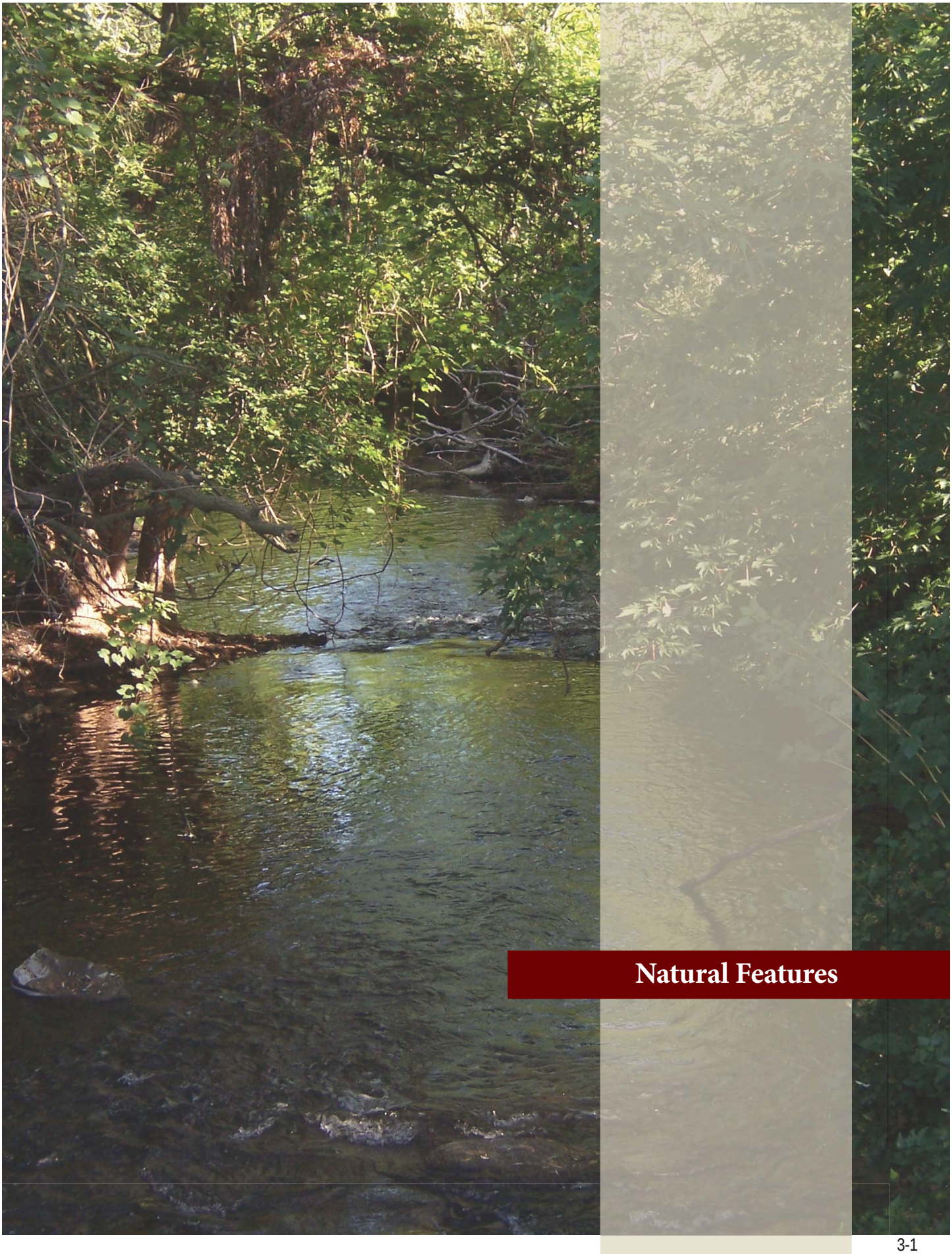


Natural Features

Physical features exert important influences in shaping the development and character of a specific area. They are nature's contribution to the Township's environment. Collectively, these features can determine the overall physical character of the community.

When integrated thoughtfully into development proposals, physical features serve to enhance the character and appearance of the constructed environment. Conversely, ignoring physical features, or misusing them, can have significant, long-term negative consequences. Some well-defined physical features serve as a barrier to development and may be difficult to overcome, except at considerable expense. It is usually better to design with nature than to attempt to substantially change an area's physical environment.

Due to the nature of the existing development pattern in the Township, it is important to ensure that the remaining available natural features are preserved and protected to the greatest extent possible. This section provides a detailed analysis of these features and offers solutions to assist in their long-term protection/preservation. The areas covered are as follows:

- Soils
- Wetlands
- Woodlands
- Watersheds

Soils

Soils play a major role in the long-term development of a community. With Lapeer Township being primarily an unsewered, rural community, the soil patterns have a major influence on directing the type, intensity and location of development, the prominence of long term farming, as well as having an impact on watershed issues, construction issues relating to infrastructure and siting of buildings, and addressing drainage problems in specific areas. A generalized soils map is provided on the following page. Some of the beneficial uses of knowing the general soil characteristics in an area are identified below:

- *Siting Houses and Commercial Buildings* - Locate soils with the fewest limitations for construction;
- *Streets, Driveways and Sidewalks* - Identify soils that have a high water table or high clay content, which can cause cracking;
- *Underground Utility Lines* - Identify soils that have properties that can cause breakage or corrosion of lines buried within them;
- *Control of Runoff and Soil Erosion* - Construction work compacts the soils and increases the amount of paved surfaces, thus increasing runoff;
- *Planting of Gardens and Landscaping* - Knowledge of the soils allows a homeowner/business owner to select plantings that have the best chance of survival;
- *Providing Suitable Recreation* - Identifying soils for the location of trails, play areas and picnic areas require a review of the drainage characteristics of the soil, the slope, the soil texture, the flood hazard and the stoniness.

Soil Descriptions

Fabius – Wasepi- Mussey –Gilford Association: Level to gently sloping, somewhat poorly drained and poorly drained soils that have a sandy loam to gravelly clay loam subsoil; on outwash plains and lake plains.

This soil association typically has a high water table and is excessively wet which constitutes a severe limitation for residential uses. However, many of the soils in this association are farmed with the aid of additional drainage. In addition, gravel and sand suitable for commercial use can be obtained from areas within this association.

