EXECUTIVE SUMMARY

Genoa Township, located in Livingston County between the cities of Howell and Brighton, is a growing community that faces the difficult challenge of accommodating ever increasing development while retaining its unique natural and rural characteristics. Values and goals of the community where developed with input from residents, landowners, the Planning Commission and the Township Board. Ultimately, it is their aspirations for Genoa Township that have become the principal basis for recommendations discussed in this Master Plan. This plan attempts to balance the various demands and interests to ensure each development decision is consistent with the overall vision for the Township.

The analysis and recommendations in this plan provide the foundation for zoning and other Township development ordinances. With this in mind, all sections of the plan will be used as tools to provide a quality community while it protects the natural features that create a sense of identity for Genoa Township.

Population Housing & Economics: Like much of Livingston County, the population of Genoa Township has been steadily increasing since the late 1980's. The population of Genoa Township was 15,901 persons in 2000 and there were a total of 5,839 households in 2000. By the year 2030, the population is projected to grow to approximately 29,083 persons.

Protection of Natural Features: Genoa Township contains numerous natural features including lakes, creeks, woodlands, and rolling topography. These features make an important contribution to the quality of life in the Township. The plan recommends a number of means to accommodate development while protecting the valuable resources that are critical to Genoa Township's quality of life.

Development densities should be limited in areas that contain fragile natural features and pristine natural conditions. Any negative impact of sanitary drainfields should be minimized through restricting residential densities in areas not served by public sanitary sewer, in particular, areas with poor soil conditions.

Design for development needs to incorporate preservation of natural topography and vegetation. Setbacks and site plan design standards should be established to protect natural features. Steep slopes, streambanks and lakeshore need to be protected during development. Stormwater needs to be managed and natural drainage ways protected.

The Genoa Township Master Plan is divided into a number of sections, including the following fundamental areas:

- *Population, Housing & Economics*
- *Environmental Conditions*
- *Existing Land Use*
- *Future Land Use*
- *Genoa Town Center*
- *Transportation*
- *Greenways & Bikepaths*
- *Grand River Avenue Corridor Plan*

Existing Land Use: Single family residential and vacant/agricultural land were the most predominant land uses in the Township in 2002. Single family residential is dispersed throughout the Township, but with higher densities in areas with public utilities along Grand River Avenue, around the Tri-Lakes area, Lake Chemung, and near the cities of Brighton and Howell. Most of the commercial land uses are located along the Grand River Avenue corridor. There are three distinct industrial areas, all along the Grand River Avenue, north of I-96.

Public Utilities: Portions of the Township are served by public sanitary sewer and water. The northwest and central portion of the Township is served by water and sanitary sewer systems developed in cooperation with adjacent townships. Areas around the City of Brighton are also served by sewer and water. While utilities were built, in part, to protect water quality, the availability of utilities has certainly influenced the pattern and pace of development.

Future Land Use: A future land use pattern is recommended based on existing land use patterns, transportation conditions, availability of public facilities, natural resource protection market trends and community goals. It is important to note that the future land use plan represents a 10-15-year vision for the community. Prior to any rezonings taking place, the timing for the land use needs to be correct.

- The plan establishes a growth boundary. Areas within the growth boundary include the Grand River Avenue/I-94 corridor between Brighton and Howell and areas surrounding the City of Brighton. Land within the Township are separated into three areas; the primary growth areas, secondary growth areas and rural reserve areas:

    - Primary growth areas are areas that are currently served or available to be served by public sewer and water. These areas include single family on lots between ¼ acre, and ½ acre and multiple family residential at higher densities. This area also includes the commercial centers, industrial parks and mixed-use centers.

    - Secondary growth areas do not have sewer and water, but due to their proximity to the cities of Brighton or Howell, are appropriate for infill with low density residential. Typical lot sizes will be around one (1) acre or clustered developments at an overall density of two (2) acres per dwelling.

  - Rural reserve areas outside of the growth boundary will be maintained at a relatively low intensity rural character of development, typically more than 2 acres per dwelling unit, and agricultural uses.

- Commercial land uses are located generally along the Grand River Avenue corridor. Neighborhood commercial areas are designated for smaller scale retail and service establishments intended to serve the needs of nearby residential neighborhoods. General commercial areas are designated for larger scale retail businesses which serve the community at large. An area for regional commercial is designated around the intersection of Grand River Avenue and Laston Road.

- A Genoa Town Center is designated along Grand River Avenue at Dorr Road. This area is planned to become a mixed-use town center with local businesses, neighborhood service establishments and traditional residential neighborhoods. Residential uses will provide a variety of housing types including apartments on upper floors above commercial uses, traditional townhouses and single family homes on smaller lots. This area will be integrated into a pedestrian-friendly, walkable area with sidewalks connecting all uses and community parks and plazas.

- Industrial areas are proposed within the areas most suitable for this type of development with the infrastructure to support these uses and adequate buffers from other land uses.

- Public/Quasi-Public includes land areas occupied by government, civic or utility uses.

Transportation: A number of transportation management strategies are recommended for consideration as the Township grows. Road widening or other major improvements will be limited; however, there is a long range plan to provide a new I-96 interchange at Latson Road. Access management standards need to be applied to the location and spacing of driveways to protect the roadway level of service. With new developments, roads need to provide a safe and efficient vehicular circulation system with a continuous street network that provides connections between neighborhoods.

Greenways and Bike Paths: The maintenance of greenways and the development of bike paths are proposed throughout the Township. Bike paths are proposed along major roads such as Grand River Avenue, Latson, Nixon, Brighton, Dorr and Crooked Lake Roads. Conservation greenways should be maintained along drainageways and in natural habitat areas.

INTRODUCTION

The master plan presented herein is a document created by Genoa Township to guide the future of this community. The intent of this master plan is to provide growth management strategies that help ensure a logical development pattern while maintaining the community character and preserving natural resources. The plan also provides policies and actions for community leaders to consider. Some of the master plan recommendations will be implemented through amendments to the zoning ordinance text and map.

The implementation of the policies and actions in this plan will help ensure that Genoa Township remains a desirable community in which to live, work or visit by allowing residents, business owners and developers to make investments with a reasonable expectation of what will happen in the future. It is of extreme importance to emphasize those qualities of the Township identified by residents, businesses and property owners as highly desired. Recent development and population trends in Genoa Township make it easy to understand the need for a Township master plan update. Among the many reasons for the master plan are the following:

- Present a future land use map that illustrates how the Township should develop logically over time.
- Provide a legal basis for zoning and other regulations for the type, intensity and timing of development.
- Provide that, as development occurs, the most significant natural features are preserved or enhanced.
- Outline specific strategies to address situations where one land use is not compatible with an adjacent land use.
- Recommend traffic management tools to preserve roadway capacity and ensure traffic circulation harmonizes with land uses and neighborhoods.
- Address the changing desires and needs of residents.
- Provide a sustainable community with a land use pattern that translates into a diversified tax base to support the desired facilities and services with reasonable tax rates.
- Provide specific recommendations for development/ redevelopment access management, road improvements and site design along the Grand River Avenue Corridor.

- Coordinate land use recommendations with anticipated land use changes and infrastructure improvements with the surrounding communities.

The development of this plan involved a process of identification and analysis of physical and socio-economic conditions affecting Genoa Township. The impact of each physical and socio-economic factor on the community in the coming years results in a series of goals and policies for the Township. The master plan goals and future land use plan will assist Township leaders in substantive, thoughtful decisions which consider the long term implications for the community. These community-wide implications may not be immediately apparent to the individual property owner or citizen, but the impacts of each decision are linked and become visible over time. Poor planning decisions are difficult to eliminate, most linger forever. The master plan can be viewed as a community blueprint for the future, a mechanism to help ensure each decision fits as part of the whole.

This master plan represents a one year effort by the Planning Commission and Township Board. A series of joint public meetings were held by the Board and Planning Commission to discuss the recommendations of the plan. Citizens, landowners and interested members of the general public also attended meetings and were involved with the discussion on the plan. A public hearing to present the draft plan [will be] conducted.

Genoa Township's last master plan for the entire Township was completed in 1998, although there were amendments to the Plan in 2000 and 2003. The Township continues to refine its zoning ordinance and subdivision regulations in response to changing conditions, goals and the law. Thus, this master plan represents the latest in a series of documents and ordinances which will help to ensure that the Township maintains its desired community character.

GOALS

A key element in the preparation of the Master Plan are the community goals, which reflect the community's desires to respond to various issues. The goals must all be considered concurrently and within the overall context of the plan, as opposed to individually. The Master Plan provides guidance and direction towards the achievement of Township goals.

Land Use

- Accommodate a variety of land uses that are located in a logical pattern and complement community goals, the surrounding land uses, environment, capacity of roads and the sanitary sewer, and public water system capabilities.
- Provide land owners with reasonable use of their land in a manner that is compatible with adjacent land uses and the overall land use plan for the Township and the capacity of infrastructure.
- Promote harmonious and organized development consistent with adjacent land uses.
- Provide a diversity of housing while retaining the attractive "rural" atmosphere in residential areas.
- Achieve well-planned, safe, balanced and pleasant residential neighborhoods.
- Provide employment, shopping and recreational opportunities for current and future residents of the Township.
- Achieve high quality of site and building design that contributes to strong neighborhoods, vital shopping districts and desirable employment centers.
- Encourage quality industrial development to diversify the tax base with room for future expansion, where not in conflict with surrounding land uses.
- Manage development by establishing a growth boundary to encourage efficient use of land, protect farmland and natural features and allow the efficient provision of public services, utilities and infrastructure.
- Promote the development of a mixed-use town center along Grand River Avenue that creates a strong sense of community identity for Genoa.

Preservation of Natural Features

- Preserve the "quality of life" in Genoa Township by retaining significant, sensitive natural amenities such as water bodies, wetlands, slopes, mature trees and natural ecosystems.
- Encourage integration of natural features such as woodlands and wetlands into site development as aesthetic and functional features.
- Protect the quality of the community's lakes and water resources from damaging overcrowding and overuse.
- Preserve the existing landscaping and natural features viewed along Township's roads.

Transportation

- Provide a transportation network necessary to support the current population and support managed growth through future improvements that are required to offset the impact of development.
- Preserve the capacity and safety of arterial streets through access management.
- Evaluate impacts of traffic generated by development and work toward improvements concurrent with new development.
- Coordinate transportation improvements with county and state agencies.
- Create a non-motorized network to provide the opportunity for pedestrian activity such as walking, jogging, and bicycling in a safe and comfortable environment.

Public Facilities & Services

- Work with the adjacent townships and the cities of Brighton and Howell to provide area residents with high quality community services and facilities.
- Provide utility improvements only in locations best suited for development to support managed growth and provide a growth boundary to ensure development is consistent with infrastructure planning.
- Provide high quality parks, recreation facilities and open space to meet the needs of Township residents.
- Provide a Township civic area that meets the needs of Township residents and can expand to meet the needs of the future population.
- Establish a unique identity for Genoa Township through entry signage and streetscape design that provides a unique sense of place.

POPULATION TRENDS

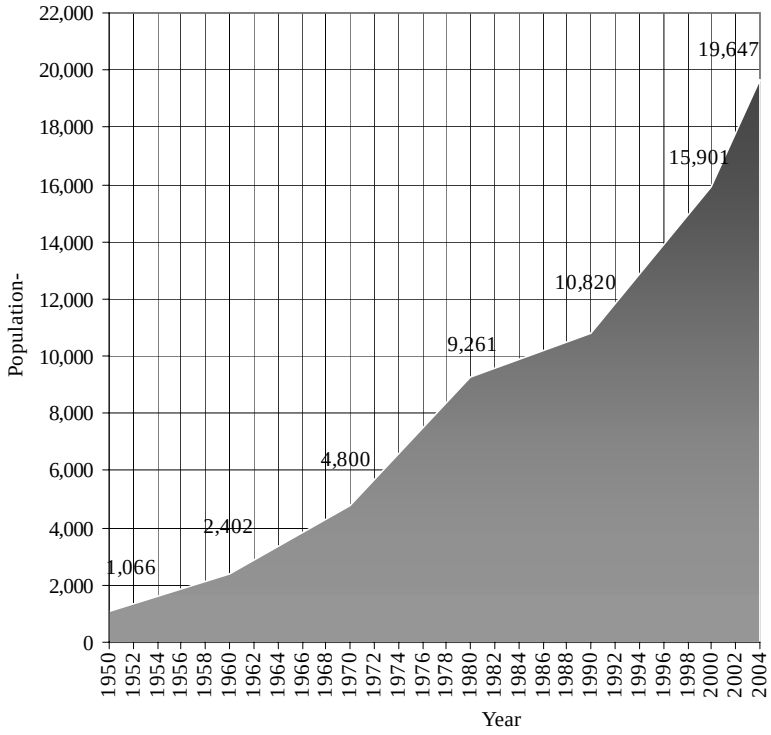
POPULATION TRENDS

Genoa Township has historically been a rural community, with resort-type development along Lake Chemung, the Tri-Lakes, and the Township's other 15 lakes. The once dominant rural/lake resort character of Genoa Township has been changing since the early 1970's, when suburbanites from the Detroit and Ann Arbor area began looking at Livingston County as a convenient commute between the rural lifestyle and metro area employment. The small town atmosphere associated with the cities of Brighton and Howell also attracted residents, businesses and small industries to this area.

Genoa Township's population doubled every decade between 1950 and 1980, then doubled again between 1980 and 2004.

Following close behind the residential growth has been supportive commercial and public facilities. Gradually the area began to establish its own healthy employment base. The growth in population in Genoa Township, as well as many of the surrounding Townships, has been substantial since 1960. Review of census and building permit information has revealed the following trends:

Population Trends
Genoa Township



- The growth rate from 1960-1980 for Genoa Township was consistently greater than the total growth rate for Livingston County. The Township's population doubled every decade between 1950 and 1980.

- The growth rate from 1980 to 1990 for Genoa Township was the smallest since 1940.

- In 1990 the Township had 10,820 people and was the fourth largest municipality in Livingston County.

- The 2000 Census indicated Genoa Township had 15,901 people; making it the third largest community in Livingston County. By 2004 the South Eastern Michigan Council of Governments (SEMCOG) estimated the Township's population at 19,647 people. This represents a 5.8 percent

Genoa Township's population grew 47 % between 1990 and 2000.

average annual growth rate, as compared to last decade's average annual growth rate of 3.9 percent.

- According to SEMCOG the population of the Township is projected to continue increasing at an annual growth rate of 1.5 percent, nearly reaching 30,000 people by the year 2030.

Genoa Township's population was 19,647 in 2004.

The most apparent reasons for the Township's growth are its quality of life, availability of sewers, abundance of vacant/agricultural land, accessibility to employment centers in metropolitan areas and the establishment of its own healthy employment base. The importance of convenient access is evidenced by Census figures which indicated that over 51% of the Township's work force commuted to employment centers outside Livingston County. The thriving employment base can be seen along the Grand River Avenue corridor.

Growth in Genoa Township has been influenced also by development in the two neighboring cities, Howell to the west and Brighton to the east. Since these cities have limited available land, developers have sought locations in Genoa Township which are convenient to residents and businesses of both communities.

Table 1
Population Trends
Genoa Township, 1950-2004

Year	Population	Numeric Change	Annual % Change
1950	1,066	--	--
1960	2,402	1,336	8 %
1970	4,800	2,398	7 %
1980	9,261	4,461	7 %
1990	10,820	1,559	2 %
2000	15,901	3,157	4 %
2004	19,647	3,746	5 %

Source U.S. Bureau of Census
SEMCOG 2004 Population Estimates

Table 2
Population Trends
Genoa Township and Surrounding Areas, 1990-2004

	1990	2,000	% change 90-00	2004	% change 00-04
Genoa Township	10,820	15,901	47.0 %	19,647	23.6%
City of Brighton	5,686	6,701	17.9 %	7,206	7.5%
Brighton Township	14,815	17,673	19.3 %	18,307	3.6%
Green Oak Township	11,604	15,618	34.6 %	17,455	11.8%
Hamburg Township	13,083	20,627	57.7 %	22,426	8.7%
City of Howell	8,184	9,232	12.8 %	9,784	6.0%
Oceola Township	4,825	8,362	73.3 %	10,707	28.0%
Livingston County	115,645	156,951	35.7 %	178,937	14.0%

Source U.S. Bureau of Census
SEMCOG 2004 Population Estimates

POPULATION CHARACTERISTICS

Demographics

A review of the general characteristics of the population is important to assist in determining future land use and community facility and service needs. The distribution of population by age for 1980 to 2000 is shown in Table 3. The following is a summary of general population characteristics of Genoa Township compiled by the U.S. Census Bureau:

- The 1990 Census indicated that the largest amount of residents in Genoa Township was between 35 to 64 years old. By 2000 this age group had increased 59%.
- Although overall the 5 to 17 years old group was the second largest group, residents 65 and over were the second fastest growing age group.

Table 3
Population by Age Group

Age	1990		2000		1990 to 2000 Change
	Population	Percent	Population	Percent	
0 to 4	733	7%	1,124	6%	53%
5 to 17	2,269	21%	3,199	20%	41%
18 to 34	2,373	22%	2,968	19%	25%
35 to 64	4,512	42%	7,168	45%	59%
65 and over	933	9%	1,442	9%	55%
Total	10,820		15,699		47%

Source - 2000 U.S. Census Bureau and SEMCOG

- Population between 18 and 34 years of age increased 25%between 1990 and 2000, however this group represented 22% of total population in 1990 and by 2000 had decreased to 19% of total.

Genoa Township's educational attainment is slightly higher than the county and state averages.

Education

The educational attainment for persons 25 years and older in 1990 was comparable to county and state averages. The percent of Genoa Township residents over the age of 25 with high school diplomas was approximately the same as Livingston County and higher than the State of Michigan average. However, the percent of residents with college degrees in Genoa Township is higher than the county or State averages.

Table 4
Educational Attainment Percentages
For Residents 25 Years and Older

	High School Diploma	College Degree
Genoa Township	92 %	33 %
Livingston County	91 %	28 %
Michigan	83 %	22 %

Source - 2000 U.S. Census Bureau and SEMCOG

HOUSING CHARACTERISTICS

Household Size

There has been a decrease in the average household size, as shown in Table 5. The decrease in household size is likely related to the type of residential development which is occurring, and the proportion of "empty nester" households within the Township. Since the introduction of public sanitary sewer and water, a portion of the residential development has been attached housing suitable for smaller households. In addition to the availability of municipal water and sewer services, part of the reduction in household size can be attributed to a national trend of single young professionals and married couples with fewer children per family and the aging of the baby boomer generation.

