Robinson Township

2023 MASTER PLAN

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Robinson Township – 12010 120th Avenue
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Robinson Township Master Plan
2023

Introduction

Throughout the nation most suburban and rural municipalities are experiencing considerable pressure to convert land areas to new and different uses. Increased mobility and population growth in recent years have reduced or eliminated the once pronounced distinction between the urban, suburban, and rural way of life.

As a community grows many new opportunities become available to its residents, but all too often, challenges are created as a result of the opportunities. The challenges of growth can be easily identified: the need for new schools, playgrounds and parks; water and sewer systems; police and fire facilities; increased volumes of traffic and travel time factors. In order for the desirable features of our environment to be passed on to future generations, reasonable but effective regulations controlling the use of our land, water and air resources must be established.

The Master Plan coupled with the Zoning Ordinance and its Map will, together, chart the course for an orderly progression of growth and development for Robinson Township. Planning and zoning have separate and distinct purposes but neither can be effective without the other.

Legal Requirement

In accordance with the Michigan Planning Enabling Act, Act 33 of 2008, as amended, this Master Plan was created to serve as a guide for development within Robinson Township.

Intent and Purpose

Robinson Township has prepared this Master Plan with a statement of community values and policies for resolving the current and anticipated challenges of land use, and for directing future growth into desirable patterns. The Master Plan is a general guide for growth. It is the framework for future, detailed planning. As a broad, long range guide to community development, the Master Plan sets forth a comprehensive analysis of the uses of land.

The Robinson Township Master Plan addresses and directs proposed land use and development in a compatible fashion with existing and future uses, the natural environment, the availability of public utilities, the capacities of transportation networks, the design and distribution of recreational opportunities and other public places, the linear relationship of the landscape including compatibility of structures, uses, and natural features, as well as numerous other planning and community attributes.

The Robinson Township Master Plan guides development that is coordinated, adjusted, harmonious, efficient and economical. In addition, the Master Plan promotes the sustainability of

uses for current and future needs that best protect and enhance the public health, safety, community values, order, convenience, prosperity and general welfare.

The Master Plan projects more than twenty years into the future and must be revisited at least every five years to ensure its legitimacy.

Content

Cornerstone Components

A Master Plan shall include:

- Maps, plats, charts and descriptive content showing the recommendations of the Planning Commission for the physical development of the unincorporated areas of the Township.

A Master Plan should, at a minimum, address the classification and allocation of land for the following, as can be reasonably considered:

- Agriculture, residences, industrial and commercial uses, public buildings and spaces, schools, environment, recreation and transportation, areas for redevelopment and various other characteristics of the Township.

A Master Plan should generally address and accommodate the location and extent of the following:

- Transportation networks (i.e. streets, bicycle facilities, railway, waterways, airports and pedestrian improvements).
- Waterways and waterfront developments
- Sanitary sewer and water supply systems
- Pollution prevention efforts
- Drainage
- Flood prevention and the maintaining of water levels
- Public utilities and structures

A Master Plan shall provide recommendations regarding the above cornerstone components, as applicable, as well as provide strategies to implement its proposals. Further, a Master Plan shall provide recommendations regarding the redevelopment or rehabilitation of blighted areas and the management of streets, grounds, open spaces, buildings, utilities or other facilities, as applicable.

Final Document

This design is intended to create the most comprehensive and effective Master Plan for Robinson Township. Its ultimate pursuit is to ensure the health, safety, and welfare of the residents, property and business owners, as well as visitors to this Township.

How to Use this Plan

For each land use or attribute chapter, the Plan identifies goals, recommendations, and strategies, which are the basis for future development. The goals, recommendations, and strategies are designed as follows:

- Goals – These are community ideals derived from significant public input and Planning Commission oversight
    - These are applied most frequently during land use review to ensure a proposed development meets and is consistent with the core values of the Master Plan
- Recommendations – These are pointed direction to achieve the goals
    - These are applied the strongest during land use review to ensure proposed development is consistent with the intent of the Master Plan
- Strategies – In an effort to accomplish the goals and recommendations of the Master Plan, the strategies are the legislative methods to mandate certain physical form, through zoning ordinance or police power ordinances.

Chapter One
Community Preferences

Introduction

Important to the residents and property owners of Robinson Township are the preferences by which they envision or define the appearance, character, and values of their community.

To capture those preferences, Robinson Township completed a community survey as well as three community workshops with the public. While the workshop areas generally encompassed the entirety of the township, the discussions were focused on agricultural lands, residential uses, and the commercial overlay. The community survey engaged the public in the same discussions as well as other interests of the community, such as transportation and recreation. Together, the workshops and community survey provided the following values, preferences, attributes, and design mechanisms, which are used to develop the foundation on which most of the goals, recommendations, and strategies within this Master Plan are based. A summary of the survey and workshops is available within the Appendix.

Definition of Terms

In order to streamline the content of the community survey and workshop results, the following terms are recognized as defined below.

- *Rural Character* – is recognized as the natural features of the earth that minimize the visual exposure of buildings, structures, or other man-made features and which create scenic character. It is also recognized as the natural features of the earth that provide environmental buffers and/or habitat that is characteristic of the Township. Features are found to include:
    - Woods, woodlots, forest areas, and trees
    - Wetlands
    - Natural vegetation
    - Wildlife habitat
    - Wildlife corridors
    - Natural field areas
    - Scenic vistas
    - Ponds and other bodies of water

  Rural Character also includes farmland, which is recognized as part of the natural features that are organized and managed by man.

- *Open Space* – is recognized as areas of land unoccupied by buildings, structures, or other man-made features, that are preserved to be unoccupied by buildings, structures, or other man-made features within a project. Open Space may include displays of art or other

cultural features; bridges, signage, utilities, and other essential service structures; or grade level features such as ponds.

- *Agriculture* – is recognized as the art or science of plowing and cultivating soil; raising and harvesting crops; and feeding, breeding, and managing livestock. Agriculture includes, by way of illustration and not limitation, farming, horticulture, forestry, dairying, sugar production, shrub and sod farming, etcetera. Farming includes the land, plants, animals, buildings, structures, including ponds used for agricultural or aquacultural activities, machinery, equipment, and other appurtenances used in the commercial production of farm products. Agriculture also includes:
    - Farmer's markets
    - You-Pick activities
    - Agri-tourism such as corn mazes, tasting rooms, etcetera

Findings

Below is a summary of findings derived from the community survey and workshop results.

- *Core Values* – the following attributes have been identified as core values for the Township:
    - Preserve and maintain rural character and open space
    - Preserve and protect farmland from premature development
    - Provide buffers between residential development and agricultural lands
    - Focus development to protect agricultural lands
    - Limit public water extensions to slow development

- *Agricultural Interests* – the following have been identified as important regarding agricultural lands
    - Restrict non-agricultural uses from agricultural areas
    - Promote agricultural growth
    - Provide for landscape buffers between agricultural land and an adjacent roadway or waterway
    - Multi-use pathways are appropriate adjacent to agriculture

- *Residential Interests* – the following have been identified as important regarding residential uses:
    - Cluster residential development
    - Provide for large lots
    - Maintain current density limits
    - Limit multi-family residential development

- *Commercial and Industrial Interests*– the following have been identified as important regarding commercial and industrial uses
    - No expansion of commercial or industrial uses without public water and sanitary sewer

- Limit light and heavy manufacturing facilities
- Traditional brick and vinyl commercial facades are most favorable
- Mixed-use buildings should be discouraged

Chapter Two
Agricultural Uses

Introduction

The amount of land which is vacant or used for agriculture has played a significant role in the development of the character of the Township. The large, open areas create a feeling of spaciousness and provide a tranquil surrounding. Agriculture is one of the major reasons that many of the current residents moved to the Township and continues to be a factor in attracting new residents.

Agriculture continues to be the dominant use of land within the Township and is widely appreciated by residents. Sixty-three percent (63%) of current residents within the Township who responded to the Master Plan Update Community Survey indicated that they agree that it is extremely important to preserve agricultural lands within the township. In addition, sixty-two percent (62%) of respondents indicated that the Township should promote agricultural growth. Further, sixty-nine percent (69%) of respondents indicated that the Township should support and promote agricultural land conservation programs. While public support is strong to prevent the development of agricultural properties, Agricultural Stakeholder meetings indicated that some farmers recognize that they may want to convert their properties to other uses in the future. It must be recognized that farming can be as much of an industry as manufacturing. Farming provides jobs and a product for sale in the marketplace and creates a significant portion of income for Michigan residents. Acknowledging farming as an essential industry can have a profound effect on the programs developed for its preservation and continuation. The agricultural resources of Ottawa County and Robinson Township are particularly significant in Michigan.

As a result of the Agricultural Lands public workshop, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for agricultural uses in Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

Goals

- Preserve agricultural lands
- Protect agricultural lands from urban and suburban encroachment
- Use of prime and/or uniquely suited agricultural lands as farms should be encouraged
- Promote agricultural services and uses as a means of preserving agriculture
- Protect and preserve the floodplain and wetlands in order to minimize property damage as well as to maintain environmental interests, including water retention and groundwater recharge areas, which have important aesthetic and scenic value

- Preserve rural character
- Support agricultural operations
- Recognize the interest of some farmers to transition their land to other uses in the future

Recommendations

- Urban encroachment on agricultural lands should be prevented, especially on those prime and/or uniquely suited agricultural lands
- Farms of the Township are considered an asset and efforts should be made to protect them from unnecessary destruction
- Encourage crop production and livestock use to minimally impact existing natural resources
- Encourage proper soil management, to ensure soil conservation and to prevent erosion and sedimentation
- Encourage all farm building construction to be designed in a central or same location within an agricultural property to preserve the most farmland as possible and minimally impact existing open spaces
- Encourage the design of a "no-cut" zone along right-of-ways to protect the natural landscape, maintain open space and rural character, as well as preserve the natural drainage system to provide soil erosion and sedimentation control and reduce flooding
- Encourage groundwater preservation practices for new development that are in accordance with Ottawa County's Groundwater Sustainability Initiative

Strategies

- Adopt or enhance appropriate ordinances to preserve natural features
- Investigate ordinance language to support wedding venues or similar ancillary uses of existing agricultural operations
- Reduce or investigate the minimum setback for all farm buildings, so as to protect the greatest amount of open space and or farmland as possible, while avoiding conflict with adjacent uses
- Encourage the preservation of any trees within the right-of-way and within 30 feet of the right of way, so as to protect the natural vegetation (any naturally deceased trees may be removed) and drainage system
- Strengthen ordinance language to prohibit private roads in the Agricultural Zoning District or on prime farmland
- Investigate a millage or alternative Township program for land acquisition to provide for the preservation of rural character and or open space in perpetuity
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

Chapter Three

Residential Uses

Low Density, Medium Density, & High Density

Introduction

While Robinson Township is primarily an agricultural community, and because of the rural character that agriculture provides in the Township, the desire for residential uses within the Township continues to grow. Despite this, sixty-six (66%) of current residents within the Township who responded to the Master Plan Update Community Survey indicated that they agree or strongly agree that the Township should maintain the current density limits within residential developments. When asked about the methods to provide for residential development, eighty-seven percent (87%) of survey respondents indicated that clustered residential lots are an appealing residential design, which create open spaces and can preserve farmland. Further, ninety-two percent (92%) of survey respondents indicated that large lots are an appealing residential design. Significant opposition was provided for multi-family residential development by survey respondents. Finally, approximately fifty-one percent (51%) of survey respondents indicated that growth is "about right," and thirty-eight percent (38%) of survey respondents indicated that growth is "too fast." Overwhelmingly, survey respondents as well as workshop participants expressed the need to preserve rural character, protect agriculture, and provide buffers between residential land uses and farming.

Given this, and while Robinson Township is a rich agricultural community and residential uses comprise a relatively small percentage of the total land area, the Township recognizes the need to accommodate residential development concurrently with the preservation and protection of its agricultural heritage.

As a result of the Residential Lands public workshop, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for residential uses in Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

Low Density Residential

Goals

- Preserve and protect the natural resources of the area that provide rural character
- Maintain the rural character of the community
- Protect and preserve the floodplain and wetlands in order to minimize property damage as well as to maintain environmental interests, including water retention and groundwater recharge areas, which have important aesthetic and scenic value

- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative
- Residential uses should be restricted to areas of soil with good percolation and be on multi-acre lots, where public water is not present
- Discourage residential "strip" development and promote interconnectivity of residential neighborhoods

Recommendations

- Protect wetlands on-site to ensure that they are not encroached upon within the development
- Wooded areas of the Township are considered an asset and efforts should be made to protect them from unnecessary destruction
- Utilize the incorporation of existing vegetation, topography, and other natural features into the design of new residential developments
- Encourage groundwater preservation practices for new development that are in accordance with Ottawa County's Groundwater Sustainability Initiative
- Buffer residential uses from agricultural land
- Require the preservation or planting of trees between the public street and dwellings
- Require new residential developments to be sited in a manner that protects the rural character and scenic views by maintaining proper setbacks and providing landscape screening as appropriate
- Require a hydrogeological study, if existing evidence reveals water quality and or quantity concerns

Strategies

- Adopt or enhance appropriate ordinances to preserve natural features
- Require the layout of new residential developments to be extensions of existing neighborhoods, where possible. This should, at a minimum, apply to lot layout, road extensions, and open space plans.
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area
- Review and strengthen density standards that are consistent with the natural capacity of soils to handle on-site septic systems and private water wells and which promote the preservation of the rural character of the Township

Medium Density Residential

Goals

- Preserve and protect the natural resources of the area that provide rural character
- Maintain the rural character of the community

- Protect and preserve the floodplain and wetlands in order to minimize property damage as well as to maintain environmental interests, including water retention and groundwater recharge areas, which have important aesthetic and scenic value
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative
- Discourage residential "strip" development and promote interconnectivity of residential neighborhoods
- Concentrate the density of residential land uses to protect rural character, open spaces, and agriculture

Recommendations

- Protect wetlands on-site to ensure that they are not encroached upon within the development
- Wooded areas of the Township are considered an asset and efforts should be made to protect them from unnecessary destruction
- Utilize the incorporation of existing vegetation, topography, and other natural features into the design of new residential developments
- Encourage groundwater preservation practices for new development that are in accordance with Ottawa County's Groundwater Sustainability Initiative
- Require a hydrogeological study, if existing evidence reveals water quality and or quantity concerns
- Provide a range of densities to accommodate a variety of dwelling types meeting the needs of diverse family sizes, age groups, and income levels
- Buffer residential uses from agricultural land
- Require clustering of housing, where appropriate
- Require connection to public water and public sanitary sewer
- Require the preservation or planting of trees between the public street and dwellings
- Require new residential developments to be sited in a manner that protects the rural character and scenic views by maintaining proper setbacks and providing landscape screening as appropriate

Strategies

- Adopt or enhance appropriate ordinances to preserve natural features
- Require the layout of new residential developments to be extensions of existing neighborhoods, where possible. This should, at a minimum, apply to lot layout, road extensions, and open space plans.
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area
- Require development to utilize open space preservation techniques, clustered housing techniques, and other amenities and features to preserve rural character, protect agricultural property from negative impacts, and protect the environment

- Rezonings to the R-1 Zoning District should not occur without public water and public sanitary sewer present at the property
- Require public water and public sanitary sewer connection for all Planned Unit Developments, Site Condominium developments, and Plat developments where the underlying zoning district is the R-1 Zoning District

High Density Residential

Goals

- Preserve and protect the natural resources of the area that provide rural character
- Maintain the rural character of the community
- Protect and preserve the floodplain and wetlands in order to minimize property damage as well as to maintain environmental interests, including water retention and groundwater recharge areas, which have important aesthetic and scenic value
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative
- Require public utility services and facilities within residential development
- Discourage residential "strip" development and promote interconnectivity of residential neighborhoods
- Concentrate the density of residential land uses to protect rural character, open spaces, and agriculture

Recommendations

- Protect wetlands on-site to ensure that they are not encroached upon within the development
- Wooded areas of the Township are considered an asset and efforts should be made to protect them from unnecessary destruction
- Utilize the incorporation of existing vegetation, topography, and other natural features into the design of new residential developments
- Encourage groundwater preservation practices for new development that are in accordance with Ottawa County's Groundwater Sustainability Initiative
- Require a hydrogeological study, if existing evidence reveals water quality and or quantity concerns
- Provide a range of densities to accommodate a variety of dwelling types meeting the needs of diverse family sizes, age groups, and income levels
- Buffer residential uses from agricultural land
- Rezonings to the R-2 Zoning District shall not occur without public water and public sanitary sewer present at the property
- Require clustering of housing and connection to public water and public sanitary sewer
- Require the preservation or planting of trees between the public street and dwellings

- Require new residential developments to be sited in a manner that protects the rural character and scenic views by maintaining proper setbacks and providing landscape screening as appropriate

Strategies

- Adopt or enhance appropriate ordinances to preserve natural features
- Require the layout of new residential developments to be extensions of existing neighborhoods, where possible. This should, at a minimum, apply to lot layout, road extensions, and open space plans.
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area
- Require development to utilize open space preservation techniques, clustered housing techniques, and other amenities and features to preserve rural character, protect agricultural property from negative impacts, and protect the environment
- Require public water and public sanitary sewer connection for all Planned Unit Developments, Site Condominium developments, and plat developments where the underlying zoning district is the R-2 Zoning District

Chapter Four
Lowland Resource Conservation

Introduction

Waterways, wetlands, and forests are important natural resources within the Township. These ecosystems are vulnerable to impact from development and require significant protection. Many of these areas are protected by State and Federal statute and are not conducive to development. The most well-known waterway in Robinson Township is the Grand River, which flows from east to west across the entire width of the Township eventually discharging to Lake Michigan at Grand Haven. Respondents to the Master Plan Update Community Survey overwhelmingly felt that the Grand River and its bayous are important, with ninety-three percent (93%) indicating they are desirable, up from eighty-three percent (83%) in the 1998 community survey. In addition, almost ninety percent (90%) of respondents believe the Township should take an active role in preserving natural waterways.

The Grand River drainage basin includes tributaries, regulated wetlands, and flood plains, all of which are home to many varieties of flora and fauna. Stearns Creek flows into Stearns Bayou, which is located at the northwest part of the Township. Other tributaries include Little Robinson Creek, Bear Creek, Bass Creek, and Bass River. The drainage system includes many other drains under the control of the Ottawa County Water Resources Drain Commissioner. Surface water in the extreme southern extent of the Township includes drains that discharge to the Pigeon River Watershed including Walters Drain, South Beeline Drain, Tubbs Creek and Fellows Drain.

The majority of wetlands within the Township are contiguous to the Grand River, its' tributaries, and County drains. There are, however, several scattered areas of wooded wetlands, wet meadows, submergent and emergent wetlands throughout the Township. Along with wetlands, forests play a significant role in the environment by providing a habitat for wildlife, stabilizing soil, preventing erosion, absorbing storm water, reducing carbon footprint, and providing a visual screen. When asked about the protection of wetlands and woodlands within the Township, almost eighty-two percent (82%) of respondents to the Master Plan Update Community Survey believe the Township should take an active role in preserving wetlands, and eighty-five percent (85%) believe the Township should take an active role in preserving forests.

Proper regulation of these areas will serve to maintain and improve groundwater and surface water quality; preserve wildlife habitat; protect natural watersheds; protect water-based recreational resources of the Township; minimize flood damage to land, buildings and structures; and protect the health, safety and welfare of the residents of the Township.

As a result of public workshops, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for the protection of the environment within Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

Goals

- Protect wetlands from development
- Preserve and protect the natural resources of the area that enhance the rural character of the Township
- Protect and preserve floodplains and wetlands to minimize property damage as well as to maintain environmental interests, including water retention and groundwater recharge areas, which have important ecological and aesthetic scenic value
- Property use in areas of frequent flooding should be limited to agriculture, recreation, and other open spaces, or permitted uses that would not be subject to flood damage
- As the Grand River is an area wide resource that can seriously affect downstream and upstream conditions, protection of the use of this resource to prevent negative effects downstream should be encouraged
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative

Recommendations

- Protect wetlands from development including excavation and/or fill consistent with State and Federal regulations
- Wooded areas of the Township are considered an asset and efforts should be made to protect them from unnecessary destruction
- Building construction in the floodplain should be discouraged to avoid damage and health hazards created by flood conditions
- Flood Plains of the Grand River and Pigeon River watersheds and their tributaries should be protected to eliminate obstructions to flow and navigability, and should not be developed except for marine purposes consistent with State and Federal regulations
- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative
- Require a hydrogeological study, if existing evidence reveals water quality and or quantity concerns

Strategies

- Adopt or enhance policies and regulations in the floodplain area should be consistent with State of Michigan and Federal guidelines
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

Chapter Five

Commercial Uses & M-231 Commercial Uses

Introduction

While the majority of commercial land use area within the Township is located along Lake Michigan Drive, limited commercial area exists within the northern area of the Township. These areas are recognized as neighborhood commercial or general business areas, including marinas, and generally are established for the purpose of allowing small convenience commercial businesses designed for the use of neighborhood residents. In that regard, respondents to the Master Plan Update Community Survey are almost equally split on whether additional neighborhood commercial development should occur, with approximately thirty-four percent (34%) supporting some additional development, approximately thirty-three percent (33%) supporting less development, and approximately twenty-eight percent (28%) indicating no change.

Although some areas of neighborhood commercial may be added in future revisions of the Master Plan as population and development increases the demand for such services, future commercial land use in Robinson Township is primarily intended to be limited to the Lake Michigan Drive and 120th Avenue area as well as the Lincoln Street and M-231 highway area.

M-231 Highway

Construction of the M-231 highway through the heart of Robinson Township has given rise to concerns over development pressure and appropriate land use at access points along the route. Given this, the related language herein addresses planning, growth, and development issues for land in the vicinity of the M-231 intersections with Lake Michigan Drive and Lincoln Street in an effort to balance preservation of prized community assets with economic growth opportunities, as well as consolidate and focus future development to planned and prioritized target areas. These provisions were first adopted by the Township in the year 2015 for the same purpose.

As a result of the Master Plan Update Community Survey, the Township found that approximately thirty-five percent (35%) of respondents desire some additional commercial development on Lake Michigan Drive, whereas approximately twenty-six percent (26%) desire less development. Approximately twenty-nine percent (29%) support no change in development.

As a result of public workshops, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for general commercial uses and commercial uses along the M-231 highway area within Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

General Commercial Uses

Goals

- Preserve and protect the natural resources of the area that provide rural character
- Maintain the rural character of the community
- Commercial facilities should provide citizens with accessibility and diversification
- Commercial uses should be well integrated with surrounding development through appropriate landscaping, greenbelts, adequate access, parking, and pedestrian pathways
- Outdoor lighting shall be unobtrusive
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative

Recommendations

- Commercial uses shall provide sufficient off street parking and loading facilities, and minimize traffic congestion
- Commercial uses shall provide sufficient pedestrian access
- Commercial "strip" development should be discouraged to minimize traffic and land use problems
- Interconnect service drives to improve traffic distribution and to promote proper access management
- The negative effects of glare on neighboring properties and abutting streets shall be controlled by regulating the height, location, and intensity of lights and dimming lighting levels after business hours
- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative

Strategies

- Strengthen requirements for site design, which address but are not necessarily limited to, building materials, location and design of refuse storage areas, location and screening of service and delivery areas, parking lot design, lighting, landscaping, pedestrian safety, and site access
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

M-231 Commercial Uses

The basis for the following Goals and Recommendations is available within the Appendix.

Goals

- Establish a pattern of land use which will promote the highest degree of health, safety,and general welfare for all segments of the community
- Preserve and protect the natural resources of the area, while maintaining the necessary balance between the social and economic needs of the Township
- Preserve the rural landscape and protect the existing rural community character and atmosphere
- Prioritize agricultural, environmental, and natural resource protection
- Ensure a safe multi-user transportation network, through sidewalks, pathways, crossings, and access management
- Capitalize on the opportunities for future parks, recreational facilities, and trails
- Ensure outdoor lighting is unobtrusive and "Dark Sky" compliant
- Promote harmonious and organized development consistent with adjacent land uses and ensure high quality site and building design that contributes to the character of the community
- Restrict consideration of sewer infrastructure to planned primary development areas
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative

Primary Growth Area Recommendations

- Highway Commercial properties should provide for:
    - Buildings that are designed in clusters rather than in-line
    - Buildings that do not exceed two stories in height
    - Building design that achieves rural character
    - Multi-tenant buildings designed to appear to be divided into smaller elements by indentations, different building materials, architectural treatments, etcetera
    - Street corner buildings shall:
        - Be located as close to the right-of-way as practicable
        - Provide a civic space adjacent to the corner
        - Contain distinctive architectural features that promote pedestrians
    - Landscaping that softens the visual impact of buildings and creates a defined sense of arrival along the street edge
    - Limit driveways through interconnection of service drives to improve traffic distribution and to promote proper access management (Concept from Map 2)
    - Shared parking facilities located in the side or rear yards
    - Safe pedestrian circulation internally and along right-of-ways
    - Decorative lighting that is "Dark Sky" compliant
    - Loading docks and overhead doors in non-street facing facades

- Community Commercial properties should provide for:
    - Multi-tenant buildings designed to appear to be divided into smaller elements with building articulation, architectural elements, change of color and materials, etcetera
    - Buildings that do not exceed two stories in height
    - Building fronts facing the right-of-way
    - No more than two wall materials (not including foundation or trim)
    - Separation between materials as primarily horizontal
    - Heavier façade materials below lighter façade materials
    - Stone material, if any, as the secondary or accent material
    - Landscape parking areas
    - Exterior site buffering to soften visual impacts
    - Safe pedestrian circulation internally and along right-of-ways
    - Public spaces and open spaces
    - External lighting that is "Dark Sky" compliant
    - Internal driveway connection to shared drives or interior roadways
    - Loading docks and overhead doors in non-street facing facades
- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative

Primary Growth Area Strategies

- Maintain or strengthen design standards provided in Chapter 18 of the Zoning Ordinance
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

Secondary Growth Area Recommendations

- Properties should provide for:
    - Safe pedestrian and bicycle circulation internally and along right-of-ways
    - Storefronts that are oriented to address and enhance public areas and pedestrian pathways
    - Shared parking and interconnect service drives to improve traffic distribution and to promote proper access management
    - Building facades parallel to the street with major roof ridges either parallel or perpendicular to the street to be consistent with established patterns, and street level porches to emphasize entrances and create a public realm
    - Barn like structures that do not exceed one to one and a half stories
    - Civic buildings and public gathering places that reinforce community identity
    - Buildings placed between Lincoln Street and associated parking areas, with parking in the rear or sides of buildings
    - Reduced or zero front yard setback to bring uses closer to the street, to create neighborhood scale
    - External lighting that is "Dark Sky" compliant

- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative

Secondary Growth Area Strategies

- Maintain or strengthen design standards provided in Chapter 17 of the Zoning Ordinance
    - Consider standards to promote pedestrian safety
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

Chapter Six

Industrial Uses & M-231 Industrial Uses

Introduction

Limited industrial development exists within the Township. While various attributes are typically present for industrial uses, ultimately, these uses should be located on large tracts of land suitable for such development, and in close proximity to major highways.

When respondents to the Master Plan Update Community Survey were asked whether more industries are desired within the Township, approximately thirteen percent (13%) agreed or strongly agreed, whereas approximately sixty-six percent (66%) disagreed or strongly disagreed. Moreover, when asked what type of industrial development, if any, survey respondents wanted to see over the next ten years, approximately twenty-two percent (22%) indicated more, approximately forty-one percent (41%) indicated less, and approximately thirty-four percent (34%) indicated no change related to light manufacturing and warehouse. When survey respondents were asked the same question regarding heavy manufacturing, approximately six percent (6%) indicated more, approximately fifty-eight percent (58%) indicated less, and approximately thirty-three percent (33%) indicated no change

M-231 Highway

Construction of the M-231 highway through the heart of Robinson Township has given rise to concerns over development pressure and appropriate land use at access points along the route. This chapter addresses planning, growth, and development issues for land in the vicinity of the M-231 intersection with Lake Michigan Drive. In an effort to balance preservation of prized community assets with economic growth opportunities, as well as consolidate and focus future development to planned and prioritized target areas, these provisions were first adopted by the Township in the year 2015 for the same purpose and have been strengthened by the current Master Plan.

As a result of public workshops, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for general industrial uses and industrial uses along the M-231 highway area within Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

General Industrial Uses

Goals

- Preserve and protect the natural resources of the area that provide rural character

- Maintain the rural character of the community
- Encourage industrial uses to locate on large, environmentally suitable tracts of land within close proximity to major transportation corridors and protected from conflicting land uses
- Orient industrial uses in a fashion that encourages a "park" design and discourages "strip" development
- Establish outdoor lighting that is unobtrusive and "Dark Sky" compliant
- Integrate industrial uses with surrounding development through appropriate structures, landscaping, greenbelts, adequate access, parking, and pedestrian pathways
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative

Recommendations

- Parking and outdoor storage should be set back and buffered by landscaping or other rural character mechanisms
- Interconnect service drives to improve traffic distribution
- Signs, architecture, and site features such as fences, should reflect a rural character
- Lighting shall be "Dark Sky" compliant. The negative effects of glare on neighboring properties and abutting streets shall be controlled by regulating the height, location, and intensity of lights and dimming lighting levels after business hours.
- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative

Strategies

- Strengthen requirements for site design, which address but are not necessarily limited to, building materials, location and design of refuse storage areas, location and screening of service and delivery areas, parking lot design, lighting, landscaping, pedestrian safety, and site access
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

M-231 Industrial Uses

The basis for the following Goals and Recommendations is available within the Appendix.