Lapeer – Miami – Celina – Association: Gently sloping to strongly sloping, well drained and moderately well drained soils that have a dominantly loam to clay loam subsoil; on till plains and moraines.

The soils in this association are fairly well suited for agricultural purposes with the largest impediment to farming being soil erosion. The limitations for residential purposes range from slight to severe depending on topography.

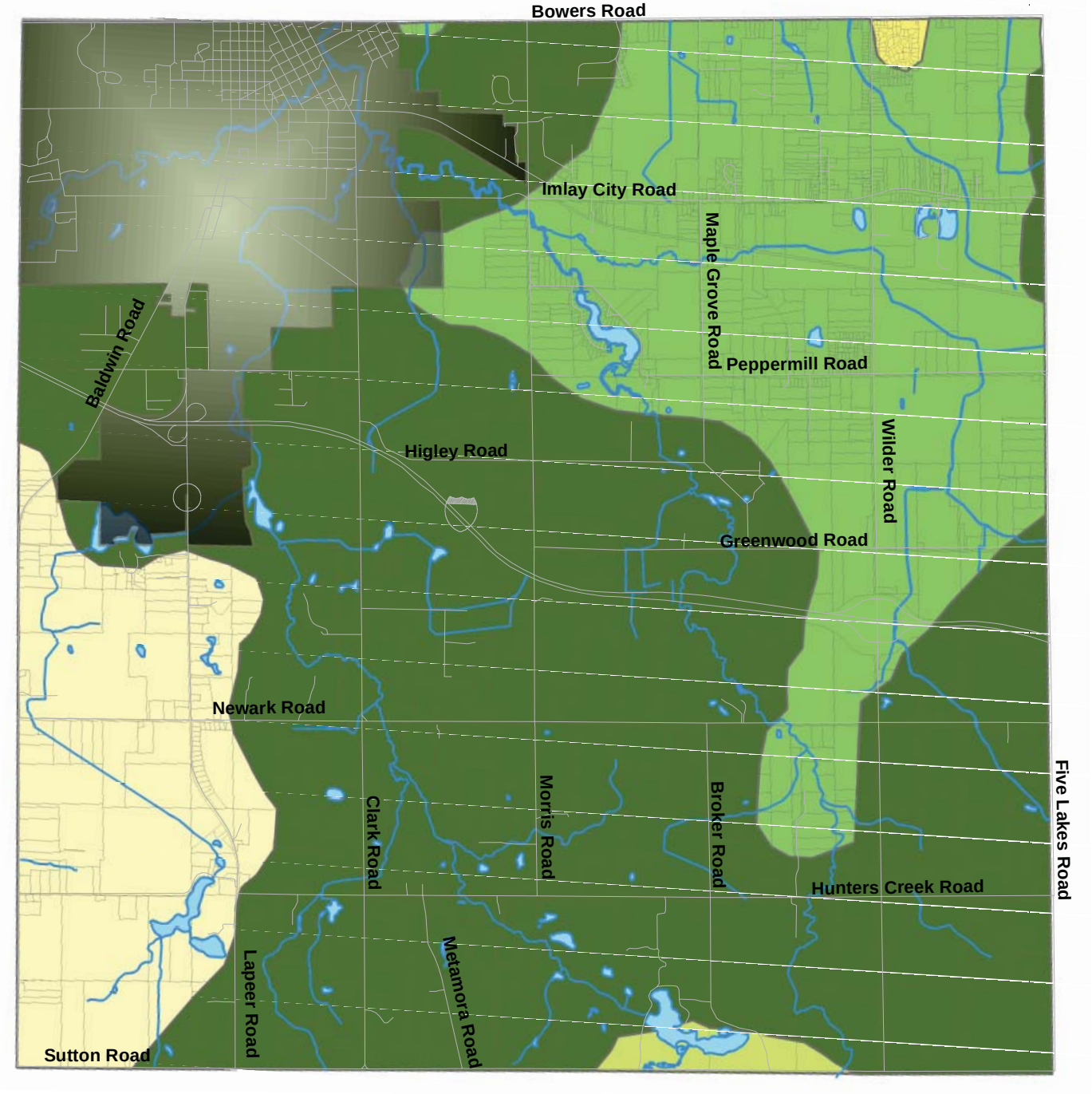
Miami – Celina – Morley Association: Gently sloping to strongly sloping, well drained and moderately well drained soils that have a clay loam and clay subsoil; on till plains and moraines.

The soils in this association are fairly well suited for agricultural purposes with the largest impediment to farming being soil erosion. The limitations for residential purposes range from slight to severe depending on topography.

Boyer – Miami – Lapeer Association: Gently sloping to very steep, well drained soils that have a sandy loam to clay loam subsoil; on outwash plains, till plains, and moraines.

This association is not conducive to long term farming due to the large presence of sand and gravel. However, the presence of the extensive amount of sand and gravel is conducive to mining operations. The limitations for residential purposes range from slight to severe depending on topography.

Soil Associations



Lapeer Township

Lapeer County

Map Prepared By:
Lapeer Township Planning Commission

With Assistance From:
Community Planning & Management, P.C.

