CHAPTER 2. THE NATURAL ENVIRONMENT

Wells Township is situated in the "thumb" area of Michigan's lower peninsula. About 0.03% of the land is water, indicating that no significant bodies of water are located within the Township. Wells is a rural community, and environmentally sensitive areas must be examined, as destruction or disturbance can affect the quality of life for its inhabitants. Reckless land uses can lead to flooding or slope erosion, affect groundwater supplies, and waste productive soils. The purpose of this section is to identify the natural resources that should be conserved and the land most suitable for agricultural or open spaces, as well as the land most suitable for development. Climate, topography, carrying capacity, soils, water resources, vegetation and farmland will be examined. All maps used in this chapter are taken from Michigan Resource Information System (MIRIS) maps as found in the 2013 Tuscola County General Development Plan.

Climate

Understanding the nature of the growing season is important for many residents who depend on the agricultural industry for their economic well-being. In addition to the information presented in Figure 2.1, it may be helpful to note that ninety percent of the time the final frost occurred on or prior to May 7th while the first frost most frequently occurred on or after October 8th, based on data collected over a 30-year period (1961-1990). The growing season is about 122 days, with an average of 15 days a year being above 90 degrees and 14 days a year being below the freezing point (all temperatures are in degrees Fahrenheit). On average, temperatures range from 13 degrees to 29 degrees in January (winter) to 57 degrees to 84 degrees in July (summer).

Figure 2.1. Climate Information

Climate Factors	Wells Township (Tuscola County), MI	United States
Rainfall (in.)	30	36.5
Snowfall (in.)	34.8	25
Measurable Precipitation Days	124	100
Sunny Days	171	205
Avg. July High	84.2	86.5
Avg. Jan. Low	13.8	20.5
Comfort Index (higher=better)	53	44

An online data source rates an area's climate using a comfort index based on humidity during the hot months, for which Wells earns a 53 out of 100, where higher is more comfortable. The U.S. average on the comfort index is 44. (updated bestplaces.net 11/2016)

Topography

The topography of Wells Township is largely influenced by glacial action, including nearly level to rolling outwash plains. The Township is 35.4 square miles in area at an elevation of about 748 feet above sea level. Slopes over 12% are found only across the lowest southeastern corner of the Township along a ridgeline where elevations above 800 feet may be found. Typically, slopes greater than 12% pose some restrictions to development.

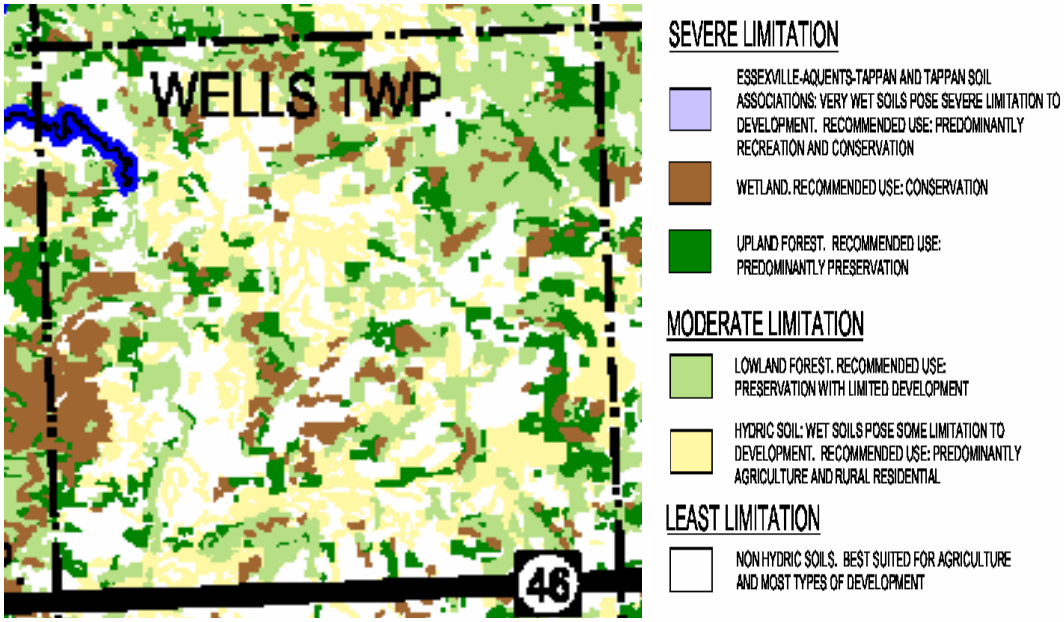
Carrying Capacity

Amended 2016

Future land use and development is determined in part by soil type and the general geography of the land area. These impact the planning and zoning choices available to the Township.

