

SECTION 4

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section identifies the social, economic, and environmental factors that exist in the project area and reviews the potential impacts of the TEPA. Please see the **Forward** of this document for further explanation. Those impacts with a reasonable possibility for individual or cumulative significant impacts were analyzed further. The results of this analysis of the TEPA are discussed below.

4.1 Relocations

To construct the proposed project, permanent fee right-of-way and grading permits will be required at the time of right-of-way acquisition.¹ Some sections of M-15 now held by permanent easement will be converted to fee-simple ownership. New right-of-way that MDOT will likely need to acquire is identified in the Engineering Report² prepared for this project (see Appendix B). Relocation information is summarized in Table 4-1. The acquisition of these parcels will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. A “Relocation Plan – Conceptual Stage” (Appendix D) was developed based on a review of real estate available in the corridor. It was determined that there is an adequate number of residences for sale and commercial space for lease or vacant commercial land available for development that will allow relocation without hardship. Many of the lots along M-15 are deep. Homeowners may be able to relocate/rebuild their homes to the rear of their lots. The same will hold true for some businesses.

**Table 4-1
Relocation Information**

| Type | Township | | | | | Total |
|---------------------------|--------------|---------|-----------|-------|---------|-------|
| | Independence | Brandon | Groveland | Atlas | Davison | |
| Single Family Dwellings | 10 | 6 | 3 | 13 | 6 | 38 |
| Multiple-Family Dwellings | 0 | 0 | 0 | 0 | 0 | 0 |
| Apartments | 0 | 0 | 0 | 0 | 0 | 0 |
| Businesses | 1 | 23 | 2 | 12 | 2 | 40 |
| Employees | 2 | 133 | 18 | 43 | 4 | 200 |
| Institutions | 0 | 0 | 0 | 0 | 0 | 0 |

Source: The Corradino Group and MDOT

¹ Grading permits give MDOT the right to temporarily enter private property to make minor grading changes - those that will not alter the permanent nature of the ground significantly or negatively. Basically, MDOT would pay a fee for "renting" the property for a short period of time to make these minor changes. Often the result is an improved driveway grade. If a large grade change is made, mitigation may be necessary, i.e. timber retaining walls, vegetation, etc. Decisions on grading permits are made during the design phase.

² "Preliminary Engineering Report, M-15—I-75 to I-69," The Corradino Group and Orchard Hiltz and McCliment, March 2003.

Much housing is available in the corridor. To give some perspective on the availability of new housing, it is noted that the number of building permits for new single-family housing in the townships and villages in the corridor in 1998, 1999, and 2000 totaled 1317. A windshield survey performed in March 2001 found 40 homes for sale on or within one-quarter mile of M-15.

Businesses in the corridor are primarily service oriented with a local client base. They are likely to relocate within the corridor, minimizing job loss. Commercial space for lease and vacant commercial land available for development will allow relocation without hardship. Additionally, many of the lots along M-15 are deep so some business property owners may be able to rebuild/relocate the business structures to the rear of the lots. A considerable number of lots zoned commercial are for sale and commercial space is available for lease at a number of locations.

4.2 Social Impacts / Community Cohesion

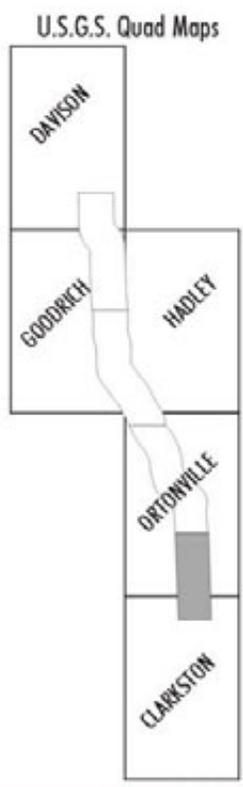
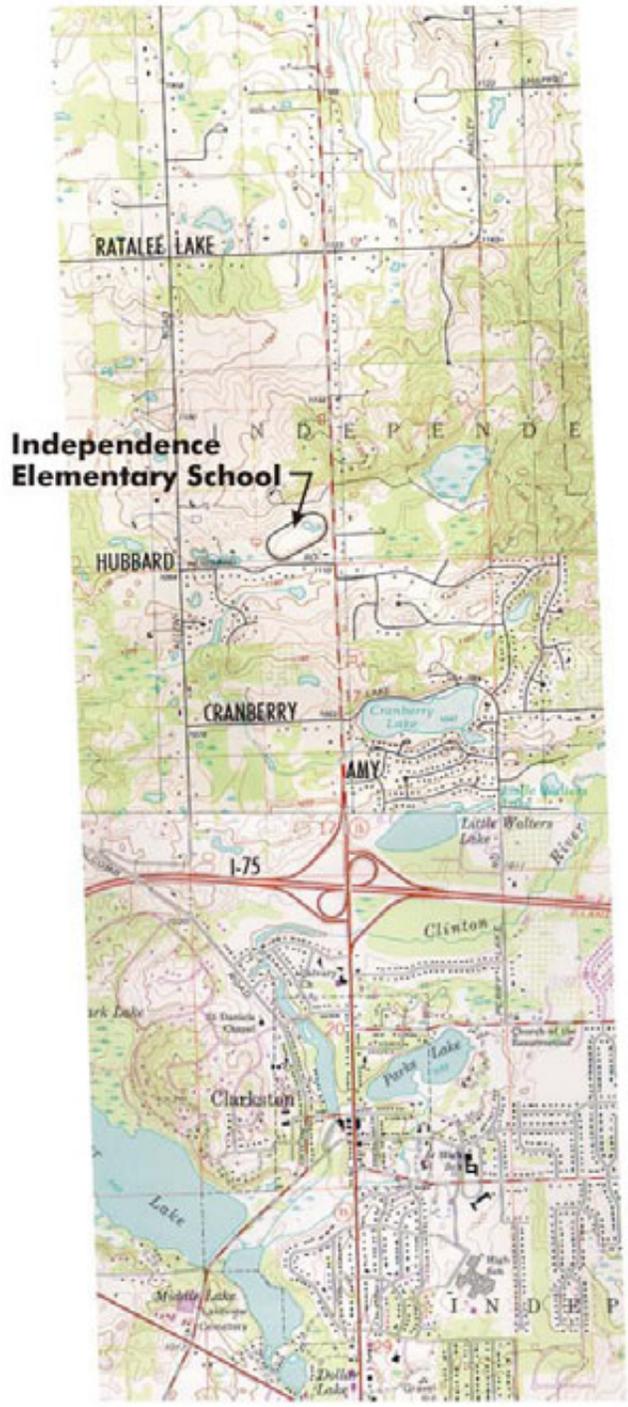
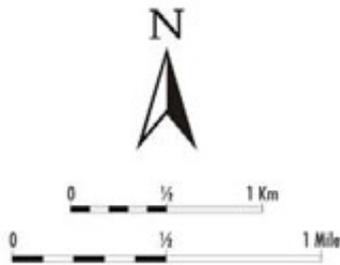
M-15 bisects Goodrich. Older residential development is to the west of M-15 around the original town center and millpond. A new subdivision of 100 dwellings is 800 feet east of M-15. M-15 separates these two areas today and would continue to do so as a five-lane road under the Technically and Environmentally Preferred Alternative. Some residents of Goodrich and the Village Council have expressed opposition to any improvements, which they view as changing the rural character of the area. However, Goodrich's population grew by 48 percent in the last decade, and the forecast of future travel demand reflects locally projected growth. Growth would have to be virtually stopped in Goodrich and north and south of it to reduce the need for the project.

The project will have no significant long-term negative impacts on area schools, churches, recreational areas, or police and fire protection services, although there may be some temporary disruptions during construction. Access for emergency vehicles will be provided for during the construction of the roadway. Meetings have been held with school officials and emergency service providers throughout the length of the corridor. With project construction considerations related to emergency services are:

- All vehicles will experience improved travel times.
- In five-lane sections there will be full access to all properties.
- In boulevard sections access will be somewhat restricted by the median. U-turn slots will be available at regular intervals to allow emergency access to all properties. Loops will be provided, if necessary, to improve the turning radius for fire trucks where the width of the median is inadequate to provide such a radius. MDOT has and will work cooperatively with local emergency service providers to review U-turn locations.

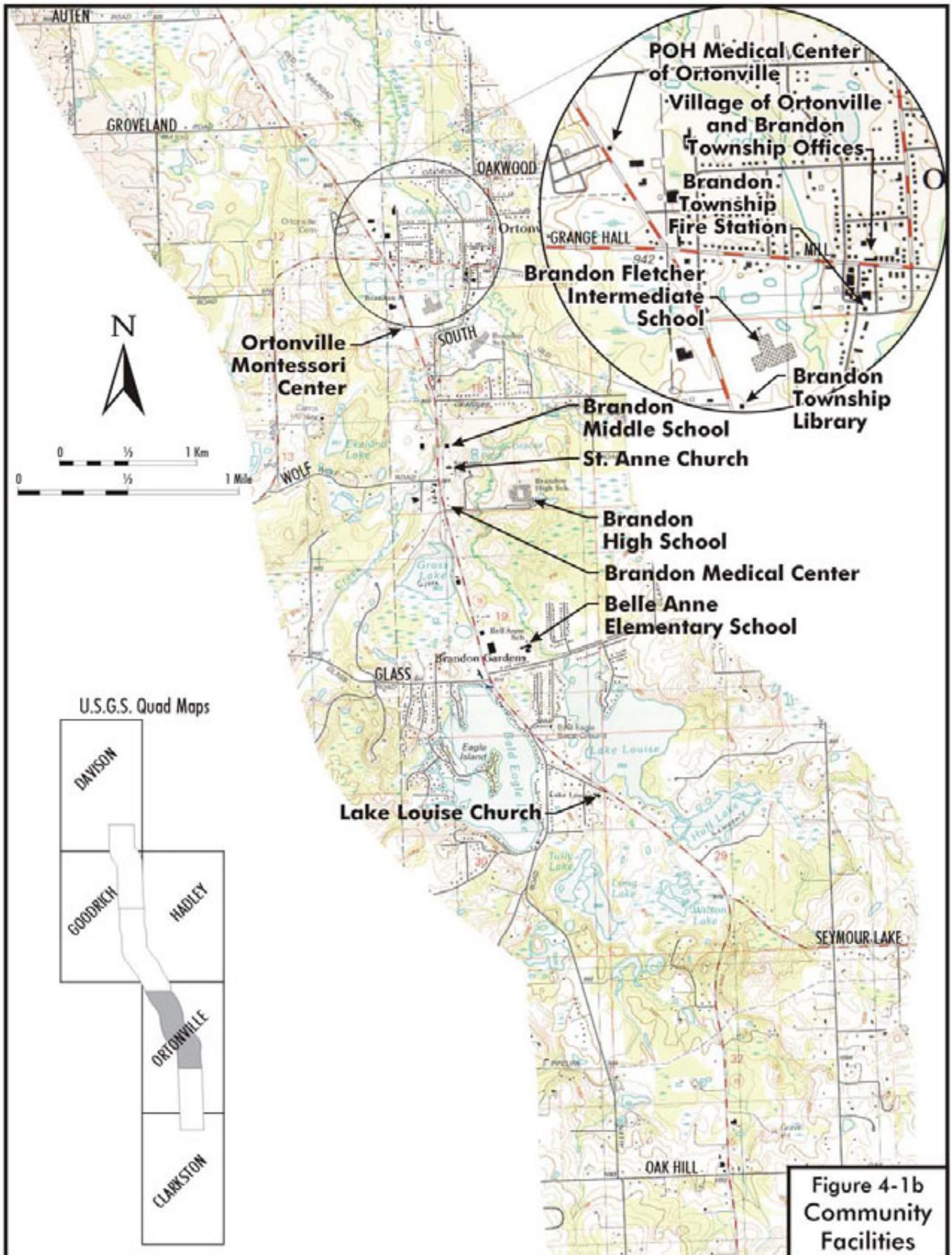
4.2.1 Community Facilities

A number of schools, medical centers and other community facilities are present in the corridor. These are described from south to north (Figure 4-1).



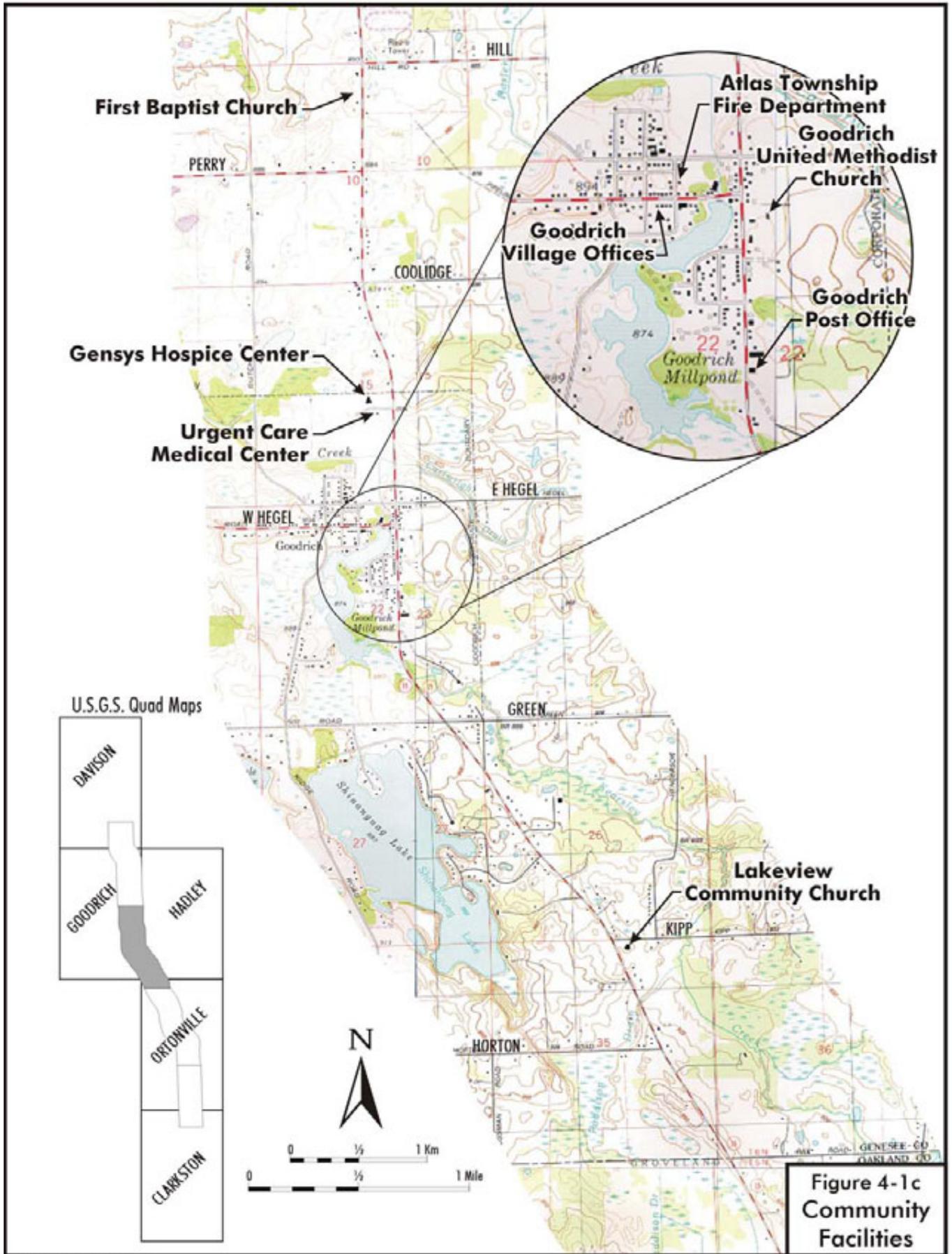
**Figure 4-1a
Community
Facilities**

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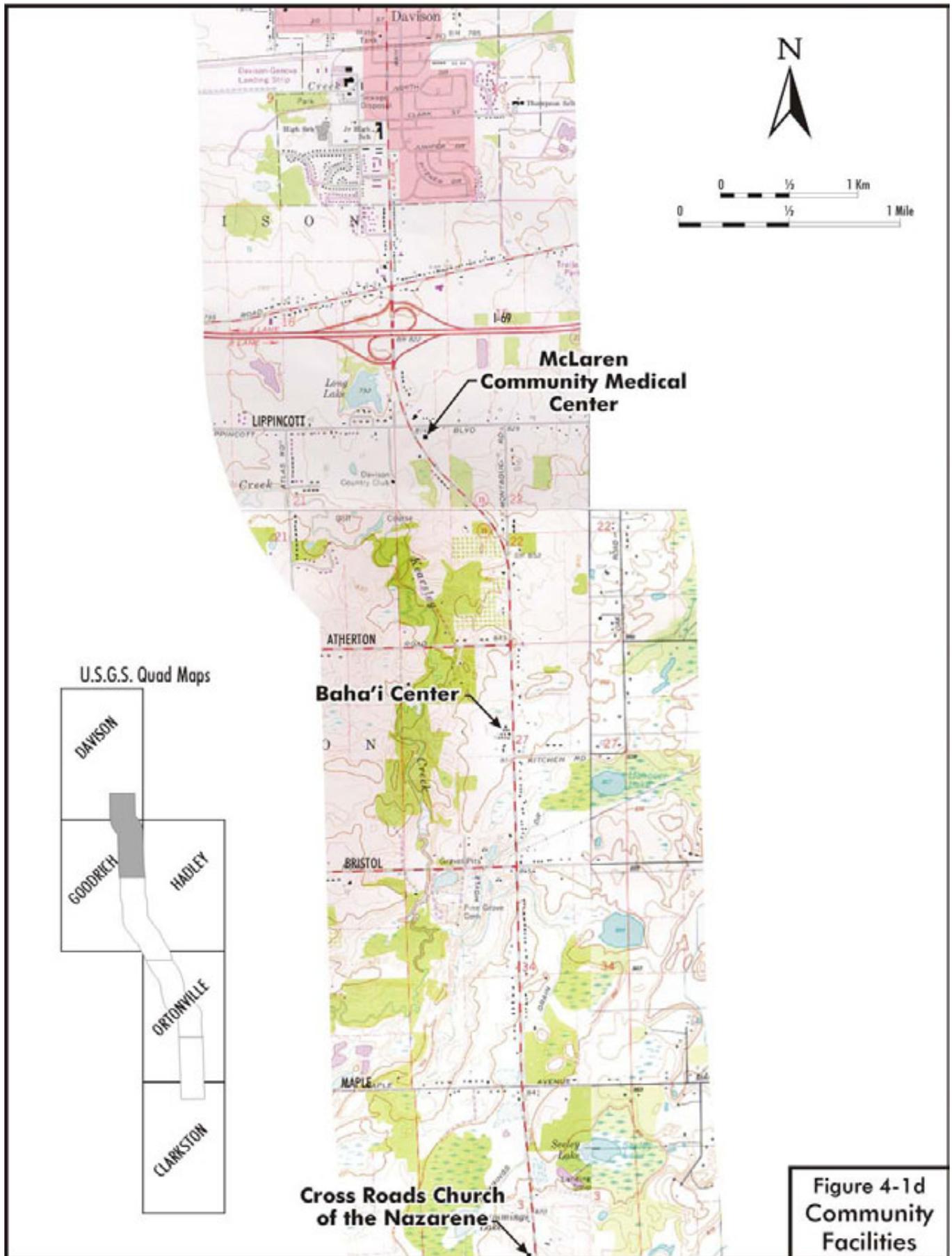
**Figure 4-1b
Community
Facilities**

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**Figure 4-1c
Community
Facilities**

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**Figure 4-1d
Community
Facilities**

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Schools

- Clarkston Independence Elementary School is at the northwest corner of M-15 and Hubbard Road. The grounds are extensive and the school is more than 500 feet from M-15. A 30-foot sliver of new right-of-way could be needed from the grounds, with no effect on school functions. The entrance to the school is off of Hubbard Road.
- Belle Anne Elementary School is two blocks east of M-15 on Glass Road. Traffic to and from the school passes through the Glass Road intersection. The school has been among those calling for improvement of the Glass Road intersection, which has an offset at its M-15 crossing. The proposed project will correct this offset and align Glass Road properly for safer operation. The school itself will not be directly affected by changes to M-15.
- Brandon High School, south of Ortonville, has a signalized access road connecting to M-15. The school is separated from M-15 by commercial frontages on M-15. A boulevard section is proposed for safety reasons through this area.
- Brandon Middle School is just north of the high school and has its own unsignalized driveway. The boulevard section continues through this area. A new safety path is planned along the school frontage as an independent project. The M-15 project would not affect the school, but could require a minor amount of right-of-way (less than 30’).
- Brandon Fletcher Intermediate School is between South Street and Mill Street on the east side of M-15 and continues the Brandon school complex. Its access is via South Street. A sliver of land on the order of 30 feet could be required from the grounds, but no facilities or recreation areas would be affected.
- Ortonville Montessori Center is across M-15 from Brandon Intermediate School. Land could be required from its playground. The playground may be relocated to the rear or the business may be relocated.
- Goodrich and other schools are all well away from the M-15 corridor and would not be affected.
- Louhelen Baha'i Center between Bristol Road and Atherton Road on the west side of M-15 is a National Register eligible site and so is afforded protection under federal law. No land would be needed from the Center.

Libraries

- The only public library in the corridor is the Brandon Township Library adjacent to the Brandon Intermediate School, to the south of the school. Like the school, its access is via South Street. Like the school, about 30 feet of land could be needed, but no facilities or parking would be affected.

Government Offices and Services

- The Village of Ortonville’s and Brandon Township’s offices are on Mill Street four blocks east of the proposed project. These would be unaffected.
- The Ortonville Fire Station is on South Street one block to the south of Mill Street and would be unaffected.
- The Ortonville Post Office is east of the Village offices and would be unaffected.
- The Goodrich village offices and fire station are one block west of M-15 on West Hegel Road and would be unaffected.
- A new Goodrich Post Office has been constructed on the east side of M-15 just north of Rhodes Road. The existing right-of-way line would be maintained in front of the new Post Office.

Medical Facilities

- The Brandon Medical Center is north of the high school entrance on the east side. About 30 feet could be needed from the front of the lot. Access to these doctors' offices would be right-in, right-out, whereas today there is full access. This access change is in keeping with the access control to be exercised in the school area.
- The POH Medical Center of Ortonville is two blocks north of Mill Street on the east side of M-15. It would be relocated by the project.
- The Urgent Care Medical Center and Gensys Hospice Center are located on the west side of M-15 north of Goodrich off of Hufstader Drive. They are both several hundred feet west of the road and would be unaffected by the project.
- The McLaren Community Medical Center is on the southeast corner of M-15 and Lippincott Boulevard. A narrow strip of right-of-way could be needed for the project, but the center would not be affected. Its access is off of Lippincott Boulevard.

Churches

- Lake Louise Church is on the west side of M-15 between Seymour Lake Road and Glass Road. No right-of-way acquisition is planned for this area.
- St. Anne Catholic Church is on the east side of M-15 north of Wolfe Road. About 20 feet of front yard could be needed. Access would change to right-in and right-out as the church entrance is in a boulevard section.
- Lakeview Community Church is on the southeast corner of M-15 and Kipp Road. About 20 feet of front yard could be needed. Access from Kipp Road would not change.
- Goodrich United Methodist Church is on the east side of Goodrich just south of West Hegel Road. It is set well back from M-15 and would not be affected.
- The First Baptist Church is on the west side of M-15 south of Hill Road. It would lose about 30 feet of front yard, but is set back approximately 150 from the road. Its access would change to right-in, right-out.
- The Crossroads Church of the Nazarene is on the west side of M-15 north of Hill Road. It would lose about 30 feet of front yard, but is set back approximately 150 from the road. Its access would change to right-in, right-out.
- The Baha'i Center is on the west side of M-15 south of Atherton Road. It may lose a row of trees, but no property.

Each township has its own school district, with each providing bus services to its schools. Several routes use M-15. Conversations with school officials did not indicate any problems with the planned improvements related to bus use. The boulevard section was noted by some school officials as safer for school bus operations. In all cases, students would embark or disembark on the right side of the road (relative to bus operation) as they do today, with no students crossing M-15 to reach the school once leaving the bus.

4.2.2 Considerations Relating to Pedestrian Access and Bicycle Use

As traffic volumes increase, pedestrians find it more difficult to cross M-15. There are few established pedestrian links across this predominantly rural, high-speed road. Mail is delivered to both sides of the road, so no one crosses to get their mail. Likewise, school bus routes are operated so that children do not cross M-15.

Independence Township calls for safety paths along M-15 in their Master Plan. Such paths are planned with the project. Safety paths (sidewalks) are also likely in Ortonville and Goodrich and in sections with curb and gutter design (a wide outside lane may be provided as an alternative in

non-urban areas). In the remainder of the corridor paved shoulders will be provided. Funding has been secured for a safety path in Brandon Township along the east side of M-15 near the high school and middle school. The proposed project will take this path into account.

New sidewalks will be designed to accommodate people with disabilities and will be in compliance with the 1992 Americans with Disabilities Act (ADA). Walk/wait signalization locations will be determined during any future design phases.

The planned shoulders and safety paths will accommodate bicycles. M-15 is the first Heritage Recreation Route in Michigan. Another goal of the organization that achieved this designation is to have M-15 become the first numbered bike route in the state.

4.2.3 Considerations Relating to Mass Transit Service

There is no regular bus route service on M-15. The Suburban Mobility Authority for Regional Transportation (SMART) provides bus services in Oakland County but not in Independence and Brandon Townships, as these townships have not contracted for SMART Services. The Flint Metropolitan Transit Authority provides “Your Ride” dial-a-ride service daily from 6:30 a.m. to 11:00 p.m. in Genesee County.

At the Illustrative Alternatives stage of this project, the ability of transit to reduce the need for roadway improvements was tested. In the rural, low-density environments of M-15, a five percent mode split was considered to be the largest that could be achieved. Even with such a high mode split, travel demand indicates the need for four lanes through the length of the corridor. For additional information on why Mass Transit was not considered further, Please see Section 4.2 of Technical Memorandum No. 1, Study Area Conditions and Illustrative Alternatives.

4.2.4 Maintaining Traffic

During the construction of the proposed improvements, traffic will be maintained on M-15. Even though the Technically and Environmentally Preferred Alternative is characterized by two roadway types, five-lane and boulevard, the same basic concept of staged construction will be employed. For most of the corridor, part-width construction techniques will be used. This means maintaining traffic on one half of the road, while the other half is being reconstructed.

To construct the five-lane roadway, traffic will be initially moved to the shoulder and the far lane, while two lanes of the new road are constructed. Traffic will then be switched to the two new lanes while the remaining three lanes are completed. For the boulevard, the separation provided by the median will allow traffic to be maintained on the existing roadway while one side of the boulevard is built. Then traffic will be placed on the newly constructed pavement and the remaining half of the boulevard will be constructed.

Part-width construction will also be used on the approaches of cross streets. Temporary traffic signals will be employed to maintain traffic control throughout construction. Access to all residential and commercial driveways will be maintained during the project.

Construction phasing involves a number of factors, such as: funding availability; length of a segment; type of proposed facility (five-lane and boulevard); changes in surrounding character (large wetland complex, dense residential area, commercial area, and the like); and, jurisdictional boundaries, such as the Oakland/Genesee County line, which also forms the boundary between two MDOT regional offices. Drainage patterns could also influence the final segments. Potential construction segments could be as follows:

1. I-75 to Oak Hill Road (five-lane/very narrow boulevard/boulevard, approximately 3.5 miles) - The most-developed residential area with the greatest amount of vertical relief in the corridor;
2. Oak Hill Road to Granger Road (boulevard/five-lane, approximately 3.8 miles) – A major wetland/lake area;
3. Granger Road to County Line (boulevard/very narrow boulevard, approximately 3.1 miles) - Ortonville and the wetland up to the county line;
4. County Line to Green Road (boulevard, approximately 2.2 miles) - Similar terrain and impacts;
5. Green to North of Hegel Road (five-lane, approximately 1.2 miles) – Goodrich and its developed limits;
6. North of Hegel Road to Maple Road (boulevard, approximately 3.2 miles) - Similar terrain and impacts; and,
7. Maple Road to I-69 (five-lane, approximately 3.3 miles) - Similar terrain and impacts.

While the above segments are logical from a construction perspective, the final phasing will result from funding considerations. Widening M-15 will likely take four years to complete.

4.2.5 Population Trends

Population in the corridor has grown rapidly over the last decade. In the five townships in which the corridor is located, the population has grown from 60,709 in 1990 to 78,475 in 2000 for a 29 percent increase. Some areas have grown extremely rapidly. The Village of Goodrich grew 48 percent over the last ten years. Even the township that experienced the smallest amount of growth, Davison Township, had a population increase of 21 percent (Table 4-2).

**Table 4-2
Corridor Population Growth**

| Townships | 1990 | 2000 | % Growth |
|------------------|--------------|--------------|-----------------|
| Independence | 23717 | 32581 | 37% |
| Brandon | 12051 | 14765 | 23% |
| Groveland | 4705 | 6150 | 31% |
| Atlas | 5551 | 7257 | 31% |
| Davison | 14685 | 17722 | 21% |
| TOTAL | 60709 | 78475 | 29% |
| Villages | | | |
| Ortonville | 1252 | 1535 | 23% |
| Goodrich | 916 | 1353 | 48% |

Source: US Census

Note: Ortonville and Goodrich are included in the township totals.

