control

- Permit is required for any earth change activity that disturbs one or more acres of land and all earth change activities within 500 feet of a water course (Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 P.A. 451)

- Purpose: mitigate the unnatural loss and deposition of sand, silt, dust, and other particulates into waterways
Why include soil and sedimentation controls?

- Safeguard against erosion during construction that might remove trees, vegetation and topsoil.
- Stormwater from impervious surfaces can carry nutrients, pathogens, sediments, toxic contaminants, and debris to the nearest watercourse.
- Soil Erosion and Sedimentation Control (SESC) regulations do not include prevention of impacts on all sensitive aquatic resources, including wetlands.
  - SESC only affects earth change activities outside of the 500-foot buffer.
Amending MP/ZO To Include Soil Erosion and Sedimentation Control

**Master Plan**
- Include a goal and objective for controlling soil erosion and sedimentation during and after development of a site
- Provide general educational information on the negative impacts of soil erosion and sedimentations

**Zoning Ordinance**
- Reference Michigan’s Natural Resources and Environmental Protection Act of 1994
- Control for specifics on when a soil erosion and sedimentation control permit is required. Should also identify the appropriate authority that developers should contact if a SESC permit is needed
Amending MP/ZO To Include Soil Erosion and Sedimentation Control

Table 4-5: Essential Elements in Master Plan and Zoning Ordinance – Earth Change Activity

<table>
<thead>
<tr>
<th>Essential Elements in Master Plan and Zoning Ordinance</th>
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<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth Change Activity as Regulated under Soil Erosion and Sedimentation Control Act (Master Plan)</td>
<td>There is nothing to add, as long as the “Good” language for Coordinated Permitting has been added.</td>
<td>The Master Plan has a goal that ensures that the Zoning Ordinance will require a SESC Permit before approving any new development or redevelopment.</td>
<td>All the elements of the “Better” category, plus the plan ensures that the Zoning Ordinance should also take into consideration the topography and existing vegetation before approving a zoning/land use permit.</td>
</tr>
<tr>
<td>Earth Change Activity as Regulated under Soil Erosion and Sedimentation Control Act (Zoning Ordinance)</td>
<td>The ordinance requires a SESC Permit to be obtained for all developments within 500 feet of an inland lake or stream.</td>
<td>All the elements of the “Good” category, plus the ordinance requires that existing vegetation and topography must be respected.</td>
<td>All of the “Better” approach, plus cross-reference the section with regulation on setbacks from sensitive natural features.</td>
</tr>
</tbody>
</table>
Sec. 27-4. Compliance with chapter required for site plan plat approval.

No site plan, plot plan or plat shall be approved under chapter 38 unless the site plan, plot plan or plat shall include soil erosion and sediment control measures consistent with the requirements of this chapter and related land development regulations.

Sec. 27-7. General requirements.

(a) All earth changes shall be conducted in such a manner which will effectively reduce accelerated soil erosion and resulting off-site sedimentation.

(b) All persons engaged in earth changes shall design, implement and maintain acceptable soil erosion and sedimentation control measures, in conformance with this chapter and Part 91.

(c) All earth changes shall be designed, constructed and completed in such a manner which shall limit the exposed area of any disturbed land for the shortest possible period of time.

(d) Sediment caused by accelerated soil erosion shall be removed from runoff water before it leaves the site of the earth change.

(e) Any temporary or permanent soil erosion and sedimentation control measures constructed for the conveyance of water around, through or from the earth change area shall be designed to limit the water flow to a nonerosive velocity.

(f) A person shall install temporary soil erosion and sedimentation control measures before or upon commencement of the earth change activity and shall maintain the measures on a daily basis. A person shall remove temporary soil erosion and sedimentation control measures after permanent soil erosion measures are in place and the area is stabilized. A person shall stabilize the area with permanent soil erosion control measures under approved standards and specifications as prescribed by Rule 323.1710.

(g) A person shall complete permanent soil erosion control measures for all slopes, channels, ditches or any disturbed land area within five (5) calendar days after final grading or the final earth change has been completed. If it is not possible to permanently stabilize a disturbed area after an earth change has been completed or if significant earth change activity ceases, then a person shall maintain temporary soil erosion and sedimentation control measures until permanent soil erosion control measures are in place and the area is stabilized.

(Ord. No. 705, § 1, 4-26-09)
Accumulation and Disposal of Waste

- Unsightly
- Potential to negatively impact a community’s water resources and subsequently, human health
- Waste can leach harmful substances that may infiltrate groundwater or contaminate nearby lakes and streams

Common types of waste:
- Yard
- Household
- Inoperable automobiles and farm implements
- Chemicals
- Batteries and electronics
- Junk
Amending MP/ZO To Include Accumulation & Disposal of Waste

Two different methodologies:

1) Stand-alone nuisance ordinance
2) Additional section in the General Regulations chapter of the Zoning Ordinance
## Table 4-6: Essential Elements in Master Plan and Zoning Ordinance - Accumulation and Disposal of Waste

<table>
<thead>
<tr>
<th>Essential Elements in Master Plan and Zoning Ordinance</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accumulation &amp; Disposal of Waste (Master Plan)</strong></td>
<td>The Master Plan prevents the accumulation of junk or other waste materials in any way that could present a hazard to ground or surface water.</td>
<td>All the elements of the “Good” category, plus the plan has objectives for how to accomplish the goal.</td>
<td>The “Better” approach may be the highest needed for this element.</td>
</tr>
<tr>
<td><strong>Accumulation &amp; Disposal of Waste (Zoning Ordinance)</strong></td>
<td>The ordinance does not allow for accumulation of junk or other waste.</td>
<td>Same as the “Good” approach, but specifically cross-reference other ordinances and regulatory agencies. Add language to the Site Plan Review section of the Zoning Ordinance per the Groundwater Protection - Zoning Ordinance in Appendix A.</td>
<td>The “Better” approach may be the highest needed for this element.</td>
</tr>
</tbody>
</table>
Exercise #1 – Group Questions

For each question, answer:
a) How long has it been there?
b) How did it get there?
c) Who took the lead?

1) How many of you are from a community that has Low Impact Development built into the Master Plan? Zoning Ordinance?
2) How many of you have an environmental inventory in the Master Plan or as a separate product?
Exercise #1 – Group Questions

For each question, answer:

a) How long has it been there?
b) How did it get there?
c) Who took the lead?

3) How many have goals in the Master Plan and Zoning Ordinance to protect water quality?