Carrying capacity refers to the number of individuals who can be supported in a given area within natural resource limits, and without degrading the natural social, cultural and economic environment for present and future generations. The carrying capacity for any given area is not fixed. It can be altered by improved technology, but mostly it is changed for the worse by pressures that accompany a population increase. As the environment is degraded, carrying capacity actually shrinks, leaving the environment no longer able to support even the number of people who could formerly have lived in the area on a sustainable basis. No population can live beyond the environment's carrying capacity for very long.

MAP 2.1. CARRYING CAPACITY



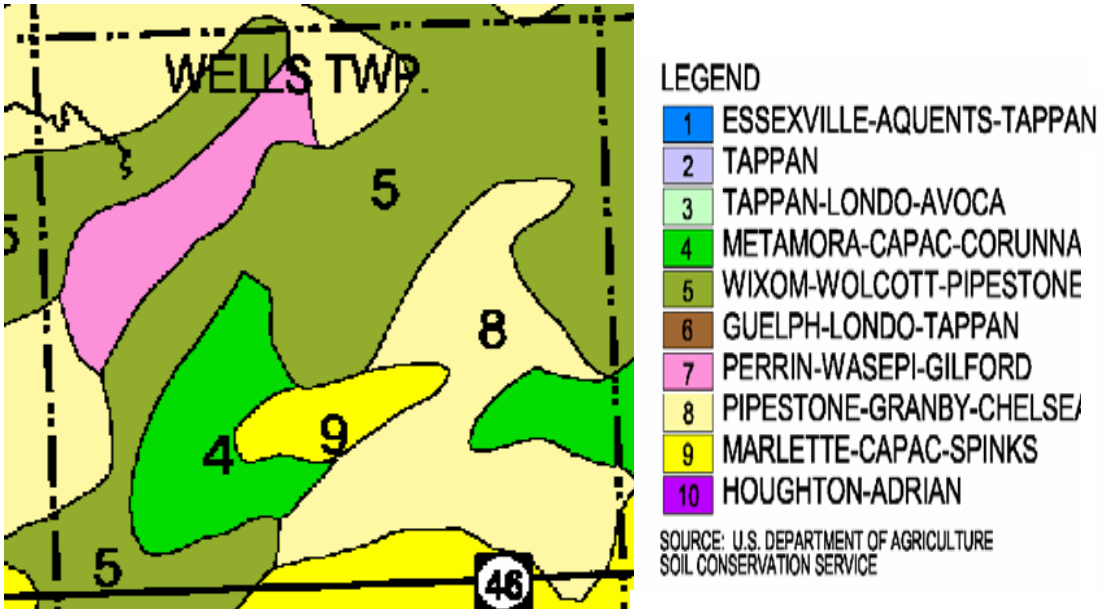
An enlarged section of a County Carrying Capacity Map of Wells Township is presented in **Map 2.1.** The map shows that areas of severe limitation, moderate limitation, and least limitation in a mottled appearance characterize Wells Township. Within the same parcel of land, multiple levels of limitation may be present, making feasibility of development a complicated issue. Careful planning is necessary to ensure that land use suits the carrying capacity of the land.

Soils

Soil characteristics help to define the land capacity to support certain types of land uses. Soils most suitable for development purposes are well drained and are not subject to a high water table. Adequate drainage is important to minimizing storm water impacts and the efficient

operation of septic drain fields, which are used by all Wells residents. Adequate depth to the water table is necessary to prevent groundwater contamination from these septic systems. A high water table limits the construction of basements. Though civil engineering techniques can be employed to improve drainage and maintain adequate separation from the water table, such techniques can be expensive to construct and maintain.

