



Hagadorn Corridor Study

East Lansing, Michigan

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Executive Summary

The Hagadorn Road Corridor located between Haslett Road and East Grand River Avenue, in East Lansing, Michigan is comprised of six predominately residential neighborhoods. The corridor lacks the pedestrian friendliness, sense of place, and traffic control measures that could improve the quality of life for those living along the route. Motorists traversing through the corridor pass by schools, daycare centers, and a multitude of residential housing types. The nature of the current roadway design has presented the City of East Lansing with a challenge: How does a city address the unique needs of predominately residential neighborhoods while at the same time preserving the current carrying capacity of the road?

This corridor study was assembled to identify, inventory, and assess current land use, pedestrian friendliness, traffic flow, and roadway design to make recommendations for future development in terms of pedestrian safety, zoning, and capital improvements. Upon completion of the Hagadorn Road Corridor Study, the research, methods, findings and recommendations presented will provide a model to address additional corridors throughout the city.

This corridor planning report focuses on a portion of North Hagadorn Road between Haslett Road and East Grand River Avenue. An analysis of strengths, weaknesses, opportunities, and threats (S.W.O.T) highlight the following:

Strengths

- Proximity to Michigan State University
- Proximity to elementary and middle schools
- Proximity to neighborhood amenities such as Patriarch Park and the River Trail

Weaknesses

- Lack of residential/commercial mixed-use
- Lack of pedestrian amenities such as crosswalks, sidewalk buffers and lighting

- Lack of vacant parcels limits opportunity for mixed-use
- Lack of design cohesion between neighborhood blocks

Opportunities

- Connection to downtown commercial
- Connection to Grand River Avenue and Saginaw Highway
- Width of the road provides for the ability to conduct a 4 to 3 lane conversion and to include bike lanes

Threats

- Traffic volume and speed
- Seasonable walkability (timely removal of snow and ice)
- Difficulty making left turns, current land use, and transportation challenges.

While taking inventory of the current land use each parcel was identified for its current location, zoning classification and overall property condition. It was found that the Hagadorn Road Corridor is fully developed with 80% of the current land use being residential. All properties were evaluated by rating the exterior of any structures located on the parcel, the doors and windows, the roof, and the yard. The marks received in each category were then summed to give the property an overall condition rating.

During assessment of traffic and accident data, a comparative analysis was completed, alternative modes of transport were researched, and time was spent evaluating the sidewalks within the corridor, and examining the school zones. It was found that converting the study area from a four-lane to a three-lane road would have the effects of reducing the perceived driving speed, provide safer crossings for pedestrians, allow for the addition of bike lanes and improve neighborhood aesthetics. In essence, the conversion of the four-lane road to a three-lane road will improve the overall quality of the corridor.

As a primary concern of the City's, the recommendations of this report are concentrated on making the corridor more pedestrian friendly. As such, the following summary of recommendations have been made to the City of East Lansing:

- **Road and traffic management:**
 - Lane conversion: 4 to 3
 - One northbound, one southbound and a two-way left turn lane (TWLTL). Purpose: To reduce perceived driving speed of drivers; Provide safer crossings for pedestrians; Allow for addition of bike lanes; Improve neighborhood aesthetics.
 - Addition of bike lanes:
 - Provide alternative mode of transportation to and from MSU campus and other East Lansing destinations.
- **Facilities improvements:**
 - Power lines:
 - Seek feasibility of improving neighborhood aesthetics throughout the corridor by burying or limiting the current number of electrical poles along the route
 - Light fixtures:
 - Addition of pedestrian oriented lighting fixtures to improve safety and visibility. Would also provide a unified appearance to the 6 neighborhoods intersected by the corridor.
 - Signage improvements:
 - Increase visibility of numerous neighborhood associations intersected by the corridor.
 - Increase visibility of neighborhood parks located in the corridor.
 - School Zone: Use consistent signage for approaching school zone to alert drivers of reduced speed.
- **Sidewalk improvements:**
 - Benches
 - Pedestrian crossings
 - Ensure ADA compliance of cross walks and sidewalks
- **Land-use:**
 - Maintain mixed-income and mixed-density characteristics of the corridor:
 - Ensure affordable housing for students and low-income residents.
 - Future development, if any, should take into consideration the existence of the Marble and McDonald Schools located along this route. Additional development should not be heavily auto dependent and therefore increase the traffic usage of the road.

These recommendations, if implemented, may assist in increasing safety for pedestrians, cyclists, and motorists while reducing speeds through school zones without causing excessive traffic congestion. The addition of bike lanes will provide an alternative mode of transportation while providing a buffer between pedestrians using the sidewalk and automobiles in the roadway.

Introduction

Practicum Structure

The faculty in Michigan State University's Urban and Regional Planning Department collectively support Planning Practicum. It is seen as a key method for integrating classroom work and pragmatic planning in real life occupational situations. The experience of Planning Practicum is fundamental in the progression of a student evolving to a skilled planning practitioner. The course encompasses the mastery of basic techniques involving data collection, fieldwork, map making, interviewing, and report writing. Students are also required to apply analytical methods to understand the state of a particular community and their problem(s) in question. During the duration of Planning Practicum, students gain thorough knowledge of planning processes and hands-on experience in the establishment of participatory procedure. The desired result at the conclusion of the course is to expose Urban and Regional Planning students to actual work performed in the planning profession.

Throughout the fourteen-week practicum process, students are advised and directed by their community project contact(s) and their Planning Practicum faculty advisors. At the conclusion of the course, students assemble their self-guided research, data interpretations, and evaluations to draw conclusions and make recommendations to help confront their particular community's problem(s). Student group-work is presented in a professional report format to clients as well as in the form of a presentation. In the end, it's a win-win situation for all involved: students gain hands-on experience in the development of recommendations for implementation while client groups receive a professional end product to put into action in their community.

The report is comprised of six sections; in the first section socio-economic data is analyzed, conveying age, income, and racial makeup of the corridor in comparison with that

of the City of East Lansing. The second section describes in detail the methods used in researching all areas of the project. Section three is focused on the S.W.O.T. analysis, during which the team gained a better understanding of the assets and deficiencies of the surveyed region. The fourth section deals with land use inventory, which accounts for each parcel's current location, classification, and overall property condition. Section five covers the transportation portion of the report, concentrating on traffic and accident data, comparative analysis, and modes of transport. This section also includes the evaluation of the sidewalks along the corridor as well as the school zones. Section six concludes with findings, analysis, and recommendations regarding the corridor.

Background

In 2000, the City of East Lansing's Department of Planning and Community Development began the process of completing a new Comprehensive Plan for the city. According to the city's website, the current plan was last created in 1981-82 and has been amended a dozen times over the past 20 years¹. The new plan will tackle many issues for the future development of the city. One such issue to be undertaken deals with corridor planning. Corridor planning will be the highlight of this report, focusing on a portion of North Hagadorn Road between East Grand River Avenue and Haslett Road.

Photo 1: Hagadorn Corridor Welcome Sign



¹ City of East Lansing. Available Online. URL: < www.cityofeastlansing.com/ > Accessed February 19, 2005.

Corridor Planning

A corridor is a broad geographic area defined by logical, existing, and forecasted travel patterns served by various modal transportation systems that provide important connections within and between regions for people, goods, and services.² Corridor planning is a process looking at the existing transportation system within the corridor and how the system could be changed to meet long-term needs.³ A corridor plan is a document that defines a comprehensive package of recommendations for managing and improving the transportation system within and along a specific corridor.⁴ Corridor planning is needed to promote the safe and efficient movement of people, goods, and services. It serves as a link between land use planning and transportation planning. Land use patterns play an important role in supporting transportation plans and systems. Both have an impact on the health of communities in relation to diseases and injuries, as well as quality of life and well-being⁵.

State and Regional Planning

As part of the Hagadorn Corridor Study, the practicum team created a series of conclusions and recommendations that adhered to the visions of the State of Michigan's Land Use Leadership Council and the Tri-County Regional Planning Commission (Appendix A). As such, summaries of their visions have been provided below. These materials were used to provide a broader planning context for the corridor study.

² Idaho State Transportation Department. Available Online URL:< <http://itd.idaho.gov/planning> > Accessed March 8, 2005.

³ Idaho State Transportation Department. Available Online URL:< <http://itd.idaho.gov/planning> > Accessed March 8, 2005.

⁴ Idaho State Transportation Department. Available Online URL:< <http://itd.idaho.gov/planning> > Accessed March 8, 2005.

⁵ NACCHO Factsheet *Public Health in Land Use Planning & Community Design*. Available Online URL:<<http://www.activelivingleadership.org>> Accessed March 29, 2005.

Michigan Land Use Leadership Council Report Vision:

“The principle purpose of the Michigan Land Use Leadership Council is to make recommendations to reform land use decisions in Michigan so that we create sustainable and more livable communities – large and small – in both the Upper and Lower Peninsulas, from Lake Michigan to Lake Erie, Huron, and Superior. Land Use in Michigan is about maintaining and, where necessary, restoring or creating communities that people want to live in and providing housing choices that do not now exist for many. At the same time, land use in Michigan is about preserving open space, farmland, and forestland”.⁶

The following issue is presented as a primary issue of the report and is of particular interest to the Hagadorn Corridor Study, as it represents the core needs of a successful neighborhood: The Michigan Land Use Leadership Council is committed to “Supporting efforts to make Michigan cities more livable by expediting the reuse of abandoned properties, controlling blight, encouraging private investment, encouraging mixed-use development, improving transportation options, supporting a full range of housing options, and attracting and retaining residents who can contribute to the viability of our urban core areas.”

Tri-County Regional Planning Commission Vision:

In 2004, the Tri-County Regional Planning Commission released the report entitled “*Regional Growth: Choices for Our Future*” which outlined the importance of regional cooperation, growth and enhancing the quality of life for those residents within the Tri-County area. As part of the report, the commission highlighted the following bulleted points to help guide and shape the tri-county regional vision:

⁶ The Michigan Land Use Leadership Council. “Michigan’s Land, Michigan’s Future: Final report of the Michigan Land Use Leadership Council”. August 15, 2003.

*Note- The State of Michigan received the report of the council, however it is not a “vision for the State” and has no binding status.

- Reduce congested lane miles by approximately 50 percent and save taxpayers between 1.8 and 4.8 billion dollars in transportation improvement costs, which would otherwise be, required if current trends are unchecked.
- Save the equivalent of three townships of agricultural land and open space through the adoption of the “Wise Growth” model (Appendix A).
- Reduce air pollutants by tens of thousands of kilograms per day, leading to public health benefits and lower long-term public health costs [through the utilization of alternate forms of transportation].
- Improve the region’s quality of life and economic competitiveness in an increasingly global economy over more than would occur under current public policies.⁷

With both visions in mind, it is the intent of the Hagadorn Corridor Study practicum team to draw conclusions and make recommendations that create livable, walkable, and sustainable neighborhoods, which meet the standards outlined above.

Scope of Service

The scope of this project revolves around the study area of North Hagadorn Road between East Grand River Avenue and Haslett Road. The goal of the study is to recommend improvements for future development of the corridor in terms of pedestrian safety, zoning, and capital improvements. The major task of the study was to inventory and assess the current land use, streetscape, and roadway design in order to make recommendations for future land use, preservation of community highlights, and to ensure efficient and safe use of the corridor by pedestrians and vehicular traffic.

To accomplish this an inventory and assessment of the corridor has been conducted. The inventory identified each parcel by the following classifications: residential, commercial & other uses, rental vs. owner occupied, and zoning classification vs. actual use. Along with the inventory and assessment, a strengths, weaknesses, opportunities, and threats analysis was conducted and a socio-economic profile was assembled. The team compiled and analyzed transportation information, which included traffic and accident data, a comparative

⁷ Tri-County Regional Planning Commission. “Regional Growth: Choices for Our Future” May 12, 2004.

analysis of Abbott Road, an evaluation of the quality and walkability of the sidewalks, as well as a school zone audit. Recommendations were made in the following four content areas: land use, transportation, sidewalks, and school zones. Finally, a summary of our findings and funding strategies has been provided within the conclusions.

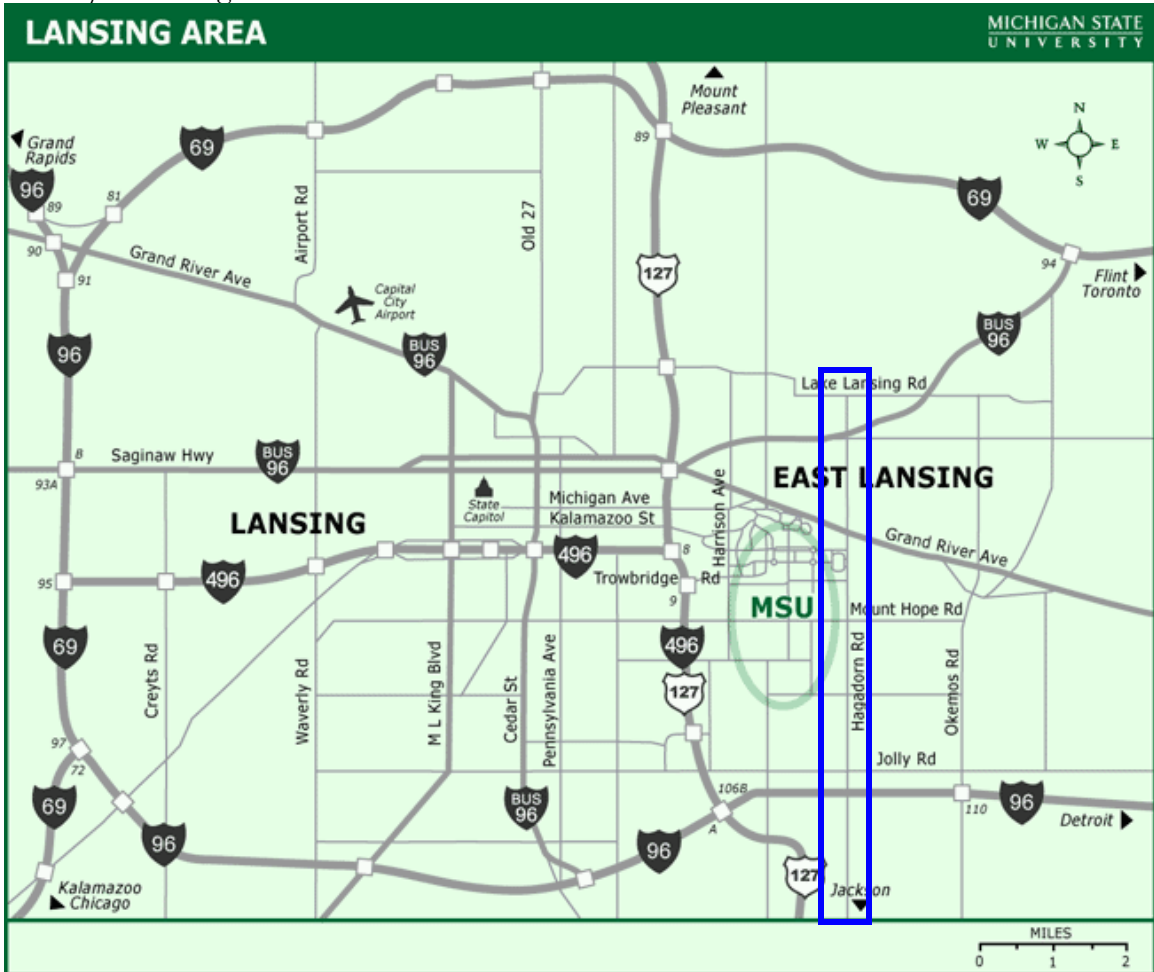
While conducting research for the Hagadorn Corridor study, the team utilized numerous sources of data and information in order to comprehensively analyze the study area as well create plausible recommendations. It was the intent of the group to produce a report, which addressed the concerns of the City while also fitting into the broader context of the region as well as the State. A clear understanding of the cities planning background, corridor planning, and the regional and State visions were beneficial in finalizing the team's recommendations.

Section One: Hagadorn Road Corridor

1.1 Location

Hagadorn Road is located east of downtown East Lansing, Michigan in Ingham County. It begins at East Lake Lansing Road in the north and continues on to Mason heading south. Major crossroads passing through Hagadorn include East Saginaw Street, Haslett Road, Burcham Drive Grand River Avenue, Mount Hope, West Jolly Road, Willoughby Road and Holt Road (see Map 1).

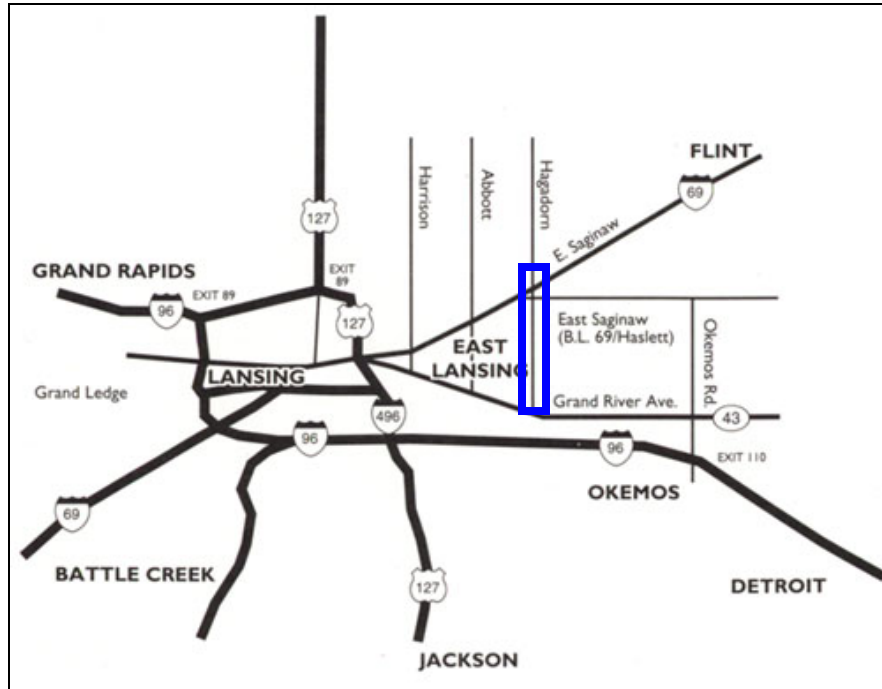
Map 1: Lansing Area



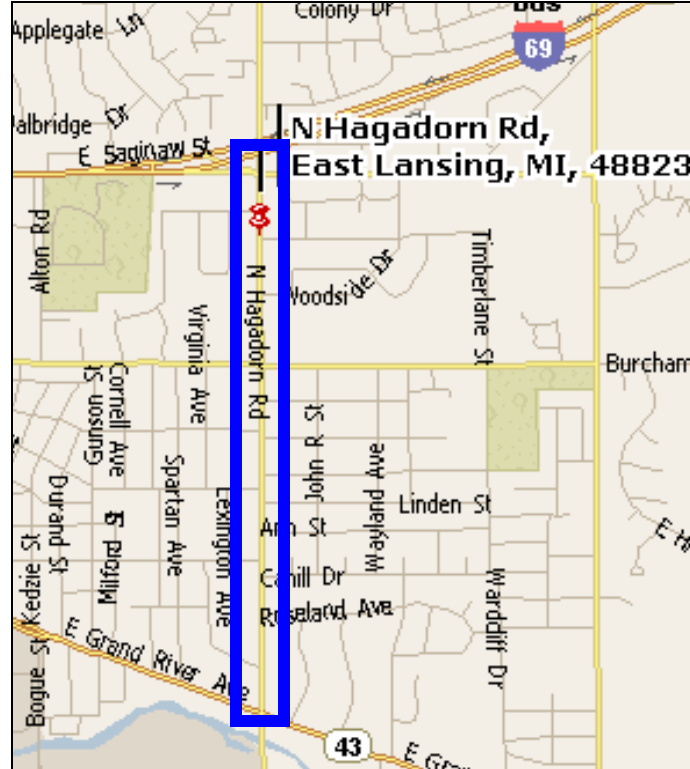
1.2 Project Boundaries

The Hagadorn Road Corridor study was conducted on North Hagadorn Road between East Grand River Avenue and Haslett Road (see Map 2 and 3).