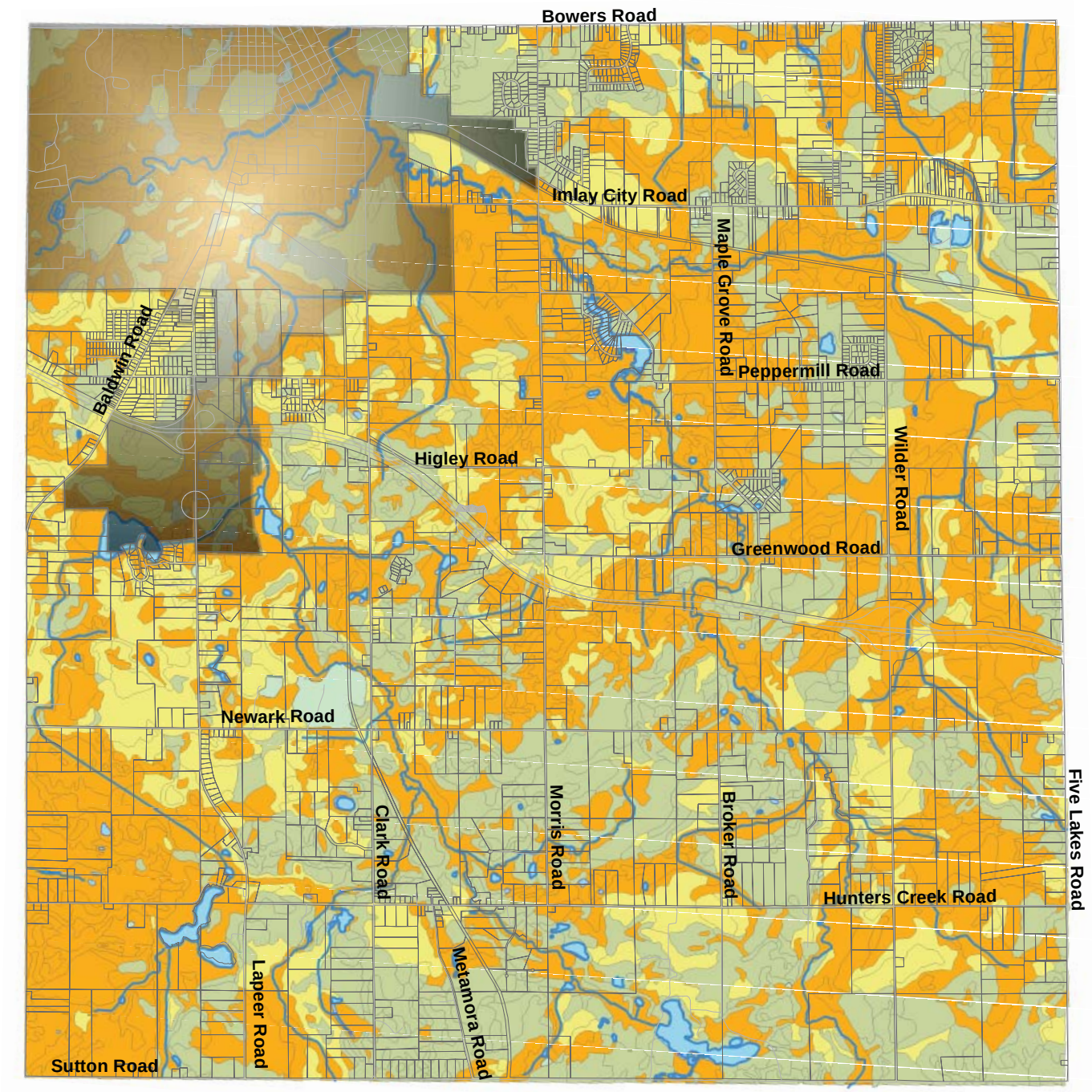
Base Map: Lapeer County Equalization

Legend

- Boyer-Montcalm-McBride
- Lapeer-Miami-Celina
- Boyer-Miami-Lapeer
- Miami-Celina-Morley
- Fabius-Wasepi-Mussey-Gilford