MAP 2.2. SOIL ASSOCIATIONS



The soils in Wells Township are classified according to **Map 2.2**, as provided by the U.S. Department of Agriculture Soil Conservation Service. The general soil map can be used to compare suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified. Because of its small scale, the map is not appropriate for planning the management of a farm or field or for selecting a site for a road or building or other structure.

Soil associations have distinctive patterns of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management. It may be useful to note that within each soil association there may be a range of fine to coarse, clay, sand, and loam mixtures with an accompanying range of drainage and suitability implications.

While some townships in Tuscola County exhibit only one or two basic soil associations, Wells Township contains quite a variety of them. Descriptions of the soil associations found in the Township and the indications for land use follow, as taken from the United States Department of Agriculture manuscript for Tuscola County, Michigan.[soildatamart.nrcs.usda.gov]

Soil Associations 4 and 5

The first two soil associations found in Wells Township, labeled 4 and 5 on the map, are nearly level to undulating soils that are somewhat poorly drained to very poorly drained. These soils are generally suitable for cultivated crops. Removing excess water during wet periods is a major management concern. These soils are poorly suited to sanitary facilities and building site development. The depth to the water table is a major limitation affecting these uses.

 # 4 Metamora-Capac-Corunna
This association of soils covers a section of the southwest quadrant and a small area along the eastern edge of the Township.

Figure 2.2. Features of Metamora-Capac-Corunna Soil Association

Description	Major Soils	Suitability	Limitations for Farming	Development Limitations	Indications for Building
Nearly level to undulating, somewhat poorly drained and poorly drained, loamy soils on till plains and moraines	Metamora-30% Capac-22% Corunna-18% (Minor Soils: Wixom, Belleville)	Cultivated crops, permanent pasture or woodland	Wetness	Wetness is a severe limitation	Poorly suited to sanitary facilities and building site development

 # 5 Wixom-Wolcott-Pipestone
This soil association covers about one third of the land in the Township, roughly from the southwest corner through the Township to the Northeast corner. A strip of these soils also runs parallel to this diagonal strip but farther toward the northwest corner.

Figure 2.3. Features of Wixom-Wolcott-Pipestone Soil Association

Description	Major Soils	Suitability	Limitations for Farming	Development Limitations	Indications for Building
Nearly level and gently undulating, somewhat poorly drained and very poorly drained, sandy and loamy soils on outwash plains, moraines, and till plains	Wixom-30% Wolcott-25% Pipestone-15% (Minor Soils: Capac, Belleville)	Cultivated crops	Wetness, soil blowing, organic matter content	Wetness is a severe limitation	Poorly suited to sanitary facilities and building site development

<u>Soil Association 7</u>
The next association, labeled 7 *Perrin-Wasepi-Gilford* on Soil Association **Map 2.2**, contains nearly level and gently undulating, loamy and sandy soils. These soils are generally suited to cultivated crops. If the soils are cultivated, removing excess water during wet periods and controlling water erosion and soil blowing are management concerns. These soils are poorly suited to sanitary facilities and building site development. The depth to the water table and a poor filtering capacity are the main limitations.

 # 7 Perrin-Wasepi-Gilford
This association covers a diagonal strip of the Township between the bands of the Wixom-Wolcott-Pipestone group.

Figure 2.4. Features of Perrin-Wasepi-Gilford Soil Association

Description	Major Soils	Suitability	Limitations for Farming	Development Limitations	Indications for Building
Nearly level and gently undulating, moderately well drained, somewhat poorly drained, and very poorly drained, loamy and sandy soils on outwash plains, lake plains, and beaches	Perrin-35% Wasepi-30% Gilford-10% (Minor Soils: Spinks, Boyer, Londo, Metamora, Wixom, Tappan)	Cropland or woodland, some mining for sand or gravel, cultivated crop suitability is fair	Wetness, soil blowing, water erosion, seasonal droughtiness	Wetness, poor filtering capacity are severe limitations	Suitability of the Gilford and Wasepi soils for building site development is poor, that of the Perrin soils is fair or poor with wetness the main limitation for all

Soil Association 8

The next association, labeled 8 *Pipestone-Granby-Chelsea* on Soil Association **Map 2.2**, contains nearly level to gently rolling, sandy soils that are generally suited to cultivated crops. Removing excess water and controlling soil blowing are management concerns if the soils are cultivated. These soils are poorly suited to sanitary facilities because of the depth to the water table and a poor filtering capacity. The suitability of these soils for building site development is good to poor. The depth to the water table and the slope are the main limitations.