Map 2: Project Boundaries



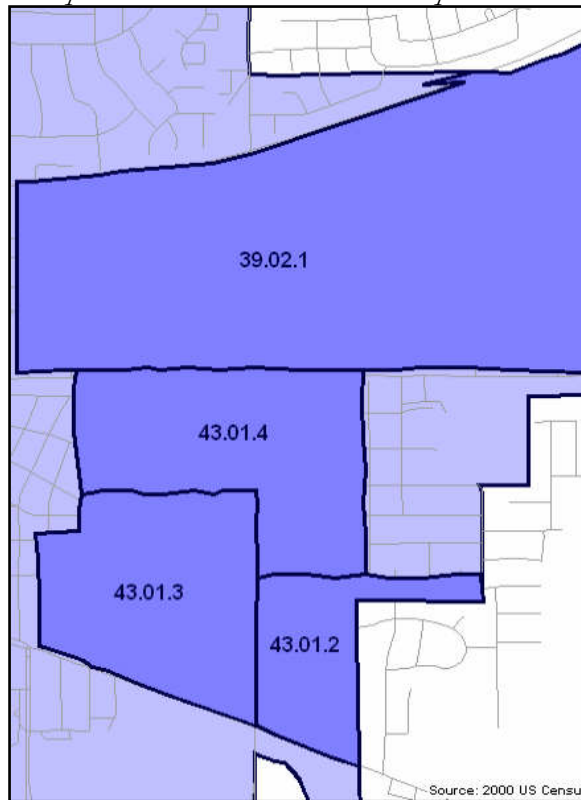
Map 3: Hagadorn Corridor



The corridor passes through very diverse neighborhoods: some with beautiful historic homes, some with affordable family residences, and others dominated by the rental market. The neighborhood housing is not the only diversity found along the corridor. There are also several community and commercial structures including Brookfield Shopping Plaza, Marble Elementary, MacDonald Intermediate Schools, two churches, multiple daycare centers, and a public park. Michigan State University is located just south of Grand River Avenue on the west side of Hagadorn Road. The corridor's proximity to Michigan State University and the two schools contribute to the high level of pedestrian and bicycle activity on the street and sidewalks; many walkers and joggers are also seen on this route.

1.3 Socio-Economic Profile

Map 4: Corridor Census Block Groups



Population characteristics from specific block groups located along the Hagadorn Corridor study area were analyzed from data gathered through the U.S. Census Bureau. Population statistics for the year 2000 were compared to the following geographic regions: Ingham County, City of East Lansing, Meridian Township, and the Lansing-East Lansing Metropolitan Statistical Area.

Table 1 details the total population, by age, for each block group within the study area and the City of East Lansing. The **bolded** figures in Table 1 indicate the highest frequency as it relates to the overall block group population.

Overall, the block groups in the area represent a rather diverse population based on income and age. The areas with the highest concentration of rental housing per capita also

have the highest rate of students and thus lower overall median income (see Tables 1 and 4).

Areas with higher instances of children, middle-aged and older residents typically had the lowest rates of student aged residents, and thus higher overall median incomes.

Table 1: Block Group Age, Gender and Total Population⁸
Source: 2000 U.S. Census

Population: By Age	Block Group 1, Census Tract 39.02	Block Group 2, Census Tract 43.01	Block Group 3, Census Tract 43.01	Block Group 4, Census Tract 43.01	East Lansing
0-18 Total	372	143	56	135	7,514
% Of Total Population	17.22%	16.59%	3.35%	8.25%	16.09%
19-24 Total	334	216	1173	948	23,898
% Of Total Population	15.46%	25.06%	70.11%	57.95%	51.17%
25-39 Total	394	207	181	207	6,279
% Of Total Population	18.24%	24.01%	10.82%	12.65%	13.44%
40-59 Total	420	224	163	224	5,474
% Of Total Population	19.44%	25.99%	9.74%	13.69%	11.72%
60-74 Total	207	52	33	75	1,856
% Of Total Population	9.58%	6.03%	1.97%	4.58%	3.97%
75+ Total	433	20	67	47	1,683
% Of Total Population	20.05%	2.32%	4.00%	2.87%	3.60%
BG Totals	2,160	862	1,673	1,636	46,704

⁸ U.S. Census Bureau. 2000 Census.

Race and Ethnicity:

The overall racial makeup of the area is predominantly white. Compared to the city-wide average of 81% white and 19% minority, the block groups averaged from 84.26% to 94.19% white, with the rest of the population being of minority descent (see Tables 2 and 3).

Table 2: Block Group Population and Race⁹

Block Group population and Race	Total	White	Black	Native American	Asian	Pacific Islander	Some other race	Two or more races
Block Group 1, Census Tract 39.02	2,160	1,820	108	5	106	0	47	74
Percentages	100.00%	84.26%	5.00%	0.23%	4.91%	0.00%	2.18%	3.43%
Block Group 2, Census Tract 43.01	862	809	0	0	43	0	0	10
Percentages	100.00%	93.85%	0.00%	0.00%	4.99%	0.00%	0.00%	1.16%
Block Group 3, Census Tract 43.01	1,673	1,490	56	31	70	0	26	0
Percentages	100.00%	89.06%	3.35%	1.85%	4.18%	0.00%	1.55%	0.00%
Block Group 4, Census Tract 43.01	1,636	1,541	0	0	39	0	35	21
Percentages	100.00%	94.19%	0.00%	0.00%	2.38%	0.00%	2.14%	1.28%

Source: 2000 U.S. Census

Table 3: Regional Population and Race¹⁰

Regional Population and Race	Total	White	Black	Native American	Asian	Pacific Islander	Some other race	Two or more races
Ingham County	279,320	221,816	29,909	1,666	9,991	182	6,893	8,863
Percentages	100%	79%	11%	1%	4%	0%	2%	3%
East Lansing city	46,687	37,629	3,353	265	3,836	95	493	1,016
Percentages	100%	81%	7%	1%	8%	0%	1%	2%
Meridian charter township	38,987	33,867	1,445	156	2,453	29	213	824
Percentages	100%	87%	4%	0%	6%	0%	1%	2%
Lansing--East Lansing MSA	447,728	377,449	35,318	2,463	11,571	217	8,719	11,991
Percentages	100%	84%	8%	1%	3%	0%	2%	3%

Source: 2000 U.S. Census

⁹ U.S. Census Bureau. 2000 Census.

¹⁰ U.S. Census Bureau. 2000 Census.

Income:

While the median incomes of the block groups had an overall higher median income than the City of East Lansing (\$28,217) (with the exception of block group 3, census tract 43.01 at \$23,750), it was still lower than the overall median income for the region. Block group 3, of census tract 43.01, had the highest rate of students for the study area at 70.11% (see Table 5), which may account for the lower median income. The median incomes of the surrounding areas are as follows:

- Ingham County - \$40,774
- Meridian Township - \$55,203
- Lansing/East Lansing MSA - \$44,441.

Map 5: Household Income by Block Group

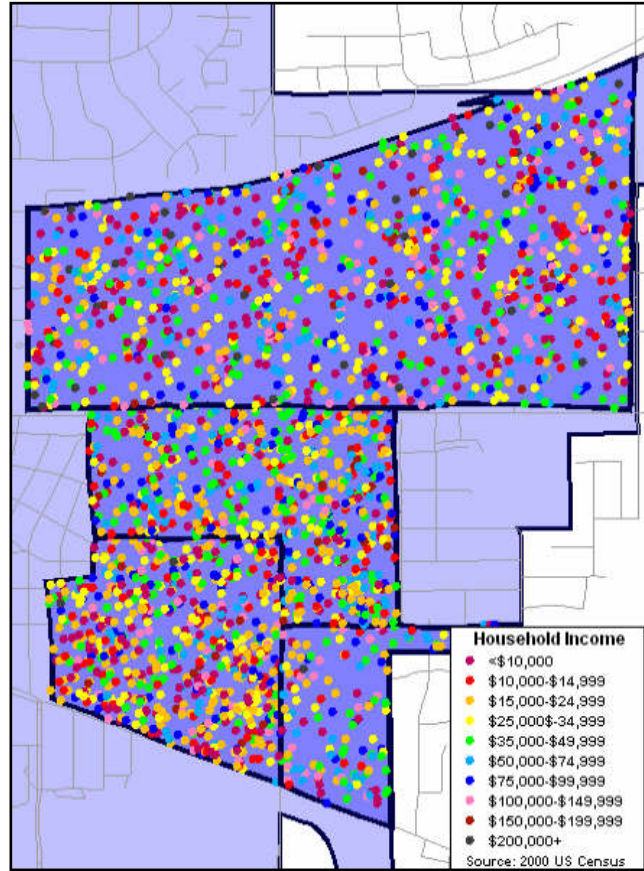


Table 4: Household Income¹¹

Household income	Total	Median income 1999	0-\$14,999	\$15,000-\$24,999	\$25,000-\$39,999	\$40,000-\$59,999	\$60,000-\$99,999	\$100,000-\$149,999	\$150,000+
Block Group 1, Census Tract 39.02	1,095	32,461	304	113	229	157	131	102	59
Percentage			27.76%	10.32%	20.91%	14.34%	11.96%	9.32%	5.39%
Block Group 2, Census Tract 43.01	371	38,828	69	55	69	60	69	46	3
Percentage			18.60%	14.82%	18.60%	16.17%	18.60%	12.40%	0.81%
Block Group 3, Census Tract 43.01	628	23,750	175	156	114	70	61	38	14
Percentage			27.87%	24.84%	18.15%	11.15%	9.71%	6.05%	2.23%
Block Group 4, Census Tract 43.01	593	31,433	118	139	92	101	115	10	18
Percentage			19.90%	23.44%	15.51%	17.03%	19.39%	1.69%	3.04%

Source: 2000 U.S. Census

Table 5: Regional Household Income¹²

Household income	Total	Median income 1999	0-\$14,999	\$15,000-\$24,999	\$25,000-\$39,999	\$40,000-\$59,999	\$60,000-\$99,999	\$100,000-\$149,999	\$150,000+
Ingham County	108,567	40,774	18,136	14,364	20,646	21,393	22,269	7,785	3,974
Percentage			16.70%	13.23%	19.02%	19.70%	20.51%	7.17%	3.66%
East Lansing city	14,401	28,217	4,086	2,488	2,352	1,693	2,037	1,079	666
Percentage			28.37%	17.28%	16.33%	11.76%	14.14%	7.49%	4.62%
Meridian charter township	16,389	55,203	2,265	1,514	2,339	2,568	3,671	2,273	1,759
Percentage			13.82%	9.24%	14.27%	15.67%	22.40%	13.87%	10.73%
Lansing--East Lansing MSA	172,525	44,441	23,954	21,056	31,930	35,865	40,393	13,578	5,749
Percentage			13.88%	12.20%	18.51%	20.79%	23.41%	7.87%	3.33%

Source: 2000 U.S. Census

¹¹ U.S. Census Bureau. 2000 Census.

¹² U.S. Census Bureau. 2000 Census.

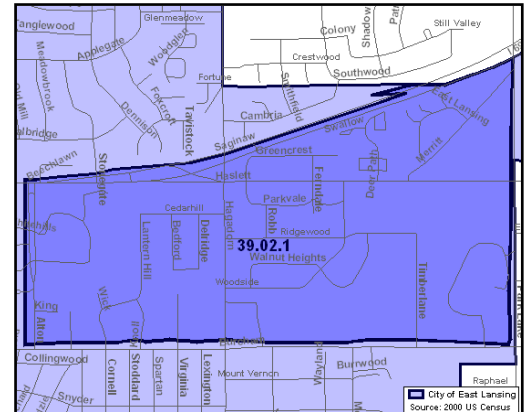
Block Group Socio-Economic Analysis:

The four block groups in the study area are examined below. Figures are related to the aforementioned tables in the socio-economic profile section.

Census Tract 39.02, Block Group 1 (Map 6):

Boundaries of block group 39.02.1 are Saginaw to the north and Burcham to the south, Park Lake to the East and Alton to the west. Upon completion of the analysis of this block group, it was noticed that the following age brackets maintained the highest rate of population groups:

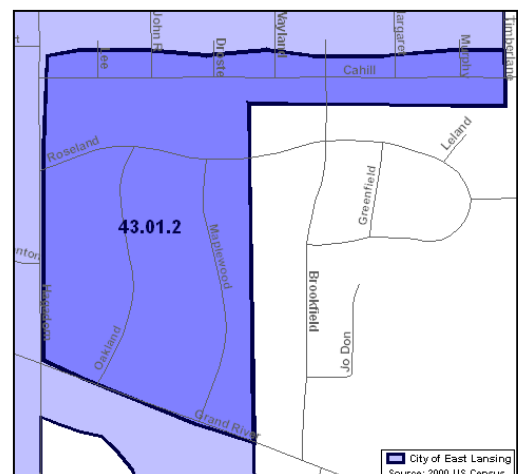
- 0-18 (17.22%) 372;
- 60-74 (9.58%) 207;
- 75+ (20.05%) 433.



The total population of this block group is 2,160. The median income, using 1999 figures, is \$32,461, the second highest of the four block groups examined in this study. This block group represents one of the most economically diverse populations of the block groups examined. The highest percentage of residents earned between 0-\$14,999 (27.76%) and the second highest percentage being \$100,000-149,999 (9.32%) and the third being \$150,000+ (5.39%). All three percentages are relatively similar to that of City of East Lansing. It was also the most ethnically diverse block group with 84.26% being white and 15.74% minorities.

Census Tract 43.01, Block Group 2 (Map 7):

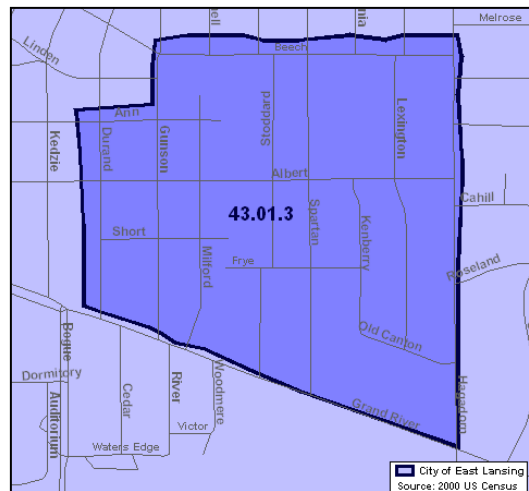
Boundaries of 43.01.2 are just north of Cahill and Grand River to the south, Park Lake to



the east and Hagadorn to the west. This block group had the lowest population observed (826) and was nearly half as populated as the next lowest block group. This same block group had the second highest occurrence of those aged 0-18 at 16.59% (143) and although it tied for second with ages 25-39 (207) and 40-59 (224), the percentage breakdowns for each group were 24.07% and 25.99%, respectively. Insofar as relative income is concerned, it had the highest median income (\$38,828) of the area observed and had the lowest occurrence of those earned between 0-14,999 (18.6%). It had the highest occurrence of those earning 60,000-99,999 (also 18.6%) and 100,000 -149,999 (12.4%). Please note, however, that this Block Group is cut at the boundary of East Lansing and Meridian Township and includes data for those living outside the City of East Lansing

Census Tract 43.01, Block Group 3 (Map 8):

Boundaries of block group 43.01.3 are just north of Beech and Grand River to the south, Hagadorn to the east and between Durand and Kedzie to the west. This block group had the second largest overall population (1,673) with the being those aged 19-24 at



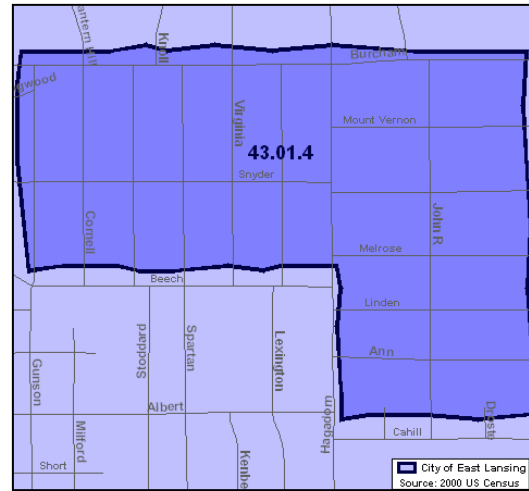
70.11% (1,173) and the second highest being of those aged 75+ at 4% (67). It had the lowest population rates in the following age brackets:

- 0-18 (3.35%) 56;
- 25-39 (10.82%) 181;
- 40-59 (9.74%) 163;
- 60-74 (1.97%) 33.

It also incurred the lowest median income (\$23,750) with 27.87% earning 0-\$14,999 and 24.84% earning \$15,000-\$24,999 a year.

Census Tract 43.01, Block Group 4 (Map 9):

Boundaries of block group 43.01.4 are Burcham to the north and Beech, down Hagadorn to Cahill on the south, Wayland to the east and Gunson to the west. This block group, with an overall population of 1,636,



had the second highest occurrence of those aged 19-24 (948), 25-39 (207), 40-59 (224) and 60-74 (75). Its 1999 median income rated third highest for the four observed block groups at \$31,433. It had the highest rate of those earning \$40,000-\$59,999 (17.03%) and \$60,000-\$99,999 (19.39%). It was also the least racially diverse block group in the observed area with 94.19% of the total population being white.

Block Group Summary

The block groups associated with the Hagadorn Corridor study area represents a predominately white population, mostly earning up to \$24,999 a year. Specific age breakdown, when compared to the City of East Lansing, represents an area relatively similar. Specific block groups, e.g. 39.02 block group 1, have higher rates of elderly residents aged 60-74 (9.58%) and 75+ (20.05%) than that of the city (3.97%, 60-74 and 3.6% 75+). This contrasts with 43.01 block group 3, whose population 19-24 (70.11%) is higher than that of the City of East Lansing (51.17%). Overall, the corridor is an age and economically diverse area with characteristics similar to that the City of East Lansing.