Table 5
Household Trends

	1970	1980	1990	2000	1990 - 2000 % change
Total Population	4,800	9,261	10,820	15,901	47%
Number of Households	1,643	2,996	3,709	5,839	57%
Average Persons Per Household	3.28	3.23	2.91	2.72	(6.5%)

Source - U.S. Census Bureau

The average household size in 1990 was 2.91 persons per occupied household. This is near the county average of 2.94 persons per household. By 2000 the average household size in Genoa had decreased to 2.72, while the county's average was 2.80 persons per household.

Number of persons per household is declining in Genoa, as with most other communities.

Housing Construction

During the early to mid 1980's the rate of housing construction in Genoa Township had been characterized for a slower pace than other communities. This slow down in construction rates can be largely attributed to economic trends in Michigan that temporarily slowed migration into Livingston County. During the late 1980's, Genoa Township saw an increased and steady growth in housing construction. Since 1990 the rate of housing construction has been increasing at nearly an exponential rate. While this level of development is characteristic of southeastern Livingston County and the economic growth of the region, it is important to note that there has been a strong and clear influence of the national lending policies that triggered a boom in residential real estate markets. The ease to borrow money at a lower rate than in previous years has influenced the pace of development, which is consequently

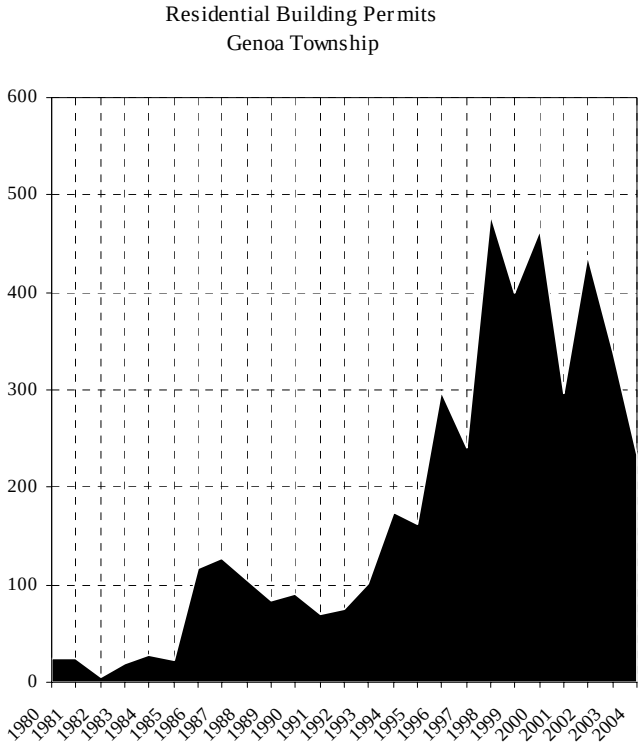
Housing construction during the mid 1990's is over twice the rate of the previous decade.

having an impact on the community. Traffic levels on local roads continue to increase and the natural rural character of Genoa Township is being eroded slowly by development.

Housing Costs

In 1990, the median value of owner occupied homes in Genoa Township was $ 159,624 (in 1999 $'s). By 2000, housing values had increased to $224,900 (in 1999 $'s).

In the mid 1990's the Livingston County Planning Department completed a study of affordable housing in Livingston County. This study pointed out that expansion in housing opportunities is necessary if there is to be expansion in the community's employment base. Maintenance of housing opportunity is also necessary to preserve the diversity in the community's population.



The recent availability of public water and sewer has allowed for developments in Genoa Township that provide housing for families with moderate incomes, younger families and older populations. These developments included smaller, more affordable homes to meet the needs of younger families, as well as a mixture of housing types such as attached condominiums to meet the needs of "empty nesters." These developments have occurred in specific areas of the Township that have the essential public utilities, services and transportation facilities.

Table 6
Residential Building Permits
Genoa Township, 1990-2004

Year	New Dwellings
1990	91
1991	69
1992	75
1993	101
1994	175
1995	163
1996	299
1997	241
1998	479
1999	400
2000	464
2001	296
2002	438
2003	337
2004	234

Source SEMCOG

POPULATION PROJECTIONS

Three factors that modify the population of an area are births, deaths and migration. The birth and death rate are factors that can be predicted based upon trends. The in-and-out migrations are largely influenced by the local economy, transportation accessibility, development policies and local lending policies.

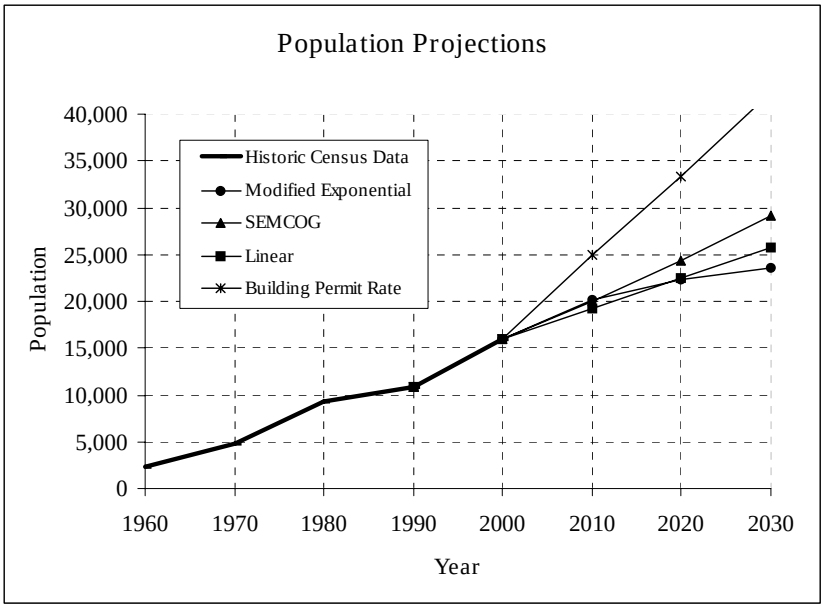
Table 7
Population Projection
Genoa Township, 2000-2030

	2000	2010	2020	2030
SEMCOG	15,901	19,976	24,349	29,083
Linear Regression		19,200	22,500	25,800
Modified Exponential		20,190	22,270	23,600
Building permits		24,910	33,360	42,280

The inability to predict population growth with pinpoint accuracy does not diminish the importance of projections as a guide to local decision-making. For the purpose of this plan, projections are used to assess the effect of growth on current and desired conditions in the Township. Population projections serve as a target for the desired level of growth the community can bear without harming its physical and social environment. The Township Master Plan is formulated in response to meeting that desired level of growth.

SEMCOG projects Genoa Township's population will grow by 26% between 2000 and 2010 (from 15,901 to 19,976), and 83% between 2000 and 2030 (to 29.083).

A few different projections were applied to Genoa Township. The population projections prepared for the 2030 Regional Development Forecast by SEMCOG provide a useful guide to projecting future population growth. A comparison of the SEMCOG projections and a build-out of the future land use map show that there is adequate capacity within the plan's growth boundaries to accommodate the projected 2030 population.



In addition to the SEMCOG projections, statistical extrapolations of historic population trends and household building permit activity were analyzed. The following models were used:

Linear Regression

This model is used when the population of the township has exhibited a trend of uniform growth, and is anticipated to do so in the future. The results of this

model indicate a trend that is slightly lower than SEMCOG projections. This would be an indication that Genoa Township is expected to continue growing at a rate equal to or greater than historical rates.

Build-out Modified Exponential

This model represents a declining rate of growth approaching an upper capacity limit – a pattern perhaps represented by recent declines in the numbers of building permits. This figure was estimated at 23,600 persons for 2030. Such a trend would reflect market-based assumptions that include increasing local housing costs, decreasing availability of easy-to-develop land, declining persons-per-household ratios.

This method involved examining existing residential unit densities per acre and applying these ratios to the undeveloped land designated for similar uses. Trends in the numbers of people per residential unit were also considered. Projections based upon this process yields a growth exceeding the total estimated by SEMCOG.

Of course, it is unlikely that "build-out" will be achieved in Genoa Township by 2030, if ever. Also, adjustments to the amount of land available for residential development will occur over time and household population rates are likely to continue to decline somewhat. Combining these factors, total build-out may eventually approximate SEMCOG's projection for 2030.

Building Permits

This trend line involved taking historic housing construction rates and projecting this construction activity into the future to determine number of households. Then, based upon average household size, future population can be approximated. While this method assumes that housing construction rates will remain constant, it provides a comparison of the Township's recent development trends with the long range development of the community. Projections based upon housing construction rates yields a greater growth rate than the SEMCOG projections and linear regression. This is an indication that current rate in housing construction will begin to decline over time.

ECONOMICS

Income

Household incomes in Genoa Township tend to be somewhat higher than other areas of Livingston County, and significantly higher than the State of Michigan overall. In 1990, the median household income in Genoa Township was $66,082 (in 1999 $'s); compared to Livingston County's median household income of $60,893 (in 1999 $'s) and the state's median household income of $41,708 (in 1999 $'s). By 2000 median household income in Genoa Township had increased 8.0% in real terms reaching $71,398 (in 1999 $'s). Livingston County's median household income increased 10.7% during the past decade reaching $67,400 (in 1999 $'s) while the state's increased 7.1% reaching $44,667 (in 1999 $'s).

The median household income was $ 71,398 for Genoa Township in 1999.

This higher median household income trend can be attributed to a number of factors such as; high educational attainment, natural features which make of Genoa a highly desirable place to live, and proximity to major employment centers in the Detroit, Ann Arbor, and Lansing areas. It is important to note, however, that during the last decade some of the surrounding communities have also observed increases in median household incomes, which makes of this trend a characteristic of the region, not only of Genoa Township. Brighton Township had a median household income of $83,940 in 1999 and observed an increase of 11.8% in real terms, Oceola Township had an income of $76,139 and observed an increase of 27.3% and Hamburg Township had income of $75,960 and observed an increase of 17.4%. Only 3% or 162 of the 5,839 total households in Genoa Township were reported to be below the poverty level in 1999. This is comparable to Livingston County's average of 3%. Both rates are significantly lower than the state's average of 10.5%.

Unemployment was 2.1% for Genoa Township in 1999.

Employment

Genoa Township tends to have relatively low levels of unemployment. In 1989 the unemployment rate for Genoa Township residents was only 2.4%. By 1999 the unemployment rate in Genoa Township had decreased to 2.1% while the state's had decreased to 3.7%.

Table 8
Labor Force Status
Genoa Township, 1989-1999

	Persons	Percent	Persons	Percent	% Change
Persons 16 years and over	8.137	--	12,029	--	47.8%
Persons in labor force	5,830	71.6%	8,604	71.5%	47.6%%
Civilian labor force	5,823	71.6%	8,598	71.5%	47.7%%
Employed	5,635	69.3%	8,341	69.3%	48.0%%
Unemployed	195	2.4%	257	2.1%	31.8%%

Source - U.S. Census Bureau

The occupations of Genoa Township residents in 1999 were fairly diverse. White collar occupations are the most prevalent, but there are a significant number of skilled precision production, craft and repair occupations.

The industry that employs the largest group of Genoa Township residents is durable goods manufacturing. Employment in retail trade is also significant. There is a significant portion of the population employed in educational and professional services.

Genoa Township can be considered a residential community for people who work elsewhere. Commuting patterns indicate that nearly 51 percent of the workers reporting their place of work in the 1990 census were employed outside Livingston County. Outside of Livingston County, this percentage increased to 53% by 2000.

Table 9
Occupation
Genoa Township, 1999

Occupation	Percent
Management Professional and related	38%
Professional and related specialty	21%
Service	12%
Sales and office	26%
Construction extraction and maintenance	10%
Production transportation and materials	13%

Source - U.S. Bureau of Census

Table 10
Industry
Genoa Township, 1999

Industry	Percent
Agriculture, forestry, fisheries, hunting and mining	0.2%
Construction	8%
Manufacturing	25%
Wholesale trade	5%
Retail Trade	10%
Transportation warehousing and utilities	3%
Information	2%
Finance, insurance, real estate and rental leasing	5%
Professional services	11%
Educational Health and Social services	19%
Arts and Food services	7%
Other services	4%
Public administration	2%

Source - U.S. Census Bureau

ENVIRONMENTAL CONDITIONS

Much of Genoa Township still retains a rural or natural character. The western and northeastern portions of the Township contain some agricultural uses. There is an abundance of natural features including lakes, woodlands and rolling terrain, which make an important contribution to the quality of life in the Township. Retention of these rural/natural resources is of primary importance to many residents.

In terms of development, these features provide both constraints and opportunities. Natural features have a significant influence on future land use patterns for the Township in conjunction with other factors such as existing land use, infrastructure, market factors, transportation and community regulations.

The natural environment is a critical element of the physical basis upon which the Township develops. The various components of the natural environment function, change and interact as part of an ecosystem. An ecosystem is a biological energy system made up of food chains along which energy is passed from one group of organisms to another. It is important to understand the interaction between these components and that alteration to one element will inevitably affect all others.

Environmental Conditions:

- *Geology*
- *Topography*
- *Soils*
- *Drainage*
- *Groundwater*
- *Surface Water*
- *Wetlands*
- *Floodplains*
- *Woodlands*
- *Fish & Wildlife*
- *Farmland*
- *Scenic Features*
- *Contamination Sites*

Alteration to the fragile natural features needs to be carefully considered to minimize impact and insure mitigation where necessary to maintain the natural balance. Not doing so will alter the system and possibly result in such things as increased erosion and sedimentation, decreased ground water recharge and increased surface runoff to the Township's various lakes and streams. To ensure that community development is compatible with the natural features of the Township, all new developments need to make every effort to maintain the natural functions of the environment.

In Genoa Township, limitations on the type and extent of future development occur in areas that are unsuitable for septic systems, unstable for building foundations, poorly drained and not well suited for road construction. While these factors place restrictions on development, other natural resource factors present opportunities for development. The scenic and recreational attractiveness of the lakes, hills and woodlands offer a unique residential setting. It is helpful to examine these natural resource factors in detail to determine both the opportunities and constraints. Examination involves an inventory of resource factors and a determination of the capability of the natural resource base to support future development.

The following is an overview of some of the major natural features that are prevalent throughout the Township. As development occurs, the following features should be considered in addition to other site specific conditions that may be pertinent to each individual location.

GEOLOGY

The soils and geology in the township are characteristic of glacially formed landscapes consisting mainly of moraines (hills of glacially deposited sands and gravel) and till plains (mixed soil materials deposited by glacier advance and retreats). The underlying bedrock is a grey shale known as the Coldwater Formation. The surface geology of the Township was formed 10,000 to 12,000 years ago when glacial activity deposited rock, soil and large blocks of ice. The glacial drift is a very thick layer of soil material that has been deposited by the advance and retreat of the Wisconsin glacier during the last ice age. The ice blocks embedded within the soil eventually melted and left depressions, which today are lakes.

Since the last ice age the soils in Genoa Township have formed as a result of a number of soil forming factors. These include water drainage, wind, slopes, climate, biological activity and human activity.

TOPOGRAPHY

Slope is an important development consideration associated with topographic features. There are areas of significant topography in the southern and eastern portions of the Township.

Excessive slope presents constraints to development. Areas with slopes greater than 12% have been mapped to identify constraints to development (Map 1). There are three general problems with steep slopes:

- Mechanical cut and fill and placement of structures on slopes result in a significant change in the natural functions of the hillside. Drainage flow can be altered, diverted and possibly increased. This can alter the function of the hillside and increase erosion and sedimentation.

- The root system of trees and vegetation helps to stabilize the soils on the hillside. Removal of natural vegetation by agricultural operations and development causes a weakening of the slope, increased surface runoff rates and eventually erosion.

Steep slopes require sensitive site planning prior to development and during construction. Care should be taken to insure that grading is minimized and vegetation, and top soil are protected.

Along the edges of many stream courses and wetlands there are steep banks or bluffs which separate field, the lowland and the upland. These will generally have steep slopes and be heavily vegetated. Disruption of the vegetative cover on these bluff areas may cause significant erosion problems and affect stream ecology.

SOILS

Construction costs and risks to the environment can be minimized by developing areas with suitable soils. Poor soils present problems such as poor foundation stability and septic limitations. The three major soil characteristics considered in the analysis of soil conditions are drainage, foundation stability and septic suitability. Each of these factors have been inventoried and mapped by the Livingston County Soil Survey, prepared by the Soil Conservation Service. (See Map 2.)

The suitability of soil for various types of development is influenced by factors such as:

- *Drainage*
- *Foundation Stability*
- *Septic Suitability*

Drainage: Development on poorly drained soils increases development costs, maintenance costs, and will lead to sanitary problems. Development costs are increased due to additional foundation, road and septic preparation. Maintenance costs and problems will be associated with septic field failures, flooded basements and impact to roads from frost action.

Foundation Stability: Soil areas that do not provide stable foundations may experience shifting building foundations, cracked walls and cracked pavement and roadways. These problems often result in increased development and maintenance costs or, in extreme cases, structural failure.

Septic Suitability: Because there are many areas of Genoa Township that rely on individual septic systems, the location of septic systems on proper soils is extremely important. Inspection and approval for use of a septic system is under Livingston County's jurisdiction and ultimately their responsibility to maintain high standards of review to prevent system complications or failures. Septic field failures are often the result of poor soil permeability, high water table or excessive slope. Soils such as compacted clays and silts will not allow wastewater to percolate, a high water table prohibits adequate filtering and excessive slope does not provide adequate percolation.

Soils Poorly Suitable for Development:

- Areas with little topographic relief, which does not allow proper drainage.
- Areas with excessive slopes which are susceptible to erosion.
- Mucks or soils with high organic materials.
- Silts and clays.
- Areas with high water tables.
- Generally along lakes, creeks and wetlands.

Soils Well Suited for Development:

- Topographic relief that provides for drainage but not excessively steep.
- Loamy and sandy soils.
- Areas sufficiently above groundwater table.

FARMLAND

Genoa Township was historically a resort and farming community. Over the years, much of the farmland has been converted to residential, commercial and industrial uses. There is still active farmland in the northeast corner of the Township and in the western portion of the Township. The prime farmland is in the northern portion of the Township. By 1998, only one farm was still registered under the State of Michigan P.A. 116 Farmland Protection Program in the northeast corner of the Township.

KEY VISTAS

The lakes, topography, vegetation and cultural resources are components in the overall scenic attractiveness of the Township. Scenic vistas are places which afford expansive views of Township visual resources. These are located on top of hills and high elevations or along roadways. Roadways are important visual corridors because they unfold a rapid sequence of vistas. Lakes, fields, homes, buildings and signs are common sites which are presented to the roadside viewer. The combination of curves in the roadway and sections of densely vegetated areas along the roadway provide departures and entrances to a sequence of changing view sheds along the road.

There are a number of areas of the Township, particularly in the west along Chilson Road, which have views characteristic of a rural/open space community. These are topographically high or open agricultural areas. These areas provide a wide panoramic view of the surrounding hills and are characteristic of an open, rural agricultural area.