#8 Pipestone-Granby-Chelsea

The Pipestone-Granby-Chelsea association covers about one third of the land in the Township. This is located mostly in the southeast quadrant of the Township, with smaller sections in the northwest corner and on the western side.

Figure 2.5. Features of Pipestone-Granby-Chelsea Soil Association

Description	Major Soils	Suitability	Limitations for Farming	Other Limitations	Indications for Building
Nearly level to gently rolling, somewhat poorly drained, poorly drained, and somewhat excessively drained, sandy soils on outwash plains, moraines, lake plains, and beaches	Pipestone-40% Granby-20% Chelsea-16% (Minor Soils: Wixom, Wolcott)	Cultivated crops, pasture, woodland	Wetness, soil blowing, organic matter content, seasonal droughtiness	Wetness of Pipestone and Granby, all have poor filtering capacity, slope in Chelsea soils	Granby and Pipestone soils are poorly suited to building site development, Chelsea soils are well suited, but the slope can be a limitation, major soils are poorly suited to sanitary facilities, as they have severe limitations for septic tank absorption fields

Soil Association 9

The soil association labeled 9 *Marlette-Capac-Spinks* contains nearly level to gently rolling soils and is generally suitable for cultivated crops. The rolling to steep soils are poorly suited or unsuited. Controlling water erosion and soil blowing and removing excess water are the main management concerns. These soils are fairly well suited or poorly suited to sanitary facilities. Slope, the depth to the water table, permeability, and a poor filtering capacity are the major

limitations. The suitability for building site development varies. The slope and the depth to the water table are the major limitations.

 # 9 Marlette-Capac-Spinks

A small strip of the Marlette-Capac-Spinks association sits a bit south of the center of the Township, as well as across the middle section of the southern border.

Figure 2.6. Features of Marlette-Capac-Spinks Soil Association

Description	Major Soils	Suitability	Limitations for Farming	Limitations	Indications for Building
Nearly level to steep, well drained and somewhat poorly drained, loamy and sandy soils on moraines, outwash plains, and beaches	Marlette-42% Capac-15% Spinks-12% (Minor Soils: Boyer, Metea, Metamora, Wixom, Wolcott)	Cultivated crops, pasture, woodland	Wetness, soil blowing, slope, water erosion	Marlette perks slowly, Capac has wetness limitations and percs slowly, slope in Spinks	Suitability for building site development is good to poor; slope and depth to the water table are the major limitations. Chelsea soils are well suited, but the slope can be a limitation, major soils are well suited or poorly suited to sanitary facilities, as slope, depth to the water table permeability, and poor filtering may be severe

The following excerpts from the Soil Survey of Tuscola County, Michigan (Soil Conservation Service) provide a summary.

> *The loamy, nearly level to undulating soils in associations 1 to 6 and in association 9 have good potential for farming… Areas where soils have severe limitations for residential and other kinds of urban development are extensive. Large areas of the soils in associations 1, 2, 3, 4, 5, 7, 8 and 10 have a high water table, which severely limits building site development. The slope severely limits building development on the gently rolling to steep soils in associations 6, 8 and 9. Extensive land shaping is needed. A few of the less sloping areas of well drained and somewhat excessively drained soils in associations 6 to 9 can be developed for residential or other urban uses. Most of these soils, however, have better potential for farmland than the other soils in the county. This potential should not be overlooked when broad land uses are considered. Most of the soils in the county have good or fair potential for woodland…the gently rolling to hilly areas in associations 6, 8, 9, and 10 have good potential for parks and extensive recreation uses.*