4.2.6 Other Population Characteristics

An examination of census tracts adjacent to M-15 (1990 tracts in Figure 4-2a and 2000 tracts in Figure 4-2b) finds the median age of the population (2000 data) in the corridor ranges from 30.8

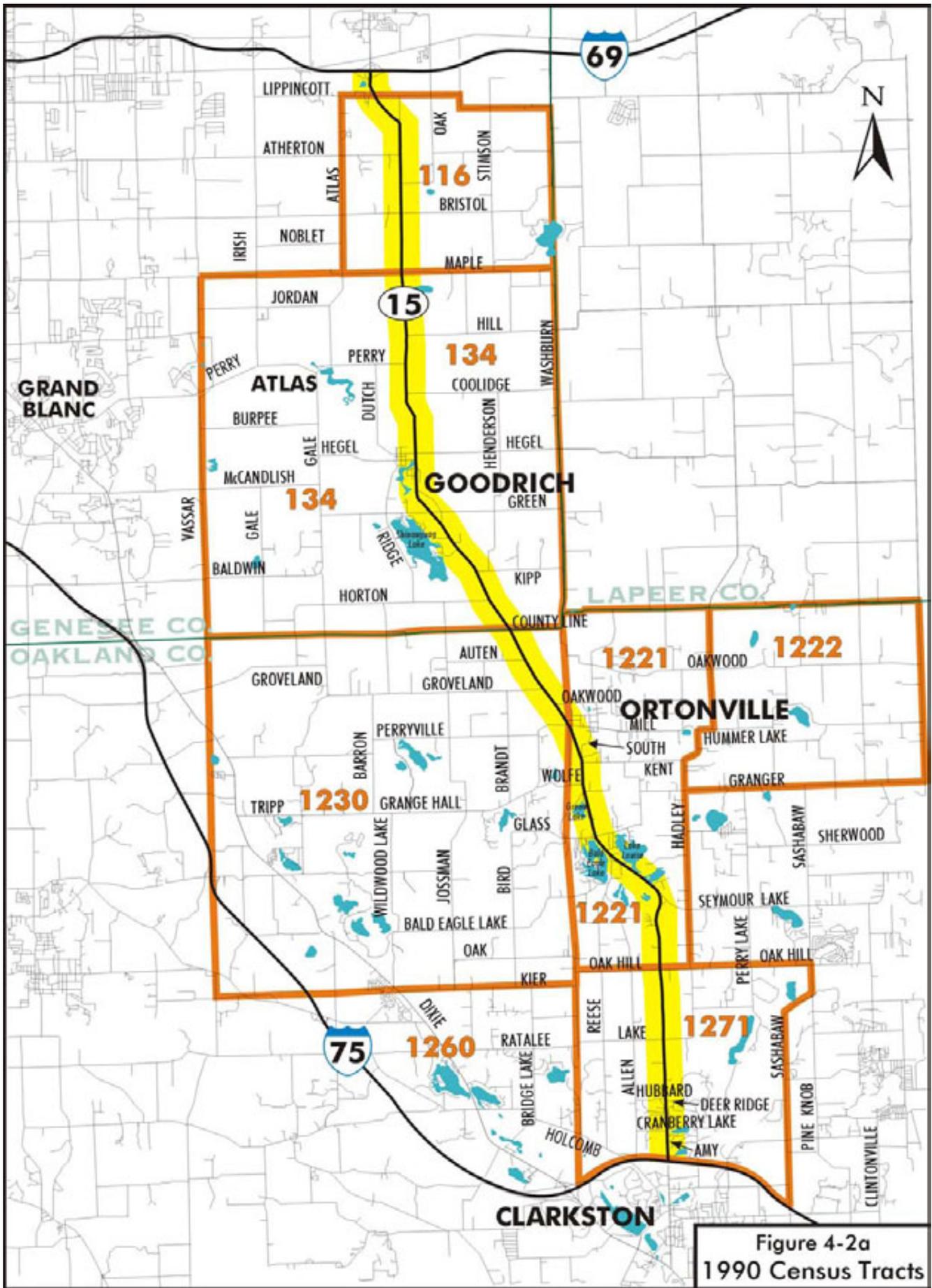


Figure 4-2a
1990 Census Tracts

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Figure 4-2b
2000 Census Tracts

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in census tract 116.10 in Davison Township to 39.3 in census tract 1271 in Independence Township (Table 4-3). These compare to values of 36.7 for Oakland County, 35.0 for Genesee County and 35.5 for the state. There were 134,959 persons 65 years of age or older in Oakland County and 50,607 in Genesee County in 2000. The census tract with the highest percentage of persons 65 years of age or older is 134.02 in Atlas Township (115 individuals). Census tract 1231 in Groveland Township has the lowest percentage of persons 65 years of age or older at 4.9 percent (153 individuals). The estimated year 2000 median income is high throughout the corridor, compared to the Detroit Metropolitan Statistical Area, the multi-county planning area (Lapeer, Macomb, Monroe, Oakland, St. Clair, and Wayne counties) used by the census to compare data with other areas. The estimated 2000 median family income for the Detroit MSA was \$63,200. Median family income in the census tracts bordering the corridor ranged from \$69,000 to \$110,000. The percent of dwelling units that are owner-occupied is also high. Apart from some apartment development in Ortonville (census tract 1229) and a concentration of apartments in the northwest area of census tract 116.10 in Davison Township, the level of ownership is very high. All the relocations for the project are single-family dwellings.

**Table 4-3
Key Population Characteristics**

| Township | 1990 Census Tracts | Est. 2000 Median Income in 1990 Tracts¹ | 2000 Census Tracts | 2000 Median Age | 2000 Population Age 65 and Older (percent) | 2000 Percent Dwelling Units Owner Occupied |
|-----------------|---------------------------|---|---------------------------|------------------------|---|---|
| Independence | 1271 | \$109,923 | 1271 | 39.3 | 7.35 | 98% |
| Brandon | 1221 | \$69,317 | NA | NA | NA | NA |
| Brandon | NA | NA | 1227 | 35.9 | 7.1% | 93% |
| Brandon | NA | NA | 1229 | 34.5 | 6.3% | 76% |
| Groveland | 1230 | \$79,537 | NA | NA | NA | NA |
| Groveland | NA | NA | 1231 | 38.8 | 4.9% | 97% |
| Atlas | 134 | \$71,528 | NA | NA | NA | NA |
| Atlas | NA | NA | 134.01 | 37.6 | 6.4% | 96% |
| Atlas | NA | NA | 134.02 | 34.7 | 9.3% | 85% |
| Davison | 116 | \$70,163 | NA | NA | NA | NA |
| Davison | NA | NA | 116.01 | 38.2 | 8.6% | 95% |
| Davison | NA | NA | 116.10 | 30.8 | 6.8% | 56% |

Source: 1990 and 2000 U.S. Census and Federal Financial Institutions Examination Council (FFIEC)

¹ 2000 Census data on income are not currently available. FFIEC data were used.

Census tract data for 2000 indicate that the highest percent minority area is census tract 116.10 in Davison Township at 3.7 percent (Table 4-4). The makeup of the minority population is complex, with no distinct patterns. The 2000 census offers many more options for racial identification than previous censuses, and many who filled out their forms have selected multiracial categories. In census tract 116.10, for example, individuals responded to 14 different categories. The top three racial categories in the corridor census tracts are noted in Table 4-4. They represent a mix of Asian alone, Black or African American alone, White/Asian, American Indian or Alaskan Native (ANIA) alone, ANAI/White.

**Table 4-4
Minority and Low-Income Populations in Corridor Census Tracts**

| Township | Percent Low-Income (1999 data) | 2000 Census Tracts | Percent Minority (2000 data) | Top Three Races (2000 data)¹ |
|-----------------|---------------------------------------|---------------------------|-------------------------------------|--|
| Independence | 3.4 | 1271 | 2.2 | A, B, W/A |
| Brandon | 4.9 | 1227 | 0.9 | W/AIAN, B, A |
| Brandon | 3.9 | 1229 | 0.7 | AIAN, A, W/AIAN |
| Groveland | 2.8 | 1231 | 1.4 | A, W/A, B |
| Atlas | 4.3 | 134.01 | 1.4 | A, B, W/AIAN |
| Atlas | 2.7 | 134.02 | 1.0 | A, B, W/A |
| Davison | 6.9 | 116.01 | 1.4 | W/AIAN, AIAN, A |
| Davison | 2.2 | 116.10 | 3.7 | A, W/AIAN, W/A |

Source: 1990 and 2000 U.S. Census

¹ A = Asian alone; B = Black or African American; W = White; AIAN = American Indian or Alaskan Native.

A “/” means two races were identified by the individual filling out the census form.

The census tract with the highest percentage of low-income persons was tract 116.01 in Groveland Township with 6.9 percent. The state average is higher at 13.1 percent.

4.3 Environmental Justice

The purpose of Executive Order 12898 is to avoid, minimize, and mitigate disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The proposed improvements will not cause disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

MDOT conducted a visual analysis of the project area and reviewed pertinent census data. Six sets of public information meetings were conducted prior to the public hearing to solicit input from potentially affected property owners (Section 7.2). This included efforts to contact Native Americans. No comments or responses were received from any Native Americans. An examination of right-of-way / relocation data found no impacts on minorities or low-income populations. The homes subject to relocation may be characterized as middle-class or higher income, based on property values. Taken together this information indicates there will be no disproportionate impacts to minorities, low-income, or other people with special transportation needs in the project area.

While there are no environmental justice issues associated with the proposed project at this time, a continuing effort will be made to identify any disproportionately high and adverse impacts to minority populations and low-income populations during subsequent phases of this project. If such impacts are identified, every effort will be made to actively involve these populations in the project development process, and to avoid, minimize, or mitigate these impacts.

4.4 Economic Impacts and Tax Base Loss

4.4.1 Economic Background

Economic activity in the project area is generated by a variety of market sectors including retail trade, services, education, and public administration. The corridor has been subject to rapid development. This trend is expected to continue.

Because of the enormity of the job base in Oakland County, its growth, in particular, has driven the residential development evident in the corridor. This growth has expressed itself in higher property costs. For example, an examination of the State Equalized Value (SEV) of ten homes fronting onto M-15 in Atlas Township found the SEV increased 45 percent from 1980 to 1990 and another 125 percent from 1990 to 2000. Between 1990 and 2000, employment in Oakland County grew 34 percent. In Genesee County it grew 14 percent. A view of the tax base change in corridor townships over the last decade indicates that in Brandon, Groveland, Atlas, and Davison Townships, the growth in the last ten years exceeds 250 percent (Table 4-5).

Table 4-5
Change in State Equalized Value – Corridor Townships
(1,000s of 2001 dollars)

| | 1990 | 1995 | 2000 | Growth | |
|--------------|------------|--------------|--------------|--------------|--------------|
| | | | | 1990 to 2000 | 1995 to 2000 |
| Independence | \$ 491,763 | \$ 707,024 | \$ 1,240,082 | 252% | 175% |
| Brandon | \$ 161,695 | \$ 247,394 | \$ 442,163 | 273% | 179% |
| Groveland | \$ 84,300 | \$ 128,980 | \$ 212,878 | 253% | 165% |
| Atlas | \$ 87,017 | \$ 138,863 | \$ 257,953 | 296% | 186% |
| Davison | \$ 161,751 | \$ 240,154 | \$ 391,593 | 242% | 163% |
| Total | \$ 986,526 | \$ 1,462,415 | \$ 2,544,669 | 258% | 174% |

Source: Oakland and Genesee County Tax Equalization offices.

M-15 has access to land suitable for residential development, which has led to today's congestion and continued predictions of population and traffic growth. Adding capacity to M-15 is a response to the growth that has already occurred and anticipates the growth predicted by the local political jurisdictions in the corridor.

4.4.2 Tax Base Loss

Property acquisition will result in a reduction in real property tax revenues of about \$362,000, based on the right-of-way cost estimate (Table 4-6). This represents only 0.014 percent of the property taxes collected by the townships and villages in the corridor. The largest effect would be on Ortonville. The increase in SEV of the remaining properties over the coming years will outweigh potential losses, with the possible exception of Ortonville. And, many of the businesses and, perhaps the residents to be relocated, are likely to relocate within the corridor, minimizing tax loss.

**Table 4-6
Tax Base Loss (2000 dollars)**

| Taxing Entity | ROW Cost¹ | Value² | 2000 Tax Rate | Tax Loss³ | Percent of Total Taxes⁴ |
|-----------------------|-----------------------------|--------------------------|--------------------------|-----------------------------|---|
| Independence Township | | | | \$ 44,678 | 0.00% |
| Owner Occupied DU | \$ 2,835,655 | \$ 1,417,828 | 0.0291 | \$ 41,191 | |
| Other | \$ 149,245 | \$ 74,623 | 0.0467 | \$ 3,486 | |
| Brandon Township | | | | \$ 40,919 | 0.01% |
| Owner Occupied DU | \$ 164,550 | \$ 82,275 | 0.0343 | \$ 2,825 | |
| Other | \$ 1,480,950 | \$ 740,475 | 0.0514 | \$ 38,094 | |
| Groveland Township | | | | \$ 14,924 | 0.01% |
| Owner Occupied DU | \$ 70,285 | \$ 35,143 | 0.0271 | \$ 951 | |
| Other | \$ 632,565 | \$ 316,283 | 0.0442 | \$ 13,972 | |
| Atlas Township | | | | \$ 14,142 | 0.01% |
| Owner Occupied DU | \$ 699,210 | \$ 349,605 | 0.0346 | \$ 12,098 | |
| Other | \$ 77,690 | \$ 38,845 | 0.0526 | \$ 2,044 | |
| Davison Township | | | | \$ 9,654 | 0.00% |
| Owner Occupied DU | \$ 599,213 | \$ 299,606 | 0.0297 | \$ 8,902 | |
| Other | \$ 31,538 | \$ 15,769 | 0.0477 | \$ 751 | |
| Village of Goodrich | | | | \$ 54,962 | 0.15% |
| Owner Occupied DU | \$ 92,013 | \$ 46,006 | 0.0426 | \$ 1,960 | |
| Other | \$ 1,748,238 | \$ 874,119 | 0.0606 | \$ 53,002 | |
| Village of Ortonville | | | | \$ 183,131 | 0.47% |
| Owner Occupied DU | \$ 0 | \$ 0 | 0.0423 | \$ 0 | |
| Other | \$ 6,161,300 | \$ 3,080,650 | 0.0594 | \$ 183,131 | |
| Total | \$ 14,742,450 | \$ 7,371,225 | | \$ 362,414 | 0.01% |

Source: Tax Equalization Offices

¹ Fair market value of the land and structures required for right-of-way.

² This is 50% of the estimated "fair market value."

³ Value times tax rate, then rounded.

⁴ Tax loss divided by total State Equivalent Value

4.5 Land Use and Zoning

Land use along M-15 in Oakland County, is predominately single-family residential with lot sizes ranging from one to 2.4 acres in the south, 2.5 to 4.9 acres in the central section and up to 10 acres (sometimes more) in the north (Figure 4-3). Commercial and industrial zoning on M-15 is located around Ortonville and the southern corridor boundary (Figure 4-4). Sewers do not serve Northern Oakland County along M-15, which now limits the density of development.

In Genesee County, land use along M-15 is mostly residential. Lack of sewers is also a constraint. Commercial zoning is located at the northern boundary of the corridor and in Goodrich. Goodrich also has light industrial zoning.

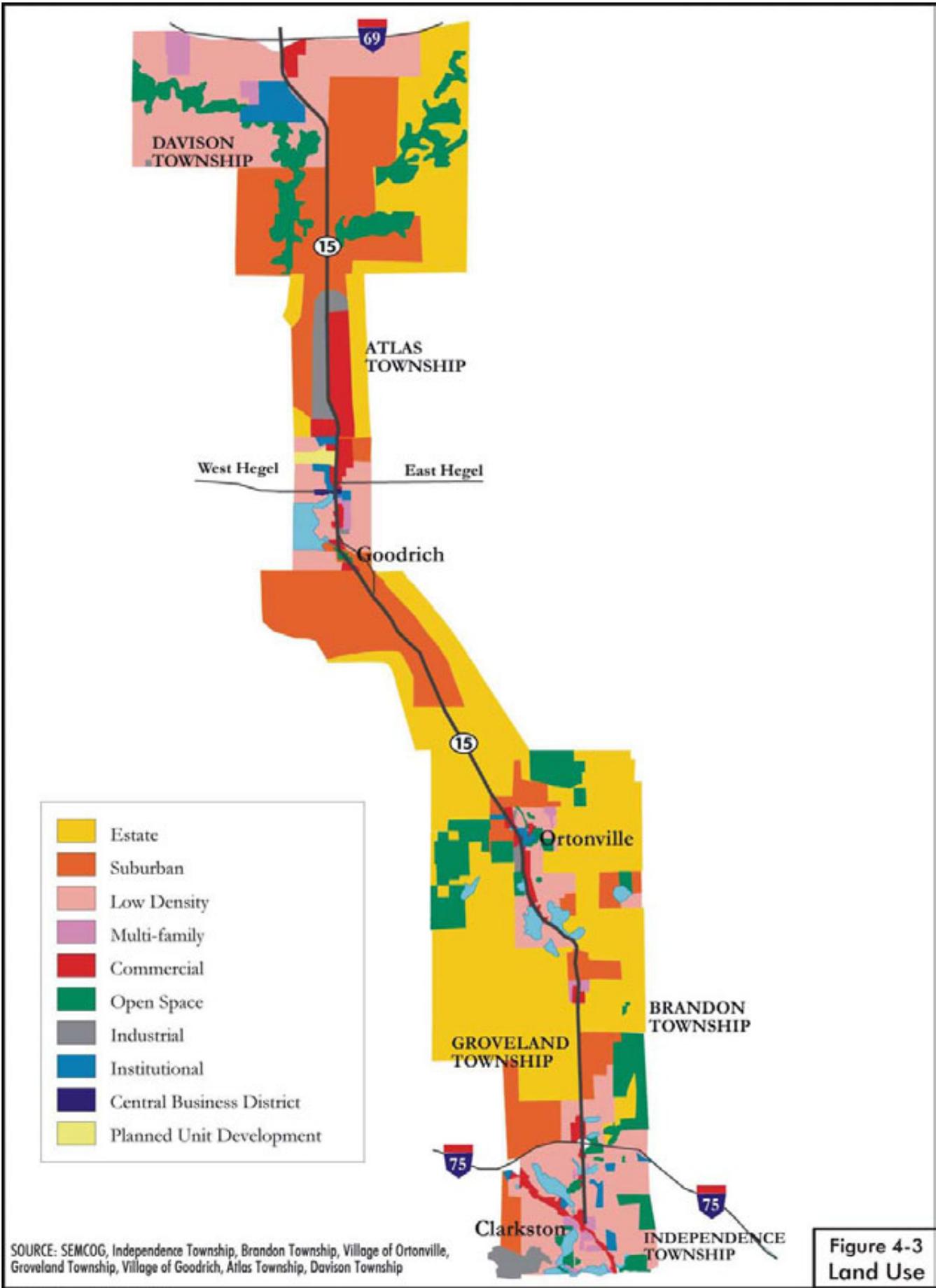


Figure 4-3
Land Use

SOURCE: SEMCOG, Independence Township, Brandon Township, Village of Ortonville, Groveland Township, Village of Goodrich, Atlas Township, Davison Township

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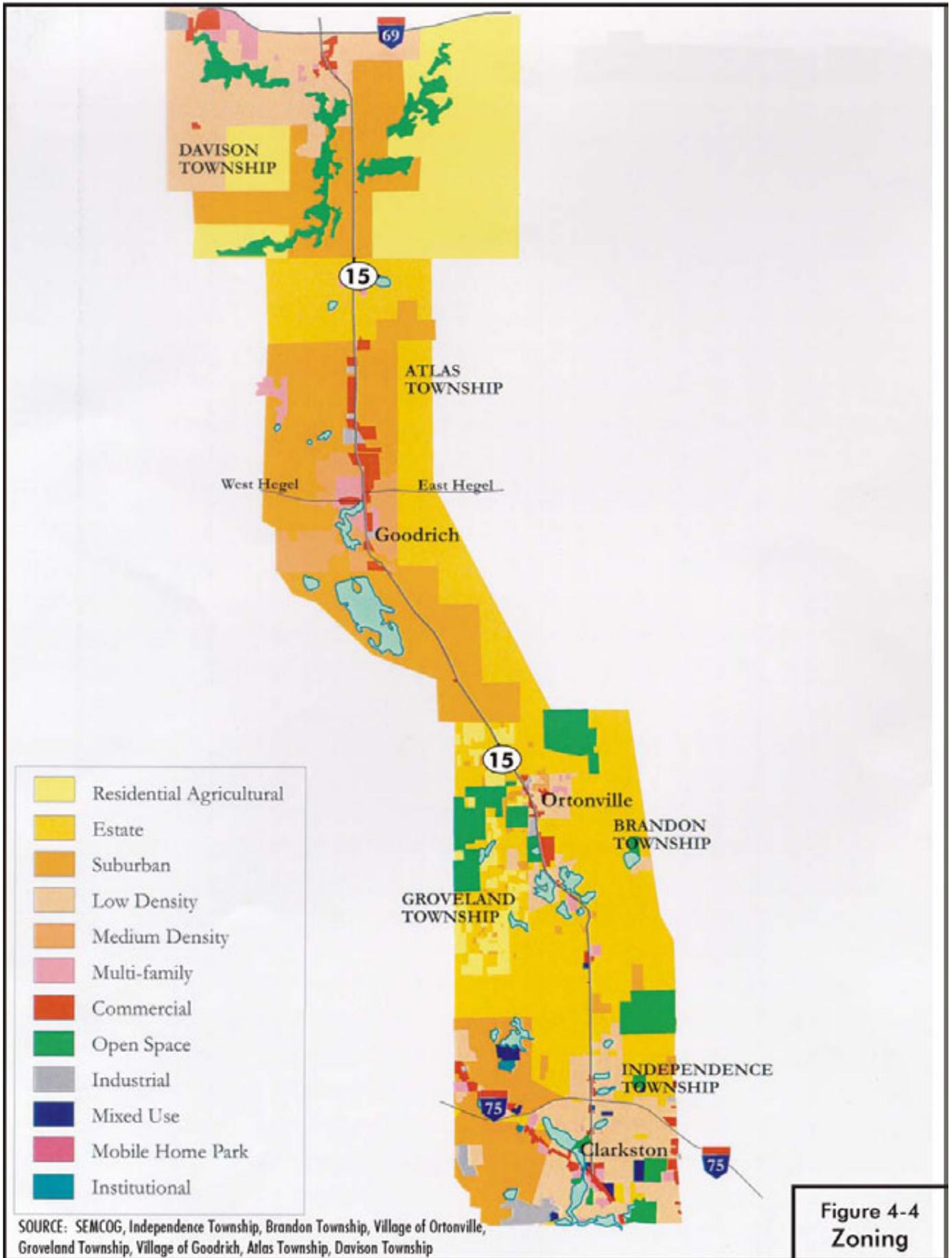


Figure 4-4
Zoning

SOURCE: SEMCOG, Independence Township, Brandon Township, Village of Ortonville, Groveland Township, Village of Goodrich, Atlas Township, Davison Township

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Within one mile of M-15 there is also land zoned for recreation/conservation and residential/agricultural uses. Many wetlands and small lakes lie in the corridor in both counties.

The study area has grown rapidly (Tables 1-1 and 4-2) and growth is expected to continue. Residential growth takes the form both of subdivision development and splits of existing lots. A substantial amount of vacant land planned for residential use remains in the corridor. SEMCOG forecasts the townships in the Oakland County portion of the corridor will be urbanized by 2010.

4.6 Farmland/Michigan Act 451, Part 361 Lands/Forest Land

There is no agriculture or forestry zoning adjacent to the proposed project. There is land under cultivation north of Hill Road. It is zoned residential agriculture and the future land use map shows it as suburban. No Michigan Public Act 451, Part 361 (The Farmland and Open Space Preservation Act) parcels are adjacent to M-15 in the project area.³ Based on zoning, additional review under the Federal Farmland Protection Policy Act was not required; therefore, an A.D. 1006 form was not prepared and coordinated with the USDA/NRCS. Wetland mitigation sites have received independent environmental clearance (see Section 5.12).

4.7 Air Quality Analysis

Effective April 6, 1995, the seven-county Detroit-Ann Arbor area (including Oakland County) was redesignated by the U.S. Environmental Protection Agency to attainment and associated section 175A maintenance of the National Ambient Air Quality Standard (NAAQS) for ozone. Effective January 16, 2001 EPA also approved the redesignation of Genesee, Bay, Midland, and Saginaw counties to attainment for the 1-hour NAAQS ozone standard. EPA also approved the state's plan for maintaining the 1-hour ozone standard for the next ten years as a revision to the Michigan State Implementation Plan (SIP).

These designations mean that, for the time being, both Oakland and Genesee counties are considered in attainment of the ozone standard. However, a new EPA 8-hour standard, which has been held in abeyance for some time, will be implemented in the coming years.

Based on the above discussion, and in accordance with Michigan Department of Transportation (MDOT), Federal Highway Administration (FHWA), and U.S EPA procedures, the air quality impact analysis for this project consisted of a microscale analysis of carbon monoxide (CO) concentrations.⁴ The criteria for adverse impact is an exceedance of the National Ambient Air Quality Standards (NAAQS) for CO at a sensitive receptor modeled for the year of opening (2010) and design year (2025).

The results of the analysis are found in Appendix E. The worst-case one-hour CO concentration in 2010, the earliest year of project opening, is estimated to be 3.3 parts per million (ppm), well below the NAAQS of 35 ppm. Converting this to an eight-hour value using a persistency of 0.6 results in an eight-hour forecast of 2.8 compared to the standard of 9 ppm. One- and eight-hour concentrations in 2025 are estimated to be 3.2 and 2.7 ppm, respectively. This project is expected to have a positive impact on air quality by reducing congestion.

³ Based on a search of the Act 451, Part 361 database for Oakland and Genesee counties provided by Rich Harlow of the Michigan Department of Agriculture, Farmland and Open Space Preservation, Environmental Stewardship Division, May 14, 2001.

⁴ "Air Quality Technical Memorandum," The Corradino Group, November 2001.

4.8 Noise Analysis

As a rule, doubling the energy of sound (twice as much traffic, half as much distance) results in about a 3 dBA sound level increase, a level undetectable by most people unless they are in a controlled laboratory setting. Thus, noticeable noise impacts typically result when the road is moved much closer to sensitive receptors.

The FHWA has established a noise guideline of 67 decibels (dBA), measured as an “average” of sound over a one-hour period (referred to as L_{Aeq1h}). This level is not to be “approached or exceeded” at the exterior of residences, churches, hospitals, parks and libraries. Should the guideline at these sensitive receptors be approached or exceeded, noise abatement measures must be considered. “Approach” is defined in Michigan as 1 dBA, so the effective criterion is 66 dBA for consideration of mitigation. Noise mitigation must also be considered if a project results in a substantial increase (10 dBA or more) in noise levels.

The frontage of M-15 is mostly residential with some commercial uses. The 66 dBA criterion applies through the residential areas of the corridor. Noise modeling for the project found that many homes are exposed to noise levels exceeding abatement criteria today and more will be in the future as traffic volumes grow.

The Transportation Noise Model (TNM1.1) available through FHWA was used to predict noise levels based on roadway geometry, the location of sensitive receptors, and traffic information such as speed and the mix of vehicles.⁵ To apply this, the corridor was divided into sections that have consistent roadway geometry and traffic. A “critical distance” was established using the TNM for each section. This is the distance from the centerline of the road to the point where the projected noise level would drop below 66 dBA. Applying these distances to aerial mapping allowed a determination of how many homes would fall within the critical distance under 2025 build and no-build conditions (Appendix F). The result of this analysis found that 145 houses would be exposed to noise levels exceeding the 66 dBA criterion under future no-build conditions compared to 175 homes with the proposed project. Future traffic would be closer to residences with the wider typical section of the proposed road, so the number of affected residences would be expected to be higher. The number of homes affected by the project would be higher yet, except that some of the houses affected under no-build conditions would be subject to relocation under the proposed action.

The test of whether noise mitigation should be pursued rests on whether such mitigation is “reasonable” and “feasible.” The “reasonable” test addresses whether noise mitigation makes sense. The “feasible” test relates to whether a measure is physically or institutionally possible.

A number of potential mitigation measures may be considered to reduce noises levels. These include lowering the roadway profile, prohibiting truck traffic, reducing traffic speeds, and constructing noise barriers. Lowering the roadway profile makes driveway access difficult in areas like the M-15 corridor, where much of the corridor is lined with single-family use or commercial nodes with direct driveway connections. Lowering the road may also require more right-of-way. For these reasons, lowering the roadway profile is not considered feasible or reasonable.

Prohibiting truck traffic is not feasible because M-15 is a state trunkline. It is specifically designed to accommodate commercial traffic. Similarly, lowering the speed limits along M-15

⁵ “Noise Study Report,” The Corradino Group, November 2001.

for noise reduction runs counter to the purpose of moving people and goods in an efficient manner over the state highway system. M-15 already has a number of speed restrictions that are reflected in the noise modeling. Because M-15 is a state trunkline, MDOT is committed to maintaining speeds limits that allow safe and efficient travel, which means maintaining a 55 mph speed limit where possible.

Noise barriers consist of earthen berms or walls, or combinations of the two. Unless right-of-way is available for berms, noise walls are normally the mitigation technique of choice. Berms are cost-effective and can substantially reduce noise levels. However, they take up a lot of space. In the M-15 corridor such space does not exist. Right-of-way is not available for berms without additional relocations, historic impacts, and wetland impacts, so noise walls were evaluated.

In most cases, noise walls are feasible unless they become so tall that wind loads become an engineering concern, so feasibility is generally not an issue. However, for M-15, reasonableness is difficult to achieve. Homes are not sufficiently dense to meet the reasonable test, which is based on a cost per dwelling unit protected (6 dBA reduction or more). In addition, experience indicates that noise barriers are not effective when they have gaps. Along most of M-15 gaps would have to be left in any noise barrier for driveway access. Finally, the general reaction to walls in front yards is often negative. For these reasons construction of berms and/or noise walls along M-15 is not considered reasonable at any location along the project and no noise mitigation is recommended.

4.9 Threatened and Endangered Species

Threatened and endangered species are officially protected in Michigan by both federal and state Endangered Species Acts: Public Law 93-205 and Part 365 of PA 451, the Michigan Natural Resources and Environmental Protection Act of 1994, respectively. An endangered species (E) under the acts is defined as in danger of extinction throughout all or a significant portion of its range. A threatened species (T) under the acts is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Special concern species (SC) are not afforded legal protection under the acts. They are species with declining or relict populations in Michigan or are species for which more information is needed.

In response to scoping, the U.S. Fish and Wildlife Service did not find any federally-listed species as endangered or threatened, or species proposed for listing (see letter dated October 26, 2000, DEIS, Appendix C, Section 2). The Michigan Natural Features Inventory (MNFI) is the most complete database available for all of Michigan's T/E/SC species. According to the Michigan Department of Natural Resources (MDNR), Wildlife Division, the Eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) has been known to occur near the project area (see letter dated October 31, 2000, DEIS, Appendix C, Section 2). This species is a candidate for federal listing, and in Michigan is a species of special concern. Subsequent correspondence from the MDNR expanded on information from the MNFI (see letter dated April 17, 2001, DEIS, Appendix C, Section 2), adding the poweshiek skipper (*Oarisma powesheik*), a butterfly, which is state threatened; and, the blazing star borer (*Papaipema beeriana*), an insect, which is of state special concern. None of these species was found, although habitat was found for the rattlesnake.

The Massasauga rattlesnake (*Sistrurus catenatus catenatus*) has been found in a variety of wetland habitats, including bogs, fens, shrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are better known

from lowland coniferous forests, such as cedar swamps. Specifically, all known sites appear to be characterized by the following: 1) open, sunny areas intermixed with shaded areas, presumably for thermoregulation; 2) presence of the water table near the surface for hibernation; and 3) variable elevations between adjoining lowland and upland habitats.

The 27 acres of existing wetland north of and contiguous to the proposed wetland creation site on Oakwood Road exhibit characteristics conducive to the support of the rattlesnake. The existing wetlands, and the mitigated wetlands that will add to the existing wetlands at this Oakwood Road site, will serve as compensation for wetland impacts for the separate M-24 project and partial compensation for wetland impacts on M-15. The existing and mitigated wetlands will be preserved in perpetuity by a conservation easement.