Other areas of the Township have characteristic views due to topography and natural features. Many of the roadways in the Township pass through rolling topography and are lined by dense woodlands. Woodlands along roadways contribute to a natural/rural atmosphere in a number of ways. The impact of vegetation on the person within the public right-of-way will be greater because of the close proximity. A greater mass of vegetation will be within the forward view of the person within the public right-of-way. Other features outside of the public right-of-way, such as buildings, will have a less dominant impact on the streetscape because they fall behind the vegetative foreground. Taller trees provide a sense of enclosure, providing a well defined public space bounded by vegetation.

Landmarks are important visual resources. There are a number of historic farm homes which lend an important character and identity to the Township. The cultural or man built landmarks should be preserved and managed in a sensitive manner. New development should compliment unique landmarks and should not detract from the scenic vistas of Genoa Township's lakes, hills and open areas.

WOODLANDS

While the Township has been experiencing rapid development, there are still significant areas of natural woodlands. The most significant woodland areas are found in the southwestern corner of the Township. This area is the most isolated portion of the Township. The rolling topography and large forested wetlands limit development in this area and contribute to the natural character. (See Map 3)

The Township currently protects woodlands through provisions in the Zoning Ordinance that restrict clearing of woodlands on a site prior to site plan approval. During site plan review, woodlands are required to be inventoried and the design is required to demonstrate preservation of natural features. As a condition of site plan approval, trees are required to be protected during construction with root-zone fencing. The Township also has landscaping regulations that require the planting of greenbelts and street trees for any new development. Landscape materials used should be native to Michigan and a variety of species should be used for street trees to minimize the impact of disease.

Woodlands provide the following community benefits, which serves as a basis for these regulations:

- Quality of life: The woodlands of Genoa Township contribute to the quality of life for Township residents. The abundant woodlands and trees help create the peaceful, rural atmosphere. Trees provide a visual barrier between individual properties and neighboring properties, an essential factor for preserving the rural atmosphere and property values.

- Influence on micro-climate: Woodlands play an important role in moderating ground-level temperatures. Tree canopies buffer the ground surface from the sun's heat and wind. Temperature extremes during winter months can also be moderated with the help of trees.

- Reduction in air pollution: Woodlands absorb carbon dioxide and return oxygen to the air. Tree leaves filter pollutants from the air, removing ozone, chlorine, hydrogen fluoride, sulfur dioxide and other pollutants. Large and dense stands of trees serve as a noise buffer as well.

- Reduction in soil erosion: Woodlands and other vegetation stabilize soils and help prevent soil erosion. The vegetation absorbs the energy of falling rain and the web of roots of all types help hold soil particles in place. Tree leaves reduce the impact of raindrops on the soil surface and give soil a chance to absorb water. Fallen leaves minimize the loss of soil moisture, help prevent erosion and enrich the soil to support later plant growth. Wooded wetlands provide the additional benefit of trapping and holding storm water runoff. Dense vegetation can help slow flood surges and flows.

- Wildlife habitat: Woodlands provide essential shelter and food for deer, raccoon, rabbits, pheasants and other birds and animals. The opportunity to observe wildlife in a natural setting has educational benefits for Township residents.

- Township's natural character: There is a significant amount of mature vegetation along many of the road corridors that pass through the Township. Woodlands located near the roadway contribute to a natural/rural atmosphere in a number of ways. The impact of vegetation on the motorist will be greater because of the close proximity to the roadway. A greater mass of vegetation will be within the forward view of the motorist. Other features such as buildings will have a less dominant impact on the streetscape because they fall behind the vegetative foreground. Taller trees will provide a sense of enclosure, providing a defined space bounded by vegetation. There is also a significant amount of vegetation along most lakes and streams throughout the area.

WETLANDS

Wetlands are transitional areas between the aquatic ecosystems and the surrounding upland areas. They are low areas which are intermittently covered with shallow water and underlined by saturated soils. Vegetation which is adapted to wet soil conditions, fluctuation in water levels and periodic flooding can be found in wetlands. Wetlands are linked with the hydrologic system, and as a result, these wetland systems are vital to the environmental quality of Genoa Township.

Wetlands serve a variety of important functions which not only benefit the natural environment but also the community. Some of the primary values which wetlands contribute are as follows:

- Mitigate flooding by detaining surface runoff.
- Control soil erosion and sedimentation loading in rivers and lakes.
- Provide links with groundwater.
- Improve water quality which is degradated by such things as:
    - nutrients and chemicals from fertilizers and pesticides used in agriculture and landscaping/lawn care;
    - polluted urban run off from roads, parking lots, industrial and other commercial activities;
    - treated effluent from waste water treatment facilities;
    - erosion and sedimentation resulting from agricultural and construction activities.
- Function as highly productive ecosystems in terms of wildlife habitat and vegetation.
- Serve a variety of aesthetic and recreational functions.

Wetlands play a very important part in the hydrological and ecological systems. In addition to providing fish and wildlife habitat, wetlands maintain and stabilize groundwater supplies, reduce the dangers of flooding and improve water quality.

The largest interconnected series of wetlands are located along the Chilson Creek corridor in the western portion of the Township. There are also numerous kettle depressions scattered throughout the Township. (See Map 4)

There are four types of wetlands predominate within the boundaries of Genoa Township: (1) emergent wetlands with rooted cattails, bulrushes and sedge grasses; (2) Scrub/shrub wetlands, (3) bogs; and (4) forested wetlands with an over-story of trees and an under-story of shrubs. As water levels rise and fall from year to year, some

ecological succession may be occurring as the wetlands shift from emergent marsh to forested wetlands.

Future development in areas surrounding these wetlands could significantly impact wetland resources. Therefore, developers and Township officials should evaluate alternative designs to minimize any potential for impact. This is best done by initially considering wetland resources as constraints to development. The relative weight of these constraints must also account for other environmental and socio-economic constraints. Minimization of impacts to these resources should take into account the cost of avoidance and the property rights of the individual. If impact is unavoidable, then mitigation should include an analysis of retaining or enhancing the wetland values to be lost.

Wetland areas are valuable as natural buffers between residential and commercial land uses. They contribute significantly to the aesthetic character of the community. By incorporating wetlands as part of the future development, they will continue to maintain open and green space as well as contribute to retaining the rural setting.

Any wetlands greater than five acres in size or contiguous with a waterway are regulated by the Michigan Department of Environmental Quality (MDEQ) through the Goemaere-Anderson Wetland Protection Act, Public Act 203, as amended. Any activity which requires these regulated wetlands be filled or drained requires a permit from the MDEQ. Permits will generally not be granted unless the issuance is in the public interest and necessary to realize the benefits derived from the activity. If a wetland fill permit is granted, mitigation should be required such as creating new wetlands within the same drainage way or enhancement of existing wetlands. In addition to this, Genoa Township Zoning Ordinance contains wetland standards that provide local reinforcement of State regulated wetlands.

LAKES

Lakes are among the Township's most valuable natural resources of the community. The largest and most significant lakes in the Township are Lake Chemung, East Crooked Lake and West Crooked Lake. The numerous lakes provide recreational opportunities such as boating, fishing and swimming. The quality of these water features enhances the value of adjacent property for residential opportunities. Areas surrounding many of the larger lakes in the Township have been developed for smaller lot resort and residential uses. These areas were initially developed with resort cottages on small lots with individual septic drain fields. Over time these areas have been converted to year-round homes. Areas

surrounding the lakes have soil conditions that are not well suited for drain fields due to poor soil texture and a high water table. The combination of the natural soil characteristics and increased residential use of the lake areas led to significant problems with septic tank systems. The septic tank leakage began affecting the quality of wells and the lakes. In response to these problems, Genoa Township has provided sanitary sewer to serve the most intensely developed areas around Lake Chemung and the Tri-Lakes.

DRAINAGE

Upland areas drain to the low lying wetlands, lakes and streams that pass through the Township. Soil permeability of most upland areas is moderate to moderately rapid. As these areas become developed, the amount of water infiltrating the surface will decrease and the surface runoff will increase. This will be caused by clearing of natural vegetation, addition of impervious material to the land (buildings and pavement) and installation of storm drains. These will have the cumulative effect of increasing the peak discharge to the area's drains, streams and lakes while reducing the amount of water infiltrating to ground water. Minimization of these impacts may involve protecting native vegetation, on-site storm water retention and clustered development.

While many of the lakes and wetlands within the Township are located within isolated potholes, there are some significant creeks, drains and streams that interconnect some of the wetlands and lakes. Chilson Creek is the major stream in the Township that flows from the north down to the Huron River in Hamburg Township in the south. Ore Creek in the southeastern corner of the Township, near the city of Brighton also drains to the Huron River in the south. Associated with the creeks are corridors of adjacent wetlands. The creeks and wetlands are important for surface drainage, groundwater recharge and wildlife habitat. Alteration of the creeks and wetlands can contribute to flooding, poor water quality, insufficient water supply and loss of valuable wildlife habitat.

GROUNDWATER

Important factors in the evaluation of groundwater are the quantity and quality of the water. Quantity or yield standards for a typical residential or commercial use range from 7 gallons per minute to 20 gallons per minute. Water is generally available in sufficient quantity and will not likely be a factor in limiting growth.

Water quality is a more important factor than water availability. Water hardness, iron content, salinity and septic field contamination are hazards encountered in Genoa Township. Potential sources of

groundwater contamination can result from all of the various land uses within Genoa Township. The level of threat of groundwater contamination will vary based on 1) the susceptibility of groundwater to contamination due to geologic features, 2) contamination loading rates based upon land use and hazardous materials management and 3) the amount and type of hazardous materials utilized within the Township.

Major sources of groundwater contamination are as follows:

- Buried wastes in landfills discharge liquids referred to as leachate which can enter groundwater.
- Agricultural fertilizers and pesticides often infiltrate the soil surface and enter groundwater.
- Urban storm water run-off from buildings, streets and parking lots contains contaminants that infiltrate the soil and enter waterways.
- Septic drainfields release sewage effluent into the soil through seepage beds.
- Spills and leakage of hazardous materials such as underground storage tanks and spills of hazardous materials will infiltrate the soil surface and enter groundwater if not properly contained.

Sources of groundwater contamination:

- *Landfills*
- *Agricultural fertilizers and pesticides*
- *Urban storm water runoff*
- *Septic drainfields*
- *Spill of hazardous materials*
- *Leaking underground storage tanks*

State and county requirements will need to be adhered to for any facility within the Township that involves the use, storage or disposal of hazardous materials. Facilities for storing hazardous materials should have secondary containment and a pollution incident prevention plan.

POTENTIAL ENVIRONMENTALLY IMPACTED SITES

According to Livingston County Health Department records, there are a few contaminated sites within the Township which pose environmental problems. Michigan Public Act 307 provides for identification, risk assessment, evaluation and cleanup of sites of environmental contamination in the State. Sites are identified through information from concerned citizens, environmental groups, industry, local health departments, MDEQ staff and others. From this process a priority list was and will continually be, updated. This list is used in part to develop funding recommendations to undertake response activities utilizing state funds when the parties responsible for the contamination are unwilling or unable.

Six Act 307 Sites have been identified in Genoa Township. These are located in industrial and commercial areas, with the majority in the northwest corner of the Township near the city of Howell. These locations are planned to remain in industrial, commercial or public land uses.

There are two closed landfills within the Township. The old Howell landfill is located on Lucy Road, adjacent to the city of Howell. This closed landfill is now a park. The second closed landfill is located on the south side of Brighton Road, east of Chilson Road.

NATURAL RESOURCE MANAGEMENT STRATEGIES

This Plan consistently emphasizes the importance of the natural resource base. The correlation of land use density in the Future Land Use Plan to natural resource capability described in this chapter will help promote preservation of natural amenities.

The Master Plan must address both the quality and the quantity of land use within the Township. Protection of Township resources requires the adoption of policies directed toward the specific resource problem including drainage, and groundwater quality, natural topography and vegetation. Resource protection regulations can be incorporated in subdivision, zoning and other special purpose regulations. High-quality natural areas have been mapped by the Livingston County Planning Department and are shown on Map 5.

Lower Density Zoning Districts: The interrelation of the environmental component of the Master Plan with the land use component is most visible with the establishment of land use categories. Within areas identified as having significant and fragile natural resources, lower impact/density development is recommended. This is based upon the natural capability analysis.

Certain portions of the Township are characterized by significant natural features such as extreme topography, large wetland complexes and extensive wildlife habitat. These, in combination with other factors such as existing land use patterns and transportation areas with critical natural features, are identified in the future land use map for Country Estate and Rural Residential Districts.

Natural Feature Setback Standards: The Township has enacted general zoning standards for setbacks from wetlands, lakes and ponds that apply to all zoning districts. There is a strong basis for this type of requirement. Development surrounding water features, particularly wetlands, affects the function of the water feature. Development immediately adjacent to a water feature may have the

Natural features to be preserved:

Wetlands:
- *Regulated Wetlands*
- *Non-regulated Wetlands*
- *Wetland Buffers*
- *Restoration of Wetlands*

Slopes Greater than 12%

Bluffs/Setbacks along Waterways

Soils That Are Not Well Suited for Development

Woodlands:
- *Along Public Thoroughfares*
- *Along Greenways*
- *High Quality Woodlands*
- *Individual Mature Trees*

Fish & Wildlife Habitat

Scenic Views and Open Space Along Roads

Connections to Adjacent Open Space

effect of increasing the disturbance to this natural ecosystem and reducing the water feature's ability to perform its natural function.

For example, wetlands are dependent on an interaction between the wetland and the surrounding upland. In terms of hydrology, water enters a wetland from the surrounding upland area in a number of ways- overland flow, through the upper layers of the soil and through groundwater. The upland soil and vegetation surrounding the wetland affect the amount, the means and the rate at which water enters the wetland following a storm or snow melt. Development of the surrounding upland will alter the relative balance between the overland (surface) flow and infiltration, resulting in a greater peak discharge to the wetland. In other instances, physical improvements such as structures, roads and storm sewer systems can intercept surface flow to the wetlands. These alterations to hydrology can result in much greater fluctuations in water levels between wet and dry seasons. The undisturbed soil between the site improvements and the wetlands acts as a buffer to try to maintain the natural upland/wetland interaction that existed prior to development.

In addition to the hydrologic function, waterways are natural open space corridors which serve as wildlife habitat. Animals move through suburban areas along remaining undeveloped natural corridors, such as the numerous drainage ways that cross the Township. Development immediately adjacent to these natural features has a detrimental impact on wildlife habitat by moving structures and disturbance further into natural corridors and increasing constriction of development on these habitats. Protection of areas that line natural features is important to wildlife because this is the interface between the aquatic and terrestrial (upland) ecosystems system. This interface is important to animals such as land mammals that need water or birds which perch on trees to hunt for fish.

Streambank & Slope Protection: Steep slopes require sensitive site planning prior to development. Above many drainage ways of the Township there are steep banks or bluffs separating the lowlands and the uplands. These generally have steep slopes and are heavily vegetated. Disruption of the vegetative cover on these bluff areas may cause significant erosion problems and adversely affect stream ecology. Care should be taken to insure extensive grading is minimized and natural features such as vegetation and top soil are protected. This applies not only to bluffs that line waterways, but also other areas of the Township where there is significant topography.

There are a number of means for the Township to protect steeply sloped areas:

- Maintain setback requirements for all waterways. The current requirement could be revised to be variable based on the extent of the slope.

- Use flexibility offered by the Planned Unit Development regulations to cluster the development away from steep slopes. The Planned Unit Development regulations could be amended to require areas with steep slopes be preserved as natural open space.

- Adopt slope-related regulations where the density of development would be reduced on sites that contain steep slopes. Lots that are located in areas with severe topography would have to be larger. While this may add complexity to conventional development, it may also serve as an incentive for clustered development under the Planned Unit Development regulations.

Storm water Management: Increase in development activity will place additional burden on existing natural drainage systems unless preventive measures are adopted. The overtaxing of drainage systems could lead to localized flooding, environmental damage and costly storm drainage improvements to be borne by taxpayers.

By prompting preservation of natural drainage ways and providing storm water retention basins, the impact of development on drainage systems can be minimized. The Township should take a comprehensive approach to storm water management by encouraging the preservation of existing natural features that perform storm water management functions, minimization of impervious surface, direction of storm water discharge to open grassed areas and careful design of erosion control mechanisms. Wet ponds and storm water marsh systems should be required for detention in new developments. Storm water basins, wet ponds and storm water marsh systems need to be landscaped. Plantings should be adapted to hydric conditions and installed to create a system that emulates the functions of natural wetlands and drainage ways both in terms of hydrology and natural habitat.

Septic Disposal: Ground water and surface water contamination from septic drain fields is a serious concern in the Township. This issue was particularly a concern in areas surrounding the lakes that developed prior to current zoning and health regulations. Many of these neighborhoods developed as cottage communities at higher densities than currently allowed and within areas where the soils are

not suitable for septic disposal. The continued growth of the community and the conversion of many of these cottages into year-round homes lead to contamination problems. In response, the Township has established public sanitary sewer districts to serve these areas, which has been effective in improving water quality in the Tri-Lakes and Lake Chemung. Through working with the Livingston County Health Department, the Township can continue to manage the problem of ground water and surface water contamination from septic drain fields.

- Continue providing public sanitary sewer to higher density areas, including high density areas around the lakes that are currently within the utility districts.

- Restrict the density of future development in areas where the threat to ground water and surface water contamination is highest. This would include areas along waterways and areas with poor soil suitability for septic drain fields.

Restoration of Wetlands: Prior to current wetland regulations, many wetlands within the Township have been filled, drained and/or otherwise altered. Wetlands along the various lakes have been filled for the purpose of development. In other areas, drains and agricultural tiles may have been installed to drain surface water from wetlands so the land could be farmed.

The location of these altered wetlands can be identified. Although the hydrology of the site has been altered, the native soils will still exhibit coloration and textures associated with hydric conditions. Also, the Michigan Department of Natural Resources has mapped pre-settlement land cover (vegetation) based on historic survey records. Maps are available for Genoa Township that show the historic natural land cover.

Where development of agricultural lands is proposed, these wetlands can be restored as part of the drainage and open space design of the development. Hydrologic restoration may involve the removal of fill material and/or closing (or slowing) man-made drainage ways. Restoration may also involve covering the soil surface with peat and re-establishing hydrophytes (wetland vegetation). Within Planned Unit Developments where there are damaged or filled wetlands, a condition of approval may be the restoration of the natural system.

Lake Access & Use Regulations: Increased population in Genoa Township and lake front development have continued to place pressures on the many lakes of the Township for recreational use. The Township has regulations that govern the creation of "keyhole" development. A keyhole, also referred to as a common use access

site, is a waterfront lot that is used to provide lake access for non-riparians (non lake front lot owners). There are many existing subdivisions that contain these keyhole lots and predate the ordinance. These keyholes are generally waterfront parks owned in common by all lot owners within the subdivision.