4) How many have a coordinated Permitting Process?
Exercise #1 – Group Questions

For each question, answer:

a) How long has it been there?
b) How did it get there?
c) Who took the lead?

5) How many have a separate Soil Erosion and Sedimentation Control Ordinance?

6) How many have a separate junk or waste disposal ordinance?
Best Management Practices (BMPs) in Rural Areas

1. Water Quality Protection via Planning and Zoning

2. BMPs tied to Low Impact Development (LIDs)
   - Parcel Splits for Buildable Area
   - Land Division Alternatives
   - Stormwater Management
   - Impervious Surface Reduction
   - Natural Feature & Drain Setbacks
   - Groundwater Protection

3. Specific Zoning Techniques

4. Public Education Measures for Master Plans
The primary environmental issues associated with land divisions and plats relate to:

- Lot width
- Depth
- Area
- Access
- “Buildability” of the lots.

Proper review and approval of land divisions and plats can dramatically reduce future problems associated with use of the lots.
Parcel Splits for Buildable Area

Problems That Can Be Prevented

Unbuildable lots in a floodway

Division of land within wetlands should not result in creation of unbuildable lots
Problems That Can Be Prevented

Long narrow waterfront lots

Short narrow waterfront lots
Many statutorily required reviews by different entities, including:

- The local government
- The County Road Commission
- Drain Commissioner
- State Department of Transportation
- State Department of Natural Resources, depending on the location and characteristics of the parcel being platted.
Amending MP/ZO For Better Parcel Splits

- **Master Plan**
  - At the very least, state that unbuildable land divisions should be prevented
  - Goal may call for the review of proposed lot splits to meet minimum standards

- **Zoning Ordinance**
  - Identify steps necessary to get a parcel split approved
    - Often a separate ordinance
  - State that a parcel of land shall not be split in a way such that an “unbuildable” parcel is create
### Table 4-7: Best Management Practices - Parcel Splits for Buildable Area

<table>
<thead>
<tr>
<th>Best Management Practices</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parcel Splits for Buildable Area (Master Plan)</td>
<td>The Master Plan has a goal to not create any unbuildable lots.</td>
<td>All the elements of the “Good” category, plus an objective for the Zoning Ordinance to require a review of all proposed lot splits for buildability.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
<tr>
<td>Parcel Splits for Buildable Area (Zoning Ordinance)</td>
<td>The Zoning Ordinance requires that all divisions/splits comply with the Land Division Act.</td>
<td>All the elements of the “Good” category, plus a requirement that there is enough buildable area when also including significant natural features areas.</td>
<td>All the elements of the “Better” category, plus a provision in the Site Plan Review that requires that the natural features and character of a land are preserved wherever possible.</td>
</tr>
</tbody>
</table>
The best proactive measures a community can take to prevent the creation of lots that do not undermine the integrity of the environment and are “buildable”, are listed below:

- Adopt and consistently administer land division regulations
- Adopt and consistently administer subdivision regulations
- Try to persuade landowners who propose to create “unbuildable” lots not to do so. If unsuccessful, file a notice with the County Register of Deeds that runs with “unbuildable” parcels that informs purchasers of the unique status of such lots.
Land Division Alternatives

- Allow municipality and the developer an opportunity to work with natural characteristics of a site, while maximizing open space and preserving sensitive natural features.
- Leads to higher potential for control of runoff than if site is stripped of vegetation, graded and developed parcel-by-parcel.
- Excessive division of land can result in an increased negative impact on water quality due to increased impervious coverage, compacted soils, and the total area consumed by buildings.
- Planned unit developments and site condominiums common.
Amending MP/ZO to Encourage Land Division Alternatives

• **Master Plan**
  - Goal and objective to guide municipal planning and zoning officials to encourage developers to utilize site condominium development and PUDs when feasible
  - Officials should conduct a Site Plan Review in these cases to identify and preserve natural features and avoid negative impacts on land

• **Zoning Ordinance**
  - Require the identification of watercourses or other natural features
  - Specify that natural features and natural flow pathways for stormwater be preserved for PUD and site condominium developments
Land Division Alternatives
### Table 4-8: Best Management Practices - Land Division Alternatives

<table>
<thead>
<tr>
<th>Best Management Practices</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Division Alternatives (Master Plan)</strong></td>
<td>The Master Plan includes a goal to encourage landowners with significant natural features to utilize land division alternatives to minimize negative impacts on identified natural features.</td>
<td>All the elements of the “Good” category, plus an objective on how to accomplish the goal.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
<tr>
<td><strong>Land Division Alternatives (Zoning Ordinance)</strong></td>
<td>The ordinance requires that all existing watercourses are identified during the Site Plan Review process.</td>
<td>All of the elements in the “Good” category, plus the natural features and character are preserved wherever possible.</td>
<td>All the elements in the “Better” category, plus language that encourages the preservation of natural features within PUDs and condominium subdivisions.</td>
</tr>
</tbody>
</table>
**Policy 7:** Encourage alternatives to traditional residential land development patterns that result in more efficient and better arranged land uses, increased open space and the preservation of natural resources.

While current open space development requirements are generally applied to large projects and pieces of property, a rural open space development option should also be explored. Such an option would be applied to land divisions and would attempt to encourage the protection of important natural resources and maintain the appearance of rural, tree-canopied roadways. A simple lot averaging technique with larger setbacks from rural roads may be sufficient to achieve this concept.

- Springfield Township Master Plan, p.33
Stormwater Management

- Goals are to detain, slow, or reduce the amount of runoff from a site

- Strategies include: site design elements such as retention basins, swales, or use of baffles or vegetation in flow pathways

- Important to mitigate amount and quality of runoff which will lead to cleaner water, healthier communities and less money spent on remediation
Amending MP/ZO to Promote and Enforce Stormwater Management

• **Master Plan**
  • Goal and objectives for control of stormwater and acknowledge the extent to which developers should manage runoff (10-, 50-, or 100-year storms)
  • References to educational resources
  • Information on any relevant local initiatives
  • Contact information for community’s County Drain Commissioner, NRCS districts and the MDEQ

• **Zoning Ordinance**
  • Ordinance that requires all new development to manage its runoff on-site without contributing additional runoff to adjacent properties
Amending MP/ZO to Promote and Enforce Stormwater Management

<table>
<thead>
<tr>
<th>Best Management Practices</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Management (Master Plan)</td>
<td>The Master Plan has a goal to establish minimum stormwater management standards and incorporate LID standards in the Zoning Ordinance.</td>
<td>All of the elements of the “Good” category, plus objectives on how to reach the goal.</td>
<td>All of the elements of the “Better” category, plus an objective to initiate efforts in cooperation with the Drain Commissioner and conservation organizations to educate landowners and stakeholders about the potential benefits of various LID techniques and other stormwater BMPs.</td>
</tr>
<tr>
<td>Stormwater Management (Zoning Ordinance)</td>
<td>The ordinance includes Site Plan Review language that requires attention be paid to surface drainage.</td>
<td>All the elements of the “Good” category, plus the ordinance does not allow for an approved permit if stormwater runoff creates a negative impact on adjacent lands, watercourses, or water bodies above the run-off impact when the application was made.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
</tbody>
</table>
• **Policy 3:** The natural capability of land shall govern the development of individual sites.

