

US-41/M-28 Comprehensive Corridor & Access Management Plan

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listed on the next page**

The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the Michigan State Transportation Commission or the Michigan Department of Transportation or the Federal Highway Administration.

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Chapter One

INTRODUCTION

Background

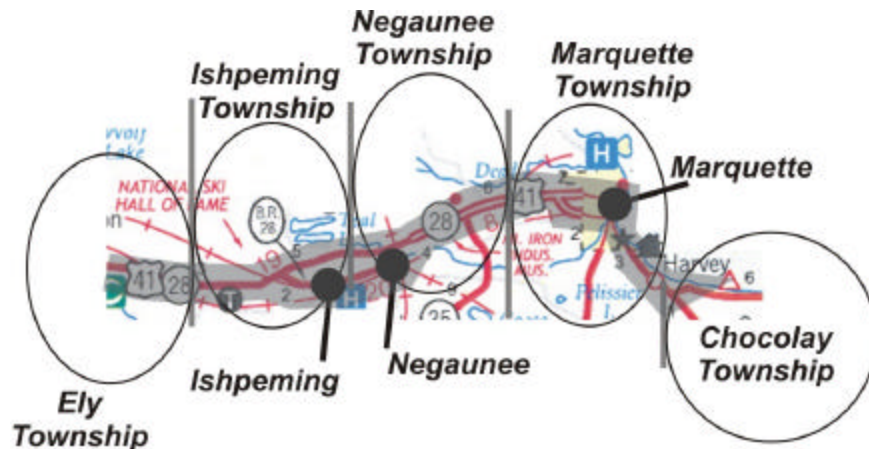
Introduction

This Chapter provides an overview of the US-41/M-28 corridor and its importance to the region, state and nation. It defines basic terms and explains the purpose and benefits of corridor and access management plans. It briefly explains the relationship of this Plan to local master plans and zoning ordinances and the process used to create this Plan.

Importance of Preserving the US-41/M-28 Corridor

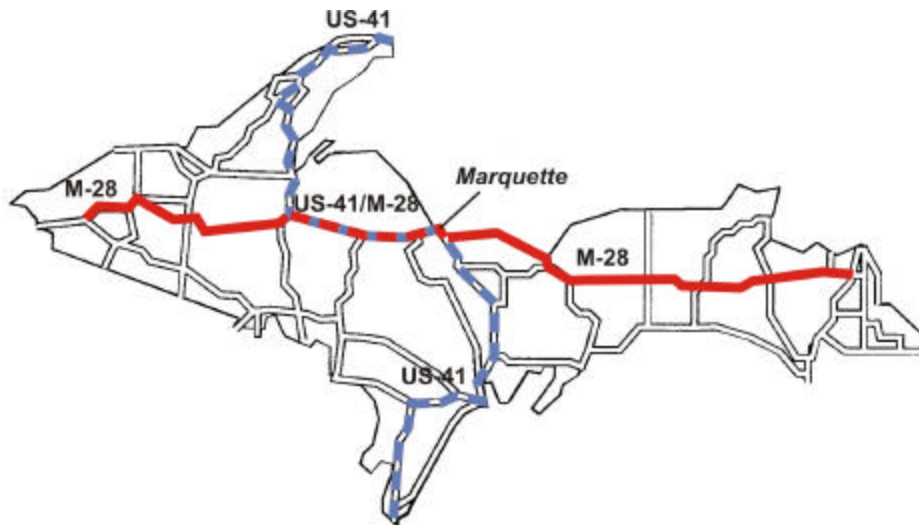
The portion of US-41/M-28 included in this study is the highway lifeline that runs through eight cities and townships in Marquette County (see Figure 1-1). It not only connects the communities, and their residents to jobs, shopping, education, entertainment and major recreation opportunities, it helps to bind and bond them along with other historical features of the area such as mining and forest products activities.

Figure 1-1: Location of Jurisdictions Along US-41/M-28



But the US-41/M-28 corridor is much more than a local lifeline. It serves as a major east/west route across not only the Upper Peninsula, but the northern United States. In addition, it provides a southern route around Lake Superior for Canadian and American trucking firms. See Figure 1-2.

Figure 1-2: US-41 and M-28 Within the Upper Peninsula



Over the latter half of the twentieth century, many sections of the US-41/M-28 corridor were reconstructed as bypasses around existing cities and villages across the Upper Peninsula. These improvements were necessary to address growing congestion problems created when local traffic intermixed with through traffic and to meet growing demands for improved travel times for transport across the Upper Peninsula. Now MDOT estimates that 50% or more of the traffic on US-41/M-28 is through traffic not destined within communities along the corridor.

As in other parts of the state, the improved access to abutting property afforded by relocating US-41/M-28 away from established downtowns to the edge of the community created new opportunities for different land uses along the corridor. First, highway service activities like gasoline stations, hotels and motels began to locate along the highway bypasses. Then homes and other businesses slowly followed. Over time, portions of the bypasses have become congested with many separate driveways and turning movements that slow traffic on the highway. Since the two principal purposes of US-41/M-28 are to provide a highway on which vehicles can safely move at design speeds (as long as weather permits), and to link communities along the route, if measures are not vigilantly taken to preserve these functions, then these highway functions will be lost.

It is natural for local governments and land owners along a state trunkline to view the functions of the highway more narrowly. The opportunity for new economic development and the associated jobs and tax base is often great when highway improvements are made. But if these activities take place in a manner which undermines the integrity of the principal highway functions, then the investment the motorists, trucking firms and other users of the highway have made in the highway can be compromised. If capacity or traffic movement is severely compromised by congestion, or by local traffic “fixes” that undermine the through

traffic function of the highway, then at some point the road may have to move again. Bypasses to bypasses usually have predictable negative economic impacts on communities. These include:

- Businesses along the old route may suffer as traffic moves to the new bypass.
- Jobs and property tax values along the old route may fall.
- Bypasses inevitably move traffic further away from the established community center and all the existing links to the center become challenged as traffic shifts.
- Bypasses are also expensive to plan for, acquire right-of-way for, and build, plus the old route will still need to be maintained.

These considerations are of special significance at the current time with stretched budgets, rising maintenance costs and growing demands for road improvements on the existing corridor.

What is needed is a mechanism to balance national, state, regional, and local interests in a manner which protects the function of the highway as well as the existing and future investments in it, along with allowing reasonable economic development opportunities. This Plan sets forth a series of proposed improvements to US-41/M-28 and a strategy for implementation that seeks to define an achievable balance among what otherwise could be competing state and local objectives. All of these improvements are designed to preserve and enhance the existing location of the highway and no bypasses are proposed.

Definitions & Benefits

Corridor Management

This Plan is both a corridor management plan and an access management plan. A corridor management plan is concerned with improving traffic safety and efficiency with a focus on traffic capacity and flow improvements. Corridor management plans are usually prepared when there is a need for extensive improvements in many locations along a corridor, and especially when some segments are proposed for capacity enhancements. There are often multiple options for certain changes, such as intersection improvements or alternative designs for additional lanes. Corridor plans usually involve multiple jurisdictions, and there is recognition that alternative changes along one part of the corridor may have significant impacts on other parts of the corridor.

Benefits of a Corridor Management Plan

A corridor management plan lays out all proposed improvements along a corridor for a specified period, often ten or more years into the future. This allows the road authority to plan and budget for those improvements in an efficient manner and it allows local governments, businesses and other landowners along the corridor to incorporate planned improvements into local plans and business decisions.

While road improvements usually focus on improving safety and efficiency of traffic flow, these benefits are most directly realized by motorists. There will be fewer traffic crashes than otherwise would have occurred and congestion will occur less often once improvements are implemented. Since driver confusion is the single biggest cause of error, many of the improvements proposed in this Plan are designed to reduce, if not eliminate, driver confusion.

When a corridor management plan is prepared on an inter-jurisdictional basis, as this one was, it also enhances the likelihood of coordinated land use decisions that both protect and enhance the new investments to be made in the corridor. This is especially true with regards to decisions concerning future access to the highway.

Access Management

The Michigan Department of Transportation publication entitled **Reducing Traffic Congestion and Improving Traffic Safety in Michigan Communities: The Access Management Guidebook** defines access management as:

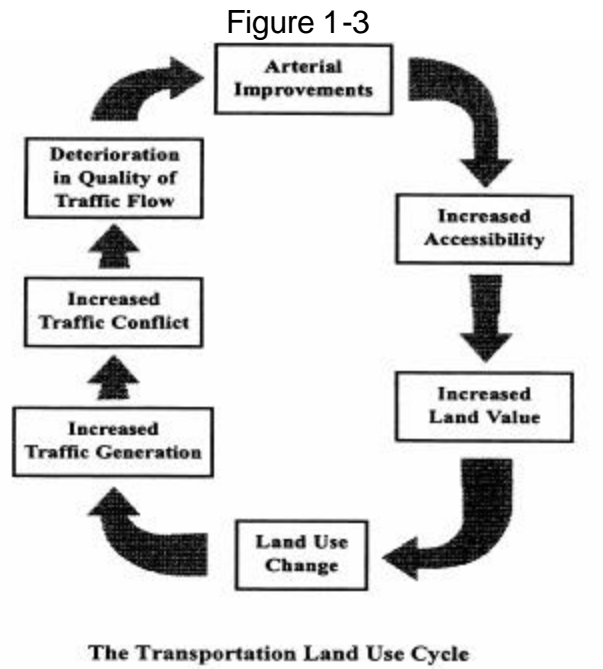
“Access management is a set of proven techniques that can help reduce traffic congestion, preserve the flow of traffic, improve traffic safety, prevent crashes, preserve existing road capacity and preserve investment in roads by managing the location, design and type of access to property.”

New conflict points, such as driveways and intersections, can rapidly increase the crash rate along a corridor. Roadways with inadequate spacing of driveways, poorly designed driveways, or improper sight distances for driveways can be improved through the use of appropriate access management techniques. Traffic safety and traffic flow can both be substantially improved with good access management.

Roadways with congestion due to too many driveways or driveways too close together, can also be improved through various access management techniques. Remedial access management efforts can be accomplished through alternative driveway design and applied during site plan review for a parcel as it goes through the redevelopment review process. However, the best time to institute access management is when there are few land uses frequently accessing the roadway, or when new roadway improvements have been made.

For the western portion of US-41/M-28, west of Marquette Township and outside of the cities of Negaunee and Ishpeming, there is little existing development, so access management is focused on preventive actions. Preventive access management actions are far easier and less expensive to implement than remedial actions. They preserve the function of the corridor and they provide added safety for motorists. If a community is able to put access management plans, review procedures and regulations in place before a corridor develops, then there is a good chance that when development does occur, the roadway

function will be preserved, instead of a typical cycle of improve and expand (see Figure 1-3). In this Figure, increased development deteriorates the road capacity and safety due to numerous driveways and creates a seemingly endless cycle of road modifications linked to the new roadway conflict points. This is very costly for everyone.



Source: National Highway Institute, Course 15255, FHWA, 1998, p. 1-18.

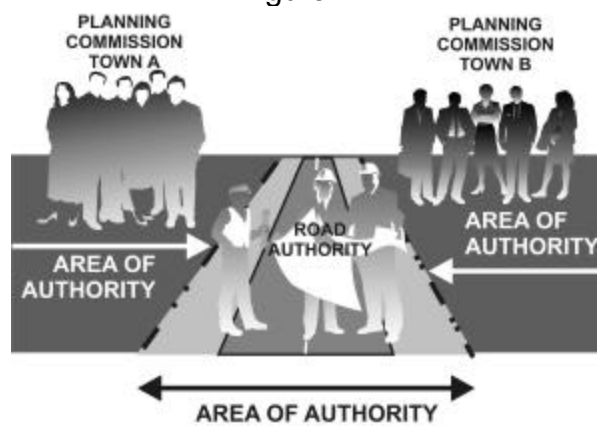
For areas that are already developed, the focus is on remedial access management techniques. Remedial access management focuses on reducing congestion, improving safety and improving aesthetic conditions on arterials that have developed into the familiar strip pattern with numerous separate driveways. Closing or consolidating driveways, sharing driveways, improving on-site circulation, linking adjoining parking lots, and constructing parallel access roads are common access techniques applied in existing developed areas.