When used for access and dockage for numerous boats, these can increase the density of boat usage on the lakes and contribute to the following problems, particularly from power boats:

- Shore erosion.
- Damage to lake bottom and stirring-up sediment.
- Oil and gas spillage.
- Noise.
- Conflicts and safety problems between users (power boats, sail boats, personal water crafts, canoes and swimmers).

As the Township continues to grow, problems associated with lake overcrowding could worsen. It is important to point out that keyholes are only one part of the problem. Impacts to the safety and quality of the Township's waterways is impacted by recreational use by riparian and waterfront lot owners, as well as through public access sites. While the current keyhole ordinance can help manage the problem, the Township should consider a more comprehensive approach to managing lake usage. Any policy needs to balance the rights of riparian owners with the right of the general public to have access to public navigable waters, and with the need to protect the quality of the state’s natural resources.

The Township may adopt a lake access ordinance that restricts the number of boats that can access each lake based on water frontage. This ordinance would apply both to keyhole access and lake front lot owners. Under this ordinance, each lake front lot (keyhole or private) would be allowed one power boat plus one additional boat for each specified amount of shore length. The specified amount of shore length would need to be established for each lake based on the carrying capacity of the lakes determined by the following:

- Lake characteristics including lake size, shoreline perimeter, amount of shallow vs. deep lake area, water quality, bank and soil characteristics and turnover rate.

- Land use characteristics including the number of platted lots along waterfront, ownership patterns, zoning minimum lot sizes/widths and common use/keyhole/public access sites.

- An inventory of the number of power boats stored on the lake, the number of boats gaining access through common use/keyhole/public access sites and the total number of boats using the lake on peak days.

Preservation of Natural Topography and Vegetation: Due to the scarcity of large tracts with woods or rolling topography, those that still exist are highly valuable. The land use densities proposed by the Land Use Plan will promote the preservation of existing vegetation and topography. Specific standards can be applied to subdivision plat regulations and site plan review to require preservation of tree cover, the provision of landscaping and buffer strips and the minimization of site grading. The Planned Unit Development regulations should continue to be utilized to encourage preservation of open space, vegetative cover and natural topography.

EXISTING LAND USE

GROWTH TRENDS

Historical Perspective

Historically Genoa Township was characterized by rural agricultural land uses, with resort-type development around Lake Chemung and the other 15 lakes in the region. In the early 1970's the rural character began to change. Suburbanites from the Detroit and Ann Arbor areas began looking at Livingston County as a convenient commute between this quiet lifestyle and metro area employment. Following the residential growth have been supportive commercial and public facilities. The small town atmosphere associated with the cities of Brighton and Howell attracted residents, businesses and small industries to this area. Gradually the area began to establish its own healthy employment base. Providing sanitary sewer service in parts of Genoa Township has contributed to the rapid pace and intensity of its growth. According to Livingston County and Genoa Township figures, most of the recent development in Genoa Township has been residential.

A number of factors can be cited for growth in the southeastern Livingston County area:

- *Interstate 96 and U.S. 23 increasing accessibility from Genoa Township to the major places of employment in the metropolitan region.*
- *The availability of relatively inexpensive large tracts of land suitable for subdivision development.*
- *People's desire to live in a community with a rural atmosphere.*
- *The attractiveness of lake front or rural estate home sites.*
- *Public sanitary sewer becoming available.*

Regional Context

Genoa Township lies within Livingston County, Michigan. The urbanization of Livingston County is part of the trend of outward migration from the Detroit Metropolitan area. Situated between Brighton and Howell, with easy access to Detroit, Ann Arbor, Lansing and Flint via freeways, Genoa Township falls in a crossroads of growth.

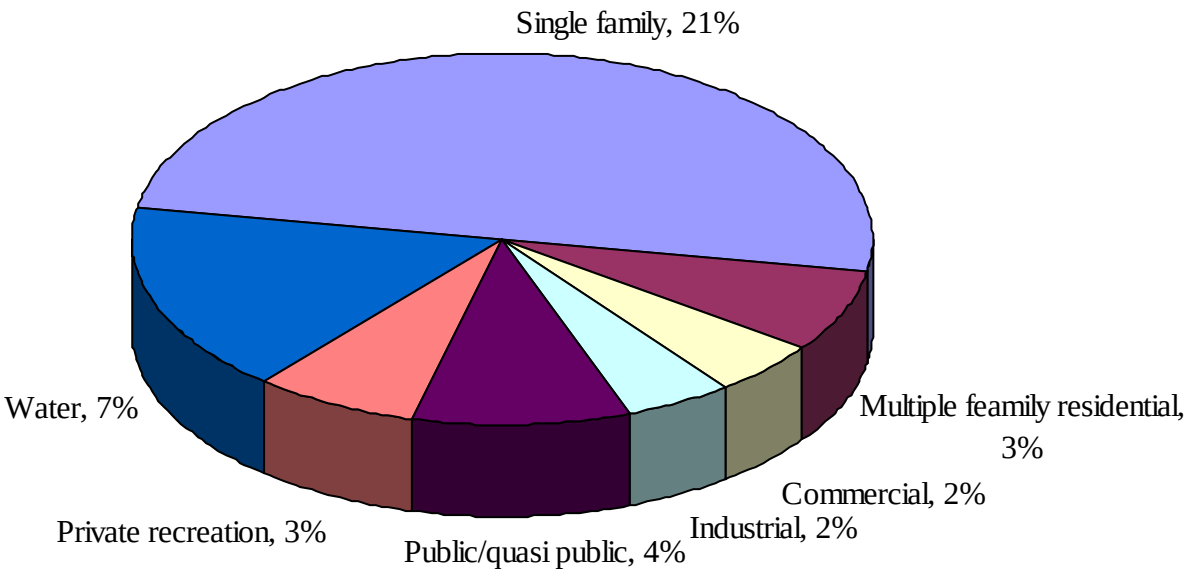
Genoa has experienced a large amount of residential development and has developed a stable, self-sustaining employment base comprised of a variety of industries. The element that sets Genoa apart from many communities in the County is the opportunity to appreciate a rural lifestyle without the long commute.

The outward growth of Brighton and Howell has directly affected the development of Genoa Township, which is apparent along the Grand River Avenue corridor, accentuated by interchange facilities with I-96. Grand River Avenue is the major roadway that links the cities of Howell and Brighton and generally parallels I-96. This corridor gradually has been developed with a variety of uses, particularly during the past decade. Some regional scale commercial establishments began to develop in part due to sanitary sewer service becoming available in 1991. The installation of public utilities has resulted in the substantial growth of industrial uses in the Grand River corridor area.

EXISTING LAND USE

An inventory of existing land use was conducted using current aerial photographs and verified by field observation. Existing land uses were classified and the extent of their acreage determined as depicted below. The following pages describe the existing land use characteristics of the Township when the land use update for the plan was done in 2004.

Percent Distribution of Land Use



Agricultural and Vacant

Over the past decade, large areas of local farmland in Livingston County have been converted to residential uses. According to the 1992 Census of Agriculture, there was a 14% reduction in the acreage of farmland in Livingston County between the years 1982 and 1992.

Agricultural/vacant includes lands actively used for agricultural purposes twenty acres and over and lands not currently put to any active use total 13,535 acres.

Table 11
Existing Land Uses,
Genoa Township, 2002

Land Use	Area	Percent of Township	Percent of Developed Area
Low Intensity Residential	4,836	21 %	59 %
High Intensity Residential	740	3 %	9 %
Commercial/ Office	521	2 %	6 %
Industrial	357	2 %	4 %
Public/Quasi Public	814	4 %	10 %
Private Recreation	936	4 %	11 %
Developed Land Subtotal	8,204	35 %	100 %
Agricultural/ Vacant	13,535	58 %	- -
Water	1,551	7 %	- -
Total	23,290	100 %	- -

Source: 2002 Land Use Update

Low Intensity Residential

Low intensity residential is the most prevalent land use in the Township. This category includes residential properties with a lot size of greater than 1/4 acre, up to 19 acres in size. This type of residential development is dispersed throughout the area. Some of this lower intensity development has resulted from gradual divisions of agricultural land. This land use can also be concentrated around lakes and in areas where public sewer and water are available, but the lots are not smaller than 1/4 acre. This land use is comprised of 4,836 acres in 2004.

High Intensity Residential

Although high intensity uses, including multiple family housing, historically has been limited to the cities of Howell and Brighton, there has been significant multiple family development in Genoa Township since public water and sanitary sewer were introduced. This category includes single family residential developments with densities of 4 units an acre or greater. This includes attached town homes, multiple family condominiums and apartments, and manufactured housing parks. This land use can also include a high density detached single family residential units. There are 704 acres of high intensity residential development in the Township in 2002, up from just over 530 acres in 1997.

Commercial/Office

Commercial uses in the Township are located primarily along the Grand River Avenue frontage. Grand River Avenue is the most heavily traveled roadway other than I-96 in Genoa Township. As a result, small regional shopping centers, individual business establishments and small offices have developed along this segment. Commercial/office use comprises 521 acres.

Industrial

Existing industrial uses are located on the south side of Grand River Avenue between Chilson and Latson. There are a number of small to medium sized industrial uses dispersed along the Grand River Avenue corridor. The largest industrial area is the partially developed 200 acre Grand Oaks Industrial Park just west of Latson Road between I-96 and Grand River Avenue. In total, 357 developed acres of industrial land exist in the Township.

Public/Quasi-Public

Areas designated as Public/Quasi-Public include public uses such as Township Hall, governmental buildings, churches and schools. These are dispersed throughout the Township with a high concentration of government facilities in the northwest corner towards the City of Howell. There is a total of 814 acres of public land in the Township.

Recreation

This classification includes areas such as golf courses, miniature golf centers, recreational vehicle campgrounds, parks, ski areas, MDNR lake access sites and the Brighton Recreation Area which total 936 acres.

LAND USE PATTERNS

The pattern of development reflects the urban influences of the cities of Brighton and Howell, combined with easy access to Detroit, Ann Arbor, Lansing and Flint via freeways. As illustrated in Map 6, the more intensive urban development is along the Grand River Avenue corridor, which is contrasted by residential development and agricultural activities away from this axis of development.

Grand River Avenue is the major roadway linking the cities of Howell and Brighton and generally parallels I-96. The installation of public utilities and accessibility has resulted in substantial growth of commercial and industrial uses southeast of the City of Howell. This area has been developing toward serving as a principal regional commercial center for Genoa Township and surrounding communities.

Residential areas north and south of the corridor historically were large lot development. In the last 15 years these lands have evolved to large planned residential communities. Some of these developments have utilized innovative design techniques to capitalize on precious environmental resources in the Township while preserving their natural condition. As a result smaller, more clustered subdivisions have emerged.

Much of the land along Grand River Avenue is less rolling and contains more buildable soils. It is the area most readily accessible and, therefore, feasible to sewer. Away from this corridor lands are characterized by more rolling topography, some areas with steep slopes, wetlands, problem soils, wooded areas and less intensive suburban rural-agricultural development.

UTILITY SERVICE AREAS

Availability of utilities has had a significant impact on the development pattern. Most of the older developments used individual septic systems. A high density of septic systems in areas with unsuitable soils, high groundwater or near bodies of water can have significant impact on the quality of the Township's water resources. The septic tank leakage from older systems has affected the quality of the Township's wells, lakes, wetlands, and groundwater and limits development potential. In response to these problems, Genoa Township developed in conjunction with surrounding communities or developers several public sanitary sewer systems for certain areas. The provision of sanitary sewer has helped to overcome some of the problems associated with septic tank systems.

Northwest portion of Township

Genoa and Oceola Townships jointly developed a sanitary sewer system with the assistance of the engineering firm of Tetra-Tech MPS back in the early 1990's. This system, the Genoa-Oceola sanitary sewer system, serves much of the Township from the area around Lake Chemung to the City of Howell, north of I-96. The treatment plant is located on Chilson Road, just north of the railroad.

The plant was designed to accommodate future development of vacant land within the presently defined service district. The system is designed to accommodate the land uses indicated in the Master Plan. Only sanitary wastewater is accepted at the waste water treatment plant. No industrial process flows are permitted.

The Township also has a public water supply system for the northwestern portion of the Township. The system serves areas north of I-96 between Lake Edgewood and the western Township border. The water system was developed as part of MHOG Water Authority, a four Township system that includes Marion, Howell, Oceola and Genoa Township. Genoa Township has a 500,000 gallon water tower by Cleary College.

Oak Pointe/Tri-Lakes

Sanitary sewer service was provided in the central portion of the Township around the Tri-Lakes area as a part of the Oak Pointe PUD. The treatment plant was constructed by the developer and dedicated to the Township. This system is being combined with the Genoa-Oceola system with the Oak Pointe treatment plant being taken off-line and wastewater routed to the treatment plant on Chilson Road. The system serves the ultimate build-out of Oak

Pointe, Northshore and the existing residential areas surrounding the Tri-Lakes. This system provided a benefit by not only serving the future development within the Oak Pointe PUD, but by also providing sanitary sewer service to the older lakefront subdivisions in the area. This has had a significant benefit for the water quality within the Tri-Lakes.

As part of the Oak Pointe PUD, a public water system was also developed. The system serves the Oak Pointe development and has been extended around to the north end of Crooked Lake to serve the Northshore PUD. The system has an Iron removal facility and a 150,000 gallon elevated storage tank in the Oak Pointe Golf Course.

Brighton

The Pine Creek PUD, adjacent to the City of Brighton, has public water and sanitary sewer service through a P.A. 425 agreement with the City. Water has also been extended to serve existing homes on Dillon Street that had contamination problems with individual wells. There are currently no plans to extend Brighton water and sanitary sewer service to other areas of the Township.

There is also a public water supply system at the eastern edge of the Township. This system was originally developed to serve the Lake Edgewood condominium development and the Brighton Village Mobile home park. This system has been extended southward along Grand River Avenue to the City of Brighton. This extension serves commercial development along Grand River Avenue near the I-96 interchange. There is a 500,000 gallon water tower on Conference Center Drive, adjacent to I-96. This water system is owned and operated by the City of Brighton.

Lake Edgewood

Sanitary sewers are provided in the eastern section of the Township, through a system known as the Lake Edgewood sanitary sewer system. The system serves the greater area along the eastern portion of the Grand River Avenue corridor, west to Sylvan Glen. The Sylvan Glen manufactured housing park is served by a private on-site package treatment plant, which ultimately will be connected to the Lake Edgewood system.

FUTURE LAND USE

DETERMINING FACTORS

There are a number of factors attracting residents and developers to Livingston County in general, and Genoa Township in particular:

- Accessibility to rapid growth areas in Ann Arbor and western Oakland County, provided by the I-96 interchange.
- Vacant, available property with lower land and development costs than in "competing" areas.
- Visibility to high and increasing traffic volumes along Grand River Avenue, especially between Howell and the I-96 interchange.
- Availability of sanitary sewer service in sections.
- An increasing population base to serve and/or employ.
- Relative affluence of residents.
- High quality of life offered in the area due to the natural features such as rolling hills, lakes, woodlots.

In addition to those general development attractors, there are some specific factors that influenced the proposed future land use pattern in Genoa Township. These factors include:

- Existing land use - Wholesale changes to the existing land use pattern would be difficult. The locations of most existing commercial and industrial developments are appropriate, and the community land use patterns have evolved around these existing land uses.
- Relationship of incompatible uses - The future land use plan strives to diminish incompatible land use relationships by providing a transition of land uses, such multiple-family between light industrial and single family residential areas.
- Natural features - The natural rolling topography, woodlots and scattered lakes provide highly marketable property for residential development. The types of development and allowable density shown on the future land use map were determined by the location and extent of natural features. For example, lower overall development densities are proposed for

Future land use determining factors:

- *Consistency with existing land use patterns.*
- *Diminishing incompatible land use relationships.*
- *Preservation of natural features and consideration of the carrying capacity of the environment.*
- *Positive incorporation of natural amenities.*
- *Existing land use planning and zoning policies such as the previous Master Plan and the Grand River Avenue Corridor Plan.*
- *Availability of infrastructure including utilities, transportation and community facilities.*
- *Market conditions for various land uses.*
- *The goals and objectives of the plan that express the community character desired by residents.*

properties containing significant wetland areas to encourage clustering in buildable areas.

- Natural Amenities - Quality residential developments require amenities such as rolling terrain, mature vegetation, water features and a preservation of natural surroundings. Future residential land uses are designated in areas where the natural features can be integrated successfully with housing units.

- Existing Township Master Plan - The original Township Master Plan, adopted by Genoa Township in 1976, and the Grand River Area Corridor Plan, adopted in 1995, were the principal basis for this current version of the Township Master Plan. The future land use plan contained in the plan has been re-evaluated based on current trends and conditions for this update.

- Infrastructure - The density of residential uses and the location of land uses such as industrial and commercial are dependent on the availability and the capacity of the infrastructure system. Portions of the Township are currently served, or are planned to be served, by public water and sewer. The capacity of the road network defines the intensity of uses that may be served without adversely impacting traffic operations. The availability of community facilities such as schools, recreational facilities, police and fire protection places bounds on service to land use, particularly the residential density. For this reason, this plan includes a growth boundary.

- Existing market conditions - Market conditions were considered even though they will change during the 20-year time frame of this plan.

- Desires of the Township - The land use pattern desired by Township officials and property owners has been expressed with the objective of a diversified tax base, employment opportunities, provision of services for residents and desire for a mixture of uses.

The future land use map is a guide to the orderly development in the area and is intended to assist in decision-making. The future land use map is based on the current transportation system (See Map 7) with the addition of the proposed full I-96 interchange at Latson Road and the existing partial interchange at Lake Chemung (See Map 8).

FUTURE LAND USE CATEGORIES

Agricultural/Country Estate: This designation of the plan identifies that this area shall remain in agricultural use, or develop as single family residential on estate lots. Many of the areas are prime farmland or have significant natural limitations such as wetlands or severe soil limitations. As these areas are not planned for sanitary sewer, they can only support a low density residential development. This classification is recommended for single family residences on lots no smaller than 5 acres.

Rural Residential: This designation identifies that this area shall develop as single family residential on large lots. Many of the areas have significant natural limitations such as wetlands or severe soil limitations and are not planned for sanitary sewer. This classification is recommended for single family residences on lots no smaller than 2 acres or clustered development with a net density of 2 units per acre.

Low Density Residential: These areas are designated for single family residential use, located on the fringe between the rural residential and the more urbanized areas of the Township. While these areas are not planned for sewer service, they have fewer environmental constraints found in the Rural Residential. Single family residential uses within these areas will be located on lots of at least 1 acre in size.