Section Two: Research Methods

2.1 Methods

An extensive literature review has been conducted to determine acceptable and appropriate procedures for the determination of blight, residential and commercial property quality, sidewalk quality, walkability, bikeability, and safe school zones.

Criteria were selected for each of the above items and numerous audits were conducted to record the existing conditions. This was necessary to gain an assessment of how conditions changed based on the time of day or changes in the weather. This analysis facilitated the identification of specific areas of needed improvement for the corridor.

Traffic data obtained from the City of East Lansing Engineering Department was also analyzed and compared to other similar streets within the City of East Lansing to assess and determine whether the current flow of traffic is high, average, or below average. In collecting and analyzing the traffic data, the team communicated with various staff members from the Michigan Department of Transportation and the City of East Lansing Engineering Department to ensure our methodology, analysis, and preliminary recommendations were appropriate.

Socioeconomic data was also gathered and analyzed to determine the characteristics of the neighborhoods that surround the Hagadorn Corridor. Specific elements of the socioeconomic data utilized include the age of the housing stock, income, modes of transportation, race, population, gender, family or individual status, distance traveled to work, and age of residents (see Section 1.3 Socio-Economic Profile).

2.1.1 Strength, Weaknesses, Opportunities, and Threats (S.W.O.T) Analysis

A S.W.O.T. analysis presents the Strengths, Weaknesses, Opportunities, and Threats of a study area. A S.W.O.T. assessment was performed by the team during the onset of the

data collection. Information gathered aided in the determination of the final recommendations for this report.

2.1.2 Blight Guidelines

Public Act 344 of 1945, Section 2(A) was utilized to determine the quality of the homes located in the Hagadorn Corridor. The criteria set forth in the Act is the same criteria the City of East Lansing previously utilized when conducting their East Village Area analysis. When conducting the evaluation of the corridor the team used criteria 1, 3, 6, and 7 to aid in the determination of blight. The criteria are as follows:

1. Physical deterioration of structures
2. Functional or economic obsolescence
3. Substandard building or facility conditions
4. Improper or inefficient arrangement of lots, streets, and open spaces
5. Inappropriate mixed character
6. Deterioration of public facilities
7. Other characteristics, which endanger the health, safety, and general welfare of the municipality.¹³

2.1.3 Residential and Commercial Property Methods and Evaluation Criteria

The following evaluation (see Table 6) was conducted to determine the physical condition of structures along the corridor (criteria 1-3 in section 2.1.2). Along with the above stated Public Act 344 of 1945, Section 2(a), the methodology for rating structures was adapted by utilizing the criteria set forth in the “Neighborhood Commercial Corridor Revitalization Study: For the South West Area Neighbors West Fulton Street Corridor, Grand Rapids, Michigan”.

¹³ Department of Community & Economic Development, City of East Lansing, MI. East Village Area: Analysis and Findings of Fact Concerning Designation as an Area of Community Rehabilitation, Revitalization, and Renewal. November 12, 2004.

Table 6: Structure and Parcel Evaluation Criteria for Hagadorn Corridor Properties

	Excellent	Good	Fair	Poor
Exterior	Siding or brick is undamaged with no visible weathering (wear and tear) to the structure	Some observation of weathering (peeling paint or brick deterioration) to the structure	Over ¼ of the structure observed to have weathering (peeling and/ or missing paint, missing siding, cracked bricks)	Over ½ of the structure observed to have weathering (paint entirely gone in places, considerable amount of siding missing)
Windows/Doors	Intact with no visible damage or weathering	Mostly intact with minor peeling paint or minor damage to doors	Over ¼ of the element is broken or damaged	Over ½ of the element is broken or damaged
Roof	Fully intact with no visible signs of water damage	Mostly intact with some missing and/or minor damage to shingles, soffit fascia or eaves trough, but no visible signs of water damage	Over ¼ of the structure missing shingles, soffit fascia and eaves trough with some visible signs of water damage	Over ½ of the structure missing shingles, soffit fascia and eaves trough with significant visible water damage
Yard	Clean and free of debris	Clean with a minuet amount of debris or minimal foliage overgrowth	Some debris with some foliage overgrowth	Significant debris and most or all foliage is overgrown

Adapted from the “Neighborhood Commercial Corridor Revitalization Study: For the South West Area Neighbors West Fulton Street Corridor, Grand Rapids, Michigan”.¹⁴

2.1.4 Walkability Methods and Evaluation Criteria

Walkability audits for the Hagadorn Corridor were conducted on multiple dates and at varying times, with the last audit being conducted the morning of February 16, 2005.

During this audit the *How Walkable is your Community* survey (Appendix B) was completed for

¹⁴ Michigan State University, Urban Planning Practicum. Andrews, K. et al. “Neighborhood Commercial Corridor Revitalization Study: For the South West Area Neighbors West Fulton Street Corridor, Grand Rapids, Michigan”. Spring 2003.

the corridor on a block-by-block basis. To alleviate researcher bias when completing the survey, two people walked the east side of Hagadorn and two people walked the west side of Hagadorn. After compiling the results of the survey, it was determined that the majority of the corridor is walkable. Although the vast majority of the blocks are not in need of major repair, there are some blocks which present a number of problems for pedestrians. Problems within the corridor include a limited number of pedestrian crosswalks, adequate buffer widths and sidewalk quality. For further information, the survey, rating scale and results can be found in Appendix B.

2.1.5 Sidewalk Quality Methods and Evaluation Criteria

While completing the *How Walkable is Your Community?* audit, the team also completed an inventory of sidewalk quality. Items such as cracks, unevenness, debris, and sidewalk obstructions were noted. The team selected some items on the *How Walkable is Your Community?* survey plus additional items that were important to note. An overall block assessment of “excellent”, “good”, “fair”, and “poor” was designated based on the criteria.

Table 7: Sidewalk Methodology and Evaluation Criteria for Hagadorn Corridor: Block by Block

	Excellent	Good	Fair	Poor
Sidewalks	Free and clear of any cracks, debris and concrete unevenness	Mostly clear of any cracks and/or concrete unevenness	Over ¼ of sidewalk section has cracks and/or concrete unevenness	Over ½ of sidewalk section has cracks and concrete unevenness

2.1.6 Seasonal Walkability Methods and Evaluation Criteria

The seasonal walkability was evaluated each time our group walked the corridor. The team determined this was necessary as weather conditions changed from one trip to the next. Concerns such as the removal of snow, ice, slush, leaves, and other seasonal variables were noted. Both the east and west sidewalks were evaluated by two person teams.

Table 8: Seasonal Walkability Methodology and Evaluation Criteria for Hagadorn Corridor: Block by Block

	Excellent	Good	Fair	Poor
Walkability	Regulation sidewalk with an appropriate buffer from roadway, clear of all seasonable elements (snow, ice, leaves)	Regulation sidewalk with most of the section having an appropriate buffer from roadway, clear of most seasonable elements (snow, ice, leaves)	Over ¼ of sidewalk section having minimal buffer from roadway and/or not being clear of seasonable elements (snow, ice, leaves)	Over ½ of sidewalk section having minimal or no buffer from roadway and/or not being clear of seasonable elements (snow, ice, leaves)

2.1.7 School Zones Methods and Evaluation Criteria

Research was conducted by answering the following yes/no questions at both the beginning and conclusion of the school day. The questions were adapted from the National Center for Bicycling and Walking (Appendix C) and required yes, no, or not applicable answers with a section for comments and observations. The questions are as follows:

- Are sidewalks and pathways clear of obstacles, in good condition and continuous along the routes?
- Are there crosswalks and pedestrian signals at busy streets and intersections?
- Are curb ramps present at intersection crosswalks? Are they ADA compliant?
- Do drivers yield to pedestrians at driveways and crosswalks?
- Is secure and convenient bicycle parking available at school?
- Is there sufficient operating width for bicycles along the route?
- Are curb radii too large, thus encouraging fast vehicle cornering?
- Do drivers, pedestrians, and bicyclists behave appropriately?
- Are sufficient sight distances and visibility provided, especially for pedestrians less than five feet tall?
- Are there adequate and visible signing and pavement markings?
- Is there enough lighting?¹⁵

2.1.8 Conclusions

The above assessments, criteria, and guidelines were utilized to give the group a complete understanding of the corridor conditions. It was necessary to complete a number

¹⁵ National Center for Bicycling and Walking. Safe Routes to School Getting Started. Available Online. URL: <http://www.bikewalk.org/safe_routes_to_school/SR2S_getting_started.htm> Accessed January 30, 2004.

of different assessments in order to understand the needs of pedestrians, school children, and motorists. The results of the evaluation will be described throughout the remainder of this report.

Section Three: Strengths, Weaknesses, Opportunities, and Threats Analysis

3.1 Brief Description

A S.W.O.T. analysis was conducted by the team to gain a better understanding of the assets and deficiencies of Hagadorn Corridor. The analysis was used as the foundation for further research, data collection, and in determining the final recommendations. Although a S.W.O.T analysis was conducted by the team, it is suggested that the City of East Lansing conduct one as well.

3.2 Analysis

The results of the analysis are as follows:

Strengths

- Proximity to Michigan State University
- Neighborhoods lack vacant parcels
- Proximity to elementary and middle schools
- Proximity to neighborhood amenities such as Patriarch Park and the River Trail
- CATA Bus System

Weaknesses

- Lack of residential/commercial mixed-use
- Lack of pedestrian crossings throughout corridor
- Distance of sidewalk to road or lack of a buffer
- Lack of vacant parcels limits opportunity for mixed-use
- Lighting is focused on streets rather than sidewalks
- Lack of design cohesion between neighborhood blocks

Opportunities

- Connection to downtown commercial
- Connection to Grand River Avenue and Saginaw Highway
- Width of the road provides for the ability to conduct a 4 to 3 lane conversion and to include bike lanes
- Relocate power lines from above ground to below

Threats

- Traffic volume and speed
- Seasonable walkability (timely removal of snow and ice)
- Difficulty making left turns

3.3 Summary

Upon completion of the S.W.O.T. analysis it was determined that the corridor had many strengths and opportunities that would allow for the corridor to become more pedestrian friendly and walkable. The close proximity to Michigan State University, public schools, parks, and the river trail make it an inviting location for people to reside. The lack of vacant parcels located in the neighborhoods within the corridor is perceived as both a strength and weakness. It is a strength because we can deduce that the neighborhoods will retain their residential zoning, therefore the level of traffic will not increase dramatically in the future. It proves to be a weakness due to the lack of vacant properties located on the corridor, thus limiting the opportunity to create mixed-use neighborhoods.

There were a number of weaknesses that stood out upon completion of the analysis, most notably, the lack of pedestrian friendly design elements such as mixed-use, appropriate lighting, lack of crosswalks, and the lack of a



- R1 – Low Density Single-Family Residential
- R2 – Medium Density Single-Family Residential
- R3 – Single-Family and Two Family Residential
- C – Community Facilities District
- B1 – General Office Business District
- B2 – Retail Sales Business District
- RM32 – City Center Multiple-Family Residential

Source: City of East Lansing, April 15, 2005.

buffer between the road and the sidewalks. Although these are weaknesses, there are a number of opportunities that can be taken advantage of to create a friendlier and safer atmosphere for pedestrians. For instance, the corridor is currently home to a four-lane road, by converting the road to three lanes with bike paths, the corridor becomes more pedestrian friendly by providing a safe place to bike, sidewalk buffers for walkers and a left turn lane for vehicular traffic. Other opportunities include the proximity and connections to major roads and the downtown area.

The high levels of traffic and their speeds were considered a significant threat to the safety of pedestrians. Due to Hagadorn being a major road, it is imperative that the road retains its current traffic capacity. As such, recommendations will be focused on creating a more walkable environment without reducing the capacity of the road.

Section Four: Land Use

4.1 Housing Stock Quality and Analysis

An inventory and assessment of 123 parcels located along the Hagadorn Corridor (Appendix D) was compiled. Of the 123 parcels, 98 were residential properties. All properties were assessed using an evaluation structure, previously stated in Section Two: Research Methods. The assessment rated the exterior of the home, the windows and doors, the roof, and the yard. The marks received in each of the categories were then summed to give the property an overall condition grade. Of the 98 residential properties, 10 received an overall rating of “excellent”, 81 received a rating of “good”, 7 were rated “fair”, and none received an overall rating of “poor”.

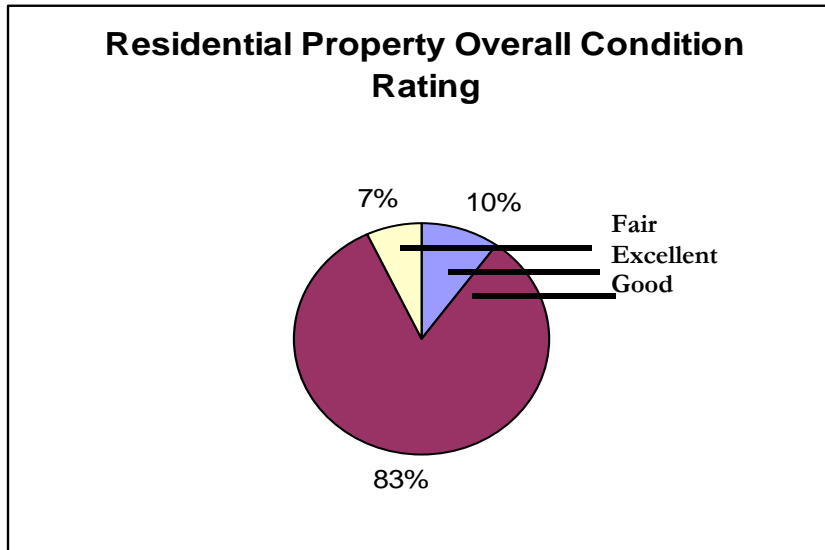
Photo 2: Example of a Home Rated “Excellent”



Photo 3: Example of a Home Rated “Good”



Chart 1: Residential Property Overall Condition Rating



Further analysis showed there to be no clusters of residential properties with ratings other than “good”. Properties receiving an overall condition rating of “excellent” are located from the 200 block of North Hagadorn Road in the southern portion of the study area to Ridgewood Drive in the northern portion (see Map 10). Properties receiving an overall condition rating of “fair” are located from the 100 block of North Hagadorn Road in the southern portion of the study area up to the 800 block of North Hagadorn in the north.

Map 11: Residential Properties Inventory and Assessment

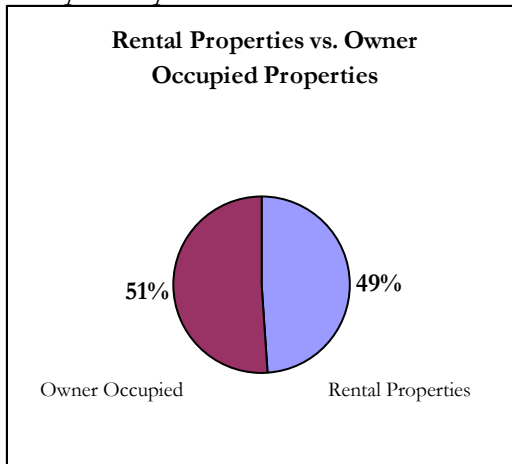


4.1.1 Rental vs. Owner Occupied Properties

Of the 98 residential properties located along the Hagadorn Corridor, 48 of them are currently rental properties (49%). The majority of the rental properties are scattered throughout the corridor, except for two small clusters. One cluster is found on the east side of North Hagadorn Road between Melrose and Burcham Road and the other small cluster is located between Ridgewood Drive and Woodside Drive (see Map 12).

Map 12: Rental Properties vs. Owner Occupied Properties

Chart 2: Rental Properties vs. Owner Occupied Properties

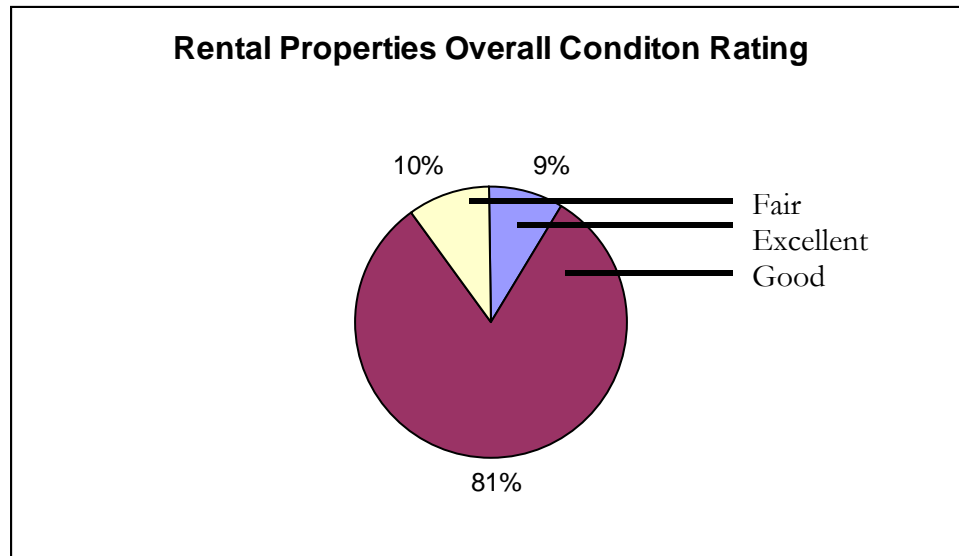


The inventory and assessment of the 48 rental properties was not dramatically different from the overall findings of all the residential



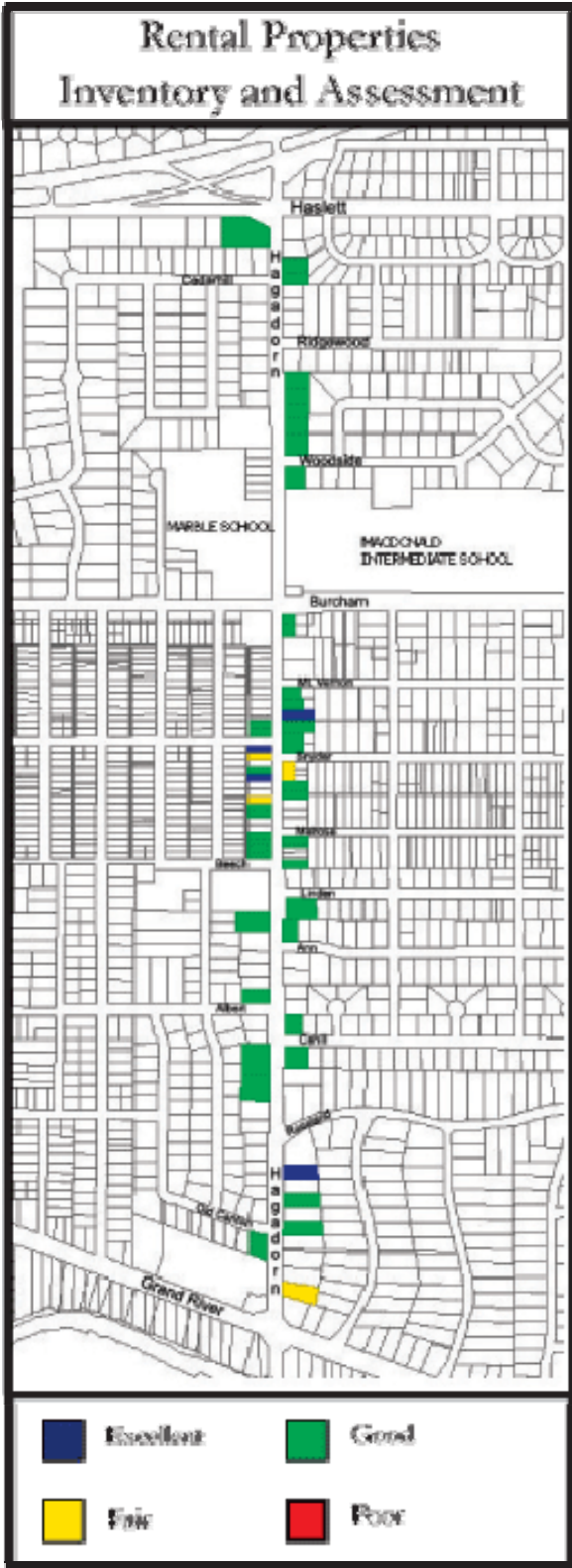
properties. All rental properties were assessed using the same evaluation criteria as the owner-occupied properties. The marks received in each of the categories were then summed to give the rental property an overall condition grade. Of the 48 rental properties, 4 received an overall rating of “excellent”, 39 received a rating of “good”, 5 were rated “fair”, and no properties received an overall rating of “poor”.