Preventative and remedial access management objectives are often achieved through site plan review as property is proposed for development or redevelopment. Expansion of roadway capacity or simply reconstructing an existing road also present good opportunities to redefine access points, improve driveway entry and exit geometry along the corridor and to establish turning lanes where appropriate. Older development may take a long time to retrofit, but if the local zoning ordinance requires access improvements as rehabilitation and redevelopment takes place, over time there will be improvement.

If all jurisdictions along a corridor have the same basic access management regulations that are consistent with MDOT's driveway permit regulations, then the chances of retaining existing highway function go up dramatically. Coordinated

regulations are especially important because local governments have all the land use authority, and control key aspects of access decisions, such as parking lot design, location, connections, parallel access and rear service roads, and other features of access that are outside the right-of-way and hence outside the scope of MDOT to regulate. This is especially significant where a roadway has one community on one side of a road and another on the other side. See Figure 1 -4.

Figure 1-4



Benefits of Access Management

The **MDOT Access Management Guidebook** identifies the following five benefits of access management.

- *Access management improves traffic safety and can prevent vehicular crashes.*
- *Access management results in shorter travel times and reduces motorist costs.*
- *Access management extends the function and capacity of roadways.*
- *Access management improves access to property while enhancing the value of private land development.*
- *Access management results in nicer communities.*

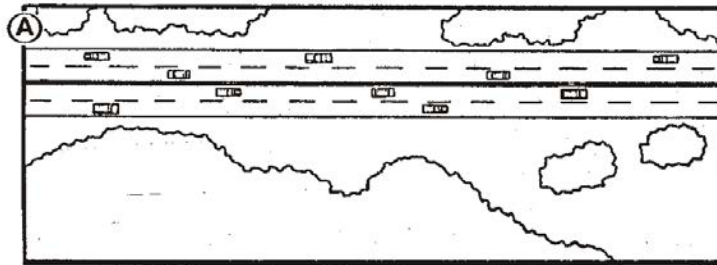
All these benefits are expected from implementation of this Plan.

Poorly Planned and Regulated Land Use Creates Unnecessary Traffic Congestion and Crashes

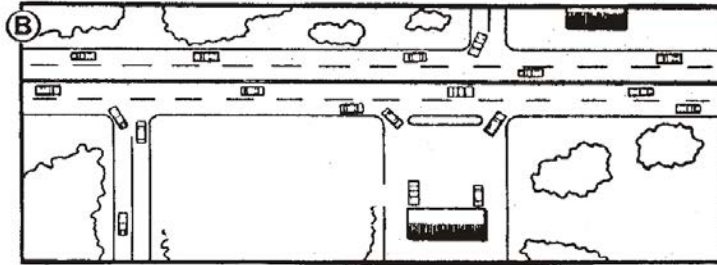
Figure 1-5 illustrates that how land is used adjacent to roadways has a tremendous impact on roadway function and operations. If unrestricted driveways are permitted, unnecessary traffic crashes and congestion will result, especially if the land is developed for commercial purposes.

Figure 1-5

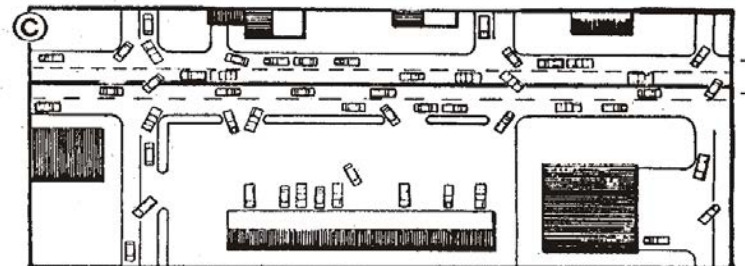
Cumulative Impact of Increased Roadside Development ...



What happens when unrestricted development takes place ...



over time ...



Source: Center for Transportation Research and Education, Iowa State University, *Iowa Access Management Guidebook*, October 2000, p. 19.

Relationship to Local Master Plans and Zoning Ordinances

Obviously, the relationship between US-41/M-28 and abutting land is a very close one. If abutting land develops in a way which undermines the integrity of the public investment in the highway, then future highway improvements will be necessary, that otherwise would not have been (see Figures 1-3 and 1-5). Since local governments have authority through the local planning and zoning statutes to plan and zone for future land use, their decisions can create or prevent future highway problems. It is important therefore, that local governments incorporate key considerations from this Plan into the local master plan and zoning ordinance.

Local master plans set forth in both text and on maps, land use and public infrastructure improvements for the next twenty years. Statutorily, local master plans are required in order to provide a strong legal basis for local zoning. In December 2001, the Michigan Legislature enacted changes to the planning enabling acts to beef up the relationship between the plan and local zoning, to require communities to review, and as necessary, to update local master plans every five years, and to coordinate plans with neighboring jurisdictions through new mandatory review and comment procedures. When a community has a current future land use map and accompanying text embodied in a local master plan, it is much easier for road authorities to plan future road improvements that are compatible with adopted local master plans.

A local zoning ordinance classifies land for various uses by means of zones or districts which establish permitted uses, and dimensional standards for lots and structures. The zoning map should reflect existing use of land. Land is often rezoned into a different zoning class when consistent with the local master plan and when the necessary infrastructure is in place to accommodate the proposed new use.

In order for local master plans and zoning ordinances to achieve the goals and objectives of this Plan, it will be important for those documents (in addition to the usual elements described above), to be consistent with the corridor improvement and access management recommendations in this Plan. It will also be important for local governments along the corridor to adopt nearly identical access management regulations and to coordinate land use and zoning decisions along the corridor. All of the communities along the corridor have already committed to this coordination and meet monthly to review proposed projects along the corridor (see Chapter Six).

Process Followed to Create This Plan

The Michigan Department of Transportation and the eight cities and townships along the portion of US-41/M-28 included in this study have worked together for nearly three years to complete this plan and associated regulations. Other project

partners included Marquette County Planning, the Marquette County Road Commission, the Marquette County Drain Commissioner, the Keweenaw Bay Indian Community and the Lake Superior Community Partnership. The local units of government have undertaken the following actions leading to the adoption of this Plan:

- signed a common Memorandum of Understanding to work on the project (see Appendix A),
- sent representatives to MDOT sponsored training on access management,
- worked with MDOT staff to refine the model MDOT access management ordinance to fit local circumstances,
- identified access management problems and corridor improvement needs,
- jointly designed an RFP and helped hire a consulting firm to assist with preparation of the Plan,
- gathered substantial information and assisted in its analysis,
- worked closely with the consultant and local government advisory committee to prepare and refine the Plan,
- assisted with sharing ideas with the public and refining Plan elements,
- assisted in the review of proposed site plans for projects along the corridor,
- committed to incorporating the final Plan elements into the local master plan and implementing this Plan's recommendations through future planning, zoning, subdivision and infrastructure decisions,
- throughout this process met at least once every month.

For its part, MDOT provided substantial leadership, staff and financial assistance to these communities and worked closely with the consultant in the preparation of this Plan. This is the kind of partnership MDOT has promoted since publication of the **MDOT Access Management Guidebook** as an effective way to plan and implement highway improvements and access management regulations .

Overview of Chapters in this Plan

This Plan has six chapters and Appendices. Following is a brief summary of the remaining chapters:

- Chapter Two defines the most basic goals and objectives of this Plan.
- Chapter Three presents a detailed description of the corridor, and identifies the key problems and opportunities along the corridor. Much of the chapter focuses on a traffic and safety analysis of high crash areas and changes that could be made to more uniformly treat intersections and major roadway segments in order to preserve safe traffic flow.
- Chapter Four presents a detailed description of both major and minor traffic, safety and access management improvements along the corridor. In many cases alternatives are presented, along with a brief description of the pros and cons of each alternative. Associated bus, bicycle, pedestrian and snowmobile issues are also discussed.

- Chapter Five presents the principal local access management and land use policies necessary to implement the goals and objectives of this Plan. Changes to local master plans and zoning ordinances necessary to implement this Plan are also identified.
- Chapter Six presents the key steps that need to be taken to implement this Plan.

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Chapter Two

GOALS AND OBJECTIVES OF PLAN

Introduction

This Chapter restates the principal challenge of this Plan, and presents basic goals and objectives. The remaining chapters provide the rationale for these goals and the specific recommendations necessary to implement the objectives of this chapter.

Achieving the Proper Balance

The use of and needs for improvement of every highway change over time. However, given the interrelationship of local government and MDOT responsibilities for both land use and highway decisions, the following is a concise statement of the principal challenge of this Plan.

To identify improvements to US-41/M-28 and local regulation of access to the highway that maintain an appropriate balance between safely meeting the mobility needs of through travelers and local highway users in a manner that reflects mutual respect and recognition of the important role that local governments and MDOT each play when making decisions that affect the corridor. In taking the above actions, it is important to always factor in the needs and impacts of each alternative on all highway users, with special consideration given to buses, pedestrians, bicyclists, and intersecting trail users.

Goals

There are five principal goals inherent in achieving the proper balance described above:

1. Maintain and improve (where feasible) the traffic carrying capacity of the highway.
2. Improve traffic safety.
3. Maintain the local economic development benefits of the highway.
4. Maintain a coordinated mechanism for future planning and zoning along the highway.
5. Maintain a coordinated mechanism for state investments in the highway and local infrastructure investments along the highway.

Objectives

The principal objectives consistent with these goals are listed below:

1. Periodically identify the cause of existing or projected congestion along the highway and following examination of alternatives, select improvements that safely preserve the traffic carrying capacity of the highway.
2. When selecting from among alternative capacity improvements, give special consideration not only to cost-effectiveness, but also to uniformity in design so that driver confusion is minimized.
3. When selecting from among alternatives, give special consideration to those that help preserve the investment in existing and planned improvements to the road, such as those that incorporate access management into the design.
4. Design and implement improvement projects in a way which minimizes disruption not only to existing traffic, but also to abutting residences, businesses and other actively used lands.
5. Plan traffic capacity improvement projects sufficiently far ahead, and in a manner which permits local governments and the County Road Commission, to most effectively coordinate associated infrastructure improvements on intersecting roadways and to accommodate cost-effective utility expansions or replacement.
6. Implement only those traffic or intersection improvements that are consistent with this Plan.
7. Periodically update this Plan to ensure that it continues to guide coordinated land use and highway improvement decisions along the corridor.
8. Ensure that land planned and zoned for intensive economic development activities is both well suited for such use, and that such use is compatible with uses on adjoining lands and the physical characteristics and capacity of the segment of the highway providing access.
9. Ensure that prior to approval of intensive new land uses along the corridor, that appropriate traffic impact studies are done and review is coordinated between MDOT, the County Road Commission, the local government in which the development is proposed, and affected units of government in adjoining jurisdictions.

10. Ensure that prior to site plan approval for any land use along the corridor, that the proposed site plan is first reviewed by the Corridor Advisory Committee so that consistent access management decisions can be made along the corridor.
11. Encourage all local units of government along the corridor to adopt and thereafter maintain (with a thorough review at least once each five years), a future land use plan, master plan or comprehensive plan of future land use that serves as the basis for future zoning and infrastructure decisions along the highway, and is carefully coordinated with similar plans in adjoining jurisdictions.
12. Encourage all local units of government along the corridor to maintain (with a thorough review at least once each five years), a zoning ordinance which appropriately manages access to the highway consistent with regulations based on MDOT's model regulations and those of adjoining jurisdictions, and is consistent with the communities future land use, master or comprehensive plan.
13. Encourage all local units of government along the corridor to prepare and thereafter annually update a community wide capital improvement program that lists proposed infrastructure spending by location, cost, source of revenue and timing, with a special focus on coordinating such spending plans with MDOT and the County Road Commission where US-41/M-28 and county roads are concerned.
14. Encourage MDOT to plan future road and access management improvements along the highway in a manner that is consistent with this Plan, that permits local input prior to final decision-making and that serves as a model of intergovernmental cooperation.
15. Educate citizens, businesses and property owners about the basic contents of this Plan and seek their input prior to adopting any Plan updates.