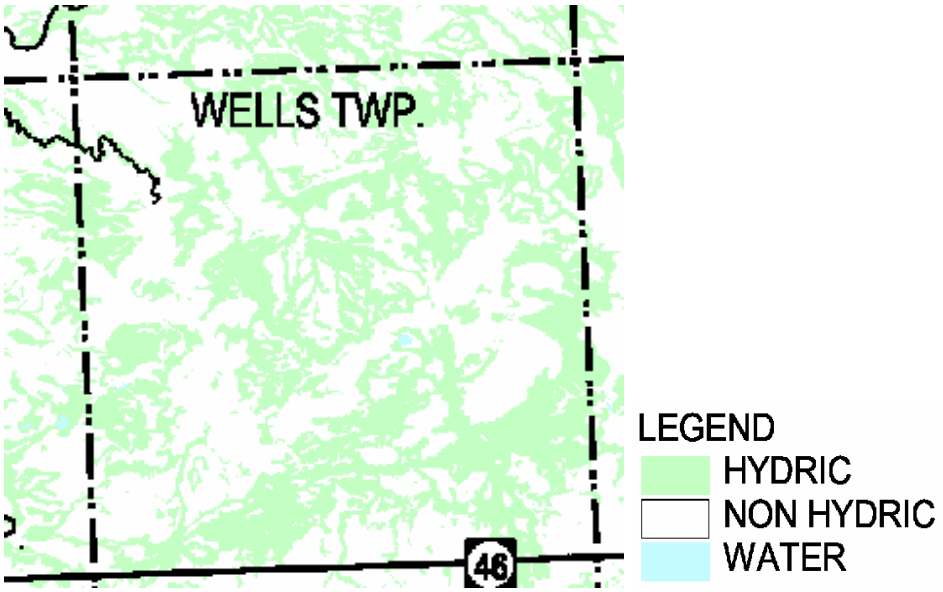
Soil Moisture Characteristics

Groundwater is the exclusive source of the Township's well water supply. Because of this, adequate site plan review standards are necessary to avoid poorly planned developments that can affect the quality of groundwater.

Wells Township is a mottled combination of hydric and non-hydric soils. Hydric soils are saturated, flooded, or pond during part of the growing season and are classified as poorly drained and very poorly drained. Hydric soils generally have poor potential for building site development and sanitary facilities. Wetness and frequent ponding are severe problems that can be difficult and costly to overcome. Sites with high water tables may be classified as wetlands

and a wetlands permit would be required to develop these areas. **Map 2.3** exhibits the soils classified as hydric by the Natural Resources Conservation Service.

MAP 2.3. SOIL CONDITIONS



Non-hydric soils are defined as being well drained or moderately well drained. These types tend to show wetness or flooding only after significant periods of rainfall or during the seasonal spring thaw.

Surface Water Features

Wetlands

Several wetland areas are present in the community, as **Map 2.4** by the Michigan Department of Natural Resources illustrates. Wells Township ranks 3rd out of 23 townships in Tuscola County in wetland acreage, covering 1,722 acres or 8.2% of the Township. While wetlands can limit development potential, wetlands offer many invaluable environmental benefits. For example, wetlands help to store precipitation which can lead to a reduction in flooding. Wetlands assist in maintaining the water table and serve as filters for sediment and organic matter, thereby sustaining water resources and improving water quality.