Chart 3: Rental Properties Overall Condition Rating



The overall condition assessment shows that the rental properties along the corridor are no more likely to be in any worse or any better condition than the owner-occupied properties. Further investigation showed there to be no clusters of rental properties with ratings other than good (see Map 13).

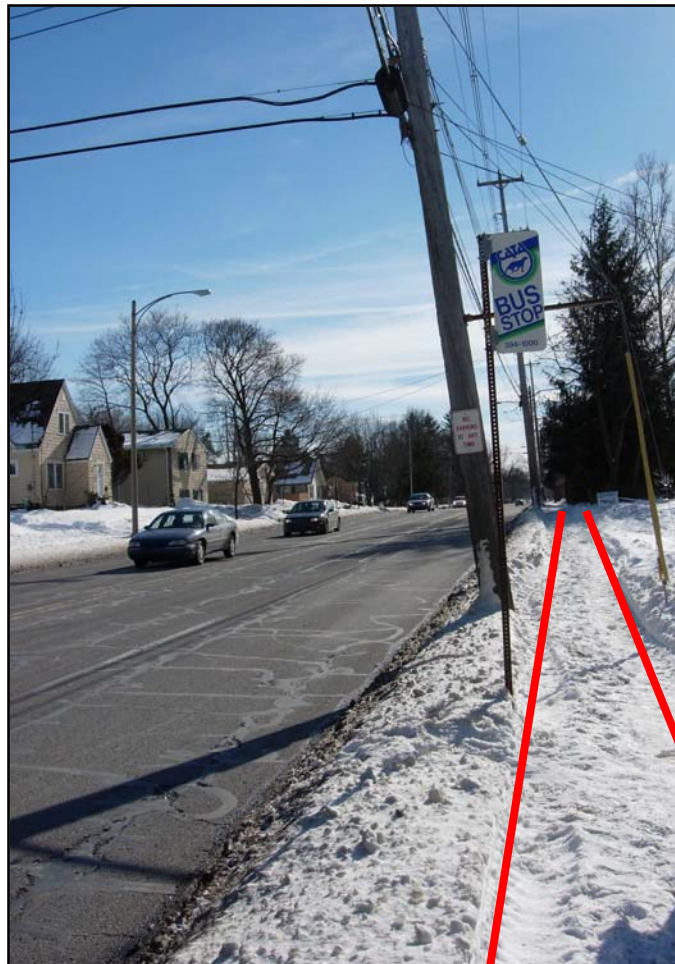
Map 13: Rental Properties Inventory and Assessment



4.1.2 Ordinance Compliance

The City of East Lansing's City Code contains ordinances explaining the proper use and structural guidelines for sidewalks and driveways, lighting, landscaping, doors and windows, as well as specific rental ordinances and historic property guidelines (Appendix E). During the completion of the parcel-by-parcel inventory, the team noted any properties that may appear to be in violation of city ordinances. The only observable city ordinance violation was noted on visits to the study area during January 12th, 19th, and 26th, 2005 and dealt with the timely removal of snow, ice, and other debris from the sidewalks. During numerous site visits it was observed that sidewalks were not cleared of snow and ice within a 24 hour time frame after precipitation was received.

Photo 4: Lack of Sidewalk Snow Removal



4.2 Commercial Stock and Other Use Quality

An inventory and assessment of 123 parcels located along the Hagadorn Corridor study area (Appendix D) was compiled. Of the 123 parcels, 18 were commercial properties and 7 others consisted of churches, schools, and public use. All properties were assessed using the same evaluation criteria as the residential properties. Elements rated include the exterior of the structure located on the property, the windows and doors, the roof, and the yard. In the event that a parcel did not have a structure on it, the parcel was solely rated on the yard criteria. The marks received in each of the categories were then summed to give the property an overall condition grade. Of the 25 commercial and “other” properties, 4 received an overall rating of “excellent”, 9 received a rating of “good”, 12 were rated “fair”, and no properties received an overall rating of “poor”.

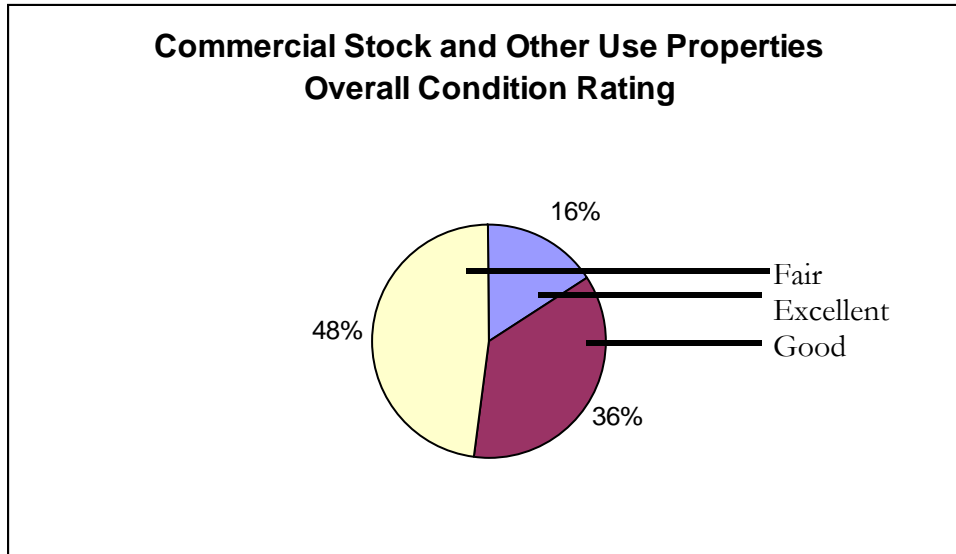


Photo 6: Brookfield Shopping Plaza



4.2.1 Commercial Stock Quality & Analysis

Chart 4: Commercial Stock and Other Use Properties Overall Condition Rating



Further analysis showed that all 12 properties with an overall condition rating of “fair” were located in the Brookfield Plaza (Appendix F). These properties scored low in the categories of structure exterior, windows/doors, and roof. The yard category was not applicable for these properties due to Brookfield Plaza only having an asphalt parking lot with no significant landscaping. The properties receiving an overall condition rating of “excellent” were Marble Elementary School, the office building located on the south east corner of North Hagadorn Road and East Grand River Avenue, the park located on the north east corner of North Hagadorn Road and East Grand River Avenue, and MacDonald Intermediate School. The 9 properties that received an overall condition rating of “good” are located throughout the corridor study area (see Map 14).

Map 14: Commercial & Other Use Properties
Inventory and Assessment



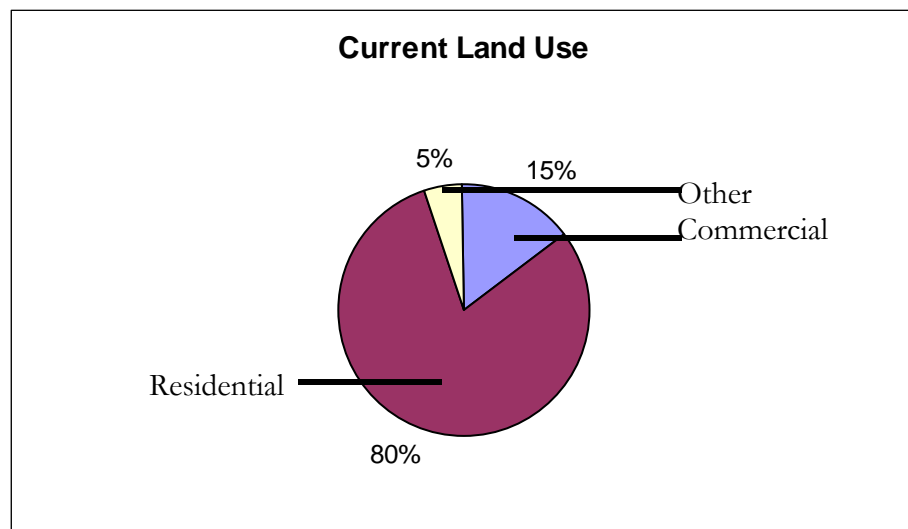
4.3 Recommendations

The Hagadorn Corridor study area is a fully developed and functional urban zone. With 80% of the current land use being residential, it could be suggested that more mixed-use development along the corridor would be desirable, but since the area is already at capacity the practicality of redeveloping residential properties is unwarranted. In addition, according to our assessment there are also no areas along the corridor in desperate need of redevelopment due to structural blight. As such, specific recommendations include the following:

- Maintain mixed-income and mixed-density characteristics of the corridor:
 - Ensure affordable housing for students and low-income residents.
 - Increase value of home-owner housing through aesthetic, traffic and sidewalk improvements.
 - Seek feasibility of the addition of landscaping elements to Brookfield Plaza

- Maintain consistent design:
 - Median age of housing development for all census tracts near and around corridor are as follows: 39.02, Block Group 1 1972, Group 2 1945, Group 3 1961; 43.01, Block Group 1 1961, Group 2 1964, Group 3 1962, Group 4 1961. The corridor and neighborhoods in the near vicinity have reached full development. Future changes should have minimal impact on current housing stock.

Chart 5: Current Land Use



Map 15: Current
Land Use (per parcel)



Section Five: Transportation

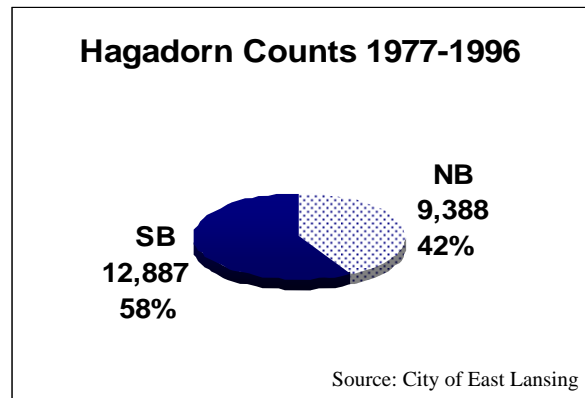
5.1 Traffic Data

The Hagadorn Corridor is a major arterial road. It is a two-way undivided four-lane road, with no center turn lane. It is used for commercial, residential, school and through traffic. Its capacity is 63,600¹⁶ vehicles per day (vpd). The lane width is twelve feet wide, a standard set by the American Association of State Highway and Transportation Officials (AASHTO)¹⁷. The posted speed limit along the corridor is 30 miles per hour (mph), except in school zones during specific times where a portion of the corridor is marked 25 mph. There are no areas of permitted parking along the corridor. There are two prohibited turns where you cannot turn right at a red light, first at the intersection of Hagadorn Road and Burcham Drive and second at Hagadorn Road and Grand River Avenue.

Traffic counts for 1977-1996 provided by the East Lansing Engineering

Chart 6: NB and SB Average Counts

Department consistently show a higher rate of southbound traffic than northbound. As shown in Chart 6, the average percentage of southbound traffic is 58% (12,887 vpd) and 42% is northbound (9,388 vpd) (Chart 7).



These averages of northbound traffic and the

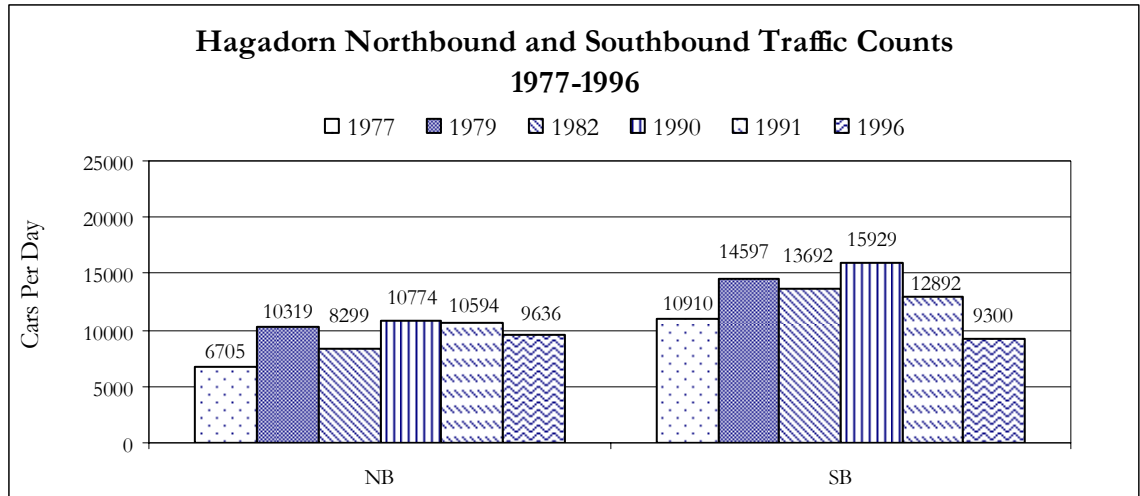
averages of the southbound traffic from 1977-1996 do not include a count for 1994 because the counts collected were a combined northbound and southbound count, and no counts were taken for northbound traffic and southbound traffic separately. Regular traffic counts

¹⁶ Tri County Regional Planning Commission

¹⁷ American Association of State Highway and Transportation Officials (AASHTO). "A Policy of Geometric Design of Highways and Streets".

have not been taken of the Hagadorn corridor. The last count done was in 2002 and that was one one-directional count at the intersection of Hagadorn and Roseland.

Chart 7: Hagadorn NB and SB Traffic Counts 1977-1996

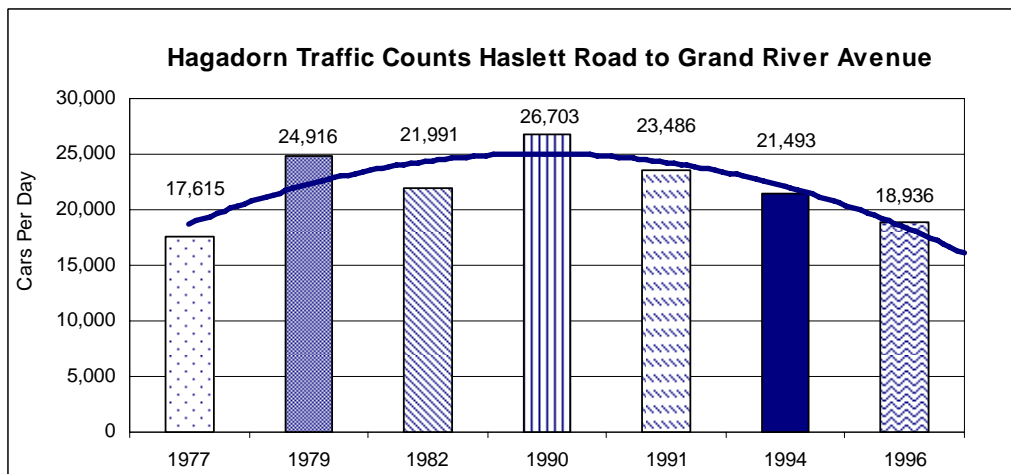


Source: City of East Lansing

Traffic count averages for 1977-1996 show just over 22,000 vpd on the corridor. However, counts indicate a declining vpd average from 1990-1996 (See Chart 8). Currently, the numbers provided by the City of East Lansing, show a decrease in rates of 12% from 1990-1991; 8.5% from 1991-1994; and 11.9% from 1994-1996.

This decline is consistent with the “Trend Model” provided by the Tri-County Regional Planning Commission who estimated traffic counts under this model by 2025 to be 7,500-8,800 vpd.

Chart 8: Hagadorn Traffic Counts Haslett Road to Grand River Avenue 1977-1996



Source: City of East Lansing

5.2 Accident Data

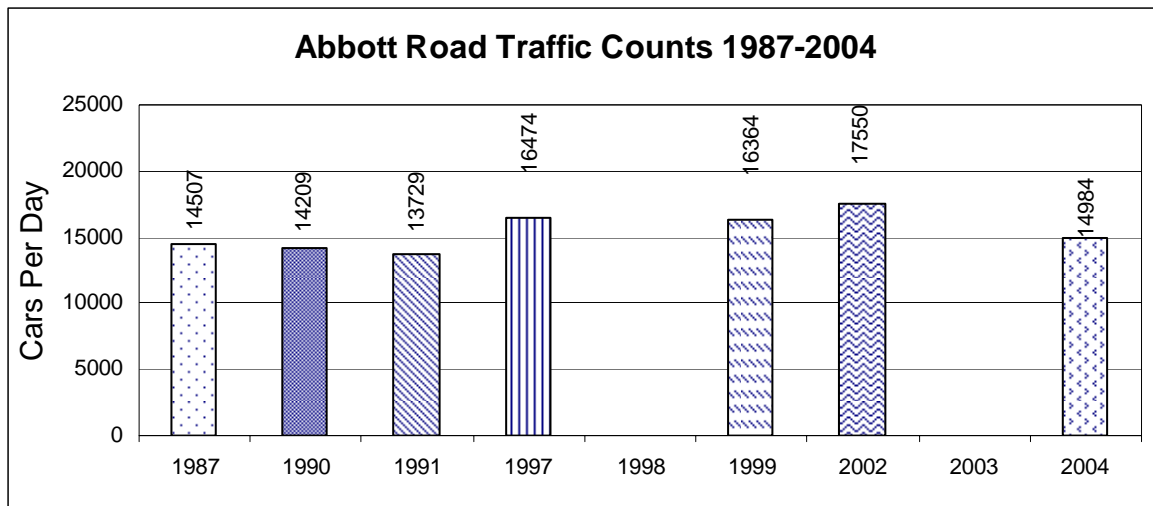
Accident data was collected from the City of East Lansing for 1994-2003, 2004 data was not available. There were a total of 536 accidents along the corridor for this 9-year period: 96% was vehicular (515 accidents), 4% was bicycle-related (19 accidents), and 0.4% was pedestrian (2 accidents).