Goals

- Establish a pattern of land use which will promote the highest degree of health, safety,and general welfare for all segments of the community
- Preserve and protect the natural resources of the area, while maintaining the necessary balance between the social and economic needs of the Township

- Preserve the rural landscape and protect the existing rural community character and atmosphere
- Prioritize agricultural, environmental, and natural resource protection
- Ensure a safe multi-user transportation network, through sidewalks, pathways, crossings, and access management
- Capitalize on the opportunities for future parks, recreational facilities, and trails
- Ensure outdoor lighting is unobtrusive and "Dark Sky" compliant
- Promote harmonious and organized development consistent with adjacent land uses and ensure high quality site and building design that contributes to the character of the community
- Restrict consideration of sewer infrastructure to planned primary development areas
- Encourage septic systems and wells transitioning to package wastewater systems and regional water and sewer service
- Promote activities that do not create noise, vibration, odor, fumes, or electrical or communications interference off the premises
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative

Recommendations

- Industrial facilities should adhere to architectural standards that ensure their compatibility with the commercial uses and reflect the standards of quality desired for the Township
- Limit outdoor activities to reduce noise, odor, and secondary effects of industrial use outside
- Lighting shall be "Dark Sky" compliant. The negative effects of glare on neighboring properties and abutting streets shall be controlled by regulating the height, location, and intensity of lights and dimming lighting levels after business hours.
- Mitigate the impact of outdoor activities to conflicting uses through site design
- All manufacturing, processing, and packaging operations shall occur within an enclosed building
- Access should be from a main interior road directly to 120th Avenue rather than individual driveways or connectivity to Lake Michigan Drive
- The site shall be designed to ensure proper vehicle stacking, circulation, and turning movements
- Buildings should be limited to one and a half stories within the height limits defined in the Zoning Ordinance
- Access points should be sufficiently separated from retail traffic
- The perimeter of industrial developments should be adequately buffered when abutting non-commercial/industrial land
- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative

Strategies

- Maintain or strengthen design standards provided in Chapter 18 of the Zoning Ordinance
    - Landscaping and buffering requirements should be adopted
    - Lighting requirements consistent with "Dark Sky" practices should be adopted
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area

Chapter Seven

Recreational and Public Facilities

Introduction

Robinson Township is home to a State Recreation Area as well as a 45 acre Township Park. Publicly owned recreation areas comprise about 1,153 acres of the Township, which include the Connor Bayou County Park, the Stearns Creek County Park, the Johnson Street County Forest Park, the Robinson County Forest Park, the Bass River State Recreation Area, the Riverside County Park, the Township Park, the M-231 parking area at North Cedar Drive, the Michigan Department of Natural Resources boat launch, the Grand Haven State Game Area, playgrounds at Robinson Elementary, and privately owned facilities such as marinas and a golf course.

In addition, the Ottawa County 2021 Parks, Recreation and Open Space Plan presents a conceptual plan for the Grand River Greenway. This concept plan presents a vision that links greenway lands with hard-surface multi-use trails. The greenway system goal is to provide a full greenway connection between Ottawa and Kent Counties.

The Robinson Township Hall and Fire Station are centrally located at 12010 120th Avenue. Police protection is provided by the Ottawa County Sheriff's Department. The Township has two school systems within its boundaries; the Grand Haven Area Public School District and the Zeeland Public School District. Robinson Elementary School is located within the Township near the Township Park.

When respondents to the Master Plan Update Community Survey were asked if they would like to see recreational lands change over the next ten years, approximately fifty percent (50%) indicated additional recreational land is desired and approximately forty-four percent (44%) indicated that the current recreational land is adequate. Related, when respondents were asked if they were willing to pay for the acquisition of lands for recreational purpose through a property tax millage, approximately sixty-three percent (63%) indicated support whereas approximately twenty-eight percent (28%) did not provide support. Further, when asked the same question regarding multi-use pathways, approximately sixty-one percent (61%) supported a millage whereas approximately thirty-one percent (31%) were opposed. Lastly, over eighty-two percent (82%) of respondents indicated that access to recreational opportunities in the township is excellent or good.

As a result of public workshops, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for recreation and public facilities within Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

Goals

- Park and recreational sites should be readily available to the people of Robinson Township, and be aligned with established regional need
- Consideration to protect those lands exhibiting the greatest need for environmental preservation and management should be paramount
- Ensure that public facilities and services can be sufficiently upgraded and expanded before new demands are placed upon those facilities and services
- Create and preserve public access to and viewsheds of the Grand River
- Protect water quality of the Grand River
- Preserve and protect the natural resources of the area that provide rural character
- Maintain the rural character of the community
- Provide protection of groundwater sources, particularly within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative

Recommendations

- Consideration should be given to recreational opportunities for all age groups during all seasons of the year
- Lighting shall be "Dark Sky" compliant. The negative effects of glare on neighboring properties and abutting streets shall be controlled by regulating the height, location, and intensity of lights and dimming lighting levels after business or open hours.
- Maximize the utilization of public buildings and grounds for multi-functional services
- Encourage groundwater preservation practices for new developments in accordance with Ottawa County's Groundwater Sustainability Initiative

Strategies

- Strengthen requirements for site design, which address but are not necessarily limited to, building materials, location and design of refuse storage areas, parking lot design, lighting, landscaping, pedestrian safety, and site access
- Limit development within the Aquifer Recharge Area identified by Ottawa County's Groundwater Sustainability Initiative, which would negatively impact the Recharge Area
- Maintain a Township Recreation Plan to be eligible for state and federal recreation funding programs
- Encourage citizen participation to determine needed and desired improvements and expansions to public facilities and recreation
- Strengthen ordinance provisions to reduce flooding, control runoff, and improve water quality of the Grand River and tributaries
- Strengthen ordinance provisions to require developers to provide road easements for and construction of pedestrian/bicycle paths

Chapter Eight
Public Utilities

Introduction

While several public water and sanitary sewer systems are available to serve the Township, the locations of these systems do not necessarily align with intended land use development. While the Township does not operate its own system, limited service to property owners exists on systems that are operated by neighboring entities. During the planning period, the Township does not seek to own and operate any system. The current Water Supply System Master Plan identifies a need to expand water service in the High Density Residential Classification of this Master Plan within the northwest area of the Township due to groundwater issues. This Plan does not intend to promote public water service outside of that area, except within the Primary Growth Area of the M-231 Highway.

M-231 Highway

The ability to provide utilities affects the development potential of land. Development sites within the Primary Growth Area are not suited for larger scale on-site septic system treatment of sewer wastewater because of poorly drained soils, a high groundwater table and the higher potential for environmental contamination. While sewer system extensions are recommended for the Primary Growth Area, Township officials recognize the potential conflict between sewer service in the Primary Growth Area and pressure to further extend sewer lines into valued agricultural and rural areas. Only utility extensions to locations best suited for development and consistent with the managed growth intent of the growth boundary should be supported. Therefore, the primary growth area, which is also the utility service area, shall mark the separation between rural and commercial/industrial areas.

Sewer extensions from adjacent townships should only be sized to accommodate the Primary Growth Area in addition to a reasonable amount of extra capacity, should boundaries be re-evaluated in the future. Additionally, decisions concerning sewer options should consider cost, distance, capacity and land use. There are three potential options to provide sewer to the Primary Growth Area each with various capacities to serve future development:

- West Central Ottawa County Wastewater Treatment Plant
- Grand Haven-Spring Lake
- Allendale Township

Acknowledging that on-site septic system treatment is not the desired long-term solution to sewer water treatment, when approving Special Land Uses within the Primary Growth Area under the future overlay district requirements, landowners shall agree to a Special Assessment Agreement. This agreement will be a precursor to a future special assessment district that will fund construction of the sewer system, as sewer infrastructure may not be feasible or cost-effective prior to a critical mass of development. As properties develop and construct on-site septic system

treatment facilities, systems shall be built to be expandable and ultimately convertible to connect to a public system.

Related, respondents to the Master Plan Update Community Survey were asked the following:

	Yes	No
Should the Township require developers to provide public water in order to support development?	60%	21%
Are you willing to pay for the extension of public water to facilitate commercial development?	17%	70%
Are you willing to pay for the extension of public water to facilitate industrial development?	9%	81%
Are you willing to pay for the extension of public water to facilitate residential development?	27%	60%
Are you willing to pay for the extension of public sewer to facilitate residential development?	22%	64%
Are you willing to incur an increase in taxes to pay for public water if it meant better quality water for existing residences?	28%	57%

As a result of public workshops, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for public utilities within Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

Goals

- Concentrate public utility extensions to avoid sprawl and to protect farmland

Recommendations

- Prohibit the extension of public water utilities outside of the High Density Residential Classification within the northwest area of the Township for the purpose of plats, condominiums, Planned Unit Developments, Open Space Developments, and similar developments
- Limit the extension of public sanitary sewer utilities to the Lake Michigan Drive Primary Growth Area only

Strategies

- Prohibit the extension of public water utilities outside of the High Density Residential Classification within the northwest area of the Township for the purpose of plats, condominiums, Planned Unit Developments, Open Space Developments, and similar developments
- Limit the extension of public sanitary sewer utilities to the Lake Michigan Drive Primary Growth Area only

Chapter Nine
Transportation

Introduction

Roadway function, efficiency and safety in Robinson Township can be furthered by defining a roadway classification system and planning and designing these facilities for their specific purpose. A functional system or hierarchy of roads provides for movement of traffic as well as access to specific sites. This hierarchy will range from principal arterials such as Lake Michigan Drive and the M-231 Highway, which primarily serves cross-county movement, to local subdivision streets that provide access to individual homes. This system defines the roles of each street, in terms of operational requirements; which is translated into planning, management and physical design features.

Principal Arterial

The Lake Michigan Drive corridor and M-231 Highway are major roadways through the heart of Ottawa County and serve a vital function toward connecting Robinson Township with developed areas in Grand Haven Charter Township, Allendale Charter Township and further east to the City of Grand Rapids and Kent County in general.

Collectors

The collectors serve to funnel traffic from local subdivision streets in residential neighborhoods to the arterials. Collectors also afford access to abutting properties. Many individual subdivisions contain one or more collector streets that carry traffic from the local streets and connect with adjacent neighborhoods.

Local and Private Roads

These interior streets provide access to abutting property and homes. These roadways are generally short and discontinuous and only provide connection to one or two collector streets.

Based upon the current view of the Township, the following is believed to be an adequate description of existing roads and highways:

TYPE	FUNCTION	SPEED	FEATURES
State Highway* (Principal Arterial)	Thoroughfare through the Township.	55 to 65 mph.	Higher traffic volumes with generally wider right of ways.

Arterial**	Connects areas of theTownship or a thoroughfare through the Township	55 mph.	Higher traffic volumes, sometimes wider right of ways.
Secondary	Provide connecting link between arterials and represent the location of most residences.	55 mph.	Moderate traffic, almost exclusively 66 feet right of way.
Private Road (serving more than 4 dwellings) paved.	Provide access to individual properties.	Unregulated by the County	Should be designed to discourage through traffic, 66 feet ROW for possible public dedication at a later date.
Private Road (serving 4 or fewer dwellings)	Provide access to a limited number of individual properties.	Unregulated by the County, however, length and condition limit speed.	Should be designed to discourage through traffic, 66 feet ROW for possible public dedication at a later date.

*State Highway

- M-45 (Lake Michigan Drive) from 144th Avenue to 96th Avenue
- M-231 from the Grand River to Lake Michigan Drive

**Arterial Streets

- 144th Avenue from M-45 to Green Street
- 128th Avenue from M-45 to Green Street
- 120th Avenue-- entire length of Township
- 104th Avenue -- M-45 to North Cedar Street
- 96th Avenue -- Fillmore Street to M-45
- Lincoln, 112th Avenue, Osborn, Bass Drive -- entire length
- Mercury Drive, Green Street, North Cedar Street—entire length
- Fillmore Street-- entire length

Overall, eighty-six percent (86%) of respondents to the Master Plan Update Community Survey indicated that the ease of travel between destinations within the Township was “excellent” or “good.” Approximately seventy percent (70%) of respondents indicated that planning for future road congestion was “important” or “very important.”

Pedestrians

Coupled with vehicle transportation, providing for pedestrian friendly means of travel are important to achieve complete streets within the Township.

Approximately seventy percent (70%) of respondents to the Master Plan Update Community Survey indicated that multi-use pathways for pedestrians, bicycles, and or equestrians are appropriate when adjacent to agriculture within the Township. Slightly over fifty percent (50%) of respondents indicated that adding bike lanes and paved shoulders along roads were "important" or "very important," coupled with approximately twenty-four percent (24%) indicating that those were "somewhat important."

As a result of public workshops, the Master Plan Update Community Survey, and various planning meetings we have concluded that the following goals are paramount for transportation within Robinson Township. In addition, through the use of modern planning principles, where applicable, recommendations regarding these goals as well as strategies to achieve success are provided below.

Goals, Recommendations, and Strategies

Goals

- Access points for traffic on Lake Michigan Drive should not be restricted by excessive driveway aprons
- An emphasis on interconnected drives and streets should be promoted so that internal trips can be made without compelling drivers to enter and exit the main road multiple times
- A system of integrated shared use paths should be promoted for all new developments to provide safe walking routes to surrounding uses

Recommendations

- Interconnect service drives to improve traffic distribution and to promote access management
- Minimize traffic disruptions on arterials, while keeping through traffic off of the local residential streets
- Promote a multimodal transportation system, encompassing bicycles, pedestrian, and automobile traffic

Strategies

- Require the layout of new residential developments to be extensions of existing neighborhoods, where possible. This should apply to roadway extensions and pedestrian pathways, to ensure interconnected neighborhoods.

- Consider adopting access management regulations, shared driveway regulations, and pedestrian pathway requirements within the Zoning Ordinance for all commercial and industrial uses

Complete Streets Plan

In 2010, the Michigan Planning Enabling Act was amended to require that Master Plans account for "all legal users" of the transportation system within the municipality. The amended Act, in part, states that the Master Plan must include, "among other things, promotion of or adequate provision for 1 or more of the following: (i) A system of transportation to lessen congestion on streets and provide for safe and efficient movement of people and goods by motor vehicles, bicycles, pedestrians, and other legal users." MCL 125.3807(2)(d).

This Chapter of the Robinson Township Master Plan, Chapter Nine – Transportation, as well as other provisions throughout the plan regarding pathways, roadway improvements, and lessening roadway congestion, identify key means to implement complete streets. As a result, the Township is compliant with this amendment.

Chapter Ten
Implementation

Introduction

In order for the Master Plan to serve as an effective guide to the continued development and preservation of Robinson Township, it must be properly implemented. Primary responsibility for implementing the Plan rests with the Robinson Township Planning Commission, the Board of Trustees, and Township staff. Implementation is accomplished through a number of methods including adoption of ordinances, policies, and administrative procedures, as well as site plan review. While the Master Plan itself has no legal authority to regulate development, it does influence land use based on the goals and recommendations identified within the Master Plan related to a proposed land use.

Zoning and Land Use Regulations

Zoning represents a legal means for the Township to regulate private property to achieve orderly land use relationships and is the tool most commonly used to implement the Master Plan. The zoning process consists of an official Zoning Map and accompanying Zoning Ordinance text. The official Zoning Map divides the community into different districts within which certain uses are permitted. The Zoning Ordinance text establishes the permitted uses, regulations to control density, height, bulk, setbacks, lot sizes and accessory uses, among other physical and linear attributes. The Zoning Ordinance also sets forth procedures for special approval provisions and regulates accessory structures such as pole barns and signage. These measures permit the Township to control the quality as well as the type of development. Numerous strategies within this Plan are provided for future implementation into the Zoning Ordinance, as well other policy documents.

The Planning Commission and Township Board should periodically review and make any necessary revisions to the zoning regulations to ensure that the strategies of the Master Plan are instituted. Further, the Zoning Ordinance requires systematic and frequent updates to address needs resulting from land use trends, case law, and state statutes.

Relationship of Master Plan Classifications to Zoning Districts (Zoning Plan)

Complementing the text of the Master Plan is its map, which identifies land use classifications by which the Township organizes and intends future improvements and uses. These classification terms are intentionally general in nature so as to not necessarily be specific to one use or type of uses permitted by the Zoning Ordinance and its Map. In other words, while the land use classifications are related to the Zoning Districts identified on the Zoning Ordinance Map, specific future uses are determined by numerous natural and man-made features of the landscape such as public utilities, topography, soils, road improvements, surrounding uses, existing densities, and etcetera, as well as other planning considerations such as compatibility, public safety, and access. Consequently, while the land use classifications of the Master Plan Map are designed to serve as

a guide for future uses, they are not considered to be a mandate for immediate improvements, public, private, or otherwise.

Ultimately, while the Master Plan Map identifies areas for future uses, the feasibility of a proposed use is determined by the aforementioned, and the Zoning Ordinance with its regulations regarding height, area, bulk, location, etcetera for each of its Zoning Districts.

Nonetheless, the Michigan Planning Enabling Act requires that a Master Plan include a "Zoning Plan" with an "explanation of how the land use categories on the future land use map relate to the districts on the zoning map. The table below summarizes the Master Plan classifications and how they relate to reach of the existing zoning districts.

Master Plan Map Classification Terms	Zoning Ordinance Map Districts
Agricultural (AG)	Agricultural (A-1) & Agricultural Service (A-2)
Low Density Residential (LDR)	Rural Residential (RR)
Medium Density Residential (MDR)	Residential One-Family (R-1)
High Density Residential (HDR)	Residential Multiple-Family (R-2)
Flood Plain (E-1)	Lowland Resource Conservation Overlay (E-1)
Commercial (C)	Neighborhood Commercial (B-1) & General Business (B-2)
Industrial (I)	Industrial (I-1) & (I-2)
M-231 Primary Growth Area	Lake Michigan Drive Commercial Overlay (LMDCOD)
M-231 Secondary Growth Area	Lincoln Street Overlay (LSOD)
Mobile Home (MHP)	Mobile Home Park (R-3)

Mining District

Given that mining rights within the State of Michigan can potentially allow mineral extraction anywhere within the Township, the Mining District within the Robinson Township Zoning Ordinance is an interim district that permits and regulates mining activities. When the mineral extraction is complete, the property requires rezoning to a zoning district that is consistent with this Master Plan, that is compatible with the surrounding zoning districts and uses, and supports the capability of the subject property to accommodate the available uses of the zoning district.

Planned Unit Development District

The Michigan Zoning Enabling Act allows a municipality to adopt provisions to provide for Planned Unit Developments within their Zoning Ordinance. Planned Unit Developments are designed to authorize and control the development of various compatible uses permitted by the Zoning Ordinance through a flexibility in the use, area, height, bulk, and placement regulations where the underlying district cannot achieve the same type of desirable

development through its regulations. Robinson Township permits recreational, clustered residential, and non-clustered residential Planned Unit Developments. While not an interim zoning district like the Mining District, the Planned Unit Development District is not identified within this Master Plan because its location in the Township occurs on a case-by-case basis as a result of existing and changing conditions.

Relationship of Master Plan Map Classification Terms to Master Plan Chapters

Several Chapters of this Master Plan identify the goals, recommendations, and strategies regarding future land uses within the Township. While the goals, recommendations, and strategies will likely always evolve, the intended uses related to the chapter titles will remain the same. Those chapter titles can generally be related to the Master Plan Map terms as provided in the table below.

Master Plan Map Classification Terms	Master Plan Chapters
Agricultural (AG)	Agricultural Uses
Low Density Residential (LDR)	Residential Uses
Medium Density Residential (MDR)	Residential Uses
High Density Residential (HDR)	Residential Uses
Flood Plain (E-1)	Lowland Resource Conservation
Commercial (C)	Commercial Uses & M-231 Commercial Uses
Industrial (I)	Industrial Uses & M-231 Industrial Uses
M-231 Primary Growth Area	Commercial Uses & M-231 Commercial Uses / Industrial Uses & M-231 Industrial Uses
M-231 Secondary Growth Area	Commercial Uses & M-231 Commercial Uses

Appendix

Available within this appendix is the following data.

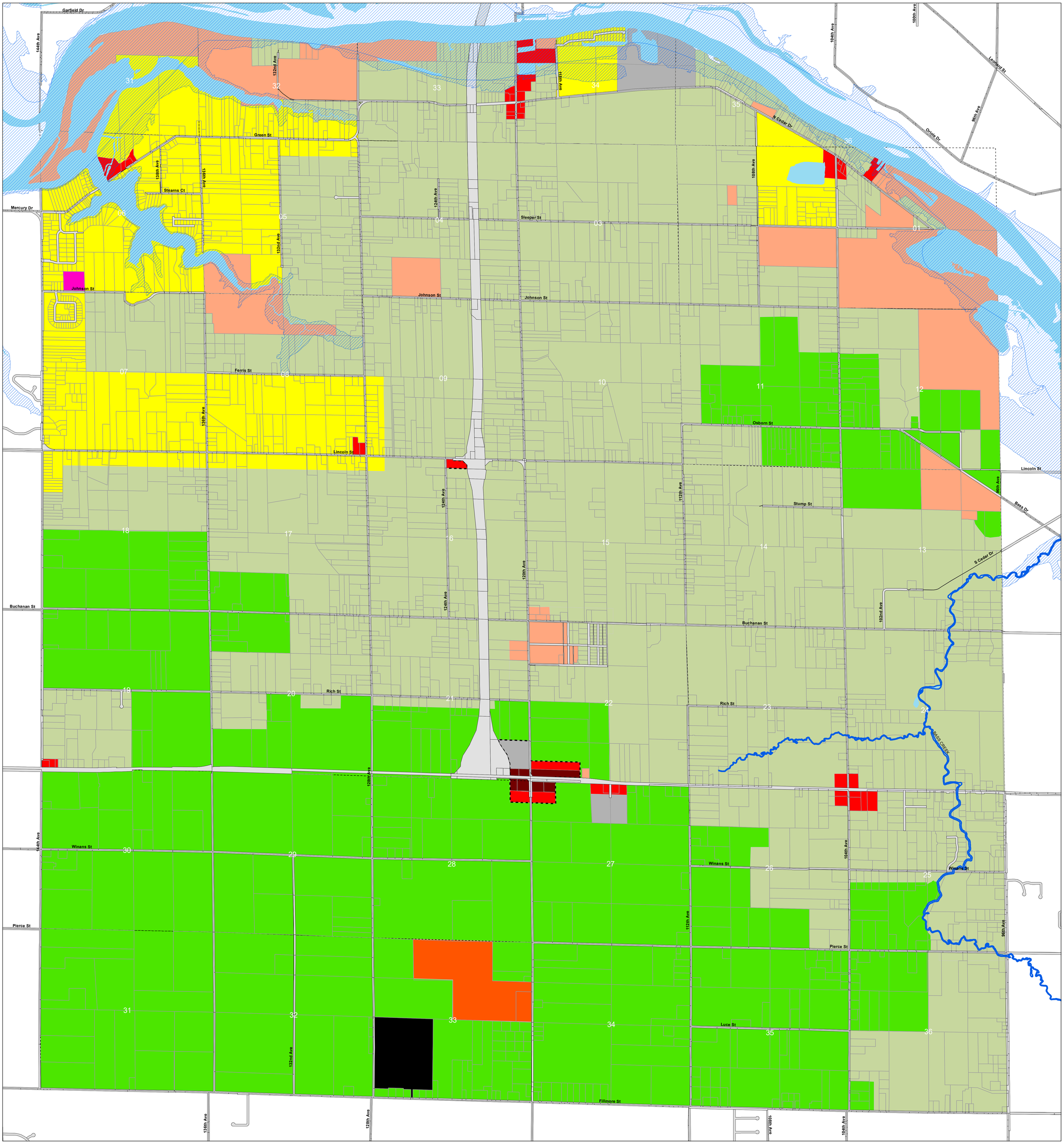
Appendix A – Community Mapping
Appendix B – M-231 Growth Areas
Appendix C – Population and Economic Data, Robinson Township
Appendix D – Robinson Township Master Plan Update Community Survey 2021 & Robinson Township Master Plan Public Workshops: Results Summary
Appendix E – Water Supply System Master Plan for Robinson Township
Appendix F – Wastewater Master Plan
Appendix G – Aquifer Recharge in Robinson Township, Ottawa County – David P. Lusch, Ph. D., Professor Emeritus, Department of Geography, Environment, and Spatial Sciences, Michigan State University

Appendix A

Community Mapping

Following are the community maps as well as their established purpose, which are incorporated as part of the Master Plan. These maps are not intended to be limited to their purposes provided below but rather establish a minimum relationship to the Master Plan.

- Master Plan Map – creates future land use classifications and delineates boundaries for certain uses of land.
- Soil Limitations for Residential Development without Public Sewer Map - illustrates soil limitations for septic systems to illustrate feasibility of supporting proposed development.
- Parks & Recreation Areas Map – illustrates existing parks and recreation areas available to the public within the Township.
- Natural Gas Suppliers Map – illustrates the location of natural gas utilities and suppliers within the Township to illustrate feasibility of supporting proposed development.
- Marathon Pipeline Map – illustrates the general location of the Marathon Pipeline within the Township.
- Electricity Suppliers Map – illustrates the location of electric utilities and suppliers within the Township to illustrate feasibility of supporting proposed development.
- Robinson Township Elevation Map – illustrates the topography within the Township to illustrate feasibility of supporting proposed development.
- Air Strips Map – illustrates the location of existing air strips within the Township.
- Designated Truck Route Map – illustrates the location of existing truck routes within the Township.
- Street Map – illustrates the location and paving material of existing public roads within the Township.
- School Districts Map – illustrates boundaries of public school districts within the Township.
- Hydrology Features Map – illustrates the location of drains and water courses throughout the Township to illustrate feasibility of supporting proposed development.
- Transportation Facilities 2022 Map – illustrates the different types of transportation facilities available within the Township.
- Merit Survey Respondents with a Minimum Speed of 100/20 Map & Merit Survey Respondents with a Minimum Speed of 25/3 Map – illustrates the availability of highspeed internet within the Township.



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Robinson Township

Master Plan
T07-08N R16W

Draft Nov. 1 2022
Rev. 01/31/2023
Rev. 03/14/2023
Rev. 04/11/2023
Rev. 05/09/2023
Rev. 05/23/2023

1 inch = 1,000 feet

0 500 1,000 2,000 3,000 4,000
Feet

Legend

- 100yr Floodplain (2011)
- Growth Area Boundary

Proposed Master Plan

- Agricultural (AG)
- Commercial (C)
- Highway Commercial (HC)
- Rural Residential (LDR)
- Residential (MDR)
- Residential (HDR)
- Industrial (I)
- Public (PQP)
- REC, Recreational (REC)
- Mobile Home, MHP

N
W E
S

Robinson Township
Soils Limitations
For Residential Development
Without Public Sewer

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Photography date: April 2014

Legend

Soils Relatively Free of Limitations or Limitations that are Easily Overcome

CODE, SERIES, SLOPE%
ChB, CHELSEA, 0-6
ChC, CHELSEA, 6-12
CwB, CROSWELL&AU GRES, 0-6
DpB, DEER PARK, 0-6
KaC, KALKASKA, 0-12
McA, MANCELONA, 0-2
McB, MANCELONA, 2-6
RsB, RUBICON, 6-18

Soils with Limitations that need to be recognized, but that may be overcome with good management and careful design

CODE, SERIES, SLOPE%
DpD, DEER PARK, 18-45
McC, MANCELONA, 6-12
RsD, RUBICON, 6-18

Soils with no estimations of limitations. Onsite investigation is necessary

CODE, SERIES, SLOPE%
BoB, BLOWN-OUT, 6-50
BoF, BLOWN -OUT, 0-6
Gr, GRAVEL PIT
Ma, MADE
Me, MARSH
WuC, WIND, sloping

Soils that can be expected to impose severe limitations: difficulties and hazards are hard and costly to overcome, if at all

CODE, SERIES, SLOPE%
Ad, ADRIAN
Ah, ADRIAN-HOUGHTON
AmB, AU GRES, 0-6
AsB, AU GRES-SAUGATUCK, 0-6
DpF, DEER PARK, 6-18
Gd, GILFORD
Gl, GLENDORA
Gm, GRANBY
Gn, GRANBY
IoA, IOSCO, 0-4
RcA, RICHTER, 0-2
RsF, RUBICON, 18-45
Sh, SHOALS
Sm, SIMS
Sn, SLOAN

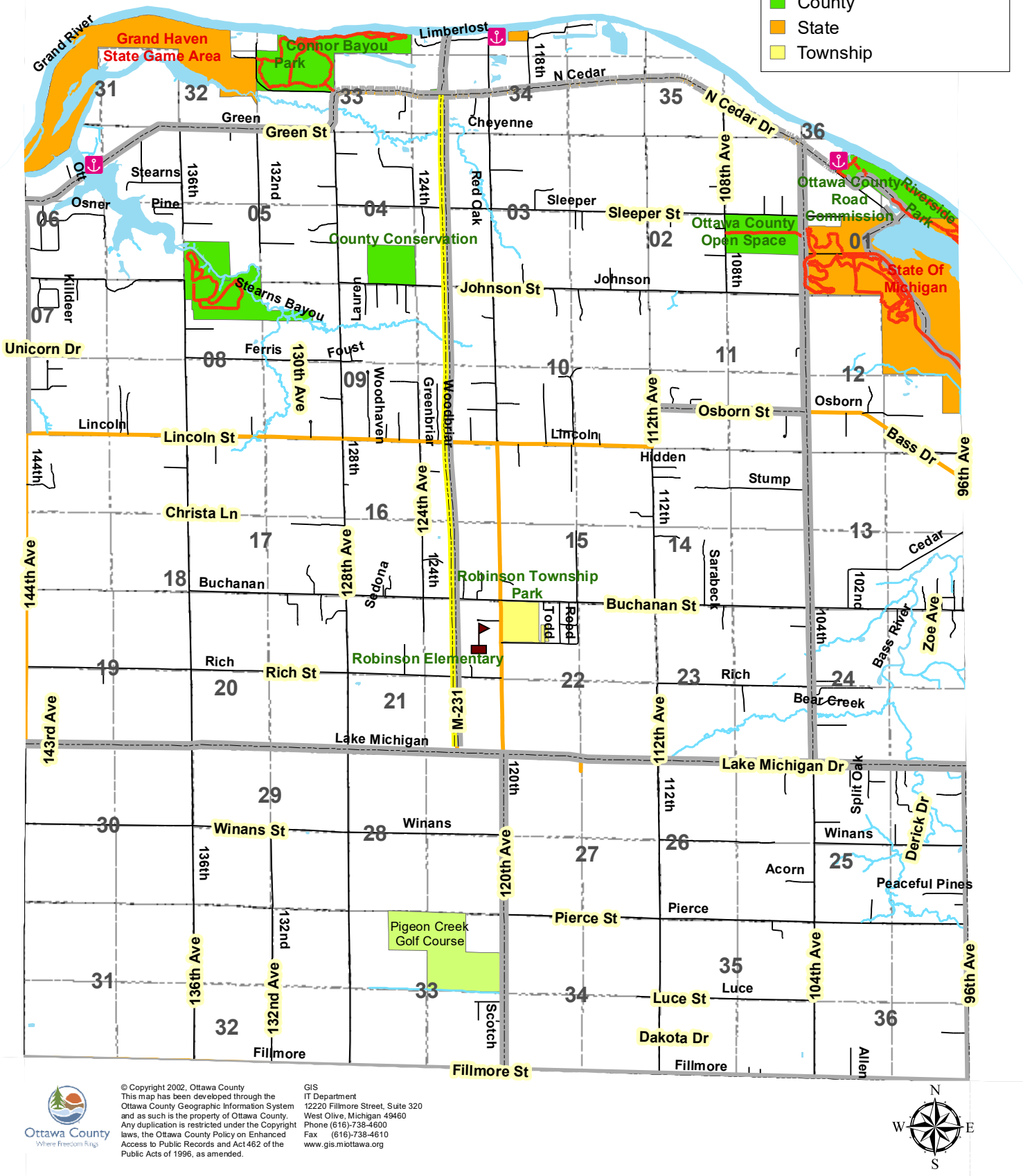
1 0 1 Miles

Document Path: S:\Local_Gov_Projects\Robinson_Twp\Landuse\MXD\Soils Limitation.mxd