NORTH

Residential Capabilities - Limitations for Septic



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Legend

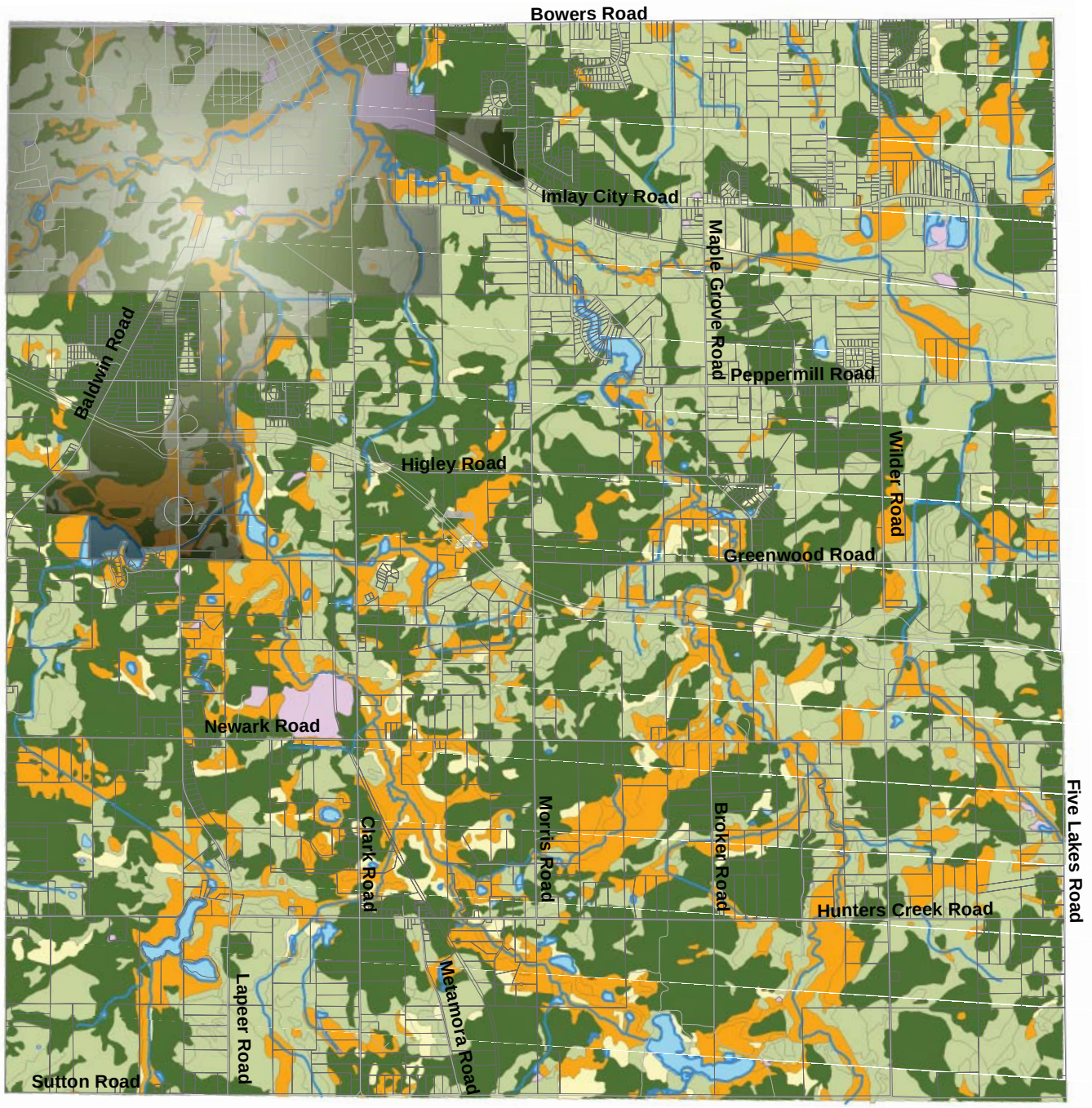
NORTH

Limitations

- Slight
- Moderate
- Severe

Base Map: Lapeer County Equalization

Agricultural Suitability



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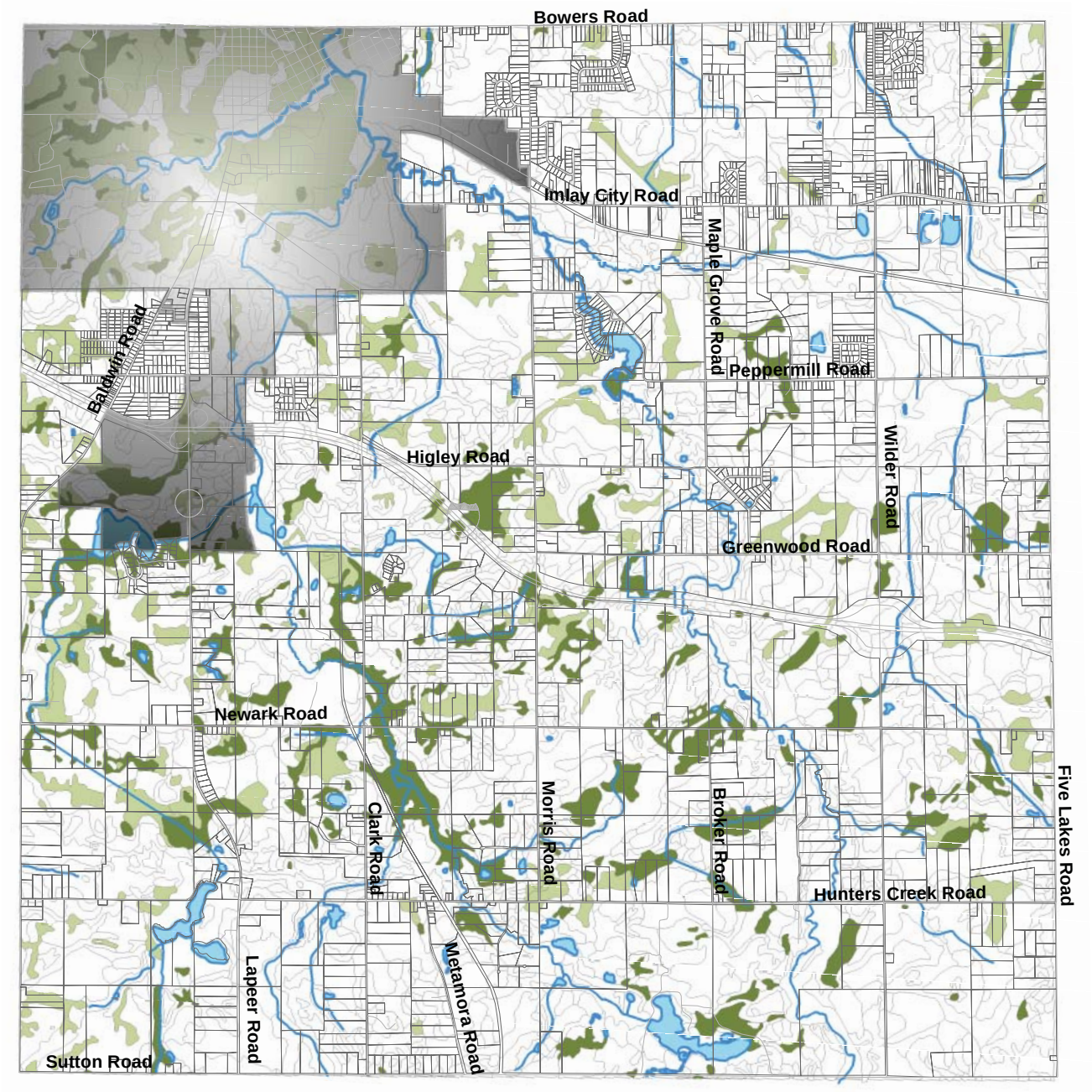
Legend