The Grand River Avenue and Hagadorn intersection had the most reported accidents along the corridor. One explanation for this could be that there is much more traffic traveling along Grand River than the other intersecting roads on this section of the corridor.

5.3 Comparative Analysis

Abbott Road is located west of Hagadorn and is very similar in characteristics. In 1999 the section of Abbott Road, between Saginaw Street and Grand River Avenue, was converted from a two-way undivided four-lane road with no center turn lane to a two-directional three-lane road with a center turn lane. This was done to reduce vehicular traveling speeds and increase pedestrian safety. Chart 10 shows traffic counts for Abbott before and after the reconfiguration, as you can see volumes have stayed about the same.

Chart 9: Abbott Road Two-Directional Counts 1987-2004



Source: City of East Lansing

In 2002 the combined northbound and southbound traffic counts reached a high of 17,550 cars per day (approximately 5,000 less than the daily traffic on Hagadorn Road). This is three years after the conversion of Abbott to a three-lane road. This count is likely due to the new development of student housing built in Bath Township on Chandler Road in the early 2000s. Since the development, many students have moved to these apartments and since Abbott is a direct route to Michigan State University, it is perceived to be the reason for the high traffic counts in 2002. This is perceived because of counts taken in 2002 for Abbott Road south of Lake Lansing which show that over 18,000 cars per day cross that intersection and in 2003 Abbott Road north of Saginaw have over 20,000 cars per day and in 2003 Abbott Road and Elizabeth Road show over 17,500 cars per day. It also appears that since 2002 there has been a decrease of traffic on Abbott Road. This could be partly due to the fact that people are taking alternative routes into campus to avoid congestion that was caused by the population growth north of East Lansing after the lane conversion. Since the Hagadorn corridor is developed almost to full capacity, both on the corridor and north of it, there is no expected increase in population density that would cause a large increase in traffic volume as was experienced on Abbott Road.

Table 9: Abbott Road Traffic Volumes

Abbott Road Traffic Volumes (24 hour volumes)			
	South of Whitehills Dr.	South of Burcham Dr.	South of Burcham Dr.
Before Change to 3-Lanes	15,067 (Avg. during week of Oct 13, 1997)	14,082 (Avg. during week of Oct. 6, 1997)	6,885 NB only (Avg. during week of Sept. 21,1998)
After Change to 3-Lanes	16,878 (Avg. during week of Sept 13, 1999)	15,215 (Avg. during week of Sept.13, 1999)	7,207 NB only (Avg. during week of Sept.13, 1999)

Table 10: Abbott-Burcham Intersection Traffic Volumes

Abbott-Burcham Intersection Traffic Volumes (Vehicles traveling through intersection)			
	AM 7am to 8 am (1/28/98)	Noon noon to 1:00 pm (1/28/98)	PM 5:00 pm to 5:45 pm (1/28/98)
Before Change to 3 - Lanes	1,038 (1/28/98)	1,127 (1/28/98)	1,171 (1/28/98)
After Change to 3 - Lanes	969 (10/20/99)	1,369 (10/20/99)	1,301 (10/20/99)

Source: City of East Lansing

Table 11: Location and Total Number of Accidents within City of East Lansing

Street Name/Location	Traffic Count (Year Taken)	Total Number of Accidents on This Corridor (1994-2003)	Vehicular Accidents / % of Accidents on This Corridor	Pedestrian Accidents / % of Accidents of This Corridor	Bicycle Accidents / % of accidents on This Corridor
Hagadorn Between Haslett and Grand River	19,641(2002 est.)	536	96%	0.40%	4%
Abbott Between Saginaw and Grand River	14,984 (2004 est.)	523	95%	1.90%	3%

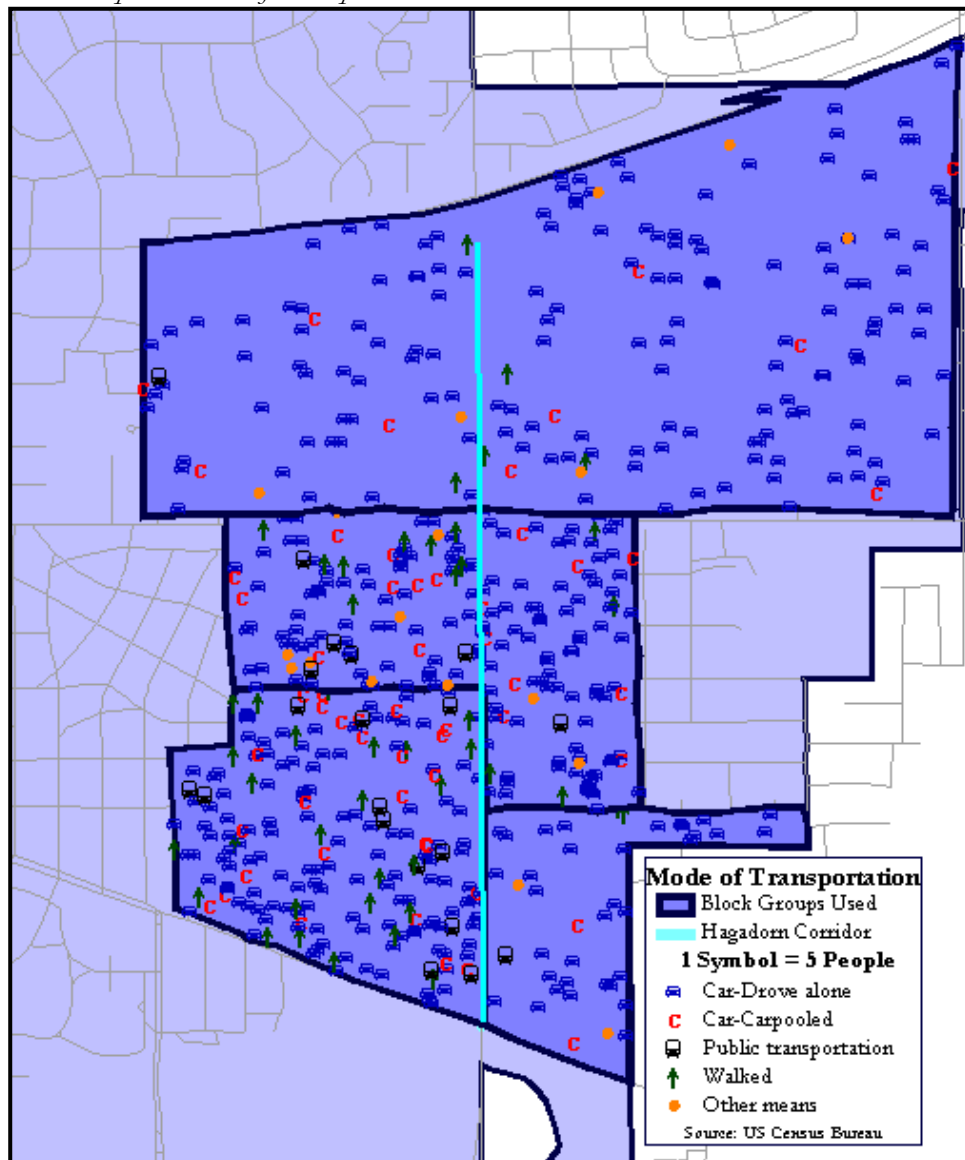
Source: City of East Lansing

5.4 Modes of Transportation

Local Block Groups:

Typical of the region as a whole, the majority of those living within the block groups associated with the corridor study area commute to work alone in an automobile. Though, there are still a high number of people using public transit, walking, or using some other form of transportation as shown in Map 16. Each block group demonstrated different characteristics.

Map 16: Mode of Transportation to Work

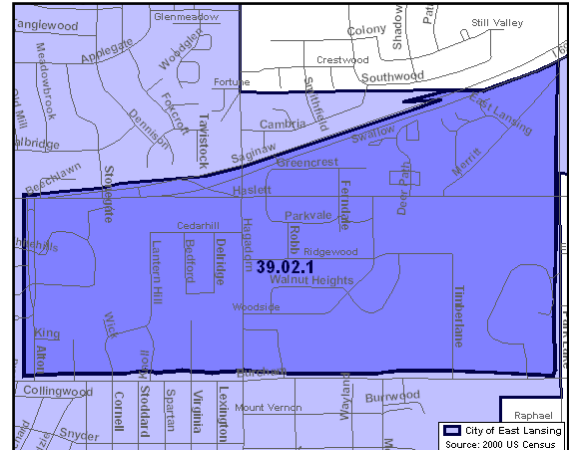


Census Tract 39.02, Block Group 1 (Map 17):

This block group, located farthest from primary East Lansing destination spots along the corridor, incurs the highest percentage rate of motor-vehicle transportation rates (nearly 83%) and the lowest rate of walking (nearly 3%).

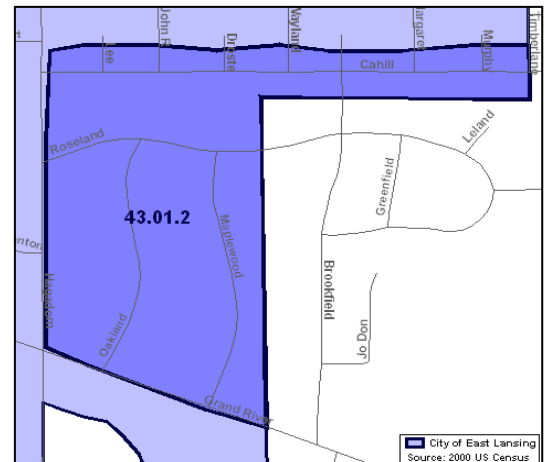
Bordered on the south by Burcham Road,

residents have access to the currently existing bike path network already in place for the City of East Lansing. This may account for the higher rate of bicycling in this group (3.17%), which is slightly higher than the 3% average for East Lansing as a whole. The use of public transportation for this block group is well below average, at 0.55%.



Census Tract 43.01, Block Group 2 (Map 18):

This block group, located due east of Hagadorn Road, incurs the second highest percentage (just above 80%) for driving alone as a means to work. This area, located east of the corner of Hagadorn and Grand River intersection, is closer to campus than the aforementioned 39.02

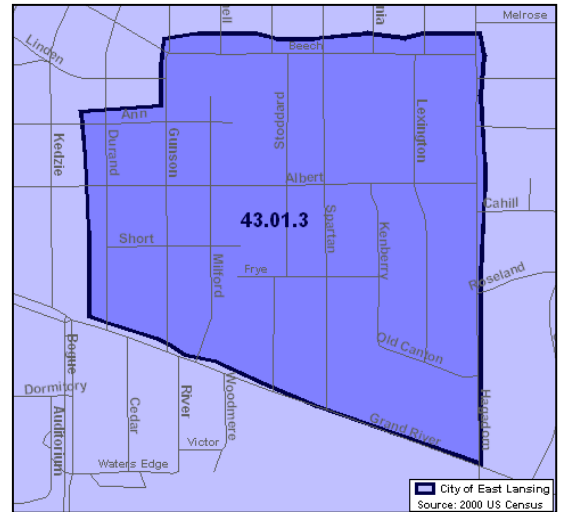


(block group 1). Since it is kitty-corner from campus across the same intersection, the rates of biking and walking are higher than that of 39.02, but not by much. Above average (for the city as a whole) rates for biking are at 3.66%, but well below average for walking (21.5% for the City; 5.49% for the block group). Since Hagadorn is the direct connecting factor that lies between this study area and primary interest areas in East Lansing, an association, while not completely proven, should be examined further.

Census Tract 43.01, Block Group 3 (Map 19):

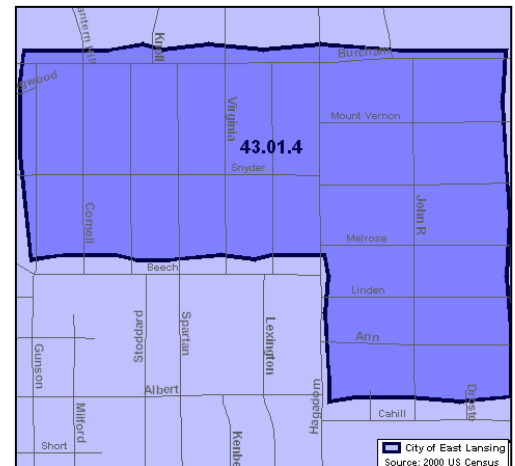
On the opposite side of Hagadorn, due west, of the above mentioned block group, numbers for walking go up to 12.55%. This is the highest recorded for the block groups associated with the study area. This area is in closer proximity to the primary destination areas of East Lansing than all others in this study. Further, it incurs the lowest rate

of use for automobiles (65.59%) and the highest rates for carpooling and busing (12.84% and 5.78% respectively). This block group, however, scored the lowest (0%) rate for use of bicycling as a means of transportation to and from work.



Census Tract 43.01, Block Group 4 (Map 20):

This block group lies approximately in the middle of our study area. It incurs the second lowest driving rate (76.58%) for the area, and the highest rate for bicycling (4.1%). The direct access, along the northern edge of the block group, to Burcham Road may account for the highest use for bicycling in the corridor. Further, it has the second highest rate for walking (6.91%) and for public transportation (3.2%).



5.5 Regional Comparisons

The City of East Lansing, based on the 2000 census data, has one of the highest percentage ratings for people bicycling, walking and using public transportation. It also has one of the lowest percentage ratings for driving as a means to go to and from work (see Table 12). Ample biking networks, walking corridors and the largest student population, as well as a more dense development as it relates to proximity to primary destinations (Central Business District and MSU) are all contributing factors to the City of East Lansing having a lower percentage rate of driving as the primary mode of transportation to and from work.

Table 12: Modes of Transportation Comparables¹⁸

Modes of Transportation Comparables	Car, truck or van: Drove alone	Car, truck or van: Carpooled	Public transportation	Bicycle	Walked	Worked at home	Totals and Averages
Ingham County	109,670	13,653	2,902	1,077	7,241	4,163	138,706
Averages	79.1%	9.8%	2.1%	0.8%	5.2%	3.0%	100.0%
City of East Lansing	14,210	1,890	961	708	5,030	608	23,407
Averages	60.7%	8.1%	4.1%	3.0%	21.5%	2.6%	100.0%
Meridian charter township	18,320	1,290	204	98	263	731	20,906
Averages	87.6%	6.2%	1.0%	0.5%	1.3%	3.5%	100.0%
Lansing/East Lansing MSA	180,309	22,476	3,332	1,192	8,889	7,230	223,428
Averages	80.7%	10.1%	1.5%	0.5%	4.0%	3.2%	100%

Source: 2000 U.S. Census

¹⁸ U.S. Census Bureau. 2000 Census.

Table 13: Block Group Modes of Transportation Comparables¹

Block Group Modes of Transportation	Car, truck or van: Drove alone	Car, truck or van: Carpooled	Public transportation	Bicycle	Walked	Worked at home	Totals and Averages
<i>Block Group 1, Census Tract 39.02</i>	759	53	5	29	27	42	915
Averages	82.95%	5.79%	0.55%	3.17%	2.95%	4.59%	100.00%
<i>Block Group 2, Census Tract 43.01</i>	437	37	3	20	30	19	546
Averages	80.04%	6.78%	0.55%	3.66%	5.49%	3.48%	100.00%
<i>Block Group 3, Census Tract 43.01</i>	669	131	59	0	128	33	1020
Averages	65.59%	12.84%	5.78%	0.00%	12.55%	3.24%	100.00%
<i>Block Group 4, Census Tract 43.01</i>	765	92	32	41	69	0	999
Averages	76.58%	9.21%	3.20%	4.10%	6.91%	0.00%	100.00%
<i>Block Group Totals</i>	2630	313	99	90	254	94	3480
Block Group Avgs	76%	9%	3%	3%	7%	3%	100%

Source: 2000 U.S. Census

Then again, the block groups associated with our study area have a much lower rate of utilizing alternative modes of transportation than the city as a whole (see Table 12 and 13). Based on block group by block group comparisons, the overbearing presence of Hagadorn and its current design may be a contributing factor to the lower use of alternate modes of transportation.

5.6 Reasons for Considering a Four to Three Lane Road Conversion

A four to three lane road conversion is a common alternative considered in transportation planning. While the most pressing issues for specific localities differ, many communities considering a lane conversion experience some or all of the following conditions:

- Average and/or 85th percentile speeds not suitable for the current corridor land uses (i.e. traditional neighborhoods or commercial districts with short setbacks).
- Safety concerns and/or noise problems occur from speed variability.
- Where improving the pedestrian environment is a priority, such as near pedestrian activity areas like parks or schools.
- The road is an existing or planned bicycle corridor.
- High accident rates due to turning movements, excessive weaving, or stop and go traffic.¹⁹

5.6.1 What is the Primary Need in the Corridor?

This is an important question to answer when you have a four-lane undivided road where you cannot add lanes or a median. Is the primary need of the corridor to move high volumes of traffic as fast as possible through the neighborhood or is it to improve safety for motorists and pedestrians while still providing an acceptable amount of service to the corridor's traffic? According to the City of East Lansing, the primary concern is to improve safety for pedestrians and motorists while maintaining the current carrying capacity of the road.

5.6.2 The Feasibility of Three Lanes

The feasibility of a conversion from a four lane undivided road to a three-lane roadway, with respect to bi-directional peak-hour traffic only, from an operational point of view is as follows:

- < or = 1,500 vehicles per hour (vph): Feasibility probable
- 1,500 to 1,750 vph:.....Exercise caution
- > or 1,750 vph: Feasibility less likely

However, these volumes are used as general guidelines. Three lanes have been used on roads with an average annual daily traffic (AADT) count of up to 24,000.²⁰

¹⁹ Southside Traffic Reduction Initiative for Determining our Environment. Three Lane Alternatives. Available Online. URL: <<http://www.stride-mn.org/LakeStreet/three-lane-alternatives.htm>>. Accessed March 10, 2005.

²⁰ Southside Traffic Reduction Initiative for Determining our Environment. Three Lane Alternatives. Available Online. URL: <<http://www.stride-mn.org/LakeStreet/three-lane-alternatives.htm>>. Accessed March 10, 2005.

5.6.3 Disadvantages of a Three Lane Road

According to the Southside Traffic Reduction Initiative for *Determining our Environment*, the following are disadvantages of four to three lane conversions (description of each is provided below):

- Increased Travel Delays
- Slow Moving Frequent-Stop Traffic
- Increased Delay at Driveways
- Loss of Passing Opportunities

Increased Travel Delays:

Increased travel delay is the primary concern when converting a four-lane road to a three-lane road. Many people assume that because half of the lanes are gone, traffic delays will double. However, most people travel in the curb lanes on a four lane road to avoid cars making left turns, especially in peak hour travel times. So, the inside lanes serve mainly as left turn lanes. This generally results in one travel lane each direction with a center turn lane. As such, the capacity of the road before and after a lane conversion remains about the same. Furthermore, the actual capacity flow of the corridor is controlled by signalized intersections.