Robinson Township

Parks & Recreation Areas Map

Date April: 2023 T07-08N, R15W



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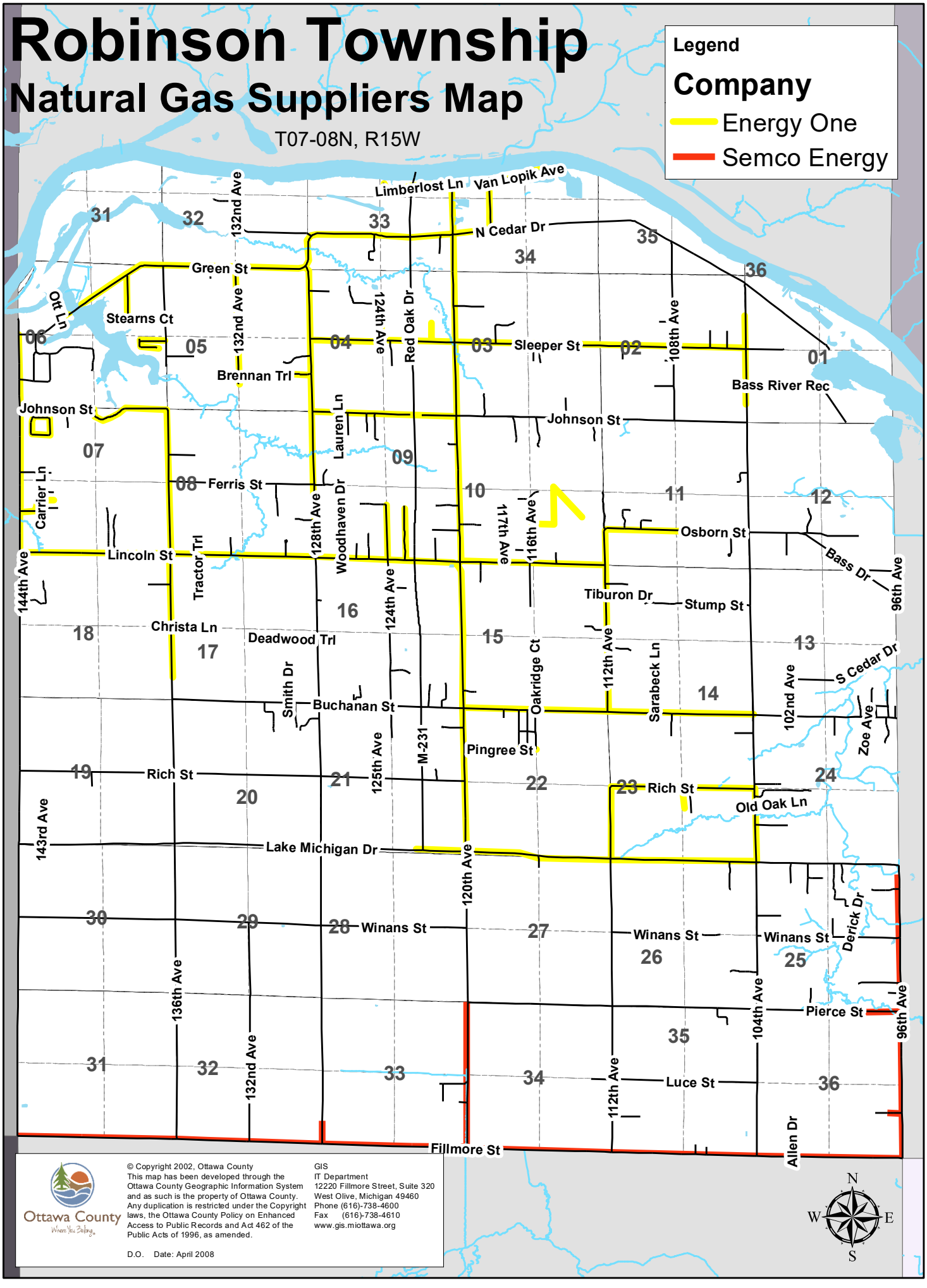
Ottawa County
Where Freedom Rings

Document Path: S:\Local_Unit_Projects\Robinson_Twp\LandUse\MXD\Parks_RecPro.mxd

Robinson Township

Natural Gas Suppliers Map

T07-08N, R15W



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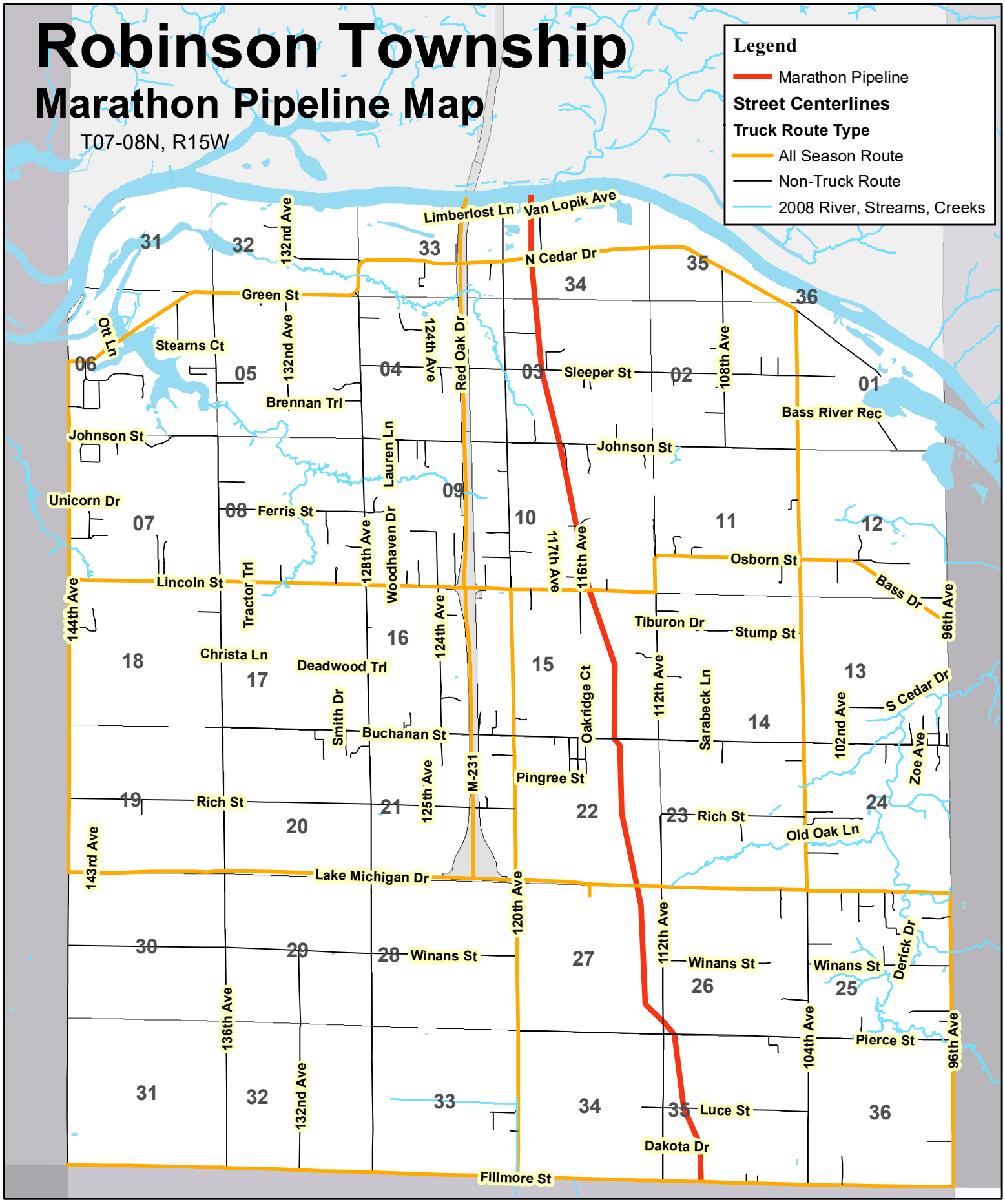
Marathon Pipeline Map

T07-08N, R15W



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Robinson Township

Electricity Suppliers Map

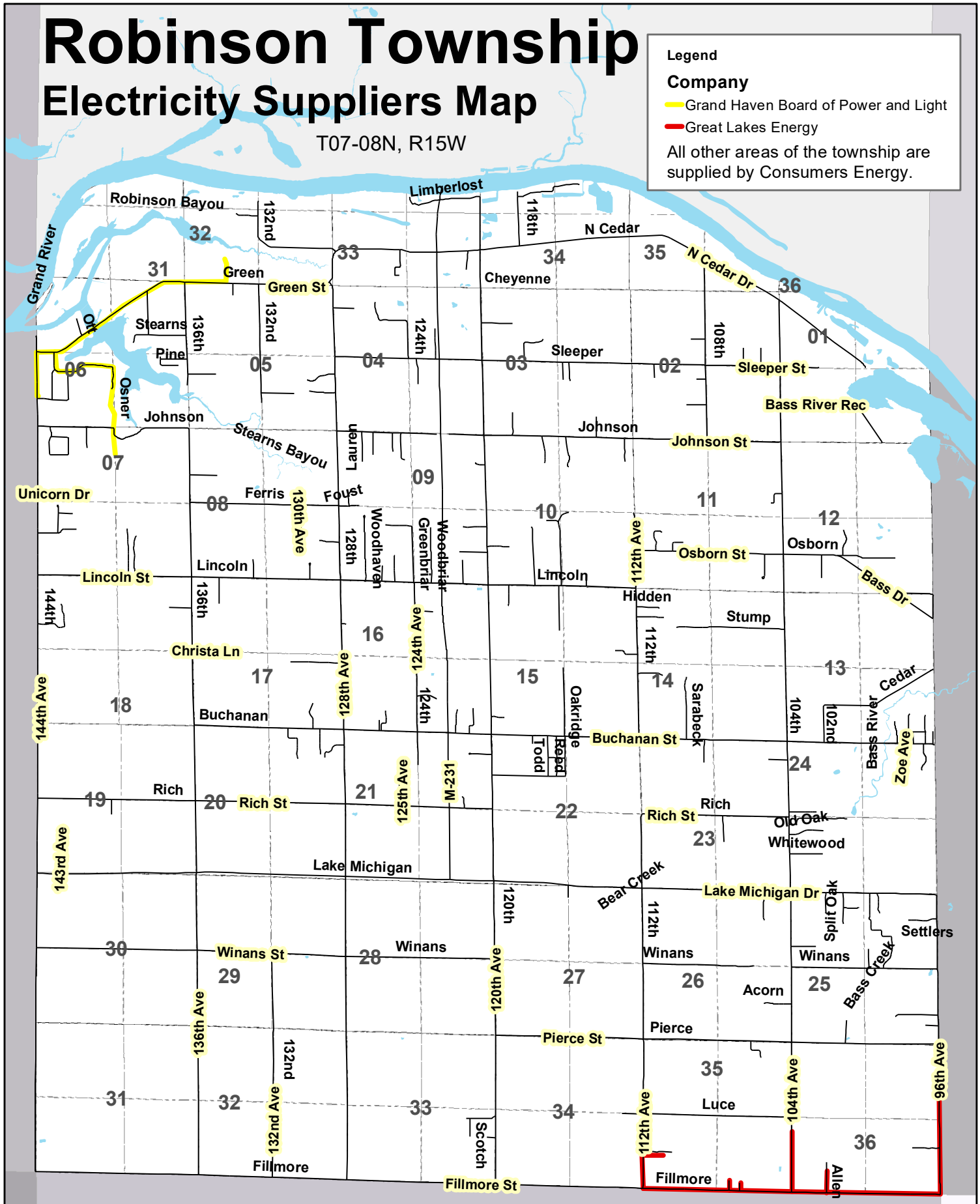
T07-08N, R15W

Legend

Company

- Grand Haven Board of Power and Light
- Great Lakes Energy

All other areas of the township are supplied by Consumers Energy.



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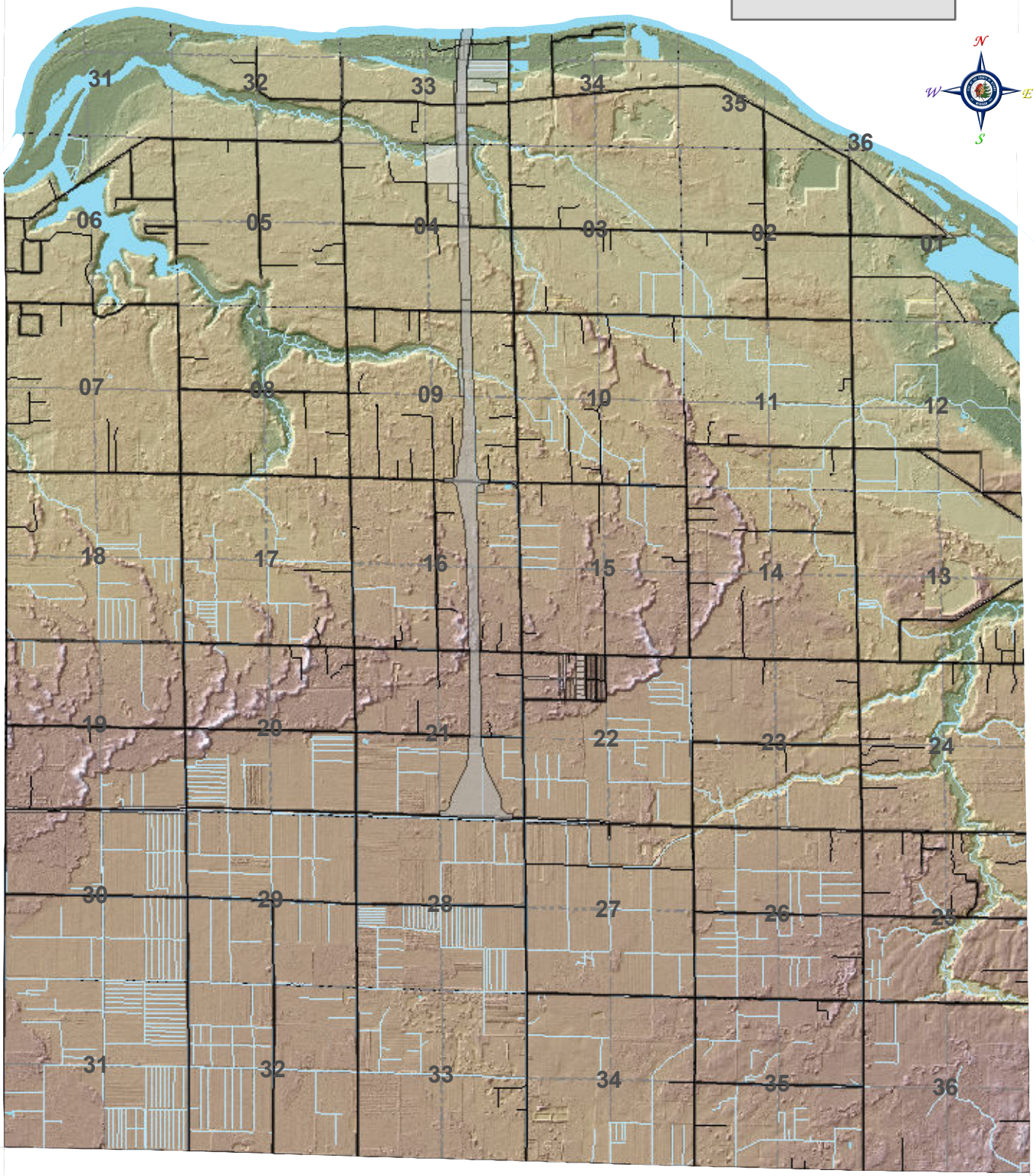
Elevation Map

T07-08N, R15W



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Air Strips Map

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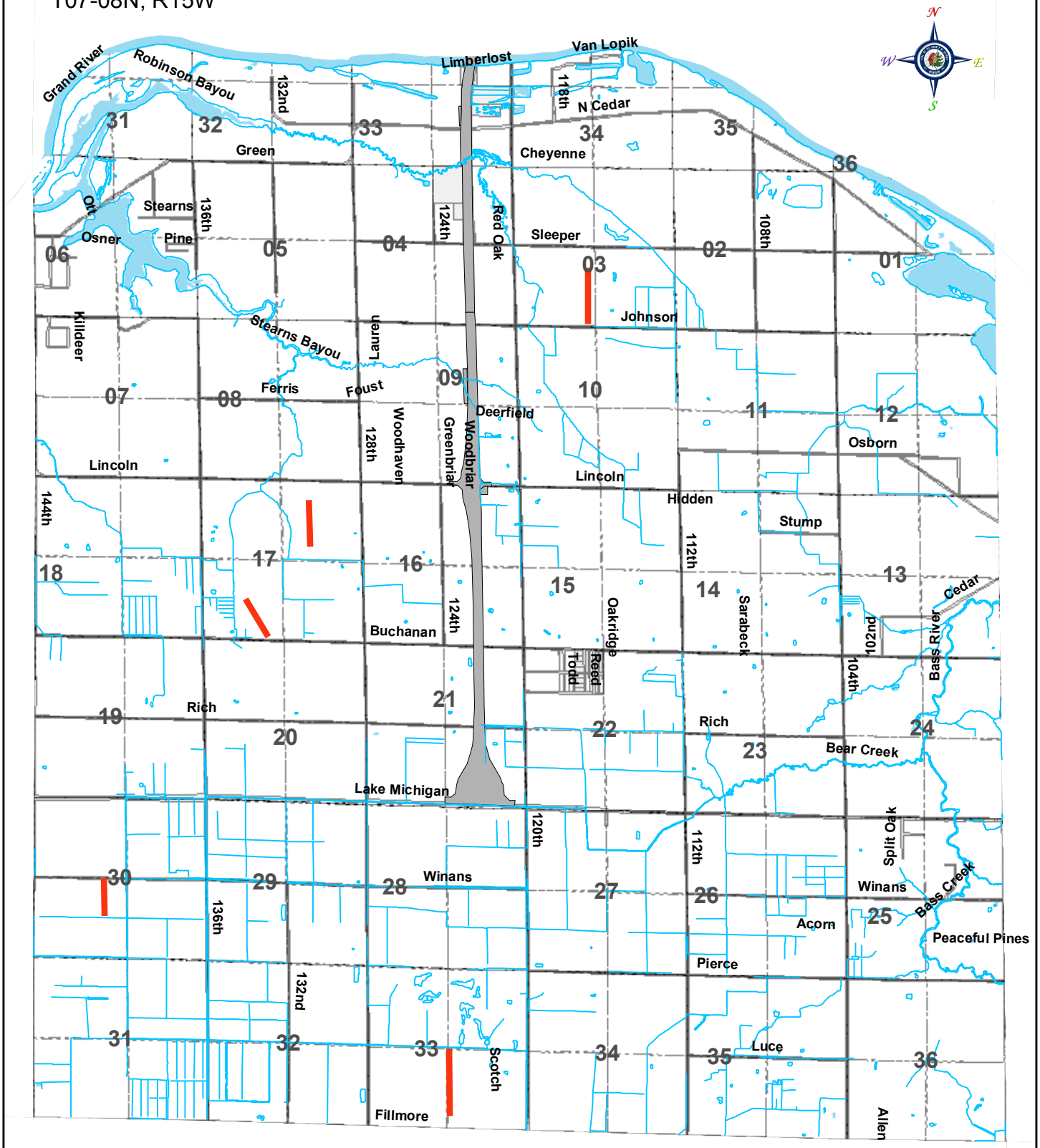

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Robinson Township

Designated Truck Route Map

T07-08N, R15W

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Legend

Street Centerlines

Truck Route Type

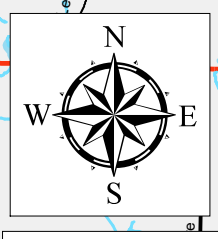
- All Season Route
- Non-Truck Route

N
W E
S

Robinson Township

Street Map 2023

T07N-08N, R15W



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Legend

Street Centerlines

New Road Class, Road Surface

- State
- Primary
- Local Paved
- County Local, 1
- Local, Unpaved
- Private
- Subdivision

1 0.5 0 1 Miles

Document Path: S:\Local_Unit_Projects\Robinson_Twp\LandUse\MXD\Street Map.mxd

Robinson Township

School Districts Map

T07-08N, R15W

Legend

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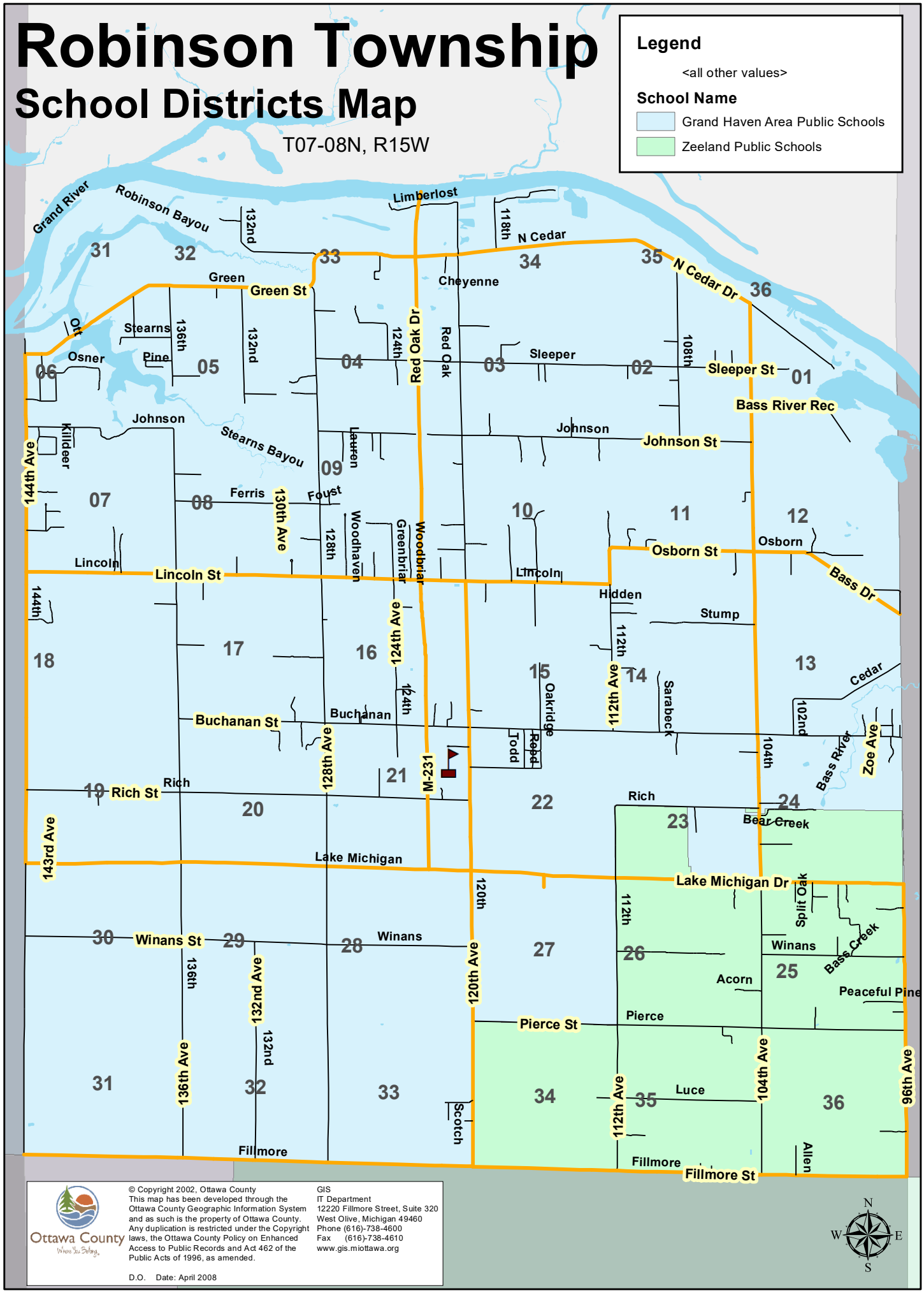
School Name

- Grand Haven Area Public Schools
- Zeeland Public Schools



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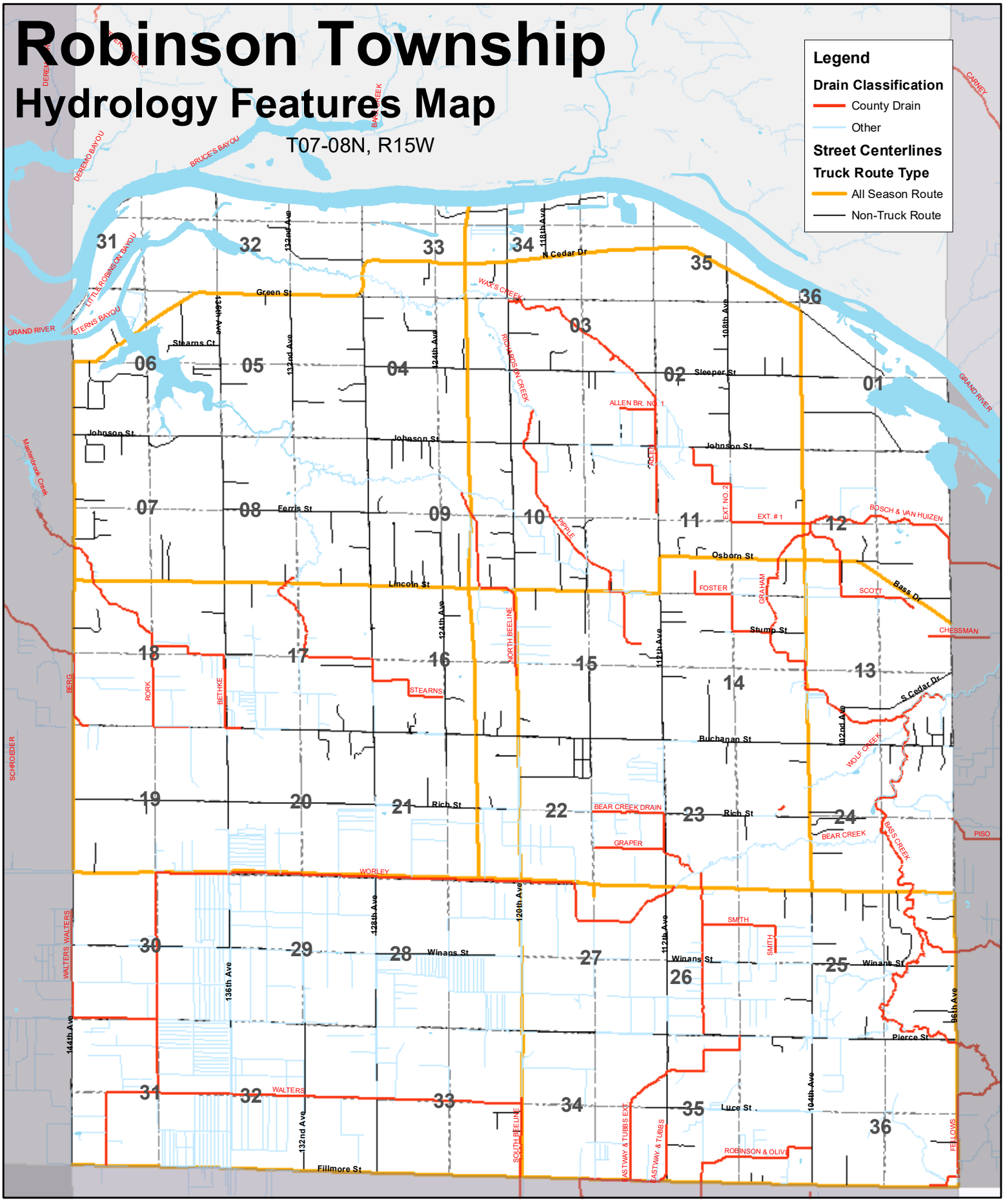
Robinson Township

Hydrology Features Map

T07-08N, R15W



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Where Freedom Rings

N
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S

Robinson Township

Transportation Facilities 2022

Legend

- Interstate/ Freeway
- Principal Arterials
- Major Collectors
- Minor Collectors
- Local
- Private

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Ottawa County
Where You Belong