- Not Suited
- Poorly Suited
- Suited
- Well Suited

NORTH

High Yielding Farm Soils for Agricultural Production



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Legend

NORTH

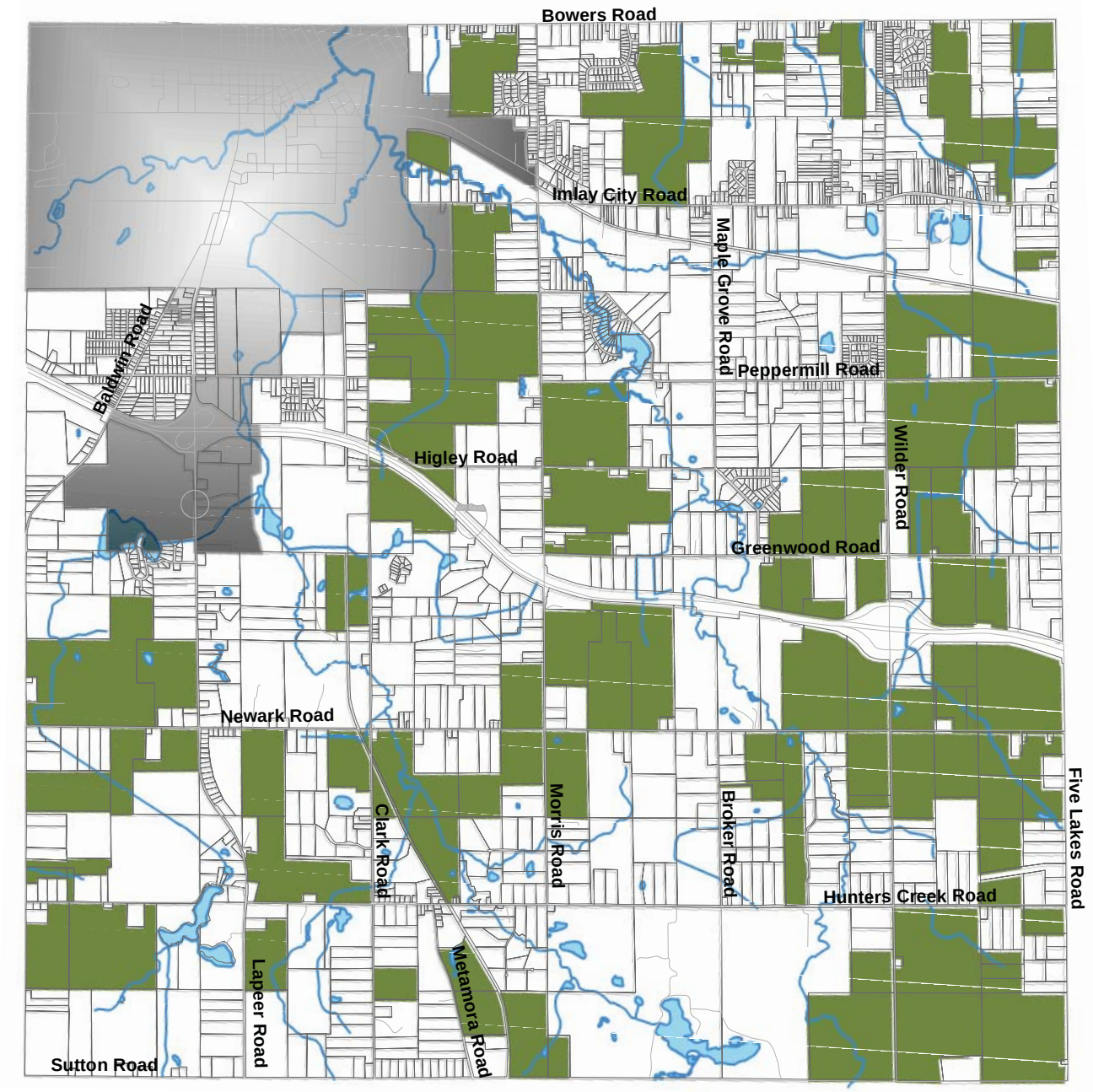
100 Bushels of Corn

110 Bushels of Corn

The two (2) categories shown represent the two highest yielding soils categorized by the Lapeer County Soil Survey

Base Map: Lapeer County Equalization

Farmed Properties



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Base Map: Lapeer County Equalization

Legend

Farmed

NORTH

Wetlands

Significance of Wetlands

- Protect downstream water supplies by providing clean ground water as a result of the nutrient retention and sediment removal. Wetland vegetation traps these sediments and pollutants, thereby preventing them from being deposited in surface water bodies.

- Function as effective natural storage basins for floodwater. Wetlands may be considered large sponges that absorb large quantities of seasonal precipitation, gradually releasing it when the receiving channels are able to accept it.

- Protect the shoreline from erosion caused by wind and wave action and effectively serving as environmental shock absorbers.

- Provide a habitat for many types of plants and animals that thrive in the type of physical environment created by wetlands. These plants and animals provide an economic and recreational benefit as a result of hunting, fishing and other leisure activities.

Impact on Lapeer Township

Lapeer Township contains numerous wetlands located throughout the community. The majority of the potential wetlands within the Township are either emergent or forested wetlands. These wetland areas can impact the developable area of each site within the Township especially due to their presence along many of the Township's roadways. Care must be taken in integrating these environmental assets into development sites to ensure their long term viability even as development occurs.

Types of Wetlands

EMERGENT - include bogs, meadows, marshes, fens, and potholes. An important marsh type is the 'Great Lakes Marsh' that is hydrologically connected to the Great Lakes and rivals rainforests in terms of biological productivity.

SHRUB-SCRUB - Shrub swamps, are similar to forested swamps, except that shrubby vegetation predominates.

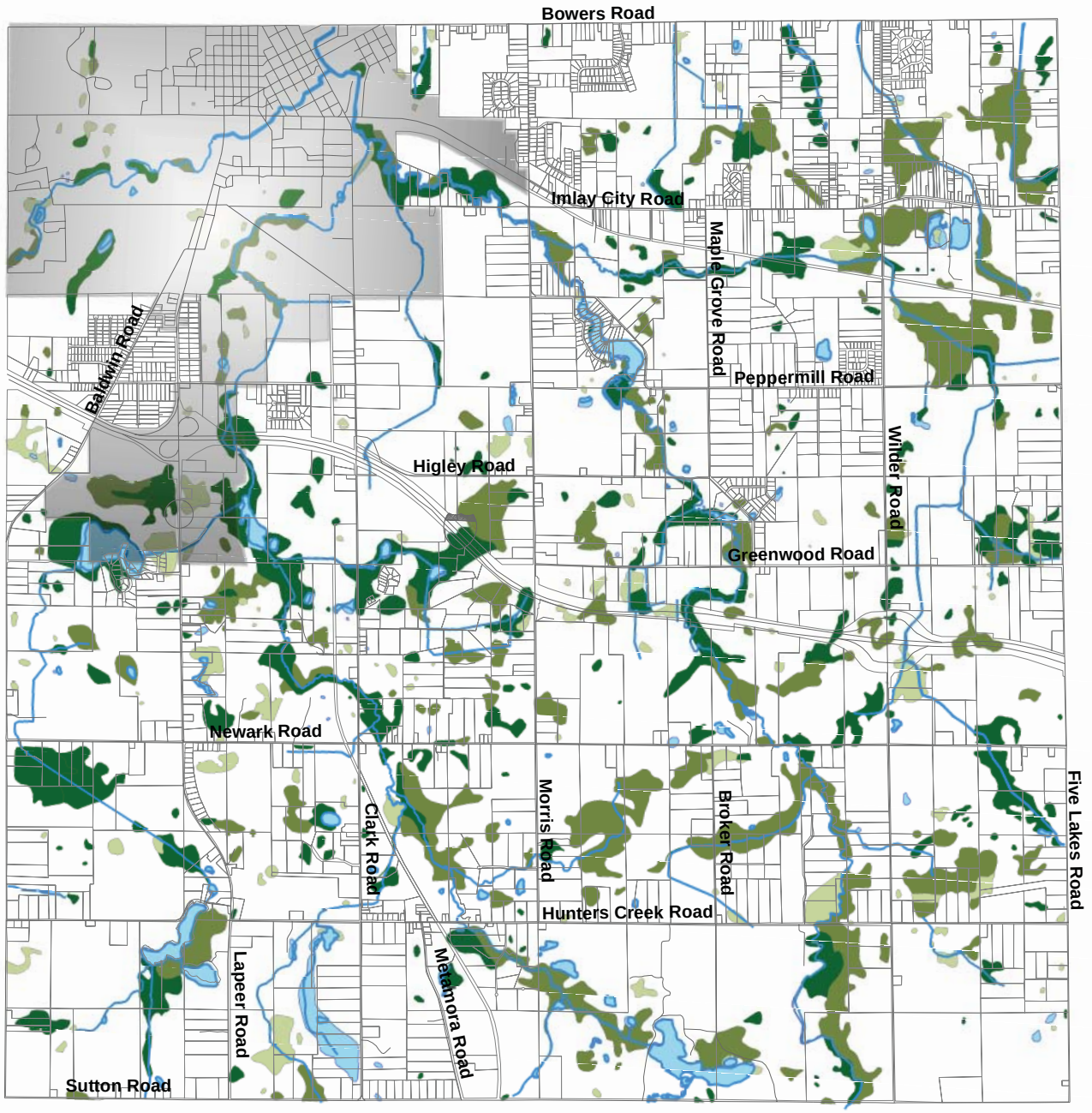
FORESTED - Forested swamps occur where trees grow in moist soils. They are often inundated with floodwater from near by rivers and streams.