Biological surveys were conducted August 14 to 18, 2000 and May 14 to 18, 2001 (Appendix G). The investigations covered a linear strip on either side of the existing highway of 200 feet for plants and up to 500 feet for animals and their habitat. Urban areas, suburban yards, and actively farmed areas were not investigated. No federal threatened or endangered species were found in either field effort. However, 436 plant species, 67 species of birds, 14 mammal species, one fish species, 14 species of amphibians or reptiles, two species of mollusks, and 20 species of insects were observed within the study area in an effort that covered 72 sites. (Note that the biological inventory was performed separate from the wetland analysis and so the inventory numbers on Figure 1-6 are distinct).

One state-listed threatened species (spotted turtle) and three state-listed species of special concern (wahoo plant, red mulberry tree, and Blandings turtle) were found during plant and wildlife surveys. Habitat for eight additional state listed species is within the project limits, however, none of these species were observed during the surveys. Portions of the following sites will be impacted by the proposed construction: 1) site 28, which contains the wahoo plant; and 2) sites 47 and 48, which contain the spotted turtle. As noted in Appendix G, the preferred habitat for the spotted turtle is distant from M-15 (200 to 300 feet), therefore, the turtle will not be adversely affected by the proposed construction. (As silt fences are put in place during construction along wetlands, it would be advisable to place signs along the spotted turtle sites instructing workers to move any turtles found inside the fence, to outside the fence, and report such activity to supervisors.) All other sites where listed plant and wildlife species were found will be avoided by the construction.

A mussel survey was conducted July 31 and August 9, 2002 in Duck Creek south of Ortonville and Kearsley Creek in south Goodrich, where M-15 crosses these creeks. Site 1 was along Duck Creek between Wolf Road and Granger Road, Site 2 was on Duck Creek 1200 feet north of Granger Road, and Site 3 was on Kearsley Creek near the south limit of Goodrich. The stream at Site 1 was approximately 2 meters (6.6 feet) average width, 0.25 meters (0.8 feet) average depth and had an estimated flow of 0.1 cubic meters (4 cubic feet) per second. Site 2 was, on average, about 2.8 meters (9.2 feet) wide, 0.25 meters (0.8 feet) average depth, and had a flow rate of about 0.1 cubic meters (5 cubic feet) per second. Site 3 was approximately 5.2 meters (17.2 feet) average width, 1 meter (3.3 feet) average depth, and had approximate flow of 0.3 cubic meters (9 cubic feet) per second. Substrate composition at Site 1 ranged from 50% gravel and 50% sand downstream to 100% sand with some woody debris at the upstream end. Stream morphology included riffles and runs. Substrate composition at Site 2 was approximately 50% gravel, 25% sand, and 25% silt. Stream morphology included riffles and runs. Substrate composition at Site 3 ranged from 50% sand and 50% silt, to 50% gravel and 50% silt. Stream morphology was a pool at the beginning of the site and a straightened channel alongside M-15.

The survey found four of the 45 species of Unionidai (mussels) native to Michigan, including: four live spike (*Elliptio dilatata*) in Kearsley Creek; one live creek heelsplitter (*Lasmigona compressa*) in Duck Creek; three live and one empty valve of strange floater (*Strophitus undulatus*) in Duck Creek; and, two empty valves of slippershell (*Alasmidonta viridis*) in Duck Creek. The last is a state species of special concern. The survey also found crayfish, pea clams, mottled sculpin (*Cottus bairdi*) and Johnny darter (*Etheostoma nigrum*), with creek chub (*Semotilus atromaculatus*) in Duck Creek and carp (*Cyprinus carpio*) in Kearsley Creek. Of interest is the fact that there are no exotic bivalves in these creeks, such as zebra mussels, which are nearly always transported by boats, implying these small creeks are a refuge for indigenous species.

4.10 Waterways/Water Quality/Floodplains

4.10.1 Waterways

Improvements to M-15 will impact 18 different waterways and waterbodies including lakes, ponds, perennial streams, intermittent streams, and drains. Huff Lake could be directly affected by improvements to M-15 as the existing 120-foot right-of-way of M-15 encroaches on it. M-15 is proposed for widening to five-lanes within this right-of-way. The pavement widening would not touch Huff Lake. Curb and gutter construction will carry runoff beyond the length of this section, and side slopes will be steepened. An unnamed stream that connects Huff Lake with Wilson Lake is crossed by M-15. This is one of six unnamed intermittent streams that M-15 crosses today and would cross with future widening. Two ponds and three drains would also be affected by the changes to M-15. The existing road already crosses these drains. M-15 would encroach into the sides of the two ponds.

Named perennial streams would be crossed five times by an improved M-15. Duck Creek would be crossed three times, Harris Creek once, and Kearsley Creek once. Duck Creek and Kearsley Creek (above the mill pond in Goodrich) are designated cold water trout streams (see letter from Michigan Department of Natural Resources in Appendix C). These streams are the only streams in the Flint River watershed known to support mottled sculpin and brown trout. (The latter are stocked). At Kearsley Creek, the future road would be narrowed to minimize impacts. This and other future crossings would be at the same locations as today, with the possible exception of one Duck Creek crossing. This exception may occur, if Duck Creek were relocated.

South of Ortonville Duck Creek acts as the roadway drainage ditch along M-15 for about 320 feet. The proposed road would occupy the creek area. Its location is constrained by an adjacent detention basin. There appears to be no practicable alternative to relocating this portion of Duck Creek. Mitigation options are outlined in Section 5.7.

Table 4-7 indicates for each culvert, named perennial stream crossing and county drain (south to north), the physical setting, type of existing structure, and existing and planned structure length (see also Figure 1-6), together with its drainage area. Structures that exist today will be replaced by culverts and bridges, so that there is no backwater impact. This will be done in the final design phase, as project construction is not expected to commence for several years, and the rapid land development occurring in the corridor is expected to continue, such that impervious surface is expected to increase and drainage conditions will change. The discharge analysis at that time will take those changes, likely growth, into account. Generally, if pipes are lengthened, the diameter is increased slightly so that the flow rate through the pipe remains the same. This prevents harmful interference (see Section 4.10.3).

**Table 4-7
Drainage / Stream Crossing Characteristics**

| Location/Stream Name | Setting | Structure Type | Old/New Length (ft.) | Drainage Area^a (acres) |
|--|-------------------------|---------------------------------|-----------------------------|--|
| 130' north of Rattallee Lake Road | Low density residential | 24" concrete culvert | 176/198 | < 2 |
| 3900' north of Rattallee Lake Road | Low density residential | 15" concrete culvert | 87/142 | < 2 |
| 720' south of Oak Hill Road | Low density residential | 24" concrete culvert | 84/156 | < 2 |
| 3050' north of Oak Hill Road | Low density residential | 72" pipe w/headwall | 84/158 | > 2 |
| 790' north of Huff Lake Road | Low density residential | 72" pipe | 60/68 | > 2 |
| Duck Creek north of Wolf | Commercial | 72" pipe w/headwall | 72/122 | 6.6 |
| Duck Creek south of Granger | Commercial | 72" pipe w/headwall | 90/126 | 6.6 |
| Duck Creek north of Granger | Commercial | 48" pipe w/headwall | 69/134 | 7.0 |
| 1700' south of Grange Hall Road | Commercial | Culvert buried | 87/128 | < 2 |
| 950' south of Grange Hall Road | Commercial | Culvert buried | 93/127 | < 2 |
| Harris Creek south of Auten | Rural / Old Farm | 9'x5' box culvert | 74/85 | 2.8 |
| 90' north of Ray Road (county line) | Low density residential | 15" concrete culvert | 54/120 | 2.5 |
| 500' south of Horton Road | Rural / Old Farm | 15" concrete culvert | 60/144 | < 2 |
| Paddison Drain north of Horton | Developing subdivision | 11.8'x6.9' box culvert | 51/141 | 2.5 |
| 1050' north of Kipp Road | Developing subdivision | 12" concrete culvert | 74/130 | < 2 |
| 260' south of Hills Lane | Developing subdivision | 15" concrete culvert w/headwall | 75/144 | < 2 |
| Under intersection w/ Rhodes Road | Low density residential | 15" concrete culvert | 75/80 | < 2 |
| 1100' north of Green Road | Low density residential | Culvert buried | 83/104 | < 2 |
| Kearsley Creek north of Green | Village fringe | 27.5'x7.5' box culvert | 50/92 | 46.6 |
| Cartwright Drain north of E. Hegel | Low density commercial | 7.5'x4.0' box culvert | 56/96 | < 2 |
| 540' north of Sojourner Drive | Developing commercial | 18" concrete culvert w/headwall | 63/146 | < 2 |
| 1390' south of Maple Road – parallel to M-15, realign Cummings Drain | Low density residential | 10'x6' elliptical CMP | 27/40 | < 2 |
| Cummings Drain south of Maple | Low density residential | 10'x6' concrete slab w/headwall | 54/154 | 2.3 |
| Under Maple Road east side M-15, remove | Low density residential | 10' deck | 37/0 | < 2 |

Source: MDEQ flood discharge database, Orchard, Hiltz and McCliment, The Corradino Group, and Tilton and Associates

^a Subject to floodplain analysis.

Current information on drainage conditions was obtained for the corridor from the drain commissions. Contact with the Oakland County Drain Commission (March 2003) indicates that there have been past concerns with flooding. A problem at Oak Hill Road was taken care of some time ago. South of Grange Hall Road an unnamed lake threatened to flood M-15. Drainage under M-15 was corrected in the summer of 2002. According to James Gerth of the Genesee County Drain Commission (phone call November 12, 2002), the structures for the open drains are adequately sized. His only concern was where road drainage may enter tiled drainage.

Streamflow data for Kearsley creek is available from a recording/gaging station near Davidson (Table 4-8). No known published discharge data is available for upper Kearsley or Duck Creeks.

**Table 4-8
Annual Streamflow Statistics for Kearsley Creek near Davison, Michigan**

| Year | Average annual flow (cfs) | Year | Average annual flow (cfs) | Year | Average annual flow (cfs) | Year | Average annual flow (cfs) |
|--|---------------------------|------|---------------------------|------|---------------------------|------|---------------------------|
| 1966 | 42.1 | 1975 | 137 | 1984 | 62.5 | 1993 | 89.8 |
| 1967 | 81.8 | 1976 | 93.0 | 1985 | 140.0 | 1994 | 97.8 |
| 1968 | 62.7 | 1977 | 38.6 | 1986 | 104.0 | 1995 | 64.5 |
| 1969 | 59.0 | 1978 | 48 | 1987 | 56.6 | 1996 | 80.3 |
| 1970 | 47.0 | 1979 | 49.3 | 1988 | 54.6 | 1997 | 85.8 |
| 1971 | 50.8 | 1980 | 61.9 | 1989 | 60.6 | 1998 | 60.5 |
| 1972 | 63.2 | 1981 | 94.7 | 1990 | 88.4 | 1999 | 34.8 |
| 1973 | 94.1 | 1982 | 80.6 | 1991 | 74.8 | 2000 | 55.3 |
| 1974 | 97.4 | 1983 | 62.1 | 1992 | 99.3 | 2001 | 80.4 |
| Summary statistics 1966-01 n=36 | | | | | | | |
| Mean average annual flow | | | 73.7 cfs | | | | |
| Median average annual flow | | | 63.9 cfs | | | | |
| Maximum average annual flow | | | 140.0 cfs (1986) | | | | |
| Minimum average annual flow | | | 34.8 cfs (1999) | | | | |
| Standard Deviation | | | 24.9 cfs | | | | |

Source: (USGS, 2002)

The loss of streambank habitat considers the change in structure length and changes to sections that parallel M-15. For Duck Creek, this would be approximately 150 feet for structure lengthening, plus another 320 feet from stream relocation. The latter effect would be mitigated. For Harris Creek, the structure would be lengthened by approximately eleven feet. For Kearsley Creek, the streambank would be stabilized, using steel sheeting or a Gabion retaining wall with riprap at its base, through approximately 300 feet (see Section 5.7) and the structure would be lengthened by about 42 feet.

The aquatic life that inhabits these water bodies is described, in part, previously, in Section 4.9. Additional recent studies of the Duck-Kearsley creek system are described in the MDNR "Flint River Assessment."⁶ (Leonardi and Gruhn, 2001).

Macroinvertebrates, including snails, clams, and insects are an important component of aquatic food webs. Stream and wetland alteration has the potential to modify macroinvertebrate populations. This, in turn, may have impact on animal groups such as birds, fish, amphibians, and reptiles that depend on these organisms as a food source. Macroinvertebrates and microbes also play a dominant role in the detritus food web that has, at its foundation, the consumption of dead plant litter. Loss of shredders and decomposers among the macroinvertebrate and microbial communities of the wetland may change the way organic matter is processed and nutrients cycled in the wetland. Recent fish studies along Kearsley and Duck Creek published by the MDNR are summarized in Tables 4-9 and 4-10.

⁶ Leonardi, J.M. and Gruhn, W.J., Flint River Assessment. Michigan Department of Natural Resources, Fisheries Division, Special Report No. 27, Lansing, MI, 2001.

**Table 4-9
Summary of Fish Surveys**

| Sampling Site | Date | Bottom Condition and Morphology | Cover | Fish Species |
|--|-------------|--|---|--|
| Duck Creek from Glass Rd to about 150 feet upstream of culvert | 7/23/93 | 98% silt 2% gravel; 100% run | Sparse cover consisting of overhanging brush, submerged logs, no pools, very little gradient | No trout collected. Mottled sculpin, creek chubs, white suckers, grass pickerel, green sunfish, central mud minnow. 72 fish total. |
| Duck Creek from Duck Creek Lane to about 50 feet downstream of culvert and to 150 feet upstream of culvert | 7/23/93 | 10% sand 10% silt 10% organic 70% gravel; 70% run 20% pool 10% riffle | Moderate overhanging brush, undercut banks and some small pools | Brook trout (1), brown trout (2) all above legal limit. Also creek chub, white sucker, mottled sculpin, blacknose dace, and bluegill. 17 fish total. |
| Duck Creek from Bird Rd to 50 feet upstream | 7/23/93 | 90% gravel 10% organic; Slow water average depth 4 feet. Beaver dam nearby | Moderate to overhanging brush and grasses, small and deep pool. | No trout collected. Mottled sculpin, blacknose dace, creek chub. 8 fish total. |
| Duck Creek at M-15 middle bridge to about 870 feet upstream to the M-15 south bridge | 7/24/01 | 50% sand 30% silt 20% gravel; 40% riffle 1% pool 59 % run | Overhanging trees and grasses and submerged logs were common, some undercut banks encountered | No trout collected. Several mottled sculpin. |
| Duck Creek at north M-15 bridge starting 800 feet down and working upstream to the bridge | 7/24/01 | 40% sand 40% silt 10% detritus 5% cobble 5% silt; 40% riffle 15% pool 45% run | Thick bank cover consisting of overhanging brush and logjams. Small pools available for adult trout | Brown trout (2 of 9 inches each) were collected. Markings indicated they were from the 2001 Kearsley Creek stocking. |
| Kearsley Creek at Granger Road bridge and extended upstream 500 feet. | 7/31/01 | 60% sand 30% gravel 10% silt; 40% riffle 5% pool 55% run | Fair bank and instream cover observed but greatly limited due to low water level. | Brown trout (2 fish, 8 and 10 inches) collected. Clip markings indicated they were stocked. |
| Kearsley Creek at Brandon Middle School, an 835-foot station | 8/01/01 | 50% sand 40% gravel 10% silt; 50% riffle 10% pool 40% run | Eroded, little cover; some woody structure and shallow pool; shallow riffle and run. | Brown trout (6 fish 8.6-9.8 inches long) collected, all having fin clips indicating they were stocked. |

**Table 4-9
Summary of Fish Surveys (Continued)**

| | | | | |
|--|---------|--|--|---|
| Kearsley Creek at Oakwood Rd (Ortonville) | 7/31/01 | 60% sand 25% gravel 15% silt; 40% riffle 25% pool 35% run | Bank cover limited due to low water. Some log jams and shallow pool areas offered some trout cover. | No trout stocked at the site in 2001. None collected. |
| Kearsley Creek at Kipp Rd along a 700-foot station | 8/13/97 | 10% boulder 5% cobble 20% gravel 45% sand 10% silt 10% clay; 20% riffle 30% pool 50% run | Good instream cover, moderate amounts of log, brush, and rocky substrate; bank cover good with overhanging trees and undercut banks; good pool and deep run. | 360 fish caught during three passes. Most of the fish were mottled sculpin (44%), central mud minnows (19%) brown trout (17.5%), others (19.5%). |
| Kearsley Creek at Kipp Road along a 930-foot station | 7/30/01 | 45% sand 20% gravel 15% silt; 30% riffle 20% pool 50% run | Fair cover for adult trout but low water level exposed much of the bank cover; some log jams, some pools, occasional undercutting | Brown trout (21 from 7-11.8 inches) collected, all containing markings, indicating they were stocked either in 2000 or 2001. |
| Kearsley Creek at Henderson Rd along a 700-foot station | 7/30/01 | Not reported | Fair cover for adult trout; fair amount of wood structure, small pools and undercut banks; sufficient depth for adult trout | Brown trout (19 fish 3.3-12.8 inches long) collected, all but one containing markings (one 3-inch fish apparently naturally reproduced). |
| Kearsley Creek at Atherton Road along a 600-foot station; this is downstream of Goodrich dam, in the warmwater section of the creek. | 8/14/97 | 20% gravel 55% sand 20% silt 5% clay; 5% riffle 0% pool 95% run | Sparse instream cover, occasional woody debris and logs, shallow, mostly sand substrate, bank cover sparse due to erosion and flashy stream | 467 fish caught during 3 passes including bluegill, bluntnose minnow, creek chub, common shiner, white sucker, green sunfish, horneyhead chub, johnny darter, largemouth bass, northern hogsucker, northern pike, pumpkinseed sunfish, river chub, rock bass. |

Source: Michigan Department of Natural Resources.

Streams and wetlands provide resting, feeding, nesting, and rearing areas for migrating birds including ducks, Canada geese, swans, herons, and redwing blackbirds. Mammals potentially associated with these streams and contiguous wetlands include raccoons, muskrats, and mink. A variety of upland wildlife is attracted to streams, lakes, and wetlands for some combination of food, cover, protection from harsh weather, or reproduction.

Many of the animals that use the streams also use contiguous wetlands. Since wetlands are protected by law, they are among the last places to be developed. Species that are adaptable may simply move into wetlands as their former habitat is eliminated. Ring-neck pheasants and deer are good examples of such adaptable species. As cropland or pasture are harvested, plowed, mowed, or grazed, pheasant move into wetlands for thick cover. White tail deer move into wetlands for similar reasons, as well as to seek protection from harsh winter weather (Schistosky and Linder, 1979).

Table 4-10
Abundance of Fish Species in Kearsley Creek
(Relative abundance of fish species as percentage of total found in upper and lower Kearsley Creek)

| Species | Latin Name | Origin | Upper Kearsley (% of fish by type) | Lower Kearsley (% of fish by type) |
|-----------------------------|-------------------------------------|---------------|---|---|
| American brook lamprey | <i>Lampetra appendix</i> | Native | 1.1 | 0.0 |
| Common shiner | <i>Luxilus cornutis</i> | Native | 0.0 | 9.2 |
| Honeyhead chub | <i>Nocomis biguttatus</i> | Native | 0.3 | 9.2 |
| River chub | <i>Nocomis micropogon</i> | Native | 0.0 | 1.9 |
| Bluntnose minnow | <i>Pimephales notatus</i> | Native | 0.0 | 13.5 |
| Creek chub | <i>Semotilus atromaculatus</i> | Native | 5.0 | 11.8 |
| White sucker | <i>Catostomus commersoni</i> | Native | 2.8 | 3.6 |
| Northern hog sucker | <i>Hypentelium nigricans</i> | Native | 0.0 | 25.3 |
| Grass pickerel | <i>Esox americanus vermiculatus</i> | Native | 0.6 | 0.0 |
| Northern pike | <i>Esox lucius</i> | Native | 0.3 | 0.6 |
| Central mudminnow | <i>Umbra limi</i> | Native | 19.2 | 0.0 |
| Brown trout | <i>Salmo trutta</i> | Introduced | 17.5 | 0.0 |
| Mottled sculpin | <i>Cottus bairdi</i> | Native | 44.4 | 0.0 |
| Rock bass | <i>Ambloplites rupestris</i> | Native | 0.0 | 3.0 |
| Green sunfish | <i>Lepomis cyanellus</i> | Native | 3.9 | 0.9 |
| Pumpkinseed | <i>Lepomis gibbosus</i> | Native | 0.6 | 1.5 |
| Bluegill | <i>Lepomis macrochirus</i> | Native | 0.0 | 0.6 |
| Hybrid sunfish | <i>Lepomis spp.</i> | Introduced | 0.0 | 0.6 |
| Smallmouth bass | <i>Micropterus dolomieu</i> | Native | 0.3 | 0.0 |
| Largemouth bass | <i>Micropterus salmoides</i> | Native | 1.9 | 7.9 |
| Black crappie | <i>Pomoxis nigromaculatus</i> | Native | 0.0 | 0.2 |
| Johnnie darter | <i>Etheostoma nigrum</i> | Native | 2.2 | 10.1 |
| Total Percent | | | 100.0 | 100.0 |
| Total of fish caught | | | 360 | 467 |

Source: Michigan Department of Natural Resources.

The potential for impact to this wildlife, including direct loss of habitat and indirect effects of increased volumes of salts and other constituents that may be carried in the runoff from road surfaces will be minimized through mitigation efforts. The Oakwood Road wetland mitigation area will provide approximately 22-acres of additional wetland in the Kearsley Creek subwatershed. This site includes Kearsley Creek shoreline that is about 0.5 miles long “as the crow flies” and much longer when considering stream sinuosity. This shoreline, along with the mitigation wetland will be protected by a permanent conservation easement. Absorbent drainage structures such as grassed swales, where feasible, would minimize the inputs of water-born contaminants that would otherwise flow directly to streams and drains.

4.10.2 Water Quality and Groundwater

Through early coordination, the Michigan Department of Environmental Quality (MDEQ) has indicated that discharge from storm water sewers into open water is discouraged. MDOT and MDEQ agree that filtration through vegetation, rather than the use of detention basins, is preferred and MDEQ has indicated that sheet flow was preferable to storm sewers (DEIS,

Appendix C - minutes of September 22, 2000 Scoping Meeting in Lansing). Considering design, a challenging situation is where wetlands occur on both sides of the road. Here, water must be carried off the length of the roadway between the wetlands to a point where it can be filtered through sheet flow. There must be sufficient elevation of the roadbed to accomplish this. On the other hand, the elevation of the roadbed should be as low as possible to minimize the footprint of impacts in these very wetlands. These tradeoffs have been addressed in the engineering supporting this document and will be further pursued during design. It is anticipated that curb-and-gutter design would be employed where there are adjacent water bodies. Water will be carried beyond the limit of the water body to an area where it could be held in detention or dispersed through sheet flow over grassy areas.

The MDEQ is working with communities in the state to establish wellhead protection plans to protect drinking water drawn from groundwater. Many plans are being developed, but none are close to M-15 and none will be affected by the project. The nearest such plan is for the City of Davison north of the project area.

Though there are not yet any designated wellhead protection areas in the corridor, the primary source of drinking water for most residents in the corridor is well water. Concern for water quality in 1996 led the US Geological Survey to perform analysis of arsenic in groundwater in southeast Michigan. That study led to a broader study in 2000.⁷ Information in that study indicates:

- Domestic wells are not monitored by any government agency, and are the responsibility of the owner.
- Surficial glacial deposits are the primary aquifer with fewer than 3 percent of wells in Oakland County in bedrock.
- Underlying bedrock is not considered a good source of potable water as it is frequently high in sulfate, iron, chloride, and dissolved solids. Bedrock is also the source of arsenic.
- High permeability, sandy soils are susceptible to contamination by human-generated pollutants, such as nitrate.
- Groundwater flow in Brandon Township is generally to the southeast.

Groundwater flow should not be substantially affected by the project. There will be little to no disturbance of bedrock. M-15 is in cut sections at several locations in the south section of the project length. The deepest proposed cut would lower M-15 an additional 10 feet at the cut through the hill north of Hubbard Road. Otherwise the roadbed would generally be built up relative to the surrounding ground, following the existing profile, to allow for proper drainage. Thus, the effects on groundwater flow are expected to be minor.

The possible effects of the alteration of the shallow groundwater system include increased runoff into receiving drains, streams, lakes, and wetlands with corresponding proportional decrease in infiltration. For smaller drains, streams and wetlands, the additional runoff could potentially result in noticeable changes in water volumes. Higher water volumes would tend to favor plant and animal species that are adapted to wetter conditions. However, these smaller wetlands and drains would be expected to continue to have seasonal fluctuations in water levels after the proposed construction. For larger water bodies, such as Duck and Kearsley Creek, Lake Louise, Wilson Lake, and others, the impacts would be likely negligible as the increases in runoff would be small compared to the water volumes in the lakes and streams. However, mitigation of these

⁷ Ground-Water Quality Atlas of Oakland County, Michigan, US Geological Survey Water-Resources Investigation 00-4120, August 2000.

negative impacts is expected though the use of MDOT standard stormwater management features incorporated into the road improvements.

The water quality of Duck and Kearsley Creek is good, judging from the aquatic life in these coldwater streams. Duck Creek is noted in the MDEQ “Clean Water Act Section 303(d) List” submittal to US EPA in compliance with the federal Clean Water Act as a “stream recovered from past manure losses” and now meets water quality standards.” No other streams in the project area are referenced in this report, which identifies those water bodies that are known to be out of compliance with water quality standards.

Within the Kearsley Creek subwatershed, variation in geologic materials create contrasting groundwater conditions. The upper (southern) portion of the subwatershed (the creek flows generally south to north) has relatively high soil permeability, while the lower (northern) basin is underlain by finer-textured, less-permeable materials. High soil permeability is associated with a higher proportion of groundwater contribution to the creek, more stable flows, and cooler water temperatures. Areas of lower soil permeability are associated with greater runoff, and “flashier” (more variable) stream flows and water temperatures. The areas of high groundwater recharge correspond to the cold/cool water habitat stretches of Duck and Kearsley Creeks identified in the MDNR “Flint River Assessment” (Leonardi and Gruhn, 2001).

4.10.3 Floodways and Floodplains

There will be no encroachment on any regulatory **floodway** (the main channel that carries water) in Oakland or Genesee County. **Floodplain** (the area into which water extends during periods of flooding) would be affected. This has been determined through an analysis performed consistent with 23 CFR 650 and Executive Order 11998. Floodplain analysis must examine whether a project creates or increases a hazard to people and/or property, and whether there is an impact on natural and beneficial floodplain values. These values include: fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge.

All new structures associated with M-15 will pass the 100-year storm event without affecting backwater. Structures and culverts will be designed to prevent the base floodplain elevation of any stream with a drainage of more than two square miles (see Table 4-7), regardless of whether floodplain has been mapped, from causing a harmful interference. Hydraulic analysis will be performed at all such locations during final design as construction is years away and conditions are likely to change. With such analysis during final design, no significant hazard to people or property is expected to result from the project.

In Oakland County there will be no floodway fringe (i.e., 100-year floodplain) affected in Independence Township. Brandon Township has just enrolled in floodplain mapping activities and no maps are available.

In Genesee County the only floodplain affected is in the Goodrich area (Figure 4-5). The floodplain will be encroached upon in two places; Kearsley Creek at the south end of Goodrich and Cartwright Drain at the north end of Goodrich. Existing M-15 already crosses the floodplain at Kearsley Creek. The right-of-way for the improved M-15 will be kept at a minimum at this location, such that the additional floodplain encroachment would amount to approximately 0.16 acres. The west side of a widened M-15 would encroach on the 100-year floodplain at Cartwright Drain (about 0.04 acres).

The encroachment at Kearsley Creak would result in an adverse impact on natural and beneficial floodplain values that are associated with those wetlands that occupy the base floodplain at this location. The values and functions of these wetlands and the impact that the proposed project will have upon them are described in the next section.

An analysis of these wetland impacts indicates that the project will not result in a substantial loss in natural and beneficial floodplain values, as measures to minimize the project's impact on these wetlands and to restore their flood control values are incorporated into the project's design.

4.11 Wetlands

Fieldwork to identify wetlands was performed consistent with state and federal guidance along the M-15 corridor in the fall of 2000 and in the spring of 2001 (Table 4-11 and Appendix H). State and federal laws and regulations (Section 404 of the Clean Water Act, Federal Executive Order 11990, and Part 303, Wetland Protection, of Michigan Public Act 451 of 1994) protect wetlands and require that: 1) they be avoided to the extent feasible and prudent; 2) if unavoidable, impacts be minimized; and, 3) mitigation be provided in the form of wetland replacement, generally as close as possible to, and in the same watershed as, the impact area. In addition, mitigation may be required for open water impacts that are part of a stream or lake (see Section 5.12) under Part 301 of Michigan Public Act 451 of 1994. Section 301 wetland impacts are included in Table 4-11 and noted with a footnote.

For a description of ecological conditions of streams and wetlands, please see the last four paragraphs of Section 4.10.1.

When Practical Alternatives were developed, avoidance was a primary consideration. Wetland protection was carefully balanced with possible impacts on cultural resources considered to be potentially eligible for the *National Register of Historic Places*. A preliminary assignment of wetland priority guided this process (see column 3 in Table 4-11). The Technically and Environmentally Preferred Alternative was created section-by-section to minimize wetland impacts. Where avoidance was impossible, a minimal footprint was pursued by narrowing the median where there are few or no access needs. Additionally, where the road is adjacent to wetlands, the standard ditch may be modified or eliminated to minimize further wetland intrusion. The incline to the waterline/ wetland will be steeper than normal, and a guardrail will be installed at the edge of the roadway's shoulder where required by design criteria.

Fifty-one wetlands are within the proposed highway right-of-way. Twenty-one include at least some forested wetland communities, 42 contain some emergent communities, 13 contain scrub-shrub communities, and 17 contain open water. (There is overlap in these categories.) All these wetlands provide wildlife habitat, water storage capacity, water quality improvement, and aesthetic enhancement to the surrounding communities. The wetlands in the vicinity of Duck and Kearsley creeks provide recharge areas important for maintaining thermal fish habitat for these cold water streams. In addition, the impacted wetlands are embedded in a landscape experiencing mounting development pressures, increasing their potential future value to society.