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Chapter Three

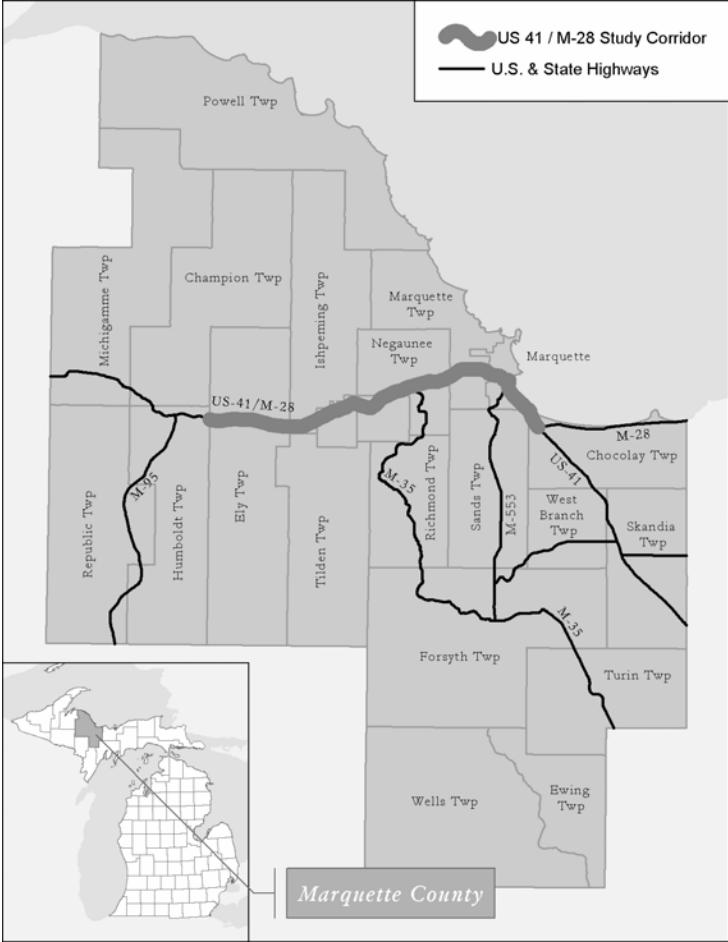
ROAD DESCRIPTION, PROBLEM AND OPPORTUNITY ANALYSIS

Introduction

This chapter gives an overview of the physical, as well as traffic and safety issues associated with the US-41/M-28 corridor. The study area for this Plan extends about ¾ mile either side of US-41/M-28 from the western-most border of Ely Township to the junction of US-41 and M-28 in Chocolay Township, which is about twenty-eight miles in length.

US-41/M-28 is classified as a state trunkline. It serves as the primary highway for local citizens in the region, but it also serves a thoroughfare for those traveling across the Upper Peninsula. See Figure 3-1.

Figure 3-1: Location Map



Corridor Roadway Description

Roadway Geometry and Speed

Beginning in the west, US-41/M-28 through Ely Township is a two-lane rural highway with a 55 MPH speed limit. The two-lane road continues as you travel east, through Ely Township into Ishpeming Township, at Westwood Drive, where the highway changes to four-lanes, and the speed also drops to 45 MPH going through commercial areas of Ishpeming Township. Continuing east, the 45 MPH speed limit increases to 55 MPH at the junction of North Lake Road within the City of Ishpeming and continues as a four-lane road. The speed limit changes to 45 MPH at Second Street east through the remainder of City of Ishpeming to the city's eastern border. The speeds increase to 55 MPH at the City of Negaunee western border but then drop to 45 MPH at Teal Lake Road in Negaunee through Iroquois Road in Negaunee Township when the speed increases to 55 MPH. US-41/M-28 goes from a four-lane to five-lane road with a turn-lane from Teal Lake Road to Iroquois Road in the City of Negaunee.

US-41/M-28 is a divided four-lane highway from Iroquois Road in the City of Negaunee east to M-35 in Negaunee Township. The speed continues at 55 MPH from Iroquois Road east into Marquette Township at the intersection of County Road 492. At the M-35 intersection the divided four-lane highway transitions into a four-lane highway with a paved median.

Within Marquette Township and the City of Marquette the speed limits change several times. At County Road 492 in Marquette Township the five-lane road transitions into a four-lane road with a median. The speed drops at CR 492 from 55 MPH to 50 MPH. The four-lane median continues east through Marquette Township and the City of Marquette to the intersection with Front Street. The speed limit drops from 50 MPH to 45 MPH at Days Inn in Marquette Township and stays that way until Washington Street where it increases to 55 MPH until near Front Street where it reduces to 50 MPH. At Front Street US-41/M-28 turns south, the speed limit drops to 35 MPH and the road continues as a five-lane with a center-turn lane. South of Hampton Street the road continues to be five-lanes, but the speed limit goes up to 50 MPH. The 50 MPH speed limit continues to Tonti Road. At Tonti Road the 55 MPH speed zone continues through to Chocolay Township where it is reduced to 45 MPH from the Welcome Center to the junction of US-41 and M-28.

Traffic and Safety Analysis

Volumes

According to MDOT, 24 Hour ADT Volumes for 2002, US-41/M-28 through Marquette Township has the highest traffic volume within the corridor study area, with close to 33,000 vehicles counted near Erickson Avenue. This area has the highest traffic volumes in the entire Upper Peninsula. To the west, average daily traffic volumes drop to 17,000 vehicles through Negaunee and 15,000 vehicles in

Ishpeming. West of Ishpeming, volumes drop to 11,000 vehicles. To the east, traffic volumes range from 15,000 vehicles between Washington Street and Front Street, then rise to 24,000 up to the State Prison, before falling to about 19,000 vehicles per day. (See Table 3-1 and Figures 3-2 and 3-3).

The traffic volumes for the US-41/M-28 corridor study area have shifted over the past five years; in some areas they have increased and others they have decreased. Volumes show increases over the past five years within areas in Marquette Township and the City of Marquette, although traffic volumes declined in other parts of the study area. In 1997, 33,900 vehicles were recorded on US-41/M-28 at Erickson Avenue. In 2002, the ADT volume count was 32,800, a 3% drop. Significant gains in traffic volume were recorded near the CR 492 intersection within Marquette Township, an increase of 26% over the past five years. This area has added several large retail establishments, which may account for much of the gains in this area.

US-41/M-28 at:	1997	2002	Difference	Percent Change
Erickson Street, Marquette Twp.	33,900	32,800	-1,100	-3.24%
CR 492, Marquette Twp.	26,000	32,800	6,800	26.15%
S. of Division, City of Marquette	22,500	24,000	1,500	6.67%
Border of City of Marquette and Sands Twp.	20,400	18,900	-1,500	-7.35%
West of Teal Lake Road, Negaunee Twp.	17,600	17,100	-500	-2.84%
2nd Street, Ishpeming	17,000	15,300	-1,700	-10.00%
Between Grove St. and Front Street	14,200	13,500	-700	-4.93%
Ishpeming Twp- border of City of Ishpeming	9,900	10,100	200	2.02%

Source: MDOT, 2002

Figure 3-2: MDOT 2002 Average Annual Traffic Volumes in Marquette

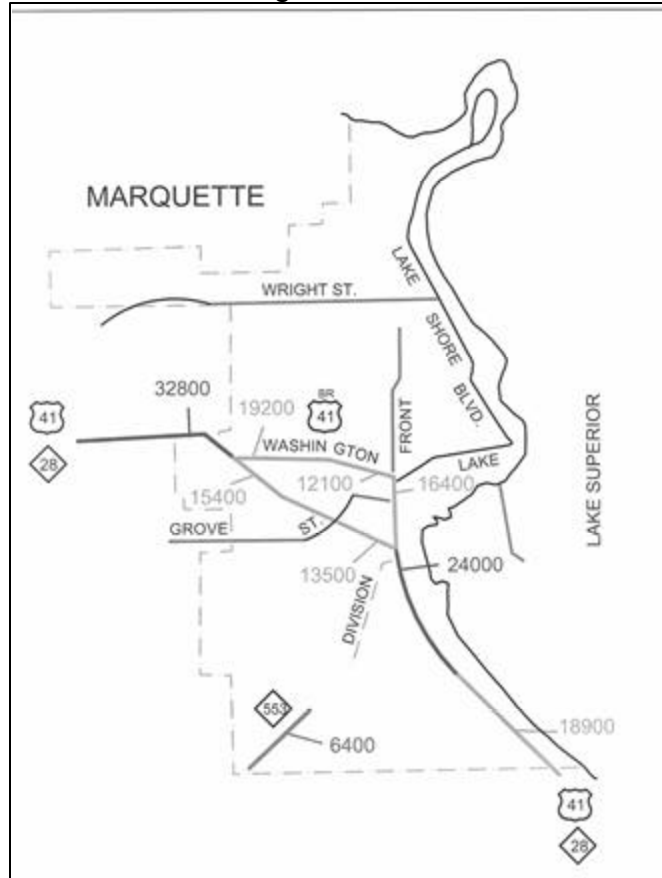


Figure 3-3: MDOT 2002 Average Annual Traffic Volumes in Ishpeming and Negaunee



Source for Maps 3-2 and 3-3: MDOT Annual Traffic Map, 2002

Crash Analysis

Crash analysis of the years 2000, 2001 and 2002 yielded the following top thirteen crash locations within the study area, based on data provided by MDOT. There is a brief description of the current geometry of each intersection along with the most frequent problems within the intersection. Detailed recommendations for these intersections will be addressed later in this Chapter and in Chapter 4. See Appendix B for detailed drawings of turning movements and crash patterns at each of the intersections.

1. US-41/M-28 at Washington (in Marquette)

With 97 crashes over a three-year period, this intersection was the highest within the study area. Over 60 of the crashes were rear-end crashes on westbound Washington Street approaching US-41/M-28. This intersection is confusing especially for drivers not familiar to the area. See Photo 3-1.

The geometry of this intersection is the most complex in the corridor. Both the east and westbound directions of US-41/M-28 are divided roadways. There are four lanes on the eastbound approach, two lanes for left-turns and two lanes for through-traffic. There are two through-lanes on the westbound approach with a right-turn lane under STOP control. The east leg of Washington Street is a divided four-lane roadway. The westbound approach has two lanes that must turn right at US-41/M-28. There is a channelized median left-turn lane for Meeske Avenue. Traffic turning from Meeske Avenue is also allowed to proceed through the intersection to US-41/M-28, under STOP control.

Photo 3-1: Washington Street and US-41/M-28



2. US-41/M-28 at McClellan (in Marquette)

There were 81 crashes at this intersection during the three-year period. The topography at this intersection is of concern. There are steep grades up to the intersection from the north that may cause sight difficulties, particularly in inclement weather. Baraga Avenue, a parallel local street to the north of US-41/M-28, is situated on a slope; it is only about 400 feet away from the US-41/M-28 and McClellan intersection. See Photo 3-2.

McClellan is currently a four-lane road at this point and US-41/M-28 is a divided four-lane highway. Left-turns are prohibited at this intersection and traffic is directed to turn around beyond the intersection at median openings on US-41/M-28.

Photo 3-2: McClellan Ave. and US-41/M-28 Intersection (20-foot Contour Lines)



3. US-41/M-28 at Lakeshore Dr. (in Ishpeming)

This intersection at Lakeshore Drive is located near the western edge of the City of Ishpeming and accommodates traffic from the Country Village shopping center on the northeast corner of the intersection. See Photo 3-3. For the three-year period the intersection had 40 crashes, 21 of which were angle crashes. There was one fatality in this intersection during this time period, the fatality occurred against another driver attempting to make a left-turn from Lakeshore Dr. Eighteen of the 40 crashes involved injuries.