• The rate of surface water runoff shall not exceed that which occurs under existing, undeveloped conditions. This policy will prevent overloading of streams receiving the runoff and will help prevent long-term erosion from uncontrolled, high velocity discharges. On-site **stormwater management** which uses natively vegetated swales, naturally designed detention areas, and other measures to reduce water velocity, promote infiltration, and remove sediments will be encouraged.

- Springfield Township Master Plan, p. 30
Policy 4: Landscaping which uses desirable native species of vegetation shall be encouraged.

The Township recognizes that species native to the local area are generally hardier, offer more wildlife benefit, filter pollutants, are an effective component in stormwater management, and support and complement local ecosystems. Additionally, native species require less maintenance, water and chemicals (including fertilizers and pesticides), and are drought resistant. It is the intent of this plan to encourage the use of desirable native species of plants for all landscaping.

- Springfield Township Master Plan, p. 30
Sec. 40-891. **Stormwater management**; impervious surface mitigation.

(a) *Purpose and intent.* It is the intent of this section to encourage the use of structural, vegetative, or managerial practices, commonly referred to as best management practices (BMPs), designed to treat, prevent, or reduce degradation of water quality due to stormwater runoff. All development projects subject to review under the requirements of this chapter shall be designed, constructed, and maintained using best management practices to prevent flooding, protect water quality, reduce soil erosion, maintain and improve wildlife habitat, and contribute to the aesthetic values of the project. The particular facilities and measures required on-site shall reflect and incorporate existing grade, natural features, wetlands, and watercourses on the site to the maximum extent feasible.

(b) *Stormwater drainage/erosion control.* All stormwater drainage and erosion control plans shall meet the standards adopted by the township for design and construction and shall, to the maximum extent feasible, utilize nonstructural control techniques, including but not limited to:

1. Limitation of land disturbance and grading;
2. Maintenance of vegetated buffers and natural vegetation;
3. Minimization of impervious surfaces
4. Use of terraces, contoured landscapes, runoff spreaders, grass or rock-lined swales;
5. Use of infiltration devices.

- Springfield Township, Code of Ordinances
Stormwater Management (plan)

- Require site construction to include a plan for managing stormwater, calculating amount of runoff to manage
- Filter stormwater through silt fencing (temporary) and vegetation buffer strips (permanent)
- Retain stormwater on site to avoid overwhelming streams (causing flooding or erosion) and neighboring properties
- Armor stream and river banks to prevent erosion with vegetation or hard materials
- Shade streams and retention basins
- Provide educational opportunities for property owners to understand benefits of stormwater management and BMPs
Impervious Surface Reduction

- Decreasing amount of land cover that prevents water from being infiltrated into the ground before it reaches streams and lakes
- Can increase velocity of streams to highly erosive levels after large snowmelts or rain showers and slow streams during dry times
- Impervious land cover can be reduced by:
  - Decreasing width of driveways
  - Require parking lot landscaping
  - Include open space provisions
  - Mandate more pervious materials be used for new pavement
  - Green roofs
  - Disconnect drains from stormwater systems
  - Rain barrels and rain gardens
Rain Garden

Source: Phil Hathaway. Location: Anacortes, Washington
Pervious Pavers

Source: Phil Hathaway. Location: Anacortes, Washington
Amending MP/ZO to Encourage Reduced Imperviousness

• **Master Plan**
  - Goals and Objectives for impervious surface reduction
  - Education on benefits of reducing imperviousness
  - Provide information to developers about LID techniques to reduce impervious coverage

• **Zoning Ordinance**
  - Site plan development standards that limit the amount of impervious surface
    - Streets and access
    - Parking
    - Site Design
Reducing Imperviousness

Permeable pavement in foreground
SEMCOG LID Manual & City of Battle Creek

Paver blocks on permeable base
SEMCOG LID Manual

Shrub plantings
SEMCOG LID Manual
## Amending MP/ZO to Encourage Reduced Imperviousness

### Table 4-11: Best Management Practices - Impervious Surface Reduction

<table>
<thead>
<tr>
<th>Best Management Practices</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impervious Surface Reduction (Master Plan)</td>
<td>There is nothing to add as long as the “Good” language for Natural Feature and Drain Setbacks has been added.</td>
<td>The Master Plan has a goal to keep the amount of new impervious surfaces low and reduce impervious surface area.</td>
<td>All the elements of the “Better” category, plus the plan has objectives for how to accomplish the goal.</td>
</tr>
<tr>
<td>Impervious Surface Reduction (Zoning Ordinance)</td>
<td>The ordinance requires that LID techniques are used when designing and constructing parking and loading areas.</td>
<td>All the elements of the “Good” category, plus pervious pavement options should be considered.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
</tbody>
</table>
Sidewalks, roads, and driveways should be designed to minimize **impervious surfaces**. (p. 29)

Traffic circles can also discourage cut through traffic. Circles can be landscaped to reduce the amount of **impervious surface.** (p. 65)

- Springfield Township Master Plan, p. 30
The township may attach conditions to the approval of a deviation that bind such approval to the specific use in question. Measures that reduce impervious surface and increase infiltration may include, but are not limited to, the following:

a. *Streets and access.*

1. The designing of residential streets with the minimum required pavement width needed to support travel lanes, on-street parking, and emergency, maintenance, and service vehicle access and function based on traffic volumes.
2. The reduction of the total length of residential streets by examining alternative street layouts to determine the best option for increasing the number of homes per unit length.
3. The designing of street right-of-way widths/private road easements to reflect the minimum required to accommodate the travelway, the sidewalk, and vegetated open channels.
4. The minimizing of the number of street cul-de-sacs and reduce the radius of cul-de-sacs to the minimum required to accommodate emergency and maintenance vehicles. Alternative turnarounds shall be considered, including the use of mountable curbing and grass shoulders for the occasional event of access by fire trucks and other large commercial trucks. Where cul-de-sacs do exist, provide landscape center islands.
5. Where density, topography, soils, and slope permit, the use of vegetated open channels in the street right-of-way/private road easements to convey and treat stormwater runoff.
6. The use of alternative driveway surfaces and shared driveways that connect two or more sites.
7. Promoting more flexible design standards for residential subdivision sidewalks. Where practical, consider locating sidewalks on only one side of the street and providing common walkways linking pedestrian areas.