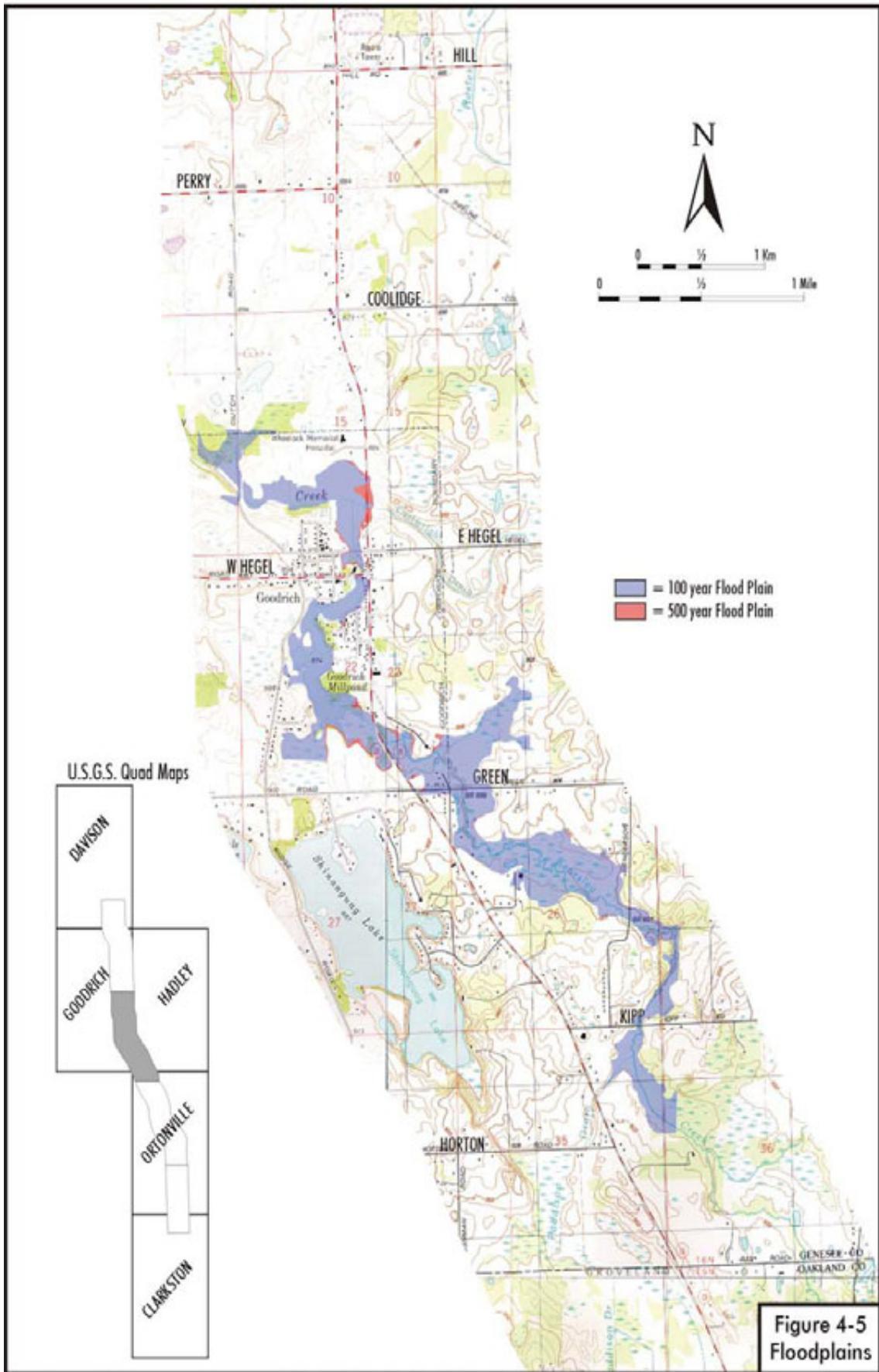


Figure 4-5
Floodplains

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**Table 4-11
Wetland Impacts**

| Wetland ID | Figure Number | Priority ¹ Class | Roadway Type | Wetland Community Classification | Percent of Total Wetland Acreage Affected ² | Total Acres Impact | Percent PFO or Lake Fringe | Lake Fringe or PFO Impact (Acres) | POW/PSS/PEM Impact (Acres) | Description |
|------------|---------------|-----------------------------|--------------|----------------------------------|--|--------------------|----------------------------|-----------------------------------|----------------------------|--|
| W68 | 1-6d | 3 | 5-lane | PEM | .01 | 0.01 | 0 | 0.00 | 0.01 | Cattail, elm, aster; organic muck soils with some recent mineral soil deposition |
| W67 | 1-6d | 2 | 5-lane | PEM | 2.0 | 0.16 | 0 | 0.00 | 0.16 | Cattail, few elm, lake fringe; gray mineral soils with bright mottles |
| W65 | 1-6d | 3 | 5-lane | PEM | 0.0 | 0.01 | 0 | 0.00 | 0.01 | Hoyle Drain; cattail, boxelder, reed canary grass, blue vervain, duck weed; organic muck soils |
| W64 | 1-6d | 3 | 5-lane | PEM | 0.0 | 0.005 | 0 | 0.00 | 0.005 | Hoyle Drain; cattail, boxelder, reed canary grass, blue vervain, duck weed; organic muck soils |
| W63 | 1-6d | 2 | 5-lane | PFO/PEM | 6.9 | 0.08 | 88 | 0.07 | 0.01 | Cummings Drain, floodplain, Carex sp., inundated, loamy grayish soil with bright mottles, mineral sediment, some muck soils on east side |
| W61 | 1-6d | 3 | 5-lane | PEM/PSS | 7.3 | 0.33 | 0 | 0.00 | 0.33 | Cattails, phragmites, elm, elder, gray dogwood; organic soils |
| W60 | 1-6d | 1 | 5-lane | PFO | 4.1 | 0.52 | 100 | 0.52 | 0.00 | Cummings Drain, ash, cottonwood, silver maple; organic soils |
| W59 | 1-6d | 3 | Narrow blvd | PEM/PSS | 100.0 | 0.15 | 0 | 0.00 | 0.15 | Drain w/cattails, dogwood; organic muck soils |
| W58 | 1-6d | 3 | Narrow blvd | PFO | 0.3 | 0.42 | 100 | 0.42 | 0.00 | Cummings Drain, silver maple, cottonwood; organic muck soils |
| W57 | 1-6d | 2 | Narrow blvd | POF/PSS | 0.1 | 0.21 | 10 | 0.02 | 0.19 | Drain with cattails, willows, ash; mucky sands |
| W56 | 1-6d | 3 | Narrow blvd | PFO/PEM/PSS | 0.2 | 0.22 | 5 | 0.01 | 0.21 | Cattail, dogwood, willow; grayish mineral soils with bright mottles |

Note: footnotes at end of table.

**Table 4-11
Wetland Impacts (Continued)**

| Wetland ID | Figure Number | Priority ¹ Class | Roadway Type | Wetland Community Classification | Percent of Total Wetland Acreage Affected ² | Total Acres Impact | Percent PFO or Lake Fringe | Lake Fringe or PFO Impact (Acres) | POW/PSS/PEM Impact (Acres) | Description |
|------------|---------------|-----------------------------|--------------|----------------------------------|--|--------------------|----------------------------|-----------------------------------|----------------------------|---|
| W55 | 1-6d | 2 | Narrow blvd | PFO/PEM | 18.2 | 0.20 | 90 | 0.18 | 0.02 | Green ash, elm, 6" watermarks, buttressed roots, organic muck soils |
| W54 | 1-6d | 2 | Narrow blvd | PFO/PEM | 54.2 | 0.13 | 30 | 0.05 | 0.08 | Elm, reed canary grass; grayish loam soils with bright mottles |
| W53 | 1-6c | 3 | Narrow blvd | PFO/PEM | 9.1 | 0.11 | 10 | 0.01 | 0.10 | Cattails; organic muck soils. |
| W52 | 1-6c | 3 | Narrow blvd | PFO/PEM | 45.0 | 0.19 | 28 | 0.05 | 0.14 | Cottonwood, ash, phragmites, reed canary grass, typha; mucky loam soils |
| W51 | 1-6c | 3 | Narrow blvd | PEM | 0.1 | 0.02 | 0 | 0.00 | 0.02 | Open water and reed canary grass associated with drain; grayish loamy soils with bright mottles |
| W50 | 1-6c | 2 | Narrow blvd | PEM | 0.1 | 0.01 | 0 | 0.00 | 0.01 | Reed canary grass, Cartwright Drain; inundation |
| W49 | 1-6c | 2 | Narrow blvd | PEM | 2.2 | 0.01 | 0 | 0.00 | 0.02 | Reed canary grass, Cartwright Drain; inundation |
| W48 | 1-6c | 1 | 5-lane | PFO/PEM/PSS | 0.5 | 0.50 | 0 | 0.05 | 0.45 | Cattails, sedges, red osier dogwood, black ash; organic muck soils, inundation, saturation |
| W47 | 1-6c | 1 | 5-lane | PFO/PEM | 0.3 | 0.30 | 60 | 0.18 | 0.12 | Green ash, elm, water marks, buttressed roots, reed canary grass, organic muck soils |
| W44 | 1-6c | 1 | 5-lane | PFO/ROW ³ | 0.7 | 0.65 | 100 | 0.66 | 0.07 | Elm, ash, cottonwood, skunk cabbage; associated with Kearsley Creek; muck soils |
| W43 | 1-6c | 2 | Narrow blvd | PFO/PSS | 3.3 | 0.03 | 33 | 0.01 | 0.01 | Silver maple, cottonwood, cattails; organic muck soils |
| W42 | 1-6c | 3 | Narrow blvd | PEM | 37.5 | 0.06 | 0 | 0.00 | 0.06 | Cattails; mucky sands |

Note: footnotes at end of table.

**Table 4-11
Wetland Impacts (Continued)**

| Wetland ID | Figure Number | Priority ¹ Class | Roadway Type | Wetland Community Classification | Percent of Total Wetland Acreage Affected ² | Total Acres Impact | Percent PFO or Lake Fringe | Lake Fringe or PFO Impact (Acres) | POW/PSS/PEM Impact (Acres) | Description |
|------------|---------------|-----------------------------|------------------|----------------------------------|--|--------------------|----------------------------|-----------------------------------|----------------------------|--|
| W41 | 1- 6c | 3 | Narrow blvd | PEM | 6.7 | 0.01 | 0 | 0.00 | 0.01 | Reed canary grass, tussock sedge; inundated (Paddison Drain) |
| W40 | 1- 6c | 3 | Narrow blvd | PEM | 5.3 | 0.01 | 0 | 0.00 | 0.01 | Reed canary grass, tussock sedge; inundated (Paddison Drain) |
| W38 | 1- 6c | 2 | Narrow blvd | PEM/PSS | 3.0 | 0.10 | 0 | 0.00 | 0.10 | Reed canary grass, Grey dogwood, Spiraea alba; mucky loam (85% PEM) |
| W37 | 1- 6b | 1 | Very narrow blvd | PEM | 2.4 | 0.34 | 0 | 0.00 | 0.34 | Includes "fen" species: pitcher plants, shrubby cinquefoil, spiraea, cattails; mucky peat soil |
| W36c | 1- 6b | 1 | Very narrow blvd | PEM | 0.3 | 0.45 | 0 | 0.00 | 0.45 | Includes "fen" species; northern half is reed canary grass/sedge meadow; southern half is fen with shrubby cinquefoil, twig rush; muck soils |
| W36b | 1- 6b | 1 | Very narrow blvd | PEM/PSS | 0.3 | 0.47 | 0 | 0.00 | 0.47 | PEM/PSS with fen species; shrubby cinquefoil, twig rush, spirea, tamarack; muck soil |
| W36a | 1- 6b | 1 | Very narrow blvd | PFO/PEM/PSS | 4.8 | 0.54 | 21 | 0.11 | 0.43 | Mixed community of green ash, willow, reed canary grass, sedges, red osier dogwood |
| W35 | 1- 6b | 3 | Very narrow blvd | PEM/POW | 100.0 | 0.16 | 0 | 0.00 | 0.16 | 70% PEM: cattails, reed canary grass; mucky sand soils; 30% POW |
| W34 | 1-6b | 2 | Very narrow blvd | LOW/LEM ³ | 9.1 | 0.73 | 0 | 0.04 | 0.69 | Reed canary grass; inundated |

Note: footnotes at end of table.

**Table 4-11
Wetland Impacts (Continued)**

| Wetland ID | Figure Number | Priority ¹ Class | Roadway Type | Wetland Community Classification | Percent of Total Wetland Acreage Affected ² | Total Acres Impact | Percent PFO or Lake Fringe | Lake Fringe or PFO Impact (Acres) | POW/PSS/PEM Impact (Acres) | Description |
|------------|---------------|-----------------------------|--------------|----------------------------------|--|--------------------|----------------------------|-----------------------------------|----------------------------|---|
| W33 | 1-6b | 3 | Narrow blvd | PEM/POW | 0.3 | 0.09 | 0 | 0.00 | 0.09 | West side: Typha, Salix, Sambucus canadensis; East side next to school soccer field: POW, sensitive fern, reed canary grass, cattails; mucky sands, inundated |
| W32 | 1-6b | 2 | Narrow blvd | PEM | 5.2 | 0.13 | 0 | 0.00 | 0.13 | Reed canary grass, cattail; organic soils |
| W31 | 1-6b | 2 | Narrow blvd | PEM/PSS | 0.5 | 0.27 | 0 | 0.00 | 0.27 | Red osier dogwood, willow, cattail, sedges, organic soil |
| W30 | 1-6b | 1 | Narrow blvd | ROW ³ | 0.4 | 0.12 | 0 | 0.00 | 0.12 | Duck Creek with little or no wetland fringe |
| W29 | 1-6b | 1 | Narrow blvd | REM/ROW ³ | 0.8 | 0.37 | 0 | 0.00 | 0.37 | Sedges, cattail wetland with Duck Creek; organic soils; inundated |
| W27 | 1-6b | 1 | Narrow blvd | PFO/PSS/REM/ROW ³ | 2.5 | 0.19 | 5 | 0.01 | 0.18 | Wetlands with Duck Creek; 65% cattail REM; 30% red osier dogwood PSS; 5%PFO with ash, cottonwood; organic soils |
| W26 | 1-6b | 1 | Narrow blvd | PFO/PSS/REM/ROW ³ | 18.7 | 0.43 | 10 | 0.04 | 0.39 | Reed canary grass, dogwood, ash wetland associated with Duck Creek |
| W25 | 1-6b | 2 | Narrow blvd | ROW ³ | 22.5 | 0.45 | 0 | 0.00 | 0.45 | Duck Creek (channelized) no wetland fringe |
| W24 | 1-6b | 2 | 5-lane | PFO | 0.1 | 0.10 | 100 | 0.10 | 0.00 | Boxelder, ash, cottonwood, reed canary grass; mucky sand soils; Green Lake-lake-fringing wetland |
| W12 | 1-6b | 3 | 5-lane | PEM | 7.4 | 0.90 | 0 | 0.00 | 0.90 | Cattails, giant reed; organic soils |
| W10.5 | 1-6b | 3 | Narrow blvd | PEM | 57.1 | 0.08 | 0 | 0.00 | 0.08 | Cattails; organic soils |
| W10 | 1-6b | 3 | Narrow blvd | PEM | 51.4 | 0.72 | 0 | 0.00 | 0.72 | Cattails; organic soils |

Note: footnotes at end of table.

**Table 4-11
Wetland Impacts (Continued)**

| Wetland ID | Figure Number | Priority ¹ Class | Roadway Type | Wetland Community Classification | Percent of Total Wetland Acreage Affected ² | Total Acres Impact | Percent PFO or Lake Fringe | Lake Fringe or PFO Impact (Acres) | POW/PSS/PEM Impact (Acres) | Description |
|--------------|---------------|-----------------------------|--------------|----------------------------------|--|--------------------|----------------------------|-----------------------------------|----------------------------|---|
| W9 | 1-6b | 3 | Narrow blvd | PFO | 100.0 | 0.05 | 100 | 0.05 | 0.00 | Cottonwood, silver maple |
| W8 | 1-6b | 2 | Narrow blvd | PEM | 0.8 | 0.25 | 0 | 0.00 | 0.25 | Cattail; mucky sand soils |
| W7 | 1-6b | 2 | Narrow blvd | PEM | 0.2 | 0.15 | 0 | 0.00 | 0.15 | Cattail; mucky sand soils |
| W5 | 1-6b | 2 | Narrow blvd | PEM/PSS | 7.4 | 0.26 | 0 | 0.00 | 0.26 | Dogwood, reed canary grass; mucky sand soils |
| W4 | 1-6b | 1 | Narrow blvd | PFO | 95.0 | 0.19 | 0 | 0.19 | 0.00 | Black willow, silver maple green ash; grayish loam soils with bright mottles |
| W3 | 1-6b | 1 | Narrow blvd | PFO/PSS | 17.4 | 0.47 | 80 | 0.37 | 0.09 | Cottonwood, silver maple, 20% PSS (dogwood); grayish loam soils with bright mottles |
| W2 | 1-a | 3 | Narrow blvd | PFO/PEM | 2.0 | 0.02 | 40 | 0.01 | 0.01 | Elms, turf grasses; grayish loam soil with bright mottles |
| Total | | | | | 0.8 | 12.45 | | 3.16 | 9.29 | |

Source: Tilton and Associates

¹Priority classes applied to this project were: 1, highest quality; 2, medium quality; and 3, lowest quality.

²For wetlands contiguous to the project, the percent of acreage that is impacted by the project.

³Mitigation for Lacustrine and Riverine Open Water (LOW and ROW) may be required during permitting.

P – Palustrine L – Lacustrine R - Riverine
EM – Emergent SS – Shrub-Scrub FO – Forested
OW – Open-Water

Note: All wetland impacts will be mitigated because of the use of federal funds (E.O. 11990).

The preliminary determination has been made that, based on the criteria outlined in Part 303, Wetland Protection, of the Natural Resources and Environmental Protection Act of 1994 (1994 P.A. 451, as amended), 51 wetlands in the proposed highway right-of-way would be affected. Any dredging, filling, or construction in regulated wetlands requires an MDEQ permit before beginning the construction activity. To be successful, a permit applicant must demonstrate that the activity is dependent on being located in the wetland, and/or no feasible or prudent alternative exist which would avoid or minimize the proposed wetland impact. In general, the MDEQ considers the magnitude and justification of the impact in granting a permit. The permit may require compensatory mitigation, which is the creation of wetland from upland to replace the affected acreage in a regulated wetland. Palustrine Forested (PFO) and lake fringe wetlands are commonly mitigated at a 2:1 ratio. Other wetland types are usually mitigated at a 1.5 to 1 ratio. The conclusion is that approximately 12.45 acres of wetland would be affected, with a likely mitigation need of about 18.14 acres (Table 4-12).

**Table 4-12
Summary of Estimated Impacts and Potential Compensatory Mitigation Requirements**

| Wetland Community Type | Estimated Impact (acres) | Probable Mitigation Ratio | Mitigation to Create or Restore (acres) |
|-------------------------------|---------------------------------|----------------------------------|--|
| Palustrine Forested | 3.11 | 2 to 1 | 6.22 |
| Palustrine Scrub-shrub | 1.70 | 1.5 to 1 | 2.55 |
| Palustrine Emergent | 5.34 | 1.5 to 1 | 8.00 |
| Palustrine Open Water | 0.20 | 1.5 to 1 | 0.30 |
| Riverine Emergent | 0.66 | 1.5 to 1 | 0.99 |
| Riverine Open Water | 0.71 | NA ¹ | NA ¹ |
| Lacustrine Emergent | 0.04 | 2 to 1 | 0.08 |
| Lacustrine Open Water | 0.69 | NA ¹ | NA ¹ |
| Total | 12.45 | | 18.14 |

Source: Tilton Associates, Inc.

¹ NA means Not Applicable, as these wetlands are regulated under Part 301. Mitigation requirements will be decided at the time of permitting..

The project is in compliance with Executive Order 11990, “Protection of Wetlands.” It has been determined that there is no practicable alternative to the proposed action, and that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

4.12 Historic and Archaeological Resources

The *National Register of Historic Places* has established criteria for determining historic significance. These criteria require a property to have integrity of location, design, setting, materials, workmanship, feeling, and association. Additionally, the property must be fifty years old or older, and meet one of the following criteria: a) be associated with a significant event; b) be associated with the lives of significant persons; c) embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master; or, d) have yielded or may be likely to yield information important in history or prehistory (usually archaeological sites).

To satisfy Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act, MDOT contacted the Michigan State Historic Preservation Office (SHPO) for help in identifying project area historic and archaeological sites. The SHPO recommended MDOT conduct historic and archaeological surveys to locate sites eligible for listing on the *National Register of Historic Places*. The FHWA and MDOT began cultural resource surveys by delineating an Area of Potential Effect (APE) for the project. The APE represents the maximum area potentially affected, both directly and indirectly, by the project and is approved at the outset of the analysis by the SHPO. The SHPO agreed the APE would extend one lot deep along most of M-15 except where the potential for a district was identified (see letters dated April 3 and June 26, 2001, DEIS, Appendix C, Section 2).

Surveys of historic and archaeological resources took place within the APE in 2000 and 2001. The survey results, project impacts, and mitigation measures are described in separate reports.⁸ The SHPO concurred with the recommendations for *National Register* eligibility in those reports (see letter dated November 26, 2001, DEIS, Appendix C, Section 2).

The FHWA and MDOT note that the Technically and Environmentally Preferred Alternative would have an “adverse effect” on cultural resources. To determine effects, the FHWA applies the criteria of adverse effect, as listed in Section 106 of the National Historic Preservation Act. A project results in an adverse effect on an historic property when it diminishes those characteristics that make it historically significant. Activities that may result in an adverse effect include demolition, landscape changes, isolation of a property from its setting, and the introduction of visual, audible or atmospheric elements out of keeping with the character of the property.

Because the Technically and Environmentally Preferred Alternative would adversely affect historic properties, FHWA and MDOT must develop mitigation measures to minimize impacts. FHWA has developed these measures in consultation with the SHPO, the community, and the Advisory Council on Historic Preservation in Washington, D.C. Section 6 of this EIS discusses historic properties that could experience an adverse effect.

4.12.1 Historic Architecture

No sites in the APE are already listed on the *National Register*. The nearest such site is the Goodrich Historic District, about 400 feet west of M-15 along West Hegel. *National Register* sites also exist in Ortonville, east of M-15. There would be “no adverse effect” on these sites.

An extensive field survey of all standing structures 50 years or older was conducted, along with literature research and interviews with knowledgeable persons in the corridor (Appendix I) to determine their historic significance and eligibility for listing on the *National Register*. Cultural resource meetings were held November 15, 2000, January 24, 2001, and April 3 and 4, 2001 to inform the public about historic resources and to solicit information about such resources. Consultation was undertaken with the SHPO. As a result, 12 historic sites (plus one archeological site) are considered potentially eligible for listing on the *National Register* (Table 4-13, Figure 1-6). Six historic sites, plus the archeological site, are expected to suffer an adverse effect from the project. Hence, a Memorandum of Agreement (MOA) is necessary and is included in this FEIS. It spells out conditions that mitigate impacts to those properties adversely

⁸ “Phase I Archaeological Survey of the Proposed M-15 Improvement Between I-75 and I-69 Oakland and Genesee Counties, Michigan,” Commonwealth Cultural Resources Group, June 2001, and “Phase I/II Above-Ground Survey of the Proposed M-15 Improvement Between I-75 and I-69 Oakland and Genesee Counties, Michigan,” Commonwealth Cultural Resources Group, October 2001.

affected. Section 6 of this EIS provides a Final Section 4(f) Evaluation of those properties that would experience an adverse effect and that would be covered in the MOA. Potentially eligible sites in Table 4-13 with no adverse effects are discussed next. As they suffer no adverse effect, they are not covered in the Section 4(f) Evaluation in Section 6. Those that would experience an adverse effect are described in Section 6.

The **West Ortonville Historic District** is centered on Mill and Narrin Streets on land owned by George Narrin, a prominent early resident. The land was sold in parcels larger than in the older parts of the community, providing plenty of space for large Queen Anne style houses. The houses in the district are associated with the initial subdivision and development of the western edge of Ortonville (Criterion A), and they embody the distinctive characteristics of a type, period, or method of construction (Criterion C), specifically the Queen Anne style. The garage of 46 Mill Street is the only structure that would be affected. It was constructed after the residence and has since been moved such that it is no longer a contributing element to the district. Therefore, the district is not considered to experience an adverse effect with the project.

The **Ortonville Cemetery** is on M-15 north of Ortonville. It demonstrates integrity of location, design, setting, materials, workmanship, feeling, and association, and is considered eligible for the *National Register* under Criterion C. The edge of pavement would remain where it is today, with widening to the east, away from the cemetery. Therefore, there would be no adverse effect.

The **Mills Farmstead** (610 North Ortonville Road) is north of the cemetery on the other side of M-15. It is an excellent example of a family farm that has functioned for almost 150 years, and is considered eligible for the *National Register* under Criteria A and C. It has association with events significant in our history, including exploration, settlement, and the practice of agriculture (Criterion A). And, buildings embody the distinctive characteristics of a type, period, or method of construction (Criterion C). Property acquisition was avoided by carrying a very narrow boulevard section past the Mills Farmstead. Therefore, there would be no adverse effect.

The **Westerby Farmstead** (1215 North Ortonville Road) is on the west side of M-15, several lots south of Auten Road. The house and garage are considered eligible for the *National Register* under Criterion C, as they embody the distinctive characteristics of a type, period, or method of construction (rustic fieldstone wall cladding). No right-of-way would be taken from this property. Therefore, there would be no adverse effect.

The **Kitchen School House** (4010 State Road), at the southwest corner of Bristol Road and M-15, is considered eligible for the *National Register* under Criteria A and C, due to its association with events that have made a significant contribution to the broad patterns of our history and the fact that the school building embodies the distinctive characteristics of a type, period, or method of construction. No new right-of-way would be required, so there would be no adverse effect.

**Table 4-13
Summary of Project Effects on Potential
National Register Eligible Cultural Resources**

| Site Name | Location | Description | Eligibility Criteria | Effect |
|--|---|---|-----------------------------|--|
| Dawley Residence / Stone Store ¹ | 850 Ortonville Road. West side M-15 north of Wolfe Road | Former residence, now gift shop with stone pillars in existing right-of-way, circa 1916 | C | New right-of-way would be about 40' into yard for wider road. |
| Ortonville West District | Mill Street, clustered at Narrin Street | Queen Anne style house built on George Narrin's land | A & C | New right-of-way will demolish 46 Mill Street garage. |
| Michigan Milk Producers Receiving Station ¹ | 126 N Ortonville Road. East side M-15 north of Myron Street | Example of small Art Moderne style industrial facility | A & C | New right-of-way line would be about 10' from building. |
| Ortonville Cemetery | West side M-15 south of Oak Wood Road | Cemetery, circa 1840-1940 | C | Existing pavement edge would be maintained. No effect on historic portion of cemetery. |
| Mills Farmstead | 610 N Ortonville Road. East side M-15 at Groveland Road | Circa 1860 well preserved farm | A & C | Existing right-of-way line maintained. |
| J. Westerby Farmstead | 1215 N Ortonville Road | Example of popular trend in fieldstone cladding, circa 1880 | C | Existing right-of-way line maintained. |
| Rhodes-Green Farm Historic District ¹ | 10448 Green Road. West side M-15 | Association with an early settler and agriculture, circa 1860/1881 | A | New right-of-way would be about 20' to 30' into yard for wider road. |
| Henry Hawes Residence Historic District ¹ | 8083 State Street. East side M-15 in Goodrich | Italianate architectural example, circa 1870 | A & C | New right-of-way would be about 30' into front yard, including two large trees. |
| Kitchen School House | 4010 State Road. SW corner M-15 and Bristol | Early school, circa 1870 | A & C | Existing right-of-way line maintained. |
| Freeman Sweers Residence / Louhelen Baha'i Center ¹ | 3208 State Road. West side M-15 north of Bristol Road | House circa 1885. Retreat founded in 1931 as Baha'i faith school and center | A & C | Existing right-of-way line maintained, but trees may be removed. |
| Goodenough Townsend Residence ¹ | 2430 State Road | Example of residential Gabled-Ell architecture, circa 1875 | C | New right-of-way would be 20'+ into front yard with smaller trees likely removed, but larger yard trees remaining. |
| Seelye House | 2224 Montague backing up to M-15 | Example of residential brick Gabled-Ell architecture, circa 1875 | A, B, & C | New right-of-way would be about 30' into back yard. |
| 200K480 | East side M-15 south of Oak Hill Road | Archaeological remains of farmstead | Unknown | Phase II testing required to determine National Register eligibility. New right-of-way would extend over much of site. |

¹ Sites that suffer an adverse effect. See Section 6.
Source: Commonwealth Cultural Resources Group

The **Seelye House** faces onto Montague Road (2224 Montague Road). The back of the lot abuts M-15. A shed in back of the house is considered a contributing element. The property's eligibility for the *National Register* falls under Criteria A, B, and C. The shed and home are associated with the broad patterns of history (Criterion A), and the house with a significant person, Abel Seelye, a prominent early settler (Criterion B). The house is also eligible under Criterion C as it is an excellent brick example of a Gabled-ElI residence. Its brick composition is an expression of the development of the local brick industry initiated as a result of railroad construction in 1871. When driving on M-15, one is not aware of the Seelye House due to screening vegetation, the elevation of the yard above the road (several feet) and the presence of the newer homes on either side of it. Acquiring 20' of right-of-way will not adversely affect those characteristics that make this site eligible for the *National Register*.

4.12.2 Archaeological Resources

A Phase I archaeological survey was performed in the APE (Appendix J). All recorded sites are well beyond the APE. Most of the area has been previously disturbed, either as roadway right-of-way or yard. Nine archaeological sites potentially affected by project work were identified as a direct result of this fieldwork. Five are historic sites in Oakland County; three are historic sites in Genesee County; and, one is a prehistoric find in Genesee County. Of the nine, eight are not considered eligible for listing in the *National Register*. Site 20OK480 needs further testing to determine its eligibility (Table 4-13). It is the remains of a farmstead located on the east side of M-15. Should the SHPO determine the site meets the eligibility criteria, MDOT will proceed to excavation, recording the information the site has to yield. This site is primarily important for the information it can give about 19th / early 20th century agriculture and not for preservation in place. It is included in the Memorandum of Agreement in Appendix L.

4.13 Parkland

No parkland is directly or indirectly affected. M-15 is Michigan's first designated Heritage Recreation Route, indicating that M-15 provides access to a number of recreational resources. A mile east of M-15 at Hadley Road is Independence Oaks County Park. One-half mile west of M-15 near Ortonville are sections of the Holly Recreation Area. One mile east of M-15 north of Ortonville are sections of the Ortonville Recreation Area and Hadley Hills Recreation Area. North of Davison are the Genesee Recreation Area and the Holloway Reservoir Regional Park.