The north and south legs of Lakeshore have two approach lanes including a 100-foot left-turn lane on the north leg and short 60-foot left-turn lane on the south leg. The posted speed on US-41/M-28 is 55 MPH in this area.

The speed limit on Lakeshore Drive is 25 MPH on the north leg and 35 MPH on the south leg. The high speeds in this area may contribute to the higher crash severity. This intersection had the only fatality in the study area during the time period and the highest number of injuries in the corridor study area.

Photo 3-3: Lakeshore Drive and Country Village



4. *US-41/M-28 at Front St. (in Marquette)*

The intersection forms a modified “T” with free flowing right-turn movements and channelized left-turn movements. The northbound to westbound left-turn movement must yield to the eastbound to northbound left-turn, even though the traffic volumes are substantially higher. The Champion Street Bridge spans US-41/M-28 on the west side of the intersection. See Photo 3-4.

The northbound approach has two through lanes and a channelized left-turn lane. There is a channelized left-turn merge lane on the north side of the intersection. The southbound approach has two travel lanes. See Photo 3-5. The eastbound approach has two lanes, one for left-turns and one for right-turns. The speed limit on the north and south legs is 35 MPH. The speed limit on the west leg is 55 MPH.

Twenty-two of the 35 crashes at this intersection involve two turning legs of the intersection, the northbound Front Street to westbound US-41/M-28 leg and the eastbound US-41/M-28 to southbound Front Street leg. There were three head on turn collisions in the three year study period. There were 12 rear-end crashes, which occurred in conjunction with turning

movements. The sloping topography and snowy or icy roads contributed to six rollover crashes in this intersection during the study period.

Photo 3-4: Front Street and US-41/M-28 Intersection



Photo 3-5: Front Street/US-41/M-28



5. US-41/M-28 at Genesee (in Marquette)

The north and south legs of US-41/M-28 (Front Street) are five-lane roadways with a center lane for left-turn. The intersection forms a "T". The west leg (Genesee Street) has two approach lanes, one lane for left-turns and one for right-turns. The intersection is controlled by a two-phase fixed-time traffic signal. See Photo 3-5.

There are pedestrian indications for crossing the south and west legs. There is a marked pedestrian crosswalk on the south leg that terminates in a flowerbed beyond the east curb line of Front Street. There is no marked pedestrian crosswalk on the west leg.

The South Rail Yard Development is currently under construction along the harbor on the east side of the intersection. The construction driveway is offset approximately 120 feet to the north of Genesee Street. When completed, the access road to the new development will be located at the intersection directly across from Genesee Street. A traffic signal study will soon be conducted to determine whether moving the traffic light from Genesee to Hampton is warranted for either safety or operational reasons.

Twenty-three of the 32 collisions at the intersections were rear-end crashes, nine of these occurred in the southbound Front Street approach and nine on the northbound Front Street approach. Approximately 36% of the rear-end crashes occurred on wet/snowy/icy pavement.

6. US-41/M-28 at Second St. (in Ishpeming)

The east leg of US-41/M-28 is a five-lane roadway with center lane for left-turn. The west leg of US-41/M-28 is five-lanes with a marked 125-foot long left-turn pocket marked at the intersection. The north and south legs of Second Street has two approach lanes, including a short 90-foot long left-turn lane on the north leg and a 70-foot long left-turn lane on the south leg. See Photo 3-6. The posted speed limit on US-41/M-28 is 45 MPH. The speed limit transitions to 55 MPH west of the intersection. The speed limit on Second Street is 25 MPH.

The intersection is controlled by a two-phase fixed-time traffic signal. There are no pedestrian indications and no marked pedestrian crosswalks. There were twelve rear-end crashes and seven head-on left-turn crashes out of 30 total crashes within the intersection. Eleven of the crashes resulted in injuries.

Photo 3-6: Second Street in Ishpeming



7. US-41/M-28 at Grove (in Marquette)

The east and west legs of US-41/M-28 are divided four-lane roadways with a channelized left-turn lane at the intersection. There are two approach lanes on the north and south legs of Grove Street, one lane for through traffic and one lane for right-turns.

Left-turns are allowed in all directions at the intersection because the median does not have sufficient width to provide median crossovers beyond the intersection to accommodate indirect left-turns. See Photo 3-7. There is a leading protected left-turn phase on US-41/M-28. Left-turns are not permitted during the through phase. The posted speed limit on US-41/M-28 is 55 MPH. The posted speed limit on south leg of Grove Street is 25 MPH. There are no pedestrian indications or marked crosswalks.

There were 23 crashes at this intersection during the study period. Fifteen of the crashes were rear-end crashes.

Photo 3-7: Grove Street in Marquette



8. US-41/M-28 at M-28 Junction and Cherry Creek Rd (in Choccolay Twp.)
US-41 (south leg) and M-28 (east leg) merge at this location. The north leg (combined US-41 and M-28) and the south leg of the intersection are five-lane roadways with center lane for left-turn. US-41/M-28 transitions to a two-lane roadway south of the intersection. The east leg (M-28) has a short 100-foot long right-turn lane marked at the intersection with a long taper.

The west leg (Cherry Creek Road) has three lanes at the intersection including a 150-foot long left-turn lane. Cherry Creek Road transitions to a two-lane roadway west of the intersection. See Photo 3-8. The posted speed limits are 45 MPH on the north leg, 55 MPH on the south leg, 45 MPH on the west leg, and 55 MPH on the east leg. There are no pedestrian indications or crosswalks at the intersection.

Observations reveal that the major turning movements at the intersection are the southbound to eastbound left-turn and the complementary westbound to northbound right-turn. Conversely the northbound to westbound left-turn volume is relatively light. Therefore the southbound through-right signal phase often operates simultaneously with the southbound left-turn phase. Of the 23 crashes at the intersection, 9 were southbound to eastbound left-turn collisions.

Photo 3-8: Cherry Creek Intersection in Choccolay Township



9. US-41/M-28 at Erickson (in Marquette Twp.)

Crash data at this site included only 2001 and 2002. This is a mid-block location where Erickson Avenue forms a "T" intersection with US-41/M-28. A directional crossover is located directly across from Erickson Avenue for eastbound traffic. Erickson Avenue is controlled by a STOP sign.

Photo 3-9: Numerous Driveways



Twenty-three crashes occurred at this intersection in the last two years (2001-2002). Half of the crashes were angle collisions, attempting a left-turn via the media opening. Thirteen of the crashes were on wet/snowy pavement. There is notable problem with driveway related crashes due to the numerous driveways and signs along this part of the corridor. See Photo 3-9 and 3-10.

Photo 3-10: Erickson Avenue in Marquette Township



10. US-41/M-28 at Silver Creek Rd. (in Chocolay Twp.)

The north and south legs of US-41/M-28 are five-lane roadways with a center lane for left-turns. The eastern leg of the intersection is Corning Street, while on the west the street is called Silver Creek Road. The access drive to the Township offices is only 75 feet from the intersection on Silver Creek Road. See Photo 3-11.

Eight of the 21 crashes were southbound rear-ends. The visibility of the southbound US-41/M-28 traffic signal may be a problem for drivers of trucks and busses because of the pedestrian bridge located on the north side of the intersection. There were five angle and four head-on left-turn crashes.

Photo 3-11: Silver Creek Road Intersection with US-41/M-28



11. US-41/M-28 at Baldwin (in Negaunee)

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left-turn. The north and south legs of Baldwin Avenue has two approach lanes, including a short 80-foot long left-turn lane on the north leg and a 100-foot long left-turn lane on the south leg. See Photo 3-12. The posted speed limit on US-41/M-28 is 45 MPH. The speed limit on the Baldwin Avenue is 25 MPH.

There are pedestrian signal indications on all four legs of the intersection. There are marked pedestrian crosswalks on the east and west legs only. Thirteen of the crashes were angle collisions.

Photo 3-12: Baldwin Street intersection in Negaunee



12. US-41/M-28 at Hampton (in Marquette)

This intersection is approximately 400 feet south of the Genesee Street signal. Hampton Street is controlled by STOP signs in both legs. US-41/M-28 operation is similar to the Genesee Street description, except the north bound US-41/M-28 speed changes from 50 MPH to 35 MPH at Furnace Street (one block south of Hampton Street). See Photo 3-13.

The crash pattern is similar to Genesee Street except this intersection is NOT signalized. It is notable that four collisions occurred at the multiple driveways of a tire center. As noted with the Genesee Street analysis, a traffic signal analysis will be performed to determine whether to change the signal location from Genesee Street to Hampton Street.

Photo 3-13: Hampton Street Intersection



13. US-41/M-28 at County Road 492 (in Marquette Twp.)

Crash data at this site included only 2001 and 2002. The intersection of US-41/M-28 and County Road 492 (Wright Street) is controlled by STOP signs on County Road 492. There is a median cross-over on eastbound US-41/M-28 to service the left-turn movement from eastbound to northbound. Therefore, all traffic on the northbound and southbound approaches on 492 must turn right at the intersection. Northbound and southbound straight-thru traffic on County Road 492 is not permitted at the intersection. See Photo 3-14. Northbound approach traffic with travel destination to the north or west is supposed to use the median cross-over located 1,200 feet to the east of the intersection (i.e. at the Westwood Mall entrance). However, local sources indicate that it is fairly common for northbound traffic from CR 492 intending to continue northbound or westbound on US-41, to ignore the "Do Not Enter" sign. There is no physical barrier such as curbing to stop this movement. Similarly, southbound approach traffic with travel destination to the south or east must use the median crossover located 1,300 feet to the west of the intersection. Therefore the total adverse travel for each indirect movement is nearly one-half mile distance.

The southbound County Road 492 approach is marked as two lanes. However, southbound traffic queues in the right lane only and does not utilize the second (left) lane. The lane separation is confusing.

There are right-turn lanes on both the eastbound and westbound US-41/M-28 approaches to the intersection. The posted speed limit on Wright Road is 45 MPH. Analysis of the two-year crash data indicates mostly rear-end collisions. The geometrics of median crossover are substandard.

Photo 3-14: Marquette Township Mall Area



Other Intersections of Concern

US-41/M-28 and Target Drive/Wal-Mart

The intersection of US-41/M-28 and the Target Drive-Wal-Mart driveway serves as the primary access points to the Wal-Mart store located on the south side of US-41/M-28 and the Target store located on the north side. To date, there is not a high level of crashes at this intersection. The signal operates with separate left-turn phases for traffic on the eastbound and westbound approaches on US-41/M-28 (see Photo 3-15).

The westbound US-41/M-28 approach to the intersection has four lanes; one lane for left-turns, two lanes for thru traffic, and one lane for right-turns. The eastbound approach has three lanes including one lane for left-turns. Both the northbound and southbound approaches to the intersection have three lanes; one lane for left-turns, one lane for thru traffic, and one lane for right-turns. The speed limit on US-41/M-28 transitions to 55 MPH west of the intersection.

Once the connector from Wright Street/CR 492 to Target Drive is constructed, much of the traffic turning westbound on US-41/M-28 at Wright Street will divert to Target Drive and this intersection will become much busier (while that at Wright Street/CR 492 will go down).

Photo 3-15: Wal-Mart/Target Intersection



US-41/M-28 at Median Crossover at Westwood Mall (Kohl's)

The intersection of US-41/M-28 and the median crossover at the Westwood Mall (Kohl's) entrance-exit driveway is controlled by a traffic signal. The signal operates on an 80 second background cycle to maintain coordination with the traffic signal at Target Drive-Wal-Mart. The median crossover on US-41/M-28 services the left-turn movement from eastbound US-41/M-28 into the mall

entrance. The median crossover also services the U-turn maneuver from eastbound US-41/M-28 to westbound. However, it is confusing to know who has the right-of-way; those making the U-turn or those exiting the mall. See Photo 3-14 and 3-16.