Small Lot Single Family Residential: This designation refers to two distinct groups of moderate density single family residential uses. The older, existing, single homes around Lake Chemung and the Tri-lakes Area are situated on smaller lots. It is intended that this area shall remain single family residential. Secondly are newer, small lot, single family subdivisions located within the more urbanized area of the Township. These areas will generally be, or are planned to be, served by public water and sanitary sewer. Single family residential uses located within these areas will typically be located on lots ranging from 14,520 square foot to 21,780 square feet in size or 2 to 3 units per acre.

Medium Density Residential: This designation refers to medium density duplexes, attached condominiums and other multiple dwelling units. This area may also be developed with single family homes on smaller ¼ acre lots. This designation is found within areas served, or planned to be served, by public water and sanitary sewer. Development will be at a density consistent with the infrastructure and land capabilities, but will not exceed a density of 5 units per acre. Developments in these areas will be served by public water and sewer.

Future Land Uses:

- *Agriculture/Country Estate 5 acres per dwelling unit*
- *Rural Residential 2 acres per dwelling unit*
- *Low Density Residential 1 acre per dwelling unit*
- *Small Lot Single Family Residential of 2 to 3 dwelling units per acre*
- *Medium Density Residential 5 dwelling units per acre*
- *High Density Residential 8 dwelling units per acre*
- *Neighborhood Commercial*
- *General Commercial*
- *Regional Commercial*
- *Mixed Use Town Center*
- *Office*
- *Industrial*
- *Planned Industrial*
- *Public/Quasi-Public*
- *Private Recreational*
- *Planned Unit Development*

High Density Residential: This designation refers to higher density condominiums, apartments and other multiple family dwellings. This designation is found within areas served, or planned to be served, by public water and sanitary sewer. Development should respond to infrastructure and land capabilities, and should not exceed 8 units per acre. High density residential developments will be served by public water and sewer.

Manufactured Housing: These areas are designated for manufactured housing/mobile home parks. Manufactured housing areas will be served, or planned to be served by public water or a community well and sanitary sewer. Development in these areas will be limited by infrastructure and land capabilities.

Neighborhood Commercial: Retail and service establishments whose primary market area includes residents and employees from within a two mile radius are designated by this category. These retail businesses and services are intended to serve the needs of nearby residential neighborhoods. Typical uses would include smaller general merchandising/retail establishments such as convenience stores, banks, dry cleaners, video rental shops and beauty/barber shops, and small retail strips.

General Commercial: Businesses which serve the requirements of the community at large including Genoa Township, Howell, Brighton, and pass-by traffic along Grand River Avenue are designated by this category. The large size and variety of permitted commercial uses generate significant volumes of vehicular and pedestrian traffic. There may be some outdoor sales or display areas. These districts are intended to be clustered, rather than allowed to create an undesirable commercial strip pattern of development, and buffered from nearby residential area. Appropriate uses include larger grocery stores, restaurants and retail shopping centers.

Regional Commercial: Land uses within this category include higher intensity commercial uses that serve the comparison shopping needs of the entire community and the regional market. Uses include big-box retail, large shopping centers, restaurants (including fast-food) and automobile service centers. Such land uses rely on higher traffic volumes and easy access via a major arterial or highway. Development within such areas should occur within a planned, integrated commercial setting. Site design for these uses should include high quality architectural and landscape design with parking areas and access points that promote safe and efficient circulation throughout the site. The location of this land use designation shall be focused along the Grand River Avenue corridor between Latson Road and Grand Oaks Drive to create a

focused regional commercial center so that the Township, County and State agencies can more efficiently focus the infrastructure and services needed to support this regional center.

Genoa Town Center: This category includes a mixture of uses integrated into a traditional-style development of high density single family homes, attached and detached, along with various commercial uses including retail and office. A more detailed description of this area can be found later in this section.

Office: This use includes various forms of office development including professional offices, medical offices and banks.

Industrial: The intent is to develop industrial uses such as research, wholesale and warehouse activities and light industrial operations which manufacture, compounding, process, package, assemble and/or treat finished or semi-finished products from previously prepared material. The processing of raw material for shipment in bulk form, to be used in an industrial operation at another location is found only in very defined and limited portions of this area.

Planned Industrial: This area should be developed as a light industrial/R&D/office park. High quality building architecture should be utilized to convey a high-quality image. Enhanced landscaping and screening should be provided along adjoining major thoroughfares. Flexibility in some zoning requirements may be considered in exchange for these aesthetic enhancements.

Public/Quasi-Public: These are land areas to be occupied by government, utility or civic uses such as churches, parks, state, county and municipal facilities and major utility lines.

Private Recreational: These are areas designated for private recreational facilities such as golf courses, campgrounds and private parks.

Redevelopment of Public/Quasi-Public Sites: Development pressures may lead to a demand for some public sites or private recreational property to be developed with other types of uses. If there is any redevelopment of public sites or private recreational lands, proper land use relationships must be maintained to ensure design and uses are compatible with the planned character of the surrounding area. In addition, since most of those sites have significant open space or natural features, some element of those features should be preserved. The Planned Unit Development (PUD) option contained in the Zoning Ordinance would be a good approach for this type of redevelopment. PUD provides design options to permit flexibility in the regulation of land development and innovation in design.

- The relatively large size of sites allows coordinated development and transitional land uses within the site to ensure compatibility with the surrounding area.

- Clustering residential units can be used to preserve common open space and natural features such as trees, topography and key views.

- Any development with another, more intense quasi-public land use, such as a medical center or hospital, should be designed as a PUD to properly integrate the development within the community. Such facilities should be designed to provide a campus type design, with coordinated access and circulation, consistent building design and preserved open space and natural features.

Table 12
Future Land Uses

Future Land Use	Acres	Percentage
Ag/Country Estates	6,080	26%
Large Lot Rural Residential	4,998	21%
Low Density Residential	4,174	18%
Small Lot Single Family Residential	2,653	11%
Medium Density Residential	531	2%
High Density Residential	145	1%
Manufactured Housing	459	2%
Neighborhood Commercial	144	1%
General Commercial	267	1%
Regional Commercial	159	1%
Mixed Use Town Center	172	1%
Office/Research	132	1%
Industrial	535	2%
Planned Industrial	250	1%
Public/Quasi-Public	633	2%
Private Recreation	407	2%
FLU Total	21,739	93%
Water	1,551	7%
Total Acres	23,290	100%

GROWTH MANAGEMENT BOUNDARY

The residents of Genoa Township have consistently said that preserving the natural beauty of the Township and controlling urban sprawl are important priorities for planning the community. The Township also desires to be able to provide efficient infrastructure services to support development. One of the most effective ways to meet both of these goals is with a "growth boundary." The growth boundary concept in the plan is designed to encourage:

- Efficient land use.
- Protection of farmland and natural areas.
- Efficient provision of utilities, services and infrastructure.
- An efficient transportation system.
- Locations for economic growth.
- Diverse housing options.

The growth boundary marks the separation between rural and urban land and defines land that can efficiently support urban services such as sewer, water and roads. Secondary growth areas are also provided to infill adjacent to the City of Brighton for low density residential. Development outside the boundary is not prohibited; however, because public utilities are not available in these areas, development needs to be maintained at a relatively low intensity and the character of development needs to not adversely impact natural features and agricultural uses.

Areas within the growth boundary include the Grand River Avenue/I-96 corridor between Brighton and Howell and areas surrounding the City of Brighton. Land within the growth boundary are separated into two distinct areas:

- *Primary growth* areas are areas that are currently served or available to be served by public sewer and water. These areas include single family and multiple family residential at higher densities with public water and sewer, commercial centers, industrial parks and mixed-use centers.

- *Secondary growth* areas do not have sewer and water, but due to their proximity to the cities of Brighton or Howell, are appropriate for infill with low density residential. Typical lot sizes will be around one (1) acre or clustered developments at an overall density of two (2) acres per dwelling.

Rural reserve areas outside of the growth boundary should be maintained at a relatively low intensity rural character of development that will not adversely impact natural features and agricultural uses.

There is presently vacant or under-utilized land within the growth boundary that can be served by public water and sewer. By focusing new development in these areas, the Township and the County can more efficiently provide the necessary infrastructure to support new growth.

In addition, the Township has planned for a mixed-use town center at Grand River and Dorr Road. This center is inside the growth boundary and currently has the public utility and transportation infrastructure to support development. This higher density center will form a compact area for housing, shopping, employment, cultural and recreational activities in a pedestrian-friendly, vital and attractive neighborhood.

The growth boundary is not intended to be static, but should be evaluated on a regular basis along with other updates to the Master Plan. The Township Planning Act requires that the Master Plan be evaluated and updated at least every 5 years. With each update, the following criteria should be taken into consideration for amending the growth boundary:

- Amount and capacity of undeveloped or under-developed land currently within the growth boundary, which should be used to satisfy the demand for development prior to expanding the boundary.
- Projected population growth within the Township and demand for other land areas for commercial or industrial development.
- The ability of the Township to extend public water and sewer to serve new land areas outside of the growth boundary.
- The capacity and condition of the road system to support the new growth areas.
- The ability of the Township, County and other public agencies to provide necessary services to the new growth areas and the additional resulting population.
- The impact of higher density development from expanding the growth boundary will have on natural features, agricultural uses and rural character.
- Consistency with the goals and objectives of the Master Plan.

GENOA TOWN CENTER

An area has been designated for the Genoa Town Center around the intersections of Grand River Avenue with Dorr and Hughes Roads. This area is planned to become a mixed-use town center with local businesses, neighborhood service establishments and traditional residential neighborhoods. Residential uses will provide a variety of housing types including apartments on upper floors above commercial uses, traditional townhouses and single family homes on smaller lots. The intent is that this area will be integrated into a pedestrian-friendly, walkable area with sidewalks connecting all uses and community parks and plazas integrated into the fabric of this town center area. The Town Center area has the potential to become an activity center for the Genoa Township community that will provide a defined sense of place for the Township.

This area is planned for higher density development and a mixture of uses; however for this type of development to be successful, it must be properly designed and developed. For that reason, this area is planned to be developed with a Town Center Overlay Zone, with specific design standards for traditional architecture, buildings, neighborhood form and streetscape elements, commonly referred to as traditional neighborhood design. Below are some general guidelines on how this area should develop.

Design Guidelines

Local Retail and Neighborhood Service

Local businesses and neighborhood service uses along Grand River Avenue will be a focal point of the proposed town center. The intent is that these areas will develop in a manner consistent with the desired small town center environment and defined by closely-knit neighborhoods surrounding a node of neighborhood commercial. Development should be similar to the traditional urban forms found in downtown Brighton and Howell.

Commercial architecture should contribute to the desired town center character. The architectural styles for buildings should resemble that of traditional architecture. Town centers commonly possess an integrated pedestrian circulation system that conveniently links residents of surrounding neighborhoods to public gathering places, neighborhood commercial areas within the town center and civic and recreational facilities. It is therefore important to ensure adequate connections are provided through the creation of a system of sidewalks and pathways that emphasizes human scale and makes a neighborhood walkable. The commercial areas of the town center need to include the following elements:

- Traditional architecture similar to that found in downtown Brighton and Howell should be used.

- Buildings should front towards and relate to the street at a pedestrian scale and orientation.

- Building envelopes should create a continuous street edge with buildings built-to the front lot line and with zero side yards between adjacent buildings.

- Parking lots should be located behind the building to minimize the dominance of automobiles and make the site more pedestrian friendly.

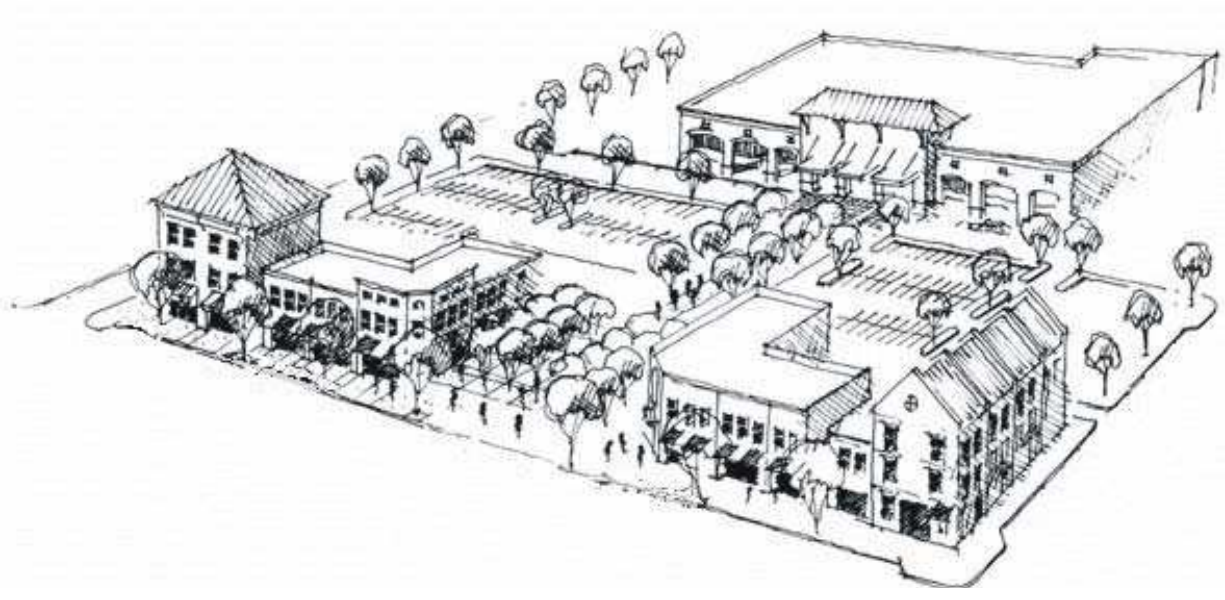
- Sidewalks and pathways should interconnect all uses within the town center with convenient links to residential areas and parks.

- Street trees should be provided along all frontages and brick walls or hedge rows used to screen any visible parking lots.

- The area should be developed with an interconnected grid street pattern with on-street parking.

- Signage on businesses should be designed to fit the traditional architecture and be pedestrian in scale.

- A vertical mixture of uses should be encouraged with residential or office above retail businesses and services.



Residential Uses

The residential areas of the town center should develop in a manner that is consistent with the traditional neighborhood character of a small-town. Residential will be a mixture of apartments above businesses, traditional townhouses, such as brownstones, and single family homes on smaller lots. Other uses may include churches, civic spaces, parks and recreational uses.

With the potential of higher density of development, it is important that residential areas be designed to include all of the elements essential to a high quality traditional neighborhood. Neighborhoods need to consist of physical components such as streets, lots, blocks, homes and community facilities, such as parks, schools and churches. Residential development should include all of the following elements:

- Traditional architecture should be utilized.
- Multiple family should be developed as tradition brownstone townhouses with courtyards and parking to the rear.
- Single family homes should be designed with the living areas on front and garages recessed to the side or rear of the home.
- Porches or stoop entrances should be provided on all front facades.
- An interconnected grid street pattern should be developed with 600-800 foot maximum block lengths. Where locations prevent through streets, then looped drives with large center green spaces should be used instead of cul-de sacs.

- Neighborhoods need to be developed at a walkable scale with sidewalks and pathways system.
- Vistas should be maintained to natural areas and focal points.
- Neighborhood parks need to be provided in visible and accessible locations to serve as neighborhood focal points/gathering places and provide for recreation.

PUBLIC STREETSCAPE AND OPEN SPACES

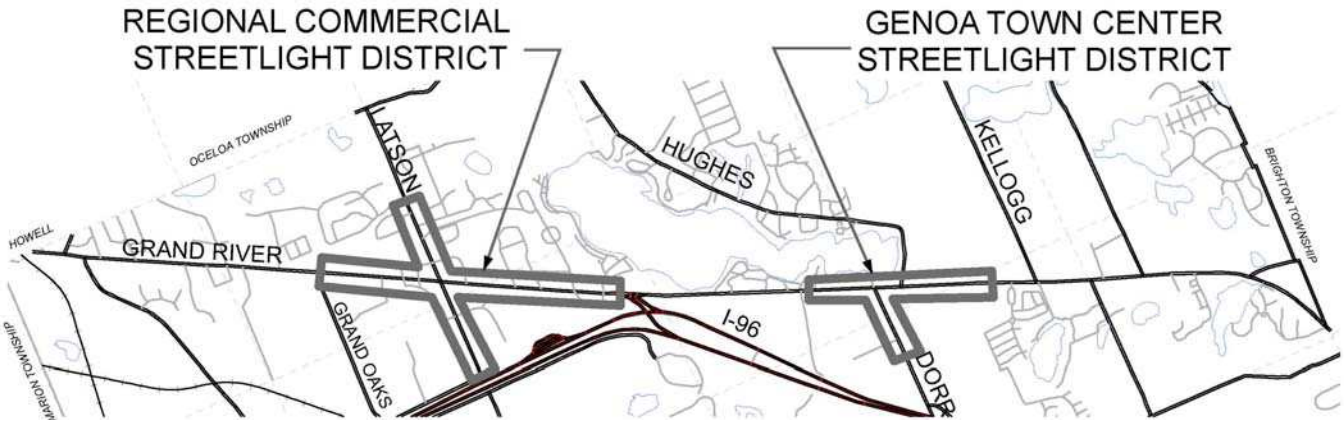
Streetscape improvements, such as street lights, landscaping, pathways and street furniture, should be integrated into the design of development in the Genoa Town Center as well as other areas along Grand River Avenue. This will create a strong sense of place and identity for the community. In order to break the corridor up, separate design themes should be considered for distinct areas such as the Genoa Town Center and the regional shopping area centered around Grand River Avenue and Latson Road.

Ornamental street lighting should be included along the frontage of development to provide unity along certain sections of the corridor. The regional commercial section of Grand River Avenue at Latson Road currently has a uniform type of street light that creates a unique identity of this area. A uniform style of street light should also be used in the Genoa Town Center area. This should be a different style of ornamental lighting to distinguish from the regional commercial area.

Gateway signs should be installed at major entryways to the Township, such as along Grand River Avenue. Enhancement elements of the entrance sign should include lighting, landscaping and masonry material.

Mixed-use developments should include plazas and public art. Public art should be designed as an enhancement to a site and provide a strong focal point. This public art should be:

- Appropriate to the scale and nature of the site.
- Integrated into the design of the building.
- Preserve and integrate natural features of the site.
- Use materials, textures, colors and design that are within the context of the surrounding area's character.
- Designed to be accessible, durable, secure, easily maintained and not pose a hazard to public safety.



I-96/LATSON ROAD SUBAREA PLAN

A new full service I-96 interchange is planned at Latson/Nixon Roads. This is a long range improvement planned by MDOT, which has not yet been scheduled for funding in the Regional Transportation Improvement Plan. The new interchange will include an overpass connecting Latson and Nixon Roads and a widening to five lanes between Grand River Avenue and the C.S.X. Railroad tracks. Nixon Road would be improved to a paved, two lane roadway from the railroad south to Chilson Road. Grand Oaks Drive and Beck Road will be relocated to accommodate the interchange ramps.