- Springfield Township Code of Ordinances, 40-891(e)
*
*Impervious surface reduction/infiltration enhancement.*
b. Parking.

1. Base the parking requirements on the specific characteristics of the use, landbanking in open space parking required to satisfy chapter requirements.
2. Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in the spillover parking areas where possible.
3. Encourage shared parking between compatible users.

c. Site design.

1. Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing rooftop runoff to the roadway and the stormwater conveyance system.
2. Create naturally vegetated buffer systems, which may vary in width as determined by the township, along all drainageways. Critical environmental features such as the 100-year floodplain, steep slopes, and wetlands shall be considered.
3. Minimize clearing and grading of woodlands and native vegetation to the minimum amount needed to build lots, allow access, and provide fire protection.
4. Conserve trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native plants.

- Springfield Township Code of Ordinances, 40-891(e)
*Impervious surface reduction/infiltration enhancement.*
Natural Feature and Drain Setbacks

• Specified distance that a building (or impervious surface) is required to be located away from a natural feature like a stream, pond, or wetland

• Setbacks allow runoff to flow through a vegetation filter and reduce volume of runoff the receiving body takes on

• Setbacks protect natural features like woodlots
Good BMPs
Amending MP/ZO to Include Natural Feature Setbacks

- **Master Plan**
  - Goal and objectives for amending the Zoning Ordinance
  - Encouraging use of vegetated filters within setback areas

- **Zoning Ordinance**
  - Utilize buffer requirements on natural features of varying distances (minimum distance of 25 feet is recommended)
Amending MP/ZO to Include Natural Feature Setbacks

Table 4-13: Best Management Practices - Natural Feature and Drain Setbacks

<table>
<thead>
<tr>
<th>Natural Feature and Drain Setbacks (Master Plan)</th>
<th>Best Management Practices</th>
<th>Natural Feature and Drain Setbacks (Zoning Ordinance)</th>
<th>Best Management Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GOOD</td>
<td>BETTER</td>
<td>BEST</td>
</tr>
<tr>
<td>The Master Plan includes a goal to implement land use patterns, and search out techniques and programs to protect and improve natural resources.</td>
<td>All the elements of the “Good” category, plus the plan has objectives for how to accomplish the goal.</td>
<td>The ordinance creates a building setback of 25 feet from significant natural features.</td>
<td>All the elements of the “Better” category, plus the ordinance requires a vegetated buffer strip between buildings and significant natural features.</td>
</tr>
</tbody>
</table>
Policy 7: Encourage alternatives to traditional residential land development patterns that result in more efficient and better arranged land uses, increased open space and the preservation of natural resources.

While current open space development requirements are generally applied to large projects and pieces of property, a rural open space development option should also be explored. Such an option would be applied to land divisions and would attempt to encourage the protection of important natural resources and maintain the appearance of rural, tree-canopied roadways. A simple lot averaging technique with larger setbacks from rural roads may be sufficient to achieve this concept.

- Springfield Township Master Plan, P. 33
Establishment of natural resource buffer zones. Natural resource buffer zones shall be established adjacent to natural features/ecosystems intended for preservation within areas of priority protection. Such buffers shall be a minimum of 25 feet in width. The township body responsible for approval may decrease the buffer zone below the 25-foot requirement where it can be demonstrated that other means are available to provide the equivalent protection. In establishing the width of the buffer zone, the township body responsible for approval shall consider the foreseeable impacts of development on the ecological character or function of the natural feature/ecosystem to be preserved and the following:

- a. Wildlife habitat, movement corridors and use characterization of the priority protection area.
- b. Extent of floodplains, floodways, wetlands and watercourses.
- c. Type, amount and extent of existing vegetation on the site.
- d. Character of the proposed development in terms of use, density, traffic generation, quality of runoff water, noise, lighting and similar potential development impacts, on the priority protection area being buffered.
- e. Site topography, including but not limited to such characteristics as steepness of slopes, existing drainage patterns, ridgelines and scenic topographic features.

- Springfield Township, Code of Ordinance, Sec. 40-892
Groundwater Protection

- Monitoring groundwater quality
- Providing educational opportunities on how to protect groundwater
- Avoid discharging toxic materials to ground surface
- Capping wells

Image: South Dakota
Amending MP/ZO for Groundwater Protection

- **Master Plan**
  - Goal and objectives specifically for protecting groundwater
  - Include: identification and proper containment of potentially hazardous substances, abandoned well capping, and remediation of leaking underground storage tanks
  - Include references to detailed resources on groundwater protection such as community’s county or district health department or MDEQ

- **Zoning Ordinance**
  - Regulations proper identification, storage, loading/unloading, and disposal of potentially hazardous substances
  - Requirement for Site Plan Review section for hazardous substance storage, identification of general purpose floor drains, and underground storage tanks
  - Reference state and federal laws for storage, spill prevention, record keeping, and emergency response.
Amending MP/ZO for Groundwater Protection

<table>
<thead>
<tr>
<th>Protecting Groundwater</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Master Plan)</td>
<td>The Master Plan has a goal to protect groundwater from contamination.</td>
<td>All the elements of the “Good” category, plus the plan has objectives for how to accomplish the goal.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
<tr>
<td>Protecting Groundwater</td>
<td>The ordinance has a Site Plan Review standard that sewage disposal and water supply shall remain safe during a development.</td>
<td>The Zoning Ordinance includes groundwater protection standards within the Site Plan Review.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
<tr>
<td>(Zoning Ordinance)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Policy 3:** The natural capability of land shall govern the development of individual sites.

To maximize the potential of recharge areas to restore underground water supplies, such areas are best kept as open space where feasible, or uses limited to low density, so as to retain as much of the permeable surface as possible. Land grading should be minimized to retain the water holding characteristics of the land. Native vegetation essential to the water holding characteristics should be preserved, or where necessary, enhanced as part of a development program. The balance and integrity of the hydrological system must be maintained in any part of a proposed development.