There is a right-turn lane on westbound US-41/M-28 at the intersection. All traffic exiting the mall must turn right. The mall driveway is divided by a center median. The twenty-two foot wide southbound mall exit operates as two approach lanes to the intersection.

The driveway at Applebee's west of the mall entrance is right in front of a median crossover permitting westbound traffic to complete a U-turn. Traffic conflicts are created by the combination of the driveway and the crossover location which could be resolved by relocating the crossover east of its present location. See further discussion in Chapter Four.

Photo 3-16: Westwood Mall Traffic Signal (*) and Commerce Drive



US-41/M-28 and Commerce Drive

The intersection of US-41/M-28 and Commerce Drive forms a "T" and is controlled by a STOP sign on Commerce Drive. Since the center median on US-41/M-28 is closed at this location, all traffic on Commerce Drive must turn right at the intersection. There is a right-turn lane on westbound US-41/M-28 at the intersection. The posted speed limits are 50 MPH on US-41/M-28 and 35 MPH on Commerce Drive.

Commerce Drive connects to County Road 492 (Wright Street) to the north. One proposal in Chapter Four is to open the median and extend Commerce Drive southward to Brookton Road (see Photo 3-16). Under this proposal the existing traffic signal at US-41/M-28 at Westwood Mall (Kohl's) would be removed and a new signal installed at Commerce Drive. This in effect would provide a direct

route for straight-through traffic on County Road 492 and may also reduce response times for emergency vehicles.

Currently there are median crossovers on US-41/M-28 to the east and west of Commerce Drive. See Photo 3-16. If the signal were moved to Commerce Drive, a decision must be made as to whether left-turns would be permitted or directed to the median crossovers. The median left-turn lanes are currently formed opposite Commerce Drive. The location of the existing median crossovers does not meet the MDOT standard of placing crossovers 600 feet distant from a signalized intersection.

Commerce Drive is 36 feet wide (from edge of pavement). If two approach lanes are to be provided to operate under traffic signal control, the road must be widened. Further analysis of this option is presented in Chapter Four.

Preventing Driver Confusion as Source of Crashes

The following sections provide an introduction to some of the concepts that will be recommended for implementation on the US-41/M-28 corridor within Chapter Four. The concepts in this section outline methods to create a uniform treatment in road design to minimize potential conflicts between drivers.

Importance of Uniform Treatment

Intersections

The intersection treatment along the US-41/M-28 corridor varies from jurisdiction to jurisdiction, but also varies within each jurisdiction. For example, within the City of Marquette drivers go through several complex intersections. From Washington Street to Front Street, the geometric design of the intersections change four times and drivers, particularly if not from the area, may become confused by the variation in intersection treatment. Pavement markings especially need to be uniform.

Median Crossovers

MDOT has a history of median implementation to improve safety and capacity along highways. In 1996 in Michigan, there were 425 miles of median with directional crossovers on the state highway system. Crossovers have been constructed where the central median is at least 50-60 feet. Directional (one-way) crossovers have been utilized for left-turning vehicles; in most cases, left-turns are prohibited at the signal. Instead, drivers go through the intersection and make a U-turn across the median when traffic clears.

Median crossovers along the US-41/M-28 corridor vary between jurisdictions, similar to the intersections. Median widths vary, as do the length of “turn-around” lanes. Some median openings allow two-way crossover, while others are designed for one-way traffic. Median crossovers would benefit from a more uniform treatment across the entire corridor. Medians are effective ways to manage high-speed traffic, however, without a uniform design, conflicts and driver confusion occur. The next section will present some of the median options that could be considered.

Signage

Signage is an important element of traffic control. Uniform signage, that is the same type of signs that are placed in a uniform fashion at each intersection, provides important information to the driver on what to expect. This helps avoid driver confusion. Speed limit signs, STOP lines, pavement marking arrows, etc. placed in a uniform fashion across the corridor can help drivers see more easily where turning lanes are and where they are expected to stop. This helps avoid the confusion that leads to crashes.

Limit the Number of Driveways

Another key to keeping crash levels low is restricting the number, location and spacing of driveways along the US-41/M-28 corridor. Numerous driveways along a corridor can cause driver confusion as drivers struggle to figure out exactly which driveway they need to turn into. The most basic fact associated with access related traffic crashes is that more driveways along a roadway result in more crashes. Driveways create conflicts between vehicles on the roadway and vehicles entering or leaving the roadway. Research shows that the more driveways per mile the higher the crash rate. See Table 3-2.

Table 3-2: Relationship of Driveway Density to Crash Rates

Driveways per Mile	Representative Crash Rate per Mile for a Multi-lane, Undivided Roadway	Increase in Crashes Associated with Higher Driveway Density
Under 20	3.4	-
20 to 40	5.9	+ 74%
40 to 60	7.4	+ 118%
Over 60	9.2	+ 171%

Source: MDOT Access Management Guidebook, 2001.

Average lot widths on both sides of a road would be about 225 feet at 40 driveways per mile and about 170 feet at 60 driveways per mile. This is substantially more than is common in some places along the US-41/M-28 corridor.

Whenever possible, communities and road authorities should limit the number of driveways per lot. This can be done through restrictions within the zoning ordinance and by using other techniques like shared access and connected parking lots. Recommendations will be made on this topic in Chapter Five.

Speed Progression

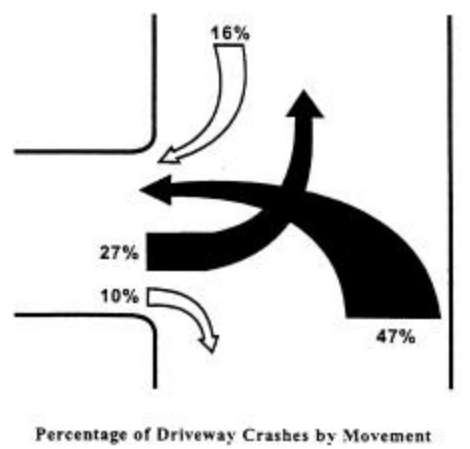
Poorly spaced signals hamper traffic progression. At least one-half mile between signals is typically desirable. Signals can provide the necessary break in traffic flow to permit vehicles to egress from properties lining the arterial. If signals are located too close, unnecessary traffic congestion can occur from through traffic which competes for road space with vehicles exiting driveways between signals. Irregularly spaced signals destroy the signal progression and therefore hamper traffic flow by increasing travel time and reducing capacity. Numerous driveways can also limit speeds because ingress and egress vehicles cause traffic to slow down.

Left-turn Movements

Many of the access management techniques focus on reducing the number of driveways and eliminating left-turn movements into driveways. Medians and restricting turns can reduce the number of left-turn crashes to and from driveways. This is important because nearly 75% of all access related crashes

are left-turns. See Figure 3-4. The left-turn movement into a driveway, without the benefit of a signal, accounts for 47% of the crashes associated with driveways. Twenty-seven percent of the crashes were turning left out of the driveway. Only 26% of driveway crashes are right-turns (with 16% in and 10% out).

Figure 3-4: Driveway Crashes by Movement



Source: National Highway Institute Research Center

Existing Land Use, Zoning and Future Land Use

The land uses chosen for a corridor can greatly affect the capacity, safety and operation of the roadway. Commercial development along a corridor can often be characterized by a long row of separate narrow lots with individual driveways to each business, sometimes called “strip commercial development.” The large number of driveways which typically characterize this form of commercial development can result in increased congestion and traffic crashes because of the higher number of turning movements associated with commercial land uses compared to residential or other uses.

By planning and zoning for mixed uses along arterials, by clustering multiple commercial uses around a single access road and limiting driveways on arterials, commercial development can be accommodated without the attendant access management problems of strip commercial development. Mixed-use development might also link residential uses with commercial, so that people do not need to always use their car to go shopping. Mixed-use development could also provide office buildings with restaurants and shopping so workers could link potential lunchtime or after work trips. Linking day care establishments with office developments have been popular mixed-use developments which allows children to be near parents and reduces two daily trips from the roadway. Specific land use and zoning recommendations for the US-41/M-28 corridor will be introduced within Chapter Five.

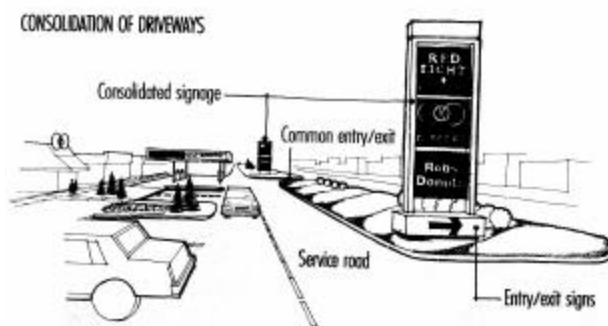
Environmental Features and Conditions

Environmental features, such as the topography of an area, can have an impact on the safety of a road. Slopes along US-41/M-28 were an apparent factor in some of the crashes along the corridor during the period studied, particularly in inclement weather. Intersections with significant slopes were of particular concern because adequate sight distance is very important at an intersection. Recommendations for individual intersections are presented in Chapter Four.

Scenic and Aesthetic Considerations

Typically improving signage, views and landscaping is thought of as an aesthetic improvement. But these improvements can also help improve safety on the corridor as well. Creating uniform signage for traffic and pavement markings can help driver orientation to the road, and simple, uncluttered signs for private businesses can also help improve driver safety. This involves establishing maximum height, area and location standards for signs. Also important is limiting the number of signs, which can be distracting to the driver. The consolidation of sign marques can provide a neater appearance as well as a safer corridor. See Figure 3-5.

Figure 3-5 Consolidated Sign



Source: Ontario Ministry of Municipal Affairs, *Design Guidelines for Highways and Commercial Areas*, 1985, p.23.

Community “Welcome” signs can provide the driver information on where they are, but they need to be placed in an area where they can be easily viewed, and if at all possible, should be located at a focal point of entry to the community where there are no sight distance problems.

Landscaping and street trees are very important to “soften” the built environment and reduce the amount of pavement. However, these plantings need to take into account the road right-of-way as well as sight distances in and out of driveways. See Chapter Five for specific recommendations for aesthetics on the corridor.

Principal Roadway and Driveway Design Guidelines

Capacity Improvements

Additional Lanes

Adding lanes is a traditional solution implemented by many local governments and road agencies facing traffic congestion. However, particularly in urban areas where there is a lot of development adjacent to a highway, implementing access management strategies is often more cost effective than adding lanes due to the extremely high cost of purchasing additional right-of-way, moving utilities, and relocating parking, signs and any structures. Widening often also results in businesses and homes being very close to the new lanes, causing sight distance problems for motorists and noise problems for residents and shoppers.

Yet, where traffic volumes warrant widening a road and adding lanes, the investment will be maximized by also consolidating driveways, installing parallel access roads, and implementing other appropriate access management techniques as a part of the widening project. The investment in added capacity should be protected by regulating the number and spacing of driveways that access the roadway.

Boulevard Designs

Raised medians separate opposing traffic and reduce conflict points by eliminating left-turns into and out of driveways along an arterial. In fact, when properly designed, a roadway with limited median crossovers is the safest design with the maximum traffic carrying capacity. Medians are also effective at intersections to guide traffic while also separating it from opposing traffic. Separation allows for quicker turns and less traffic backups.

Standard Median

The standard MDOT 50-60 foot median requires about 270 feet of total right-of-way. The standard median design also does not allow left turns at intersecting roads. Figure 3-6 illustrates a standard Michigan median with an indirect left-turn. This is a safe design that has been widely copied around the world. Figures 3-7 and 3-8 illustrate example cross sections for four-lane median designs with the necessary right-of-way required for each.