1 0.5 0 1 Miles

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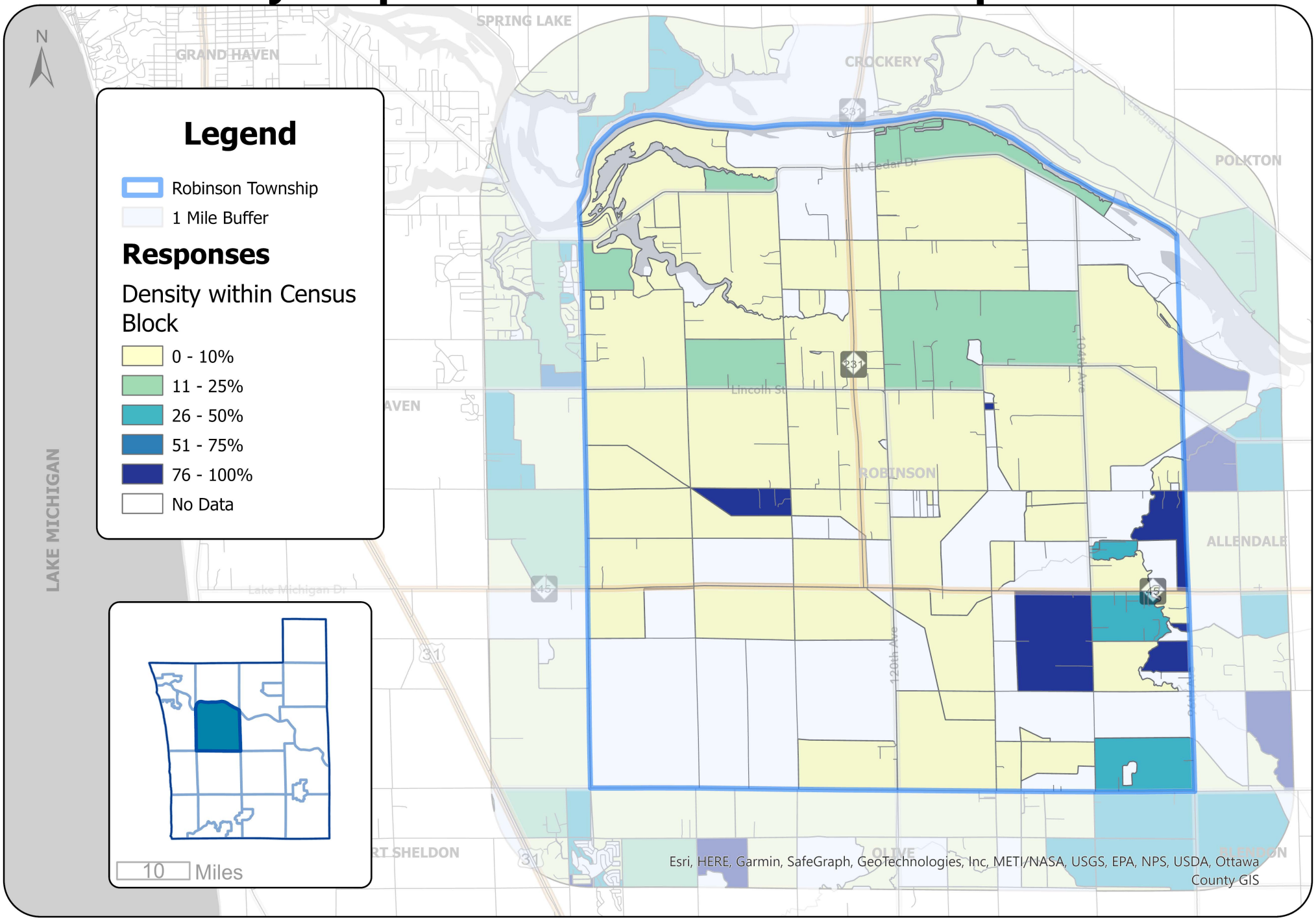
Merit Survey Respondents with a Minimum Speed of 100/20



0 1½ 3 6 Miles

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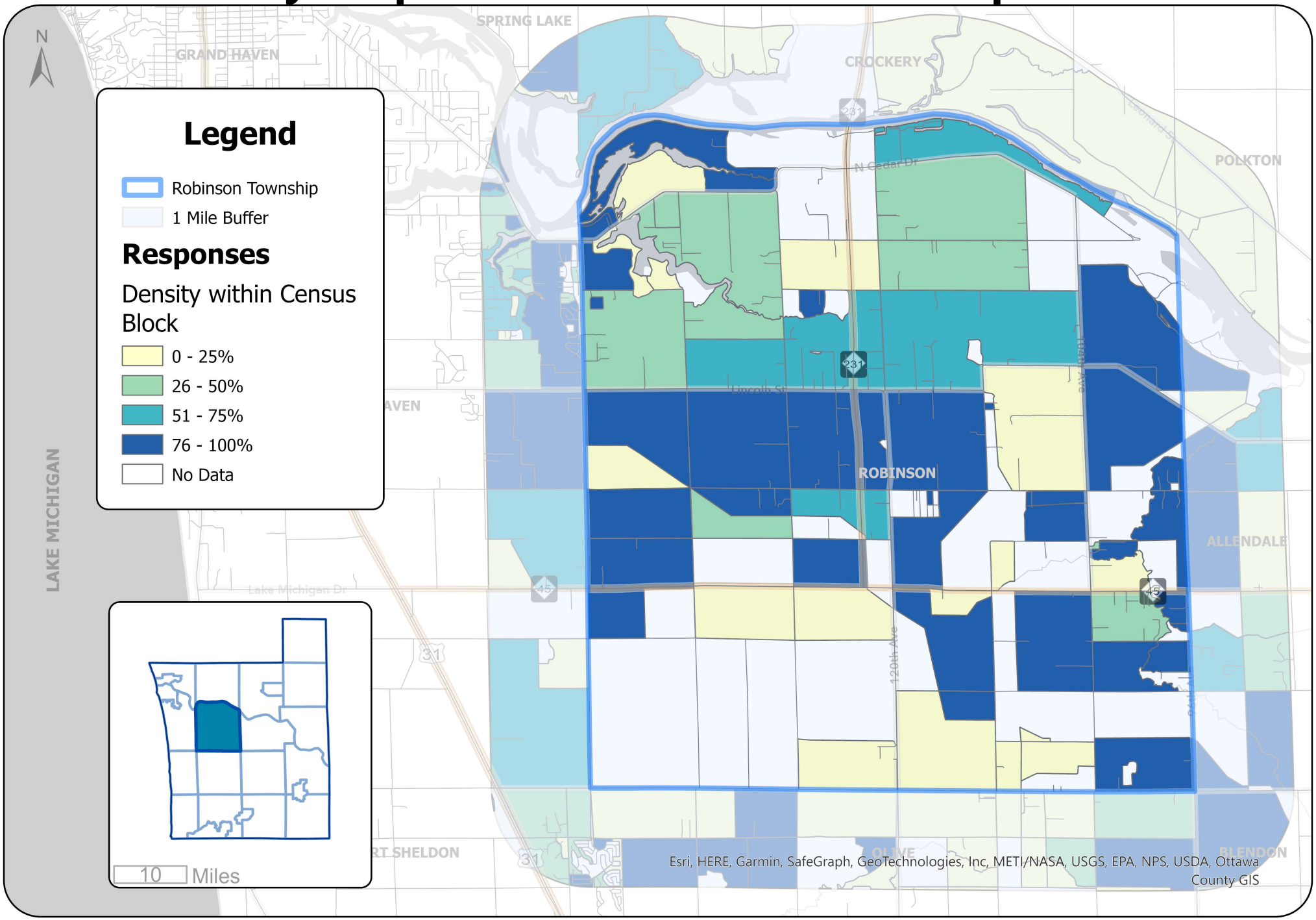
9/23/2022

Merit Survey Respondents with a Minimum Speed of 25/3



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Appendix B

M-231 Growth Areas

Following are factors, tables, and maps that provide information specific to the M-231 Growth Areas within the Township.

- Growth Boundary Factors
- Table 1: Growth Boundaries – Development Suitability Factors
- Table 2: Average Daily Traffic and Projections

GROWTH BOUNDARY FACTORS

Delineation of growth boundaries and future land uses are based on a variety of objective and subjective factors. Although factors are not weighted, prioritized, or exclusive, an assessment of information concerning all factors and a cumulative evaluation of the factors serve as the basis for the Robinson Township growth strategy.

1. Road infrastructure (Existing and Planned). Roads are an essential component of community infrastructure and are integral to land use decisions. Therefore, it is critical to ensure that the primary function of arterial roads (such as M-45 and Lincoln} which is to carry relatively high volumes of traffic long distances, is not compromised by inappropriate uses. All too often, the higher traffic volumes and greater visibility of arterial corridors entices businesses seeking that increased exposure to customer traffic. However, if not controlled, the proliferation of individual driveways and frequent in and out turning movements diminishes the capacity of the road and impedes its basic function to move traffic. Therefore, a delicate balance must be maintained between preserving the traffic-carrying function of the arterial road and permitting uses that depend on that traffic.
2. Soils and Natural Resources. Hydric soils are generally considered unsuitable for development due to their historically wet conditions. These soils are typically saturated through a significant part of the growing season or flooded long enough to eliminate oxygen in the root zone. According to the Robinson Township Hazard Mitigation plan, areas with hydric soils "are to be considered flood-prone, wetland, or otherwise suited to have development discouraged or specifically engineered to account for site hydrology." Therefore, the presence of such soils is considered a significant constraint to development due to their instability for buildings and limitations for on-site septic systems.
3. Existing Land Use. Established land use patterns must be considered in determining potential future land use options. Except in rare circumstances where redevelopment is advocated, the existing land use context must be a shaping influence as future land use options are explored. Intensive land uses may not be compatible and could potentially affect historically residential or agricultural areas negatively by reducing property values, increasing traffic, or creating nuisances (noise, hours of operation, glare, odor, etc.).
4. Future Land Use and Zoning. Development should emanate incrementally outward from areas targeted for growth through conscious land use planning. A logical, orderly, sequential growth pattern allows for the gradual expansion of needed infrastructure and other municipal services in a cost-effective and efficient manner. The Township Master Plan and this Growth Area Plan strive to manage growth and diminish incompatible land use relationships. Zoning regulations are the fundamental tools to support plan recommendations. They should ensure that appropriate uses are situated in conformance with the plan and an orderly transition is accomplished from intense uses to very low intensity uses.
5. Survey and Community Preference. Local desires are an important ingredient in any planning effort. All communities are different, local philosophies vary and conditions may

be unique. During past planning efforts, residents were surveyed to gauge their opinions regarding growth and development. The results of that survey provided valuable direction for the preparation of this plan.

6. Utilities. Water and sewer service infrastructure are critical determinants for land use intensity. Where public water and sewer are available, greater intensity of development is feasible. However, where such facilities are unavailable and private systems (septic and well) are employed, the range of potential uses and the intensity of development are severely limited.
7. Truck Routes. Except as expressly permitted under the Truck Route Ordinance, operation of heavy trucks and trailers is restricted to designated truck routes. As commercial and industrial developments are reliant upon trucks for deliveries and general operation, the most suitable lands are those that have direct access to truck routes in all directions.
8. Visibility and Demand. Commercial and industrial zoning map amendments, special land use review and site plan review requests are indicators of general demand for development. Additionally, visibility of property based on new traffic patterns and increase in the number of travelers in the township affects suitability.

The following table includes the application of the assessment factors as they related to the growth areas.

Table 1 Growth Boundaries- Development Suitability Factors

Planning Factor	Lincoln Street Focus Area	Lake Michigan Drive Focus Area	Outlying Areas
1. Road Infrastructure (Existing and Planned)	Medium • County Road- Lincoln Street • M-231	High • M-45 Lake Michigan Drive • M-231	Low • County secondary paved roads • County unpaved roads
2. Soils	Low • Hydric Soils	Low • Hydric Soils	Varies • Hydric and Non-Hydric Soils
3. Existing Land Use	Low • Low and medium density residential (north) • Agricultural land (south)	High • Generally agricultural and undeveloped • Existing commercial	Low • Agricultural uses • Low and medium density residential
4. Future Land Use and Zoning	Low • Existing low density residential zoning. • Low density residential future land use planned.	Medium/High • Existing commercial and industrial zoning • Commercial and industrial land use planned	Low • Existing residential zoning • Existing Residential future land use planned
5. Community Survey	Low • Development not desired.	Medium • Development more acceptable	Low • Development not desired
6. Utilities	Low • No existing or planned water and sewer.	Medium • No existing or planned water and sewer • Closer proximity to existing utilities	Low • No existing or planned water and sewer
7. Truck Routes	Medium • Truck routes travel in two directions.	High • Truck routes travel in all directions	Low • Trucks are generally prohibited
8. Visibility and Demand	Medium • New bypass traffic capture- significant increase on Lincoln west of M-231 (see traffic projections in Table 2 and Map 1).	Medium/High • Regionally significant intersection	Low • No bypass traffic capture or increases anticipated

		• New bypass traffic capture: travelers will stop for convenience-oriented needs but the location will not be a "destination." Some commercial developers may seek to take advantage of a key location and a potential new market resulting from the new hub at Lake Michigan Drive and M -231 (see traffic projections in Table 2).	
Overall Score Recommendation	Low/Medium Consolidated low-intensity commercial around new intersection to the southwest of the Lincoln/M-231 intersection.	Medium/High Designation of existing commercial and industrial future land use areas as priority area for future development.	Low No change in growth concept.

Table 2 Average Daily Traffic and Projections

Road Section	2006	2013	2014	2015 (M-231 completed)	2016	2017	2018	2019	2020	2021	2030 Projected
Lincoln east of M-231	2,500										4,800
Lincoln east of 120th		2,078			1,623			1,535			
Lincoln west of M-231	4,300										11,100
Lincoln east of 128th		3,482			6,111			5,906			
Lincoln east of 144th		4,021			5,411			6,007			
120th south of Lincoln	3,000			3,040						2,294	2,400
120th north of Lincoln	1,200			1,156			1,471				2,300
M-45 west of M-231	5,400							6,700			8,400
M-45 east of M-231	7,000							13,750			14,100
M-231 south of Lincoln	N/A							no data avaialble			10,000
M-231 north of Lincoln	N/A							11,000			22,000

Appendix C

Population and Economic Data

The following tables collected from the U.S. Census Bureau and the Ottawa County Department of Strategic Impact are included as a reference to the make up of Robinson Township's Population and Economic Characteristics. The narratives below were created using data from the tables.

- Table 1: Ottawa County, Michigan Decennial Population Data

From 1980 to 2010 Robinson Township was in the top half of municipalities in Ottawa County for population growth. This trend did not continue into 2020. From 2010 to 2020, Robinson Township was in the bottom third of Ottawa County municipalities for population growth.

- Table 2: Data Profile: Selected Social Characteristics

An overwhelming majority (90%) of Robinson Township residents live in the same place they did one year ago. Of the occupied housing units in Robinson Township, 70% are occupied by married couples. Lastly, of the 1,499 individuals enrolled in school, a majority (55%) are enrolled in grades one through eight.

- Table 3: Data Profile: Selected Economic Characteristics

Robinson Township has 4,666 residents that are 16 or older; of which 67% (3,166) are in the labor force. For residents in the labor force 95% are employed with a majority (88%) commuting to work alone. Most residents are employed in the manufacturing (25.4%), retail (7.7%), construction (7.5), and agricultural (7.2%) industries.

The median household income for Robinson Township is $81,287 with 67% of households earning between $50,000 and $149,000 annually.

- Table 4: Data Profile: Selected Housing Characteristics

Approximately 97% of the housing units in Robinson Township are occupied, with a majority being owner-occupied. Of the 2,019 housing units in the Township, 46% have been built since 1990, with 54% being built in or before 1989. Two-thirds of housing units are heated using natural gas.

The median house value is $235,300.

- Table 5: Data Profile: Demographic and Housing Estimates

Robinson Township has a total population of 6,466 individuals of which 53% are male and 47% are female. The median age is 37 with 96.7% of residents being white.

TABLE 1:

Ottawa County, Michigan Decennial Population Data

Data collected from Ottawa County Department of Strategic Impact

1980-1990			1990-2000			2000-2010			2010-2020		
Unit of Government	80-90 #	1990	Unit of Government	90-00 #	2000	Unit of Government	00-10 #	2010	Unit of Government	10-20 #	2020
Georgetown Township	6,568	32,672	Holland Township	11,388	28,911	Allendale Township	7,666	20,708	Georgetown Township	7,156	54,141
Holland Township	3,784	17,523	Georgetown Township	8,986	41,658	Holland Township	6,725	35,636	Allendale Township	5,614	26,322
Holland City (Ottawa pt)	3,319	25,086	Allendale Township	5,020	13,042	Georgetown Township	5,327	46,985	Grand Haven Township	2,859	18,037
Park Township	3,187	13,541	Park Township	4,038	17,579	Zeeland Township	2,358	9,971	Holland Township	2,730	38,366
Grand Haven Township	2,472	9,710	Grand Haven Township	3,568	13,278	Jamestown Township	1,972	7,034	Jamestown Township	2,615	9,649
Allendale Township	1,942	8,022	Zeeland Township	3,141	7,613	Grand Haven Township	1,900	15,178	Zeeland Township	2,062	12,033
Spring Lake Township	1,357	8,214	Holland City (Ottawa pt)	2,760	27,846	Spring Lake Township	1,351	11,977	Blendon Township	1,323	7,095
Hudsonville City	1,326	6,170	Spring Lake Township	2,412	10,626	Tallmadge Township	694	7,575	Tallmadge Township	1,240	8,815
Holland City (Allegan pt)	1,278	5,792	Olive Township	1,825	4,691	Robinson Township	496	6,084	Port Sheldon Township	969	5,209
Blendon Township	977	4,740	Robinson Township	1,663	5,588	Coopersville City	365	4,275	Park Township	871	18,673
Robinson Township	907	3,925	Port Sheldon Township	1,574	4,503	Park Township	223	17,802	Spring Lake Township	803	12,780
Zeeland Township	761	4,472	Holland City (Allegan pt)	1,410	7,202	Crockery Township	178	3,960	Holland City (Allegan pt)	712	7,728
Port Sheldon Township	723	2,929	Jamestown Township	1,003	5,062	Polkton Township	88	2,423	Crockery Township	621	4,581
Zeeland City	653	5,417	Hudsonville City	990	7,160	Blendon Township	51	5,772	Grand Haven City	605	11,017
Coopersville City	532	3,421	Blendon Township	981	5,721	Olive Township	44	4,735	Coopersville City	562	4,837
Jamestown Township	513	4,059	Tallmadge Township	581	6,881	Hudsonville City	(44)	7,116	Hudsonville City	523	7,639
Ferrysburg Village	479	2,919	Coopersville City	489	3,910	Wright Township	(139)	3,147	Holland City (Ottawa pt)	479	26,514
Olive Township	417	2,866	Zeeland City	388	5,805	Ferrysburg Village	(148)	2,892	Robinson Township	313	6,397
Tallmadge Township	373	6,300	Crockery Township	183	3,782	Holland City (Allegan pt)	(186)	7,016	Olive Township	278	5,013
Polkton Township	250	2,277	Chester Township	182	2,315	Spring Lake Village	(191)	2,323	Zeeland City	219	5,723
Grand Haven City	188	11,951	Ferrysburg Village	121	3,040	Port Sheldon Township	(263)	4,240	Spring Lake Village	217	2,540
Chester Township	99	2,133	Polkton Township	58	2,335	Chester Township	(298)	2,017	Polkton Township	148	2,571
Crockery Township	63	3,599	Wright Township	1	3,286	Zeeland City	(301)	5,504	Chester Township	85	2,102
Wright Township	(102)	3,285	Spring Lake Village	(23)	2,514	Grand Haven City	(756)	10,412	Ferrysburg Village	63	2,955
Spring Lake Village	(194)	2,537	Grand Haven City	(783)	11,168	Holland City (Ottawa pt)	(1,811)	26,035	Wright Township	44	3,191
Unit of Government	80-90 #	1990	Unit of Government	90-00 #	2000	Unit of Government	00-10 #	2010	Unit of Government	10-20 #	2020
Ottawa County	30,594	187,768	Ottawa County	50,546	238,314	Ottawa County	25,487	263,801	Ottawa County	32,399	296,200
Michigan	33,243	9,295,287	Michigan	643,157	9,938,444	Michigan	(54,804)	9,883,640	Michigan	193,691	10,077,331

TABLE 2:

2020 American Community Survey 5-year Estimates: U.S. Census Bureau

Data Profile: Selected Social Characteristics

	Estimate
HOUSEHOLDS BY TYPE	
Total households	1,971
Married-couple household	1,390
With children of the householder under 18 years	(X)
Cohabiting couple household	79
With children of the householder under 18 years	(X)
Male householder, no spouse/partner present	260
With children of the householder under 18 years	(X)
Householder living alone	162
65 years and over	61
Female householder, no spouse/partner present	242
With children of the householder under 18 years	(X)
Householder living alone	85
65 years and over	32
Households with one or more people under 18 years	746
Households with one or more people 65 years and over	550
Average household size	3
Average family size	4
RELATIONSHIP	
Population in households	6,372
Householder	1,971
Spouse	1,355
Unmarried partner	76
Child	2,126
Other relatives	641
Other nonrelatives	203

MARITAL STATUS	
Males 15 years and over	2,514
Never married	746
Now married, except separated	1,551
Separated	-
Widowed	58
Divorced	159
Females 15 years and over	2,218
Never married	409
Now married, except separated	1,457
Separated	45
Widowed	159
Divorced	148
FERTILITY	
Number of women 15 to 50 years old who had a birth in the past 12 months	70
Unmarried women (widowed, divorced, and never married)	11
Per 1,000 unmarried women	23
Per 1,000 women 15 to 50 years old	54
Per 1,000 women 15 to 19 years old	-
Per 1,000 women 20 to 34 years old	108
Per 1,000 women 35 to 50 years old	25
GRANDPARENTS	
Number of grandparents living with own grandchildren under 18 years	189
Grandparents responsible for grandchildren	81
Years responsible for grandchildren	
Less than 1 year	-
1 or 2 years	16
3 or 4 years	7
5 or more years	58
Number of grandparents responsible for own grandchildren under 18 years	81
Who are female	40
Who are married	74
SCHOOL ENROLLMENT	
Population 3 years and over enrolled in school	1,499
Nursery school, preschool	70
Kindergarten	136
Elementary school (grades 1-8)	825
High school (grades 9-12)	281
College or graduate school	187

EDUCATIONAL ATTAINMENT	
Population 25 years and over	4,144
Less than 9th grade	146
9th to 12th grade, no diploma	262
High school graduate (includes equivalency)	1,326
Some college, no degree	885
Associate's degree	491
Bachelor's degree	715
Graduate or professional degree	319
High school graduate or higher	3,736
Bachelor's degree or higher	1,034
VETERAN STATUS	
Civilian population 18 years and over	4,506
Civilian veterans	381
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION	
Total Civilian Noninstitutionalized Population	6,466
With a disability	751
Under 18 years	1,960
With a disability	112
18 to 64 years	3,674
With a disability	376
65 years and over	832
With a disability	263
RESIDENCE 1 YEAR AGO	
Population 1 year and over	6,396
Same house	5,805
Different house (in the U.S. or abroad)	591
Different house in the U.S.	575
Same county	542
Different county	33
Same state	20
Different state	13
Abroad	16
PLACE OF BIRTH	
Total population	6,466
Native	6,157
Born in United States	6,117
State of residence	5,201
Different state	916
Born in Puerto Rico, U.S. Island areas, or born abroad to American parent(s)	40
Foreign born	309

U.S. CITIZENSHIP STATUS	
Foreign-born population	309
Naturalized U.S. citizen	146
Not a U.S. citizen	163
YEAR OF ENTRY	
Population born outside the United States	349
Native	40
Entered 2010 or later	-
Entered before 2010	40
Foreign born	309
Entered 2010 or later	73
Entered before 2010	236
WORLD REGION OF BIRTH OF FOREIGN BORN	
Foreign-born population, excluding population born at sea	309
Europe	10
Asia	75
Africa	-
Oceania	-
Latin America	217
Northern America	7
LANGUAGE SPOKEN AT HOME	
Population 5 years and over	6,111
English only	5,632
Language other than English	479
Speak English less than "very well"	280
Spanish	396
Speak English less than "very well"	246
Other Indo-European languages	10
Speak English less than "very well"	-
Asian and Pacific Islander languages	5
Speak English less than "very well"	5
Other languages	68
Speak English less than "very well"	29

ANCESTRY	
Total population	6,466
American	312
Arab	50
Czech	11
Danish	6
Dutch	1,587
English	400
French (except Basque)	125
French Canadian	5
German	1,287
Greek	43
Hungarian	23
Irish	961
Italian	66
Lithuanian	-
Norwegian	60
Polish	487
Portuguese	-
Russian	-
Scotch-Irish	63
Scottish	48
Slovak	17
Subsaharan African	-
Swedish	90
Swiss	6
Ukrainian	37
Welsh	5
West Indian (excluding Hispanic origin groups)	-
COMPUTERS AND INTERNET USE	
Total households	1,971
With a computer	1,899
With a broadband Internet subscription	1,757

TABLE 3:

2020 American Community Survey 5-year Estimates: U.S. Census Bureau

Data Profile: Selected Economic Characteristics

	Estimate
EMPLOYMENT STATUS	
Population 16 years and over	4,666
In labor force	3,116
Civilian labor force	3,116
Employed	2,983
Unemployed	133
Armed Forces	-
Not in labor force	1,550
Civilian labor force	3,116
Unemployment Rate	(X)
Females 16 years and over	2,195
In labor force	1,271
Civilian labor force	1,271
Employed	1,215
Own children of the householder under 6 years	466
All parents in family in labor force	339
Own children of the householder 6 to 17 years	1,489
All parents in family in labor force	785
COMMUTING TO WORK	
Workers 16 years and over	2,930
Car, truck, or van -- drove alone	2,530
Car, truck, or van -- carpooled	271
Public transportation (excluding taxicab)	-
Walked	6
Other means	2
Worked from home	121
Mean travel time to work (minutes)	23
OCCUPATION	
Civilian employed population 16 years and over	2,983
Management, business, science, and arts occupations	1,035
Service occupations	405
Sales and office occupations	561
Natural resources, construction, and maintenance occupations	485
Production, transportation, and material moving occupations	497

INDUSTRY	
Civilian employed population 16 years and over	2,983
Agriculture, forestry, fishing and hunting, and mining	217
Construction	224
Manufacturing	758
Wholesale trade	74
Retail trade	230
Transportation and warehousing, and utilities	155
Information	48
Finance and insurance, and real estate and rental and leasing	91
Professional, scientific, and management, and administrative and waste management services	206
Educational services, and health care and social assistance	506
Arts, entertainment, and recreation, and accommodation and food services	211
Other services, except public administration	159
Public administration	104
CLASS OF WORKER	
Civilian employed population 16 years and over	2,983
Private wage and salary workers	2,570
Government workers	268
Self-employed in own not incorporated business workers	145
Unpaid family workers	-

INCOME AND BENEFITS (IN 2020 INFLATION-ADJUSTED DOLLARS)	
Total households	1,971
Less than $10,000	26
$10,000 to $14,999	18
$15,000 to $24,999	62
$25,000 to $34,999	87
$35,000 to $49,999	149
$50,000 to $74,999	494
$75,000 to $99,999	398
$100,000 to $149,999	429
$150,000 to $199,999	214
$200,000 or more	94
Median household income (dollars)	81,287
Mean household income (dollars)	95,831
With earnings	1,680
Mean earnings (dollars)	90,876
With Social Security	668
Mean Social Security income (dollars)	27,053
With retirement income	447
Mean retirement income (dollars)	22,220
With Supplemental Security Income	115
Mean Supplemental Security Income (dollars)	11,865
With cash public assistance income	71
Mean cash public assistance income (dollars)	3,410
With Food Stamp/SNAP benefits in the past 12 months	80
Families	1,637
Less than $10,000	8
$10,000 to $14,999	9
$15,000 to $24,999	24
$25,000 to $34,999	63
$35,000 to $49,999	110
$50,000 to $74,999	370
$75,000 to $99,999	405
$100,000 to $149,999	344
$150,000 to $199,999	214
$200,000 or more	90
Median family income (dollars)	85,766
Mean family income (dollars)	102,011
Per capita income (dollars)	29,397
Nonfamily households	334
Median nonfamily income (dollars)	51,058
Mean nonfamily income (dollars)	57,690
Median earnings for workers (dollars)	36,603
Median earnings for male full-time, year-round workers (dollars)	60,168
Median earnings for female full-time, year-round workers (dollars)	39,659

HEALTH INSURANCE COVERAGE	
Civilian noninstitutionalized population	6,466
With health insurance coverage	6,358
With private health insurance	5,238
With public coverage	2,142
No health insurance coverage	108
Civilian noninstitutionalized population under 19 years	2,015
No health insurance coverage	10
Civilian noninstitutionalized population 19 to 64 years	3,619
In labor force:	2,902
Employed:	2,781
With health insurance coverage	2,712
With private health insurance	2,592
With public coverage	182
No health insurance coverage	69
Unemployed:	121
With health insurance coverage	121
With private health insurance	113
With public coverage	8
No health insurance coverage	-
Not in labor force:	717
With health insurance coverage	693
With private health insurance	482
With public coverage	365
No health insurance coverage	24
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL *(X) = Data not Available*	
All families	(X)
With related children of the householder under 18 years	(X)
With related children of the householder under 5 years only	(X)
Married couple families	(X)
With related children of the householder under 18 years	(X)
With related children of the householder under 5 years only	(X)
Families with female householder, no spouse present	(X)
With related children of the householder under 18 years	(X)
With related children of the householder under 5 years only	(X)
All people	(X)
Under 18 years	(X)
Related children of the householder under 18 years	(X)
Related children of the householder under 5 years	(X)
Related children of the householder 5 to 17 years	(X)
18 years and over	(X)
18 to 64 years	(X)
65 years and over	(X)
People in families	(X)
Unrelated individuals 15 years and over	(X)

TABLE 4:

2020 American Community Survey 5-year Estimates: U.S. Census Bureau

Data Profile: Selected Housing Characteristics

	Estimate
HOUSING OCCUPANCY	
Total housing units	2,019
Occupied housing units	1,971
Vacant housing units	48
Homeowner vacancy rate	-
Rental vacancy rate	-
UNITS IN STRUCTURE	
Total housing units	2,019
1-unit, detached	1,917
1-unit, attached	24
2 units	26
3 or 4 units	5
5 to 9 units	-
10 to 19 units	4
20 or more units	-
Mobile home	43
Boat, RV, van, etc.	-
YEAR STRUCTURE BUILT	
Total housing units	2,019
Built 2014 or later	110
Built 2010 to 2013	53
Built 2000 to 2009	264
Built 1990 to 1999	503
Built 1980 to 1989	241
Built 1970 to 1979	445
Built 1960 to 1969	146
Built 1950 to 1959	129
Built 1940 to 1949	39
Built 1939 or earlier	89

ROOMS	
Total housing units	2,019
1 room	-
2 rooms	-
3 rooms	14
4 rooms	272
5 rooms	363
6 rooms	343
7 rooms	270
8 rooms	300
9 rooms or more	457
Median rooms	7
BEDROOMS	
Total housing units	2,019
No bedroom	-
1 bedroom	28
2 bedrooms	327
3 bedrooms	959
4 bedrooms	515
5 or more bedrooms	190
HOUSING TENURE	
Occupied housing units	1,971
Owner-occupied	1,854
Renter-occupied	117
Average household size of owner-occupied unit	3
Average household size of renter-occupied unit	4
YEAR HOUSEHOLDER MOVED INTO UNIT	
Occupied housing units	1,971
Moved in 2019 or later	61
Moved in 2015 to 2018	283
Moved in 2010 to 2014	410
Moved in 2000 to 2009	451
Moved in 1990 to 1999	386
Moved in 1989 and earlier	380
VEHICLES AVAILABLE	
Occupied housing units	1,971
No vehicles available	45
1 vehicle available	321
2 vehicles available	794
3 or more vehicles available	811