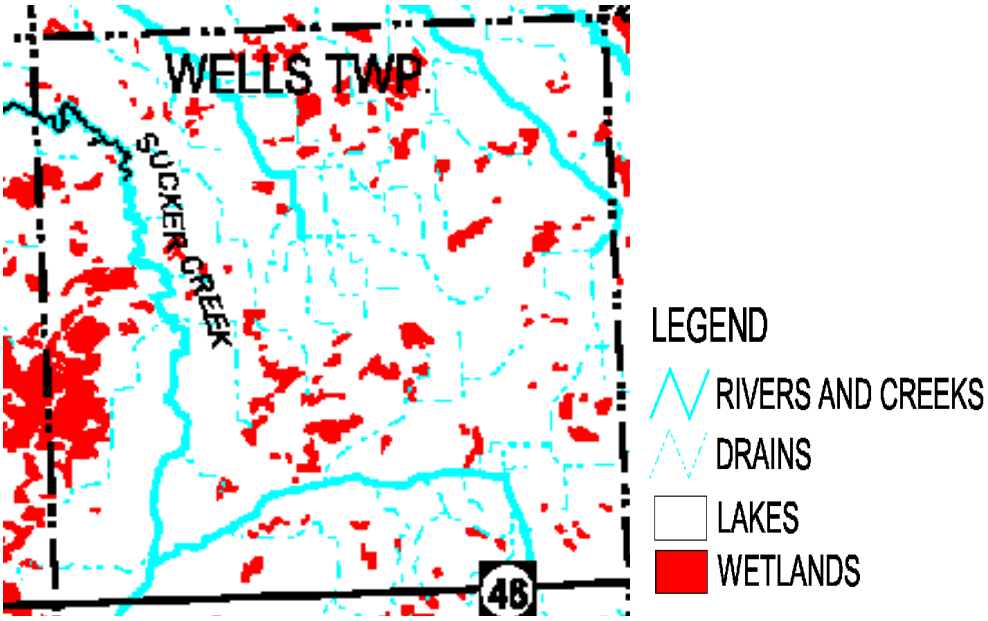
Lakes, Rivers and Creeks

No lakes or rivers exist in Wells Township, although the Cass River flows just northwest of the Township. The Cass River is a part of the Saginaw River system connecting to the Saginaw River via the Shiawassee River. The Saginaw River then empties into the Saginaw Bay. It runs 55 miles through the center of Tuscola County, flowing from the northeast to the southwest. Wells Township is part of the Cass River watershed. Sucker Creek is a major creek emptying into the Cass River at a point west of the northwest corner of the Township.

The County Drain Commissioner is charged with the responsibility of maintaining the County

drains. The maintenance costs for the County drains are assessed to the County and Township as well as landowners in each drainage district. Dredging and straightening existing creeks and digging drainage ditches through natural drainage ways or low areas created the drains. The purpose for creating county drains and private farm drains is to improve soil drainage by increasing the flow of water from the landscape. Drainage tile systems have been buried in many farm fields and connect to the drainage ditches to further improve soil and growing conditions. These drainage systems also enable the County Road Commission to construct and to maintain the existing County road network. Since a substantial number of soils tend to be poorly drained in Wells Township and Tuscola County, these improvements allow for adequate water removal, enabling current land uses to continue in most areas.

MAP 2.4. WATER RESOURCES



Groundwater

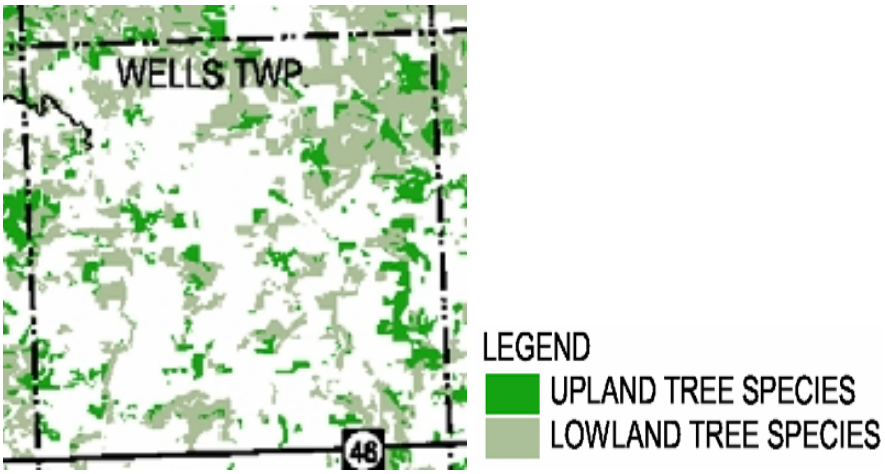
Wells Township is fortunate to have an adequate groundwater resource generally within 100 feet of the surface. The Tuscola County Health Department describes the aquifer in most of the County as located between an impermeable clay layer and above an impermeable bedrock (shale) layer. This would provide added protection should a point source pollutant be released. Wells Township is located in an area of lesser risk overall, and is not affected by concentrations of natural brine or natural arsenic as are some townships north of the Cass River. The vulnerability of drinking water aquifers to surface contamination is moderate to relatively safe in general, although local site reviews are always necessary when assessing the vulnerability of a particular location.