OPEN WATER - Deeper, perennial pools within wetlands and shallow portions of lakes and rivers. The warmth of the water supports numerous aquatic organisms. Typically home to submerged plants (plants that grow underwater) which provide unique habitat resources such as substrates for macroinvertebrates, cover and forage for waterfowl, and spawning and nursing for fish.

NREPA Part 303

Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), authorizes the Michigan Department of Natural Resources and Environment (MDNRE), to regulate the types of activities which may impact wetlands within the State.

Potential Wetlands



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Base Map: Lapeer County Equalization

Legend

NORTH

- Emergent
- Scrub-Shrub
- Forested
- Open Water

Woodlands

Significance of Woodlands

In an environment such as Lapeer Township, the importance of woodlands, and trees in general, should not be underestimated. The abundance of these features does not minimize their importance on a site by site basis. Woodlands serve many useful environmental purposes that should be recognized for planning. These include the following:

- Slope stabilization and erosion control
- Conserving water quality
- Maintaining a micro-climate
- Filtering pollution from the atmosphere
- Decreasing noise
- Providing a habitat for wildlife

Woodlands in Lapeer Township

Significant woodland areas can be found throughout the Township. These woodland areas are either stand alone woodlands or are associated with a potential wetland as noted previously. Obviously those woodlands associated with a potential wetland should be preserved for not only the reasons noted above but also for the wetland benefits. Those woodlands that are stand alone woodlands (not associated with a wetland) should also be incorporated into the overall design of future development sites, providing a more mature setting for the development, maintaining existing habitat and wildlife areas, as well as providing an overall aesthetic.

Types of Woodlands
(commonly found in Michigan)

White Red Jack Pine - This grouping includes Jack Pine, and is found primarily on sandy soils of the eastern upper peninsula and north central lower peninsula.

Spruce Fir - This grouping consists of White Cedar, Balsam Fir, White Spruce, and Black Spruce and exists primarily in the upper peninsula.

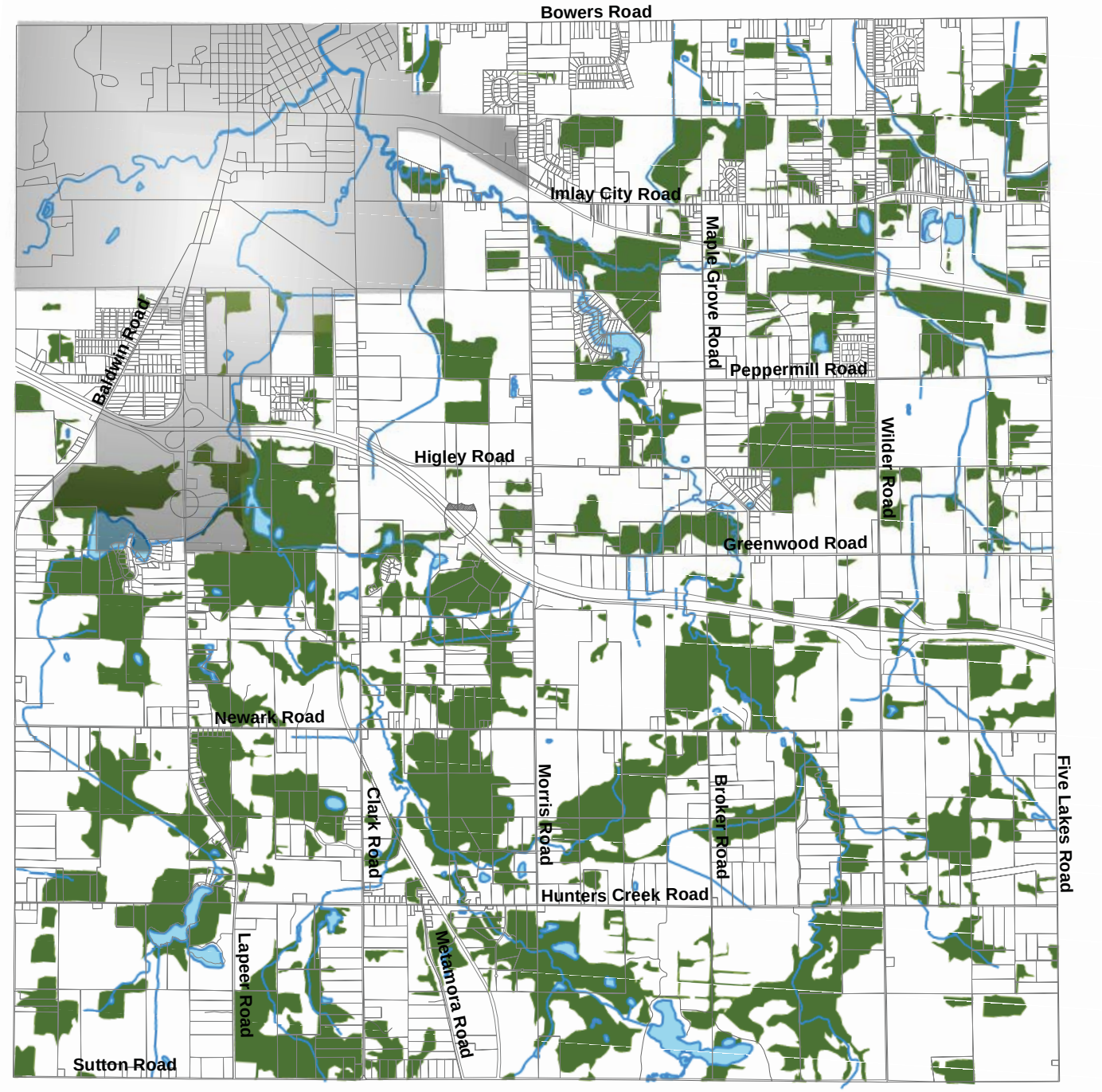
Oak Hickory - This group is mainly found in the sandy soils of southern Lower Michigan.