4.14 Visual Conditions

In the south corridor, M-15 passes over hills north of Cranberry Lake Drive and Hubbard Road. The terrain is then flat to rolling until a hill south of Seymour Lake Road. M-15 is relatively flat through Goodrich. It then passes over rolling terrain north through Genesee County to I-69. The dominant visual characteristic is large-lot residential uses punctuated by lakes and wetlands, and in Genesee County, rural landscapes, both natural and manmade (farmlands). Commercial strip development occurs near Ortonville and at the north and south ends of Goodrich. Commercial/office uses dominate the visual scene near Lippincott Road in Davison Township. Ortonville and Goodrich influence the setting of the roadway. Ortonville contains a potential *National Register* historic district, but it is off line of M-15. In Goodrich a district is listed on the *National Register*, but it too is off-line. There is newer commercial development to the south of this area on the east side of M-15 and just north of Goodrich.

When improvements to M-15 were proposed in the early 1990s in the form of a five-lane road, those in the corridor expressed a desire for a more aesthetic road - a boulevard. The aesthetic

attributes of the boulevard have been recognized to integrate better with the character of the corridor and so the Technically and Environmentally Preferred Alternative mixes five-lane and boulevard cross sections. Where the narrow boulevard “fits” with acceptable impacts, it has been proposed.

4.15 Contaminated Sites

A Project Area Contamination Survey (PACS) was conducted for the M-15 improvement project (Appendix K).⁹ The purposes of the PACS were to investigate parcels of property potentially affected by the project for the presence of environmental contamination and to determine whether further investigation or remediation is needed. The assessment for contamination included: field reconnaissance; interviews with business owners and governmental agency representatives; review of federal and state environmental databases; and, review of historical land use records. The PACS assessed commercial and industrial properties along the corridor. Residential, farm, and institutional properties were not covered unless there were specific observations or reported indications of contamination. Each site was categorized by contamination potential as no, low, or medium/high (Table 4-14 and Figure 1-6). Locations noted as medium/high are recommended for further investigation. Details of the analysis follow.

Review of federal databases found no listed sites within one mile of the project corridor; i.e., no CERCLIS (Comprehensive Environmental Response, Compensation, and Liability, Information System); NPL (National Priorities List [Superfund]); and, RCRIS-TSDs (Resource Conservation and Recovery Information System hazardous waste Treatment, Storage and Disposal facilities) sites. The Michigan Contaminated Sites list, the equivalent of a state superfund list, contained one site in the corridor known as Mill Street Residential Wells (Ortonville). It involved a contaminated groundwater plume near Mill Street and M-15 in Ortonville. Groundwater depth in this area is less than ten feet in some locations; therefore, contaminated groundwater could possibly be encountered during construction. Other state environmental databases and records reviewed included permitted hazardous waste generators, underground and aboveground storage tank sites, and landfills/solid waste facilities. Twenty-six permitted hazardous waste generators were identified along M-15 within the project corridor. Most of these facilities were registered for disposal of tank sludge and waste liquids generated during the removal of underground storage tanks (USTs) and are not currently generating hazardous wastes.

Seven non-underground storage tank sites were classified as “medium/high” for contamination potential because of their handling of hazardous materials or wastes, and the presence of an on-site septic system. These sites should be tested further for soil and groundwater impacts.

No permitted solid waste/landfill facilities were identified. One former municipal landfill used by Brandon and Independence Townships was reported in interviews with local governmental representatives in a low-lying area of approximately 20 acres on the west side of M-15, approximately one mile north of Oak Hill Road. The landfill site was reportedly acquired by private owners in the late 1960s or early 1970s and the operation ceased. No records regarding this site were available from MDEQ. The proposed project would acquire approximately a 50-foot strip along the eastern edge of this property. A Preliminary Site Investigation (PSI) consisting of soil and groundwater testing should be performed prior to acquisition by MDOT.

⁹ “Project Area Contamination Survey,” The Corradino Group, November 2001.

**Table 4-14
Contamination Summary**

| SID No. | Site Name (Former Name or Use) | Address or Location | City | Records/ Observations | | | | | | | ROW W or A | Contamination Potential Rating | Comment |
|---------|---|---------------------|------------|-----------------------|------------------|------|-----|--------------------|-----|--------------------|------------|--------------------------------|-------------------|
| | | | | CERCLIS/NPL | MI Contam. Sites | LUST | UST | RCRIS (Haz. Waste) | AST | Other ¹ | | | |
| 1 | Mobil Gas Station | 1499 S State Rd | Davison | | | | X | | | | A | L | Gas Station |
| 3 | Zips Party Store (Zirnhelms County Market) ^a | 3355 S State Rd | Davison | | | X-c | X | | | | W | M/H | Gas Station |
| 5 | Vacant Garage, NE corner of Bristol Rd & M-15 ^a | Bristol Rd/M-15 | Davison | | | | | | | X | W | M/H | Old Gas Station |
| 6 | Filled Site, west of M-15, south of Maple Road | Near Maple Rd | Davison | | | | | | | X | W | L | Construction Fill |
| 7 | Last Chance Party Store ^a | 5545 S State Rd | Davison | | | | | | X | X | W | M/H | Old Gas Station |
| 9 | Burton Industries ^a | 6202 S State Rd | Goodrich | | | | | X | | | W | M/H | Haz Materials |
| 10 | Burkland Textron | 6520 S State Rd | Goodrich | | | | | X | | | W | L | Haz Materials |
| 14 | Jan's Sport Marine | 7285 S State Rd | Goodrich | | | | | | X | X | W | L | Haz Materials |
| 19 | Kens Ready Mix | 8016 S State Rd | Goodrich | | | | | | X | X | W | L | Haz Materials |
| 22 | Church & Sons Auto Center (Kellys Auto Repair) ^a | 8039 S State Rd | Goodrich | | | X-c | X | X | X | | W | M/H | Gas Station |
| 23 | John's Steak House (Dominic Sirignano) | 8038 State Rd | Goodrich | | | X-o | X | X | | | W | L | Old Gas Station |
| 24 | Quick-Sav Food Stores ^a | 10318 Hegel Rd | Goodrich | | | | X | X | | | W | M/H | Gas Station |
| 25 | Vacant Lot, SE corner of Hawes & M-15 ^a | Hawes/M-15 | Goodrich | | | | | | | X | W | M/H | Old Gas Station |
| 28 | Morts Barber Shop/Goodrich Cleaners ^a | 8191-93 State Rd | Goodrich | | | | | | | X | W | M/H | Old Gas Station |
| 29 | Town Pride Carpet ^a | 8217 State Rd | Goodrich | | | | | | | X | W | M/H | Old Gas Station |
| 30 | Goodrich Car Care (Oakhill Auto Restoration) ^a | 8221-23 S State Rd | Goodrich | | | X-o | X | X | | | W | M/H | Old Gas Station |
| 35 | Goodrich Mfg. Co. | 8267 S State Rd | Goodrich | | | | | X | | X | A | L | Haz Materials |
| 38 | Nu View Auto Glass/Car Wash ^a | 8355 State Rd | Goodrich | | | X-c | X | X | | | W | M/H | Old Gas Station |
| 39 | Goodrich Auto Parts/RJs TV Repair | 8359-65 S State Rd | Goodrich | | | | | | | | W | L | Haz Materials |
| 40 | The Village Greenery | 8340 State Rd | Goodrich | | | | | | | X | W | L | Haz Materials |
| 41 | Atlas Real Estate (Germaines Corvettes) | 8491 State Rd | Goodrich | | | | | X | | | W | L | Haz Materials |
| 44 | Vacant Commercial Bldg ^a | Horton Rd & M-15 | Goodrich | | | | | | | X | W | M/H | Old Gas Station |
| 45 | Bedrock Express | 1290 M-15 | Ortonville | | | | | | X | X | W | L | Truck Maintenance |

Notes: ¹Other potential contamination sites identified by reconnaissance and/or interviews.

LUST – Leaking underground storage tank; X-c = Closed case; X-o = Open case.

UST - Underground storage tank AST - Aboveground storage tank

CERCLIS - Comprehensive Environmental Response, Compensation and Liability Information System

RCRIS – Resource Conservation and Recovery Information System

W = Within Right-of-Way, A = Adjacent to Right-of-Way.

**Table 4-14
Contamination Summary (Continued)**

| SID No. | Site Name (Former Name or Use) | Address or Location | City | Records/ Observations | | | | | | ROW W or A | Contamination Potential Rating | Comment | |
|---------|--|---------------------|------------|-----------------------|------------------|------|-----|--------------------|-----|------------|--------------------------------|---------|----------------------|
| | | | | CERCLIS/NPL | MI Contam. Sites | LUST | UST | RCRIS (Haz. Waste) | AST | | | | Other ¹ |
| 47 | POH Medical Center (Ortonville Family Medicine) | 180 N Ortonville Rd | Ortonville | | | | | X | | | W | L | Haz Materials |
| 48 | Recovery Systems Int. (Allflo Products) | 160 N Ortonville Rd | Ortonville | | | | | X | | | W | L | Haz Materials |
| 49 | Engineering Tube Specialties (former dairy) ^a | Ortonville Rd | Ortonville | | | | | | | X | W | M/H | Haz Materials |
| 51 | Rite Aid (Waterlock Solvents) ^a | 1 Mill Street | Ortonville | | | | | X | | | W | M/H | Old Dry Cleaners |
| 52 | Ace Hardware (Waterlock Solvents) ^a | 4 N Ortonville Rd. | Ortonville | | | | | | | X | W | M/H | Old Dry Cleaners |
| 53 | Marathon Station (CMS/Boron) ^a | 15 N Ortonville Rd. | Ortonville | | | X-o | X | X | | X | W | M/H | Gas Station |
| 54 | Closed Garage (Futura Collision) ^a | 12 M-15 | Ortonville | | | | | X | | X | W | M/H | Haz Mat/Old Gas Sta. |
| 55 | Little Caesars (former gas station) ^a | 11 S Ortonville Rd | Ortonville | | | | | X | | X | W | M/H | Old Gas Station |
| 58 | Vacant Comm. Bldg. | S Ortonville Rd | Ortonville | | | | | | | | W | L | No Comment |
| 60 | Simms Chevrolet (Owen Motors, Inc.) | 110 S Ortonville Rd | Ortonville | | | | X | X | | | W | L | Haz Materials |
| 61 | C & J Oil Change | 150 S Ortonville Rd | Ortonville | | | | | X | | X | W | L | Haz Materials |
| 63 | Hamiltons Propane, Inc. | 300 Ortonville Rd | Ortonville | | | | | | X | | W | L | Haz Materials |
| 64 | Vacant Commercial Bldg (Bell Auto Parts) ^a | 384 Ortonville Rd | Ortonville | | | | | | | X | W | M/H | Haz Materials |
| 70 | Country Countertops ^a | 490 S Ortonville Rd | Ortonville | | | | | | | | W | M/H | Old Gas Station |
| 71 | Clark Station ^a | 495 S Ortonville Rd | Ortonville | | | | X | X | | X | W | M/H | Gas Station |
| 73 | Brandon Tire & Auto Center ^a | 595 S Ortonville Rd | Ortonville | | | | | X | | | W | M/H | Haz Materials |
| 79 | Brandon Family Dentist Office | 830 S Ortonville Rd | Ortonville | | | | | | | | W | L | Haz Materials |
| 81 | Forster Auto Wash ^a | 880 S Ortonville Rd | Ortonville | | | | | | | X | W | M/H | Old Gas Station |
| 83 | James Lumber Co. (Brandon Building Center, Oxford Lumber) ^a | 910 S Ortonville Rd | Ortonville | | | | X | | | | W | M/H | Old UST Site |
| 87 | Arrants Ford | 968 Ortonville Rd | Ortonville | | | | | X | | X | A | L | Haz Materials |
| 88 | New gas station | Ortonville Rd | Ortonville | | | | X | | | X | W | L | New UST Site |

**Table 4-14
Contamination Summary (Continued)**

| SID No. | Site Name (Former Name or Use) | Address or Location | City | Records/ Observations | | | | | | ROW W or A | Contamination Potential Rating | Comment | |
|---------|---|-------------------------|------------|-----------------------|------------------|------|-----|--------------------|-----|------------|--------------------------------|---------|-----------------------|
| | | | | CERCLIS/NPL | MI Contam. Sites | LUST | UST | RCRIS (Haz. Waste) | AST | | | | Other ¹ |
| 91 | J & F Collision, Inc. ^a | 1342 S Ortonville Rd | Ortonville | | | | | X | | X | W | M/H | Haz Materials |
| 94 | Vacant Commercial (Sunburst Florist & Nursery) | 1660 S Ortonville Rd | Ortonville | | | | | | | | A | L | Haz Materials |
| 95 | Masterack (Eng. Comp Sys/AutoFab, Inc./Autocomp/Legget & Platt) | 1695 S Ortonville Rd | Ortonville | | | | | X | | | A | L | Haz Materials |
| 96 | Shell Food Mart | 1765 S Ortonville Rd | Ortonville | | | X-o | X | | | X | A | L | Gas Station |
| 97 | Eagle Point Shopping Center (former gas station) ^a | 1764-76 S Ortonville Rd | Ortonville | | | | | | | X | W | M/H | Old Gas Station |
| 99 | Tri-Mountain Water | 1963 S Ortonville Rd | Ortonville | | | | | | | X | A | L | Old Gas Station |
| 101 | Alderman Animal Hospital (former gas station) ^a | 2140 S Ortonville Rd | Ortonville | | | | X | | | | W | M/H | Old Gas Station |
| 103 | Bullfrogs Restaurant | 2225 S Ortonville Rd | Ortonville | | | | | | | X | A | L | Old Auto Salvage Yard |
| 104 | Mike's Auto Repair (Woody & Rays Marathon) | 2200 S Ortonville Rd | Ortonville | | | | X | X | | | A | L | Old Gas Station |
| 105 | Real Estate One (Jim's Auto Parts & Oil Service) | 2245 S Ortonville Rd | Ortonville | | | | | | | X | A | L | Old Auto Salvage Yard |
| 106 | Former Dump (near Solley's Appliances) | S Ortonville Rd | Clarkston | | | | | | | X | W | M/H | Old Dump |
| 108 | Oakhill Auto Parts/MVA Contr/City Press ^a | 3960-80 S Ortonville Rd | Clarkston | | | | | X | | X | W | M/H | Haz Materials |
| 110 | And I Do (Oakhill Auto Restoration) ^a | 3994 S Ortonville Rd | Ortonville | | | | | X | | X | W | M/H | Haz Materials |
| 112 | Nicolodeon Restaurant | 10081 S Ortonville Rd | Ortonville | | | | | | | X | A | L | Old Gas Station |
| 113 | Clarkston Citco | 7650 S Ortonville Rd | Clarkston | | | | X | | | X | A | L | Gas Station |
| 124 | Mill Street Residential Wells ^a | Mill Street | Ortonville | | X | | | | | | W | M/H | GW Contamination |

Source: The Corradino Group

^a Sites recommended for Phase II testing.

By far the most common potential environmental problem for the project is UST sites. There are eight operating gas stations and nineteen former gas stations/UST sites along M-15 within the corridor. Twenty-one properties that are within the right-of-way of the proposed project have or had USTs. MDEQ UST records show that there are sixteen registered UST facilities within the corridor. Seven of these were identified as Leaking UST (LUST) sites. Of the seven LUST sites, MDEQ records indicate four are “open” meaning they are being investigated or remediated.

Several of the former gas stations/UST sites closed before 1988, which is when comprehensive federal and state UST regulations went into effect. Because they were not subject to the current UST regulations, there are no public records available for these older sites. Due to the potential for soil and/or groundwater contamination associated with USTs, on-site testing should be performed at all current and former UST sites that are within the project corridor during the PSI.

In total, 31 sites are recommended for Phase II testing including: one dump; eleven sites potentially affected by hazardous material handling; and, 19 underground storage tank sites. This total could change as more information on the extent of soil disturbance and final right-of-way boundaries are established. Areas of cut would be of greater concern than areas of fill. If there is no ground disturbance, there is little likelihood that a plume of contamination in the ground would be affected. Also, additional information may come to light as the records kept by regulatory agencies are updated.

4.16 Soils and Utilities

Organic soils are present at a number of locations in the corridor, especially in wetland areas. The presence of these soils increases project costs, as special techniques are required to provide a stable roadbed. Depending on the depth and breadth of these soils, techniques range from total soil removal within the influence of the proposed pavement to partial removal. High-quality geotextile fabrics may be used for additional strength to support the proposed roadway.

Reconstruction of M-15 at the north end of the corridor could affect sections of a sewer line along the west right-of-way line north at Bristol Road. A high-tension electrical line north of County Line Road would not be affected as the towers are well outside the right-of-way. Other effects on utilities would be consistent with normal utility relocations for roadway projects.

4.17 Construction Permits

A permit will be required from the Road Commission for Oakland County to realign the approaches of Glass Road outside of the MDOT right-of-way, as Glass Road is a county road.

There will be permits necessary from the County Drain Office for each of the county drains that are crossed.

Michigan Department of Environmental Quality permits will be required during the design phase for use of wetlands, stream crossings, and stormwater discharges. The construction phasing will dictate the number of permits required.

4.18 Indirect (Secondary) and Cumulative Impacts

A number of communities in the corridor expressed interest in controlling growth in interviews conducted for the study. The general trend has been to zone residential areas for large lot

development. The lack of sewers has historically limited the density of development, including commercial and industrial uses.

The townships in the corridor have not pursued paving of local and county roads as travel alternatives to M-15 (Independence Township and, to a lesser extent, Davison Township are exceptions). Consequently, M-15 has been and continues to be the focus of growth and travel in the corridor. Tremendous growth in the employment base in Oakland County and a general movement to the outer limits of both Oakland and Genesee counties has resulted in a market for much residential development in the corridor as evidenced by the population growth data shown in Table 1-1.

Widening of M-15 addresses a need already in evidence, not an induced need. There is no indication that land use policies will limit growth to a level that the need for four lanes of through travel on M-15 is eliminated. Growth has and will occur whether or not M-15 is reconstructed. Reconstruction of M-15 keeps roadway development in step with overall development.

The indirect (secondary) and cumulative effects associated with the proposed widening of M-15 are presented here. The basis upon which the analysis was conducted is that defined in federal guidance, which indicates the following:

Indirect (Secondary) Effects – caused by the action (widening M-15) and occurring later in time or farther removed in distance, but occurring in the reasonably foreseeable future (40 CFR 1508.8(b)).

Cumulative Effects – resulting from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions (40 CFR 1508.7).

The database supporting this analysis includes material from the following sources:

- Land Use Plans from communities such as Atlas Township, Goodrich, Ortonville, Davison and Brandon Township.
- Future Land Use Maps from SEMCOG.
- Population data from SEMCOG and Genesee County.
- Sewer Service Areas from SEMCOG.
- Census of Agriculture.
- County Plat Maps.
- MIRIS.
- Michigan Natural Features Inventory.
- I-69/I-75 Concept Plan.
- Aerial Photography from Oakland and Genesee Counties.

It is noteworthy that the information base is somewhat more detailed for Oakland County as compared to Genesee. In dealing with this situation, the federal guidance is again followed. It indicates, "... The continuing challenge of cumulative effects analysis is to focus on important cumulative issues, recognizing that a better decision, rather than a perfect cumulative effect analysis, is the goal of NEPA."

Experience indicates the area of traffic influence is a sound basis upon which to establish the boundaries of the indirect/cumulative effects assessment area. The travel analysis testing of the

range of alternatives cited earlier (Section 3) indicates that five townships served by M-15 form a reasonable area on which to base the indirect/cumulative effects assessment.

- Oakland County Townships
 - ✓ Independence
 - ✓ Brandon
 - ✓ Groveland
- Genesee County Townships
 - ✓ Atlas
 - ✓ Davison

For example, Alternative No. 2A tested the possible diversion of traffic from M-15 to the western edge of Davison and Atlas Townships (i.e., Irish and Vassar Roads, respectively). The results (Table 3-1) indicate between 70 and 85 percent of the traffic would remain on M-15. So, using the edge of Davis and Atlas Townships as the indirect/cumulative effects assessment area's western boundary based on the traffic analysis is logical.

Likewise, Alternative No. 4 tested the use of Hadley/Washburn Roads from Ratalee Lake Road in Oakland County to Sawmill Lake Road in Genesee County. These facilities form the eastern edge of Independence, Brandon, Atlas and Davison Townships. Their possible improvement does even less to divert traffic from M-15. So, the eastern boundary of the indirect/cumulative effects area being the edge of these four townships is logical.

4.18.1 Past Trends

Highway Development

Old State Road M-15 evolved over the past 160 years. The state road established by the Michigan Legislature in 1839, was designated as a link between Pontiac and Flint. The roadway between Davison and Goodrich was opened as a county road by the late 1850s and became a state-funded road shortly before World War I. The route out of Clarkston between Oak Hill and Seymour Lake Roads (Independence and Brandon Townships) was built after 1916. The state road in Genesee County (Atlas Township) turned west at West Eagle Road, running through Atlas to Grand Blanc and Flint. As established in 1930, M-15 functioned as a connector between Pontiac (U.S. 24) and Bay City.

After 1930, segments of M-15 included the construction of a bypass at Allen Road (Brandon Township) the bypass of the original state road route along Rhodes Road at Green Road (Atlas Township) and the bypass of Montague Road near I-69 (Davison Township).

Cut and fill in the existing M-15 right-of-way has been an ongoing feature of roadway development. Cut banks and berms associated with 1902 construction of the Detroit United Railway (DUR) marked the east margin of M-15 for approximately 3 miles between Auten and Green Roads. Much of the DUR route, which was abandoned in 1930-31, was incorporated into M-15 when portions of the old state road were abandoned to meet the engineering requirements of modern, high-speed automobile transport.

Other engineering modifications designed to maintain acceptable grades led to deep-cut grading of rolling terrain and the raising of depressions and wetlands with extensive road fills that often extended beyond the existing right-of-way. The ability to implement this labor-intensive type construction in rural highway development was a direct result of the introduction of mechanized heavy earth moving equipment during the first quarter of the twentieth century. It was not until

this period (after 1916) that the final connecting element of M-15, as it presently exists, was built through the wetlands in what are known as sections 29 and 32 of Brandon Township.

While M-15 development dates back 160 years, I-75 was open to traffic in the vicinity of M-15 in 1962. I-69 was completed across M-15 in 1973. The timing of all these road improvements and the development of communities served are discussed next.

Community Development

Although once largely an agricultural region, large amounts of wetlands and numerous small lakes in northern Oakland County played a major role in the development of the region. Several small communities were established within the corridor by the mid-nineteenth century, including Goodrich (Atlas Township) in 1836 and Ortonville (Brandon Township) in 1848. By the early twentieth century, cottage development had begun around Bald Eagle Lake, whose shores are now entirely dedicated to closely spaced residences and several small businesses catering to the local population.

In the mid-twentieth century, large sections of the study corridor changed from traditional farming to single-family housing development on large lots fronting on M-15. Within the last 5 to 10 years, this trend has manifested itself in the creation of numerous housing subdivisions. Most of these feature large houses on relatively small lots with one or two access roads to M-15. Correspondent to this growth, relatively large commercial developments have been constructed along the northern edges of Ortonville and Goodrich.

Population Trends

With one noticeable exception, the 50-year period between the Civil War Era and World War I was one of slow, but steady, population decline of the study area (Table 4-15). But, Davison Township grew, transitioning from the least to the most populous of the study area townships during this period. The most critical influencing factor is likely the fact that Davison was the only township crossed by a railroad. This occurred in 1871 with the completion of the Port Huron and Lake Michigan Railroad between Port Huron and Flint. The creation of Davison Station was significant; by 1890, upward of 28 percent of the township population resided in the incorporated village that grew up at this location. As of 1920, the community represented 50 percent of all the township's inhabitants and nearly 60 percent in 1940.

On the other hand, the opening of the Detroit United Railway in 1900-01 had only a minor effect on area population dynamics. It did, however, open the region to a wide transportation network that gave rise to other opportunities. This was particularly significant in the expansion of area dairy and fruit crop production. The new wealth of the urban-industrial middle-class also found an outlet in the recreation potential of the region. This was first felt in the lakes area extending through Independence Township. During the decade following the end of World War I, the subdivision of lakefront properties marked a recurrent theme extending along M-15, north of Clarkston. The process is highlighted by the platting of the Bunnell subdivision on the Goodrich Mill Pond in Atlas Township in 1919 and the Bald Eagle Lake and Bald Eagle Lake Shores subdivisions in 1920 and 1926, respectively.

**Table 4-15
M-15 Study Area Population Statistics, 1860-1940**

| | Oakland County Townships | | | Genesee County Townships | | Villages/Cities | |
|------|--------------------------|---------|-----------|--------------------------|---------|-----------------|----------------------|
| | Independence | Brandon | Groveland | Atlas | Davison | Clarkston | Davison ¹ |
| 1860 | 1641 | 1302 | 1265 | 1481 | 950 | 376 | - |
| 1870 | 1586 | 1284 | 1180 | 1501 | 1124 | 471 | - |
| 1880 | 1386 | 1367 | 1126 | 1346 | 1536 | - | - |
| 1890 | 1297 | 1260 | 917 | 1256 | 1617 | 387 | 456 |
| 1900 | 1191 | 1179 | 828 | 1199 | 1768 | 360 | 751 |
| 1910 | 1144 | 1129 | 772 | 1120 | 1547 | 345 | 673 |
| 1920 | 1081 | 1204 | 662 | 1199 | 1608 | 419 | 811 |
| 1930 | 1803 | 1347 | 674 | 1494 | 2945 | 639 | 1298 |
| 1940 | 2280 | 1621 | 930 | 1660 | 2372 | 653 | 1397 |

¹ Chartered as a city in 1939. Village and city population also included in township enumerations.
Sources: (Hunt 1913:907, 914; Truesdell 1942:507, 510; Walker 1873:170, 174; Walker and Seaton 1883:29)

Since the advent of the automobile, and creation of an improved network of rural roads between the close of World War I and the beginning of World War II, population growth increased in the five-township study area. The impact is one of urban fringe development emanating from the Detroit-Pontiac and Flint metropolitan areas. Between 1920 and 1940, the phenomenon was most discernible in Independence Township with a growth rate of slightly more than 110 percent (Table 4-15). The next highest growth rate was evidenced in Davison Township (47 percent), followed by Groveland (41 percent), Atlas (38 percent) and Brandon (35 percent). As of 1940, Davison and Independence Townships were the most populous in the study area. However, the growth was quite disparate. City dwellers in Davison accounted for about 60 percent of the township, while population of the Village of Clarkston was less than 30 percent of the Independence Township population.

Following World War II, the development of highways was significant. The interstate system was born. And, completion of the connection of M-15 to I-75 in 1962 and I-69 in 1973 saw growth in the study area reach new highs. It is within the period from 1960 to 1980 that the most significant growth occurred (Table 4-16). Urbanization during this period is depicted in Figure 4-6. But, while the trend of urban development continues to extend out from the core of Wayne County/Detroit, significant urbanization is not anticipated in the study area even by 2020.

Other Infrastructure

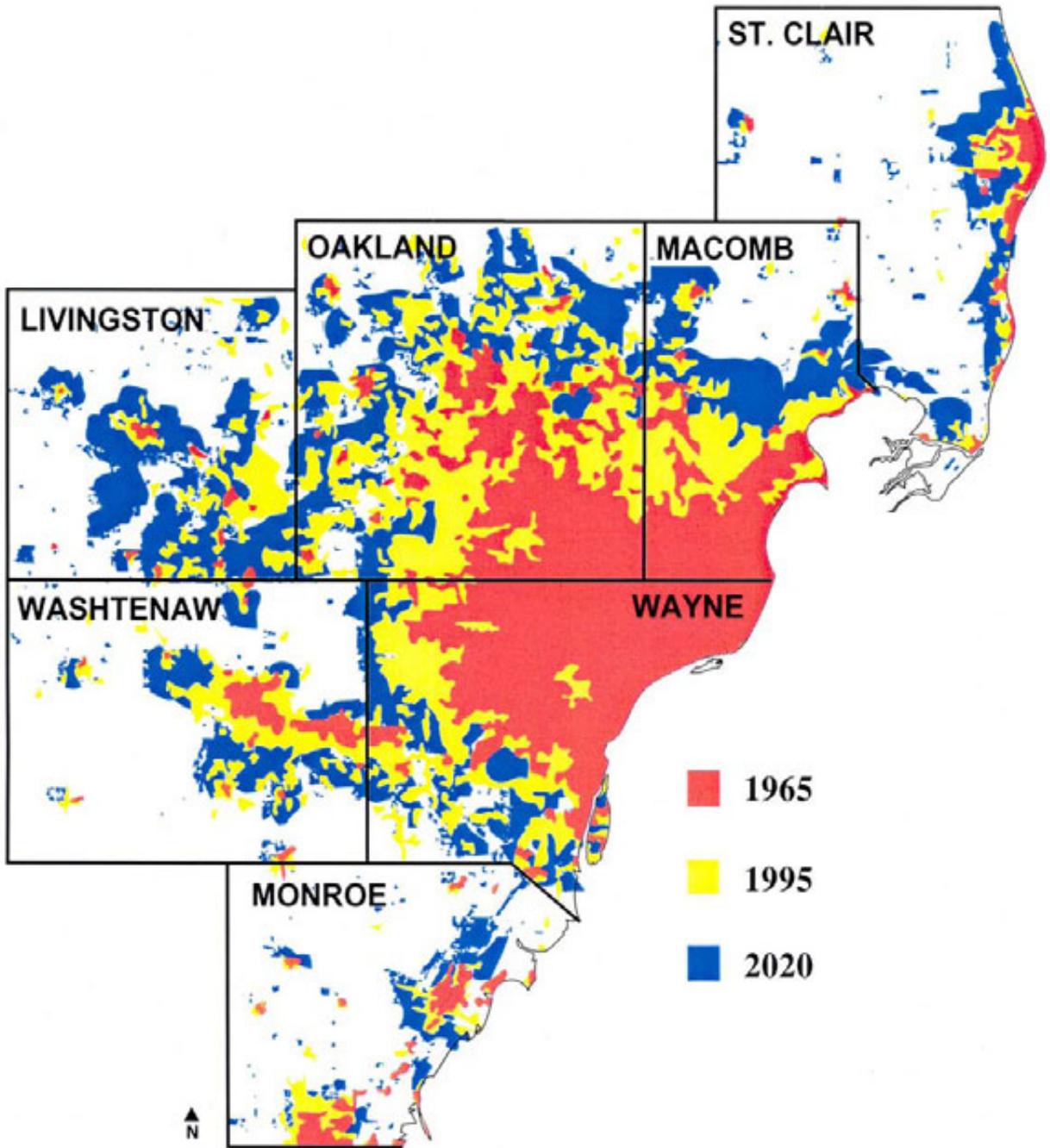
The trend in urbanization in the study corridor is being affected in large part by the availability, or lack thereof, of wastewater treatment facilities in the area (Figure 4-7). Areas eligible for sewer service funding in SEMCOG’s current water quality management plan are limited to places like Ortonville (Figure 4-8). In Genesee County, and in particular Atlas Township, there has been a struggle over the installation of sewerage facilities. Even so, the growth in Atlas Township and the Village of Goodrich was 27 percent and 48 percent, respectively, in the 1990 to 2000 period, indicating the inherent attractiveness of the area.