HOUSE HEATING FUEL	
Occupied housing units	1,971
Utility gas	1,314
Bottled, tank, or LP gas	355
Electricity	98
Fuel oil, kerosene, etc.	15
Coal or coke	-
Wood	124
Solar energy	-
Other fuel	32
No fuel used	33
SELECTED CHARACTERISTICS	
Occupied housing units	1,971
Lacking complete plumbing facilities	-
Lacking complete kitchen facilities	-
No telephone service available	15
OCCUPANTS PER ROOM	
Occupied housing units	1,971
1.00 or less	1,912
1.01 to 1.50	53
1.51 or more	6
VALUE	
Owner-occupied units	1,854
Less than $50,000	80
$50,000 to $99,999	38
$100,000 to $149,999	241
$150,000 to $199,999	352
$200,000 to $299,999	550
$300,000 to $499,999	516
$500,000 to $999,999	77
$1,000,000 or more	-
Median (dollars)	235,300
MORTGAGE STATUS	
Owner-occupied units	1,854
Housing units with a mortgage	1,279
Housing units without a mortgage	575

SELECTED MONTHLY OWNER COSTS (SMOC)	
Housing units with a mortgage	1,279
Less than $500	37
$500 to $999	208
$1,000 to $1,499	471
$1,500 to $1,999	345
$2,000 to $2,499	111
$2,500 to $2,999	44
$3,000 or more	63
Median (dollars)	1,428
Housing units without a mortgage	575
Less than $250	59
$250 to $399	130
$400 to $599	266
$600 to $799	89
$800 to $999	27
$1,000 or more	4
Median (dollars)	477
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAPI)	
Housing units with a mortgage (excluding units where SMOCAPI cannot be computed)	1,279
Less than 20.0 percent	726
20.0 to 24.9 percent	151
25.0 to 29.9 percent	198
30.0 to 34.9 percent	83
35.0 percent or more	121
Not computed	-
Housing unit without a mortgage (excluding units where SMOCAPI cannot be computed)	562
Less than 10.0 percent	335
10.0 to 14.9 percent	128
15.0 to 19.9 percent	25
20.0 to 24.9 percent	26
25.0 to 29.9 percent	34
30.0 to 34.9 percent	-
35.0 percent or more	14
Not computed	13

GROSS RENT	
Occupied units paying rent	63
Less than $500	4
$500 to $999	30
$1,000 to $1,499	29
$1,500 to $1,999	-
$2,000 to $2,499	-
$2,500 to $2,999	-
$3,000 or more	-
Median (dollars)	964
No rent paid	54
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAPI)	
Occupied units paying rent (excluding units where GRAPI cannot be computed)	63
Less than 15.0 percent	27
15.0 to 19.9 percent	7
20.0 to 24.9 percent	24
25.0 to 29.9 percent	-
30.0 to 34.9 percent	-
35.0 percent or more	5
Not computed	54

TABLE 5:

2020 American Community Survey 5-year Estimates: U.S. Census Bureau

Data Profile: Demographic and Housing Estimates

	Estimate
SEX AND AGE	
Total population	6,466
Male	3,442
Female	3,024
Sex ratio (males per 100 females)	114
Under 5 years	355
5 to 9 years	589
10 to 14 years	790
15 to 19 years	358
20 to 24 years	230
25 to 34 years	708
35 to 44 years	847
45 to 54 years	913
55 to 59 years	440
60 to 64 years	404
65 to 74 years	458
75 to 84 years	323
85 years and over	51
Median age (years)	37
Under 18 years	1,960
16 years and over	4,666
18 years and over	4,506
21 years and over	4,332
62 years and over	1,136
65 years and over	832
18 years and over	4,506
Male	2,344
Female	2,162
Sex ratio (males per 100 females)	108
65 years and over	832
Male	420
Female	412
Sex ratio (males per 100 females)	102

RACE	
Total population	6,466
One race	6,191
Two or more races	275
One race	6,191
White	5,982
Black or African American	21
American Indian and Alaska Native	28
Cherokee tribal grouping	-
Chippewa tribal grouping	-
Navajo tribal grouping	-
Sioux tribal grouping	-
Asian	16
Asian Indian	-
Chinese	16
Filipino	-
Japanese	-
Korean	-
Vietnamese	-
Other Asian	-
Native Hawaiian and Other Pacific Islander	-
Native Hawaiian	-
Chamorro	-
Samoan	-
Other Pacific Islander	-
Some other race	144
Two or more races	275
White and Black or African American	-
White and American Indian and Alaska Native	36
White and Asian	-
Black or African American and American Indian and Alaska Native	-
Race alone or in combination with one or more other races	
Total population	6,466
White	6,257
Black or African American	21
American Indian and Alaska Native	64
Asian	16
Native Hawaiian and Other Pacific Islander	-
Some other race	383

HISPANIC OR LATINO AND RACE	
Total population	6,466
Hispanic or Latino (of any race)	529
Mexican	399
Puerto Rican	35
Cuban	58
Other Hispanic or Latino	37
Not Hispanic or Latino	5,937
White alone	5,670
Black or African American alone	21
American Indian and Alaska Native alone	28
Asian alone	16
Native Hawaiian and Other Pacific Islander alone	-
Some other race alone	-
Two or more races	202
Two races including Some other race	166
Two races excluding Some other race, and Three or more races	36
Total housing units	2,019
CITIZEN, VOTING AGE POPULATION	
Citizen, 18 and over population	4,343
Male	2,221
Female	2,122

Sources:

Table 1: https://www.miottawa.org/Departments/Planning/county_statistics.htm

Table 2: https://data.census.gov/cedsci/table?g=0600000US2613969000&tid=ACSDP5Y2020.DP02

Table 3: https://data.census.gov/cedsci/table?g=0600000US2613969000&tid=ACSDP5Y2020.DP03

Table 4: https://data.census.gov/cedsci/table?g=0600000US2613969000&tid=ACSDP5Y2020.DP04

Table 5: https://data.census.gov/cedsci/table?g=0600000US2613969000&tid=ACSDP5Y2020.DP05

Appendix D

Robinson Township Master Plan Update Community Survey 2021 & Robinson Township Master Plan Public Workshops: Results Summary

A summary of the Master Plan Update Community Survey 2021 and the Public Workshops is provided within this Appendix D. The entirety of the results is available at the Township Hall.

Robinson Township – Master Plan Update 2021
Master Plan Update Community Survey and Workshops Summary

As part of the master plan update process, a township wide community survey was available to the public for approximately two months, which sought their perspectives on numerous community attributes related to land development. Nearly 450 surveys were completed. Three township wide workshops were also held to discuss Robinson's agricultural lands, residential neighborhoods, and commercial overlay district area. Below is a summary of the survey and workshop findings. For your convenience, the related survey question is noted within parenthesis to provide reference to the information source. (Q3 = Question 3) Themes gathered from the three different in-person workshops are outlined within the "Key Takeaways" portions of this summary, along with the similar themes gathered through the survey.

Demographic Characteristics & General Responses

Internal Attributes

- Approximately forty-eight percent (48.1%) of respondents identified themselves as "female," forty-eight percent (48.4%) identified themselves as "male," and three and a half percent (3.5%) preferred not to answer. (Q41)
- The most common age range of respondents was 35 to 44 years, which included twenty-five percent (25%) of respondents. Twenty-four percent (24%) of respondents ranged from 45 to 54 years. (Q42)
- Approximately ninety-five percent (95%) of respondents live in the township (Q43)
- Fifty percent (50%) of respondents live in Quadrant A (north side of Lake Michigan Drive, between 120th and 144th Avenues. (Q44)
- Sixty-one percent (61%) of respondents have lived in Robinson for 10 or more years (Q45)
- Ninety-seven percent (97%) of respondents live in a single-family home. (Q46)

Respondents were asked to rate four attributes of the current quality of Robinson Township. Their results are below:

Rate Robinson as a place to live (Q1)	Overall quality of life	Quality of Neighborhood	A place to raise children	A place to retire
Excellent	34%	36%	40%	34%
Good	55%	47%	48%	44%
Total	**89%**	**83%**	**88%**	**78%**

External Attributes

Although some of the attributes in the table below are not external, the entirety of the results to Question 2 have been included. It is important to note those attributes that are external given the inability of the township to control the influence from those attributes. Specifically, these include:

- Ease of Travel – the township contains direct or nearly direct access to the M-231 highway and Lake Michigan Drive. These road networks greatly influence the convenience of travel to and from the township.
- Good Educational Opportunities – Robinson Township Elementary is a part of the Grand Haven Area Public School District. Although Robinson Township does not have middle or high schools in the township, it is served by nearby public-school districts that are ranked very highly.
- Access to Health Care Facilities – There are no medical centers in Robinson Township, and this could likely be due to the lack of availability of commercial zoning and related land use provisions. However, many healthcare facilities can be reached by Lak Michigan Drive or the M-231 highway.

Rate each of the following characteristics (Q2)	Ease of travel	Availability of quality, affordable housing	Diverse housing options	Job opportunities	Access to health care facilities	Access to shopping amenities	Good educational opportunities	Recreational opportunities	Rural character
Excellent	33%	15%	14%	18%	17%	15%	25%	41%	44%
Good	54%	50%	48%	45%	50%	48%	54%	41%	42%
Total	**87%**	**65%**	**62%**	**63%**	**67%**	**63%**	**79%**	**82%**	**86%**

Rate of Growth (Q3)

- Growth is too fast: 38.01%%
- Growth is about right: 50.90%
- Growth is too slow: 11.09%

Key Takeaways

Support exists for slowing or at least maintaining current growth but nearly all of the respondents acknowledge that their quality of life, neighborhood, a place to raise children, and a place to retire in Robinson Township is excellent to good. External factors such as the demand for development along the M-231 highway will be challenging to slow down growth, or even maintain it as it is now. The new highway also has the potential to expand Robinson's population base by giving easy access to Robinson Township from different towns nearby. Rural character is a strongly favored characteristic of the Township and we believe that is something that will have to be given specific attention to in the Master Plan. Participants at the in-person workshops all feel that Robinson Township is an "oasis" and they would like to preserve that feel by protecting and maintaining the rural character and natural lands of the township.

Agricultural

- Sixty-three percent (63%) of respondents agree the agricultural lands are adequate as they currently are and do not need to change. (Q8)
- Sixty-three percent (63%) of respondents agree that it is extremely important to preserve agricultural lands in the township. (Q9)
- Thirty-five percent (35%) of respondents stated they agree, and twenty-nine percent (29%) of respondents stated they strongly agree that a landscape buffer should be planted when agricultural lands are located adjacent a waterway or roadway. (Q10)

- Thirty-six percent (36%) of respondents stated they agree, and thirty-four percent (34%) of respondents stated they strongly agree that multi-use pathways for bikes and pedestrians are appropriate land uses when adjacent to agriculture. (Q11)
- Thirty-seven percent (37%) of respondents stated they agree and thirty-two percent (32%) of respondents stated they strongly agree that the township should support and promote agricultural land conservation programs/initiatives. (Q12)
- Forty-two percent (42%) of respondents strongly agree that the township should aggressively attempt to preserve its agricultural heritage by restricting non-agricultural land uses (such as residential development) from agricultural areas. (Q13)
- Thirty-seven percent (37%) of respondents stated they agree, and twenty-five percent (25%) of residents stated they strongly agree that the township should promote agricultural growth. (Q14)

Themes Gathered from Stakeholder Interviews with Local Farmers

- Plan to grow their farm operations
- Agriculture will eventually be pushed out of Robinson Township
- Support residential development
- Residential and commercial development should be somewhat clustered
- Want option to sell for development

SWOT Workshop Results

- Strengths: Clustered development, require greater density to reduce loss of farmland, rural character
- Weaknesses: Market pricing, State regulations, local regulations, preservation programs that "handcuff" the farmer, encroachment of residential
- Opportunities: You-pick farms, development of property for retirement
- Threats: Outside investors, uneducated homeowners about farming

Key Takeaways

The agricultural lands of the township remain important to respondents and may need preservation through programs that maintain the agricultural land in perpetuity. However, the property stakeholders that were interviewed during the workshop creation were generally opposed to such programs. They argued that not all land within the township can be farmed and that PDRs are too restrictive. Respondents indicated that landscape buffers and multi-use pathways would be desirable aspects of any development that is to occur near agricultural uses, as this would help preserve rural character and promote recreation. Respondents in both the survey as well as at the in-person workshops clearly indicated the importance of protecting their agricultural lands and hope to see them grow despite the pressure of housing development and crop imports. Participants in the workshops recognized the benefits of clustering development to slow the loss of farmland.

Residential

- Eighty percent (80%) of respondents indicated that they do not want to see an increase in large-scale multi-family residential developments in the township. Seventy percent (70%) of respondents indicated that they do not want to see an increase in small-scale multi-family developments in the township. (Q15)
- Eighty-seven percent (87%) of respondents find clustered residential lots to be an appealing residential design. (Q16)
- Thirty-six percent (36%) of respondents stated that they agree, and thirty percent (30%) of respondents stated they strongly agree that the township should maintain the current density limits within residential developments. (Q19)
- Ninety-two (92%) of respondents find cul-de-sac streets with large lots to be an appealing residential design. (Q21) However, this result contradicts the results of Q16.
- Fifty-seven percent (57%) of respondents indicated that they would not be willing to incur an increase property tax through a millage to pay for public water systems for new residential development even if it meant better quality groundwater for existing residences. (Q22) Respondents expressed concerns that if sewer and water were to be brought in, along with it would come more and more new residents.
- Respondents have a significant number of concerns regarding the potential for new multi-family residential developments. Eighty percent (80%) are concerned about traffic congestion, fifty-four percent (54%) about tall buildings, forty-three percent (43%) about visibility of parking lots from the roadway, sixty percent (60%) about property conditions and maintenance, forty-nine percent (49%) about insufficient utilities, and seventy-three percent (73%) about the density being too high. (Q23)
- Forty-three percent (43%) of respondents strongly agree that multi-family residential developments should be required to have increased setbacks from property lines and landscape buffers around the development. (Q24)

SWOT Workshop Results

- Strengths: Rural (oasis), minimum lot sizes, people care about their neighborhoods, no municipal water, less modern amenities, open spaces
- Weaknesses: Regulations and varying interpretations; dust on gravel roads
- Opportunities: Regulations to clean-up the area, requiring/strengthening regulations to not become Allendale
- Threats: Paving roads, increased population, lack of enforcement, public water extension

Key Takeaways

Multi-family residential developments are not desired by the respondents with eighty percent (80%) opposing it. Many concerns were indicated by the respondents regarding the aforementioned. Respondents are in favor of large residential lots located along roads with cul-de-sacs, however, respondents also expressed an interest in clustered residential developments. Although these two designs conflict, we believe it shows that respondents appreciate large lots but are open to new residential concepts that create large open spaces with smaller lots. However, they do not want to see an increase in density. Participants at the in-person workshops also displayed concern that if water mains were be brought into the township, density would likely increase.

Commercial and Industrial

- Twenty-seven percent (27%) of respondents felt that there is not a strong desire for more businesses and services within Robinson Township. (Q25)
- Thirty-five percent (35%) of respondents agree, and thirty-five percent (35%) of respondents strongly agree that the Township should only permit additional commercial and industrial development when the developer provides any necessary extensions of public water. (Q27) The same results were shown regarding extending public sewer. (Q28)
- Q29 asks what type of commercial or industrial land use change respondents would want to see in Robinson Township over the next ten (10) years. The results are as follows: fifty-eight percent (58%) of respondents want there to be less heavy manufacturing development and forty-one percent (41%) of respondents want less light manufacturing and warehouse development. Twenty-nine percent of respondents do not want any changes to highway commercial development and thirty-five percent (35%) of respondents want to see some additional highway commercial development.
- Forty-six percent (46%) of respondents find traditional brick and vinyl building facades to be the most desirable. (Q30)
- Thirty percent (30%) of respondents disagree and twenty-three percent (23%) of respondents strongly disagree that mixed-use buildings should be permitted. (Q31)
- Twenty-eight percent (28%) of respondents favor traditional barn style commercial developments (similar to Merle Boes). Fifty-one percent (51%) think that old rustic buildings with clashing colors are not desirable. (Q32)
- Thirty-nine percent (39%) of respondents disagree and twenty-seven percent (27%) of respondents strongly disagree that more industries are desired in the township. (Q26)

SWOT Workshop Results

- Strengths: Limiting location of business
- Weaknesses: [None]
- Opportunities: Pathways, commercial outside of overlay
- Threats: Pathways reducing rural character, too much business regulation

Key Takeaways

Most respondents had neutral feelings regarding commercial development, however, both survey respondents and workshop participants stated that they want to see this development happen in an organized and mindful way so that it does not extend throughout the entire township. Industrial and commercial uses are not favored and only thirty-five percent (35%) of respondents want to see additional highway commercial development. Similar to the existing "Merle Boes" building, respondents want to maintain the township's rural character-building style while still allowing for light commercial uses, as they know that those uses will inevitably enter the township in the future.

1998 and 2021 Community Survey Comparisons

The following questions were repeated from the 1998 community survey to the 2021 community survey. This provides us with the opportunity to compare the results and analyze how responses have changed or stayed the same over time. Below is a snapshot of the results.

QUESTION	1998 RESULTS	2021 RESULTS
What quadrant do you live, work, or own a business in?	Q1 (Data not available)	50% = Quadrant A 40% = Quadrant B
How long have you lived in Robinson Township?	Q2 44% = 10+ Years	61% = 10+ Years
What type of residence do you live in?	Q4 (Data not available)	97% = Single family home
What type of land is your residence located on?	Q5 32% = Parcel < 2 acres	28% = > 2 acres but < 5 acres 27% = 2 acres or less
How would you characterize development in the entire Township?	Q15 • Some areas have changed a lot • Some areas are still the same	• Want to preserve natural features of the Township
How would you change the rate of development in the Township?	Q16 59% = Generally slow it down	51% = About right 38% = Too fast
How do you feel about high-density residential areas in the Township?	Q17 90% = Undesirable	87% = Undesirable
How do you feel about low-density residential areas in the Township?	Q17 87% = Desirable	90% = Desirable
How do you feel about the rural character in the Township?	Q17 81% = Desirable	80% = Desirable
How do you feel about the available vacant land in the Township?	Q17 37% = Desirable	35% = Undecided
How do you feel about the quality of the well water in the Township?	Q17 75% = Desirable	58% = Desirable

How do you feel about the river and bayou resources in the Township?	Q17 83% = Desirable	93% = Desirable
How do you feel about animal and plant life in the Township?	Q17 90% = Desirable	95% = Desirable
How do you feel about accessibility to developed areas in the Township?	Q17 60% = Desirable	59% = Desirable
How do you feel about lack of population and traffic in the Township?	Q17 81% = Desirable	83% = Desirable
What type of agricultural land use change would you like to see in the Township in the next 10 years?	Q19 – AG • No change = 46% • Some more = 27%	• Agricultural lands are adequate as they currently exist in Robinson Township = 63%
What type of residential land use change would you like to see in the Township in the next 10 years?	Q19 – RES • Single-family, large lot o Some more = 38% o No change = 28% • Single-family, small lot o Less = 51% o No change = 32% • Multiple-family o Less = 72% • Mobile home parks o Less = 82% • Duplex o Less = 59%	• Single-family, large lot o Some more = 38% o No change = 31% • Single-family, small lot o Less = 45% o No change = 27% • Multiple-family o Less = 80% • Mobile home parks o Less = 84% • Duplex o Less = 70%
What type of commercial land use change would you like to see in the Township in the next 10 years?	Q19 – COM • Neighborhood commercial: o No change = 43% o 32% = Less • Professional services: o No change = 37% o Some more = 33% • Doctor, Dentist, Legal: o No change = 36%	• Neighborhood commercial: o No change = 28% o 34% = Some more • Professional services (doctor, beauty, legal): o No change = 36% o Some more = 31% • M-45 Highway: o No change = 29%

	○ Some more = 30% ○ Less = 28% • M-45 Highway: ○ No change = 33% ○ Some more = 32% ○ Less = 28%	○ Some more = 35% • Light Manufacturing/Warehouse: ○ Less = 41% ○ No change = 34% • Heavy Manufacturing: ○ Less = 58%
What type of recreational land use change would you like to see in the Township in the next 10 years?	Q19 – REC • Some more = 46%	• Additional desired = 50% • Currently adequate = 44%
What type of undeveloped land use change would you like to see in the Township in the next 10 years?	Q19 – OPEN LAND • No change = 34% • Some more = 32%	• Open lands are adequate as they currently exist in Robinson Township = 82%
Should the Township aggressively preserve its agricultural base/heritage by restricting non-agricultural uses in agricultural areas?	Q20 82% = Yes	42% = Strongly agree 29% = Agree (71%)
Would you be willing to pay increased taxes for the following services?	Q22 • Agricultural preservation: 33% = Yes • Bike paths: 44% = Yes • Fire/police protection: 38% = Yes • Buy land for park: 35% = Yes • Public water system: 27% = Yes • Public sewer system: 19% = Yes	• Acquiring agricultural lands for preservation: 42% = Yes • Multi-use pathways: 61% = Yes • Acquiring lands for recreational use: 63% = Yes • Extension of public water to facilitate commercial development: 70% = No • Extension of public water to facilitate industrial development: 81% = No • Public sewer system for new residential development: 64% = No • Public water system for new residential development: 60% = No

Appendix E

Water Supply System Master Plan for Robinson Township

Available within the December 2014 Water Supply System Master Plan is the following:

- Introduction
- Existing Water System
- Water Use Projections
- Proposed Water Supply System
- Procedures for System Extensions
- Figures
    - Figure 1 – Robinson Township Water Plan – Existing Systems
    - Figure 2 – Robinson Township Proposed Land Use Plan
    - Figure 3 – Wells in Robinson Township per Wellogic
    - Figure 4 – Robinson Township Water Master Plan
    - Figure 5 – Robinson Township Water Master Plan – Northeast
    - Figure 6 – Robinson Township Water Master Plan – Southeast
    - Figure 7 – Robinson Township Water Master Plan – Northwest

ROBINSON TOWNSHIP

OTTAWA COUNTY, MICHIGAN

WATER SUPPLY SYSTEM

MASTER PLAN

December 2014

Prepared by:
Ottawa County Road Commission
Public Utilities Department

Table of Contents

I. INTRODUCTION

The purpose of this report is to update the Water Supply Master Plan which was prepared for Robinson Township by Prein & Newhof in October 1985, April 1996, and June 2004.

Robinson Township is located near the northwest corner of Ottawa County. It is bordered by the Grand River on the north, Allendale Township on the east, Olive Township on the south and Grand Haven Township on the west.

State Highway M-45 traverses the Township from east to west. A new State Highway, M-231, will traverse the Township from north to south, intersecting M-45 about 2 miles north of the south Township line.

The topography of the Township is relatively flat and lies between U.S.G.S. elevations 600 and 630.

The population of Robinson Township is continuing to grow at the rate of approximately 1,000 people every ten years. Historical population data (U.S. Census) and population projections (West Michigan Regional Planning Commission and Ottawa County Planning and Performance Improvement Department) are shown in Table 1.

Table 1

Population Trends

Source	U.S. Census			West Mich Reg. Planning Comm.			O.C. Planning & Perf. Impr. Dept.		
Year	Population	Increase	% Change	Population	Increase	% Change	Population	Increase	% Change
1970	2,051								
1980	3,018	967	47.1%						
1990	3,925	907	30.1%						
2000	5,588	1,663	42.4%						
2010	6,084	496	8.9%						
2020				7,443	1,359	22.3%	6,841	757	12.4%
2030				8,802	1,359	18.3%	7,598	1,514	22.1%

There are four existing public water supply systems in, or adjacent to Robinson Township, as described in Figure 1.

- The City of Grand Rapids provides water to two businesses from the M-45 transmission main. Robinson Township has installed a metering station to the east of these customers so a water system can be installed when needed. This is the blue area on Figure 1.
- The City of Grand Rapids supplies water to Olive and Robinson Townships. Robinson Township has service off the Olive-Robinson Water System. This is the yellow area on Figure 1.
- The City of Grand Rapids supplies water to Allendale Township. Robinson Township has service off the Allendale Township Water System. This is the purple area on Figure 1.
- The Northwest Ottawa Water System supplies water to Grand Haven Township. Robinson Township has service off the Grand Haven Township Water System. This is the green area on Figure 1.

II. EXISTING WATER SYSTEMS

A. Private Wells

There are substantial clay deposits in Robinson Township which are not suitable for development of water supply. The thickness of this clay deposit is 100 feet to 200 feet. The top of the clay is approximately ten to thirty feet below the ground surface. Therefore, the private wells that have been developed in the Township usually are described as shallow wells which are constructed in the sand deposits above the clay to a depth of ten to twenty feet, or as deep wells which are constructed in sand deposits or possibly sandstone, below the clay at a depth of greater than 100 feet.

The MDEQ maintains a database of wells on their Wellogic website. The records for Robinson Township were downloaded and reviewed. Table 2 includes the list of wells included in the database and the depth of these wells. A location map of these wells is included in Figure 2.

Table 2

Depth of Wells	Number of wells
less than 25'	54
between 25' and 50'	501
between 50' and 200'	210
no depth	8
	773

B. Grand Rapids Water System

The City of Grand Rapids takes its water supply from Lake Michigan with two intakes located on the shore of Lake Michigan at the west end of M-45. The water treatment plant is located near the shore of Lake Michigan, in Grand Haven Township at the intersection of M-45 and Lake Shore Drive. Treated water is pumped through two transmission mains, across Ottawa County, to the City of Grand Rapids.

The Ottawa County Road Commission negotiated agreements with the City of Grand Rapids for the County and each of the Townships through which the transmission mains are constructed. These agreements permit use of the water by Ottawa County and its various municipalities with certain limitations described in the contracts.

Water can be withdrawn from the transmission mains at designated connection points. The 46" transmission main located along M-45 has several tees in the transmission main which were installed for the purpose of connecting various appurtenances which are required for normal function of the transmission main. Some of these tees can be used for connection points for service to the municipal customers. The contract provides for use of "A" chambers. There are two of these located in Robinson Township. The contract also permits the use of "G" chambers provided prior approval by the City of Grand Rapids is obtained. There are two of these chambers in Robinson Township.

The Grand Rapids/Ottawa County contract also permits use of tees installed on the 60" transmission main located along Fillmore Street. Several of these are located within Robinson

Township. Three of these connection points have been utilized for minor connection points. The Port Sheldon Township Water System has a connection at 144th Avenue and Fillmore Street. The Olive-Robinson Water System has a connection point at 120th Avenue and Fillmore Street. The Allendale-Robinson Township Water System has a connection point at 96th Avenue and Fillmore Street. Robinson Township has a contract that allows its residents to connect to the Allendale-Robinson Water System. Robinson Township has granted the County a franchise to operate the Olive-Robinson Water System, which is also available for residents. Water service from the Port Sheldon Township Water System is possible, but would require a contract.

1. Robinson Township Water System

The Grand Rapids/Ottawa County contract allows for up to two individual connections to the transmission main. The Yellow Jacket Restaurant and Northland Evergreen are both connected to an air release chamber located at the intersection of M-45 and 120th Avenue. No more connections can be made at this connection point.

Due to restrictions on the use of fire hydrants on the transmission main, the Township decided to install a metering station and fire hydrant meeting the requirements of a minor connection point in the contract. The Township obtained permission to connect to the "G" chamber to the east of 120th Avenue along M-45. If additional water service is needed in the vicinity, water mains can be extended from this connection point.

2. Allendale / Robinson Water System

Allendale Township extended a water main along 96th Avenue to serve a school. Since this is a boundary street, Robinson Township participated in the project. Currently, only a few Robinson Township residents along 96th Avenue are served by this system.

3. Olive / Robinson Water System

Ottawa County constructed a water system at 120th Avenue and Fillmore Street to serve the Fillmore Complex. A developer extended this water main to the east to serve a subdivision.

Robinson Township has access to this water system. Currently, only a few Robinson Township residents along Fillmore Street are served by this system.

C. Northwest Ottawa Water System

The Northwest Ottawa Water System serves the City of Grand Haven, the City of Ferrysburg, Spring Lake Village, Spring Lake Township, Crockery Township, Grand Haven Township and Robinson Township.

The water supply consists of two Lake Michigan intakes, a pumping station in the Grand Haven State Park, and two raw water mains to the treatment plant. A direct filtration water plant in the City of Grand Haven provides water treatment and high service pumping. Transmission mains deliver the water from the water plant to various municipal customers.

Water supply for Robinson Township is delivered from the water plant through the Duncan Woods and the Mercury Drive transmission mains to two metering stations located in Grand Haven Township. Grand Haven Township has two storage tanks located within their distribution system. Currently, Grand Haven Township operates the water distribution system that has been extended into Robinson Township from the Northwest Ottawa Water System.

1. Grand Haven Township / Robinson Water System

As the Grand Haven Township Water System expanded to Robinson Township's border along 144th Avenue, an opportunity arose for water service. Robinson Township participated in the cost of the boundary street water mains and has two water main extensions that serve subdivisions. This system currently serves 110 Robinson Township residents and is the Township's largest water system.

III. WATER USE PROJECTIONS

There are two issues that will drive the need for future public water service in Robinson Township in the next 20 years; the construction of M-231 and the quality of the groundwater supply.

M-231 is being constructed to the west of 120th Avenue, from M-45 to the north. While no development has been proposed, there has been considerable interest at the intersection of M-45 and M-231. It is likely that further development pressures will occur at the M-231 and Lincoln Street interchange.

Groundwater quality is another issue that will drive the need for public water service. Currently, there are two areas experiencing poor groundwater quality due to high chloride concentrations; the Stearns Bayou area and the Bass Creek area. Ottawa County is conducting a Phase 2 Water Resources Study because they believe there may be a problem with sustainability of the groundwater supply after reviewing the results of the Phase 1 study. The Phase 2 study will take about three years to be completed.

The proposed Robinson Township Land Use Map, which is included in Figure 3, will also impact where future public water supply will be needed. The south half of the Township is zoned as agriculture. Therefore, most of the public water demand will occur in the north half of the Township, in the vicinity of M-231, and at the boundary streets of Fillmore Street and 96th Avenue.

The Robinson Township Water System (blue area on Figure 1) flow projections are listed in Table 2. There is potential for some growth around M-231, which is reflected in the flow projections. All of these customers are in Robinson Township. This growth will require new water mains.

Table 2

Robinson - GR Water System				
	(gallons)	(gpd)	(Robinson Twp customers)	(gpd/cust)
2007	788,285	2,160	2	1,080
2008	478,413	1,311	2	655
2009	507,997	1,392	2	696
2010	523,850	1,435	2	718
2011	698,732	1,914	2	957
2012	771,114	2,113	2	1,056
2013	686,842	1,882	2	941
2020	6,000,000	16,438	15	1,096
2030	10,000,000	27,397	25	1,096

The Allendale / Robinson Water System (purple area on Figure 1) flow projections are listed in Table 3. The majority of the usage is from Allendale Township customers. The number of Robinson customers is listed in Table 3, along with the flow projections for these customers at an average rate of 250 gpd/customer. There are some residents abutting the existing water main that are not connected. Therefore, some of the growth projected does not require water main extensions.