Figure 3-6: Indirect U-turn

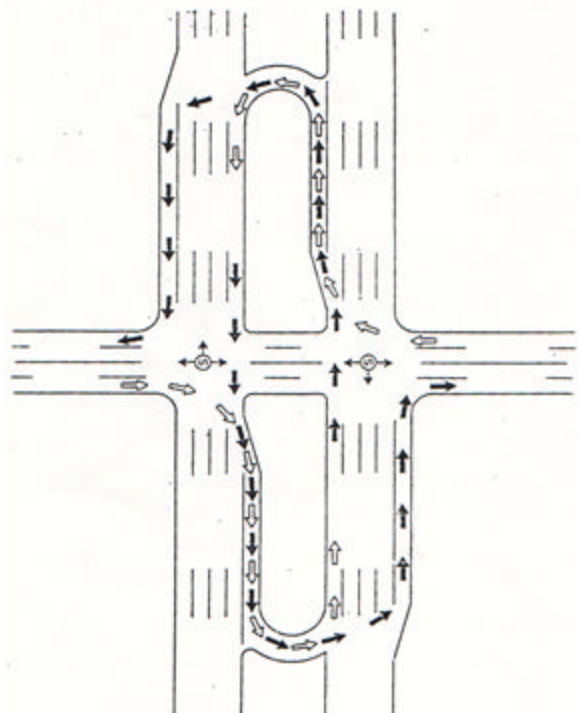


Figure 3-7: Existing Cross Section for Four-Lane Road with Median

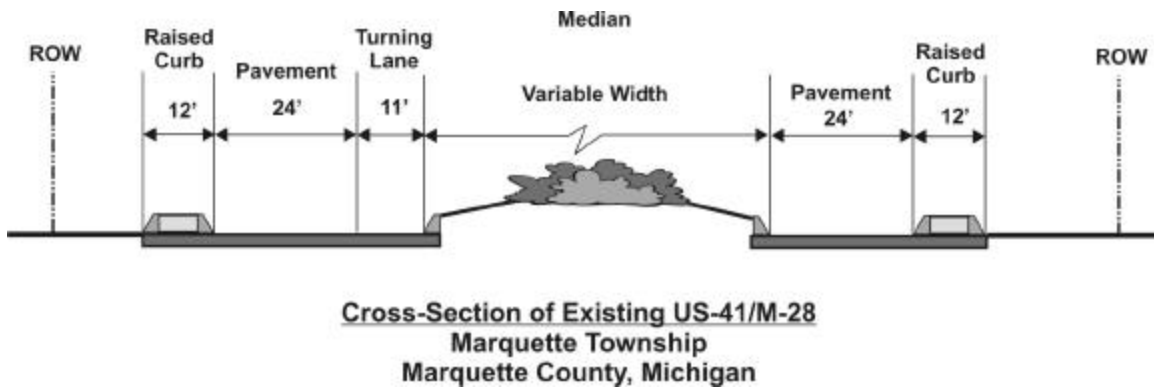
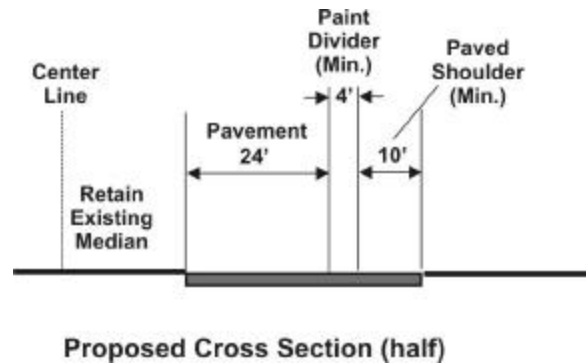


Figure 3-8: Proposed Half Cross Section for Four-Lane Road with Median



Narrow Width Medians

Narrow width medians, center islands that vary from 20 to 40 feet have been utilized in urban or suburban areas in Michigan where the right-of-way did not allow a standard median width. The narrow width median may require special turn-around lanes for trucks and buses because the narrow width geometry cannot adequately accommodate the large vehicles. See Photo 3-17 for an example.

Photo 3-17: Narrow Width Median on 44th Street in Kentwood



Source: Joe Pung, City of Kentwood, August 2001.

Roundabouts

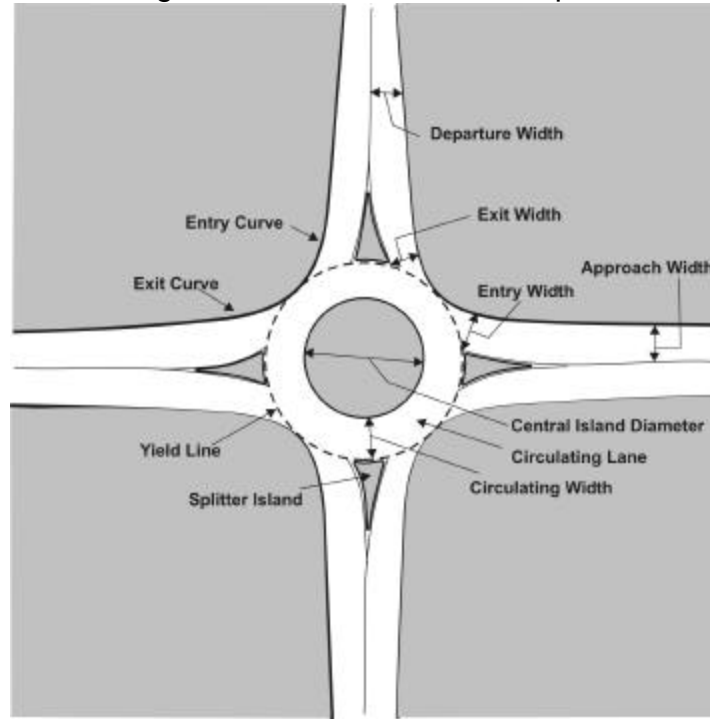
Roundabout intersection design within the City of Marquette has been discussed by city officials as a potential redesign for several intersections. Roundabout design has become more popular because of the safety benefits, better traffic progression, and because it can create an “entry” point to a community by creating a more interesting intersection design. They are also typically easy to maintain in the winter because the snow plows can turn-around so easily.

A roundabout is often used for intersections as an alternative to signalization. Roundabouts are designed with yield signs at entry points, which allow drivers to flow around the circle without stopping at a traffic light. Geometry of a roundabout is limited to speeds of 10-20 MPH within the circle. The diameter must be large enough to accommodate logging trucks and other large vehicles that commonly use the intersection. Roundabouts have been documented as safer than old traffic circles and traffic light controlled intersections because of the reduced number of conflict points from drivers making left-turns. *“The injury crashes are documented to be 35 to 78% lower than a typical signaled intersection. Overall, the average delay at a roundabout is estimated to be less than half of that at a typical signalized intersection.”*¹ However, roundabouts typically require more space than a standard intersection and must have well designed approaches and exits to function properly. They are also expensive. See Figure 3-9. If a roundabout design was the desired preferred intersection alternative for any of the intersections on US-41/M-28 at which roundabouts are listed as an option, each such location would require a feasibility study to determine if the roundabout design could be achieved in a safe and cost-effective way that retained, if not improved, traffic flow (without decreasing level of service or causing additional user delay). If the analysis demonstrated feasibility and

¹ Jacquemart, Georges. “Let’s Go Round and Round,” **Planning**, June 1996.

cost-effective results compared to alternative intersection designs with the same benefits, then the specifics of the roundabout design would be decided upon during the design phase.

Figure 3-9: Roundabout Example



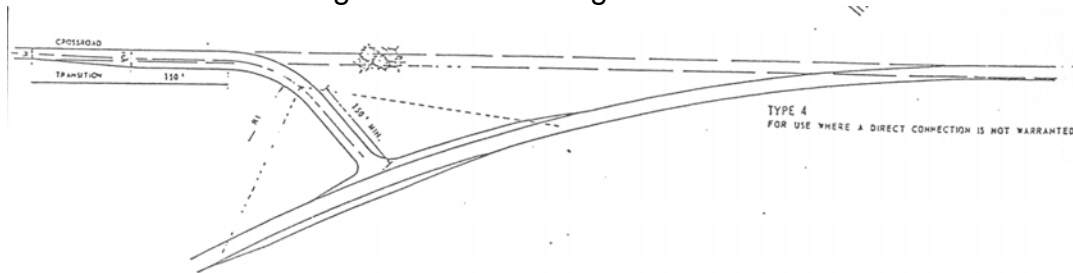
Source: Planning and Zoning Center, Inc. May 2000

Other Intersection Safety Improvements

Improve Turning Radius

Because there are many oblique intersections along US-41/M-28, and such intersections create visibility and safety issues for drivers, creating “T intersections” is a primary recommendation in Chapter Four. Creating a “T intersection” involves realigning the intersecting road so it is perpendicular to the main roadway. This allows for better, safer turning angles. See Figure 3-10.

Figure 3-10: Creating a “T Intersection”



Source: MDOT Traffic and Safety Note VII-640A “Turned-In Roadways” 2-4-91.

Right-turn Lanes

Right-turning vehicles can be removed from the arterial traffic with dedicated right-turn lanes. This allows through traffic to proceed without much slowing, preserving capacity and reducing the potential for crashes. MDOT guidelines suggest the use of right-turn lanes at any intersection where a capacity analysis determines a right-turn lane is necessary to meet a desired level of service. There are several recommendations for the construction of right-turn lanes at intersections within Chapter Four.

Access Management Improvements

This section provides a brief introduction to access management terminology which is used to describe recommendations within Chapter Four.

Close or Alter Driveways

A common problem along US-41/M-28 is properties with too many driveways. Sometimes there are three or four driveways when one well designed driveway is all that is needed. When there is not more than one driveway per parcel, and when driveways are properly spaced between properties, the roadway is safer, there are fewer crashes, and traffic flows better. As a result one of the most effective access management techniques is driveway closure and/or redesign. An existing driveway to a parcel can not be closed unless there will still be reasonable access provided in another way, such as from a shared driveway or, an alternative access point as for example, from the rear or side of the property. Closing driveways requires careful education of property owners and should be a key part of any plan to rebuild or expand capacity on a roadway.

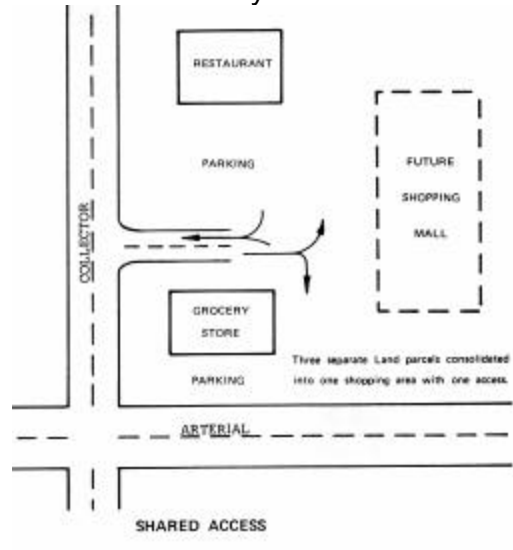
Driveway alterations can be a fairly inexpensive fix that provides a large benefit through reduction of crashes. Most commonly, driveway closures and alterations occur as part of a road reconstruction project, or when a property is proposed for redevelopment or new use. In these instances, site plan review is used as the process to ensure appropriate driveway design.

Combine or Consolidate Driveways

Close driveway spacing is a problem for two reasons: 1) for drivers turning out of adjacent driveways, competing for the same roadway; 2) for drivers that have to react to the turning movements from ingress and egress traffic at several points simultaneously. Consolidating driveways can remove a conflict point from the road and if the driveways are too closely spaced, consolidating driveways can result in the redesign of a safer driveway for both businesses. Figure 3-11 illustrates how driveways may link together. In Marquette Township, Red Lobster and Culvers Ice Cream have driveways so close together, they could easily be combined. Patrons frequently go in the “wrong” driveway because of the poor design.

Two or more adjacent properties can often share driveways and limit access points to an arterial. Sharing driveways is particularly valuable when lot frontages are narrow and alternative access is not available. In newer commercial developments, shared driveways are very common. Shopping plazas often provide one or two driveways for all the stores within them. Abutting shopping plazas can also often be linked together by connecting parking lots so that drivers can avoid exiting onto main arterials when going to adjacent properties.