**Table 4-16
Growth by Community
(1960 to 2000)**

| NAME | Change 1960 to 2000 | Change 1960 to 1970 | Change 1970 to 1980 | Change 1980 to 1990 | Change 1990 to 2000 |
|-----------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Brandon Twp | 448% | 59% | 118% | 30% | 23% |
| Village of Ortonville | 99% | 27% | 21% | 5% | 23% |
| Groveland Twp | 371% | 97% | 60% | 14% | 31% |
| Holly Twp | 71% | 33% | 7% | 0% | 20% |
| Village of Holly | 88% | 33% | 20% | 7% | 10% |
| Independence Twp | 222% | 61% | 26% | 15% | 37% |
| Clarkston | 25% | 34% | -6% | 4% | -4% |
| Springfield Twp | 401% | 65% | 89% | 20% | 34% |
| Rose Twp | 319% | 69% | 78% | 10% | 26% |
| Elba Twp | 1% | 4% | -19% | -1% | 20% |
| Hadley Twp | 257% | 54% | 66% | 15% | 22% |
| Davison Twp | 258% | 67% | 66% | 7% | 21% |
| City of Davison | 47% | 40% | 16% | -6% | -3% |
| Burton | 1% | 10% | -8% | -8% | 10% |
| Atlas Twp | 291% | 53% | 77% | 13% | 27% |
| Village of Goodrich | 93% | 10% | 3% | 15% | 48% |
| Grand Blanc Twp | 217% | 104% | 27% | 4% | 17% |
| Grand Blanc | 427% | 228% | 33% | 13% | 6% |
| | | | | | |
| | | | | | |
| NAME | Change 1960 to 2000 | Change 1960 to 1970 | Change 1970 to 1980 | Change 1980 to 1990 | Change 1990 to 2000 |
| Brandon Twp | 10,814 | 1,414 | 4,506 | 2,463 | 2,431 |
| Village of Ortonville | 764 | 212 | 207 | 62 | 283 |
| Groveland Twp | 4,844 | 1,264 | 1,544 | 591 | 1,445 |
| Holly Twp | 1,620 | 759 | 208 | 8 | 645 |
| Village of Holly | 2,866 | 1,086 | 882 | 358 | 540 |
| Independence Twp | 21,691 | 6,471 | 4,176 | 3,185 | 7,859 |
| Clarkston | 193 | 265 | (66) | 37 | (43) |
| Springfield Twp | 10,674 | 1,724 | 3,907 | 1,632 | 3,411 |
| Rose Twp | 4,728 | 1,020 | 1,963 | 461 | 1,284 |
| Elba Twp | 52 | 241 | (1,047) | (68) | 926 |
| Hadley Twp | 3,351 | 707 | 1,320 | 499 | 825 |
| Davison Twp | 12,774 | 3,312 | 5,448 | 963 | 3,051 |
| City of Davison | 1,775 | 1,498 | 828 | (394) | (157) |
| Burton | 608 | 2,840 | (2,564) | (2,359) | 2,691 |
| Atlas Twp | 4,395 | 806 | 1,781 | 539 | 1,269 |
| Village of Goodrich | 652 | 73 | 21 | 121 | 437 |
| Grand Blanc Twp | 20,409 | 9,811 | 5,184 | 979 | 4,435 |
| Grand Blanc | 6,677 | 3,567 | 1,716 | 912 | 482 |

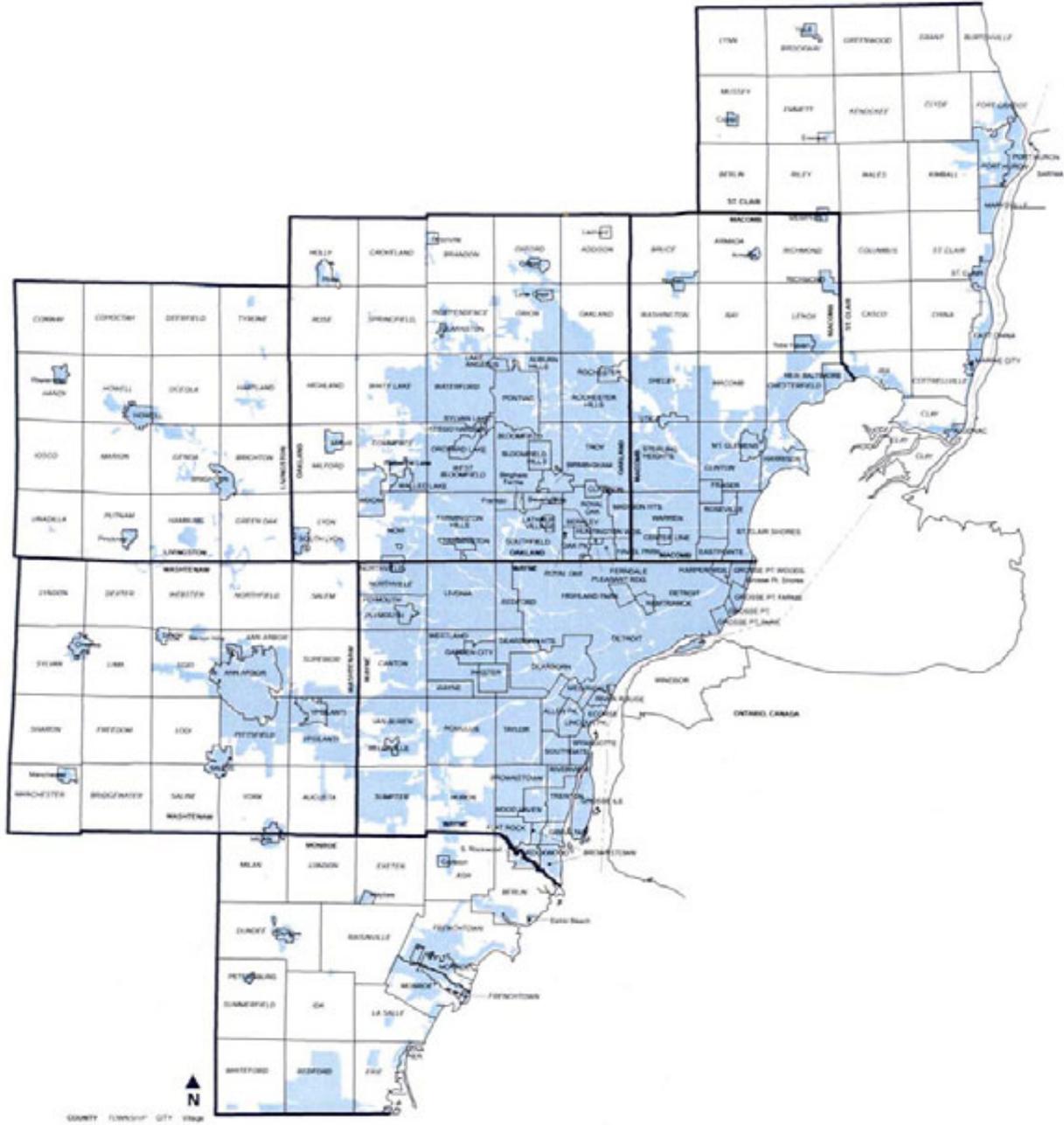
■ - Highest Growth Period.
Source: U.S. Census.

Figure 4-6
Urbanization in Southeast Michigan
1965, 1995, 2020



Source: SEMCOG.

**Figure 4-8
Areas Eligible for Sewer Service Funding
SEMCOG's Water Quality Management Plan**



Source: SEMCOG.

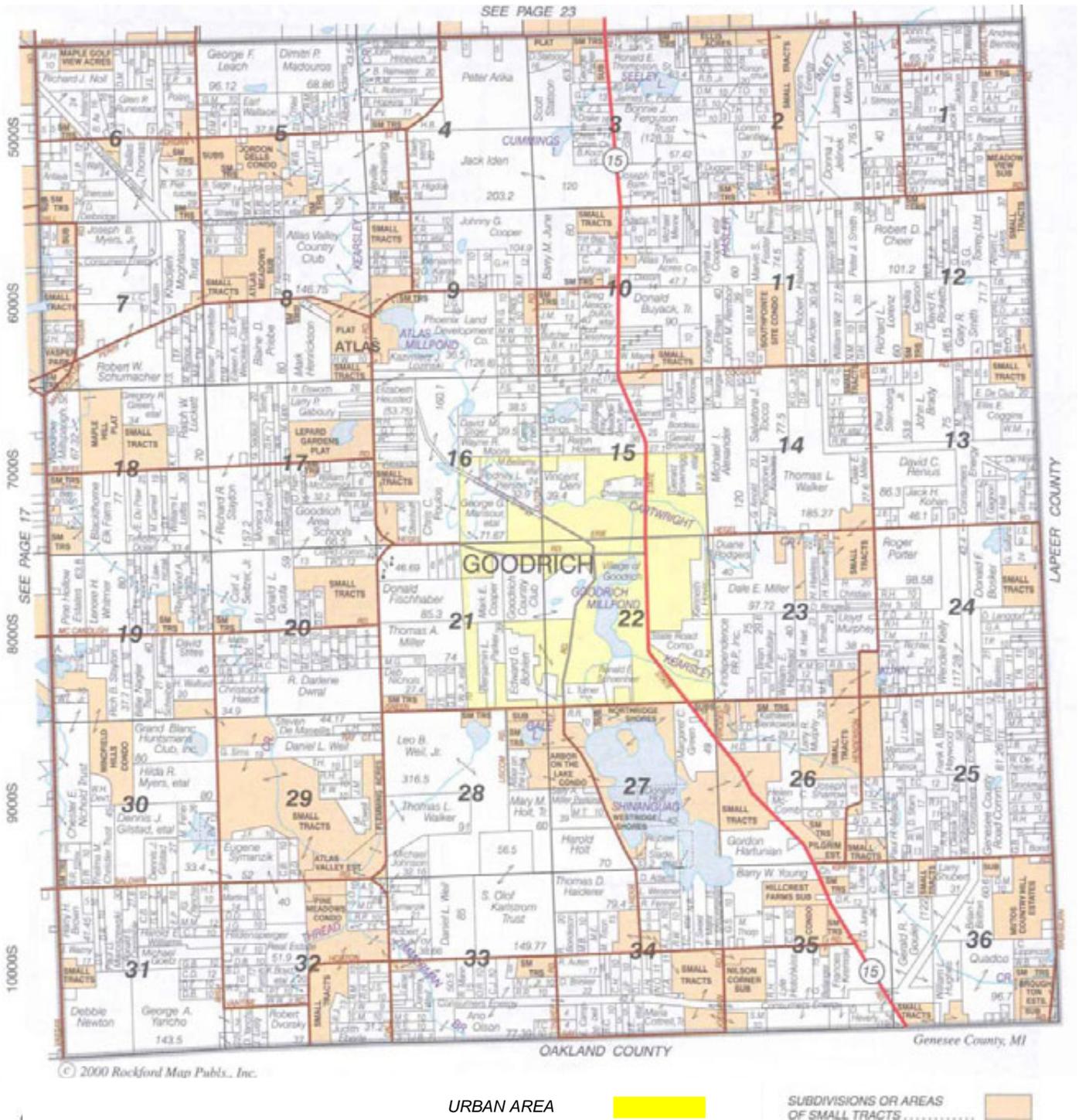
Sensitive Areas

A survey of the lands along M-15 indicates that active croplands are virtually non-existent. Cultivated fields are limited to the sparse tracts scattered throughout Atlas (Genesee County) and Groveland (Oakland County) Townships. Abandoned or unused farm tracts in the Goodrich and Ortonville areas are rapidly being developed into residential subdivisions and commercial sites (Figures 4-9 and 4-10). Suburban development within the study area is pervasive.

Comparison of historical data with MIRIS¹⁰ estimates indicates a net wetland loss of 46 percent for Oakland County from 1800 to present (Tables 4-17 and 4-18). This represents the drainage of about 52,000 acres, mostly concentrated in the Pontiac area. All wetland categories but shrub swamps show significant declines in acreage. (Note that the increased acreage in this category reflects a difference in how wetlands have been classified.) About 96 percent (37,000 acres) of conifer swamps, 41 percent (18,000 acres) of lowland hardwoods, and 45 percent (13,000 acres) of emergent wetlands, have been lost in Oakland County. Of over 24,000 acres of wet prairie historically described as occurring in Oakland County, none are known to remain at this time.

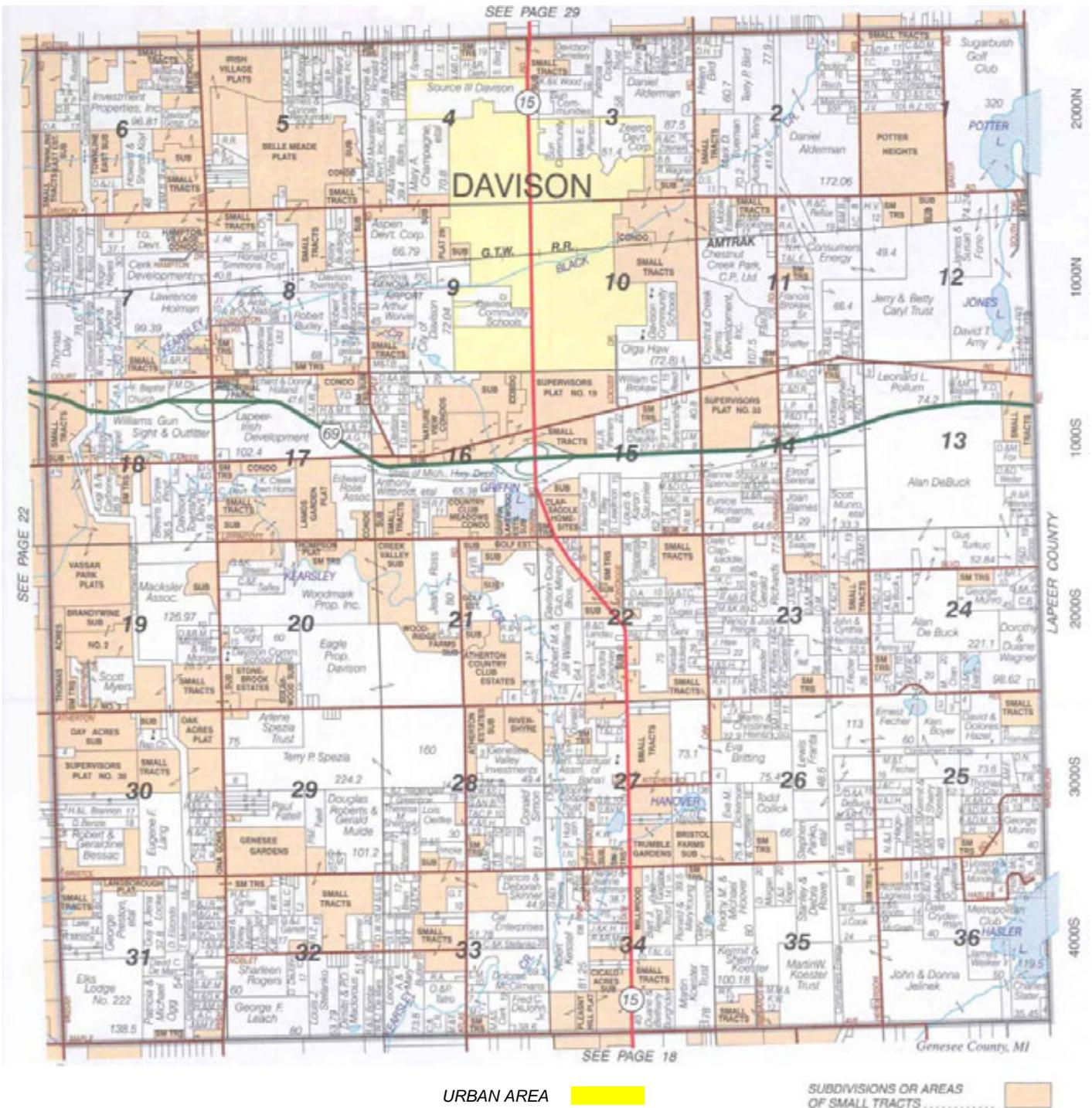
¹⁰ Michigan Resource Information System – a database of land use in Michigan.

Figure 4-9
Approved Subdivisions in Atlas Township



Source: Rockford Map Publishing, Inc. (used with permission)

**Figure 4-10
Approved Subdivisions in Davison Township**



Source: Rockford Map Publishing, Inc. (used with permission)

Table 4-17
Estimate Wetland Acreage in Michigan – circa 1800

| Category | Lowland Hardwoods | Lowland Conifers | Shrub Swamp | Emergent Wetland | Total |
|-----------------|--------------------------|-------------------------|--------------------|-------------------------|--------------|
| Oakland | 43,183 | 38,546 | 3,001 | 29,205 | 113,937 |
| Genesee | 26,379 | 9,299 | 399 | 6,662 | 42,739 |

Source: Wetland Trends in Michigan since 1800: A Preliminary Assessment, Michigan Department of Environmental Quality, June 1996.

Table 4-18
Modern Wetland Acreage by Category

| County | Lowland Hardwoods | Lowland Conifers | Shrub Swamp | Emergent Wetland | Total |
|---------------|--------------------------|-------------------------|--------------------|-------------------------|--------------|
| Oakland | 25,430 | 1,689 | 17,788 | 16,122 | 61,029 |
| Genesee | 11,697 | 52 | 3,584 | 3,537 | 18,870 |

Source: Michigan Resource Information System, Michigan Department of Natural Resources.

Historically, Genesee County was believed to contain about 43,000 acres of wetlands. Today, almost 60 percent of that has been lost. Upland forests and savannahs on rich soils were exploited for agriculture. Genesee County today contains 13 percent of the forested acres that existed in the early 1800s. Not until 1977 when a federal Executive Order was signed and 1979 when the Michigan Wetland Protection Law (Act 451) was enacted did the “no net loss” philosophy begin to stem this tide.

4.18.2 Expected Future Development

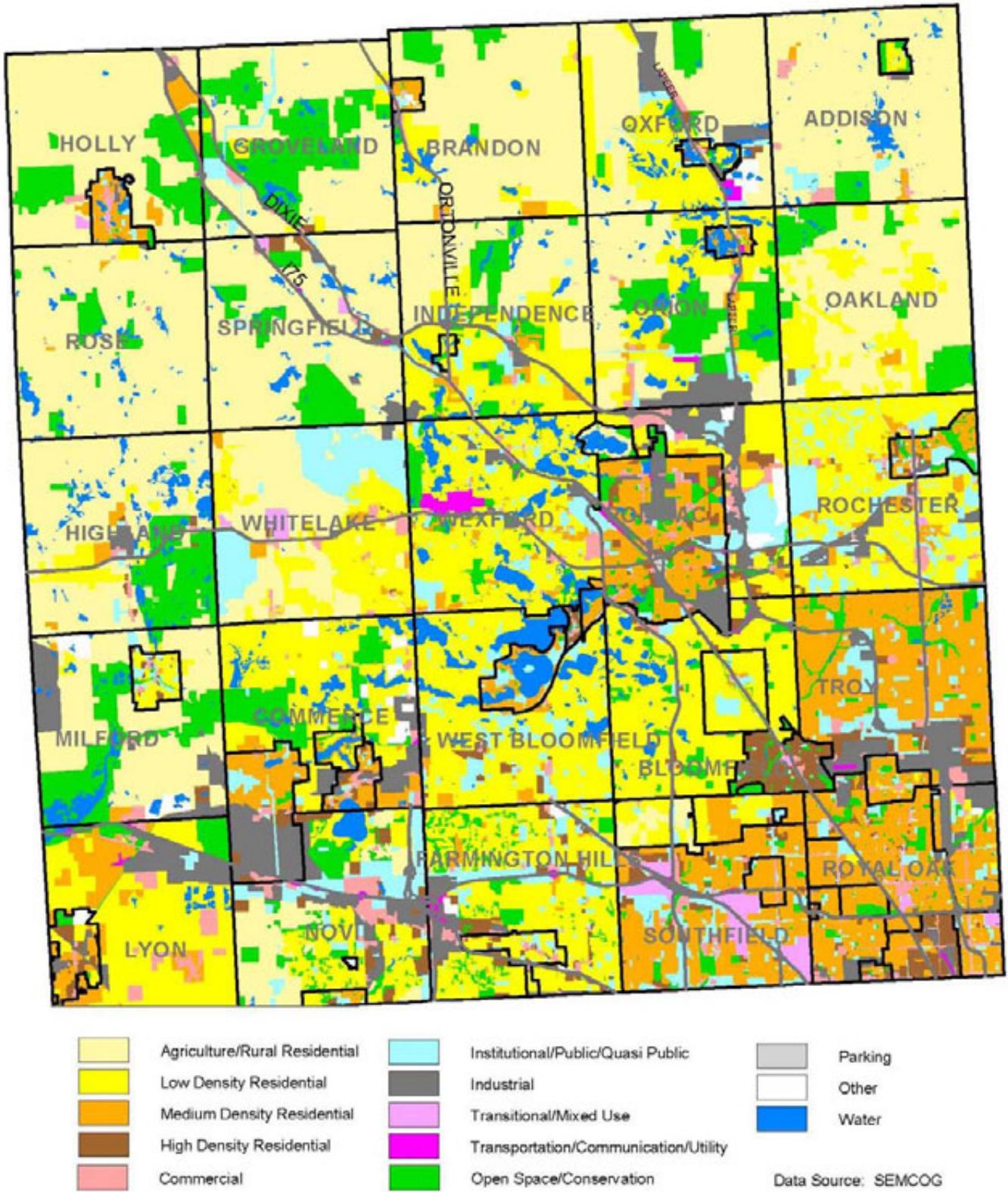
This section presents expected future developments in land use and population and expected public developments in infrastructure at the state/federal and local levels.

Land Use/Population

Figure 4-11 depicts the land use plan throughout Oakland County including Independence, Brandon and Groveland Townships. Most of these three townships are expected to be either low-density residential development or remain in state-owned recreational uses.

For the major communities in Oakland County that make up the M-15 study area, the growth is typically expected to be about 15 percent in the 30 years from 2000 to 2030 (Table 4-19). Clarkston, on the other hand, is expected to be unchanged, while Brandon Township is expected to see growth of about 40 percent over this 30-year period. These growth rates are much less than the triple-digit growth rates experienced over the 40 years from 1960 to 2000.

**Figure 4-11
Oakland County Future Land Use**



Source: SEMCOG

**Table 4-19
Population Forecast for Major Communities in Oakland County**

| Community | 2000 Population | 2030 Forecast | Percent Change |
|-----------------------|----------------------------|--------------------------|---------------------------|
| Independence Twp | 32,581 | 38,103 | +16.9 |
| Clarkston | 962 | 957 | -0.5 |
| Brandon Twp | 13,230 | 18,509 | +39.9 |
| Village of Ortonville | 1,535 | 1,830 | +16.1 |
| Groveland Twp | 6,150 | 7,239 | +15.0 |

Source: SEMCOG

The future land use of Atlas Township in Genesee County is mainly low-density residential (Figure 4-12). It is noteworthy that the current government leadership in Atlas Township is dedicated to a reduction in development in the area (see letter in Appendix C).

The land use plan for the Village of Goodrich likewise has an overall low-density residential emphasis (Figure 4-13). However, the Goodrich M-15 Corridor Plan drafted in 1999 calls for more intense uses along this state highway (Figure 4-14).

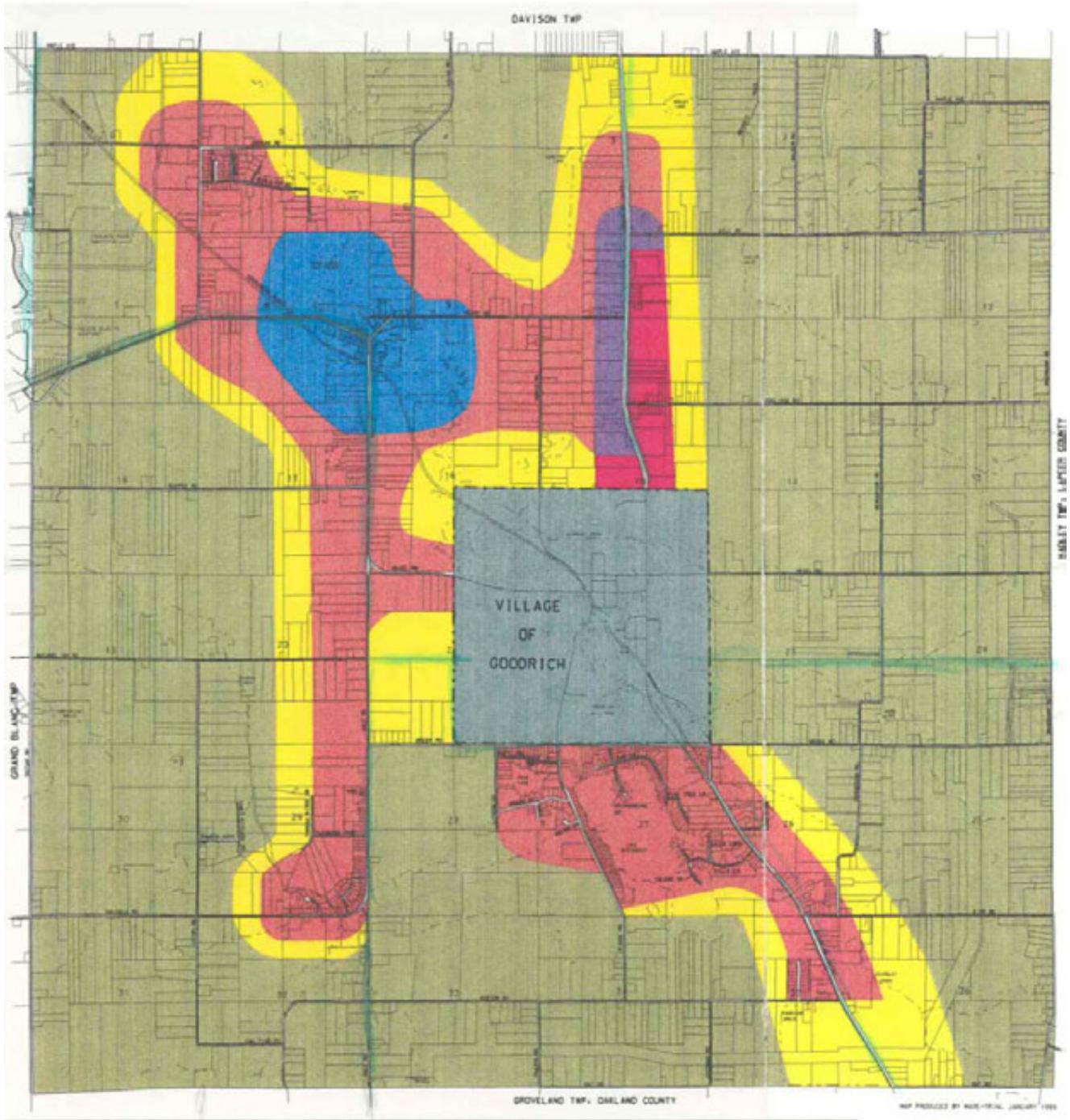
In Davison Township south of I-69, the future land use emphasis is low-density residential (Figure 4-15) with more intense commercial development north on M-15 near I-69.

The population that is expected to accompany these land use scenarios indicates growth over the next 20 to 25 years of from 5 percent (Davison Township and City of Davison) to about 19 percent (Village of Goodrich) (Table 4-20). Atlas Township is expected at the middle of this range. In all cases, these 20+ year projections are much lower than the growth rates experienced in the last 20 years.

Infrastructure Improvements – Roadways

The roadway development plans in Oakland County include the widening of I-75 by one lane in each direction where another lane is needed to provide four through lanes from M-102 (8-Mile Road) to the Genesee County line. Additionally, the Road Commission for Oakland County is planning to improve about three-dozen arterials (Figure 4-16 and Table 4-21). In Genesee County, MDOT’s 5-Year Road and Bridge Program includes a number of bridge rebuilding and road resurfacing plans for I-69, I-75, I-475 and US 23. But, there are no widening proposals for any major facilities.

Figure 4-12
Atlas Township Future Land Use Districts

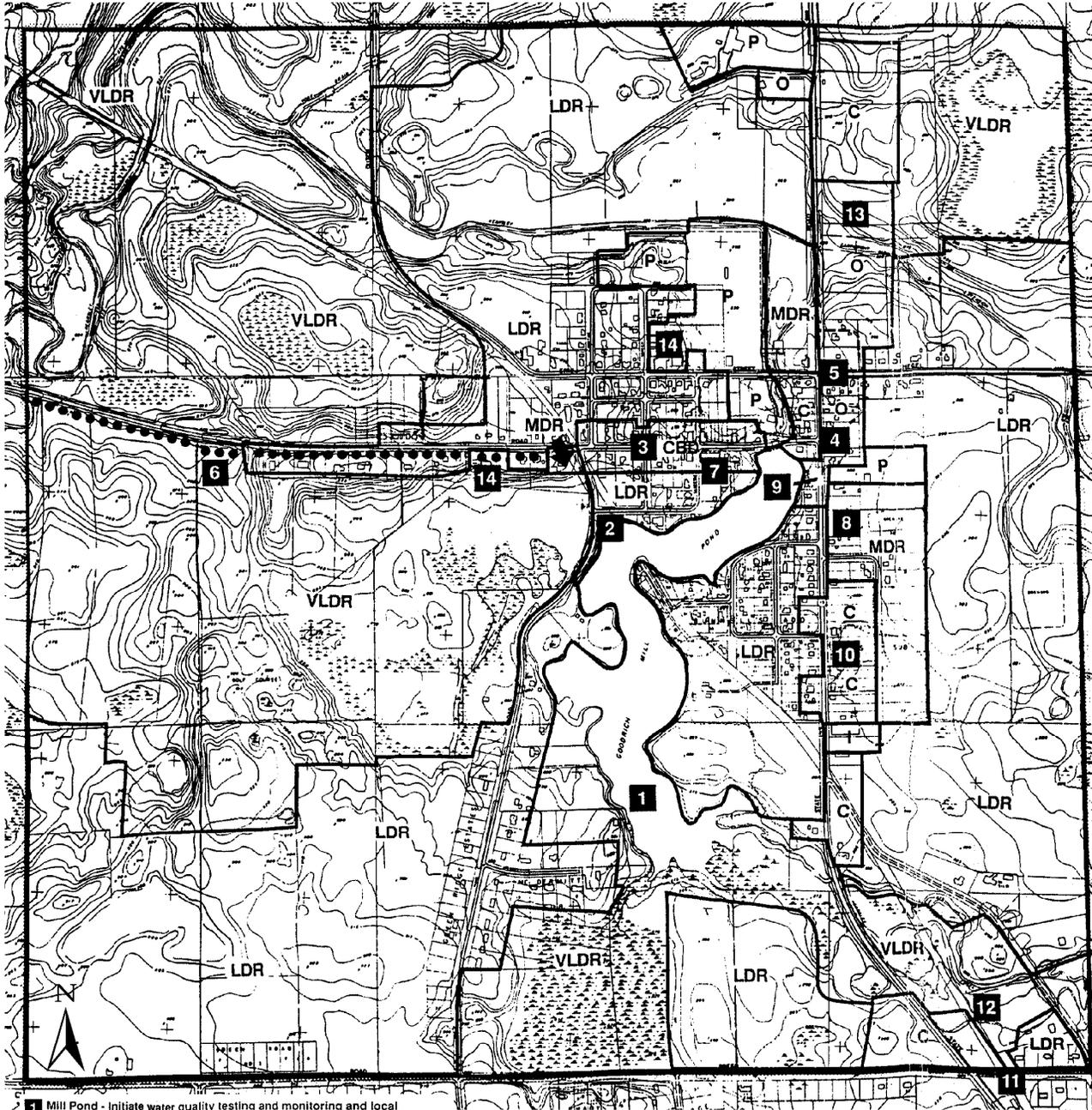


LEGEND

| | | | |
|---|--------------|---|-----------------|
|  | RURAL ESTATE |  | CENTRAL VILLAGE |
|  | ESTATE |  | COMMERCIAL |
|  | SUBURBAN |  | INDUSTRIAL |

Source: Wade-Trim, January, 1999.