Table 3

Allendale / Robinson Twp Water System - GR (96th Avenue)				
	(gallons)	(gpd)	(Robinson Twp customers)	(Robinson gallons)
2007	5,410,000	14,822		
2008	6,646,000	18,208		
2009	5,112,000	14,005		
2010	4,714,000	12,915		
2011	4,445,000	12,178		
2012	11,837,000	32,430		
2013	4,668,000	12,789	9	
2020	6,570,000	18,000	15	1,368,750
2030	7,300,000	20,000	40	3,650,000

The Olive / Robinson Water System (yellow area on Figure 1) flow projections are listed in Table 4. The majority of the usage is from Olive Township customers. The number of Robinson customers is listed in Table 4, along with the flow projections for these customers at an average

rate of 250 gpd/customer. There are some residents abutting the existing water main that are not connected. Therefore, the growth projected does not require water main extensions.

Table 4

Olive / Robinson Water System - GR (120th Avenue)				
	(gallons)	(gpd)	(Robinson Twp customers)	(Robinson gallons)
2007	27,603,000	75,625	3	
2008	21,960,000	60,164	3	
2009	23,321,000	63,893	4	
2010	22,586,000	61,879	4	
2011	21,051,000	57,674	4	
2012	24,133,000	66,118	4	
2013	20,918,000	57,310	4	
2020	24,000,000	65,753	6	547,500
2030	30,000,000	82,192	10	912,500

The Grand Haven Township / Robinson Water System (green area on Figure 1) flow projections are listed in Table 5. All of these customers are from Robinson Township. The growth in this system will require water main extensions.

Table 5

G H Twp / Robinson Water System - NOWS (144th Avenue)				
	(gallons)	(gpd)	(Robinson Twp customers)	(gpd/cust)
2007	10,496,700	28,758	83	346
2008	9,782,600	26,802	88	305
2009	9,369,100	25,669	88	292
2010	9,911,400	27,155	88	309
2011	9,164,900	25,109	91	276
2012	13,577,700	37,199	100	372
2013	14,046,300	38,483	110	350
2020	15,230,000	41,726	130	321
2030	20,500,000	56,164	175	321

IV. PROPOSED WATER SUPPLY SYSTEM

The 1996 Master Plan envisioned a boundary between the Northwest Ottawa Water System and Grand Rapids Water System between 144th Avenue and Buchanan Street to 104th Avenue and Johnson Street. With the addition of M-231, utility extensions under the highway will be expensive, due to the need to bore and jack the crossings. Therefore, Buchanan and M-231 is proposed as the boundary line of the area to be served by the Northwest Ottawa System. Please refer to Figure 4 for the Master Plan map. The remainder of the Township can be served by the Grand Rapids Water System. Economics will determine if these boundaries remain in the future.

A. Private Wells

Due to the low density of housing in Robinson Township, public water supply may not be economical. The only viable option for water supply in many areas of the Township will continue to be using the groundwater supply through private water wells.

The 2010 Census data was used to investigate the number of households using private wells. The population measurements and projections were used as the basis with an average household size of 3. Using this methodology, Table 6 below shows the population served by public water and by private wells.

Table 6

	Population						
Year	Rob-GR	Rob-ACT	Rob-OI Twp	Rob-GH Twp	Public Subtotal	Wells	Total Twp
2010	6	27	12	264	309	5,775	6,084
2020	45	45	18	390	498	6,343	6,841
2030	75	120	30	525	750	6,848	7,598
	Population Increase						
2020	39	18	6	126	189	568	757
2030	30	75	12	135	252	505	757

Table 7 reduces the population to the number of households or customers.

Table 7

	Households / Customers						
Year	Rob-GR	Rob-ACT	Rob-OI Twp	Rob-GH Twp	Public Subtotal	Wells	Total Twp
2010	2	9	4	88	103	1,925	2,028
2020	15	15	6	130	166	2,114	2,280
2030	25	40	10	175	250	2,283	2,533
	Customers Increase						
2020	13	6	2	42	63	189	252
2030	10	25	4	45	84	168	252

This methodology was checked against the GIS parcel data. In 2014, the Township had 2,179 improved residential, commercial, and industrial parcels. This fits in between the 2010 and 2020 total Township households/customers estimate listed above in Table 7.

B. Grand Rapids Water System

The Grand Rapids/Ottawa County contract requires an above ground meter station and water storage tank after the average daily flow of the water system reaches 100,000 gallons per day. The Master Plan includes a potential location for the storage tank. The actual location will depend on many factors. Generally speaking, the storage tank should be located as far from the source of water as economical and should have a 16-inch main between both points. Figures 5 and 6 show a more detailed map of the Master Plan for the area supplied from Grand Rapids.

1. Robinson Township Water System

Water service to the area north of M-45 and east of M-231 should originate from the existing metering station on M-45, just east of 120th Avenue. The water mains should be a minimum of 16-inches along M-45, from M-231 to 104th Avenue in order to support the industrial zoning in this area. The water main along 120th Avenue should also be a minimum of 16-inches from Fillmore Street until Lincoln or Johnson Street, depending on the location of the future water

storage tank. Water mains in the remaining major roads should be a minimum of 12-inches in diameter. Subdivision streets can generally be served by 8-inch water mains.

Three emergency interconnections are possible at the following locations: M-231 and Lincoln, 120th Avenue and Fillmore Street, and M-45 and 104th Avenue. The actual locations of these interconnections will depend on how each of the systems develop over time.

2. Allendale / Robinson Water System

The Michigan Department of Environmental Quality would like a second supply or a storage tank for this system. The Master Plan envisions a 12-inch water main extension on 96th Avenue and M-45, with a future interconnection with the Robinson Township Water System at M-45 and 104th Avenue. There are also options to connect to the Allendale Township Water System. A storage tank for this small system would be cost prohibitive.

Water service to the area west of 96th Avenue can be served with 8-inch and 12-inch water mains, depending on fire flow requirements.

3. Olive / Robinson Water System

Since most of the property abutting the Olive / Robinson Water System is zoned agriculture, the only service planned in the area is for boundary street service. Since Fillmore Street has several metering stations, the water main along Fillmore Street should be 16-inch in diameter to allow for emergency interconnections between systems.

C. Northwest Ottawa Water System

The contract with Grand Haven Township also has a requirement for a water storage tank after the average daily flow of the water system exceeds 100,000 gallons per day. The Master Plan includes potential location for the storage tank. The actual location will depend on many factors. Generally speaking, the storage tank should be located as far from the source of water as

economical and should have a 16-inch main between both points. Figure 7 contains a more detailed map of the Master Plan for the area supplied from NOWS.

1. Grand Haven Township / Robinson Water System

A meter station location has been planned at Osner Drive and Green Street. Another meter station may be needed at 144th Avenue and Lincoln Street, depending on how the system develops. A 16-inch water main should be extended to the storage tank location, which is planned along Lincoln Street. This minimizes the length of 16-inch water main needed and also aligns the larger main with the larger mains in the Robinson Township Water System, which will be beneficial as an emergency interconnection. The remainder of the water mains can be 12-inches and 8-inches in diameter, depending on the fire flow requirements.

V. PROCEDURES FOR SYSTEM EXTENSIONS

Water main extensions can be constructed in several different ways. The following is a general outline of the options available to the Township.

Special Assessment Districts

The Special Assessment District (SAD) process requires residents to circulate a petition to the Township requesting water service. If over 50% of the residents (calculated on land area within the district) are in favor of the project, the Township can proceed. It requires a public hearing on the necessity of the project and another hearing on the assessment role. If the Township chose to proceed after the hearings, all properties in the district will be assessed for the project, regardless of if the resident actually connects to the water system. This procedure provides the Township with a very good method of collecting all of the necessary revenue needed to construct a water system. However, the process takes time and there are additional legal expenses for the SAD hearings.

Township Extensions

The Township could decide to bypass the SAD process and simply construct the facility. The Township would establish an in-lieu-of assessment and residents would only have to pay the assessment if they connect. This method avoids the time and expense of the SAD hearings. However, it would leave the Township holding the debt on the water main for those that decide not to connect.

Third Party Extensions

A Third Party could decide to construct a water main if it is needed to serve a development and they receive all of the necessary approvals from the Township. If the water main is extended past existing residents outside of the development, the Township would typically negotiate a payback agreement with the Third Party so those residents could connect to the water main. The Third Party is left holding the debt for those that decide not to connect.

In each of these cases, a good Master Plan is helpful so a preliminary cost estimate can be prepared and discussions can start on the needed water main extension.

Cost Estimates

The approximate unit costs for various water system components as of 2014 are as follows.

- 8-inch water main = $40 - $50 / ft.
- 12-inch water main = $50 - $60 / ft.
- 16-inch water main = $60 - $70 / ft.
- Minor meter station = $100,000 (vault with fire flow meter, PRV, property)
- Major meter station = $400,000 (building, meter, PRV, property, etc.)
- Elevated storage tank = $1.00 - $1.50 /gallon. 250,000 gal = $250,000 - $375,000
- Contingencies are typically 10% of construction subtotal
- Engineering/Administration/Financing/Legal is typically about 25% of construction subtotal.

Robinson Township Water Master Plan - Existing Systems

Figure 1

Legend

- Exisiting Emergency Interconnection
- Robinson - Allendale - GR - Current
- Allendale Meter Station
- Allendale 8-inch WM
- Allendale-Robinson 12-inch WM
- Robinson - Olive - GR - Current
- Olive-Robinson Meter Station
- Olive-Robinson 8-inch
- Olive-Robinson 12-inch
- Olive-Robinson 16-inch
- Robinson - GR - Current
- Robinson Meter Station
- Robinson - GH Twp - NOWS - Current
- Robinson 8-inch WM
- Robinson 12-inch WM
- Robinson 16-inch WM
- GH Twp 8-inch WM
- GH Twp 12-inch WM
- GH Twp 16-inch WM
- PS Twp Meter Station
- PSTwpWaterSystem
- GR Transmission Mains
- M-231

1 inch = 3,500 feet

Gary
Comstock
Airpark
Sharon
Mercury
160th
Indian Trails
154th
144th
Indigo
Limberlost
118th
Cedar
Industrial Park
Robrick
Lake
Groesbeck
Payne Forest
156th
155th
Bignell
Sleeper
Grand Oak
Pine Ridge
Riverhaven
Oakwood
Osner
Ott
138th
136th
132nd
Green
124th
Setter
Cheyenne
3 D
Sleeper
108th
Leonard
96th
88th
Hayes
Oriole
Windmill Creek
90th
84th
Bass River Rec
Sadies
Johnson
Jennifer
Albright
Lauren
Nicole
Foust
Brennan
Pine
Johnson
Riverside
Ravine View
White Pine
Killdeer
141st
Pinewood
Unicorn
Jacqueline
Shady Tree
Ferris
130th
Green Briar
Deerfield
Joshua
Eisen
Osborn
Lake Forest
Trail Creek
Stonegate
Lincoln
Hunters
144th
Lindbrook
Liberty
Woodhaven
Timberline
Woodbriar
North Star
Lighthouse
116th
Tiburon
Stump
Lincoln
Bass River
West Pine
East Pine
Deadwood
124th
136th
Crimson
Warner
Cedar
90th
Shady Creek
Buchanan
Meadows Pointe
Sedona
Morel
Kalkman
M-231
125th
Pingree
Clark
Mill
Oakridge
112th
Sarabeck
108th
104th
102nd
Davis
Zoe
Rich
Foxhollow
Old Oak
Whitewood
Lake Michigan
120th
143rd
Split Oak
Settlers
Winans
Derick
Deer
92nd
Acorn
Dakota
Peaceful Pines
Lauren
Pierce
Harley
96th
Jane
Luce
Dakota
Amber Rose
Ridgeland
Fillmore
Pine Bow
Allen
Scotch
Amber
148th
128th
152nd
146th
136th
US-31
Cole
160th
Wake
Shoreline
Tantrum

DEQ Water Well Viewer

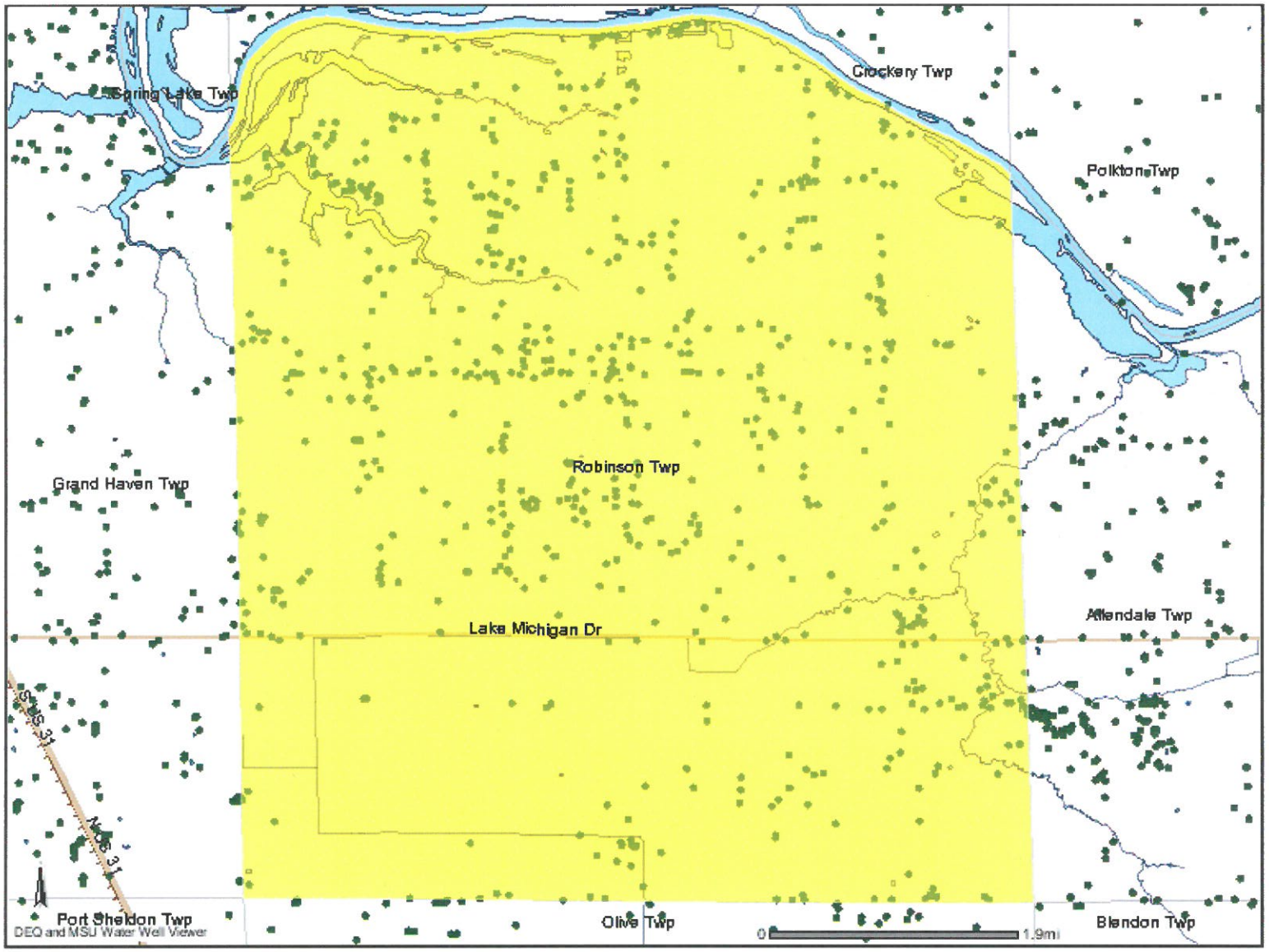
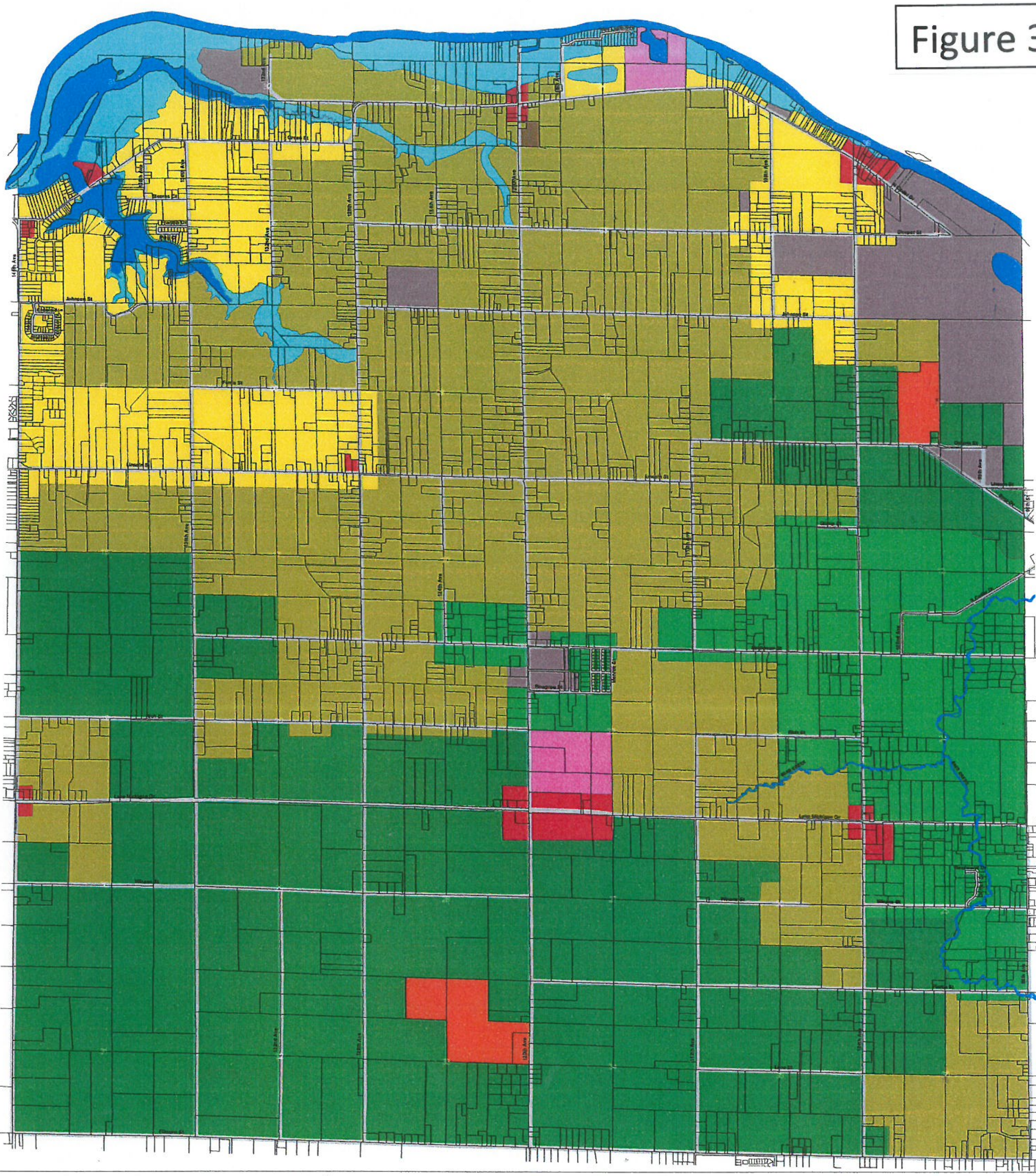


Figure 2

Figure 3



Robinson Township

Proposed Land Use Plan
T07-08N R16W
Date: 01-23-2008

GIS Department
12220 Fillmore Street, Suite 172
West Olive, Michigan 49460

Phone (616)-738-4600
Fax (616)-738-4604
www.gis.co.ottawa.mi.us

1 inch equals 1,000 feet
0 500 1,000 2,000 3,000 4,000 Feet

Legend

Land Use

Classification

- Agricultural
- Commercial
- Industrial
- Public, Quasi-Public
- Recreational
- Residential - Multi-Family
- Residential - Single Family
- Rural Preserve
- Rural Residential
- Flood Plain
- Water

Date	Number	Section	Change
	A1	Title Block	Added revision area
	A2	Legend	Added Recreational Classification
	A3	34N	Planned Development revised to Industrial Residential and Rural Preserve
	A4	35N	Planned Development area revised to Residential and Rural Preserve
	A5	1	Planned Development revised to Residential and Public
	A6	2	Planned Development revised to Rural Preserve and Residential
	A7	3	Planned Development revised to Rural Preserve
	A8	8	Residential revised to Commercial at SE corner of section
	A9	9	Public revised to Rural Preserve
	A10	12	Planned Development revised to Public, Rural Preserve and Recreational. Agriculture changed to Public and Recreational
	A11	14 AND 15	Change Public to Rural Preserve
	A12	22	Rural Residential revised to Public at NW corner of section. South [illegible] of Industrial revised to Commercial
	A13	27	Commercial at NW corner of section extended East to ¼ section line
	A14	33	Agricultural revised to Recreational
	A15	2	Add new cemetery property as Public
	A16	34N	Change PP to MF-Res

Robinson Township Water Master Plan

Figure 4

Legend

- Exisiting Emergency Interconnection
- Robinson - Allendale - GR - Current
- Robinson-Allendale-GR - Future
- Allendale Meter Station
- Allendale 8-inch WM
- Allendale-Robinson 12-inch WM
- Robinson - Olive - GR - Current
- Robinson-Olive-GR - Future
- Olive-Robinson Meter Station
- Olive-Robinson 8-inch
- Olive-Robinson 12-inch
- Olive-Robinson 16-inch
- Robinson - GR - Current
- Robinson-GR - Future
- Robinson Meter Station
- Future Water Tank
- Robinson Future 8-inch WM
- Robinson Future 12-inch WM
- Robinson Future 16-inch WM
- Robinson - GH Twp - NOWS - Current
- Robinson-GHTwp-NOWS - Future
- Future Meter Station
- Robinson 8-inch WM
- Robinson 12-inch WM
- Robinson 16-inch WM
- GH Twp 8-inch WM
- GH Twp 12-inch WM
- GH Twp 16-inch WM
- PS Twp Meter Station
- PSTwpWaterSystem
- GR Transmission Mains
- M-231
- Future Emergency Interconnection

1 inch = 3,500 feet

Robinson Township Water Master Plan - Northeast

Figure 5

Legend

- Exisiting Emergency Interconnection
- Robinson - Allendale - GR - Current
- Robinson-Allendale-GR - Future
- Allendale Meter Station
- Allendale 8-inch WM
- Allendale-Robinson 12-inch WM
- Robinson - Olive - GR - Current
- Robinson-Olive-GR - Future
- Olive-Robinson Meter Station
- Olive-Robinson 8-inch
- Olive-Robinson 12-inch
- Olive-Robinson 16-inch
- Robinson - GR - Current
- Robinson-GR - Future
- Robinson Meter Station
- Future Water Tank
- Robinson Future 8-inch WM
- Robinson Future 12-inch WM
- Robinson Future 16-inch WM
- Robinson - GH Twp - NOWS - Current
- Robinson-GHTwp-NOWS - Future
- Future Meter Station
- Robinson 8-inch WM
- Robinson 12-inch WM
- Robinson 16-inch WM
- GH Twp 8-inch WM
- GH Twp 12-inch WM
- GH Twp 16-inch WM
- PS Twp Meter Station
- PSTwpWaterSystem
- GR Transmission Mains
- M-231
- Future Emergency Interconnection

N W E S

1 inch = 2,000 feet

Van Lopik
Limberlost
118th
Cedar
124th
M-231
Setter
Cheyenne
Red Oak
Schmidt
Oakcrest
Autumn
3 D
Sleeper
Twin Oaks
Farm
Brenden
108th
Sundstrom
Sharp
104th
Sadies
Bass River Rec
Jennifer
120th
Johnson
Albright
Wildflower
113th
Lauren
Nicole
Frost
130th
Green Briar
Magdic
Woodhaven
Woodbriar
Liberty
Sierra
Timberline
124th
Deerfield
Joshua
117th
116th
North Star
Lincoln
Lighthouse
Katherine
Mission
Rosebud
Eisen
Osborn
Tenbrink
Wydeck
Tiburon
Stump
112th
128th
Hemlock
Crimson
Deadwood
Minglewood
Smith
Sedona
Morel
Kalkman
Basketball
Frenchmans
Oakridge
Sarabeck
Buchanan
Whippoorwill
Mill
Reed
102nd
Zoe
DeVis
Visser
92nd
Warner
90th
Lincoln
River
Bass
Cedar
Lake Forest
Windmill Creek
Alex
Oriole
Leonard
96th
100th
104th

Robinson Township Water Master Plan - Southeast

Figure 6

Legend

- Exisiting Emergency Interconnection
- Robinson - Allendale - GR - Current
- Robinson-Allendale-GR - Future
- Allendale Meter Station
- Allendale 8-inch WM
- Allendale-Robinson 12-inch WM
- Robinson - Olive - GR - Current
- Robinson-Olive-GR - Future
- Olive-Robinson Meter Station
- Olive-Robinson 8-inch
- Olive-Robinson 12-inch
- Olive-Robinson 16-inch
- Robinson - GR - Current
- Robinson-GR - Future
- Robinson Meter Station
- Future Water Tank
- Robinson Future 8-inch WM
- Robinson Future 12-inch WM
- Robinson Future 16-inch WM
- Robinson - GH Twp - NOWS - Current
- Robinson-GHTwp-NOWS - Future
- Future Meter Station
- Robinson 8-inch WM
- Robinson 12-inch WM
- Robinson 16-inch WM
- GH Twp 8-inch WM
- GH Twp 12-inch WM
- GH Twp 16-inch WM
- PS Twp Meter Station
- PSTwpWaterSystem
- GR Transmission Mains
- M-231
- Future Emergency Interconnection

N W E S

1 inch = 2,000 feet

Robinson Township Water Master Plan - Northwest

Figure 7

Legend

- Exisiting Emergency Interconnection
- Robinson - Allendale - GR - Current
- Robinson-Allendale-GR - Future
- Allendale Meter Station
- Allendale 8-inch WM
- Allendale-Robinson 12-inch WM
- Robinson - Olive - GR - Current
- Robinson-Olive-GR - Future
- Olive-Robinson Meter Station
- Olive-Robinson 8-inch
- Olive-Robinson 12-inch
- Olive-Robinson 16-inch
- Robinson - GR - Current
- Robinson-GR - Future
- Robinson Meter Station
- Future Water Tank
- Robinson Future 8-inch WM
- Robinson Future 12-inch WM
- Robinson Future 16-inch WM
- Robinson - GH Twp - NOWS - Current
- Robinson-GHTwp-NOWS - Future
- Future Meter Station
- Robinson 8-inch WM
- Robinson 12-inch WM
- Robinson 16-inch WM
- GH Twp 8-inch WM
- GH Twp 12-inch WM
- GH Twp 16-inch WM
- PS Twp Meter Station
- PSTwpWaterSystem
- GR Transmission Mains
- M-231
- Future Emergency Interconnection

N W E S

1 inch = 2,000 feet

Camp
Van Lopik
Limberlost
Indigo
132nd
144th
118th
Cedar
124th
M-231
Green
Setter
Cheyenne
3 D
Sleeper
Sundstrom
Twin Oaks
Farm
Red Oak
Autumn
Schmidt
Oakcrest
Brennan
Pine
Panacea
Stearns
138th
136th
132nd
Olt
Osner
Mackinaw
Bignell
Pine Ridge
148th
Riverside
Ravine View
Riverhaven
Clearwater
Winding Creek
Oakwood
Oaktree
Pinewood
Oakfield
Killdeer
Johnson
141st
Shady Tree
Unicorn
Briar Hollow
Jacqueline
Ferris
130th
Foust
Green Briar
Magdic
Woodhaven
Woodbriar
Sierra
Timberline
Liberty
Bink Woods
Stonegate
Old Bear
Lindbrook
Hunters
144th
136th
Katherine
Deadwood
128th
Minglewood
Smith
Sedona
Morel
Carson
Kalkman
Basketball
Frenchmans
Whippoorwill
Mill
Reed
Oakridge
Buchanan
Sarabeck
Deerfield
Joshua
North Star
Lighthouse
117th
116th
Mission
Rosebud
Osborn
Tiburon
112th
Hemlock
Crimson
Jennifer
120th
Lauren
Nicole
Albright
Wildflower
Johnson
113th
152nd
Glendora
Gaddini
Estes Park
156th
Buchanan

Appendix F

Wastewater Master Plan

Available within the March 2014 Wastewater Master Plan is the following:

- Introduction
- Master Plan
- Service to M-231 & M-45 Interchange
- Service to M-321 & Lincoln Street
- Tables
    - Table 1 – Capacity Analysis
    - Table 2 – Projected Flow Rates
    - Table 3 – Cost Estimate Connect to Ottawa County System at Fillmore Street and 120th Avenue
    - Table 4 – Cost Estimate Service from West Central Ottawa Treatment Plant
    - Table 5 – Cost Estimate Forcemain from M-45 and M-231 to Grand Haven Charter Township Pump Station
    - Table 6 – Cost Estimate Service from Allendale Township
    - Table 7 – Cost Estimate On-Site Septic Tank and Drainfield System
    - Table 8 – Cost Estimate Wastewater Collection and Treatment System/On-site Lagoon System
- Figures
    - Figure 1 – Zoning Map
    - Figure 2 – Wastewater Master Plan
    - Figure 3 – Ottawa County Complex, Flow Schematic

Wastewater Master Plan

Robinson Township

Wastewater Plan for the Township and
Service to the Intersection of M-231 and M-45

March, 2014

2130643

Table of Contents

Tables

Figures

I. INTRODUCTION

The purpose of this report is to prepare a master wastewater plan for Robinson Township and to evaluate the feasibility of providing public wastewater collection and treatment at the intersection of M-231 and M-45 in Robinson Township.

This report presents the results of a review of capacities of the existing wastewater collection systems and the wastewater treatment plants in the vicinity of Robinson Township. This report also contains an evaluation of the feasibility of on-site wastewater treatment systems as development begins to take place. With this information, a master plan for a public wastewater collection system and treatment facilities has been developed for Robinson Township.

II. MASTER PLAN

A. Soils

Soils in the Township have been classified by the US Department of Agriculture Soil Conservation Service. The western two-thirds of the southern one-third of the township and the western one-half of the central region of the township are classified as nearly level and gently sloping, very poorly drained to somewhat poorly drained, sandy soils of the lake plains.

The remainder of the Township is classified as level and gently sloping, very poorly drained, sandy soils of the lake plains and out-wash plains.