Slow Moving Frequent-Stop Traffic:

Buses are an example of a slow moving frequent-stop vehicle. These sorts of vehicles will have a great impact on the operation of a three-lane road because of the inability of traffic to pass. However, providing pullouts for a bus to go when picking up passengers will allow traffic to flow freely, however, the feasibility of utilizing the bus pullouts on the Hagadorn Corridor needs to be further studied by the City of East Lansing due to cost and construction.

Increased Delay at Driveways:

A three-lane road will have fewer gaps in traffic than a four-lane road, so drivers backing out of driveways will perhaps experience delay while waiting for the traffic to clear. However, backing onto a four-lane road poses more dangers as motorists have two lanes of traffic to contend with instead of one. After observing the corridor, there are very few driveways that have a turnaround to use, therefore backing onto the road is an area of concern in the 4-lane design.

Loss of Passing Opportunities:

Motorists are often concerned with losing the ability to pass a slow moving vehicle. This disadvantage does provide a benefit to pedestrians and other motorists trying to cross or enter or back out onto the roadway.

5.6.4 Benefits of a Three Lane Road

According to the Southside Traffic Reduction Initiative for *Determining our Environment*, the following are advantages of four to three lane conversions (description of each is provided below):

- Improved vehicular safety
- Improved Pedestrian and Bicyclist Safety
- Traffic Calming
- Change in Roadway Character
- Improved Emergency Response Time
- Relatively Inexpensive²¹

Improved vehicular safety:

Roads after a three-lane conversion can show a significant reduction in the amount of accidents than the road's four lane counterparts especially rear-end and bicycle involved collisions. Case studies show a reduction in the total number of crashes from 17%-62%.

²¹ Southside Traffic Reduction Initiative for Determining our Environment. Three Lane Alternatives. Available Online. URL: <<http://www.stride-mn.org/LakeStreet/three-lane-alternatives.htm>>. Accessed March 10, 2005.

Improved Pedestrian and Bicyclist Safety:

The addition of bike lanes increases safety and ease of travel for bicyclists. The center lane provides a safe haven for pedestrians and bicyclists that are trying to cross the road and allow them to concentrate on only one direction of traffic at a time. Since the distance from the sidewalk to traffic is increased, the sense of safety is increased as well.

Traffic Calming:

Past conversions show a drop in average vehicle speed. This is beneficial to vehicle and pedestrian safety alike. Case studies show a reduction of the average 85th percentile speeds by typically less than five mph. However there is a dramatic reduction in excessive speeding, which was reduced by 60-70% in drivers going five mph or more over the speed limit.

Change in Roadway Character:

Fewer travel lanes improve aesthetic appeal and sense of community. There is also a greater sense of safety felt by pedestrians.²²

Improved Emergency Response Time:

Emergency vehicles can have trouble traveling down a four-lane road as they wait for people to pull off to the side, especially when there is no shoulder. The two-way center turn lanes provide a place for emergency vehicles to travel as people slow down and stop in the travel lanes.

Relatively Inexpensive:

The cost of converting a four-lane road to a three-lane road with a center turn lane is relatively inexpensive. The cost comes from re-stripping the road and reconfiguring traffic

²² City of East Lansing., Engineering Department. Presentation on Four to Three Lane Conversions. March 2005.

lights, which is relatively inexpensive. For this reason, it is common for cities to re-stripe a road for a test run of the conversion.

5.7 Case Studies

The following case studies illustrate the successful completion of four to three lane conversions along with a Hagadorn Road scenario.

5.7.1 Abbott Road

The Abbott Road lane conversion was implemented to “slow traffic speeds, improve safety and enhance biking facilities”²³ and was completed with the re-striping of the corridor in July of 1999. The new configuration includes one travel lane for both north and southbound traffic and a two-way center left turn lane with the addition of separate bike lanes along each curb. As some congestion was anticipated, a left turn green arrow light was added at the intersection of Abbott and Burcham.

For a ten-month period before and after the conversion, volume, speed, and crash data were collected along the corridor. These are measurements to help show that the conversion of four lanes to three was beneficial and met the conversion goals outlined by the engineering department.²⁴

Traffic Volumes:

As the Table 14 shows, average traffic for Abbott Road before the lane conversion was between 14,000-15,000 cars per twenty-four hour period. After the lane conversion, the traffic flow jumped to between 15,000 and almost 17,000 cars per day. The rise in traffic volume could represent the following scenarios: 1.) Drivers are using the road more due to increased safety and appeal and/or 2.) An increase of college students living north of the

²³ City of East Lansing., Engineering Department. Presentation on Four to Three Lane Conversions. March 2005.

²⁴ City of East Lansing., Engineering Department. The East Lansing Engineering Department Report. June 12, 2000.

corridor in Bath Township has increased the number of trips on the corridor as it is a direct route to Michigan State University.

Either way, the numbers show that the reduction of lanes does not reduce the capacity of the road. Table 15 shows volumes of traffic traveling through the intersection of Abbott Road and Burcham Drive before and after lane conversion. The numbers have changed for the three time periods, 7am-8am, noon-1pm, 5pm-5:45pm, by negative seven percent, twenty-percent, and ten-percent respectively (see Tables 14 and 15). These numbers are not overly compatible as they were collected in different months of their respective year, January and October, and people have different traveling patterns during different times of the year.

Tables 14 & 15: Abbott Road Traffic Volumes & Abbott-Burcham Intersection Traffic Volumes

Abbott Road Traffic Volumes (24 hour volumes)			
	South of Whitehills Dr.	South of Burcham Dr.	South of Burcham Dr.
Before Change to 3-Lanes	15,067 (Avg. during week of Oct 13, 1997)	14,082 (Avg. during week of Oct. 6, 1997)	6,885 NB only (Avg. during week of Sept. 21,1998)
After Change to 3-Lanes	16,878 (Avg. during week of Sept 13, 1999)	15,215 (Avg. during week of Sept.13, 1999)	7,207 NB only (Avg. during week of Sept.13, 1999)
Abbott-Burcham Intersection Traffic Volumes (vehicles traveling through intersection)			
	AM 7am to 8 am (1/28/98)	Noon noon to 1:00 pm (1/28/98)	PM 5:00 pm to 5:45 pm (1/28/98)
Before Change to 3 - Lanes	1,038 (1/28/98)	1,127 (1/28/98)	1,171 (1/28/98)
After Change to 3 - Lanes	969 (10/20/99)	1,369 (10/20/99)	1,301 (10/20/99)

Source: City of East Lansing Engineering Department June 12, 2000 report.

Another goal of the City of East Lansing was to reduce speeds traveled on the Abbott Road corridor.²⁵ Table 16 shows these results. Speeds were collected between Linden and Elizabeth and between Northlawn and Centerlawn. The 85th percentile speeds recorded show minimal change. The biggest change in speed came from the northbound direction between Linden and Elizabeth where the average speed decreased from twenty-eight mph to twenty-six mph and the 85th percentile speed decreased from thirty-two mph to twenty-eight mph.

Between Northlawn and Centerlawn the change in the 85th percentile and the average was one to two mph. The ten mph pace, which is the range of speeds that contain the most number of vehicles, for the southbound traffic remained the same before and after the conversion. Northbound traffic at the ten mph pace was lowered by five mph at both locations. At the Linden to Elizabeth location the pace range fell from twenty-six to thirty-five mph to twenty-one to thirty mph. Between Northlawn and Centerlawn the pace dropped from a range of thirty-one to forty mph to twenty-six to thirty-five mph.

²⁵ City of East Lansing., Engineering Department. The East Lansing Engineering Department Report. June 12, 2000.

Table 16: Abbott Road Speed Measurements

ABBOTT ROAD SPEED MEASUREMENTS				
	South of Elizabeth		South of Elizabeth	
	Northbound - before change to 3 lanes	Northbound - after change to 3 lanes	Southbound - before change to 3 lanes	Southbound- after change to 3 lanes
Average Speeds	28 mph	26 mph	30 mph	29 mph
85 th Percentile Speeds	32 mph	28 mph	36 mph	36 mph
10 mph Pace*	26 to 35 mph	21 to 30 mph	26 to 35 mph	26 to 35 mph
	South of Northlawn		South of Northlawn	
	Northbound - before change to 3 lanes	Northbound - after change to 3 lanes	Southbound before change to 3 lanes	Southbound after change to 3 lanes
Average Speeds	33 mph	33 mph	31 mph	32 mph
85 th Percentile Speeds	37 mph	37 mph	36 mph	36 mph
10 mph Pace	31 to 40 mph	26 to 35 mph	26 to 35 mph	26 to 35 mph

Source: City of East Lansing Engineering Department June 12, 2000 report

Another goal of the City of East Lansing was to increase safety for drivers, bikers, and pedestrians²⁶. Traffic accident type and frequency data was also collected on Abbott between Grand River and Saginaw. The overall number of accidents was reduced from fifty-four before the conversion to thirty after the conversion, a drop of almost forty-four percent during the period from July 1998 through May 2000. Table 17 shows the breakdown of types of accidents before and after the lane conversion. Accidents that involved bikers were completely eliminated four to zero and rear end collisions dropped by fifty-two percent,

²⁶ City of East Lansing., Engineering Department. The East Lansing Engineering Department Report. June 12, 2000.

twenty-one accidents to ten. Another big drop was in sideswipe accidents that went down from seven to one, a change of eighty-five percent. Left turn accidents did not decrease.

Table 17: Abbott Road Traffic Crash Data (Grand River to Saginaw)

Abbott Road Traffic Crash Data (Grand River to Saginaw) (Approximately 10 months of Before and After Data)							
	Angle	Rear End	Sideswipe	Left Turn	Bike	Other	Total
July 18,1998 to May 31, 1999	10	21	7	8	4	4	54
July 18, 1999 to May 31, 2000	7	10	1	8	0	4	30

Source: City of East Lansing Engineering Department June 12, 2000 report

The crash type and frequency for the area between Linden and Whitehills shows a decrease of nearly fifty-nine percent, from thirty-four to fourteen. Rear end accidents dropped over fifty-six percent; a little more than the whole corridor’s drop of fifty-two percent. Sideswipes were completely eliminated and left turn accident frequency stayed the same. Bicycle involved accidents dropped from two to zero.

Table 18: Abbott Road Traffic Crash Data (Linden to Whitehills)

Abbott Road Traffic Crash Data (Linden to Whitehills) (Approximately 10 months of Before and After Data)							
	Angle	Rear End	Sideswipe	Left Turn	Bike	Other	Total
July 18, 1998 to May 31, 1999	5	16	5	2	2	4	34
July 18, 1999 to May 31, 2000	4	7	0	2	0	1	14

Source: City of East Lansing Engineering Department June 12, 2000 report

These numbers show that the lane conversion seems to have accomplished its purpose of improving safety. Most accident types went down or stayed the same and no type had an increase in number of accidents. Bicycle involved accidents were eliminated completely for this time period.

Some negative impacts that have occurred since the conversion is an increase in the delay of side street traffic, longer queues at the Abbott-Burcham signal, and merging problems for southbound traffic just south of Saginaw Street, according to information provided by the City of East Lansing Engineering Department.

The data collected for the ten-month period before and after the lane conversion show that safety has increased as speeds traveled have gone down and accident frequency has dropped dramatically while the traffic volume has increased. The lane conversion seems to have successfully met the goals of slowing traffic speeds and improving safety.

5.7.2 St. Paul, Minnesota - Will a Four to Three Lane Conversion Work for the Downtown Street of Lake Street?

When researching four to three lane conversion case studies, it was determined that St. Paul Minnesota would be utilized since Lake Street located in downtown St. Paul Minnesota has similar traffic volumes as Hagadorn Road. Given the feasibility parameters for a four to

three-lane conversion (< or = 1,500 vph...Feasibility probable; 1,500 to 1,750 vph...Exercise caution; > or 1,750 vph...Feasibility less likely) and the AADT being about 20,000, Lake Street is at the high end of the scale for the lane conversion, but not to an unreasonable extent. Peak hour traffic is, however, the most important factor in determining a four to three lane conversion. Peak hour traffic is estimated to be between eight and twelve percent of the AADT. This estimate makes peak hour traffic for Lake Street between 1,600 vph and 2,400 vph, respectively. However, observations show the corridor to be busy all day, making the peak hour traffic volume a smaller percentage of the overall traffic.

Future Traffic:

Hennepin County produced traffic forecasts for the year 2000, the Table 19 illustrates differences between actual and forecasted counts between 1995 and 2000. As you will see, the counts stayed just about the same for 2000 and actually decreased slightly in 1995.

Table 19: Lake Street 2000 Forecasts from 1995

Lake Street 2000 Forecasts from 1995					
	1995 AADT	2000 Forecast	Forecast Difference	2000 AADT	Actual Difference
I-35 near Chicago	21,600	26,000	20%	21,400	-1%
Chicago near Cedar	23,500	29,000	23%	20,700	-12%
Cedar to Hiawatha	20,700	24,000	16%	19,900	-4%

Source: Minnesota Department of Transportation Four to Three Lane Conversions

Forecasts were also made for 2010 and 2020. Though the accuracy of these cannot be verified since employment and population growth for this area are not known, they are

important to show since these are the types of numbers used to justify road expansion/improvement projects.

Table 20: Lake Street 2010 and 2020 Forecasts

Lake Street 2010 and 2020 Forecasts					
	2000 AADT	2010 Forecast	Percent Change	2020 AADT	Percent Change
I-35 near Chicago	21,600	32,000	50%	30,000	40%
Chicago near Cedar	23,500	28,500	38%	29,000	40%
Cedar to Hiawatha	20,700	28,500	43%	29,500	48%

Source: Minnesota Department of Transportation Four to Three Lane Conversions

Table 21: Observation/Conclusions of Lake Street

Left Turns	A substantial part of problem due to few gaps in traffic resulting in more stop and go traffic. "In fact, it seems that Lake Street's inside-lane is used mostly as a turning-lane with through traffic staying in the right lane
Speeds	High speeds with high variability
Corridor Extent	High transit use, on-street parking, businesses with short set backs and traditional neighborhood design. Speeds greater than 30mph are not appropriate
Bicycle Environment	Poor bicycle environment
Safety	Excessive weaving between lanes, high amount of stop and go traffic
Cut-Through Traffic	Due to current conditions, traffic may be diverting to alternate routes
Traffic Volumes	Not an unreasonable candidate for a three-lane configuration
Three-Lane Test	Re-striping the current roadway prior to any construction

Source: Minnesota Department of Transportation Four to Three Lane Conversions

Four to Three Lane Conversion Benefits:

Hennepin County residents will benefit greatly from the reconfigured Lake Street from a four-lane undivided highway to a three-lane roadway, which is scheduled for construction beginning in 2005 and lasting until 2007. A three-lane test would be appropriate to ensure that the positive effects of the reconfiguration would occur.²⁷

²⁷ Southside Traffic Reduction Initiative for Determining our Environment. Three Lane Alternatives. Available Online. URL: <<http://www.stride-mn.org/LakeStreet/three-lane-alternatives.htm>>. Accessed March 10, 2005.

5.7.3 Will a Four to Three Lane Conversion Work for Hagadorn Road?:

The following are a set of questions written by the Minnesota Department of Transportation and should be asked of the study area before attempting a four to three lane conversion, as the answers will determine the appropriateness:

- Are existing average and/or 85th percentile speeds appropriate given corridor land uses?
- Does speed variability create safety concerns and/or noise problems?
- Is the road near pedestrian activity areas, such as parks and schools or where improving the pedestrian environment is a priority?
- Is the road an existing or planned bicycle corridor?
- Do high crash rates exist due to turning movements, excessive weaving, and/or stop and go traffic?²⁸

The existing speeds of the 85th percentile are not appropriate for the corridor, they may be too fast given this is a residential area with schools and daycare centers. Speed variability is an issue as it is unsafe for pedestrians to cross the road. While walking the corridor you feel unsafe while on the sidewalk. There are many pedestrian activity areas on the corridor: schools/university, parks, and churches. Traffic accidents are not excessive on the corridor due to excessive weaving or stop and go traffic. However, there are accidents and there is a need to increase pedestrian safety.

Given the feasibility parameters used for Lake Street for a four to three-lane conversion (< or = 1,500 vph...Feasibility probable; 1,500 to 1,750 vph...Exercise caution; > or 1,750 vph...Feasibility less likely) and Hagadorn's current AADT being about 19,000, Hagadorn is at the higher end of the scale for the lane conversion. However, like Lake Street, not to an unreasonable extent. Peak hour traffic is, however, the most important factor in determining a four to three lane conversion. With peak hour traffic estimated to be between eight and twelve percent of the AADT, the Hagadorn corridor's estimated peak hour traffic counts are between 1,500 vph and 2,300 vph, respectively. These numbers are consistent

²⁸ Minnesota Department of Transportation

with the trend forecasting calculated by the Tri-County Regional Planning Commission (TCRPC). Given the similarity of the attributes between Hagadorn and the case studies, a four-lane to three-lane conversion is possible and feasible.

Future Traffic:

TCRPC produced traffic forecasts for the year 2025 based on the approved Wise Growth model. Due to the planned infill in urban centers traffic along the corridor it is estimated to produce a PM peak hour traffic volume of 4600-5400 vehicles. When totaled with the AM and Off-Peak Traffic hours, the projected vpd of Hagadorn road came to be between 16,200 and 18,400 (see Map 21.) The results of the Trend Model were lower; resulting in a range of 7,500 to 8,800 vpd (see Map 21.)

Table 22 highlights the carrying capacity for various lane numbers. As you can see, and coupled with both current and projected future counts, the conversion of Hagadorn from four-lanes to three, with the center being a two way left turn lane (TWLTL), the design can easily absorb both current and projected amounts. The logic behind the increased capacity of a two-lane road with a TWLTL is that you add 15% to carrying capacity of a two-lane road by the addition of the center turn lane. While the carrying capacity of a four-lane road is greater than all others described, continuing to operate Hagadorn Road under this capacity does not enable the city to meet its other needs.