**Figure 4-13
Goodrich Land Use Plan**

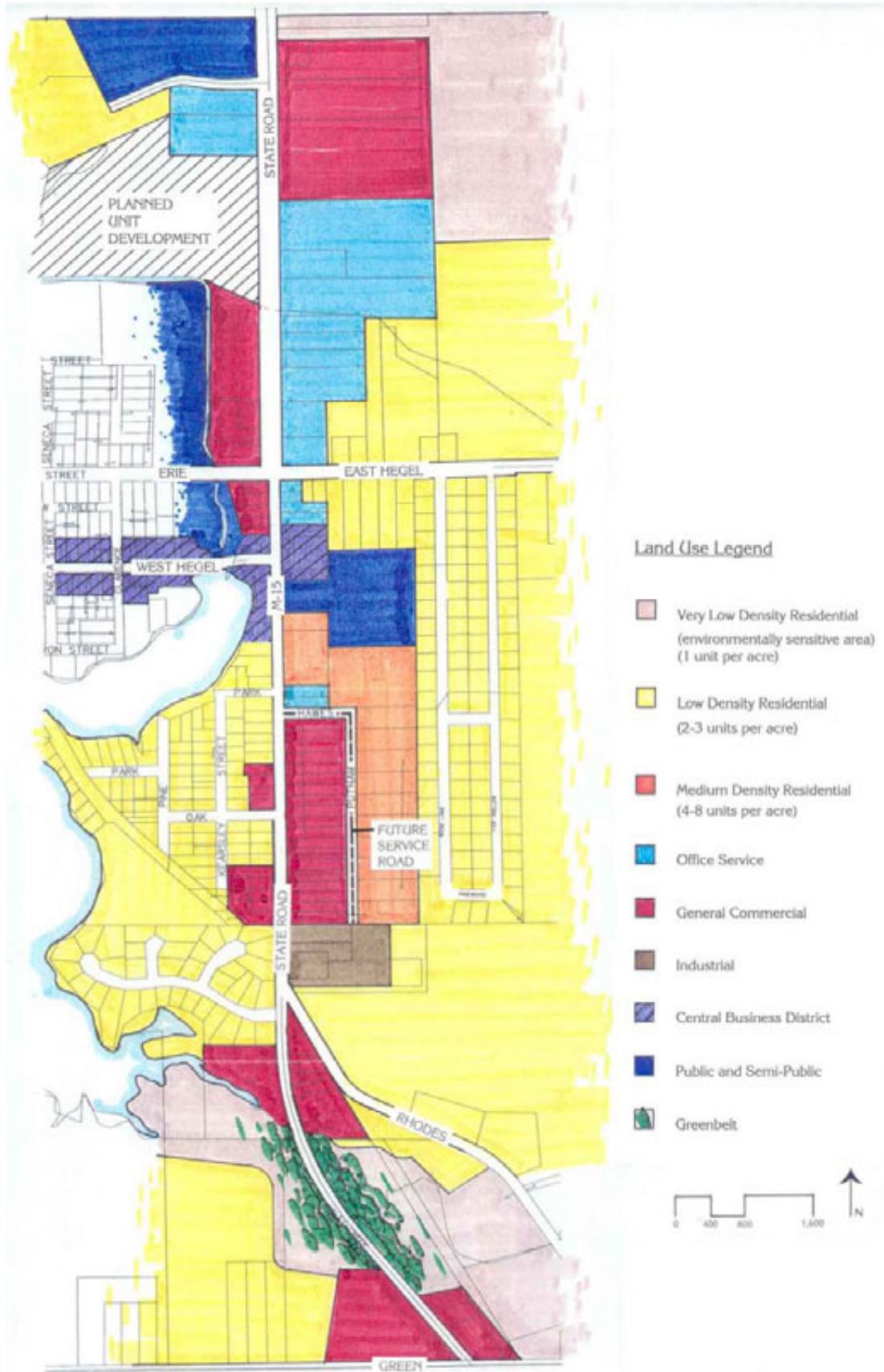


- 1** Mill Pond - Initiate water quality testing and monitoring and local awareness and education program.
- 2** Possible park sites.
- 3** Incorporate recommendations of Downtown Plan.
- 4** Install full traffic signal/improve intersection - Hegel & M-15.
- 5** Full traffic signal/intersection improvements OR create cul-de-sac on Erie, west of M-15 to buffer incompatible uses.
- 6** Bikepath along Hegel Rd. between downtown and high school.
- 7** Possible site for joint teen/senior recreation center.
- 8** Possible sites for senior housing.
- 9** Redevelop existing Single Family structures as Office/Service. (Possibly consider restaurant with Mill Pond deck).
- 10** M-15 - Add landscaping
Reduce number of driveways
More strictly limit number of signs
- 11** Use signs and landscaping to create an identifiable entry way into Village.
- 12** M-15 - Eliminate billboards.
- 13** Maintain deep setbacks of current office uses.
- 14** Parking lot improvements needed (golf course and elementary school).

| | | | |
|-------------|---|------------|----------------------------------|
| VLDR | VERY LOW DENSITY RESIDENTIAL (1 unit per acre) (environmentally sensitive area) | CBD | CENTRAL BUSINESS DISTRICT |
| LDR | LOW DENSITY RESIDENTIAL (2-3 units per acre) | C | GENERAL COMMERCIAL |
| MDR | MEDIUM DENSITY RESIDENTIAL (4-8 units per acre) | O | OFFICE / SERVICE |
| | | I | INDUSTRIAL |
| | | P | PUBLIC/SEMI-PUBLIC |

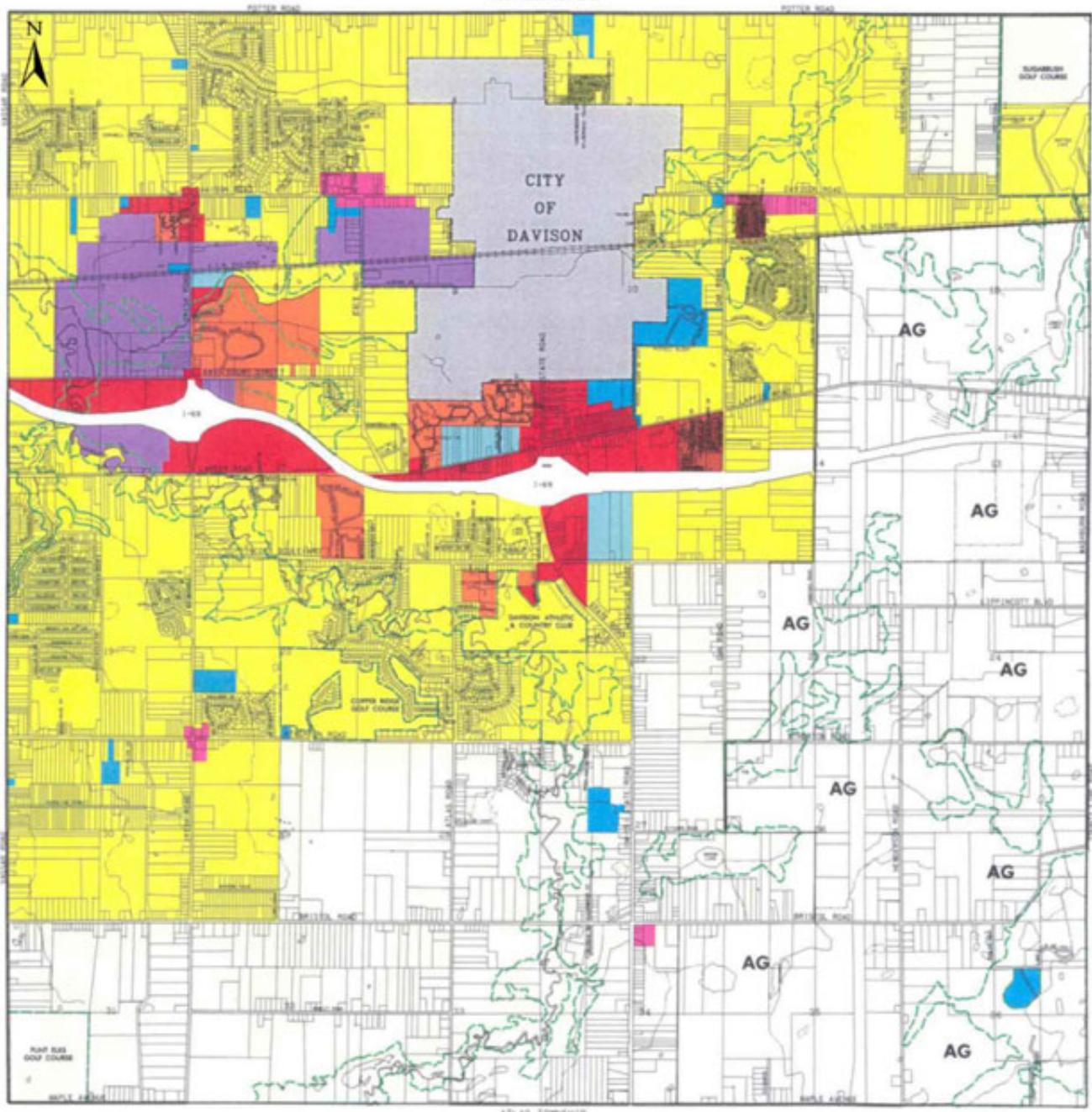
Source: M-15 Corridor Plan

**Figure 4-14
Future Land Use M-15 Corridor Plan
in Goodrich**



Source: Wade-Trim, January 1999.

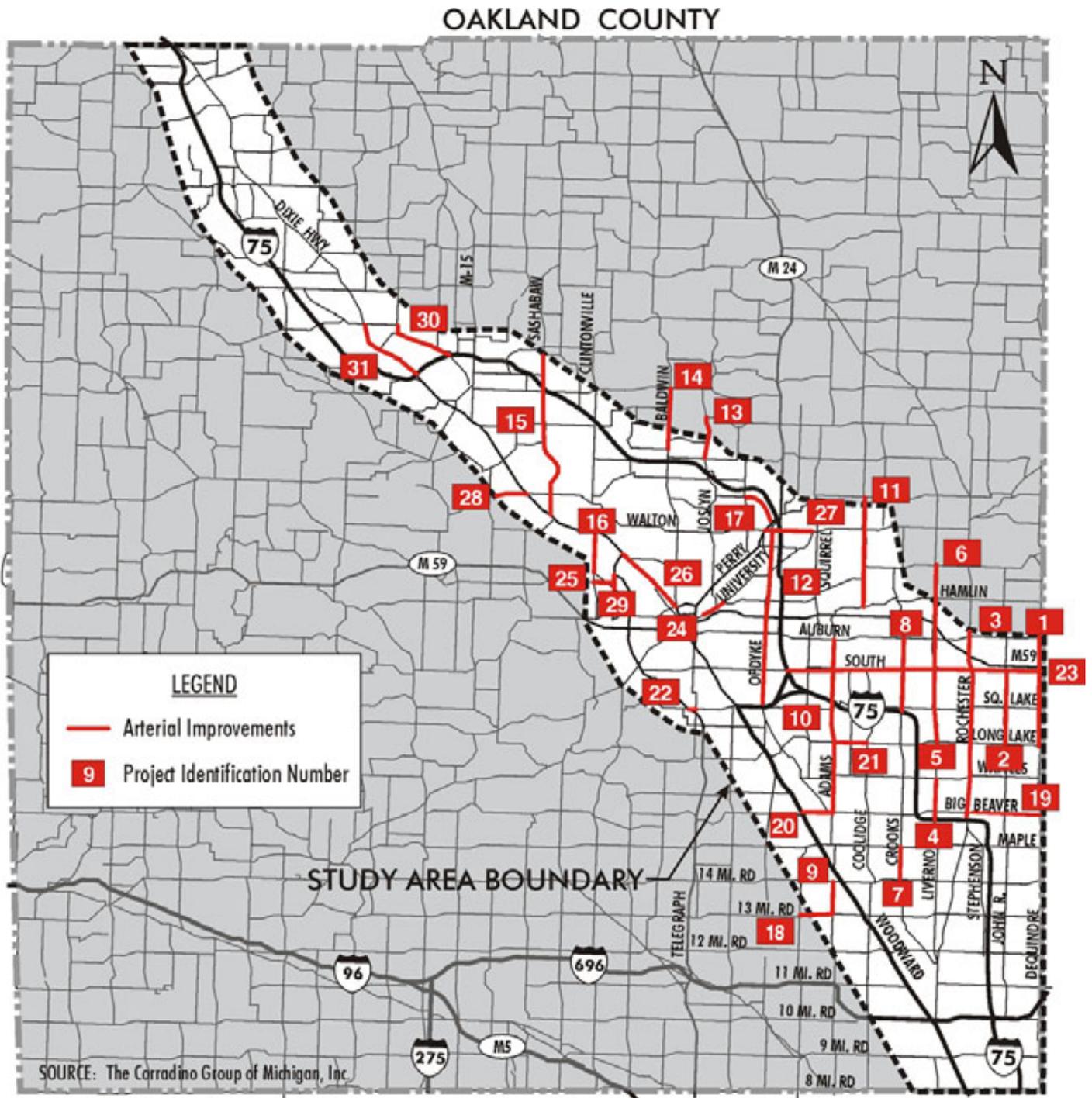
**Figure 4-15
Future Land Use Plan Davison Township**



- | | |
|---|--|
| AG AGRICULTURE | GENERAL BUSINESS |
| SUBURBAN ESTATE | INDUSTRIAL |
| SINGLE FAMILY | RESEARCH-TECHNOLOGY |
| MULTIPLE FAMILY | INSTITUTIONAL |
| MOBILE HOME PARK | RECREATION-CONSERVATION |
| MIXED-USE DEVELOPMENT | CITY OF DAVISON |
| LOCAL BUSINESS | |

Source: Master Plan, Davison Township, Genesee Co., Michigan/Wade-TRIM.

Figure 4-16
 Arterial Projects Improvements Proposed in Oakland County



**Table 4-20
Population by Study Area in Genesee County**

| Community | 2000 Population | 2025 Forecast¹ | Percent Change |
|---------------------|----------------------------|--------------------------------------|---------------------------|
| Atlas Twp | 5,904 | 6,670 | + 13.0 |
| Village of Goodrich | 1,353 | 1,611 | + 19.1 |
| Davison Twp | 17,722 | 18,653 | + 5.3 |
| City of Davison | 5,536 | 5,795 | + 4.7 |

¹ 2025 projections provided by Genesee County were based on 1990 Census Data and have been adjusted to reflect actual population change since the 1990 Census.

Source: Genesee County Metropolitan Plan Commission

**Table 4-21
Arterial (Non I-75 Roadway) Improvements – 2025
Proposed in Oakland County**

| | North-South Roads | Limits | | Type of Improvement |
|----|-------------------------------|---------------------|---------------------|---------------------------------|
| | | From | To | |
| 1 | Dequindre | Long Lake | Auburn | Widen to 5 lanes |
| 2 | John R Road | Long Lake | South Boulevard | Widen to 5 lanes |
| 3 | Rochester Road | North of Big Beaver | Hamlin | Widen to 6 lane boulevard |
| 4 | Livernois Road | I-75 | Wattles Road | Widen |
| 5 | Livernois Road | Long Lake | Square Lake | Widen to 5 lanes |
| 6 | Livernois Road | Square Lake | Avon | Widen to 5 lanes |
| 7 | Crooks Road | Fourteen-Mile | Maple | Widen to 5 lanes |
| 8 | Crooks Road | Square Lake | Auburn | Widen to 4 lane boulevard |
| 9 | Greenfield | Thirteen-Mile | 14 Mile | Widen to 3 lanes |
| 10 | Adams | Big Beaver | Auburn | Widen to 5 lanes |
| 11 | Adams | Hamlin | Tienken | Widen to 5 lanes |
| 12 | Opdyke | Square Lake | Walton | Widen to 6 lane boulevard |
| 13 | Joslyn | Brown | Silver Bell | Widen to 5 lanes |
| 14 | Baldwin | Morgan | Waldon | Widen to 5 lanes |
| 15 | Sashabow | Dixie | Clarkston | Widen to 5 lanes |
| 16 | Scott Lake | Watkins Lake | U.S. 24/Dixie | Widen to 5 lanes |
| | East-West Roads | | | |
| 17 | Taylor Road | Gidings Road | M-24 | New Road – Extend |
| 18 | 13 Mile | Greenfield | Southfield | Widen to 5 lanes |
| 19 | Big Beaver | Dequindre | Rochester | Widen to 6 lane boulevard |
| 20 | Quarton | Woodward | Adams | Widen to 5 lanes |
| 21 | Long Lake | Coolidge | Adams | Widen to 5 lanes |
| 22 | Square Lake | Telegraph | Franklin | Intersection Improvement |
| 23 | South Boulevard | Dequindre | I-75 | Widen to 5 lanes |
| 24 | S. University Drive | Paddock | MLK | Widen to 5 lanes |
| 25 | Pontiac Lake Road | Scott Lake Road | County Center Drive | Widen to 5 lanes |
| 26 | Dixie (Oakland) | Telegraph | Woodward | Connector signage/signal timing |
| 27 | Walton Boulevard | Perry Street | Squirrel | Widen to 5 lanes |
| 28 | Williams Lake Road | Airport | Dixie | Widen to 5 lanes |
| 29 | County Center Drive | Pontiac Lake | Telegraph | Widen to 5 lanes |
| 30 | Holcomb Road/Bridge Lake Road | Davisburg Road | I-75 | Pave 2-lane road |
| 31 | Dixie Highway (U.S. 24) | Davisburg Road | I-75 | Widen to 5 lanes |

Source: The Corradino Group of Michigan, Inc.

The I-69/I-75 Concept Plan, which outlines areas for potential development for the five-county area of Genesee, Lapeer, Shiawassee, Saginaw and St. Clair counties, calls for studying the widening of M-15 from the south Genesee County line to M-57; and studying a new connection of I-475 to US 23 in Genesee County. That concept plan also calls for developing over the next 25 years a Hub and Satellite system with a 1,600-acre hub at Bishop Airport and thirteen satellites throughout the rest of Genesee County (Figure 4-17). A second hub is proposed at MBS Airport in Saginaw County with another 8 satellites spread throughout Saginaw, Shiawassee (4 satellites), Lapeer (9 satellites), and St. Clair (5 satellites) counties.

Few local road improvements are proposed in the five townships that make up the M-15 study area. Many of these roads are now gravel. Proposals to pave them are limited largely because of funding constraints. And, there has been organized local opposition in a number of instances to paying for such proposals.

Sewers – Intersection Improvements

Regional sewer service developments are expected to be limited in Independence Township, north of I-75 as well as in Brandon and Groveland Townships (Figure 4-18). And, a large portion of Brandon Township may never be sewerred.

In Atlas Township, sewerage the area has been largely resisted in the recent past. The most recent sewerage of the Atlas Mill Pond residential development was fought by the Township. And, while sewers were installed, the Township had to be forced to pay for 20 percent of the total cost; the property owners paid the remainder. Davison County sewer development is more aggressive. But, because recent court decisions and state laws limit local governments' ability to raise revenue for sewer infrastructure (e.g., *Bolt vs. City of Lansing*), implementation of even needed projects to remedy septic field problems is difficult, at best.

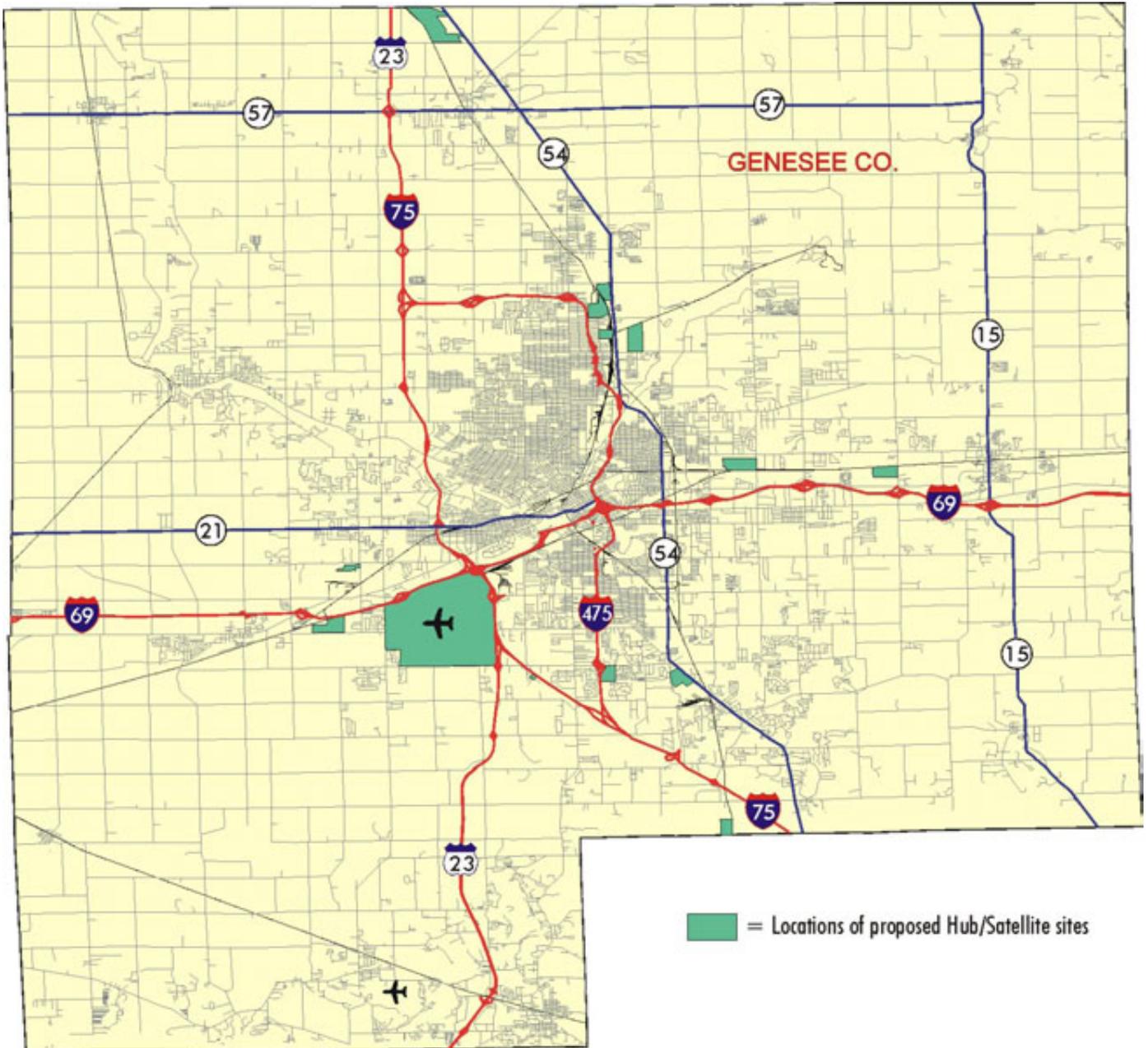
4.18.3 Conclusions

Based upon the information discussed above and the proposed plan to widen M-15, the following conclusions about indirect and cumulative effects are noteworthy.

Indirect Effects

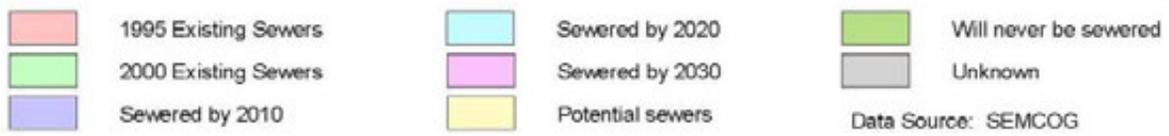
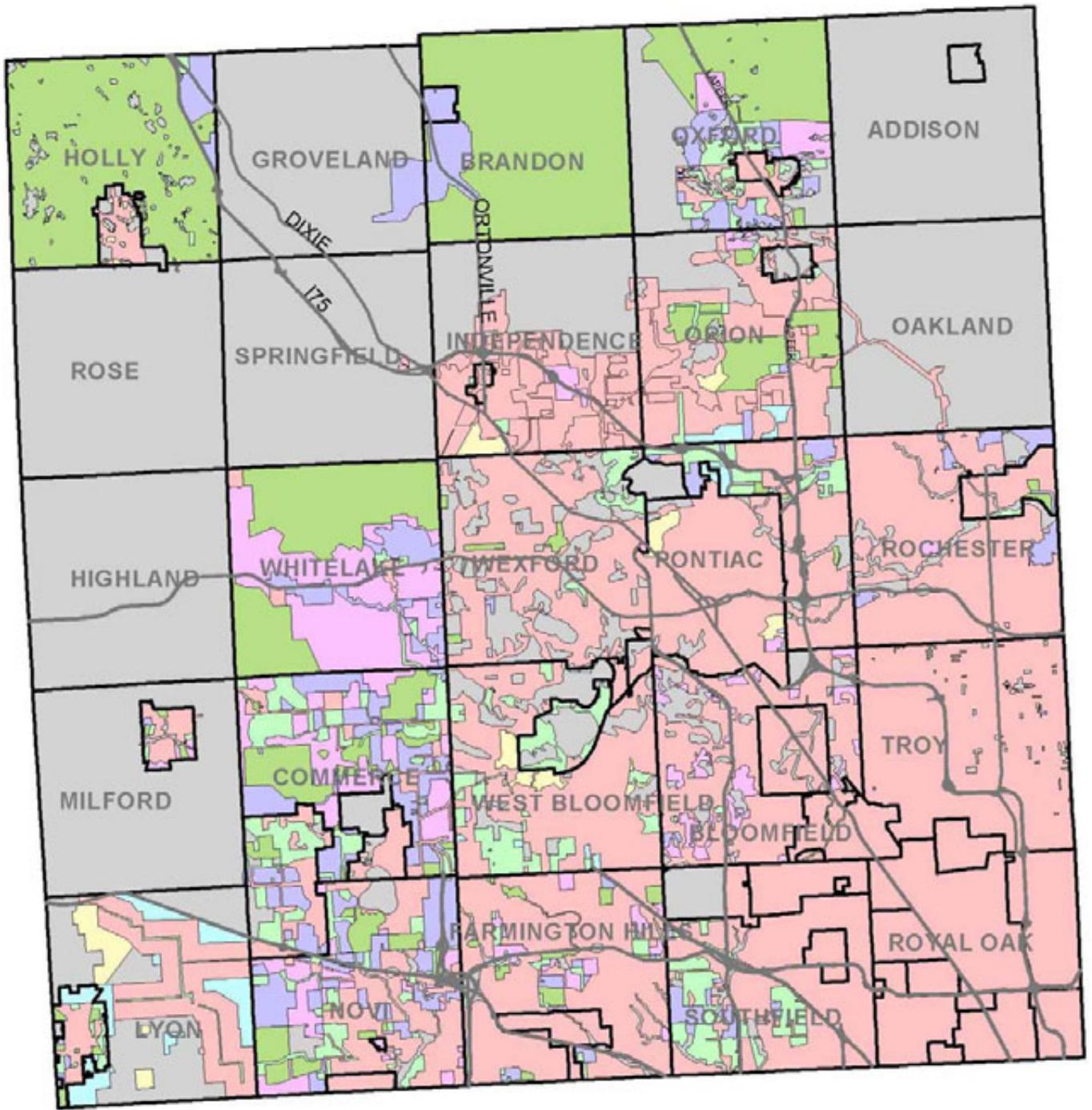
Analysis documented earlier indicates improvement to facilities that parallel M-15, like Irish/Vassar Roads or Hadley/Washburn Roads, would not only fail to relieve M-15 traffic, they would also not support local plans to control the need for new infrastructure, the cost of which would be borne largely by local governments. This includes paving gravel roads, which would be needed to channel traffic to/from M-15 because M-15 will still serve as a destination place (shopping, schools, institutions) that will attract trips. Local plans have, and will continue, to support this role of M-15. On the other hand, building alternative facilities to complement M-15, or divert its traffic, will foster increased development away from the well-defined M-15 corridor causing the need for additional sewer and drainage infrastructure for which there are few plans and fewer resources.

Figure 4-17
I-69/I-75 Concept Plan, Genesee County Hub and Distribution System



Source: I-69/I-75 Concept Plan.

Figure 4-18
Oakland County Sewer Service Areas



Source: SEMCOG

This position is supported when reviewing the application of the Simplified Land Allocation Model (SLAM), which helps assess whether widening M-15 would affect other actions at some reasonably foreseeable point in time or distance. SLAM uses forecasts of a number of land use variables to assess how shifts in expected (not additional) growth could cause changes in travel. A test of additional growth would not be reasonable, as the local jurisdictions work with SEMCOG to define growth. There is presently pressure in the corridor to restrict growth. Therefore, it is more likely that growth will be somewhat less than that predicted, if anything. A land use scenario that reduced the expected growth in Atlas Township by 75 percent showed the demand on M-15 for four lanes remained.

SLAM was applied with the concept of improving Irish/Vassar Roads on the west edge of the study area rather than widening M-15. The results of the reallocation indicate that growth could be expected to shift from Oakland to Genesee County, consistent with the availability of more developable land in Genesee County (Table 4-22 and Figure 4-19). Nevertheless, this growth reallocation does not lessen the need for more lanes on M-15, as the diversion of traffic to Irish/Vassar Roads is no more than about 4,000 daily trips.