The high water table impacts a corridor along Lake Michigan Drive and an area bordering the Grand River at the northern Township limit. The fact that the soils are poorly drained indicates that site specific data must be collected before designing an on-site system. High ground water should be expected.

B. Zoning

A zoning map of Robinson Township can be found in Figure 1. Zoning near the intersection of M-231 and M-45 identifies an area that is in transition. There is industrial and commercial zoning at this intersection already.

C. Existing Wastewater Collection & Treatment Systems

1. Allendale Township

Allendale Township is located immediately east of Robinson Township. Its wastewater collection system extends west of the developed area on M-45. A capacity analysis is necessary before additional area is served by the system. The wastewater treatment plant is located northeast of the community close to the Grand River. The capacity of the plant is 1.6 mgd and the present average day flow is 1.3 mgd. See Table 1. Buy-in cost for the wastewater collection and treatment system must be determined.

2. Grand Haven – Spring Lake

The Grand Haven – Spring Lake system has a wastewater treatment plant located on Beechtree Street in the City of Grand Haven. It has a capacity of 6.67 mgd and a present average day flow of 3.33 mgd, see Table 1. A potential connection point for the wastewater collection system is located in Grand Haven Charter Township at US-31 and M-45. Capacity analysis and buy-in costs must be determined.

3. West Central Ottawa County

Ottawa County owns and operates a wastewater treatment plant located in Section 7 of Olive Township at the intersection of 142nd Avenue and Croswell Street. The plant has a capacity of 0.3 mgd and a present average day flow of 0.128 mgd over the last 11-years. See Table 1. The headworks of the plant requires an equalization basin to

stabilize flows. The current collection system consists of force mains manifolded together creating significant flow variations at the plant. This makes treatment operations difficult to maintain.

The trunkage charge for connecting to the treatment plant is $1,850 per residential equivalent.

An 8-inch forcemain extends west from the Ottawa County Complex to Stanton Street and then south to the treatment plant. At the County Complex a submersible pump station with a capacity of 240 gpm at 57 feet of total dynamic head is located. This pump station is equipped with a grinder to reduce the size of solid material in the wastewater. At this time, the wastewater system serves the County Complex and the Pine Meadows development as well as the West Olive Estates Mobile Home Park at 142nd Avenue and Stanton Street.

The existing wastewater collection system along the US-31 corridor consists of a dry pit pump station known as Pump Station No. 3 at 136th Avenue and Port Sheldon Street. It pumps wastewater through an 8-inch diameter and 12-inch diameter force main in Port Sheldon and along US-31 to the West Central Ottawa Wastewater Treatment Plant. Another dry pit pump pump station known as Pump Station No. 2 at 2nd Street south of Croswell Street pumps wastewater through an 8-inch diameter force main to the 12-inch force main from Pump Station No. 3. The design capacities of these stations are 350 gpm and 310 gpm respectively.

D. Service Areas/Watersheds for Robinson Township

Figure 2 identifies the watersheds in Robinson Township. It is likely that, in general, most wastewater collection system extensions will follow the watersheds. In the northwest

corner of the Township a future wastewater collection system will most likely tie into a proposed system on Green Street in Grand Haven Charter Township.

In the eastern area of the Township, a future wastewater collection system will follow the Bass River in the Grand River Drainage Basin. A pump station or wastewater treatment plant will be necessary where the Bass River joins the Grand River.

The area around and south of M-45 could utilize the existing West Central Ottawa County wastewater treatment plant in Olive Township at the intersection of Croswell Street and 142nd Avenue. The existing pump station at the Ottawa County Complex could be utilized however; there is insufficient capacity in the pump station at this time.

III. SERVICE TO M-231 & M-45 INTERCHANGE

A. Projected Flow Rates

A big box store has been proposed for the intersection of the proposed M-231 and M-45. The initial projected flow rate is 9,500 gallons per day (gpd). Figure 2 shows potential location and routes for forcemains serving the proposed development. Table 2 projects flows at this location for the next 20 years.

B. West Central Ottawa County Wastewater Treatment Plant

This plant and the associated 8-inch forcemain and pump station in the Ottawa County Complex are closest to the interchange at M-45 and M-231. Table 3 identifies Option 1 and the cost estimate for extending the system. Figure 2 identifies the location of Option 1. Negotiations with Ottawa County will be necessary to determine the cost to utilize the connection to the wastewater plant and the pump station and force main systems.

When flows increase, an equalization basin may be required in order to connect to this system. The equalization basin may be located at the Ottawa County Complex with their permission. The capacity of the basin is assumed to be approximately 100,000 gallons. Figure 3 is a schematic diagram of this facility. Location, size, capacity and equipment details will be determined by a preliminary design prior to construction.

The existing pump station on the Ottawa County Complex has a capacity of 240 gpm. Connection to this pump station may require increasing the capacity of the existing pumps or alternatively increasing the size of the pump chambers as demand for wastewater service increases. At the present time the wet well is a 6.0 foot concrete manhole with a working storage volume of 5feet.

Another alternative could be constructing a force main directly from the intersection of M-231 and M-45 to the West Central Ottawa wastewater treatment plant. This option, requires no capacity purchase for the wastewater collection system but developers will be required to pay the trunkage charges of $1,850 per residential equivalent. See Table 4 for an estimated cost of Option 2 and see Figure 2 for the location of this option.

C. Grand Haven – Spring Lake

The potential connection to the Grand Haven – Spring Lake system is located at M-45 and US-31, approximately five miles west of the M-231 and M-45 intersection. This is Option 3 on Figure 2. Connection to this system will require negotiations with the Grand Haven – Spring Lake Sewer Authority for wastewater treatment and Grand Haven Charter Township for the purchase of capacity in its wastewater collection system. Table 5 is a cost estimate for Option 3.

The capacity of the wastewater plant is 6.67 mgd and present average day flow is 3.33 mgd. See Table 1.

D. Allendale Township

Allendale Township is located east of Robinson Township. The M-231 and M-45 intersection is located six miles west of the existing wastewater collection system on M-45. Service could be provided from this location. Table 6 is a cost estimate for Option 4. A capacity analysis of the Allendale Township wastewater collection system and negotiation for capacity purchase will be required prior to connecting to this system. The capacity of the Allendale wastewater treatment plant is 1.6 mgd and the average day flow is 1.3 mgd. See Table 1.

E. On-Site Disposal of Wastewater

There are several on-site methods which could be utilized for the treatment of wastewater at the intersection of M-231 and M-45. The two most common are a septic tank and drainfield system or a lagoon system with seasonal discharges to Bass Creek or, alternatively, an on-site irrigation system. These two methods of wastewater treatment will each require a discharge permit from Ottawa County Environmental Health Department (less than 10,000 gpd flow) or from the Michigan Department of Environmental Quality (MDEQ).

The estimated cost for a septic tank and drainfield system serving a 10,000 gpd development is $400,000 (see Table 7). This alternate will require a site with the water table at least four feet below the drainfield.

The other option for on-site treatment is a lagoon system with seasonal discharge to the Bass River. Initially, the lagoon could be very small with a capacity of 25,000 gpd and the

seasonal discharges to the Bass River would also be quite small. However, discharge to this surface water would require a NPDES permit from the MDEQ. As the area grows, the lagoon system can be expanded to accommodate the larger wastewater flow rates.

The lagoon will require a composite (double) liner because the nature of the existing sandy, on-site soils is not suitable as a liner for a lagoon system. The estimated cost for a lagoon system with capacity to treat 25,000 gpd and with a seasonal discharge is $1,900,000 (see Table 8). Alternatively, the lagoon effluent might be used to irrigate cropland. This discharge will require suitable soils and crops. Also, this discharge will require a permit from MDEQ. Cost estimates do not include the cost of a wastewater collection system if the lagoons are located at a remote location from the development sites.

F. Mechanical Treatment Plant

When wastewater flow exceeds 10,000 gpd and a septic system with a drainfield discharge is no longer adequate, a mechanical plant could be considered for treatment of a continuous discharge to Bass Creek or one of its tributaries.

The National Pollutant Discharge Elimination System (NPDES) discharge permit issued by the MDEQ will determine the quality of treatment that will be required. There are various types of mechanical treatment plants employing one of several different processes that are available for consideration. Some of those are:

- Sequencing Batch Reactor (SBR)
- Moving Bed Bioreactor (MBBR)
- Membrane Bioreactor (MBR)

At the time a mechanical treatment plant is being considered, a preliminiary engineering design should be prepared that would consider the various treatment processes that are available and the quality of the effluent that will be required by the NPDES permit.

Construction cost for a mechanical plant with capacity of 75,000 gpd to 200,000 gpd is estimated to range from $2 million dollars to $4 million dollars depending on the capacity and the type of treatment that is provided.

Operating costs for the mechanical plant will include a part-time operator, power, chemicals and miscellaneous expenses. This cost should be estimated when the capacity and type of treatment are known.

G. Recommendations

The least expensive cost option for a low wastewater volume is constructing a septic tank and drainfield. See Table 9. There are limitations on this type of wastewater treatment. The soils in the area are not well suited to this type of treatment. They are generally described as poorly drained with a high groundwater table. A typical drainfield in soils of this nature will have a shorter life expectancy than in sandy well drained soils. There is a concern over contamination of the ground water from the drainfield effluent which would have a negative impact on the entire area.

If a drainfield is considered, it will probably be a temporary solution. In that case, a regional public system operated by the Ottawa County Road Commission is the best alternative. As additional businesses locate in the area, the system could be modified to accept the additional growth.

The most cost effective long-term public method of disposing of the wastewater generated at M-231 and M-45 is through the Ottawa County Complex and the West Central Ottawa County Wastewater Treatment Plant. This alternative will require negotiating an agreement with Ottawa County for the use of the existing infrastructure to determine the total township cost. The existing 8-inch forcemain has a capacity of 240 gpm (0.34 million gallons per day (mgd)). It can be increased to over 400 gpm (0.57 mgd) by changing the pumps and motors at the pump station. An equalization basin could also be installed to reduce peak flows and the corresponding pumping energy. In addition, depending on the amount and type of development, the wastewater plant may need to be expanded.

IV. SERVICE TO M-231 & LINCOLN STREET

A. Projected Flow

Eventually, there could be demand for municipal water and sewer at the proposed interchange of M-231 and Lincoln Street. Projected flow rates are similar to the intersection of M-231 and M-45. Initially the flow is expected to be approximately 10,000 gpd. After 10-years of growth, the flow rates may increase to 25,000 gpd and after 20-years to 100,000 gpd.

The likely source of wastewater treatment is the West Central Ottawa wastewater Treatment Plant. The closest wastewater collection location will be M-231 and M-45 which is two miles south of this location assuming that area develops first.

The Grand Haven – Spring Lake systems could also provide this intersection with wastewater service. The existing collection system in Grand Haven Charter Township is located west of 144th Avenue, one quarter mile north of Lincoln Street in the center of Section 12, three miles west of the intersection.

B. Recommendation

It is recommended that Robinson Township consider the West Central Ottawa County Wastewater Treatment Plant and the Ottawa County Complex for wastewater service to M-231 and Lincoln Street because it is one mile closer than the Grand Haven system. At the time development occurs at this location, more consideration should be given to the cost of capacity in the West Central Ottawa system and the Grand Haven-Spring Lake system.

Tables

Table 1
Capacity Analysis for Robinson Township

Wastewater Plant	Average Day Flow (mgd)	Current Capacity (mgd)
Allendale Township	1.3	1.6
Grand Haven-Spring Lake	3.33	6.67
West Central Ottawa County	0.128	0.3

Table 2
Projected Flow Rates from Robinson Township at M-231 and M-45

	Average Day (mgd)	Maximum Day (mgd)
5-Year	0.0095	0.038
10-Year	0.025	0.10
20-Year	0.10	0.40

Prein&Newhof
Engineers▪Surveyors▪Environmental▪Laboratory

Estimate of Probable Cost - Table 3

Owner:
Robinson Township Option 1

Project Title:
Connect to the Ottawa County System at Fillmore Street and 120th Avenue

Project #:
2130643

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	8" Forcemain Directionally Drilled	11500	LF	$41.00	$471,500.00
2	Air Release Structures	2	Ea	$5,000.00	$10,000.00
3	Submersible Pump Station	1	Ea	$200,000.00	$200,000.00
4	100,000 Gallon Equalization Basin - Double Pumping	1	Ea	$200,000.00	$200,000.00
	Allowance for Construction Contingencies, Legal, Administration, Engineering	1	Ea	$253,500.00	$253,500.00
			Total Project Cost:		**$1,135,000.00**

Additional Consideration

Purchase capacity from the County for use of the existing pump station and force main upgrade the headworks and purchase capacity for treatment from the West Central Ottawa County Wastewater Treatment Plant.

Collection system will be required in the development area.

Prein&Newhof
Engineers▪Surveyors▪Environmental▪Laboratory

Estimate of Probable Cost - Table 4

Owner:
Robinson Township Option 2

Project Title:
Service from the West Central Ottawa Treatment Plant

Project #:
2130643

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	8" Forcemain Directionally Drilled	33000	LF	$41.00	$1,353,000.00
2	Air Release Structures	7	Ea	$5,000.00	$35,000.00
3	Submersible Pump Station	1	Ea	$200,000.00	$200,000.00
4	Allowance for Construction Contingencies, Legal, Administration, Engineering	1	Ea	$487,000.00	$487,000.00

Total Project Cost: **$2,075,000.00**

Additional Consideration

Purchase Capacity in the West Central Wastewater Treatment Plant

Headworks will require upgrade with a significant increase in wastewater flow rates.

Collection system will be required in the development area.

Prein&Newhof
Engineers▪Surveyors▪Environmental▪Laboratory

Estimate of Probable Cost - Table 5

Owner:
Robinson Township Option 3

Project Title:
Force Main from M-45 and M-231 west along M-45 to US-31 to the Grand Haven Charter Township Pump Station

Project #:
2130643

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	8" Forcemain Directionally Drilled	26500	LF	$41.00	$1,086,500.00
2	Air Release Structures	5	Ea	$5,000.00	$25,000.00
3	Submersible Pump Station	1	Ea	$200,000.00	$200,000.00
	Allowance for Construction Contingencies, Legal, Administration, Engineering	1	Ea		$388,500.00
		Total Project Cost:			**$1,700,000.00**

Additional Considerations

Purchase Capacity in Grand Haven Charter Township Wastewater Collection System and the Grand Haven/ Spring Lake Wastewater Treatment System

Collection system will be required in the development area.

Prein&Newhof
Engineers▪Surveyors▪Environmental▪Laboratory

Estimate of Probable Cost - Table 6

Owner:
Robinson Township Option 4

Project Title:
Service from Allendale Township

Project #:
2130643

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	8" Forcemain Directionally Drilled	35000	LF	$41.00	$1,435,000.00
2	Air Release Structures	7	Ea	$5,000.00	$35,000.00
3	Submersible Pump Station	1	Ea	$200,000.00	$200,000.00
4	Wastewater Collection System Capacity Study	1	Ea	$6,000.00	$6,000.00
5	Allowance for Construction Contingencies, Legal, Administration, Engineering				$499,000.00
		Total Project Cost:			**$2,175,000.00**

Additional Consideration

Negotiate capacity in Allendale Township's Wastewater Collection and Treatment System

May require collection system buy-in and costs for upgrading the systems.

Collection system will be required in the development area.

Estimate of Probable Cost - Table 7

Owner:
Robinson Township Option 5

Project Title:
On-site Septic Tank and Drainfield System

Project #:
2130643

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	Surge Tank	1	Each	$20,000.00	$20,000.00
2	Septic Tanks	10	Each	$10,000.00	$100,000.00
3	Dosing Tank w/ Pump & Control Valves	1	Each	$25,000.00	$25,000.00
4	Drainfield	20,000	SqFt	$6.00	$120,000.00
5	Site Improvements, Fence, Drive	1	Each	$25,000.00	$25,000.00
6	Electric Service	1	Each	$10,000.00	$10,000.00
			Total Construction Cost:		**$300,000.00**
	Allowance for Construction Contingency, Engineering, Legal & Administration				$100,000.00
			Total Project Cost		**$400,000.00**

Additional Consideration

Collection system will be required in the development area and to the treatment site.

Estimate of Probable Cost - Table 8

Owner:
Robinson Township Option 6

Project Title:
Onsite Lagoon System

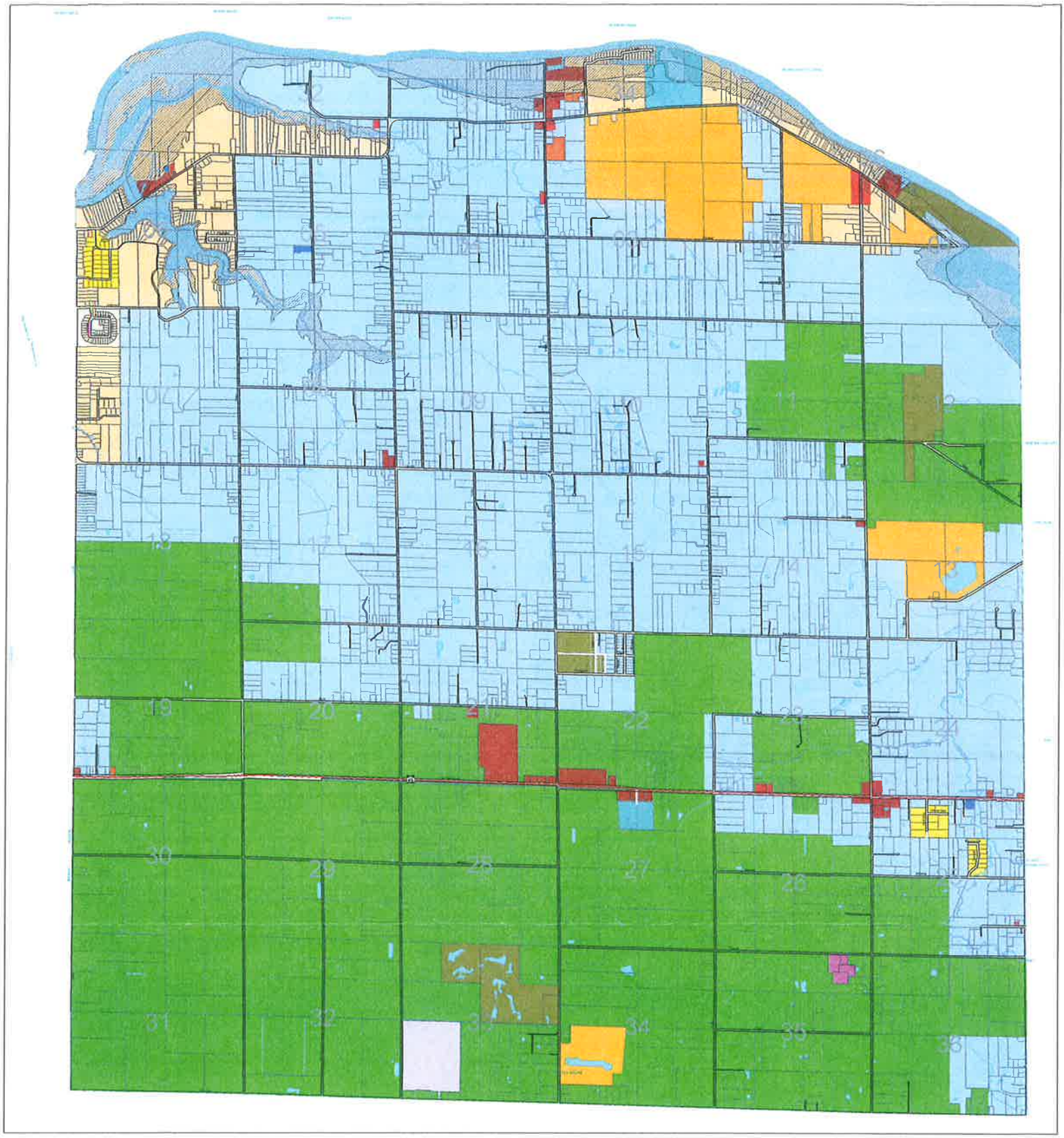
Project #:
2130643

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
	20 Acre Lagoon Treatment System				
1	Land	40	Ac	$10,000.00	$400,000.00
2	Topsoil Stripping	3,000	Cyd	$2.00	$6,000.00
3	Pond Dikes	30,000	Cyd	$4.50	$135,000.00
4	Composite Liner	90,000	SqFt	$1.20	$108,000.00
5	Sand Cushion	3,500	Cyd	$9.00	$31,500.00
6	Inlet Structure	1	Each	$30,000.00	$30,000.00
7	Outlet Structure	1	Each	$25,000.00	$25,000.00
8	Transfer Structure	2	Each	$15,000.00	$30,000.00
9	Rip Rap	6,600	Syd	$40.00	$264,000.00
10	Topsoil, Seed	12,500	Syd	$3.00	$37,500.00
11	Gravel Access Roadway	1,700	Syd	$5.00	$8,500.00
11	Fence	1,200	LF	$7.00	$8,400.00
12	Force Main to Plant (8")	5,000	LF	$41.00	$205,000.00
13	Coagulant Storage & Feeding Facility	1	Lsum	$200,000.00	$200,000.00
15	Underdrain	12,000	LF	$3.00	$36,000.00
			Total Construction Cost:		**$1,524,900.00**
	Allowance for Construction Contingency, Engineering, Legal & Administration				$375,100.00
			Total Project Cost		**$1,900,000.00**

Additional Consideration

Collection system will be required in the development area and to the treatment site.

Figures



Robinson Township Zoning Map

1 inch = 1,000 feet

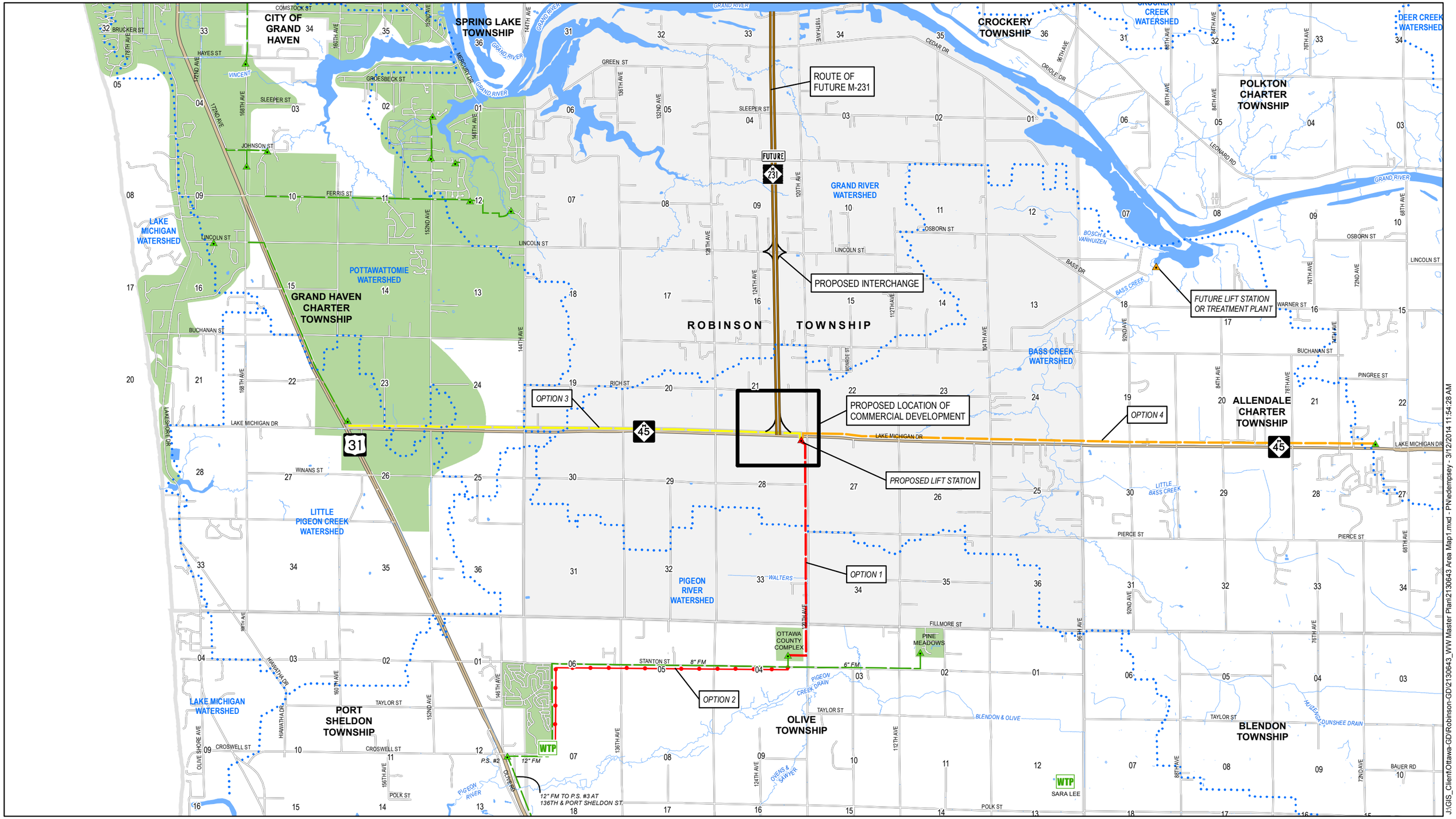
1,000 500 0 1,000 2,000 3,000 4,000 Feet

Legend

Zoning

Zoning Class and Code

- Agricultural (A-1)
- Agricultural Service (A-2)
- Neighborhood Commercial (B-1)
- General Business (B-2)
- Industrial (I-1)
- Industrial (I-2)
- Mining (M-1)
- Clustered Residential (PUD C)
- Non-Clustered Residential (PUD NC)
- Recreational Park (PUD RP)
- One-Family Residential (R-1)
- Multiple-Family Residential (R-2)
- Rural Residential (RR)
- Mobile Home Park (PUD MHP)
- Lowland Resource Conservation (E-1)
- Contract Zoned



SCALE: 1 " = 5,000 '

LEGEND

- Ex. Pump Station
- Ex. WWTP
- Proposed Pump Station
- Existing Sanitary Sewer Service Areas
- Existing Forcemain
- Watersheds

Treatment Options

- Option 1 - West Central Ottawa / County Complex
- Option 2 - West Central Ottawa / Direct
- Option 3 - Grand Haven - Spring Lake
- Option 4 - Allendale

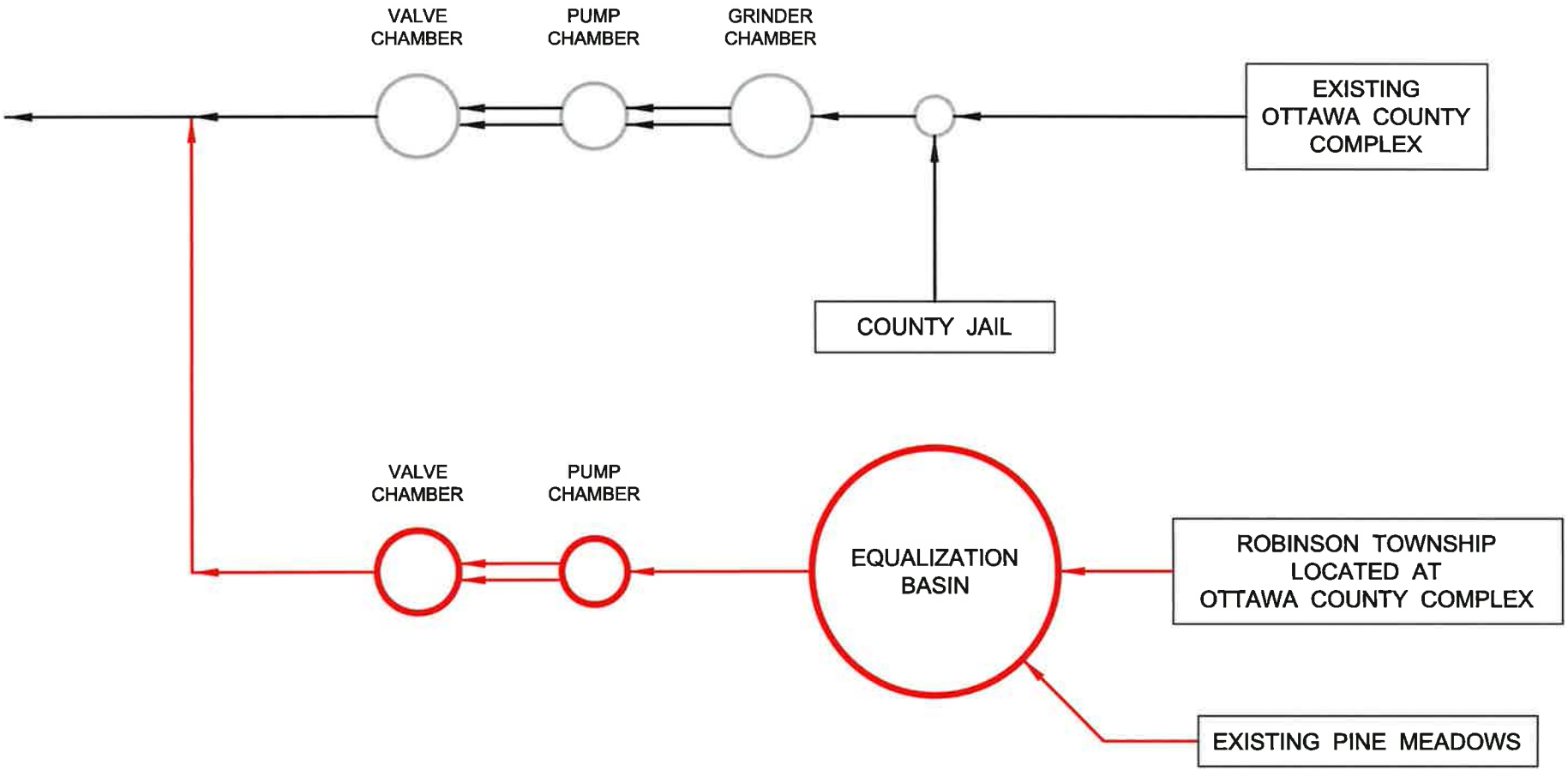
ROBINSON TOWNSHIP
OTTAWA COUNTY, MICHIGAN

WASTEWATER MASTER PLAN TREATMENT OPTIONS

FIGURE 2

Prein&Newhof
2130643

J:\GIS_Client\Ottawa-GD\Robinson-GD\2130643_WW Master Plan\2130643 Area Map1.mxd - PNiedempsey - 3/12/2014 11:54:28 AM



LEGEND

- EXISTING PROCESS UNIT
- EXISTING FLOW
- FUTURE PROCESS UNIT
- FUTURE FLOW

ROBINSON TOWNSHIP
OTTAWA COUNTY, MICHIGAN

OTTAWA COUNTY COMPLEX
FLOW SCHEMATIC

FIGURE 3

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Appendix G

Aquifer Recharge in Robinson Township, Ottawa County – David P. Lusch, Ph. D., Professor Emeritus, Department of Geography, Environment, and Spatial Sciences, Michigan State University

Aquifer Recharge in Robinson Township, Ottawa County

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November 1, 2022

This information is provided in response to an email inquiry dated October 30, 2022, from Mr. Bill Maschewske of the Robinson Township Planning Commission.