Recharge areas should be protected from pollution by proper regulation of all uses which handle hazardous materials and discharge wastes. Drain field discharges should not adversely affect the quality of ground water. Stormwater runoff should be controlled so as to eliminate the percolation of pollutants from surface runoff into the underground system. Use of natively vegetated swales, buffers, and infiltration areas provided on-site are encouraged. Sidewalks, roads, and driveways should be designed to minimize impervious surfaces.

- Springfield Township Master Plan, p. 28-29
Criteria for Site Plan Review:

9. Natural resources will be preserved to the maximum extent possible in the site design by development in a manner which will not detrimentally affect or destroy natural features such as lakes, ponds, streams, wetlands, steep slopes, groundwater and woodlands.

Sec. 36-465. Stormwater and groundwater control.

(a) Yard drains, patio drains, catchbasins, downspouts, weep tile, perimeter and footing drains or any other structure used for the collection and conveyance of stormwater and/or groundwater shall not be permitted to discharge into any sanitary sewer connected directly or indirectly to the county system, except as provided under subsection (b) of this section.

(b) The crock to iron joint shall be sealed by approved flexible adaptor fittings such as those manufactured by Fernco Joint Sealer Company, or as approved by the county agency. The iron pipe inside the buildings shall be plugged and leaded and remain plugged and watertight until such time as the plumbing is carried on to the first floor, the basement backfilled and the roof is on the building, thereby providing that no water from the excavated basement will enter the sanitary sewer.

(Ord. No. 77, § 3.05, 8-14-2007)
Best Management Practices (BMPs) in Rural Areas

1. Water Quality Protection via Planning and Zoning
2. BMPs tied to Low Impact Development (LIDs)
3. Specific Zoning Techniques
   - Resource Protection Overlay Districts
   - Floodplains
   - Wetland Protection/Restoration/Creation
   - Woodland Protection and Reforestation
   - Conservation Easements
4. Public Education Measures for master plans
Resource Protection Overlay Districts

• Resource protection areas contain natural features and vegetation that helps prevent negative impacts of pollutants reaching waterways.

• A Resource Protection Overlay District ensures natural features within the community not adequately protected by State and Federal law are preserved. Overlay Districts establish what types of uses are allowed within or adjacent to them.
Separate statutory authority exists for local units of government to adopt local regulations to protect the following natural resources:

- Wetlands
- Environmental areas
- Soil erosion and sedimentation control
- Inland lakes and streams
- Natural rivers
- Floodplains
- High risk erosion areas
- Sand dunes.

All but soil erosion and sedimentation regulations can be structured as an overlay zone. The special natural resource protection regulations apply only in the overlay zone and are in addition to the other applicable district regulations.
Resource Protection Overlay Districts

• The **Master Plan** should include language that provides for the creation of an overlay zone to protect the natural resources of the community, along with objectives on how to reach this goal.

• The **Master Plan** should also include a full inventory of these natural resources with the corresponding maps.

<table>
<thead>
<tr>
<th>Resource Protection Overlay Districts</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Master Plan includes a goal to create an overlay zone to protect valuable natural features.</td>
<td>All of the elements in the “Good” category, plus the Master Plan adds objectives for how to accomplish the goal.</td>
<td>Only after conducting a full natural features inventory, and including appropriate maps in the Master Plan, the Planning Commission may find it desirable to create a new Natural Features Protection Overlay District, similar to the existing Floodplain Overlay District. It could be targeted to protecting existing wetlands and/or woodlands.</td>
</tr>
</tbody>
</table>
Resource Protection Overlay District in the zoning ordinance ... If a parcel proposed for development is located within a Priority Resource Protection Area, the applicant is required to gather factual data on the ecology of the property known as an Ecological Characterization and submit this with the site plan review materials.

- Natural Areas Plan in Springfield Master Plan, p.66
Sec. 40-892. Resource protection overlay district

(a) Purpose. The purpose of this section is to ensure that property is developed in a manner which is consistent with its zoning designation, meets the goals and objectives of the township master plan and the proposed physical elements are designed and arranged to protect priority resource protection areas identified by the township, both on the site and in the vicinity of the site. The overlay district establishes procedures to enable the applicant and township to achieve the mutually compatible objectives of reasonable use of land and protection of vital natural resources.

-Springfield Township Code of Ordinances
Floodplains

- Floodplains are regulated federally under Part 31 Water Resources Protection of NREPA, P.A. 451 of 1994, along with the Federal Emergency Management Agency (FEMA) and their National Flood Insurance Program (NFIP), which has 3 components:
  - Flood insurance
  - Floodplain management
  - Flood Hazard Mapping

Still, greater protection may be necessary for a community as the amount of prime buildable land decreases. **Floodplain ordinances** seek to preserve floodplains and reduces risks and hazards to residents and their property.
Floodplains

A Master Plan should include a floodplain map that details the land subject to flooding, and may include the following measures/goals:

- Enroll in FEMA National Flood Insurance Program
- Educate public on floods and floodplains
- Creation of a Flood Hazard Overlay Zone

Table 4-16: Resource Protection Techniques – Floodplains

<table>
<thead>
<tr>
<th>Resource Protection Techniques</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floodplains</td>
<td>A floodplain map is included in the environmental inventory.</td>
<td>A FEMA approved 100-year flood map is available either in the Master Plan or at the Community Hall.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
</tbody>
</table>
Floodplains

Challenges:

• Many of the storm water lines in the city were undersized when engineered decades ago, leading to capacity issues and potential flooding.
• The drain areas of special concern, as detailed in in the Map 4, represent geographies that cannot accommodate an increase in impervious surface or other construction till appropriate drainage solutions are implemented by the city or the developing party.
• The need for the replacement of one utility may not coincide with the need to replace adjacent or affected utilities. For example, a sewer line may need to be replaced before the street that it is under requires reconstruction, or vice-versa.

100 year Flood Plain Map in City of Owosso 2012 Master Plan, along with related language citing Areas of Concern for future development, p. 91
c. Site design.

2. Create naturally vegetated buffer systems, which may vary in width as determined by the township, along all drainage ways. Critical environmental features such as the 100-year floodplain, steep slopes, and wetlands shall be considered.