With the development of the new interchange, Latson Road will become an important gateway to the community. While the completion of the interchange may be beyond the time frame of this plan, a specific subarea plan for the Latson Road area is included in the Master Plan. The subarea plan is intended to address the following:

- Manage traffic around the new I-96 interchange and the intersection of Latson and Grand River Avenue to maintain a level of service that will meet the needs of the surrounding community.

- Encourage high-quality design for the land uses surrounding the interchange to create a gateway that presents a positive image to the community for residents, businesses and visitors.

- Protect the character of the rural residential neighborhoods south of I-96 through preservation of natural features, limiting density and preventing the intrusion of nonresidential uses beyond the immediate interchange area.

The Latson Road Subarea Plan includes the following recommendations for when the proposed I-96 interchange is constructed, as illustrated on the subarea map (See Map 8):

- The land on the west side of Latson Road between I-96 and Grand River Avenue is planned for a mixed-use PUD. This PUD should include the following:

    - A diversified mixture of uses that may include: commercial and office/research and development.

    - A mixture of uses that will diversify traffic generated from the site by spreading out the peak hour over times that minimize impact to the interchange's peak hour traffic.

Planning for the Latson/Nixon Road Corridor if the proposed I-96 interchange is developed include:

- *Manage traffic and access around interchange.*
- *Create community gateway with distinctive character.*
- *Diversified mixture of land uses.*
- *High quality architecture.*
- *Streetscape and landscaping improvements along Latson and Grand River.*
- *Protect character of rural residential neighborhoods south of I-96.*

- Access management that will minimize the number of driveways and protect the efficiency of traffic flow along Latson Road between the interchange and Grand River Avenue.

- Distinct and prominent architectural features of enhanced character, which reflect the importance of the site's location and create a positive visual landmark for this gateway to the community.

- Extensive landscaping along Latson Road and Grand River Avenue to enhance the appearance of these corridors and the gateway to the community.

- Uniformity in design through coordination of architectural styles, landscaping, ornamental lighting, pedestrian circulation and vehicular access.

- The east side of Latson Road between I-96 and Grand River Avenue is currently occupied by Latson Elementary School, Prentis Estates Apartments and a Consumer's Power service facility. If the lands occupied by the school and the Consumer's Power facility are redeveloped for another land use, the subarea plan proposes that these be redeveloped as office.

- A limited area of neighborhood service commercial and office is proposed for both sides of Nixon Road between I-96 and the C.S.X. Railroad tracks when the interchange is complete.

- Some additional residential density is proposed along Beck Road within ½ mile of the interchange, but at a density that does not require public sewer or water.

- Residential development along Nixon Road south of the C.S.X. Railroad tracks will remain at Rural Residential and Country Estate densities. The intent is to protect the rural residential character and natural features through lower density development. Some limited residential clustering may be allowed through the PUD regulations where significant buffers along Nixon Road and other natural features can be preserved. Any clustered development would need to meet County and Township requirements for on-site sanitary drainfields.

When the time frame for the interchanges is determined, the Township should update the future land use map to reflect the above land uses.

PLANNED UNIT DEVELOPMENT

Some areas may be appropriate for development under the Planned Unit Development (PUD) option contained in the Zoning Ordinance. Areas of the Township that contain significant natural features are appropriate to develop under the PUD option. The purpose of this alternate development procedure is to facilitate the following:

- Provide flexible design to respond to the unique characteristics of the site, instead of the conventional zoning standards.

- Coordinate development on larger sites.

- Preserve significant natural features.

- Provide alternatives for land that exhibits difficult development constraints, where an improved design can provide a community benefit.

- Allow clustering of residential units to preserve common open space and natural features.

- Ensure public infrastructure and road improvements are made concurrent with the development, with developer participation.

- Provide the opportunity to mix compatible land uses or residential types.

- Coordinate infill and redevelopment along the Grand River Avenue Corridor.

RESIDENTIAL DESIGN STANDARDS

Residential Densities/Rezonings: Residential densities will be based primarily on the Master Plan's Future Land Use Map. With a rezoning, the Master Plan must be considered in conjunction with site specific conditions & timing. Other factors that need to be considered are soil suitability, utilities, road conditions, natural features and surrounding land uses.

Large lot vs. cluster: Where public utilities such as sewer and water are available, this creates the opportunity to have clustered development. In areas where sewer and water are not available, there may still be the opportunity to provide a degree of clustered housing in locations where soils are well suited for onsite septic systems.

In general, areas not served, or planned to be served by sanitary sewer are planned for a low density and large lot size to accommodate on-site sanitary drainfields without compromising environmental quality. Areas planned for the lower densities are also not able to support higher densities due to limitations of roads and other public services. Areas with sensitive natural features are also planned for lower densities. While the overall net density of a site can remain consistent with the Master Plan, the PUD or cluster development option can be used to cluster the dwelling units in areas with soils suitable for sanitary drainfields and away from sensitive natural features.

Natural features preserved: Natural features that can be preserved by clustering include woodlands, wetlands, steep slopes, waterfront and poor development soils. Clustering should also be utilized to preserve greenway corridors, buffers and natural open space. A uniformly wooded site or an open site may not benefit from clustering, unless innovative design is utilized. In all instances, the benefit of clustering should be determined by a comparison of larger lot conventional subdivision and clustered development.

Open space standards: Standards need to specify that the location of open space will preserve natural features, open space corridors along waterfronts creeks and major roads. Standards in the Zoning Ordinance PUD regulations should specify the desired size of open space areas and identify priorities of items to preserve. Quality open space needs to be maintained as opposed to remnant land.

Recreational facilities: Requirements should be made for all major residential developments to have active and passive recreational amenities. The Township Subdivision Regulations should be amended to require a minimum amount of usable neighborhood

New residential development should include the following elements:

- *Density and character of development consistent with plan and surroundings.*
- *Clustered development where beneficial and appropriate*
- *Preserved natural features.*
- *Open space and neighborhood recreational areas.*
- *Pedestrian facilities for higher densities.*
- *Landscaping.*

recreational area within all subdivisions and condominium projects, whether a development is a clustered PUD or a conventional subdivision.

Pedestrian circulation: As the community grows and traffic volumes increase, the need for pedestrian facilities becomes more apparent. Neighborhood streets should be constructed with some form of pedestrian circulation, particularly for higher density developments or along collector roads. Sidewalks should be provided in consideration of factors such as the density of development, age characteristics of the expected residents, expected traffic volumes along the street, proximity to other sidewalk systems and proximity to schools, parks and public institutions.

- Sidewalks should be required along new streets within residential developments that have half acre or smaller lots or an overall density of 2 units per acre or greater.

- Bikepaths should be required where a development fronts on a major road that is designated for a pathway in the Greenways and Pathways section of this Master Plan.

- Paved pathways should be required within open space areas of PUD's. Stone or wood chip paths or wooden boardwalks should be provided in areas with sensitive environmental features instead of paved sidewalks.

Landscaping: To preserve the rural character of the Township and to enhance the natural quality of residential neighborhoods, the following landscaping should be required in all residential developments:

- Street trees or canopy trees within the front yard of each lot.

- Perimeter buffering along major roads that border the development.

- Detention pond landscaping.

RELATIONSHIP TO ZONING

The future land use map should not be confused with the Townships zoning district map, which is a current (short term) mechanism for shaping development. The plan categories generally correspond to zoning districts, but there is some overlap to allow for specific site conditions. Thus, not all properties should be immediately rezoned to correspond with the Plan. The Future Land Use Plan is intended to serve as a guide for land use decisions over a longer period of time (5 to 15 years).

Zoning changes should be made gradually so that growth can be managed. The Plan should also be consulted as one of the criterion to judge the merits of a rezoning request. Suggested zoning criteria based on standards recommended by a number of planning organizations and significant case law are listed below:

- Is the proposed rezoning consistent with the policy statements and future land use plan recommended in this study. If not, is it reasonable to change the plan? There should be justification for a deviation from the plan. The Planning Commission could require an amendment to the plan before approval of a contrary zoning request.
- Is the timing for the zoning change correct?
- Is there reason to believe that the property owner cannot realize a reasonable rate of return with any use allowed under the current zoning classification? (i.e. is use under current zoning viable?) The right to a "reasonable" use of the property, is not necessarily the most profitable use.
- Are all of the permitted uses allowed under the requested zoning district compatible with surrounding land uses and zoning?
- Is the environment of the site capable of accommodating the list of uses permitted under the requested zoning classification?
- Is the proposed change in keeping with the growth management plan? Is there sufficient public infrastructure (street, sewer and water capacity) to accommodate the host of uses allowed under the requested zoning classification? If not, is mitigation being proposed to accommodate the impacts?
- Is the site large enough to meet all requirements for setbacks, area, utilities and driveway spacing?

If the response to all those questions is affirmative, then the Township should approve the rezoning. If the response to one or more of the questions is "no" then substantial evidence should be provided by the applicant to justify the change.

Zoning changes following the future land use plan may be made over time if conditions warrant:

- *Consistency with the Master Plan.*
- *Timing.*
- *Reasonable use of land.*
- *Compatibility with surrounding land uses.*
- *Environmental conditions.*
- *Infrastructure capacity.*
- *Suitability of the lot to meet zoning requirements.*

TRANSPORTATION

INTRODUCTION

There is a strong link between land uses and transportation in Genoa Township. In addition to residential growth in the Township, there is significant new development in the surrounding townships. The area's population growth has increased the demand for retail services and has been a catalyst for economic development. A significant portion of the county's commercial and industrial development has been in Genoa Township along Grand River Avenue between the cities of Brighton and Howell. One of the more visible impacts of this growth is the increase in traffic volumes. Traffic volumes have increased even faster than the population growth.

Improvements to the road system have not kept pace with the development. One challenge for the Township is to manage growth and road improvements to provide a safe and efficient system without compromises to the natural features that give the Township its character.

To some degree, there is a conflict between the need for road improvements and other goals of the Township and residents. The same natural features that make Genoa Township a desirable place to live can be viewed as constraints to road improvements. The rolling topography, sharp curves, and limited sight distances contribute to difficult driving conditions, especially during adverse weather. Adjacent land uses and numerous road intersections at curves and areas with poor sight distance cause traffic flow restrictions and potential safety hazards.

The transportation issues to be addressed in this chapter include:

- What road improvements are needed to accommodate the projected volumes?
- How can the Township preserve its visual features and still provide safe and efficient traffic flow?
- What innovative regulatory and financial techniques can help preserve capacity and accelerate improvements?
- How can the Township ensure the impacts of each incremental development are considered and addressed?

EXISTING TRAFFIC CONDITIONS

Genoa Township is linked to the overall region by I-96, with full movement interchanges in both of the adjacent cities of Brighton and Howell; and a partial interchange in the center of the Township for traffic traveling to and from the southeast.

Within the county, Genoa Township is linked to adjacent communities by Grand River Avenue and a number of county primary roads such as Chilson and Brighton Roads.

Genoa Township's local transportation network is segmented by I-96, an east-west limited access highway that passes through the community. The division created by the expressway separates the northern third of the Township containing a majority of the commercial and industrial land from the southern two-thirds containing the majority of residential lands. Only two roads cross the six mile length of I-96 through the Township (Chilson and Dorr Roads).

Because traffic patterns are closely related to land use, it is vital that road development be coordinated with the overall land use plan for the Township.

Among the roads in Genoa Township, I-96 and the western half of Grand River Avenue are under the jurisdiction of the Michigan Department of Transportation. Primary and local roads are maintained by the Livingston County Road Commission with the State Motor Vehicle Highway Fund matched by Township funds.

Grand River Avenue is a five lane roadway that runs between the cities of Howell and Brighton. This roadway is discussed in greater detail in the Grand River Avenue Corridor Subarea Plan, a separate document considered part of this Master Plan.

The county primary roads are generally two lane paved roadways. Many of these roads have limitations due to topography, sharp curves and poor sight distance.

Future traffic patterns within the road network will be closely related to land use. Because of this, it is vitally important that road development be coordinated with the overall plan for the Township.

EXISTING TRAFFIC VOLUMES

Existing traffic volumes for roadways throughout Genoa Township vary, depending upon the location of the segment studied or the date the study was conducted. Specific studies of intersections are possible and encouraged, depending upon development trends in the Township. Recent traffic counts for several arterial, collector and local streets throughout Genoa Township are shown on Map 12.

These traffic counts demonstrate several of the Township's most traversed roadways. It is important to consider existing traffic volumes when considering future development within the Township, plans for roadway upgrading or widening or projection of future capacity.

It is impossible to apply general formula to each of the Township's many arterial and collector streets to establish a threshold of maximum expected roadway capacity. The Township should work with the Michigan Department of Transportation and the Livingston County Road Commission to evaluate existing conditions and establish an action plan for review of specific traffic management issues.

TABLE 13
Comparison of Trip Generation Rates

	Trips In Peak Hour	Trips In Average Weekday
Residential (per unit)		
Single Family	.74	9.55
Apartment	.51	6.47
Condominium	.44	5.86
Mobile Home	.40	4.81
Office (per 1,000 sq. ft. gross floor area)		
General Office Building	3.20	24.60
Medical Office Building	2.69	34.17
Research and Development	1.23	7.70
Commercial (per 1,000 sq. ft. gross floor area)		
Retail, General Merchandise	4.80	NA
Small Retail Strip	8.44	91.65
Moderate Retail Strip	6.56	70.67
Large Retail Strip	3.66	38.65
Quality Sit-down Restaurant	7.66	96.51
Fast Food Restaurant (w/drive through)	36.53	632.12
Service Station (per pump)	16.30	NA
Convenience Store	52.74	737.99
Drive-in Bank	51.23	265.21
Industrial (per 1,000 sq. ft. gross floor area)		
Light Industrial	1.08	6.97
Heavy Industrial	.68	1.50
Industrial Park	.86	6.97
Manufacturing	.75	3.85
Warehousing	.60	4.88
(Note: A trip is a one-way movement, 10 trips = 5 in, 5 out)		

Source: Institute of Transportation Engineers, Trip Generation Manual, 5th Edition.

FUTURE TRAFFIC VOLUMES

Future traffic volumes will be dependant upon the amount, type and intensity of development. The estimated traffic generation by land use type is provided in Table 12. Actual volumes in the future will be dependent on a variety of factors:

- Timing of development.
- Specific types of uses developed and their trip generation characteristics.
- Availability and price of gasoline.
- Characteristics of travel - how long the trips are and how frequently people drive.
- Amount of competing retail development.

The process for evaluating future traffic is as follows:

- Inventory existing traffic conditions.
- Project traffic production and attraction for future land uses at a designated time in the future.
- Estimate where the future traffic will travel.
- Distribute the future traffic on the road system.
- Add estimate for future through traffic.
- Identify needed transportation improvements.

Traffic counts are taken by MDOT and the LCRC on major roads in Genoa Township. The most recent existing traffic volumes are shown on Table 13 at the right.

Table 14

Existing Traffic Volumes

Roadway	2002 Volumes (vpd)
Grand River Ave. west of Chilson Rd.	22,202
Grand River Ave. west of Exit 141.	33,300
Grand River Ave. west of Dorr Rd.	16,475
Grand River Ave. east of Dorr Rd.	18,231
Grand River Ave. east of Euler Rd.	22,567
Latson Rd. north of Grand River	6,706
Chilson Rd. north of I-96	6,919
Brighton Rd. east of Chilson Rd.	14,487
Chilson Rd. north of Brighton Rd.	7,987
Bauer Rd. north of Brighton Rd.	9,712
Dorr Rd. south of Grand River Ave.	5,215
Hughes Rd. north of Grand River Ave.	3,929

Source: MDOT, SEMCOG, LCRC

CAPACITY OF THE ROADWAY SYSTEM

Traffic operations are typically evaluated by the extent to which motorists are delayed in their travel. Future traffic operations are evaluated by comparing projected traffic volumes to the capacity or the road network. Roadway capacity is defined as the number of vehicles that can travel through an intersection or roadway segment during a specified time period. Generally, traffic operations and capacity analysis is evaluated for the peak hours of traffic. Traffic engineers use a gradation scale of A through F. Generally a level of service of D or better is considered acceptable. Level of service E or F represents long, undesirable delays.

Determination of roadway capacity is dependent on a number of factors. Generally, a two lane paved roadway will have a 24 hour capacity of 8,000 to 10,000 vehicle trips for Level of Service A (unrestricted flow). This will be influenced by a number of factors that will define individual roadway capacity. These include:

- Intersection design, turning lanes and traffic control devices;
- Pavement condition and material;
- Roadway width and number of lanes;
- Topography (rolling or flat);

- Design setting (winding rural or unswerving urban);
- Location and frequency of curb cuts;
- Speed limits and other traffic control devices; and
- Sight distance limitations.

Roadway capacity is dependent on:

- *Intersection design and control*
- *Pavement condition*
- *Width*
- *Topography*
- *Design*
- *Curb cuts*
- *Traffic control*
- *Sight distance*

ACCIDENT (CRASH) DATA

Auto accidents occur more frequently on the major roads and intersections of the Township. Locations of relatively high accident locations are shown on the Traffic Conditions Map, based upon Livingston Road Commission Intersection Accident Rates between 1992 and 1996.

According to the Livingston County Road Commission, intersection operation and design issues (sight distance limitations, too many driveways, etc.) are a major consideration in determining road safety conditions. The motorist on a roadway approaching an at-grade intersection with another roadway (including driveways) should have an unobstructed view of the entire intersection and sufficient distance to the intersecting roadway to permit control of a vehicle, thus avoiding accidents. At a minimum, the driver should be able to see the headlights of an approaching vehicle.

Unobstructed sight distances should be provided on all approaches at each intersection. After a vehicle has stopped at an intersection, a driver should have sufficient sight distance to make a safe departure through an intersection area. The intersection design should provide adequate sight distance for all of the various vehicular maneuvers required upon departure from a stopped position.

ROADWAY FUNCTIONAL CLASSIFICATION

Function, efficiency and safety of roadway movement in Genoa Township can be furthered through the establishment of a classification of roads 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 major arterials such as Grand River Avenue, which primarily serves for cross-town movement, to local subdivision streets which serve to access individual homes.

This system defines the roles of each street, in terms of operational requirements; which is in turn translated into planning, management and physical design features.

Expressway: I-96 serves as the principal route between the residential population of Genoa Township and major activity centers throughout the region.

Major Arterial: The Grand River Avenue Corridor is the major roadway through Genoa Township. This roadway serves a vital function towards connecting the Township with the adjacent cities of Brighton and Howell. Because of the amount of traffic on Grand River Avenue, commercial uses have developed along this corridor.

Arterial: There are a number of roadways which move traffic throughout the Township and provide connections with other adjacent communities including Brighton Rd., Chilson Rd., and Latson Rd. These roadways also provide access from other areas of Genoa Township to Grand River Avenue.