Figure 3-11: Shared Driveways and Connected Parking Lots



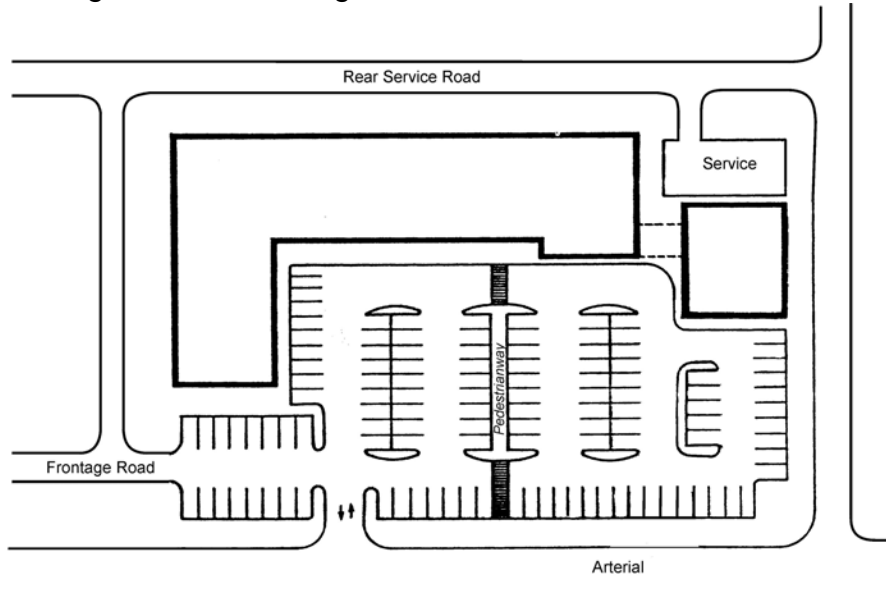
Source: *Arterial Street Access Control Study*, Tri-County Regional Planning Commission, 1981, p.24.

Frontage Roads and Rear Service Roads

Frontage roads and rear service roads can be utilized to keep traffic off of the main arterial. They can greatly reduce turning movements and direct traffic to collectors where a traffic signal can facilitate safer turns. However, frontage roads have come under some scrutiny, because they can create confusing turning movements, if used with high traffic generation uses. Adequate space may also be unavailable for a frontage or rear service road. Frontage roads can be most effectively utilized with low traffic generators like residential and small office uses or service uses like dental and eye care. Rear service roads can usually be designed to handle larger volumes of traffic.

Frontage roads or rear access between parcels can also aid connections between properties on a smaller scale. Rear access roads should be used whenever possible to more effectively move truck traffic around a commercial site and provide alternative access connections for automobile traffic between businesses. These connections can allow traffic to circulate between adjacent commercial properties without going onto the main arterial. See Figure 3-12 which illustrates how front and rear access drives work.

Figure 3-12: Frontage Roads and Rear Service Roads



Note: Rear access roads are usually safer and more effective than frontage roads and should be used whenever possible. Frontage roads should not be too close to the roadway or used where the volume of traffic is too great for safe vehicle use.

Improved Local Street Connections

Secondary streets can be a very effective means of access management when they function to keep local vehicles off of the main roadway. This requires an interconnected design with streets running parallel to the main road and intersecting streets at appropriate intervals. There are very few places along the corridor where this design exists and functions well. Chapter Four includes recommendations for extending local streets, particularly in areas where commercial development could be accommodated away from the arterial.

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Chapter Four

PROPOSED IMPROVEMENTS AND RATIONALE

Introduction

This chapter provides recommendations for corridor improvements within the study area. It begins by summarizing the proposed major improvements and then details improvements for each jurisdiction. Recommendations range from adding lanes, improving intersections, redesigning boulevards, converting diagonal intersections to T-intersections, adding bypass lanes or turning lanes, and other access management solutions. The options selected for intersection improvements should provide more consistency in intersection treatments and median crossover design along US-41/M-28 to minimize driver confusion. The final section in this chapter includes pedestrian, trail and transit recommendations.

Summary of Major Improvements on the Corridor

Adding Lanes and Extending Boulevards

MDOT has existing plans for improvement of the US-41/M-28 corridor which include adding lanes and extending some of the existing boulevard area. Wherever cost-effective, the new median width would be sufficient to permit median crossovers as illustrated in Chapter 3, Figure 3-6. These lane additions, boulevard extensions, median crossover improvements and other reconstruction projects should be accompanied with appropriate access management techniques to protect the new investment in the road. For example, “locking in” the number of driveways can be accomplished in especially the rural parts of the corridor by local zoning when the road is reconstructed. Future driveways would be planned to share access from a limited number of access points. All new driveways should be spaced in accordance with the MDOT Guidelines for Driveway Spacing in Table 4-1 below.

Table 4-1 Guideline for Unsignalized Driveway Spacing

Speed on Roadway (MPH)	MDOT Spacing Guidelines (feet)
25	130
30	185
35	245
40	300
45	350
50	455
55	455+

Source: “Spacing for Commercial Drives and Streets,” MDOT Traffic & Safety Division Note 7.9, Table 1.

The major recommendations for new lanes and extending boulevards are presented from west to east along the corridor. The recommendations in this section also appear in the following more detailed recommendations sections, and can be located on Maps 4-1 through 4-8.

Ely Township

There is a five-lane extension planned from County Road 496 in Ely Township, east to Westwood Drive in Ishpeming Township. This would be a major capacity and safety improvement because the existing road is only two lanes. This will accommodate the ingress and egress traffic turning into the W. Marquette County Transfer Station, traffic turning onto Aspen Ridge Road, the traffic turning into Country Road 496 at both intersections within this section of the corridor. This will also eliminate the problem of sight interference that presently exists with a power pole located along the Northeast side of the US-41/M-28 and County Road 496 intersection. If this improvement is initiated, the driveways on currently undeveloped land should be "locked in" to prevent any additional driveways in this area of the corridor. See Chapter Five and Six for a fuller discussion of this technique. Also the turning radius at the intersections of County Road 496 and US-41/M-28 should be improved.

Ishpeming

US-41/M-28 is planned to be uniformly widened to five-lanes from Malton Road in Ishpeming to Cambria in the City of Negaunee and eventually to connect to the rest of the five-lane segment at Teal Lake Road in Negaunee. The planned expansion would be a significant safety improvement which would allow ingress and egress traffic to utilize a left-turn lane in this area. If this improvement is initiated, the driveways should be "locked in" to prevent any additional driveways in this area of the corridor, also the turning radius at the intersection at Cambria should be improved.

Negaunee Township and Marquette Township

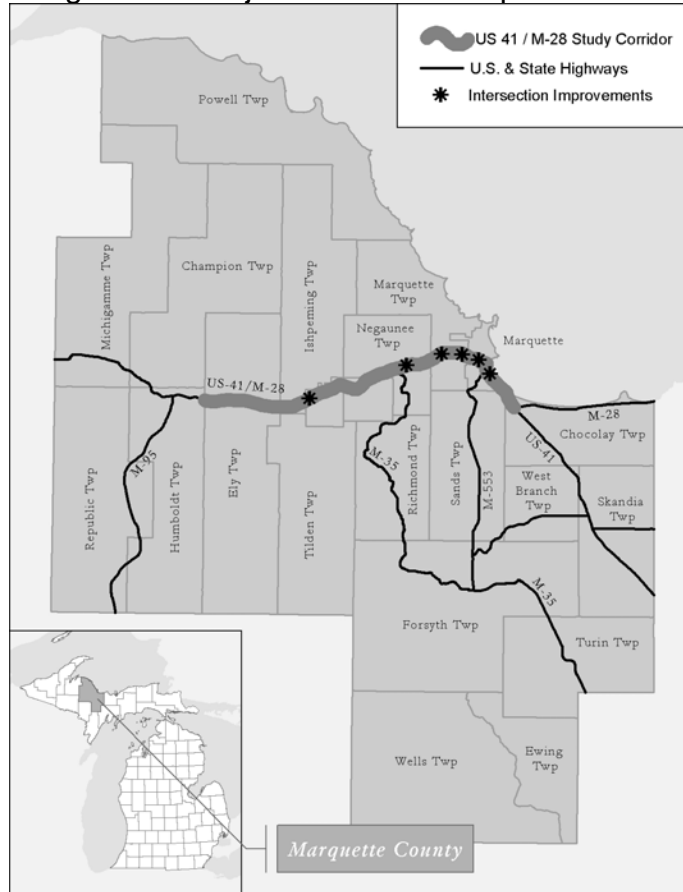
MDOT has planned for the median within Negaunee Township to be improved and upgraded. Median crossovers need to be redesigned in this area so that eastbound and westbound turn-around traffic is separated. Medians would assist drivers in this area because of the topography changes which restrict sight distance in some areas. Also, the median is planned to be widened from Negaunee Township through to Marquette Township, just east of Brickyard Road. Median crossovers also need to be redesigned in Marquette Township to incorporate the indirect left-turn at intersections such as Erickson, Target and the Westwood Mall entrance (see Chapter 3, Photos 3-14 and 3-16). Several median crossovers would be closed and others moved as a part of boulevard reconstruction.

Intersection Improvements

Following are major intersection improvements that should be considered. The general locations are represented on Figure 4-1. Other intersection

improvements are also addressed within the detailed recommendations for each jurisdiction. These improvements include correcting the radius of turns, adding turning lanes, improving signalization, new signage, improving the pedestrian facilities at the intersection or a combination of several of these elements. In addition, some speed limit changes should be considered. The most significant is establishing a uniform speed limit from Brickyard Road in Marquette Township to Front Street in Marquette on both sides of the street. Refer to Maps 4-1 to 4-8 for locations of each detailed recommendation.

Figure 4-1: Major Intersection Improvements



Lakeshore Drive, Ishpeming

Intersection improvements should be considered at Lakeshore Drive which had 40 crashes from 2000 to 2003, and had the most injury crashes within the study area with 18 injury related crashes and one fatality. The signal timing has been evaluated at this intersection to ensure there adequate turning time for left-turns. Internal linkages should be improved within Country Village to encourage left out at the light at Lakeshore, instead of at three driveways. Consider permitting only right-turns out of the shopping plaza for westbound traffic. The internal improvements would better connect parking lots and improve traffic flow. The turning radius of the existing driveways should be improved to “T” (see Figure 3-7). Also signage and pavement markings could be improved within the plaza to

orient drivers to utilize the Lakeshore Drive exit. Eventually, Carp River Road should be linked to Lakeshore Drive to provide alternative access.

Old Airport Site, Negaunee Township

At the site of the former airport, a casino development has been proposed. If this parcel is redeveloped the Township should limit additional access from US-41/M-28. Instead, access should come from a parallel road to US-41/M-28 that extends from Snowfield Road on the east to Heritage Drive on the west. A proper entry can then be established for the proposed casino off of US-41/M-28 at the point of the existing entry to the old airport. The current entry road is difficult to locate and should be reconstructed to improve visibility to the site. The median on US-41/M-28 should be redesigned to restrict left-turns directly into and out of the casino. An indirect left-turn with a turn-around for the eastbound and westbound traffic on US-41/M-28 is recommended. The casino entry and turn-around lanes on US-41/M-28 should be carefully sited to avoid conflicts with the M-35 intersection.

Target/County Road 492/Westwood Mall, Marquette Township

This area has the highest traffic volumes in the Upper Peninsula and will continue to increase in traffic volumes as more development occurs. The following options would be an improvement to the existing road geometry and traffic signal location. See Photos 4-1 and 4-2.

The first option for this area is for the County Road Commission to complete connection of Target Drive from current County Road 492 (Wright St.) north of Target so that traffic can use the light in front of Wal-Mart. This would allow vehicles on Wright Street to move up the hill and turn onto westbound US-41/M-28 at a flatter grade by Target. The County Road Commission has a plan to purchase the right-of-way and complete this road in the next few years.