- Springfield Township Code of Ordinances, 40-891(e)

*Impervious surface reduction/infiltration enhancement.*
Wetland Protection/ Restoration/ Creation

- Protect water quality
- Reduce flooding
- Provide wildlife habitat
- Treat stormwater
- Recharge groundwater
- Preserve aesthetics
- Protect property values associated with wetland vistas
Site plan review works well with large projects and can help protect wetlands as part of open space zoning or PUDs.
Wetland Protection/Restoration/Creation

- Wetlands over 5 acres in size are protected under Part 303 of NREPA; however, smaller, non-coastal wetlands are not provided for, placing an impetus on local policies and practices to address these needs.

- Wetlands serve as natural sponges for stormwater runoff and reduce burdens on stormwater infrastructure while lowering chances for floods.

- Communities need language in place in their Master Plans and/or Zoning Ordinance that properly utilizes these wetlands as “green infrastructure”
• Key elements of wetland ordinances are:
  • *No dredge or fill*
  • *No development closer than X feet to the wetland*

• Site plan review that conditions approval on ensuring that state and/or federal permits have been obtained and that requirements of local wetlands ordinance are met
### Table 4-18: Resource Protection Techniques - Wetland Protection/Restoration/Creation

<table>
<thead>
<tr>
<th>Resource Protection Techniques</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland Protection/Restoration/Creation</td>
<td>There is nothing to add, as long as the “Good” language for Natural Feature and Drain Setbacks has been added.</td>
<td>There is nothing to add, as long as the “Better” language for the Natural Feature and Drain Setbacks has been added. Master Plan adds objectives for how to accomplish this goal.</td>
<td>Unless there is local capacity to administer a full Natural Features Protection Ordinance (which is rare in rural areas), the “Better” approach is the appropriate solution for this practice.</td>
</tr>
</tbody>
</table>
Action Summary:

3) Protect non-regulated wetlands from development and water quality degradation. Best management practices should be implemented for the capture and filtering of stormwater and stormwater infiltration to treat water before it reaches any existing wetland.

-Springfield Township Master Plan, Shiawassee River, p. 73
6) **Provisions For Wetlands.** During the review of any zoning permit application, if the zoning administrator determines that the proposed activity will impact regulated wetlands, he or she will provide the applicant with a copy of the DNR joint permit application form and assist with filling it in. The state department of natural resources personnel will determine whether the department actually has jurisdiction over the area in question. Further review of the zoning permit application may proceed, with any approvals conditioned upon receipt of a wetlands permit or waiver of DNR jurisdiction.

- St. Charles, Zoning Ordinance, p. 4-18, General Provisions, Section 408. Supplementary Environmental Regulations.
Woodland Protection & Reforestation

- Local governments may be able to protect woodlands through conservation easements or Resource Protection Overlay Districts, but the most important measures are education through the Master Plan.

- The *Master Plan* should identify places where woodland protection/restoration should take place, along with objectives on how to accomplish this goal.

- The community’s *Zoning Ordinance* may also assist in establishing guidelines on tree cutting or soil removal, or protection of existing woodlots from new residential subdivision development.
## Woodland Protection & Reforestation

### Table 4-17: Resource Protection Techniques - Woodland Protection and Reforestation

<table>
<thead>
<tr>
<th>Resource Protection Techniques</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Woodland Protection and Reforestation: (Master Plan)</strong></td>
<td>The Master Plan has a goal to identify places where woodland protection, restoration, or development of a Woodland Management Plan should take place.</td>
<td>All of the elements in the “Good” category, plus Master Plan adds objectives for how to accomplish the goal.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
<tr>
<td><strong>Woodland Protection and Reforestation (Zoning Ordinance)</strong></td>
<td>Prohibit tree cutting of more than “X” living trees and soil removal without an approved plan. (“X” is decided by the community.)</td>
<td>All of the elements of the “Good” category, plus require protection of existing woodlots as new residential subdivisions and development along waterways occurs.</td>
<td>The “Better” approach may be the highest needed for this practice.</td>
</tr>
</tbody>
</table>
Some Master Plans such as the City of Owosso include wetland and woodland maps along with language discussing the need to protect these areas.
Policy 3: The natural capability of land shall govern the development of individual sites.

The conservation of woodlands is essential to protect water, air, and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitats, and to preserve aesthetic values and community beauty. The significance of specific woodland areas must be determined at the time of review. Development which is permitted in and around wooded areas, or where significant specimens of individual trees are involved, should be planned, constructed, and maintained so that existing healthy trees and desirable native vegetation are preserved. The objective should be to preserve native trees rather than to rely on removal and subsequent replanting. If replanting is proposed, native species should be used. The diversity of woodland areas should be protected to ensure long-term stability.
Criteria for Site Plan Review:

9. Natural resources will be preserved to the maximum extent possible in the site design by development in a manner which will not detrimentally affect or destroy natural features such as lakes, ponds, streams, wetlands, steep slopes, groundwater and woodlands.

- Owosso, Code of Ordinances
Conservation Easements

- *Conservation easements* transfer certain use rights for the purpose of conservation, with protection occurring by separating the right to development from other property rights for an extended period of time.

- *Conservation easements* are a voluntary implementation technique, they can only be encouraged, not required.

- The *Master Plan’s* environmental inventory should help in identifying critical natural resources in need of protection.
## Table 4-19: Resource Protection Techniques – Conservation Easements

<table>
<thead>
<tr>
<th>Resource Protection Techniques</th>
<th>GOOD</th>
<th>BETTER</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation Easements</td>
<td>The Master Plan has a goal to encourage landowners and businesses to use land donation, conservation easements, deed restrictions, and targeted land purchases to protect sensitive natural features and other natural resources.</td>
<td>All of the elements in the “Good” category, plus the Master Plan adds an objective for how to accomplish the goal.</td>
<td>All the elements in the “Better” category, plus the Master Plan adds an additional objective.</td>
</tr>
</tbody>
</table>
(h) *Preservation and maintenance.* The effectiveness of any approval of a cluster lot development under this section shall be conditioned upon recording of appropriate *conservation easements* or other instruments for the purpose of providing for long-term maintenance and preservation of common areas, open space areas, wooded areas and/or other areas with natural resources or features to be preserved on the property. Such *easement* and/or other instrumentation shall be in a form and contain the content approved by the township attorney.

Sec. 40-594, Springfield Township Code of Ordinances
Break into 3 small groups and each group will tackle one of the following questions. For each question, identify at least two places where model amendments can be found.

1) How could your Master Plan and Zoning Ordinance be amended to provide for rain gardens?

2) How could your Master Plan and Zoning Ordinance be amended to provide for better groundwater protection?