These roadways serve for longer trips within the Genoa Township and adjacent communities. Like Grand River Avenue, the primary function of these roads is to move traffic. Access to these roads must be managed in order to maintain safe and effective movement.

Collector: The collectors serve to assemble traffic from local subdivision streets of residential neighborhoods and deliver it to the arterial. Collectors will also serve to provide access to abutting properties. Many individual subdivisions will contain one or more collector streets which funnel traffic from the local streets and connects with adjacent neighborhoods.

Local Streets: Local streets serve primarily to provide access to property and homes. These roadways are generally short and discontinuous, and generally only provide connection to one or two collector streets.

The functional classification system has a four element hierarchy in Genoa Township:

- Expressway- I-96
- Major Arterial - Grand River Ave.
- Arterial
- Collector
- Local

CONSTRAINTS

Several natural and fiscal constraints impact the development and efficiency of Genoa Township's public roadway network. In a featureless environment, where no financial hindrances to development is present, the roadway system will most likely resemble a grid system, much like that which has developed in many Midwestern communities. Genoa, however, is not a featureless environment, nor does it benefit from infinite resources. As such, the following considerations must be examined to most effectively plan, prioritize and program the Township's transportation system:

- I-96 limited access freeway;
- Water bodies;
- Wetlands;
- Topography;
- Rights-of-way;
- Financing availability; and
- Cost effectiveness of proposed improvements.

IMPROVEMENTS

There are a number of improvements that will need to be made to the road network in Genoa Township. As the Township continues to develop, traffic levels will increase creating capacity deficiencies. Maintaining the capacity of the transportation network should be done through a comprehensive approach. Intersection improvements and signalization can be made at congested intersections or intersections with relatively high crash rates. Transportation management practices, such as access management, can be used to maintain the efficiency of the transportation network.

Grand River Avenue

Specific recommendations are made for Grand River Avenue, including signalization, road widening and service drives. These are contained in the Grand River Avenue Corridor Plan.

I-96 Interchange

I-96 was constructed in the 1960s. The original Lake Chemung Interchange (Exit 141) was typical of many partial access facilities built in rural areas at the beginning of the Interstate Highway System. Interstate drivers going to a major community, such as Howell, were provided a smooth transition from the Interstate to the old highway which was usually the community's main street. A similar interchange, on the far side of the community allowed travelers, who had completed their business, to continue, via the

Interstate, to their next destination. As the area continues to grow, however, direct access to the freeway from both sides of the interchange becomes important in improving traffic conditions.

A Major Investment Study and Environmental Impact Statement was prepared to evaluate improvements to the original interchange. This study identified the following needs for transportation improvements and proposed major access modifications.

The resulting planned improvements consisted of two separate parts, with one half of the improvements being modifications to the existing Lake Chemung Interchange and the other half consisting of a new interchange at Latson/Nixon Roads. The modifications to the Lake Chemung Interchange, described below, have already been completed. The Latson/Nixon Roads interchange is part of MDOT's long-range transportation plan, although it is not programmed for construction within the time frame of this Master Plan. When a definite time frame is chosen for this new interchange, the Township's Master Plan should be updated to reflect the significant changes this improvement will have on the Township's transportation network.

The MIS/EIS identified the following needs:

- *Rapid suburbanization.*
- *Access to westbound I-96.*
- *Congestion and safety.*
- *Access south of I-96.*
- *Long distance north / south access.*
- *Limited improvement options at the Lake Chemung interchange.*
- *Livingston County expected to grow significantly by 2020.*

The existing Lake Chemung Interchange (Exit 141) has been reconstructed with a new, longer ramp to the east replacing the existing exit ramp. The new exit ramp intersects Grand River at a signalized "T" intersection and requires drivers to slow and stop in order to execute right or left turns onto Grand River Avenue. The intersection with the existing entrance ramp has been reconfigured to "T" with Grand River Avenue so drivers from the east (westbound on Grand River Avenue) access the entrance ramp from a exclusive left turn lane. Eastbound Grand River drivers entering the ramp are required to slow and execute a right turn. This intersection has been signalized to allow safe left turns.

The planned redesigned interchange consists of a modified diamond interchange with two loop ramps at Latson/Nixon Roads and a revised ramp system at the existing interchange at Lake Chemung. The Latson/Nixon portion of the interchange will be constructed initially with the "T" ramps to the west providing I-96 access to and from the west; and, the two loop ramps designed to provide full local access to 1-96 to and from the east.

Other improvements would be required to Latson Road from the new interchange to Grand River Avenue. A five lane section is generally proposed with a northbound dual left turn at the Grand River/Latson intersection. A dual left turn is also recommended for westbound Grand River Avenue. The remaining two approaches to the Grand River/Latson intersection will be constructed for two left

turn lanes to balance lanes with the required dual left turns. Nixon Road south of the interchange will require two southbound lanes to the railroad tracks to accommodate vehicle queues when trains cross the road. As a practical matter, Nixon would be constructed as a five lane section through the interchange, transitioning to a two lane roadway south of the C.S.X. Railroad tracks. Nixon Road would be improved to a paved, two lane roadway from the railroad south to Chilson Road.

Latson road between I-96 and Grand River Avenue will be shifted to the west to minimize impacts to the school. Grand Oaks Drive will be relocated to the north to accommodate the westbound entrance ramps. Likewise, Beck Road east of 1-96 will also be relocated to accommodate ramps.

Road Widening

In order to preserve the rural character of Genoa Township, any future road widening should balance traffic needs with consideration of natural features. Excessive road widening would lead to increased traffic speeds and a more suburbanized appearance. The narrower roads which wind through the hills of the community add to the natural rural character of Genoa Township. Periodic congestion may be preferred over excessive widening for through traffic. In addition, the Road Commission does not have funding available for road widening.

Because road widening is not planned, improvements will need to be made at intersections to improve efficiency. Much of the improvements to roads will include left turn lanes at intersections.

The Township should also request acceleration and deceleration lanes along major roads for all developments which require site plan review and passing lanes for projects that will generate moderate to high left turn volumes or where there are sight distance limitations.

Road Paving

Much of the expected road paving will be completed in conjunction with the proposed I-96 interchange improvements at Latson/Nixon Road. If the interchange is installed, Nixon Road, south of I-96 would be paved southward to Chilson Road. Crooked Lake Road is also in need of pavement to provide access to the Three Fires Middle School, however funding has not been allocated for this project.

Intersection Improvements

Selected intersection improvements should be made at locations which have experienced higher crash rates than other intersections. Improvements can include turn lanes, sight distance improvements, pavement improvements, signalization or other form of traffic control.

The major roadway improvement planned within the Township is the realignment of Challis Road at Bauer Road. The west approach of Challis Road is to be realigned to the south to line up with the east approach. This will create a regular "T" intersection with the south approach of Bauer road. The north section of Bauer Road will be accessed from the former west leg of Challis Road.

Another intersection under consideration for improvements is the intersection of Brighton Road and Chilson Road. This intersection is a four-way stop that currently meets at an odd angle. Also, there is a right-turn by-pass lane from northbound Chilson road to east bound Brighton Road. The by-pass may be eliminated and the intersection realigned to create more of a regular, 90 degree intersection.

Access Management

Typically the approach to addressing high traffic volume is to widen a road to 3, 4 or 5 lanes. However, widening can disrupt the rural atmosphere of an area. Maintaining safety and smooth traffic flow without costly, premature or even unnecessary widening is a goal of this Plan. One technique to help preserve capacity and promote safety while delaying or avoiding the need for widening is access management.

The lack of controls over the number and placement of driveways increases potential for traffic congestion and crashes. Poor but heavily used access systems conflict with the traffic movement function of the Township's major roads. Because of sight distance limitations in many areas of the Township, there are limited locations for optimum driveway and intersection placement.

Access management involves a series of tools to reduce traffic conflict points, and thus preserve capacity and improve safety. Access management standards regulate the number, spacing and design of access points, and requires the use of shared access systems where practical. The Township has adopted zoning standards for access management.

Number of Access Points: The number of access points should be limited to one where possible. Along major roads, driveways should be properly spaced from one another and from intersections with other major streets. Driveways should be aligned with those across the street or properly offset following the adopted zoning standards.

Alternative Access: Along major arterials, such as Grand River Avenue, alternative access should be encouraged, such as shared driveways, rear service drives or frontage roads. Commercial developments and parking lots should be connected through front or rear service drives. Frontage drives, rear service drives, shared driveways, and connected parking lots should be used to minimize the number of driveways, while preserving the property owner's right to reasonable access. Certain turning movements should be limited, especially left turns, where safety hazards may be created or traffic flow may be impeded.

High Traffic Generators: Uses that are high traffic generators should be located on the future land use and zoning maps where they can best be accommodated by the roadway system.

New Road Development

There are currently no plans or funding for the Livingston County Road Commission, or the Michigan Department of Transportation to construct new public roads. As presently planned, all new road construction within the Township will be the result of private development.

There are a number of areas in the Township that have un-subdivided parcels. The Township is currently experiencing a rapid rate of development with numerous new subdivisions, condominiums and lot splits. All newly created lots (and condominium units) are required by the Zoning Ordinance to have public road frontage, or frontage on a private road constructed to the standards of the Township Private Road Ordinance.

Development of future roads, whether public or private, needs to be well planned to ensure the establishment of a safe and efficient vehicular circulation system. Special attention needs to be given to the planning and design of roads for the following purposes:

- Protect the substantial public investment in the street system.
- Promote and coordinate effective and energy efficient development.

- Promote the orderly development of, and ongoing access to, land.
- Protect community character and minimize environmental impacts.
- Promote safe and efficient travel within the Township.
- Prevent duplication of roads.
- Ensure reasonable, though not always direct, access to properties.
- Ensure roads remain passable in all weather conditions and are adequate to provide safe, year-round access by fire, police and other public and emergency vehicles.
- Ensure roads are improved to properly handle development impacts.

Requiring connections of local roads is essential to developing a local road network and maintaining the effectiveness of the Township's major roads. Providing road connections between adjacent subdivisions allows for the movement between adjacent neighborhoods without the need to access major roads. It also provides alternative means for residents within the subdivisions to access the major road network at locations that are most efficient for traveling to their destination, shortening trips and thereby minimizing traffic impacts to the major road network. It is important that connections between local streets be designed to discourage use by through traffic that does not have an origin or destination within the local neighborhood.

Residential Roads

The Township currently has standards in the Township Private Road Ordinance for development of local private roads. These standards are applicable to local streets with a primary function to provide access to abutting residential land, and not serve higher volumes of through traffic. While all roads are required to be designed to meet Livingston County Road Commission standards, the Township has the discretion to allow some modifications on private roads where significant natural features will be preserved.

Township roadway standards provides for a hierarchy of roads based upon function. The following are used to determine the necessary road widths in residential developments:

- Lower density developments are allowed to have roads with widths as narrow as 22 feet with gravel shoulders and open ditch drainage, particularly in the rural residential areas of the Township.

- Higher density developments are required to have wider roads of 26-28 feet with concrete curb and gutter.

- Wider roads are required where a larger amount of on-street parking is anticipated.

- Collector roads in higher density developments are required to be 30 feet wide to handle larger traffic volumes.

- The roads that serve as a single point of access for a relatively large number of residential units will need to be wider and boulevards should be provided into the development. The divided roadway in effect provides an alternate access for emergency vehicles in the event one side is blocked by an accident or fallen tree.

Implementation

A majority of the road improvements, including new road development and improvements to existing roads, will be privately implemented concurrent with development. These improvements are necessary to serve development. The Township should also work closely with the Michigan Department of Transportation and the Livingston County Road Commission to ensure that proper road improvements are being installed with development. This can include additional turn lanes or the dedication of future right-of-way.

A number of public road improvements will also be implemented by the Michigan Department of Transportation and the Livingston County Road Commission. The Township should continue to work with these agencies to ensure road improvements will meet the needs of Township residents and businesses.

The Township can also take a direct role in implementing public road improvements. Current practices and programs for funding maintenance and improvements to Genoa's roadways allow a range of options, including: dedicated millage, special assessments, bond programs, tax increment financing and Transportation Equity Act for the 21st Century (TEA-21).

OTHER MODES OF TRANSPORTATION

Rail

Genoa Township has two active railroad lines. The T.S.B Rail Road line runs north and south through the west side of the Township. The C.S.X. Rail Road line runs east and west through the center of the Township between the cities of Brighton and Howell. Both of these lines are fairly active. These rail lines are predominantly for freight transit.

Non-motorized

In the past, there has been limited development of pedestrian facilities within the Township. In response to the recommendations of the Grand River Avenue Corridor Plan, the Zoning Ordinance and Subdivision regulations have been amended to require sidewalks in medium to higher density residential developments and commercial frontages of Grand River Avenue.

Modes of transportation:

- *Vehicular*
- *Non-motorized*
- *Rail*
- *Air*

Commercial and residential development along Grand River Avenue have begun to install sidewalks. Sidewalks in this area are intended to maximize the benefit of providing higher density residential development within walking distance of complimentary commercial uses.

A number of recent developments within the Township have utilized Planned Unit Development (PUD) option for creating clustered housing surrounded by natural open space. Most of these types of development have included trail networks. Efforts should be made to create linkages between these PUD's to create an integrated community network.

Genoa Township currently has a Bike Path Committee that is working with the Livingston County Greenways Initiative to investigate locations for pedestrian facilities within the Township. The next chapter of this Master Plan deals with bike paths and greenways.

Air Ports

There are no airfields in Genoa Township. The nearest public airport to Genoa Township is the Livingston County Airport, northwest of the City of Howell. Detroit Metropolitan Airport is in the City of Romulus, approximately 45 miles southeast of Genoa Township.

GREENWAYS AND PATHWAYS

GREENWAYS DEFINED

A greenway is a linear feature within the natural landscape that acts as a conveyance to integrate the various components of the landscape. Portions of the greenway function is to tie together the cultural landscape by providing transportation routes and access between Genoa's residential population and the various recreational, civic, cultural, and natural resources. Greenways also enhance the ecological function of Genoa's natural environment by preserving natural areas and corridors which are vital to the environment. A greenway is a corridor that provides the following:

- Protection, management and enhancement of Genoa's cultural resources and provision of recreational opportunities, including:
    - nature trails, bike paths and pedestrian facilities development,
    - establishing linkages between cultural and recreational resources, and
    - providing recreational opportunities;
- Protection, management and enhancement of Genoa's natural resources, including:
    - water quality improvement,
    - fish and wildlife migration and habitat enhancement, and
    - protection of natural vegetation;
- Enhancement of the quality of life and aesthetic appeal of Genoa, including:
    - scenic natural areas,
    - natural character of residential neighborhoods, and
    - natural buffers between residential and non-residential land uses,
- Provision of an alternative non-motorized transportation mode to link residential areas to major destination points within the Township.

Greenways function as linkages which tie together the various components of Genoa's cultural and natural resources. The function of creating and maintaining these linkages as a Township wide network, enhances the value and quality of each individual component.

Greenways are corridors or linkages that are managed for conservation and/or recreation and which connect focal areas. These include:

- *Recreational greenways featuring paths and trails of various kinds, based upon natural corridors and public rights-of-ways;*
- *Ecologically significant natural corridors possibly along waterways and/or drainageways;*
- *Scenic routes along public right-of-ways, especially along waterways and through natural areas;*
- *Buffer zones between neighborhoods and other, non-residential land uses; and,*
- *Linkages providing for alternative modes of non-motorized movement between residential neighborhoods and destinations such as recreation areas, shopping districts, schools and churches.*

GREENWAY GOALS & OBJECTIVES

- Create a complete non-motorized network to provide the opportunity for pedestrian activity such as walking, jogging, and bicycling in a safe and comfortable environment.
- Provide linkages between residential areas and recreation areas.
- Preserve the Township's natural character of forested areas, water resources and open views of rural open space.
- Provide a natural corridor of open space connecting significant natural/open space and conservation areas of the Township.
- Provide buffers between development and ecologically sensitive areas.
- Maintain the ecological functions of natural waterways and drainage networks.
- Enhance natural habitat and migration routes to increase the Township's ability to support indigenous wildlife.
- Increase awareness and access to the system of greenways, bike paths and the Township's natural amenities.

Greenway Objectives:

- *Pedestrian activity*
- *Linkages from neighborhoods to destinations*
- *Preserve natural rural character*
- *Natural corridors connecting open space*
- *Buffer ecologically sensitive areas*
- *Protect natural waterways*
- *Wildlife habitat*
- *Increase awareness of greenways*

SOUTHEAST LIVINGSTON GREENWAYS

A conceptual greenways plan has been prepared for southeast Livingston County. This plan illustrates a non-motorized system of paths and conservation corridors containing significant natural features. This plan is a cooperative effort between the City of Brighton, the four surrounding townships, including Genoa, the Livingston County Planning Department and the Southeastern Livingston County Recreation Authority

The Livingston County Planning Department has also prepared a greenway manual for the Livingston County Greenways Initiative. This document outlines goals, and objectives of greenways and standards for greenway development within the county.

Both of these documents are incorporated into this plan by reference as they provide a basis and a regional context. This plan examines Genoa Township in more detail and makes additional recommendations relative to the development of greenways concurrently with the growth and development of Genoa Township.

GENOA'S CULTURAL AND NATURAL RESOURCES

Cultural and natural resource components are comprised of a variety of land and water areas; all of which function as an integral system. Because the combined total system provides more value than the sum of its individual parts decisions on individual locations should be based upon the vision of the whole. The components of Genoa's cultural and natural resource system are classified into a range of categories from public to private. These include the following:

- Brighton State Recreation Area;
- Detroit Camp;
- County lands;
- Township Hall and other Township owned properties;
- Other government properties such as public schools, road rights-of-way and utility easements;
- Private areas which are maintained in a natural state such as drainageways and wetlands;

These open space areas are accessible to a varied group of people. Government owned areas are generally accessible to the public while private green space is only open to a smaller private group of users.

Genoa Township is made up of a number of individual cultural and natural resource components which combine to create the overall quality community. These include:

- *Township owned natural areas and public open space properties;*
- *Other municipal properties such as the Township Hall;*
- *Schools, roads and bike paths;*
- *Drainageways, wetlands and floodplains; and,*
- *Private open space.*

TOWNSHIP PROPERTY

The Township owns approximately 45 acres containing Township Hall and featuring large open space areas and wetlands. The surrounding land also provides the opportunity for other uses such as public open space, conservation and recreation. In addition, two sites located near Latson Road and Grand River Avenue were recently dedicated for future neighborhood parks. The Township is also seeking locations for future community parks, as detailed in the Parks and Recreation Plan. The Township lands should be linked with the greenways and bike path system for the community to tie the public lands with surrounding neighborhoods.