Elm Ash Cottonwood - This group is commonly referred to as lowland hardwoods. It is common in fertile soils and along streams.

Maple Beech Birch - This group is typically found in northern Michigan and include Maples, Beeches and Yellow Birches.

Aspen Birch - This group includes Aspens and Paper Birches and is found primarily in the northern Lower and south Upper Peninsula, as well as scattered throughout the State.

Woodlands



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Legend

Woodlands

NORTH

Watersheds

Significance of Watersheds

Communities across the nation are finding that their water resources are degrading in response to growth and development. Activity within a watershed will likely impact the quality of that watershed. For instance, if a new shopping center is built, rain water which was once absorbed into that vacant property will now runoff into the nearest drain, collecting dirt, oils and other chemicals and carrying them into that drain and eventually into the rivers and lakes of the State.

Watershed management is one way to ensure that the water resources of an area are protected. As defined, a watershed is an area of land that catches rain or snow, eventually draining into a body of water (such as a marsh, stream, river, lake or groundwater).

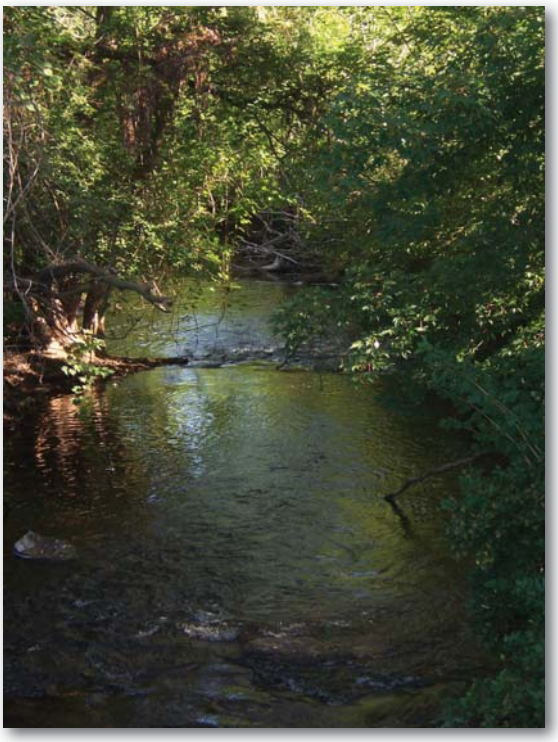
There are several reasons to protect local watersheds, including economic benefits, recreation, flood prevention, scenery and the overall quality of life. Some of the primary benefits that can be realized from watershed protection are:

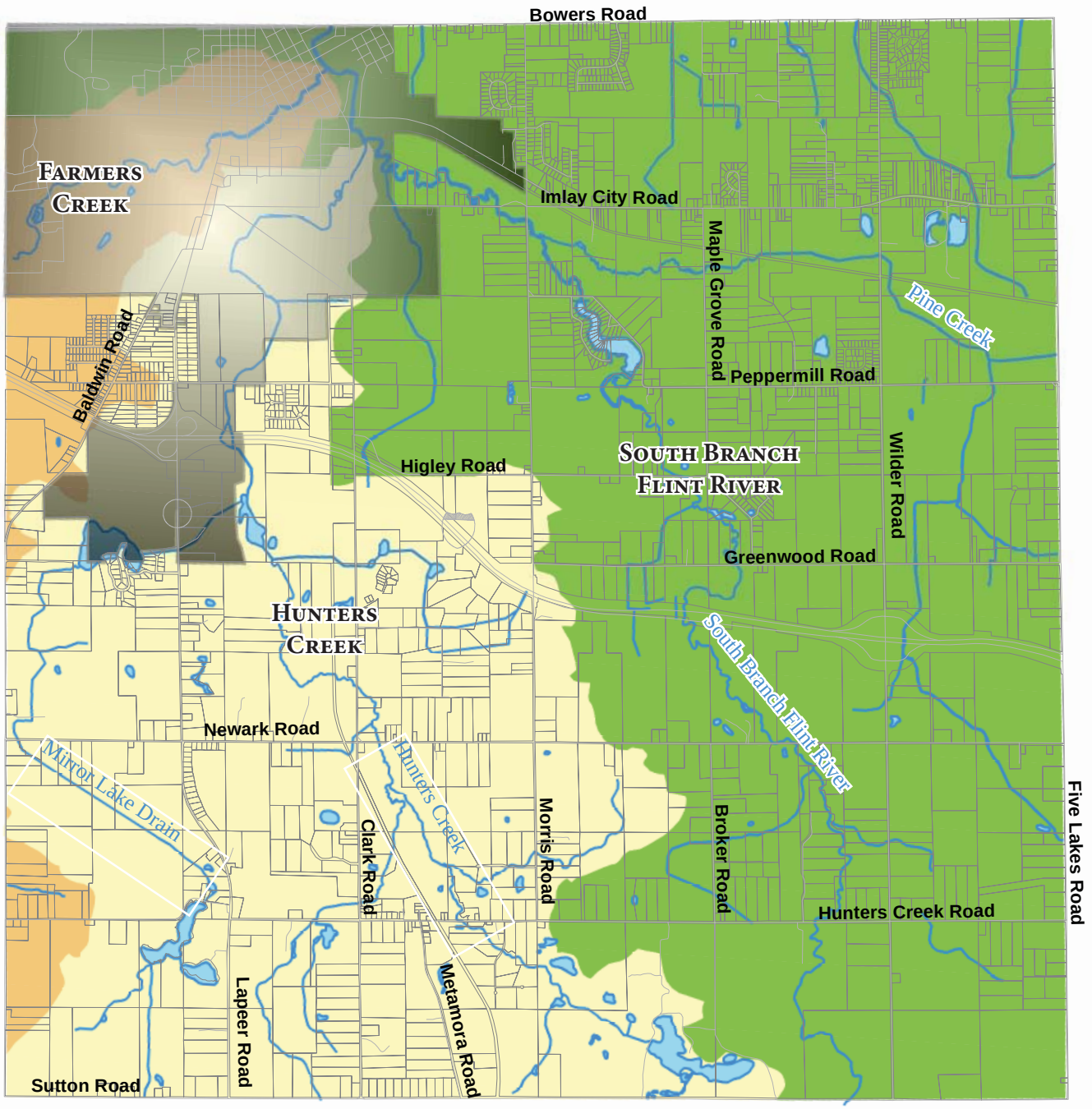
- The restoration and enhancement of recreational areas/uses;
- The protection of aquatic life, wildlife and habitat, including native landscapes and vegetation;
- The protection of public health through improved water quality;
- The reduction of impacts from peak water flows due to proper flood management.