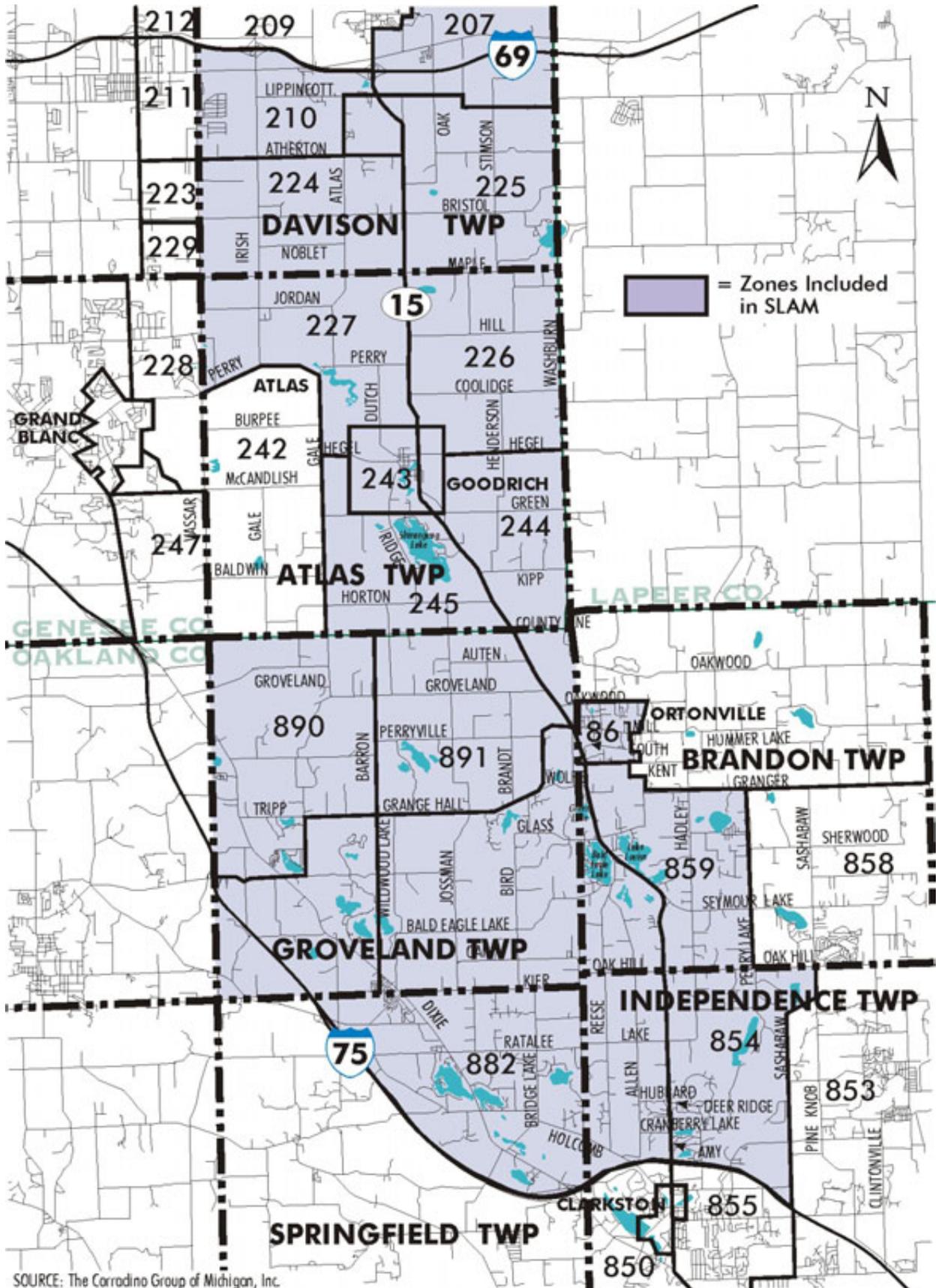
Table 4-22
SLAM-Proposed Growth Factors on Trips

| M-15 Model TAZ | Location | Trip Gener. Growth Factor |
|-----------------------|------------------|----------------------------------|
| 207 | Davison TWP | 3.9 |
| 210 | Davison TWP | 1.4 |
| 224 | Davison TWP | 1.4 |
| 225 | Davison TWP | 1.7 |
| 226 | Atlas TWP | 1.3 |
| 227 | Atlas TWP | 1.1 |
| 243 | Goodrich | 1.2 |
| 244 | Atlas TWP | 1.2 |
| 245 | Atlas TWP | 0.9 |
| 854 | Independence TWP | 0.8 |
| 859 | Brandon TWP | 0.6 |
| 861 | Ortonville | 0.7 |
| 882 | Springfield TWP | 0.9 |
| 890 | Groveland TWP | 0.6 |
| 891 | Groveland TWP | 0.7 |

Source: The Corradino Group of Michigan, Inc.

In conclusion, no significant secondary impacts are foreseen if M-15 were widened, based on regional and local land use and infrastructure plans, and a comprehensive evaluation of alternatives to widening M-15. This is expected even if shifts in growth were to occur. However, local jurisdictions must continue to enforce their vision of future land uses to prove that assessment to be accurate.

Figure 4-19
Study Area Traffic Analysis Zones Included in SLAM



Cumulative Effects

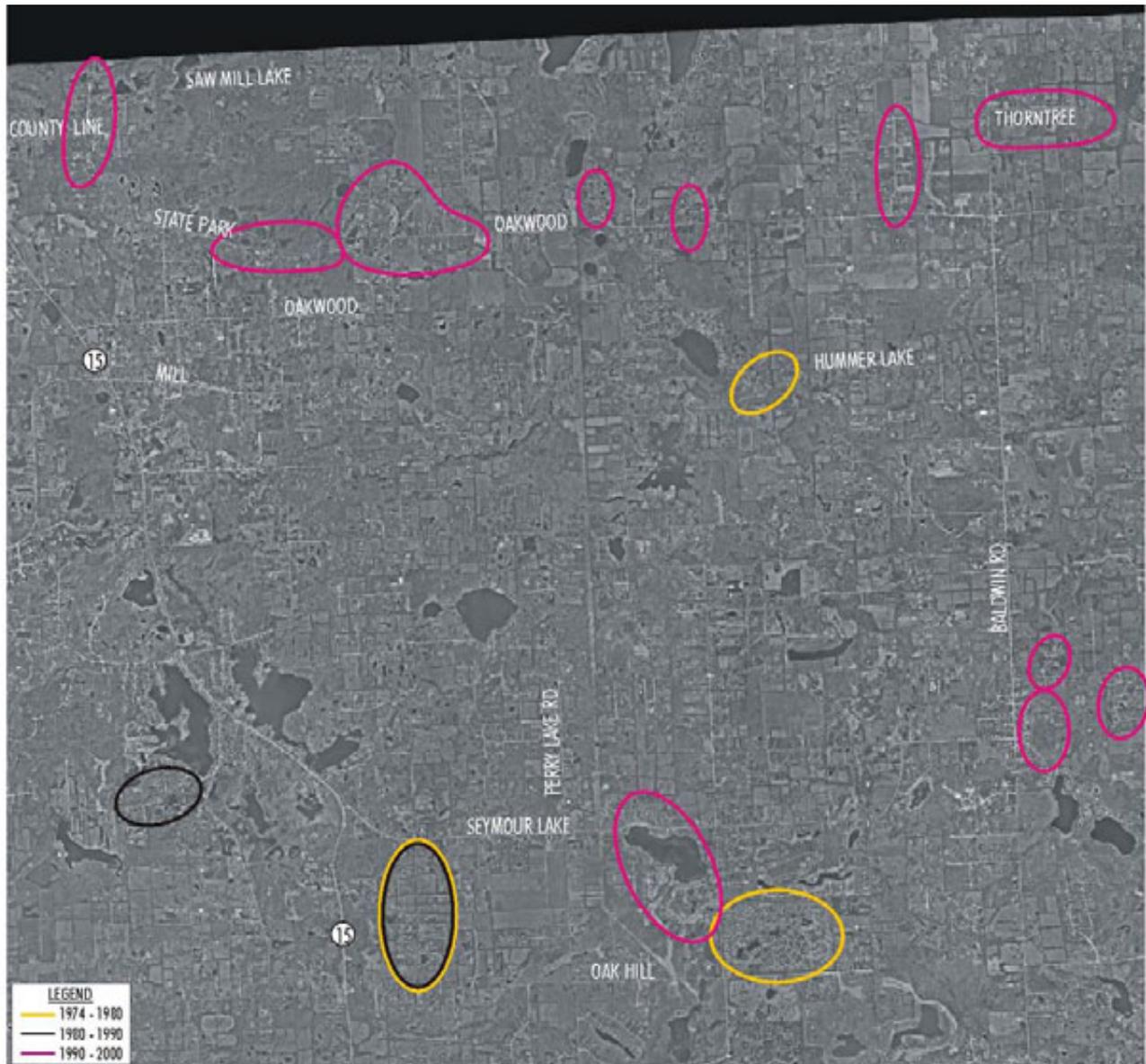
It is logical and accurate to suggest that transportation improvements have had a cumulative effect on development and associated impacts in the five-township study area. The growth rates of the 1960s and 1970s reflect the completion of M-15's connection to I-75 (1962) and I-69 (1973). But, it is important to note these transportation developments coincided with a major development catalyst – the urban unrest experienced in core cities across America, which caused a “flight to the suburbs.” Then, in the 1980s, the growth almost stopped, relatively speaking (Table 4-16). Again, this could be associated with transportation developments, as I-75 in Oakland County became increasingly congested along with a number of arterial highways feeding it. But, it is essential to look beyond that for a cause/effect relationship.

The economy in the decade of the 1980s was especially difficult on the auto industry, and, therefore, Michigan. On the other hand, the 1990s saw what some believe is the most significant economic growth in a century. And, over that 20-year period, travel conditions worsened throughout Southeast Michigan. During that time, no major roads in the region were built. Nevertheless, during the 1990s, subdivisions were approved throughout the study area at an unprecedented pace. Again the question becomes: Why did this happen? The tax structure of Michigan causes local governments to depend on the property tax as the principal source of revenue. So, more development becomes key to economic sustainability, regardless of the infrastructure available. Viewing the aerial photography of Figures 4-20 and 4-21 for Brandon and Atlas Townships, respectively, illustrates how the number and spread of residential developments “took off” in the last 20 years when new transportation projects were relatively nonexistent. During that time, the economy was both “bust” and “boom.” And, an examination of the capacity of the approved subdivisions (Figures 4-9 and 4-10) supports the belief that enough room is available to handle the forecast growth for the next 20 years.

The economic pressures on the farmer must also be examined as a cause of the development changes typical of all five townships in the study area and depicted in Figures 4-20 and 4-21. These pressures have continued to increase such that selling farm acreage is often an economic necessity. For example, in Genesee County in the ten years from 1982 to 1992, the number of farms with over \$10,000 in sales declined twenty percent. In Oakland County, the drop in the number of farms was closer to 30 percent during the same time period. And, the average age of the farmer in each county has increased from 50 to 53 years making “retirement” decisions more imminent, which further stimulate the sale of farmland for urban development uses.

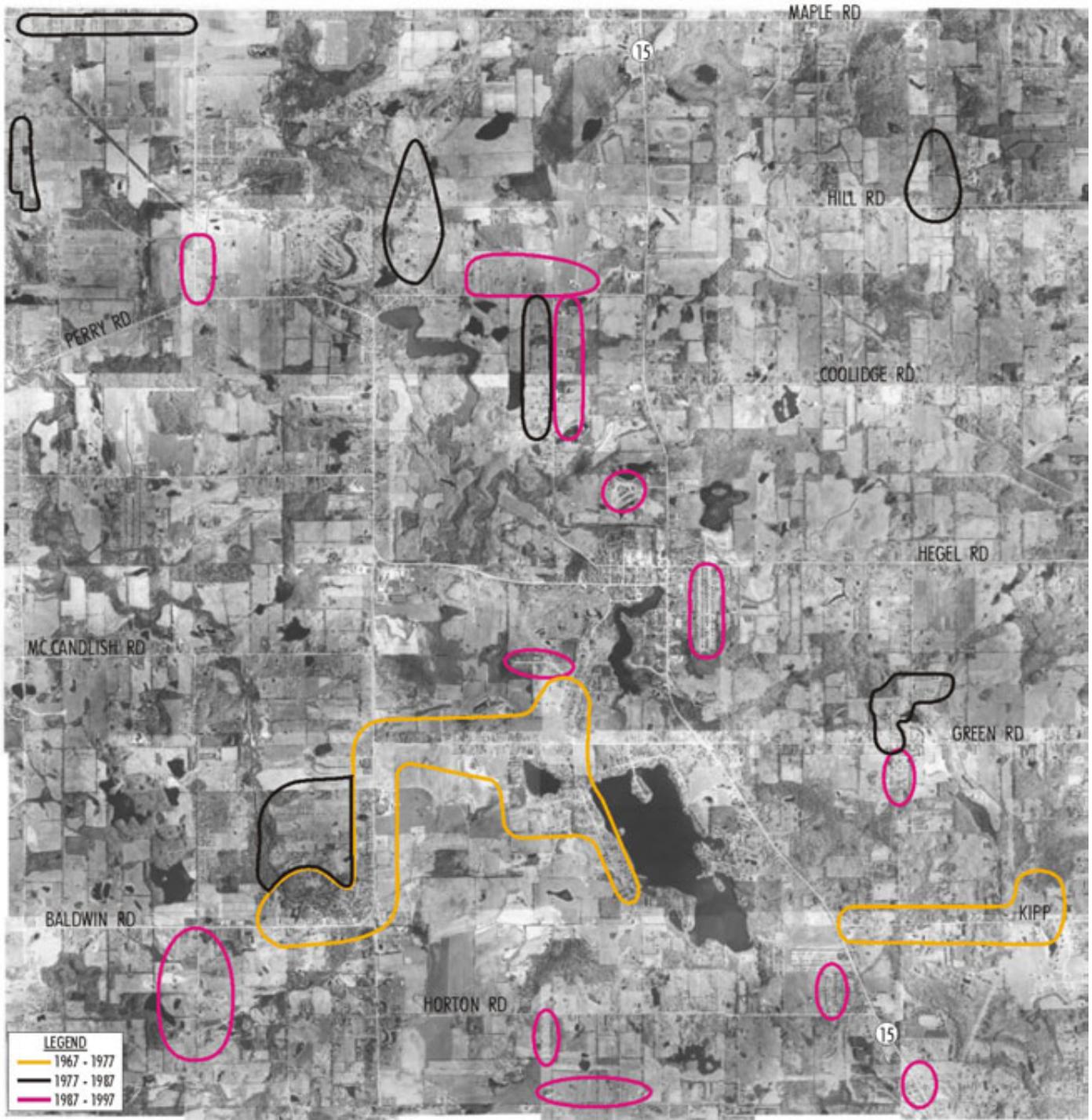
So, at the end of this analysis, it is difficult to assert that widening M-15, when added to other past, present and reasonably foreseeable future actions, regardless of responsible party, will be significantly negative. And, forecasts of growth, plus analysis of its shifts in the five-township study area in a pattern different from that now forecast, indicate: 1) that widening M-15 is needed under any reasonable growth forecast; No-Build is not a reasonable and prudent option based on year 2000 forecasts; 2) that focusing transportation improvements on M-15 will control the need for additional and costly infrastructure; and, 3) that growth controls may possibly slow the timetable for M-15 improvement in its entirety from I-75 to I-69, but they will not eliminate the need to widen M-15. Nevertheless, concerns for the preservation of open space, protection and conservation of natural resources, and preservation of cultural character are consistent themes in all five townships that make up the study area. Specific techniques to manage traffic are also important, particularly in terms of land use/zoning decisions and access management and control. MDOT has and will continue to offer training in access management. MDOT will continue to implement mitigation for its direct impacts and work with other agencies and communities. For example, MDOT continues to work with communities on M-15 as a Heritage Recreation Route.

Figure 4-20
Residential Development in Brandon Township



Source: Oakland Co. and The Corradino Group of Michigan, Inc.

Figure 4-21
Residential Development in Atlas Township



Source: Genesee Co. and The Corradino Group of Michigan, Inc.

4.19 Energy

Energy will be used to construct the project. Fuel savings to motorists should be realized in the long term due to improved traffic flow. Motorists will also be able to maintain more constant traveling speeds, adding to their fuel savings.

4.20 Cost

A construction cost estimate has been prepared based on average unit bid prices and estimated quantities from the engineering analysis. Added to these costs is a 15 percent contingency. Project design and construction management represent a 25 percent add-on to the construction cost. Right-of-way/relocation costs were then added to estimate the project's total cost – \$133.0 million in year 2000 dollars. The costs are presented in Table 4-23 by corridor sector (Figure 1-5).

4.21 The Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

This project is a result of local and regional, as well as statewide comprehensive planning. Present and future traffic needs were considered and are reflected in the proposed project (Appendix A). It is concluded that the local short-term impacts and use of resources by the proposed action are consistent with the maintenance and enhancement of long-term productivity for both the local area and the State of Michigan.

4.22 Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action

Implementation of the proposed action involves a commitment of a range of natural, physical, human, and fiscal resources. Land used for construction of the proposed trunkline is an irreversible commitment of land for a roadway facility.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material will be expended for this project. Additionally, large amounts of labor and natural resources will be used in the fabrication and preparation of construction materials. However, these materials are not in short supply, and their use will not have an adverse effect upon continued availability of these resources.

Construction of this project will require a substantial expenditure of state, federal, and local funds. The commitment of these resources will result in an improved transportation system, providing improved accessibility and safety, and savings in time. These are anticipated to outweigh the commitment of these resources.

4.23 Impacts of the No-Build Alternative (Recommended Alternative)

If capacity is not added to M-15 to satisfy increasing travel demand, congestion will increase. Projections indicate that the entire corridor will experience traffic greater than the capacity of the existing rural-type road.

Sight restrictions now limit the ability to pass for much of the length of this urbanizing two-lane road. As traffic increases, passing opportunities will continue to decrease. More importantly access and egress from cross streets and adjoining driveways will become increasingly difficult for long periods of the day. There are over 400 individual driveways to single-family residences along M-15 and another 150 driveways serving other uses (primarily commercial). At each driveway, left-turn movements in and out represent direct conflicts with traffic flow. This condition will worsen as time goes on if nothing is done to improve M-15.

Improving M-15 will also improve air quality by reducing congestion, lessening idling, and smoothing traffic flow. Increased traffic will be detrimental to community cohesion, if no action is taken.

Doing-nothing will lead to crashes increasing at a faster rate than if the project were built. If nothing were done, it is estimated that there will be 707 crashes in 2025. It is estimated that with the implementation of the Recommended Alternative, M-15 will experience 644 crashes in 2025. If nothing were done there will be 145 existing dwelling units exposed to 66 dBA or more (residential noise criteria).

Table 4-23
M-15 Project
Preliminary Cost Estimate in Year 2000 Dollars

CONSTRUCTION

| <u>Items</u> | <u>Quantity</u> | <u>Unit</u> | <u>Unit Price</u> | <u>Cost</u> |
|---|-----------------|-------------|-------------------|---------------------|
| <u>Sector A1 - Five Lane</u> | | | | |
| Roadway | 3500 | LFT | \$550 | \$1,930,000 |
| Peat excavation | 600 | CYD | \$10 | \$10,000 |
| Swamp Backfill | 600 | CYD | \$10 | \$10,000 |
| Remove/Replace Sanitary | 110 | LFT | \$70 | \$10,000 |
| Traffic Signals (Four-Way) | 1 | EACH | \$25,000 | \$30,000 |
| Contingency (15%) | | | | \$300,000 |
| Sector Construction Subtotal | | | | \$2,290,000 |
| <u>Sector A2a - Five Lane</u> | | | | |
| Roadway | 13900 | LFT | \$550 | \$7,650,000 |
| Box Culvert | 600 | LFT | \$1,000 | \$600,000 |
| Peat Excavation | 17900 | CYD | \$10 | \$180,000 |
| Swamp backfill | 17900 | CYD | \$10 | \$180,000 |
| Remove/Replace Sanitary | 6050 | LFT | \$70 | \$420,000 |
| Contingency (15%) | | | | \$1,350,000 |
| Sector Construction Subtotal | | | | \$10,380,000 |
| <u>Sector A2b - Narrow Boulevard</u> | | | | |
| Roadway | 5300 | LFT | \$525 | \$2,780,000 |
| Storm Sewer | 2800 | LFT | \$70 | \$200,000 |
| Peat Excavation | 12800 | CYD | \$10 | \$130,000 |
| Swamp backfill | 12800 | CYD | \$10 | \$130,000 |
| Contingency (15%) | | | | \$490,000 |
| Sector Construction Subtotal | | | | \$3,730,000 |
| <u>Sector B1 - Narrow Boulevard</u> | | | | |
| Roadway | 11300 | LFT | \$525 | \$5,930,000 |
| Storm Sewer | 6000 | LFT | \$70 | \$420,000 |
| Box Culvert | 140 | LFT | \$1,000 | \$140,000 |
| Peat excavation | 2900 | CYD | \$10 | \$30,000 |
| Swamp Backfill | 2900 | CYD | \$10 | \$30,000 |
| Remove/Replace Sanitary | 300 | LFT | \$70 | \$20,000 |
| Contingency (15%) | | | | \$990,000 |
| Sector Construction Subtotal | | | | \$7,560,000 |

Table 4-23 (continued)
M-15 Project
Preliminary Cost Estimate in Year 2000 Dollars

Sector B2 - Five Lane (Urban)

| | | | |
|-------------------------------------|-----------|----------|--------------------|
| Roadway (5-Lane) | 7700 LFT | \$550 | \$4,240,000 |
| Storm Sewer | 9800 LFT | \$70 | \$690,000 |
| Box Culvert | 80 LFT | \$1,000 | \$80,000 |
| Peat Excavation | 10200 CYD | \$10 | \$100,000 |
| Swamp backfill | 10200 CYD | \$10 | \$100,000 |
| Remove/Replace Sanitary | 185 LFT | \$70 | \$10,000 |
| Traffic Signal (Four-Way) | 1 EACH | \$25,000 | \$30,000 |
| Traffic Signal (Three-Way) | 1 EACH | \$20,000 | \$20,000 |
| Contingency (15%) | | | \$790,000 |
| Sector Construction Subtotal | | | \$6,060,000 |

Sector B3 - Narrow Boulevard

| | | | |
|-------------------------------------|----------|-------|--------------------|
| Roadway (Boulevard) | 6600 LFT | \$525 | \$3,470,000 |
| Storm Sewer | 3520 LFT | \$70 | \$250,000 |
| Peat Excavation | 1000 CYD | \$10 | \$10,000 |
| Swamp Backfill | 1000 CYD | \$10 | \$10,000 |
| Contingency (15%) | | | \$560,000 |
| Sector Construction Subtotal | | | \$4,300,000 |

Sector C1 - Narrow Boulevard

| | | | |
|-------------------------------------|----------|-------|--------------------|
| Roadway | 9000 LFT | \$525 | \$4,730,000 |
| Storm Sewer | 4800 LFT | \$70 | \$340,000 |
| Peat Excavation | 1600 CYD | \$10 | \$20,000 |
| Swamp backfill | 1600 CYD | \$10 | \$20,000 |
| Contingency (15%) | | | \$770,000 |
| Sector Construction Subtotal | | | \$5,880,000 |

Sector C2 - Very Narrow Boulevard

| | | | |
|-------------------------------------|-----------|---------|--------------------|
| Roadway | 3100 LFT | \$525 | \$1,630,000 |
| Storm Sewer | 3900 LFT | \$70 | \$270,000 |
| Box Culvert | 100 LFT | \$1,000 | \$100,000 |
| Peat excavation | 12300 CYD | \$10 | \$120,000 |
| Swamp Backfill | 12300 CYD | \$10 | \$120,000 |
| Contingency (15%) | | | \$340,000 |
| Sector Construction Subtotal | | | \$2,580,000 |

Table 4-23 (continued)
M-15 Project
Preliminary Cost Estimate in Year 2000 Dollars

Sector D - Narrow Boulevard

| | | | |
|-------------------------------------|-----------|----------|--------------------|
| Roadway | 9500 LFT | \$525 | \$4,990,000 |
| Storm Sewer | 5100 LFT | \$70 | \$360,000 |
| Box Culvert | 425 LFT | \$1,000 | \$430,000 |
| Peat Excavation | 21800 CYD | \$10 | \$220,000 |
| Swamp backfill | 21800 CYD | \$10 | \$220,000 |
| Traffic Signal (Four-Way) | 2 EACH | \$25,000 | \$50,000 |
| Contingency (15%) | | | \$940,000 |
| Sector Construction Subtotal | | | \$7,210,000 |

Sector E1 - Five Lane

| | | | |
|-------------------------------------|-----------|----------|--------------------|
| Roadway | 13000 LFT | \$550 | \$7,150,000 |
| Additional Earth Excavation | 1600 LFT | \$40 | \$60,000 |
| Box Culvert | 150 LFT | \$1,000 | \$150,000 |
| Peat excavation | 26700 CYD | \$10 | \$270,000 |
| Swamp Backfill | 26700 CYD | \$10 | \$270,000 |
| Traffic Signals (Four-Way) | 1 EACH | \$25,000 | \$25,000 |
| Traffic Signals (Three-Way) | 1 EACH | \$20,000 | \$20,000 |
| Contingency (15%) | | | \$1,192,000 |
| Sector Construction Subtotal | | | \$9,137,000 |

Sector E2 - Narrow Boulevard

| | | | |
|-------------------------------------|-----------|-------|--------------------|
| Roadway | 6900 LFT | \$525 | \$3,620,000 |
| Additional Earth Excavation | 875 LFT | \$53 | \$50,000 |
| Storm Sewer | 3700 LFT | \$70 | \$260,000 |
| Peat excavation | 14400 CYD | \$10 | \$140,000 |
| Swamp Backfill | 14400 CYD | \$10 | \$140,000 |
| Contingency (15%) | | | \$630,000 |
| Sector Construction Subtotal | | | \$4,840,000 |

Sector F1 - Boulevard

| | | | |
|-------------------------------------|-----------|----------|--------------------|
| Roadway (Boulevard) | 11000 LFT | \$525 | \$5,780,000 |
| Roadway (5-Lane) | 600 LFT | \$550 | \$330,000 |
| Additional Earth Excavation | 1800 LFT | \$53 | \$90,000 |
| Keystone Retaining Wall | 27000 SFT | \$50 | \$1,350,000 |
| Storm Sewer | 6600 LFT | \$70 | \$460,000 |
| Peat Excavation | 8800 CYD | \$10 | \$90,000 |
| Swamp backfill | 8800 CYD | \$10 | \$90,000 |
| Traffic Signal (Four-Way) | 4 EACH | \$25,000 | \$100,000 |
| Contingency (15%) | | | \$1,240,000 |
| Sector Construction Subtotal | | | \$9,530,000 |

Table 4-23 (continued)
M-15 Project
Preliminary Cost Estimate in Year 2000 Dollars

Sector F2a - Very Narrow Boulevard

| | | | |
|-------------------------------------|-----------|----------|--------------------|
| Roadway | 1900 LFT | \$525 | \$1,000,000 |
| Additional Earth Excavation | 1300 LFT | \$53 | \$70,000 |
| Keystone Retaining Wall | 39000 SFT | \$50 | \$1,950,000 |
| Storm Sewer | 2400 LFT | \$70 | \$170,000 |
| Traffic Signals (Three-Way) | 2 EACH | \$20,000 | \$40,000 |
| Remove/Replace Path | 140 LFT | \$50 | \$10,000 |
| Contingency (15%) | | | \$490,000 |
| Sector Construction Subtotal | | | \$3,730,000 |

Sector F2a - Five Lane

| | | | |
|-------------------------------------|----------|----------|--------------------|
| Roadway | 1200 LFT | \$700 | \$840,000 |
| Traffic Signals (Four-Way) | 1 EACH | \$25,000 | \$30,000 |
| Remove/Replace Water Main | 1420 LFT | \$75 | \$110,000 |
| Contingency (15%) | | | \$150,000 |
| Sector Construction Subtotal | | | \$1,130,000 |

GRAND TOTAL CONSTRUCTION COST: \$78,360,000

GRAND TOTAL CONSTRUCTION COST: \$78,360,000

DESIGN & CONSTRUCT. MANAGEMENT (25 % of construction) \$19,590,000

RIGHT-OF-WAY (Including contingencies) \$34,900,000

TOTAL ESTIMATED PROJECT COST \$132,850,000

Notes:

Assumes a depth of 5' on all Peat Excavation and Swamp Backfill quantities.

Assumes all through intersections would have 2 traffic signals.

Assumes additional Earth Excavation and Keystone Retaining Walls are used in areas of large vertical relief.

4.24 Project Status

The current status of the project can be found in the Forward of this document. It will detail the project history, reasoning for changing alternatives, and steps for any future actions.

It is anticipated that several years will pass before the construction of the Technically and Environmentally Preferred Alternative. The project will improve capacity along M-15 between I-75 and I-69. It is one of a number of capacity improvement projects statewide that have been deferred, as MDOT is dedicated to a “preserve first” philosophy. This philosophy is to improve the existing infrastructure, and the goal is to restore 95 percent of Michigan’s freeways and 85 percent of its non-freeway trunkline system to a “good” condition by 2007. Deferred projects will be added to the Five-Year Program on a priority basis, based on available funding, when MDOT can meet and sustain the condition goal and when additional revenues are available.

As time goes on, MDOT will adhere to the applicable rules with respect to reviews and reassessments of this document. In the meantime, completing this document well in advance of construction provides necessary planning guidance to the communities in the corridor.

Further, the wetland mitigation program is underway. At the Oakwood Road site (see Section 5.12), wetland construction should begin in 2004. Once the Little Hunt Club site is acquired work will begin at that site as well. Mitigation in advance of roadway construction is unusual, but is preferred, when it can be achieved.

When planning for the project began in 1994, an M-15 Task Force of local officials formed. That Task Force continues to meet. MDOT will continue to work with the Task Force to identify and correct, where possible, operational problems as they develop. This includes, but is not limited to traffic signals, turn lanes, access management implementation, and other intersection improvements. A corridor access management study will commence in 2004. Its purpose is to prolong the functional capability of the existing roadway, and to ensure that the improved operation of the Technically and Environmentally Preferred Alternative is not seriously degraded by additional growth in the corridor after it is constructed.

MDOT will continue to work with the corridor communities to find new approaches to traffic management and new technologies for traffic handling to further reduce the expected impacts of the Technically and Environmentally Preferred Alternative. Where such measures are identified, they will be reported on in the next periodic review of this document.

For the relationship of the project to inclusion in appropriate planning documents and with respect to air quality conformity see Section 1.7.