BACKGROUND

Gravity is the dominant force driving groundwater movement. Under natural conditions, groundwater moves downhill (down the pressure gradient) until it reaches the land surface at a spring or seeps into a surface waterbody (along the side and bottom of a stream channel or the bottom of a lake or wetland). The water table (the upper surface of the unconfined aquifer) is usually a subdued replica of the land surface (Figure 1).

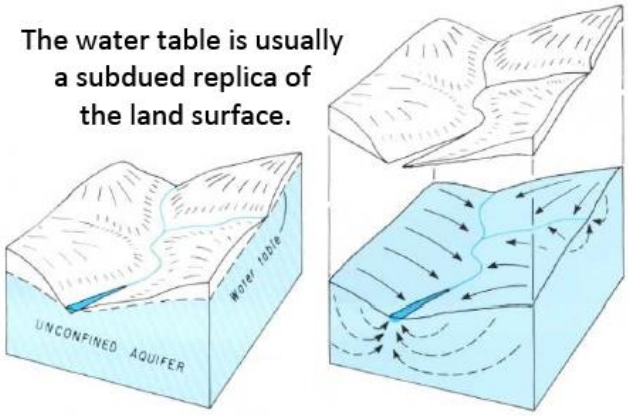

Figure 1. The water table surface is usually a subdued replica of the land surface.

Water seeks its own level and, therefore, an undisturbed volume of water has a horizontal, flat surface. More than 5200 years ago, the Egyptians used this principle to provide a level reference plane by building a small mote that surrounded the construction site of a pyramid (Figure 2).

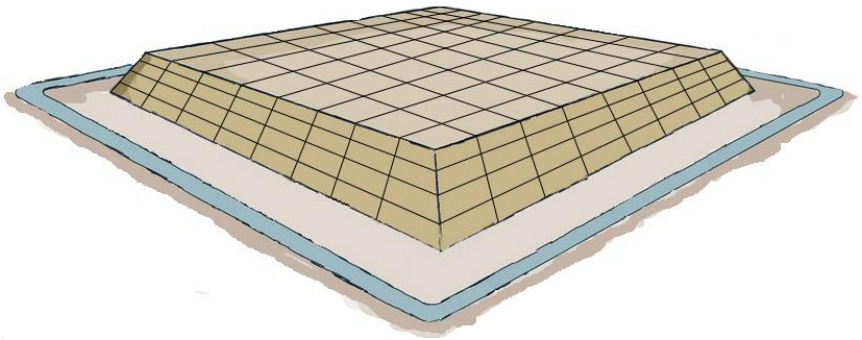

Figure 2. The leveling mote around a pyramid construction site.

But, as we have seen, the water table is not a horizontal plane underground. It typically has an undulating surface with mounds and valleys. Why is this? The main reasons for the irregular surface of the water table are localized zones of recharge (additions) and discharge (losses).

Figure 3 shows a hypothetical water table surface with several groundwater mounds and one master valley. Groundwater flow directions are shown by the arrows. At the mounds (A, B and C), groundwater flow is ***divergent*** (blue arrows), while the discharge valley (which is connected to a surface stream in this example) is the longitudinal site of ***convergent*** groundwater flow (red arrows). The divergent flow mounds on the water table (i.e., static water level surface of the unconfined aquifer) show the locations of zones of recharge, while the convergent flow valleys mark the zones of groundwater discharge. There can be closed depressions on the water table surface (not shown in Figure 3), which will show discharge areas associated with lakes or wetlands. High, large-area mounds (e.g., A) mark zones of enhanced local recharge, while smaller-area, low mounds (e.g., B and C) mark zones of weaker local recharge.

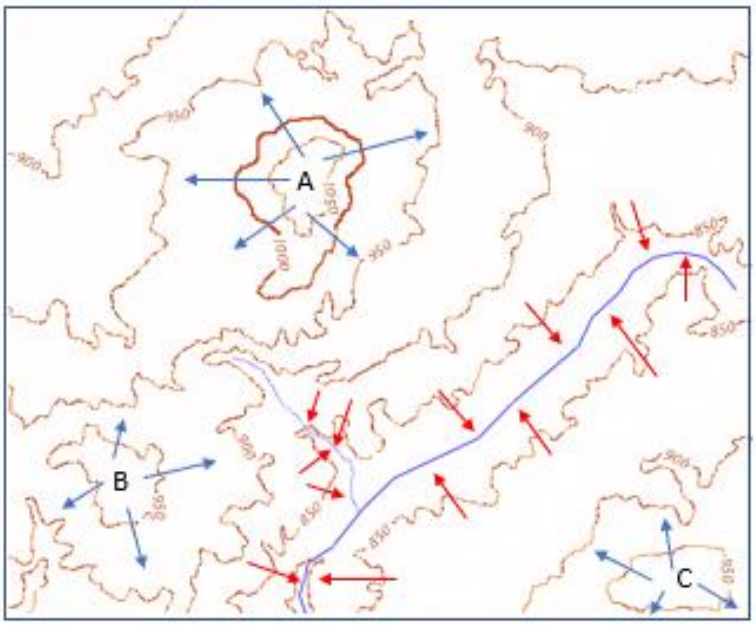

Figure 3. Hypothetical water table surface showing divergent (blue) and convergent (red) groundwater flow.

Figure 4 shows the average static water level surface (water table) of the unconfined, glacial aquifer beneath Ottawa County. The highest groundwater mounds (recharge areas) are shown by the yellow, cyan and blue colors, while the lowest valleys (discharge zones) are shown by the dark orange and red colors. Using the principles discussed earlier, this surface configuration demonstrates that the strongest recharge zone in Ottawa County is located in southwestern Chester Township and northeastern Wright Township. The second strongest localized recharge area in the county dominates the central and southeastern portions of Jamestown Township. The third strongest localized recharge zone in the county straddles the central border between Blendon and Georgetown townships. There are also three weaker, localized recharge zones in the county (marked A, B, and C). Recharge zone A occupies the southwestern portion of Robinson Township and the southeastern quadrant of Grand Haven Township.

Recharge zone B straddles the border between Port Sheldon and Park townships. Recharge zone C occupies the northwest quadrant of Crockery Township.

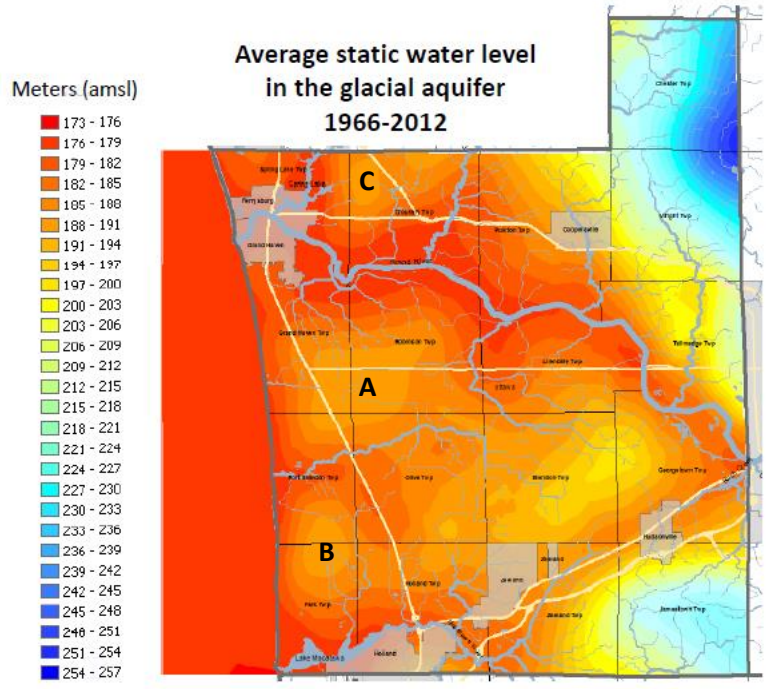

Figure 4. Average static water level in the glacial aquifer of Ottawa County, 1966 – 2012.

ROBINSON TOWNSHIP RECHARGE ZONE

Figure 5 shows the average (1966 – 2012) static water level (i.e., the water table) for the unconfined glacial aquifer in Robinson Township. A groundwater mound with a summit elevation in the 191 – 194 m above mean sea level range dominates the southwest quadrant of the township and indicates that this part of the township functions as a recharge zone to the unconfined aquifer. The mound is 18 m above the groundwater discharge zone along the Grand River at the northern edge of the township and 3 m above the groundwater discharge zone along the Pigeon River just south of the township.

In its 2018 Phase 2 Ottawa County Water Resource Study, MSU simulated the natural recharge to the glacial aquifer system using the USGS model INFIL 3.0 – a grid-based, distributed parameter, deterministic watershed model that estimates net infiltration below the rootzone (USGS, 2008). Drainage basin characteristics and daily climate records of precipitation and air temperature were used to simulate the near-surface water balance, including precipitation as either rain or snow; snowfall accumulation, sublimation, and snowmelt; infiltration into the root zone; evapotranspiration from the rootzone; drainage and water-content redistribution within the root-zone profile; surface-water runoff from/to adjacent grid cells; and net infiltration across the bottom of the rootzone. MSU used daily precipitation and air temperature data from the PRISM Climate Group, at 4km spatial resolution, for all years since 1981 (Daly et al., 2008). Surface topography was modeled using the 10m DEM from USGS

(NED, 2006). Land use and land cover was represented using the USGS National Land Cover Dataset 2006 (Fry et al., 2011). Soil type distribution and root-zone depth across the model domain was obtained from Natural Resources Conservation Service, USDA (SSURGO, ND). The recharge simulations for 2010 and 2015 are shown in Figure 6. Note that both simulations show a localized recharge high spot (arrows) in southwestern Robinson Township with a magnitude in the range of 5 to 6 inches per year.

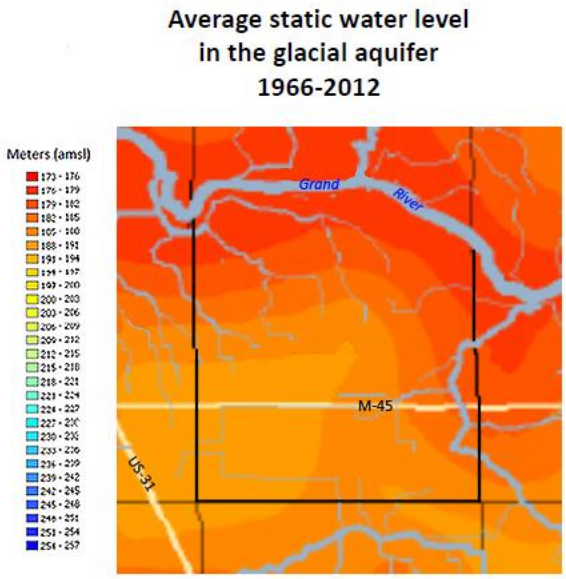

Figure 5. Average static water level in the glacial aquifer of Robinson Township, 1966 – 2012.

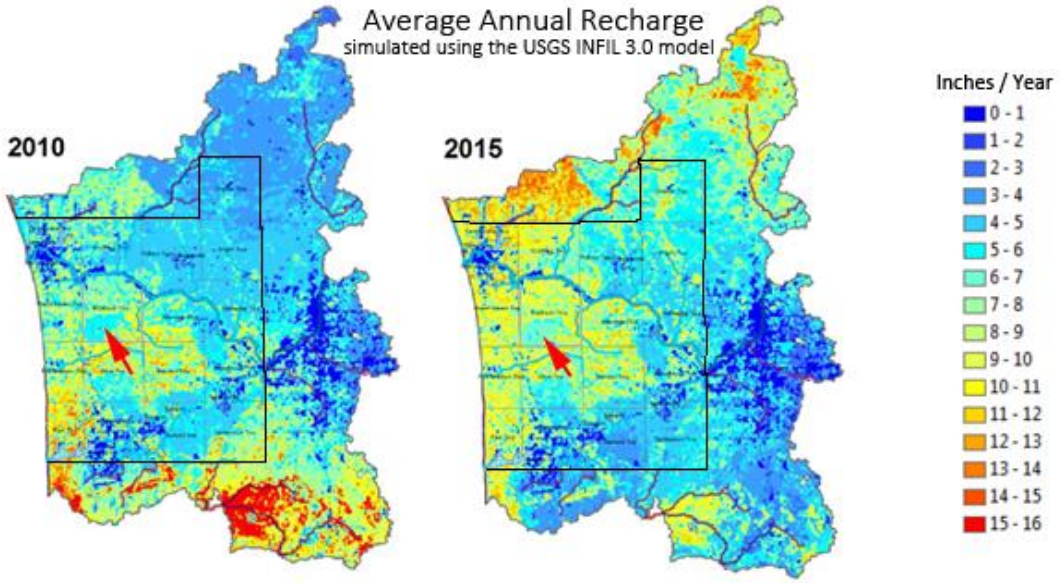

Figure 5. Average annual recharge for 2010 and 2015 simulated with the USGS INFIL 3.0 model.

The permeability of the soil is one of the primary physical characteristics that controls the amount of infiltration that can occur in any area. Infiltrating water that percolates through the soil layer becomes recharge to the local water table – the top of the unconfined aquifer. One measure of soil permeability is the saturated hydraulic conductivity – the velocity that infiltrating water can move downward in a saturated soil. As shown in Figure 6, most of Robinson Township contains soils with high or very high saturated hydraulic conductivities.

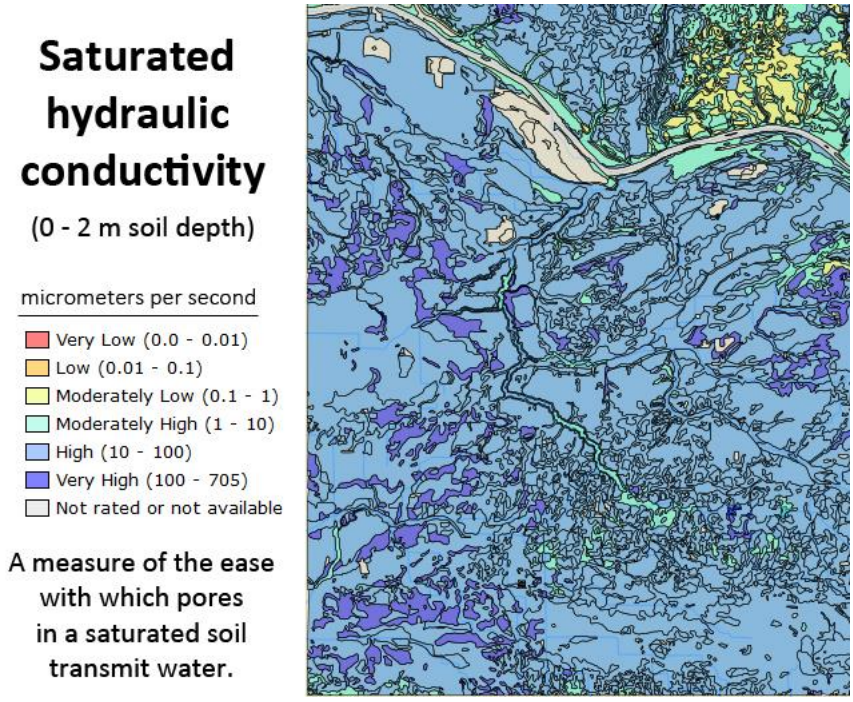

Figure 6. Saturated hydraulic conductivity of the soil zone in Robinson Township.

Surface slope is a second physical characteristic that controls the amount of infiltration that can occur in an area. Precipitation and snow melt inputs can be partitioned into surface runoff, infiltration, and evaporation outputs. Surface slope modulates the partitioning between runoff and infiltration. Assuming similar saturated hydraulic conductivities, steeper slopes promote more runoff, while low slopes promote more infiltration. As shown in Figure 7, most of the land surface in Robinson Township exhibits slopes of 5 percent or less.

The depth to the water table is another physical characteristic that controls the amount of infiltration that becomes recharge in an area. Areas where the water table occurs far beneath the land surface (i.e., the unsaturated zone is thick) provide only limited recharge to the unconfined aquifer because the most frequent precipitation events produce volumes of infiltration water can be readily stored as soil moisture in the thick unsaturated zone. Conversely, areas where the water table is close to the land surface allow infiltration water to frequently recharge the water table aquifer. As Figure 8 shows, across virtually all of southwestern Robinson Township, the water table is within 25 cm of the land surface.

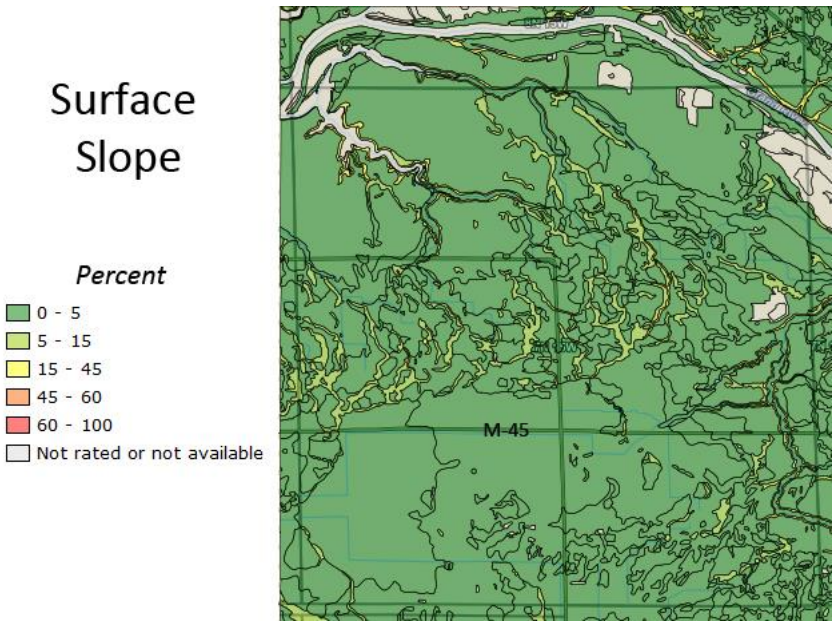

Figure 7. Surface slope classes in Robinson Township.

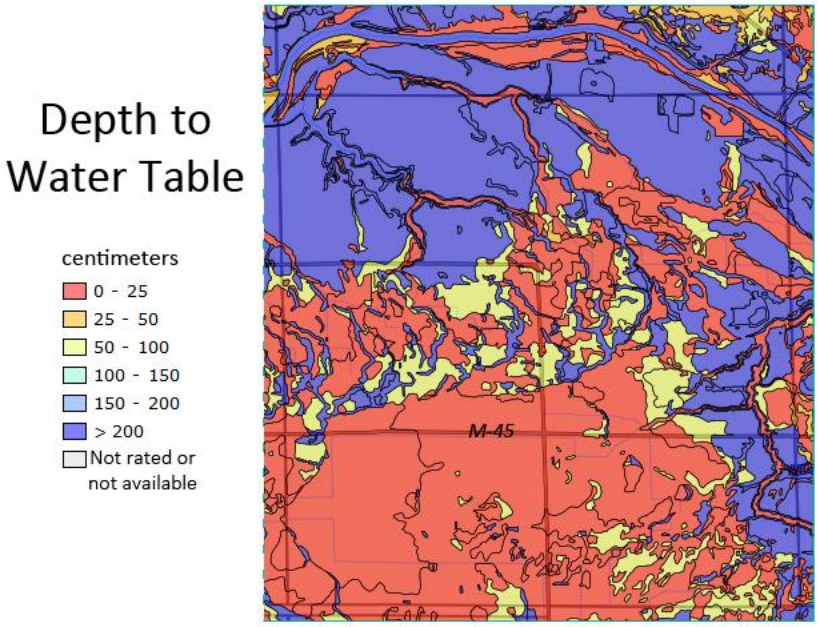

Figure 8. Depth to the water table in Robinson Township.

An important physical characteristic when evaluating recharge zones is the thickness of the unconfined aquifer. This parameter gives an indication of the volume of groundwater storage that the aquifer possesses. Put simply, thick aquifers store more groundwater than thin aquifers. Figure 9 shows the thickness of the glacial sediments above the bedrock in Robinson Township. In the southwest quarter of the township, the glacial deposits range from 140 - 214 feet thick.

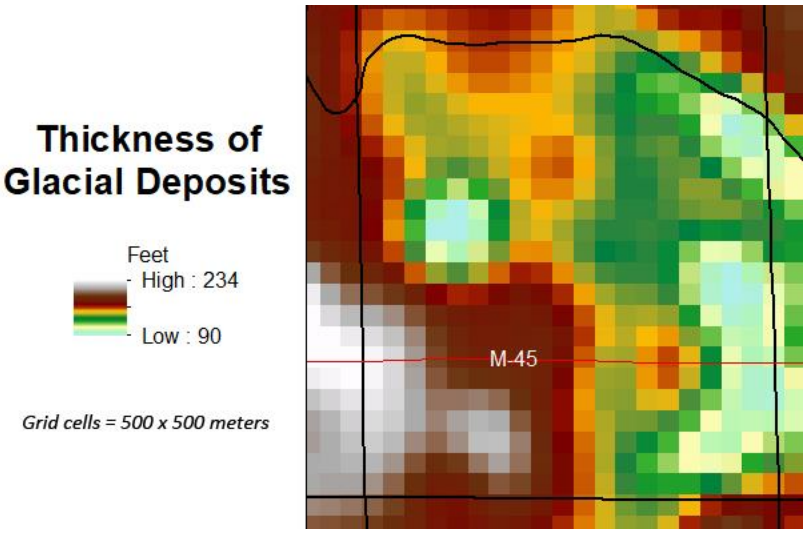

Figure 9. Thickness of the glacial deposits in Robinson Township.

A crucial question, however, is how much of these glacial deposits are composed of aquifer materials and are they interconnected? In the 2018 Phase 2 Ottawa County Water Resource Study, MSU modelled the 3-D heterogeneity of the glacial aquifer using the transition probability geostatistical approach. Figure 10 shows the horizontal hydraulic conductivity results of the transition probability modelling in the five glacial layers used in the final groundwater flow model for Ottawa County. Hydraulic conductivity describes the ease with which groundwater can move through the pore spaces of a sediment. Throughout the whole model domain (which extends somewhat beyond the borders of Ottawa County), the hydraulic conductivity of the glacial deposits ranges from 0.015 – 29.804 feet per day.

Focusing on Robinson Township, Figure 10 shows that the hydraulic conductivity (K) of almost all of the upper one-fifth of the glacial deposits under the township is very high, ranging from 16.6 – 29.8 feet per day. In the second glacial layer down, the hydraulic conductivity drops to very low values in the northern and eastern margins of the township, while the remainder of the township exhibits high and very high hydraulic conductivities. Throughout most of the township, the third glacial layer at depth has low or very low hydraulic conductivities, but the southwest corner of the township, south of M-45, maintains high and very high K values. In the fourth glacial layer at depth beneath most of the township the hydraulic conductivity values are low to very low. The exception to this pattern is the southwest quarter of the township, where the 4th glacial layer maintains moderate to high K values. In the bottommost 5th layer that rests on bedrock, the north-central and west-central regions of the township north of M-45 present moderate to high hydraulic conductivities. The western two-thirds of the region south of M-45 exhibits moderate to moderately low K values, while the 5th layer under the southeastern corner of the township has low or very low hydraulic conductivities.

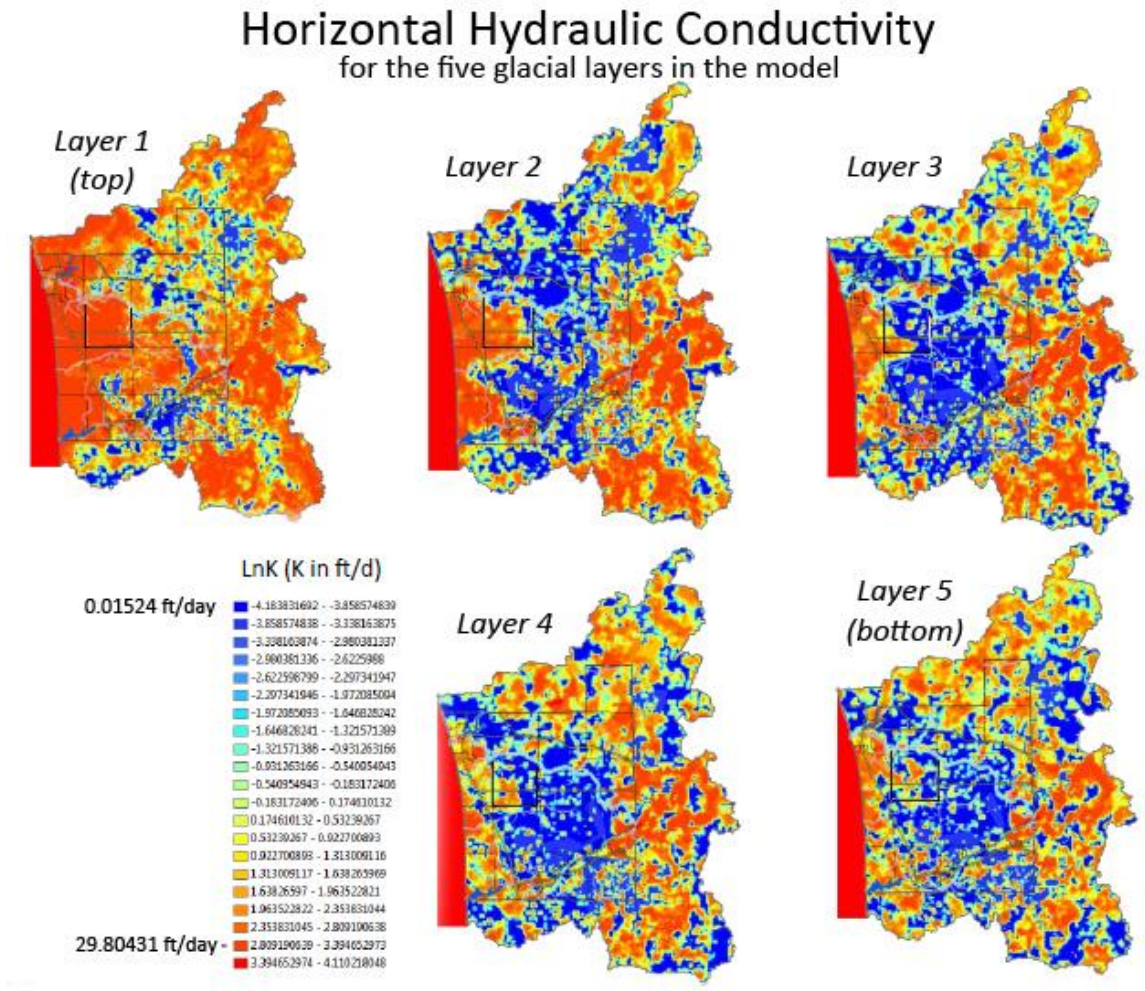

Figure 10. Estimated horizontal hydraulic conductivity of the glacial layers used in the Ottawa groundwater flow model.

Figure 11 illustrates the bedrock geology beneath Ottawa County, where only three rock formations occur: the Michigan Formation (a partially confining unit), the Marshall Formation (an aquifer), and the Coldwater Shale which is a confining unit. Note that almost all of Robinson Township is underlain by the Marshall Sandstone (the only bedrock aquifer in the vicinity). An exception to this pattern occurs in the west-central portion of the township which is underlain by the Coldwater Shale (a confining unit). The importance of these observations is that, not only is the southwestern part of Robinson Township a regionally rare zone of enhanced recharge to the thick glacial aquifer in the area, but also (as shown in Figure 10) this part of the township likely provides recharge to the underlying Marshall Sandstone aquifer!

PLANNING AND ZONING IMPLICATIONS

The regionally rare recharge zone in the southwestern part of Robinson Township not only sustains the thick glacial aquifer in the vicinity, but it also likely contributes some recharge to the Marshall Sandstone

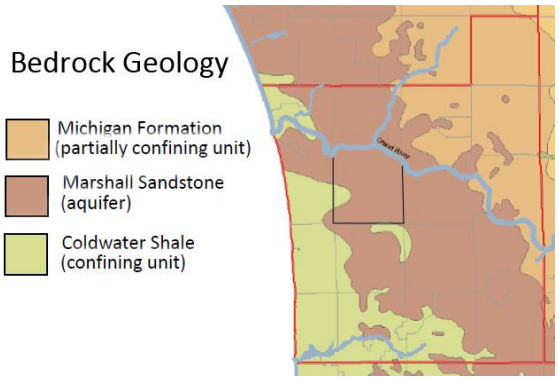

Figure 11. Bedrock geology beneath Ottawa County (Robinson Township outlined in black).

aquifer. As such, from the perspective of water resource management and sustainability, this portion of Robinson Township deserves special attention and ***should be reserved for open space land uses which promote infiltration***.

The infiltration advantages of open space land uses can be illustrated by the runoff curve number (CN), an empirical parameter used in hydrology for predicting direct runoff or infiltration from rainfall excess. CN is based on the hydrologic soil group, land use, treatment, and hydrologic condition of an area – it ranges from 30 (maximum infiltration potential) to 100 (minimum infiltration potential). Table 1 shows the curve number for a selection of land uses under the same hydrologic soil group, treatment, and hydrologic conditions.

Table 1. Curve numbers and infiltration potential for selected land uses.

Land Use	***Curve Number***	***Infiltration Potential***
Impervious areas	98	minimum
Commercial and business (85% impervious)	89	very low
Industrial (72% impervious)	81	very low
Residential 1⁄8 acre or less (65% impervious)	77	low
Row crops	61 - 67	moderate
Small grains	58 - 63	moderate
Residential 1⁄4 acre (38% impervious)	61	moderate
Residential 1⁄3 acre (30% impervious)	57	moderate
Pasture—continuous forage for grazing	39	high
Open space (parks, golf courses, cemeteries, etc.)	39	high
Orchard or tree farm	32	very high
Meadow—continuous grass, protected from grazing and generally mowed for hay	30	maximum
Woods protected from grazing, and litter / brush adequately cover the soil	30	maximum

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