Watersheds in Lapeer Township

The majority of Lapeer Township is located in one of two (2) main subwatersheds; being the South Branch of the Flint River as well as the Hunters Creek Subwatershed. The other noted subwatershed is the Farmers Creek.

- South Branch of the Flint River - The South Branch of the Flint River Subwatershed is located primarily in the eastern one half of the Township. The South Branch of the Flint River Subwatershed contains approximately 22,650 acres.
- Hunters Creek - The Hunters Creek Subwatershed drains a large portion of the southwestern portion of the Township, from essentially Baldwin Road to just east of Morris Road into the City. The Hunters Creek Subwatershed contains approximately 12, 560 acres.
- Farmers Creek - That portion of the Farmers Creek subwatershed which extends into Lapeer Township is a portion of a larger 32,665 acre watershed.





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Legend

- South Branch Flint River
- Hunters Creek
- Farmers Creek

NORTH

Lapeer Township's Environmental Responsibility

As noted, Lapeer Township is located in three major watersheds – the South Branch of the Flint River, the Hunters Creek, and the Farmers Creek Watershed. The Township's development decisions have lasting impacts on not only the residents and businesses but the residents and businesses in these watersheds. The Township should continue to collaborate with the appropriate watershed groups and consider implementing Best Management Practices which are conducive to maintaining water quality.

The preservation of water resources is imperative to a healthy environment. Water resources are an integral component of natural areas in the Township and are part of the community's character, recreation network, economic success, and general quality of life.

Best Management Practices

Through the use of Best Management Practices (BMPs), the Plan encourages Low Impact Development (LID) techniques. LID strives to replicate virtually all components of the natural water cycle by:

- Minimizing total runoff volume,
- Controlling peak rate of runoff,
- Maximizing infiltration and groundwater recharge,
- Maintaining stream baseflow,
- Maximizing evapotranspiration, and
- Protecting water quality.

The goals and policies for LID and stormwater management should include elements that:

- Protect the land's natural ability to absorb, clean, and store stormwater,
- Minimize impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and improve infiltration,
- Use Best Management Practices (BMPs) throughout the community to reduce the impacts of stormwater,
- Implement community programs that improve water quality and educate the public about their role in water quality, and
- Link protection of water quality through stormwater management to the protection of residents' health, safety, and welfare.

Mitigate Existing Impervious Surfaces [Imperviousness]

By managing runoff from impervious surfaces before it enters the storm sewer system or nearby waterbody, peak flow rates, total volume runoff, and pollutant concentrations can be reduced.

The following concepts can be incorporated into regulation or policy to mitigate existing impervious surfaces:

- Vegetated parking lot islands;
- Vegetated road medians (in conjunction with the Road Commission of Lapeer County);
- Green roofs;
- Pervious pavement / pavers;
- Parking space requirement reduction (both number and size)

Infiltration Techniques [Infiltration]

Using infiltration techniques to manage runoff reduces peak flow rates, total volume runoff, and pollutant concentrations that would otherwise enter the storm sewer system and impact a nearby waterbody. Infiltration techniques refer to practices which promote groundwater recharge and where the soils are conducive for infiltration.

The following concepts can be incorporated into regulation or policy to reduce stormwater impacts through infiltration:

- Rain gardens / tree boxes / bioretention;
- Infiltration basins;
- Infiltration trenches;
- Porous pipe and underground infiltration systems; and
- Water spreading.

Filtration Techniques [Filtration]

Filtration techniques are similar to infiltration techniques in that they reduce peak flow rates, total volume runoff (if bio-filtration is used), and pollutant concentrations. They differ in that filtration is usually used in areas where the soils are not appropriate for infiltration. Subsequently, filtration techniques bring in an alternative filtering media, such as sand, and use an underdrain to direct the treated water to a storm sewer system or waterbody.

The following concepts can be incorporated into regulation or policy to reduce stormwater impacts through filtration:

- Sand/ organic / media filters (surface and underground);
- Pocket filters;
- Intermittent filters;
- Recirculating filters;
- Filter strips; and
- Perimeter sand filters

Vegetative Buffers & Natural Conveyance [Natural Buffers]

Using vegetative conveyance to manage runoff reduces peak flow rates, pollutant concentrations, and in some cases total volume runoff that would otherwise enter the storm sewer system or nearby waterbody. The following concepts can be incorporated into regulation or policy to reduce stormwater impacts through vegetative buffers and natural conveyance:

- Herbaceous and forested riparian buffers;
- Wet and dry swales; and
- Vegetated channels