PROPERTIES OWNED BY OTHER GOVERNMENT AGENCIES

The Township contains other publicly owned lands which contribute to the overall network of public open space. These include the following:

- Many road rights-of-way provide linear paths. Some have improvements such as bike paths that allow non-motorized movement. Many provide natural aesthetic amenities such as natural vegetation and views of open water.

- Public schools will serve more as destinations then routes for cultural and civic activities. These facilities are destinations for children in the community as well as locations for school related community events.

- The Brighton State Recreation Area is 4,947-acre park is located at the southern edge of the Township. The majority of the park is located in Hamburg Township, however a portion is in Genoa. Brighton Recreation Area provides a multitude of year round activities.

- The Lake Chemung Park is a recreational facility, located along Grand River on Lake Chemung, is owned by the Livingston County Road Commission. The small site provides open space and picnic facilities.

- Lucy Road Park is a 50-acre park, located just south of Grand River Avenue near the township's western boundary and owned by the City of Howell. The former landfill was closed in 1988, the City has been working with the Michigan Department of Environmental Quality to reopen the park.

- There are two Department of Natural Resources (DNR) Access Sites within Genoa Township, one of which is located on Lake Chemung and the another on Crooked Lake. These sites provide public boat launches.

PRIVATE OPEN SPACE

In addition to having public areas for access, recreation and non-motorized movement, a need exists to have these networks for ecological reasons. Private open space plays an important role in maintaining the Township's ecological functions. These include private lands maintained in a near natural state through regulatory means such as drainageways and wetlands. Private open space can also include conservation easements or park/common areas within

Management of natural greenway systems enhances each individual's enjoyment of their own private open space and protects the investment that each resident has made in their property through the following:

- *Habitat for wildlife.*
- *Buffers between clustered development and ecologically sensitive areas.*
- *Minimize increases in storm water runoff.*
- *Vegetation to maintain air quality.*
- *Maintain natural rural character.*

developments, such as PUD's as well as areas which have been left undeveloped due to constraints, such as steep slopes and dense forest.

While these private open space areas are not accessible by the general public, they do enhance the quality of each individual's personal space. Collectively, these open space areas are essential to maintaining the investment that each resident has made as a part of the community. As the Township becomes more developed, natural ecosystems will be disrupted and the rural character of the community may be altered. Providing for a natural open space which is integrated with development will help to mitigate these impacts and protect private property owner's investments. This private open space also still provides ecological benefits and wildlife habitat. Private open space within Genoa Township includes the following:

- Subdivision parks and common areas range in size from about half an acre to over 100 acres.

- Commercial Recreation Facilities include; the Mt. Brighton Ski Area, a 220-acre recreation area located in the southeastern portion of the township featuring downhill skiing during winter and an 18-hole golf course. Other commercial recreational facilities within Genoa Township include golf courses.

It is important that pathways to these publicly and privately owned facilities be provided to ensure a higher level of pedestrian activity is achieved within the Township.

ENVIRONMENTAL CONDITIONS

The natural environment is a critical element. The components to the environment function, change and interact as part of the ecosystem. A major objective of the greenway program is to maintain these natural functions in a balanced state, while still allowing the community to grow in a controlled manner. One method to protect these areas is through the greenways program. The environmental features to be considered, as described in the Environmental Conditions section of this Master Plan, are soils, topography, creeks, wetlands, lakes, woodlands and wildlife habitat.

USER GROUPS

There are a number of user groups for various components of the Township Greenways system. These include the following:

- Pedestrians: This group utilizes the trail and path system for an alternative means of transportation. While the requirements of this group are similar to those of the recreational walkers, convenient and safe access to destinations is most important.

- Bicyclists: This group utilizes the path system for recreation as well as transportation. The pathway's physical requirements are much different for this group. Bicyclists will generally have a much larger range than pedestrians and require more greatly improved trails. In crowded situations, there will be conflicts between pedestrians and bicyclists. If there are high traffic areas, separately designated paths may be required.

- Recreational/health walkers and joggers: These groups will utilize the path system for recreation, scenic enjoyment and physical exercise. These users require a safe and relaxing environment.

- Handicapped: In development of a greenway system, the specialized needs of the handicapped need to be considered. Handicapped accessible facilities should minimize hazardous conditions and permit maneuverability.

- Educators/students: An integral part of the greenway system are Brighton and Howell area schools. Greenways can not only be used as routes for students going to and from school, but also as "outdoor classrooms" for the study of nature.

- Equestrians: Despite the rapid rate of development in Genoa Township, there is a significant amount of residents that keep horses. Currently, horseback riders utilize private property, the Brighton State Recreation Area, and gravel county roads with low traffic volumes. Trails for this use may conflict with other users. If there is a demand for this use, specific bridle trails may be designated in proximity to any riding stables in the Township.

User Groups:

- *Pedestrians*
- *Bicyclists*
- *Recreational/health walkers and joggers*
- *Handicapped*
- *Educators/students*
- *Equestrians*

GREENWAYS

PATHWAYS

The trails proposed under the Greenway plan will provide connections between homes and neighborhood schools, and activity centers, as well as other trails and transportation facilities. In addition, these trails will provide ample opportunities for recreational use.

RECREATION

In addition to recreation related to trails and active parks, other passive recreation is encouraged where environmental impacts will be acceptable and where appropriate easements exist. Passive recreation consists of activities which are not programmed and do not require developed facilities. Examples are photography, resting, bird and wildlife observation, picnicking, reading, and fishing.

Types of Greenways:

- *Conservation*
- *Recreation*
- *Pathways*

CONSERVATION

Greenways can be established to maintain and enhance the ecological functions which are vital to the quality of life on Genoa. The natural functions to maintain and the components of the natural system are described in the previous section of this plan under Environmental Conditions. Natural features which will determine the most appropriate location for greenways serving this purpose are soils, drainage, wetlands, vegetation and wildlife habitat.

Drainageways: Greenways should be established to protect natural drainageways. This will include the drainageways wetland areas that the drain flows through and the natural vegetation in the upland areas surrounding drainageways. Sufficient natural buffers on both sides of creeks should be protected in a natural vegetative state to maintain the quality and moderation of surface water flow into the drainageways and protect from excessive soil erosion.

Habitat: Greenways should be established to reconnect natural habitat corridors. Where there are areas of wildlife habitat such as wooded areas or wetlands, these can be connected by greenways. Connections should be made between like natural areas, and the connection should match the natural characteristics of the existing habitat areas.

PATHWAYS

Pathways are to be shared use facilities among pedestrians, cyclists, equestrians, the handicapped, and other pathway users. The pathways will provide connections between homes and neighborhood schools, other activity centers, other pathways and transportation facilities. In addition, these pathways will provide ample opportunities for recreation. Pathways are proposed in the following locations:

- Along Grand River Avenue: Paved pathways should be developed along both sides of Grand River Avenue from the City of Brighton to the City of Howell. This will serve as the principal east-west connection through the Township and link many of the neighborhoods in the northern portion of the Township with the adjacent cities. Other north-south pathways will provide connections to the Grand River Avenue paths to create an integrated network.

- Latson/Nixon/Chilson Roads: a continuous paved path is proposed to span the Township from north to south along the Latson/Nixon/Chilson Road corridor. If a new interchange is constructed at Latson Road, the overpass will be designed with a pedestrian pathway. Pathways are proposed along both sides of Latson Road, north of Grand River Avenue to serve the higher density residential in this area which is in close proximity to the Grand River Avenue corridor. The sections along Nixon Road and Chilson Road in the southern portion of the Township may include a paved path and a separate unpaved path for horseback riding. At the southern edge of the Township, the pathway will enter the Brighton State Recreation Area and tie into the hiking paths located in Hamburg Township to the south.

- Brighton Road: A pathway is proposed along Brighton Road between Chilson Road and the City of Brighton. This will provide a connection between the higher density residential in the area of Oak Pointe and the City of Brighton.

- Dorr Road: A new Township Hall has been constructed on Dorr Road between I-96 and Crooked Lake Road. A pathway along Dorr Road would provide a link between the Township Hall and the new Town Center at Grand River Avenue. This would require a pedestrian bridge over I-96. A pathway along this route would also provide a strong link between the higher density residential area around Lake Chemung and that around the Tri-Lakes area. A long term goal is to have the path extended down Conrad and Clifford Road to connect with Brighton Road.

- Crooked Lake Road: A pathway extending west along Crooked Lake Road from the Township Hall to Nixon Road would complete a looped path system around the Tri-Lakes area. This would also provide a linkage between the Township Hall and the Three Fires Middle School.

- Challis Road: An off-road shared used pathway should be developed along Challis Road from Dorr Road to the City of Brighton.

- Bauer Road: An off-road shared used pathway should be developed along Bauer Road from Challis Road to the Brighton State Recreational Area at the southern edge of the Township.

Pathway Siting: The major objectives of pathway location are as follows:

- To design a pathway that produces a minimum impact on the land.

- To provide for recreation and transportation.

- To choose an alignment that is visually pleasing and provides a variety of views and experiences.

- To take advantage of the natural terrain and vegetation.

- To provide a pathway that requires minimum maintenance.

- To have minimum impact on wildlife habitat and wetlands.

Design:

- The Livingston County Greenways Initiative contains standards for development of various types of trails. The standards contained in this plan should be followed.

- A pathway should be designed with curves that appear to have a purpose, not be placed haphazardly or regularly throughout the pathway length. An alignment which has long curves and short tangents will flow gracefully through the landscape.

- The relationship between Greenway projects, particularly pathways, and nearby private spaces must be carefully considered. Views, residential privacy, and access from residential privacy, and access from residential areas adjacent to Greenways are important.

- Residential neighborhoods require a design that is sensitive to the character, forms, materials, and colors. Nearby residents should be closely involved in the design process. Consider carefully the character of the public/private interface.

- Environmentally sensitive areas require a careful balance between the desire for recreation and the protection of natural resources. Determine the appropriate location and intensity of use of any path system carefully. Take advantage of opportunities to enhance the natural environment of the greenway. Provide seating in areas where wildlife can be observed without being disturbed.

- Pathways and wildlife habitat potentially conflict because of the environmental impact of construction. In addition, some wildlife species are intolerant of the presence of pathway users. Where high quality habitat is present, pathway links should be rerouted around the habitat. Subtle, attractive buffers should be integrated where necessary to protect privacy and wildlife.

- Occasional viewing, and seating areas can be provided along the path for resting and passive recreation activities.

- Path alignment should consider the larger patches of vegetation, open space, and drainage corridors that have high wildlife value by not cutting through the center of such parcels.

- Locate path intersections at natural focal points and convenient access points.

Pathway type: Pathways can be paved or unpaved. Paved pathways should be designed and constructed following the standards of the American Association of State Highway and Transportation Officials. To determine whether paved, unpaved, or parallel paved and unpaved pathways are most appropriate, the following criteria can be used:

- Paved pathways should be provided when:

    - High bicycle speed and volume is anticipated
    - There is an existing or projected year round transportation need for the pathway.
    - Winter maintenance is anticipated.
    - The pathway connects paved pathway sections along a Greenway.

- Unpaved pathways should be provided when:

- The Township finds that a paved pathway would cause unacceptable environmental impacts.
- The criteria for paving a pathway are un-met and a pathway is still needed.
- Equestrian use is anticipated.

- Separate paved and unpaved pathways may be provided when:

  - Both the criteria for paving a pathway are met and equestrian use is anticipated.
  - Use conflict are anticipated because of high volume.
  - The environmental impacts of separate pathways are acceptable.
  - The area has sufficient space and amenity to make separate pathways desirable.

IMPLEMENTATION

The following table provides a summary list of the recommendations contained in this plan and alternative impleme

Plan Recommendation	Implementation Mechanisms
Natural Resources Management	
Lower density zoning districts for areas with significant fragile natural resources.	▸ Maintain lower density Country Estate and Rural Residential zon
Natural features setbacks from wetlands, creeks, ponds and lakes.	▸ Maintain setback requirements from waterways in Zoning Ordin ▸ Utilize clustering allowed by PUD to preserve wetlands as open setbacks from shorelines.
Protect natural topography and vegetation on areas with steep slopes.	▸ Maintain setback requirements from waterways in Zoning Ordin ▸ Utilize clustering allowed by PUD to preserve steep slopes as op ▸ Adopt slope based density regulations to reduce allowable densit
Storm water management to protect the quality of natural waterways and adjacent properties.	▸ Adopt Township Stormwater Ordinance.
Protect quality of ground and surface water from contamination by septic disposal or hazardous materials.	▸ Provide sanitary sewer service to existing higher density resident ▸ Minimize residential densities in areas where public sewer is not ▸ Require all uses that handle hazardous materials to prepare a pol plan and provide secondary containment and other necessary pro ▸ Prohibit floor drains for industrial uses from discharging to storn
Restore natural wetlands that have been altered from their natural state.	▸ Require PUD's to restore previously disturbed wetlands as a qua PUD approval. ▸ Incorporate restoration of wetlands into drainage design for new
Manage boat usage to prevent overcrowding and degradation of lake quality.	▸ Maintain keyhole ordinance. ▸ Adopt additional lake access regulations.
Preserve natural vegetation.	▸ Utilize clustering allowed by PUD to preserve steep slopes as op ▸ Require natural buffer zones along public road frontages.

Land Use	
Implement future land use plan.	▸ Maintain current zoning that is consistent with Future Land Use ▸ Rezone properties to the Future Land Use Plan when timing and gradually over the 20 year plan time frame.
Maintain growth boundaries.	▸ Do not extend sewer or water services outside of growth bounda ▸ Allow infill development within growth boundary and do not rez growth boundary to allow higher density residential or commerc ▸ Evaluate growth boundary with each regular Master Plan update available for infill development
Develop Genoa Town Center.	▸ Adopt form-based zoning regulations for the Town Center to ens redevelopment in this area is consistent with the intent to create a neighborhood. ▸ Prepare an overall concept plan for this area to coordinate develo sites. ▸ Develop streetscape standards for this area including sidewalks, lighting, street furniture, public art and plazas. ▸ Utilize PUD regulations to coordinate development of larger site
Implement I-96/Latson/Nixon Road Subarea Plan.	▸ Require PUD for development of large parcels along Latson/Nix ▸ Adopt additional access management standards for roads adjacer ▸ Require design of residential developments to preserve buffers a
Transportation	
Grand River Avenue improvements, including signalization, road widening and service drives, as detailed in the Grand River Avenue Corridor Plan.	▸ Coordinate with MDOT and LCRC. ▸ Special Assessment District. ▸ TEA 21. ▸ Require proportionate share of improvements as a condition of d
New I-96 Interchange at Latson/Nixon Roads and a revised ramp system at the existing interchange at Lake Chemung.	▸ Coordinate with MDOT and LCRC.

Road Widening	▸ Coordinate with MDOT and LCRC. ▸ Require proportionate share of improvements as a condition of d ▸ Regulate residential densities and the location of traffic intense u road widening.
Road Paving	▸ Coordinate with LCRC. ▸ Require proportionate share of improvements as a condition of d ▸ Regulate residential densities to minimize traffic on gravel roads
Intersection Improvements	▸ Coordinate with MDOT and LCRC. ▸ Special Assessment District.
Access Management	▸ Coordinate with MDOT and LCRC. ▸ Regulate access through Zoning Ordinance access management s
New Road Development	▸ Require adequate roadways within all new development through condominium regulations.
Greenways, Pathways and Recreation	
Provide for recreational areas	▸ Work with Livingston County, school districts and the cities of B provide recreational facilities for the area. ▸ Require private neighborhood recreational areas within all reside ▸ Obtain grant to acquire site for future Township park. ▸ Private investment and donations.
Provide for conservation greenways	▸ Utilize clustering allowed by PUD to preserve ecological and rip open space. ▸ Private investment and donations.
Develop bike path system for Township	▸ Provide dedicated millage for bike path construction. ▸ Include bike paths in Township Capital Improvement Plan ▸ Work with LCRC to include bike paths with road projects. ▸ TEA 21 grants. ▸ MDNR funds for pathways. ▸ Private investment and donations. ▸ Require all developments to construct bike paths along site front bike path plan.

Township Implementation Funding Sources

Dedicated Millage: Special millage can be used to generate revenues for a specific purpose. The Township cou for special millage to implement recommendations in the Master Plan. For example, several Michigan comm acquisition fund that is supported by a one-quarter mill property tax. A land acquisition fund would be a useful way widening or dedication in Genoa Township. Other communities have millages to fund road improvements, parkland acquisition.

Special Assessment: Special assessments are compulsory contributions collected from the owners of property be improvements (paving, drainage improvements, etc.) to defray the costs of such improvements. Special asse according to the assumed benefits to the property affected. Special assessment funding might prove useful to im streetscape improvements, secondary access drives in districts fronting on arterial streets and to construct new appropriate. These programs are particularly helpful for improving and upgrading older local roads.

Bond Programs: Bonds are among the principal sources of financing used by communities to pay for capital obligation bonds are issued for specific community projects and are paid off by the general public via property tax r are issued for construction of projects that generate revenue (i.e. parking structures, etc.). These bonds are retired, generated by the project.

Tax Increment Financing: Tax increment financing is authorized by the Downtown Development Authority Act Finance Authority Act. When a tax increment finance district is established, the stated equalized assessment valu the district is recorded. Every year thereafter, the property tax revenue generated by any increase in the total "captured" by the responsible organization to finance improvements established in the overall development plan. T required document illustrating all proposed improvements within the district. Often, revenue bonds are used to f and the tax increment revenues are used to repay the bonds. This tool could also prove to be a valuable tool fo within the Township.

Transportation Efficiency Act (TEA21): The Transportation Efficiency Act of 1998 (TEA21) establishes a enhancement activities. Funds from the Surface Transportation Program are set aside for these activities and transportation enhancement activities including historic preservation, landscaping and beautification, pedest improvements and other similar projects. Each year funds become available for allocation based on a competitive r solicited and screened for application completeness at the local level, screened for project merit at the regional lev action at the State level by the Michigan Department of Transportation. This program is an established resource wh also consider, particularly to fund bike path construction.

Michigan Natural Resources Trust Fund: MNRTF provides funding assistance for state and local outdoor re land acquisition and development of recreation facilities. This assistance is directed at creating and improv opportunities and providing protection to valuable natural resources. These are grants between $15,000 and $ minimum local match of 25 percent. This grant is ideal for implementing land acquisition and park development go

Land and Water Conservation Fund: LWCF provides funding assistance for communities to acquire and d recreation. The minimum award is $15,000 and the maximum of $500,000. The eligibility criterion emphasize resources such as waterways. This grant is ideal for land acquisition that is intended for passive recreation and open

Michigan Natural Resources Tree Planting Grants: Through the Michigan Department of Natural Resour planting grant programs that will assist in funding landscape enhancements at the parks and re-foresting proj awarded some tree planting monies to plant trees at the Township Hall.