3) How could your Master Plan and Zoning Ordinance be amended to provide for wetland protection?
Best Management Practices (BMPs) in Rural Areas

1. Water Quality Protection via Planning and Zoning
2. BMPs tied to Low Impact Development (LIDs)
3. Specific Zoning Techniques
4. Public Education Measures for master plans
   • Agricultural Education & Outreach
   • Preserving Open Space
   • Water Quality Monitoring
   • Drain Maintenance, Road and Stream Crossings
Water Quality and Public Education

- By educating the public about sources of water pollution and teaching them how to prevent conditions that lead to harmful impacts on water resources, local government is engaging in non-regulatory strategies that reduce the potential for expensive remediation tactics.

Community Visioning Session for Thread Lake in Flint, MI
October, 2013
Water Quality and Public Education

- The **Master Plan** should outline a strategy for community engagement that addresses the following concerns:
  - Agricultural Education & Outreach
  - Preserving Open Space
  - Water Quality Monitoring
  - Drain Maintenance, Road and Stream Crossings

*Visioning Session in Flint discussing water quality issues around Flint Park Lake, November 2013*
Agricultural BMPs

- Address soil erosion from water and wind problem
- Help limit nutrients, chemicals and bacteria entering public water bodies
- Prevent loss of topsoil and fertility
- Local government has limited authority, Right-to-Farm

Solutions
- GAAMPS
- Education
Water Quality and Public Education

Agricultural Education & Outreach

- Stormwater runoff from agricultural land is often the primary source for water pollution in rural communities
- Following Generally Accepted Agricultural & Management Practices (GAAMP) will help reduce these impacts.
  - Manure management/utilization
  - Care for farm animals
  - Irrigation water use
  - Site Selection
  - Nutrient utilization
  - Pesticide utilization/pest control

Table 4-20: Public Education – Agricultural Best Management Practices

<table>
<thead>
<tr>
<th>Public Education</th>
<th>MASTER PLAN GOALS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural BMPs</td>
<td>Support and encourage best management practices for agriculture that respect the environment and protect water quality.</td>
</tr>
</tbody>
</table>
Open Lands Vegetation Management

• Benefits of deep-rooted vegetation in water quality protection
  • Filters stormwater runoff
  • Increases infiltration
• Other benefits
  • Lowers land management costs
  • Limits fossil fuel use in management (pollution and costs)
• Acquisition of lands for preserves
• Education
• Public land owners set example
Preserving Open Space

- Keeping the overall % of impervious surfaces low in the watershed is essential for maintaining water quality. Natural open space with well-established vegetation helps limit stormwater volumes and filters out pollutants and debris that would end up in community waterways.

- Planned Unit Developments (PUDs)
- Conservation easements
- Purchase or Transfer of Development Rights (PDR, TDR)
Water Quality and Public Education

Water Quality Monitoring

• Baseline information to track improvement or decline
• Beach water quality monitoring—generally by County Health Departments
  http://www.michigan.gov/deq/0,4561,7-135-3313_3686_3730-11005--,00.html
• Inland lakes monitoring—cooperative program with Michigan Lakes and Streams Association
  http://www.michigan.gov/deq/0,4561,7-135-3313_3686_3731---,00.html
• Surface water assessment
  http://www.michigan.gov/deq/0,4561,7-135-3313_3686_3728---,00.html

Ralph Bednarz (Michigan DNRE) joins CLMP volunteers for side-by-side lake sampling, part of the quality assurance program for CLMP data. (MiCorps photo by Jo Latimore)
Water Quality and Public Education

Water Quality Monitoring

- The Master Plan should identify sources for water quality information and credit organizations/public agencies that monitor surface water quality around the community, and list resources that post routine updates on water quality levels.
- Raising awareness of water quality issues in the community will improve lake, river, and stream monitoring while establishing preventative measures for future contaminations.

Table 4-22: Public Education - Water Quality Monitoring

<table>
<thead>
<tr>
<th>Public Education</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MASTER PLAN GOALS:</strong></td>
</tr>
<tr>
<td><strong>Water Quality Monitoring</strong></td>
</tr>
</tbody>
</table>
Water Quality and Public Education

Water Quality Monitoring

- Non-profits, government agencies, and other local stakeholders can collaborate in hosting public education events related to water quality initiatives.

MSU’s Planning & Zoning Center partnered with the Flint River Watershed Coalition for community engagement events addressing water quality issues pertaining to the natural resources of Thread Lake and Flint Park Lake.
Drain Clearing

- Move stormwater from agricultural areas and developed areas
- County Drain Commissioners have authority on designated county drains
- Adjacent land owners pay for costs
- Buffer strips would reduce need and costs
Water Quality and Public Education

Drain Maintenance, Road and Stream Crossings

- Poorly designed erosion control leads to soil erosion around crossing structures (such as bridges or culverts) and sedimentation into the waterway.

- The **Master Plan** should include details that instruct projects with a significant amount of earth-moving to coordinate with soil erosion and sedimentation authorities in the area, such as the County Road Commissioner or Drain Commissioner.

- Promotes public education of water quality impacts and proper techniques for road and stream crossing
- Requires obtaining an SESC permit, demonstration of adequate design
- Increases infrastructure safety and reduces harmful environmental impacts
Road & Bridge Repair and Stream Crossings

- Roads and stream crossings a potential source of erosion and sedimentation
- State DOT and county road commissions responsible for implementing BMPS
Water Quality and Public Education

- Drain Maintenance, Road and Stream Crossings

Excerpt from Owosso 2012 Master Plan, goals pertaining to Shiawassee River and related issues of soil erosion, riparian preservation, and water quality

<table>
<thead>
<tr>
<th>Plan Recommendation</th>
<th>Actions</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Additional Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consider zoning changes that encourage or require riparian preservation</td>
<td>Planning commission; city council; FSR</td>
<td>1-2 years</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>Continue to observe strict soil erosion permitting</td>
<td>Staff</td>
<td>On-going</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>Continue to support the Friends of the Shiawassee River in their attempts to protect and enhance the water quality.</td>
<td>Staff; city council</td>
<td>On-going</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Table 4-23: Public Education – Drain Clearing, Road and Bridge Repair, and Stream Crossings

<table>
<thead>
<tr>
<th>Public Education</th>
<th>MASTER PLAN GOALS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain Clearing</td>
<td>Promote education about, and the coordination of, drain maintenance activities with public and private landowners for the implementation of BMPs to reduce soil erosion and sedimentation of drains and other water bodies.</td>
</tr>
<tr>
<td>Road and Bridge Repair, and Stream Crossings</td>
<td>Promote education about, and the coordination of, road and bridge repair, and stream crossing construction activities with public and private landowners for the implementation of BMPs to reduce soil erosion and sedimentation of drains and other water bodies.</td>
</tr>
</tbody>
</table>
Appendix B: Local Planning & Zoning Assessment Tool

I. **Introduction**
   Purpose, Methodology, Organization and Content, How to Use Assessment, Defined Terms, and Notes

II. **Background**
    Title of Plans, Dates Updated, Community Statistics

III. **General Questions/Provisions/Supplementary Info**
    County Drain Commissioner, Health Departments, and other agencies

IV. **Master Plan**
    Goals and Objectives and Growth and Development

V. **Zoning Ordinance**
    General, Site Plan Review, and Subdivision/Plot Regulations
### Springfield Township

Are any of the following water quality protection measures included in the Master Plan’s goals, objectives, strategies, or action items?