Table 22: Design Carrying Capacity²⁹

Number of Lanes	Lane Capacity per hour	VPD Capacity
Four Lane	2,650/hour	63,600
Three Lane	1,550/hour	37,200
2 Lane	1,290/hour	30,690
2 Lane and Center Turn Lane	1,484/hour	35,604

²⁹ Tri County Regional Planning Commission

Map 21: 2025 Future Traffic Counts

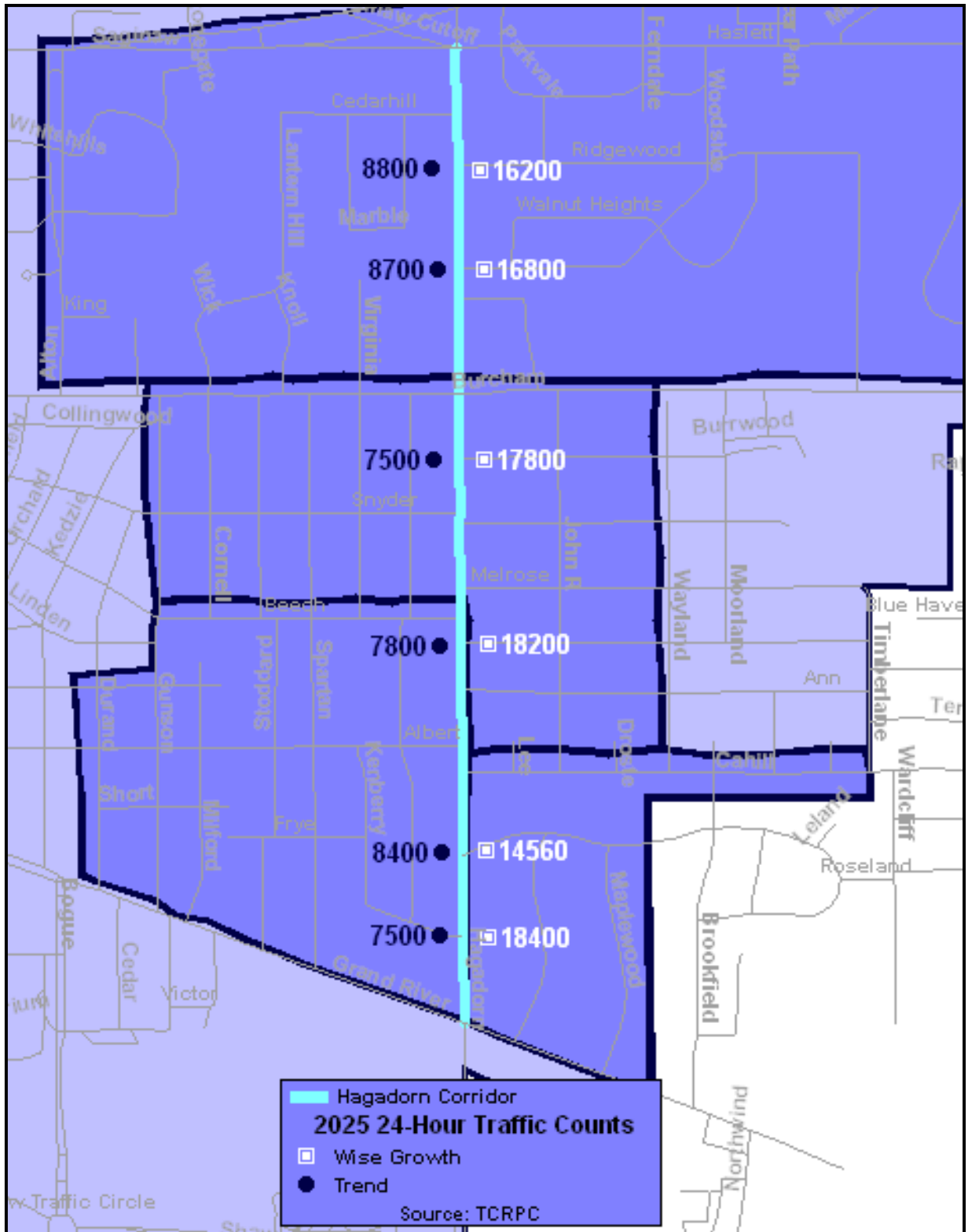


Table 23: Observation/Conclusions of Hagadorn Road

Left Turns	Intermediate problem resulting in some stop and go traffic
Speeds	High speeds with high variability making walking and biking dangerous
Corridor Extent	High transit use, no on street parking, residences with short set backs, traditional neighborhood design. Speeds greater than 30mph are not appropriate but are common.
Bicycle Environment	Poor bicycle environment, no bike lanes
Safety	Intermediate weaving between lanes, high amount of stop and go traffic
Cut-Through Traffic	Due to the schools and proximity to Michigan State University and the proximity to Abbott Road, Hagadorn is likely to be the corridor of choice
Traffic Volumes	Not an unreasonable candidate for a three-lane configuration
Three-Lane Test	Re-striping the current roadway prior to any construction

Based on the aforementioned information and comparables, the three-lane conversion of Hagadorn will be able to both absorb the increased traffic and at the same time reduce the accident rates along the corridor. This again is based on the assumption that the wise-growth model build-out will come to fruition. If not, however, then based on trend modeling of the same area, coupled with the already decreasing rates clearly visible along this route, the results of the three-lane conversion of Hagadorn conclusion still holds true. The final result of the conversion will help facilitate the implementation of the proposals put forth: viable multi-modal transportation options, an increased sense of place along the route, increased safety for motorists, pedestrians and cyclists, and reduced speeds through school zones.

5.8 Recommendations

Road and Traffic Management Recommendations:

- Lane conversion: 4 to 3
 - One northbound, one southbound and a two-way left turn lane (TWLTL). Purpose: To reduce perceived driving speed of drivers;

Provide safer crossings for pedestrians; Allow for addition of bike lanes; Improve neighborhood aesthetics.

- Traffic counts provided by the city of East Lansing suggest a stable level of traffic along this corridor:
 - Majority of traffic counts suggests a much higher vehicle per day usage for southbound traffic.
- Addition of bike lanes:
 - Provide alternative transportation to and from MSU campus and other East Lansing destinations.
 - Doubles as a buffer between pedestrians using the sidewalk and motorists along the route.

5.9 Sidewalks

An important piece of creating a walkable and bikeable community is in creating sidewalks and bike paths that are accessible and usable for everyone within the community regardless of age or ability. As such, it was necessary to conduct numerous walkability audits to determine the accessibility, safety, and conditions of the provided sidewalks. While conducting the evaluations the tools utilized included the *How Walkable is Your Community Checklist* (Appendix B) created by the Pedestrian and Bicycle Information Center as well as attributes and definitions the team felt described a walkable neighborhood. The attributes and definitions can be found in *Table 24*.

Table 24: Attributes of Good Sidewalk Corridors

Attribute	Definition
Accessibility	The Sidewalk Corridor should be easily accessible to all users, whatever their level of ability.
Adequate travel width	In most areas, two people walking together should be able to pass a third person comfortably, and different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should be wider to accommodate the greater volume of walkers.
Safety	Sidewalk Corridors should allow pedestrians to feel a sense of safety and predictability. Sidewalk users should not feel threatened by adjacent traffic.
Continuity	The walking route along a Sidewalk Corridor should be obvious and should not require pedestrians to travel out of there way unnecessarily.
Landscaping	Plantings and street trees in the Sidewalk Corridor should create desirable microclimates and should contribute to the psychological and visual comfort of sidewalk users.
Social Space	Sidewalk Corridors should provide places for people to interact. There should be places for standing, visiting, and sitting. The Sidewalk Corridor should be a place where children can safely participate in public life.
Quality of Place	Sidewalk Corridors should contribute to the character of neighborhoods and business districts, and strengthen their identity.

Matrix was compiled from the *Creating Walkable Communities: A Guide for Local Governments Report*³⁰

Along with the previously described attributes, a series of pedestrian friendly elements were adopted as another scale as to which the Hagadorn Corridor could be measured against. The elements were adapted from the Mid-American Regional Council and are as follows:

- Streets that are interconnected and small block patterns that provide good opportunities for pedestrian access and mobility.
- Narrower streets, scaled down for pedestrians and less conducive to high motor vehicle speeds.
- Traffic-calming treatments to help ensure that motor vehicles are operated at or below compatible speeds.
- Wide and continuous sidewalks that are fully accessible, that maintain a fairly level cant (slope), and that are well maintained.
- Well-designed intersections to ensure easy, safe crossing by pedestrians of all ages and abilities.

³⁰ Mid-American Regional Council. *Creating Walkable Communities: A Guide for Local Governments*. Available Online. <http://www.marc.org/cwctoc.pdf> Accessed February 5, 2005.

- Well-designed and marked crosswalks, both at intersections and where needed, at mid-block locations.
- Appropriate use of signs and signals for both pedestrians and motorists, with equitable treatment for pedestrians.
- Median islands on wider streets to provide a refuge area of crossing pedestrians.
- Street lighting designed to pedestrian scale (e.g. shorter light poles and/or lower light fixtures that are designed to be effective in illuminating the pedestrian travel way).
- Planning buffers, with landscaping and street trees that provide shelter and shade without obstructing sight distances.
- Street furnishings and public art intended to enhance the pedestrian experience, such as benches, trash receptacles, drinking fountains, and newspaper stands, places so as not to interfere with pedestrian travel.³¹

5.9.1 Sidewalk Analysis

Overall, the neighborhoods are designed in a way that would allow pedestrian easy access, if there were adequate crosswalks and traffic calming measures. While the blocks surrounding the corridor are relatively small and were designed in the grid style, the corridor

is lacking pedestrian friendly elements. The

amount of traffic and the high speeds of which the traffic moves on the four-lane road makes pedestrians feel unsafe and as if they do not belong on the sidewalks, in some instances the buffer between the sidewalk and the road is

only the curb. The lack of adequate buffers and

the high volumes of traffic make Hagadorn an undesirable place to walk or bike.

Photo 7: Example of Sidewalk Proximity to Roadway

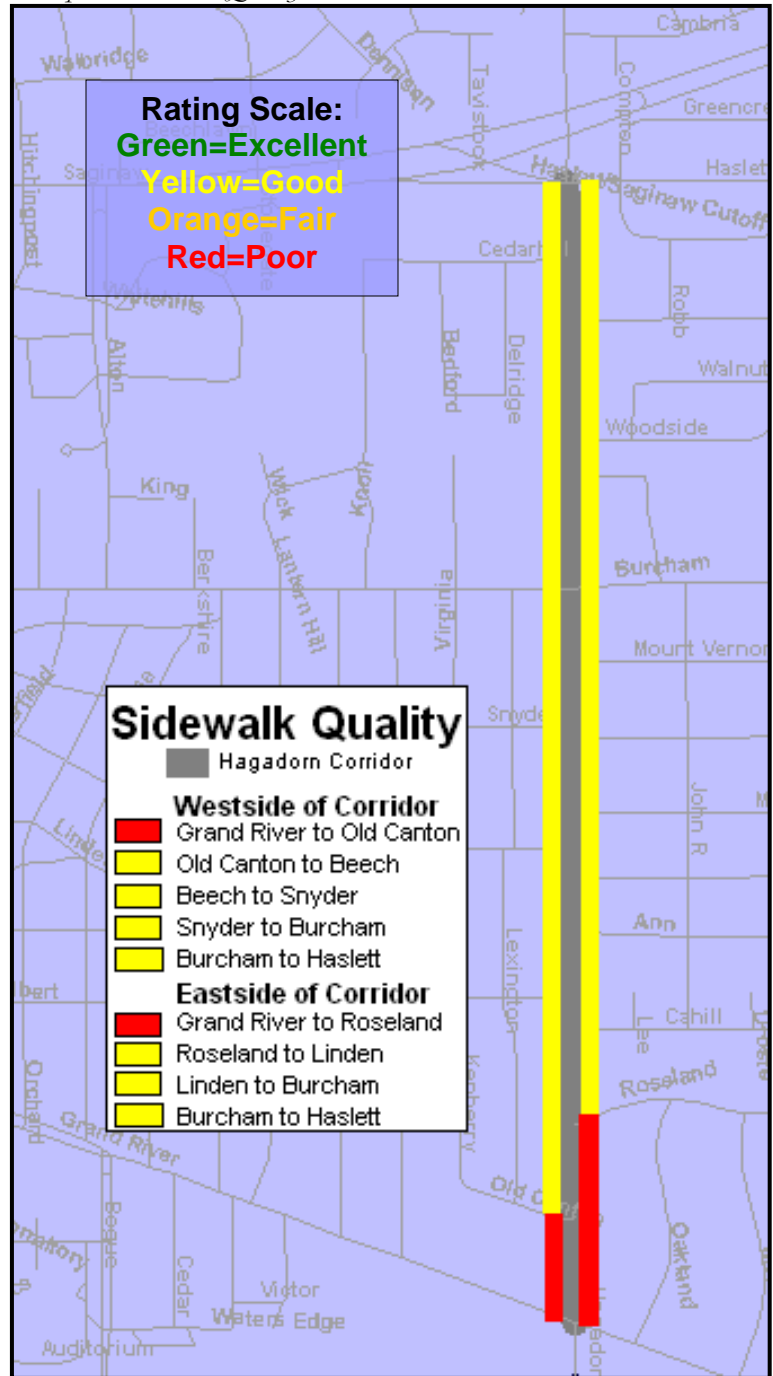


³¹ Mid-American Regional Council. *Creating Walkable Communities: A Guide for Local Governments*. Available Online. <http://www.marc.org/cwctoc.pdf> Accessed February 5, 2005.

Map 22 illustrates the quality of the sidewalks located on the corridor. While the sidewalks were evaluated on a four-point scale ranging from “excellent”, “good”, “fair” and “poor”, the results revealed that there were no areas rated as “excellent” or “fair”. The vast majority of the sidewalks located on the corridor were rated as “good” with only the portions of the sidewalk between Grand River Avenue and Roseland and between Grand River Avenue and Canton rated as “poor”.

Examples of the sidewalk quality are best demonstrated in photos 7 and 8. Photo 7 demonstrates the lack of buffer between the sidewalk and Hagadorn Road. Photo 8 demonstrates the sidewalk quality between Grand River and Roseland, as the photo depicts the sidewalk is uneven, covered in gravel, missing pieces of concrete, and lacks a buffer between the sidewalk and Hagadorn Road.

Map 22: Sidewalk Quality



While the sidewalks are continuous and in most cases are of adequate size (5 - 6 feet), in certain areas they are not well maintained and as such, suffer from overgrown grass, shrubs, and crumbling retaining walls. Virtually all sections of the sidewalks were clear of cracks and debris and were fairly level. However, there were two sections located within the corridor that need immediate attention, as the sidewalks received the lowest evaluation rating of “poor”. The sidewalks located from Grand River to Old Canton and Grand River to Roseland suffered from overgrown grass and shrubs, the pavement was cracked, broken, or had missing sections and only the curb served as the buffer between the quickly moving traffic and the pedestrians.

Crosswalks are limited to major intersections, creating a lack of convenient crossing designations. As a result, pedestrians were often observed crossing Hagadorn at bus stops rather than the closest intersection. Although crosswalks are located at major intersections, most were in desperate need of repainting and were not utilized by the observed pedestrians. Another problem area within the crosswalks, are the lack of adequate time for pedestrians to cross the busy

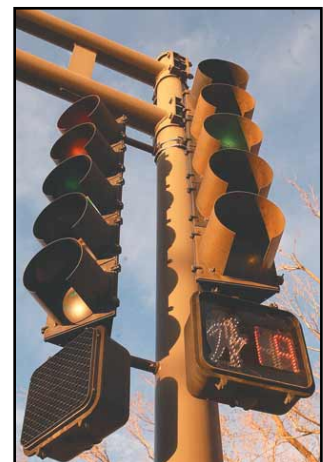
Photo 8: Example of Sidewalk Quality on



Photo 9: Example of Crosswalk on Corridor



*Photo 10:
Example of
Timed
Crosswalk*



intersections. Often, the signals would change before the pedestrians were able to cross safely.

Hagadorn corridor was designed with the automobile in mind all signage and signals utilized are there to create a quicker and more efficient route for drivers, not for pedestrians. Lacking throughout the corridor are pedestrian friendly elements such as benches, public art, adequate lighting, trash facilities, trees, flowers, and buffers. In their place are elements such as electrical wires, fences, large volumes of traffic (including semi-trucks), crumbling retaining walls, and an occasional poorly maintained yard.

5.9.2 Recommendations

The following is a listing of recommendations that would help improve the walkability of the corridor and would also help the corridor conform to Principle 19 of the Tri-County Regional Planning Committee, summary report entitled “Regional Growth: Choices for Our Future”. The principle states, “Pathways, sidewalks, trails and on-street bike facilities should be developed and enhanced to provided alternatives to motorized transportation, improve linkages to recreational opportunities for regional residents and provide public health benefits by offering opportunities for physical activity”.³² It is suggested that the City of East Lansing conduct resident interviews and feasibility studies to determine the placement of additional crosswalks and the location of benches. Preliminary suggestions would include placement of benches near the CATA bus stops as well as places with aesthetically pleasing views. The recommendations are divided into two basic categories; sidewalk improvements and facility improvements.

Sidewalk Improvements:

- Benches
- Pedestrian crossings:

³² Tri-County Regional Planning Commission. “Regional Growth: Choices for Our Future” Summary Report. May 2004.

- Increase number of crossing points along Hagadorn Road to coincide with the current locations of CATA bus stops. Currently only three exist: Grand River, Burcham and Haslett intersections.
- Increase timing of crosswalks to facilitate safe pedestrian crossings.
- Increase the number of crossing points, e.g. marked crossings, along Burcham in and around McDonald and Marble (e.g. intersection of John R. and Burcham Road).
- Ensure ADA compliance (Appendix G) of cross walks and sidewalks

Facilities Improvements:

- Power lines:
 - Seek feasibility of improving neighborhood aesthetics throughout the corridor by burying the power lines or limiting the current number of electrical poles along the route.
- Light fixtures:
 - Addition of pedestrian oriented lighting fixtures to improve safety and visibility; would also provide a unified appearance to the 6 neighborhoods intersected by Hagadorn Road.
- Signage improvements:
 - Increase visibility of numerous neighborhood associations intersected by the corridor.
 - Increase visibility of neighborhood parks located in the corridor.

5.10 School Zones

An essential part of creating a pedestrian friendly community is to provide accessible and safe routes to neighborhood schools. The concept of a Safe Routes to School Program is twofold: first, it is imperative for students to remain safe during their walk or bike to and from school; second, improving the overall health of the student by increasing physical activity is a resulting benefit. The program is designed to decrease traffic and pollution and increase the health of children and the community. The program promotes walking and biking to school through education and

***Safe Routes to School Program
Elements, Components, and Benefits***

Elements:

- Education,
- Engineering,
- Enforcement, and
- Evaluation.

Components:

- Sidewalk construction or improvements,
- Signage,
- Crosswalks,
- Evaluation strategies, and
- Enforcement of speed limits

Benefits:

- Improving safety
- Providing frequent and habitual exercise,
- Reducing traffic congestion, and
- Encouraging healthy, active lifestyles

incentives that show how much fun it can be. The program also addresses the safety concerns of parents by encouraging greater enforcement of traffic laws, educating the public, and exploring ways to create safer streets.³³ The Hagadorn Corridor can create a safe route to school by completing the *Safe Routes to School* program administered by the Michigan Fitness Foundation.