Woodlands

Wells ranks 4th out of 23 townships in the County in lowland tree acreage, covering 5,216 acres or 24.9% of the Township. The Township ranks 7th in upland tree acreage, covering 2,494 acres

or 11.9% of the Township. **Map 2.5** illustrates the general location of tree species within the Township.

MAP 2.5. WOODLANDS



Woodland areas are complex ecological systems and consequently provide multiple benefits to the environment and its wildlife and human inhabitants. Woodlands also reduce air pollutants by absorbing certain air borne particles. In addition to providing wildlife habitat, woodland vegetation moderates the effects of winds and temperatures while stabilizing and enriching the soil. For human inhabitants, woodland areas offer scenic contrasts within the landscape and with the changing of the seasons. Woodlands act as buffers from noise on heavily traveled roads. Primary non-preservation uses of woodlands are recreational, as parts of two state game areas are located within the Township.

Farmland

Soil associations one through five are rated the best locations for prime farmland, followed by six through eight as reasonable, depending on the locality. Nine is less preferred due to being well drained and ten is least preferred due to very poor drainage qualities. Soil associations four and five cover roughly 50% of the Township, while soil associations seven, eight, and nine cover the remainder of the land area. It is important to note that the inclusion of poorly drained or very poorly drained lands into the prime category is done only where improvements like drains or flood controls are in place.

Loss of prime farmland has occurred within the Township as farmed lands are sold and divided into smaller residential plots. Subdividing agricultural lands may make it difficult or impractical to continue farm operations. The Farmland and Open Space Preservation Program, commonly known as Public Act 116, offers tax incentives for farmers who agree not to sell their land for non-agricultural uses. P.A. 116 is intended to protect farmland and open space via agreements that limit development and offer certain tax incentives. Essentially, the agreements require open land to remain as such for a minimum of 10 years in exchange for certain income tax benefits and indemnity from special assessments related to municipal infrastructure extensions. According to the Michigan Department of Agriculture, there are currently 29 farmlands in the Township operating under the P.A. 116 agreement, accounting for 1865 acres and accounting for only 8% of the total acres in the Township. Six of the neighboring eight Townships show more

acres enrolled in the P.A. 116 agreements, with four of those showing over twice as many acres covered by the agreements.

Air Quality

Air quality in Wells Township is 93.2 on a scale to 100 (higher is better). The average score for the United States on this scale is 93.9. The Air Quality index is based on annual reports from the EPA. Indicators of air quality are ozone alert days and the amounts of seven pollutants including particulates, carbon monoxide, sulfur dioxide, lead, and volatile organic chemicals. (updated 11/2016 bestplaces.net)

IMPLICATIONS – NATURAL FEATURES

1. The land in Wells Township is well suited for the agricultural purposes of cultivated crops and pasture, as well as woodlands. Land use for building site development may have limitations that may imply special design, significant increases in construction costs, and possibly increased maintenance.

2. It can be assumed that the Township has adequate land available to accommodate residential growth over the next 20 years. The effect this growth has on the character of the Township and the quality of the natural environment will be determined by the care with which future zoning is implemented. Prudent planning will be necessary to ensure that development occurs within the suitability of the land.

3. Michigan has lost 74% of its farms in the past century, and the acreage of farmland has fallen 41%. Strong support exists to preserve the farmland in Wells Township. Enrolling more acres in programs such as P.A. 116 may help insure that this happens, and educating Township residents may assist to this end. The Township has an opportunity to support or oppose the agreements. It is wise for the Township to continue supporting these agreements.

4. Purchase of Development Rights (PDR) programs are one viable approach that state and local governments may use to preserve farmland and open space. Purchase of development rights programs provides a way to financially compensate willing landowners for not developing their land. When buying development rights, the community obtains a legal easement, sometimes referred to as a conservation easement, that (usually) permanently restricts development on the land. The landowner, however, still owns the land and can use or sell it for purposes specified in the easement, such as farming, timber production, or hunting. As development pressures arise, use of PDRs may be a tool that the Township can utilize to protect the environment (protecting groundwater, wildlife habitat, etc.); agriculture (preserving farmland); aesthetics (preserving rural character and scenic beauty); and manage growth that may threaten the rural nature of the community. PDR programs are subject to availability of funding.