<table>
<thead>
<tr>
<th>Measure</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinated Site Plan Review</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Land Division</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Buffer Strips</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Impervious Surface Reduction:</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Resource Protection Overlay District</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Conservation Easements</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Green Streets Bio-Retention</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Natural Feature and Drain Setbacks</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Improving Groundwater Recharge</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Pollution Prevention: <em>Wellheads, Chemical Storage &amp; Disposal, Storm Drain Inlet Labeling, Building &amp; Demolition Materials Storage &amp; Disposal</em></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Floodplain Protection</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Woodland Protection and Reforestation</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Wetland Protection/Restoration/Creation</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Accumulation &amp; Disposal of Waste (Junk &amp; Yard Waste) and Other Materials</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Septic Systems</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Public Education: <em>Water Quality Monitoring</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Road &amp; bridge repair and stream crossings</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Drain clearing</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Agricultural BMPs</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Open Lands Vegetation Management</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Road Construction/Repair BMPs</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Stream and Drain Crossing/Bridges</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

### Owosso

Are any of the following water quality protection measures included in the Master Plan’s goals, objectives, strategies, or action items?

<table>
<thead>
<tr>
<th>Measure</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinated Site Plan Review</td>
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<td>Buffer Strips</td>
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<td>No</td>
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<tr>
<td>Improving Groundwater Recharge</td>
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<tr>
<td>Pollution Prevention: <em>Wellheads, Chemical Storage &amp; Disposal, Storm Drain Inlet Labeling, Building &amp; Demolition Materials Storage &amp; Disposal</em></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Floodplain Protection</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Woodland Protection and Reforestation</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Wetland Protection/Restoration/Creation</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Accumulation &amp; Disposal of Waste (Junk &amp; Yard Waste) and Other Materials</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Septic Systems</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Water Quality Monitoring</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Road &amp; bridge repair and stream crossings</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Drain clearing</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Agricultural BMPs</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Public Education: <em>Open Lands Vegetation Management</em></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Road Construction/Repair BMPs</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Stream and Drain Crossing/Bridges</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>
### Springfield Township

4. Is the application of any of the following low impact development techniques (for stormwater management or pollution prevention) required or encouraged by the zoning ordinance?

<table>
<thead>
<tr>
<th>LIDs</th>
<th>Required (pg. #)</th>
<th>Potential BMP(s) to apply</th>
<th>Notes (Citations, characteristics, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Management: Other Site Plan Review Standards</td>
<td>40-136</td>
<td>Yes</td>
<td>(2)</td>
</tr>
<tr>
<td>Bioretention or rain gardens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetated, grassed, or bio swale</td>
<td>40-891 40-721</td>
<td>Yes</td>
<td>40-891 (b) (4). (c) (4).</td>
</tr>
<tr>
<td>Constructed surface or subsurface filters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet ponds or retention basins</td>
<td>40-891 40-721</td>
<td>Yes</td>
<td>40-891 (c) (5)</td>
</tr>
<tr>
<td>Dry detention basins</td>
<td>40-721</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Two-stage ditches/channels or naturalized ditches</td>
<td>40-891</td>
<td>Yes</td>
<td>(e) (3) a. 5.</td>
</tr>
<tr>
<td>Infiltration basins</td>
<td>40-891</td>
<td>Yes</td>
<td>(b) (5) &quot;Use of infiltration devices&quot;</td>
</tr>
<tr>
<td>Level spreaders</td>
<td>40-891</td>
<td>Yes</td>
<td>(b)(4).</td>
</tr>
<tr>
<td>Pervious pavement</td>
<td>40-891</td>
<td>Yes</td>
<td>(c)</td>
</tr>
<tr>
<td>Stormwater planters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetated filter strips</td>
<td>80-891</td>
<td>Yes</td>
<td>(e)</td>
</tr>
<tr>
<td>Water quality devices (such as hydrodynamic separators and baffle boxes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind barriers (such as no-till shelterbelts, contouring farming, wind breaks)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steep slope protection (such as riprap, level spreaders, reinforced soil)</td>
<td>80-891</td>
<td>Yes</td>
<td>(e)</td>
</tr>
<tr>
<td>Lot coverage</td>
<td>40-640</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Prohibiting the storage of potentially contaminating materials in floodplain</td>
<td>40-886 40-890</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Provisions for the rebuilding/demolition of non-conforming structures within a floodplain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilization of overlay zoning to protect environmentally sensitive areas, indicate the types of overlay zones used.</td>
<td>40-892</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Upcoming Water Quality Workshops

• March 11, 2014 from 6 – 9 p.m.
  Rustic Inn
  133 N. Saginaw Street
  St. Charles, MI 48655

• March 13, 2014 from 6 – 9 p.m.
  Fenton Community Center
  50 S. Leroy Street
  Fenton, MI 48430
Saginaw Bay Watershed Conference

- June 12, 2014 at Saginaw Valley State University
- http://www.landpolicy.msu.edu/SaginawBayProject
Mark A. Wyckoff, FAICP
Professor and Director
Planning & Zoning Center at MSU
Senior Associate Director, Land Policy Institute

Pardeep Toor
Research Assistant
Land Policy Institute

Devin Grace Gill
Director
Friends of the Shiawassee River
989.723.9062
deving@shiawasseeriver.org

Michigan State University
Land Policy Institute
Planning & Zoning Center
552 W. Circle Drive, Room 112
East Lansing, MI 48824
517.432.2222
toorpard@landpolicy.msu.edu
www.landpolicy.msu.edu/saginawbayproject