Forty years ago, more than 60 percent of students nationwide walked or rode bikes to school. Since then, that number has decreased to less than ten percent.³⁴ The decrease in the amount of children walking to school has also led to an increase in morning rush-hour traffic congestion. Today, more than one third of all morning rush-hour car trips nationwide are to drop off students at school. These trips are also becoming increasingly dangerous for students both inside and outside the car. Car accidents, either the students being physically hit by a car, or when the student is inside the car, are the leading cause of death for children 4-14 years old nationwide.³⁵ In addition to the pedestrians under 15 years old who died, 21,000 were injured in motor vehicle crashes. These young pedestrians accounted for 26 percent of the total number of pedestrians injured in motor vehicle crashes in 2001³⁶.

The intersection of Hagadorn and Burcham is home to both MacDonald Middle School and Marble Elementary School. Both schools are public schools and have a combined enrollment of 880 students. In 2004 -05, Marble Elementary School grades K – 6 has an enrollment of 302 students while the remaining 578 students attend MacDonald Middle School, grades 7 -8.³⁷ The enrollment numbers combined with the locations of the

³³ Michigan State University. "Safe Routes to School: A Policy Paper". Kim, S. et al. November, 2004.

³⁴ America Bikes. Policy: Provide Safe Routes to School. Available online. URL: <http://www.americabikes.org/resources_policy_saferoutes.asp> Accessed October 18, 2004.

³⁵ Michigan State University. "Safe Routes to School: A Policy Paper". Kim, S. et al. November, 2004.

³⁶ Traffic Safety Facts 2001: Children. National Highway Traffic Safety Administration. Available Online. <<http://www.nhtsa.dot.gov>> Accessed March 13, 2003.

³⁷ National Center for Education Statistics. Available Online. URL: <<http://nces.ed.gov>> Accessed March 15, 2005.

schools create the perception of one of the busiest pedestrian intersections before and after the school day. As such, it was determined a *Safe Routes to School Audit* needed to be conducted in order to provide complete and concise recommendations. The results of the audit for MacDonald Middle School are in *Table 25* and in *Table 26* for Marble Elementary School.

Photo 11: Marble Elementary School



Photo 12: MacDonald Intermediate School



5.10.1 School Zone Audit Results

Table 25: MacDonal Middle School Observation Results, A.M. & P.M.

	Yes	No	Comments
Are sidewalks and pathways clear of obstacles, in good condition and continuous along the routes?	A.M. & P.M.		<ul style="list-style-type: none"> Northern sidewalk on Burcham Road ends on the East side of the school. Hagadorn – Yes
Are there crosswalks and pedestrian signals at busy streets and intersections?	A.M. & P.M.		<ul style="list-style-type: none"> Crosswalks are located at the intersection of Burcham and Hagadorn. A crosswalk is needed from school property to the south side of Burcham/John R. Pedestrian signals at the Burcham & Hagadorn intersection do not provide adequate time to cross.
Are curb ramps present at intersection crosswalks? Are they ADA compliant?	A.M. & P.M.		<ul style="list-style-type: none"> Curb ramps are present and are ADA compliant.
Do drivers yield to pedestrians at driveways and crosswalks?	A.M. & P.M.		<ul style="list-style-type: none"> Yes, observed drivers behaved appropriately by yielding.
Is secure and convenient bicycle parking available at school?		A.M. & P.M.	<ul style="list-style-type: none"> Bicycle parking is not adequate with only two bike racks located at the main entrance of the school.
Is there sufficient operating width for bicycles along the route?		A.M. & P.M.	<ul style="list-style-type: none"> Hagadorn does not have bike lanes. Burcham does have bike lanes located on the road.
Are curb radii too large, thus encouraging fast vehicle cornering?		A.M. & P.M.	<ul style="list-style-type: none"> Observed drivers did take the corners at low speeds.
Do drivers, pedestrians, and bicyclists behave appropriately?	A.M. & P.M.		<ul style="list-style-type: none"> MacDonald has a student drop-off and pick up zone that is well defined and organized. There are two entrances/exits for parents to get in and out of the school. Buses have been provided with their own entrance/exit and pick-up/drop-off zone. Traffic flows well with very little congestion or problems.
Are sufficient sight distances and visibility provided, especially for pedestrians less than five feet tall?	A.M. & P.M.		<ul style="list-style-type: none"> Sufficient sight distances are provided for. The schools and the sidewalks are sited on predominately flat land without view obstructions.
Are there adequate and visible signing and pavement markings?		A.M. & P.M.	<ul style="list-style-type: none"> Signage is inconsistent and unclear (some blink, and colors vary) and in some instances located too far from school grounds. Specifically, there is a school zone sign located on the west side of Hagadorn before Snyder that indicates you are entering a school zone. It is unclear however, where the school is. Crosswalks at the Hagadorn and Burcham intersection need to be repainted.
Is there enough lighting?	A.M. & P.M.		<ul style="list-style-type: none"> Observations were conducted during school hours, therefore, lighting was not an issue. Most extracurricular activities such as sports practice, tutoring, or band lessons are held immediately after school before dark, therefore a nighttime assessment was not completed.

Table 26: Marble Elementary School Observation Results, A.M. & P.M.

	Yes	No	Comments
Are sidewalks and pathways clear of obstacles, in good condition and continuous along the routes?	A.M. & P.M.		<ul style="list-style-type: none"> Hagadorn – Yes
Are there crosswalks and pedestrian signals at busy streets and intersections?	A.M. & P.M.		<ul style="list-style-type: none"> Crosswalks are located at the intersection of Burcham and Hagadorn. A crosswalk is needed from school property to the south side of Burcham/John R. Pedestrian signals at the Burcham & Hagadorn intersection do not provide adequate time to cross. Crossing Guards and The Safety Patrol were stationed at the appropriate intersections.
Are curb ramps present at intersection crosswalks? Are they ADA compliant?	A.M. & P.M.		<ul style="list-style-type: none"> Curb ramps are present and are ADA compliant.
Do drivers yield to pedestrians at driveways and crosswalks?	A.M. & P.M.		<ul style="list-style-type: none"> Yes, observed drivers behaved appropriately by yielding.
Is secure and convenient bicycle parking available at school?	A.M. & P.M.		<ul style="list-style-type: none"> There were no bicycle racks/facilities.
Is there sufficient operating width for bicycles along the route?		A.M. & P.M.	<ul style="list-style-type: none"> Hagadorn does not have bike lanes. Burcham does have bike lanes located on the road.
Are curb radii too large, thus encouraging fast vehicle cornering?		A.M. & P.M.	<ul style="list-style-type: none"> Observed drivers did take the corners at low speeds.
Do drivers, pedestrians, and bicyclists behave appropriately?	A.M. & P.M.		<ul style="list-style-type: none"> There are two student pick up and drop off points. One is located on school grounds and is shared between parents and buses. The other is located in the parking lot located at East Minster. The Eastminster pick up/drop off zones runs smoothly and is not congested. The one located on school grounds is very congested, but is also very organized with someone to direct traffic flow. Drivers and pedestrians behaved appropriately at both.
Are sufficient sight distances and visibility provided, especially for pedestrians less than five feet tall?	A.M. & P.M.		<ul style="list-style-type: none"> Sufficient sight distances are provided for. The schools and the sidewalks are sited on predominately flat land without view obstructions.
Are there adequate and visible signing and pavement markings?		A.M. & P.M.	<ul style="list-style-type: none"> Signage is inconsistent and unclear (some blink, and colors vary) and in some instances located too far from school grounds. Specifically, there is a school zone sign located on the west side of Hagadorn before Snyder that indicates you are entering a school zone. It is unclear however, where the school is. Crosswalks at the Hagadorn and Burcham intersection need to be repainted..
Is there enough lighting?	A.M. & P.M.		<ul style="list-style-type: none"> Observations were conducted during school hours, therefore, lighting was not an issue. Most extracurricular activities such as sports practice, tutoring, or band lessons are held immediately after school before dark, therefore a nighttime assessment was not completed.

5.10.2 School Zone Audit Analysis

After conducting the school zone audit, it was determined that overall the schools have taken steps to provide for the safety of those children that walk and bike to school.

While exact numbers of how many children bike and walk to school could not be established, it was observed that the sidewalks were utilized by a number of children and parents before and after school. This observation establishes the need to continue to build upon the school zone policies already established and enforced.

While overall the school zones appear to maximize the safety of pedestrians, there are a few items that can be done to further enhance the safety of all those that travel through the zone. For instance, it would be helpful if all crosswalks were repainted. Currently, it is difficult to determine where the crosswalks are exactly located. Repainting the stripes this would alleviate confusion for both pedestrians and drivers and provide for a clearly marked and safe place to cross streets.

Another confusing aspect of the school zone is the lack of consistent signage. There are many types of signs, some of which blink, are of different colors and sizes, and still others which posted the school zone speed limit. While each sign has a specific purpose, the lack of

Photos 13 & 14:



Examples of inconsistent school zone signage currently utilized

continuity among color and size makes the signage less effective. If the signs were of all the same color and size drivers and pedestrians would be less confused on how to appropriately behave in the school zone.

A key component of a safe school zone is education. Both parents and children need to be reminded of the dangers of walking or biking to school. On numerous occasions, parents and school children were observed crossing the busy streets outside of the intersections with designated crosswalks. During 2001, eighty-two percent of young pedestrian fatalities [nationally] occurred at non-intersection locations³⁸. Therefore it is imperative that schools provide a yearly reminder of the importance of pedestrian safety and appropriate behavior.

While conducting the school zones audits, it was encouraging to observe most pedestrians and drivers behaving appropriately by obeying the posted speed limits, using the crosswalks/crossing guards, obeying traffic signals, and by walking on the sidewalks. However, continual efforts need to be made to ensure that crosswalk designations remain clear, signage is in compliance and is consistent, that more traffic calming measures are incorporated along the school routes and also for students and parents to be continually reminded of the importance of pedestrian safety. The community's due diligence is recommended; a child's life may depend on it.

5.10.3 Recommendations

Based on the analysis, the following is a listing of recommendations that would help improve the walkability of the school zone.

School Zone:

- Use consistent signage for approaching school zone to alert drivers of reduced speed.

³⁸ Traffic Safety Facts 2001: Children. National Highway Traffic Safety Administration. Available Online. <<http://www.nhtsa.dot.gov>> Accessed March 13, 2003.

- Distance from school/location of signs
 - Types of signs
- Crosswalks
 - Repaint
 - Raise
 - Signal time extended

Section Six: Conclusions

Although the resulting recommendations will aid in the creation of a more pedestrian friendly environment, without the support of the neighborhood residents, the City of East Lansing Planning Staff and financial backing the recommendations cannot be successfully implemented. The following section provides a brief outline of current funding strategies available to implement the team's recommendations, a complete set of recommendations, and the conclusions.

6.1 Financing

While the aforementioned recommendations are necessary to create a walkable and pedestrian friendly community, it is also necessary to briefly outline current funding strategies available to implement the recommendations. According to the National center For Bicycling and Walking in *Increasing Physical Activity Through Community Design: A Guide for Public Health Practitioners*, funds for pedestrian and bicycle projects generally come from the following sources:

- State or local transportation funds, usually as part of a larger road project.
- TEA – 21 funds, administered by state or local agencies.
- Local revenue sources.
- Private donations.
- A combination of above.³⁹

Specifically, federal, state, and local funding strategies include the following programs:

- Transportation Enhancements Program
- State Transportation Enhancement Program
- Congestion Mitigation and Air Quality Improvement Program
- Hazard Elimination
- Surface Transportation Program
- TEA –21 Funding Sources

³⁹ National Center for Bicycling & Walking. *Increasing Physical Activity Through Community Design: A Guide for Public Health Practitioners*. May 2002.

- Property Taxes
- Local Improvements Districts
- Impact Fees
- Exactments

To learn more about how the above programs and strategies function, please refer to Appendix H.

6.2 Complete Set of Recommendations

In examination of the corridor it has been determined that the livability and viability of these neighborhoods depends directly upon proper traffic management of Hagadorn Road, as it has become the dominant presence in the neighborhood. This dominance has prevented the implementation of bike paths and shared walking space for those seeking to establish a viable sense of community. As such, the current conditions of Hagadorn Road may prevent residents immediately on the corridor from enjoying an active, healthy and vibrant community life. It is the goal of Team Hagadorn, and, congruently, the City of East Lansing to enable those along the corridor the opportunity to enjoy a quality of life based on the desires of its citizens, not the limitations of traffic.

Pursuant to guidelines outlined in the original 2005 Urban Planning Partnership Proposal, Team Hagadorn makes the following recommendations to the City of East Lansing.

- **Road and traffic management:**
 - Lane conversion: 4 to 3
 - One northbound, one southbound and a two-way left turn lane (TWLTL). Purpose: To reduce perceived driving speed of drivers; Provide safer crossings for pedestrians; Allow for addition of bike lanes; Improve neighborhood aesthetics.
 - Traffic counts provided by the city of East Lansing suggest a static use of traffic along this corridor:
 - Majority of traffic counts suggests a much higher vehicle per day usage for southbound traffic.

- Addition of bike lanes:
 - Provide alternative modes of transportation to and from MSU campus and other East Lansing destinations.
 - Doubles as a buffer between pedestrians and motorists along the route.
- **Facilities improvements:**
 - Power lines:
 - Seek feasibility of improving neighborhood aesthetics throughout the corridor by burying or limiting the current number of electrical poles along the route.
 - Light fixtures:
 - Reorientation of existing lighting or the addition of lighting fixtures that are pedestrian oriented to improve safety and visibility. Would also provide a unified appearance to the 6 neighborhoods intersected by Hagadorn Road.
 - Signage improvements:
 - Increase visibility of numerous neighborhood associations intersected by the corridor.
 - Increase visibility of neighborhood parks located in the corridor.
 - School Zone:
 - Use consistent signage for approaching school zone to alert drivers of reduced speed.
 - Distance from school/location of signs
 - Types of signs
- **Sidewalk improvements:**
 - Benches
 - Pedestrian crossings:
 - Increase number of crossing points along Hagadorn Road. Currently only three exist:: Grand River, Burcham and Haslett intersections.
 - Increase timing of crosswalks to facilitate safe pedestrian crossings.
 - Increase the number of crossing points, e.g. marked crossings, along Burcham in and around McDonald and Marble (e.g. intersection of John R. and Burcham Road).
 - Ensure ADA compliance of cross walks and sidewalks
- **Land-use:**
 - Maintain mixed-income and mixed-density characteristics of the corridor:
 - Ensure affordable housing for students and low-income residents.
 - Increase value of home-owner housing through aesthetic, traffic and sidewalk improvements.
 - Seek feasibility of the addition of landscaping elements to Brookfield Plaza
 - Maintain consistent design:
 - Median age of housing development for all census tracts near and around corridor are as follows: 39.02, Block Group 1 1972, Group 2

1945, Group 3 1961; 43.01, Block Group 1 1961, Group 2 1964, Group 3 1962, Group 4 1961. The corridor and neighborhoods in the near vicinity have reached full development. Future changes should have minimal impact on current housing stock.

- Future development, if any, should take into consideration the existence of the Marble and McDonald Schools located along this route. Additional development should not be heavily auto dependent and therefore increase the traffic usage of the road.

- **Future Follow-up**

- Monitor growth rates of block groups 39.02.1, 43.01.2, 43.01.3, and 43.01.4
- Monitor traffic volumes on the Hagadorn Road Corridor by taking counts every one to two years
- Monitor number of traffic accidents to check performance of three-lane conversion
- Periodically examine the timing configuration of traffic signals to reduce congestion
- Seek feasibility of adding bus pull-outs to help reduce stop and go traffic and traffic back-ups
- Coordinate with the Tri-County Regional Planning Commission to:
 - Run a travel demand model of a three-lane conversion on the Hagadorn Corridor to examine effects of a three-lane conversion.
 - Run a Select Link Analysis to determine origin and destinations of people using the corridor to get a better sense of the corridor. Since the majority of traffic, 58%, is using Hagadorn Road for southbound travel, this analysis will help show which road is being used for the northbound traffic that is not returning north on the corridor. Therefore will help fulfill the needs of that corridor that can be met by this further analysis.
 - Run future demand modeling.

6.3 Conclusions

The overlying premise of the Hagadorn Corridor study is concentrated on making the corridor more pedestrian friendly. The presence of two schools, multiple daycare facilities, and the proximity to Michigan State University supports the need to improve safety and promote multi-modal transit along the corridor. In order to respond to this concern, it is recommended that the City of East Lansing convert North Hagadorn Road within the corridor study area from four-lanes to three-lanes with bicycle lanes. This will assist in increasing safety for pedestrians, cyclists, and motorists while reducing speeds through

school zones without causing excessive traffic congestion or altering the current carrying capacity of the road. The addition of bike lanes will provide an alternative mode of transportation while doubling as a buffer between pedestrians using the sidewalk and automobiles in the roadway.

The recommendation for lane conversion became apparent after the team spent countless hours identifying, taking inventory, and assessing current land use, pedestrian friendliness, traffic flow, and roadway design. The corridor was analyzed in terms of its strengths, weaknesses, opportunities, and threats (S.W.O.T), during which the team gained a better understanding of the assets and deficiencies of the surveyed region. Upon completion of the S.W.O.T. it was determined that the corridor has many strengths and opportunities that would allow for a more pedestrian friendly and walkable environment. A socio-economic profile was also completed to gain a better understanding of the residents within the study area and the surrounding neighborhoods. The statistical data was then compared to the statistics for the City of East Lansing.

While taking inventory of the current land use each parcel was identified for its current location, zoning classification and overall property condition. It was found that the Hagadorn Corridor is fully developed with 80% of the current land use being residential. All properties were evaluated by rating the exterior of any structures located on the parcel, the doors and windows, the roof, and the yard. The marks received in each category were then summed to give the property an overall condition rating. None of the properties received an overall ranking of “poor” and 85% were either in “excellent” or “good” condition. From this assessment it is recommended investment and resources available should be focused not on individual parcel redevelopment at this time, but on the improvement of the overall quality of the corridor, primarily focusing on pedestrian safety.

During assessment of traffic and accident data, a comparative analysis was completed, alternative modes of transport were researched, and time was spent evaluating the sidewalks within the corridor, and examining the school zones. It was found that converting the study area from a four-lane to a three-lane road would have the effects of reducing the perceived driving speed, provide safer crossings for pedestrians, allow for the addition of bike lanes and improve neighborhood aesthetics. In essence, the conversion of the four-lane road to a three-lane road will improve the overall quality of the corridor.

With the addition of bike lanes, the corridor will provide an alternative mode of transportation for resident's to travel to and from their destinations. The bike lane will also act as a buffer between pedestrians using the sidewalk and motorists along the route. The conversion recommendation has many beneficial aspects such as providing for the health, safety, and welfare of the residents, as well as creating an aesthetically pleasing environment which will attract new residents and visitors, which will eventually result in greater economic stability for the community.

In summary, based on the aforementioned research, assessment, comparables, and analysis, this report concludes that a four-lane to three-lane conversion with bike lanes needs to take place in order to improve the overall quality of the corridor. The conversion will help to improve safety among motorists, pedestrians, and cyclists, while also reducing traffic speeds through school zones.