Another option is to add a traffic light and full four-way intersection at the current junction of County Road 492 and US-41/M-28. This change would be the lowest cost, and would also require the least physical changes. However, this would require adding a third light ¼ mile from the two existing lights in violation of warrant standards. Also, trucks turning west onto US-41/M-28 have a steep uphill grade at this intersection and may have trouble getting up to speed to cross the intersection or turn west.

Another option in this area is moving the traffic light from in front of Kohl's to the intersection of Commerce Drive and US-41/M-28. Commerce Drive would be extended on the south side of US-41 to connect to Brookton which would need improvement to the current CR 492 in front of the Marquette Township Hall. In order to put a road through, significant rock would need to be excavated and a single family home would need to be acquired. But this location puts the traffic light in a better position for use by new businesses served by Commerce Drive, as well as, serving mall traffic, and it keeps a half mile separation distance

between the traffic lights. It would also improve the emergency response time of the Township Fire Department to properties south of US-41/M-28.

Potential problems with putting a traffic signal here and extending the road across US-41/M-28 include directing some truck traffic on Commerce Drive that otherwise would not go there. Also, extending Commerce through to Brookton is more expensive than just moving the traffic light. There may also need to be a study regarding stopping distance of trucks on US-41/M-28 or possible surface roughing techniques to improve the grip of tires, because the slope may present problems for large trucks to start from signal changes during snowy or icy conditions.

At an unspecified future time, and when the opportunity exists, it may be desirable to extend Brickyard southeast of US-41/M-28 to existing 492 along the old railroad tracks behind Wal-Mart. This provides a parallel road on the south side of US-41/M-28 and opens additional property south of US-41/M-28 for intensive development. It also keeps the desired ½ mile separation distance between traffic signals if a new signal were added at Brickyard. If this were done, it would also be desirable to extend Target Drive south to the new road between Wal-Mart and the SBC buildings. This option has not yet been approved by any of the existing property owners and would require careful analysis before implementation.

Whatever options are selected, the chosen improvements should include an internal circulation plan for the north side of US-41/M-28 to better link parcels and restrict access to the main arterial. This means redesigning flow within existing parking lots and ensuring all parcels are connected. Also, the median crossovers within the area between Target and Erickson should be redesigned (and some closed) to allow for limited turn-around movements, and more left-turn stacking room. In particular, the crossover in front of Applebee's should be moved east of the present location. These changes could be made as the opportunity presents itself (because of other changes in the area), but definitely should be implemented when the boulevard is widened to conform to current MDOT standards. These improvements need to be accompanied with proper signs and improved striping so traffic routes into and through the mall area are clear to motorists.

Photo 4-1: Signal across from Target and Wal-Mart in Marquette Township

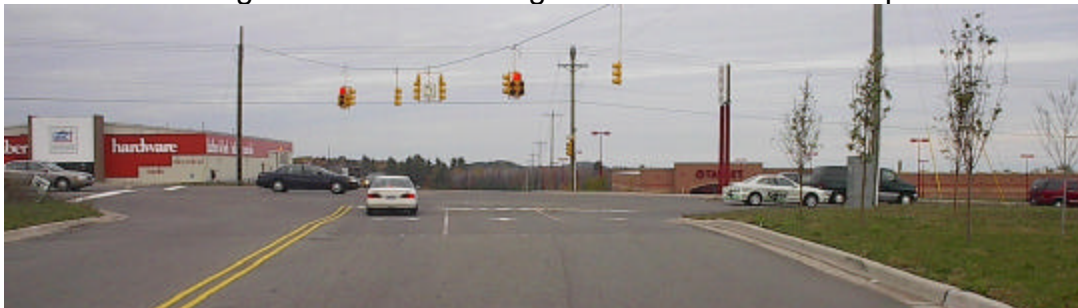


Photo 4-2: Signal across from Kohl's



Washington Street/US-41/M-28, City of Marquette

Currently the Washington Street and US-41/M-28 intersection in City of Marquette appears to work relatively well even though it is the most complicated design along the corridor with many conflict points. However, it is the highest crash intersection within the study area. The dual left signal at this intersection allows eastbound traffic to turn onto Washington (see Photo 4-3). Crashes often occur when cars accelerate to get through the left-turn. See Crash Diagrams in Appendix B. Recommendations for improving this intersection should be considered jointly with other intersection improvements within the City of Marquette to try to achieve a more uniform treatment within this part of US-41/M-28.

One option for the Washington/US-41/M-28 intersection would be to close Meeske at US-41/M-28 so it did not go straight through. Another option is closing Meeske at Washington so it is right-in and right-out only. This would reduce several conflict points.

A third option is to create a standard T-intersection with signals in all directions. This will increase delay and reduce the level of service on US-41/M-28, but would likely slow traffic enough to reduce crashes. It is also a simpler design to that would reduce driver confusion. This option is much less costly than the next one and could be phased, offering substantial safety benefits for little expense.

A more comprehensive solution though a more expensive design would be eliminating the traffic signal and reconfiguring the intersection as a roundabout. There is ample existing space and it would present a unique opportunity for a beautiful entry to Marquette from the west. Roundabouts are generally considered to be a safer design that would reduce congestion and allow traffic to flow more smoothly at peak periods. If there were substantial interest in this option, then roundabouts at three other intersections east of this one, within the City of Marquette, should also be considered to create a uniform approach that minimizes driver confusion. However, none of the other intersections have as

much space as this one and a detailed cost and feasibility analysis would be necessary before pursuing this option further. Whatever option, it should not decrease level of service or cause additional user delay; nor should it add to user confusion.

Photo 4-3: US-41/M-28 traffic turning onto Washington Street



US-41/M-28 at McClellan

The McClellan intersection has the second highest number of crashes in the study area. The grade on McClellan on the north side of the intersection limits the sight distance.

One option is to change the grade on McClellan from Baraga to US-41/M-28 to improve southbound sight lines when approaching the US/41-M-28 intersection. Baraga is only about 400 feet from the US-41/M-28 intersection. Baraga has several institutional uses that have trucks pulling in and out of the Baraga/McClellan intersection. Unless the City of Marquette is willing to restrict turning movements at Baraga to allow only right-turns onto McClellan, the grade on McClellan should be altered to allow better sight for vehicles progressing through the US-41/M-28 intersection. This may require driveway relocation of the auto dealership.

If after a feasibility analysis, a roundabout is selected for Washington Street and/or Front Street and US-41/M-28 within the City of Marquette, and then the McClellan intersection should also be considered for a roundabout. A roundabout at McClellan would also require significant grading to reduce sight distance problems for southbound traffic, and also to accommodate the entry and exit angles required for a roundabout. There may be a need to acquire additional land, and/or cut on the south side and fill on the north side to achieve a proper design. This could further limit available space to improve the grade on McClellan north of US-41/M-28. It may not be a viable option.

Pedestrian and bicycle crossing of US-41/M-28 at McClellan is difficult and likely to become more of a problem as the City implements bike routes. A structure over the road will be a problem with wind, snow and ice and is not likely to be used as often as it should be. A tunnel should be explored, but because of the grade changes it may be difficult and expensive to implement. The old rail bridge crossing US-41/M-28 west of McClellan provides one possible opportunity for pedestrian, bicycle and snowmobile connection, but the route would need to diagonal back to O'Dovero Drive after US-41/M-28 were crossed. Still, this is the safest alternative and should be explored. The City of Marquette is undecided on snowmobile use of the rail trail east of the rail bridge at this time, so any trail design should take into account the results of a planning study to determine the best use.

US-41/M-28 at Grove Street

This intersection may have more traffic in the future if 7th Street is extended on the north side of the intersection, through the former rail yard. Such an extension would significantly improve north/south travel options to key destinations in the City. The first option presented to improve safety at the intersection includes eliminating left-turns at the existing intersection (see Photo 4-4). This would require the current median to be redesigned to require an indirect left-turn. This puts the turn-around close to the Altamont bridge overpass and would possibly require widening the median to get closer to the proper width, although the separation distance from the intersection would still be substandard. These technical deficiencies may eliminate this as a viable option.

Minor changes to signalization and the left-turn design may also improve traffic safety and flow. Any such changes should be carefully coordinated with similar changes at the three adjacent intersections to ensure driver confusion is reduced through a more common intersection design.

Another option to consider is to eliminate the traffic signals and install a roundabout at the existing intersection. If after a feasibility analysis a roundabout is chosen for Washington Street and/or Front Street and US-41/M-28 within the City of Marquette, then the Grove intersection should also be considered for a roundabout. A roundabout would need to be carefully designed to avoid negative impacts on a nearby stream, wetland, and additional right-of-way may need to be acquired. It would be an expensive option and may not be viable.

The last alternative is a standard 4-way intersection at a new western route for 7th Street, 800' west of the existing intersection. The north side of the existing intersection would be closed. This would leave room for proper median crossovers and Grove would have all left-turns prohibited. Left-turns would only be accommodated with an indirect turn-around. However, this option would clearly involve a stream crossing, impact a wetland, and probably require an Act of Congress to change the intersection point on an urban freeway segment. It also presents challenges for traffic movement on Homestead Street in front of an

existing apartment building on the south side of US-41/M-28.

Pedestrian and bicycle crossing is a growing issue at this intersection, and will only increase in significance if 7th Street is extended. A pedestrian bridge across US-41/M-28 would need to be very long to achieve the necessary grades under the Americans With Disabilities Act and would be very expensive. A much better option is to continue to use Altamont Street as the crossing location since it is nearby, there is already an overpass in place and it is a designated part of the City bicycle system.

Photo 4-4: Grove Street Intersection (looking west)



US-41/M-28/Front Street, City of Marquette

This intersection also has unique geometry (see Photo 4-5). US-41/M-28 curves to the south to bypass downtown Marquette and Front Street also merges with US-41/M-28. As Photo 4-5 shows, traffic is allowed to crossover many lanes to complete turning movements without a traffic signal.

Photo 4-5: US-41/M-28/Front Street intersection (looking south)



Minimally, the storage lane of the north to west traffic volume needs to be lengthened and a study of merging lanes is needed to avoid the frequent rear-end crashes at this intersection. Eastbound approach speeds may also be reduced to 45 MPH, if speed study supports a change.

The intersection could be most cost-effectively improved by creating a T-intersection with stoplights. This may be a safety improvement over the existing intersection, but is likely to create a traffic delay at peak periods. While this design will reduce driver confusion, it may also reduce the level of service at the

intersection compared to the present design or a roundabout design.

If a roundabout is chosen for Washington Street at US-41/M-28, then the Front Street intersection should also be seriously considered for a roundabout. A roundabout would allow steady and safe traffic progression and preserve, if not enhance, the level of service at the intersection. A roundabout would provide a great opportunity for a more beautiful entry to Marquette from the east. However, space is limited here and a roundabout may require creating some space lakeward over the edge of the bluff or cutting further into banks on the southwest and northwest sides of the intersection, which would increase the cost of a roundabout here.

Walter Kulash, a noted transportation planner, examined this intersection and gave the City a report in 2001 that identified several other options for this intersection, including roundabout variations. These should be carefully considered as part of a larger roundabout feasibility analysis, because at least one Kulash variation included a smaller than usual design that may fit this intersection.

Again, the roundabout option is more expensive and available space is limited creating other potential problems. If there is interest in this option, this intersection along with Grove, McClellan and Washington should all be evaluated as part of a feasibility analysis. If the result was infeasible at one or more of these intersections, the option selected should focus on a single uniform design to minimize driver confusion. If roundabouts were feasible and selected for any of the intersections within the City of Marquette, it is important that driver education and public awareness campaigns be jointly developed and delivered by MDOT and the City to properly prepare motorists for roundabout design.

US-41 at Hampton

This intersection is located about ¼ of a mile south of the Genesee Street intersection. Reportedly cars and trucks often “blow” through this intersection. The steep approach grade from the south (westbound US-41/M-28) direction is the problem. Rumble strips could be added coming down the hill (just as they are coming up to the Front St/US-41/M-28 intersection going east bound) and they may help slow traffic through this area. A number of speed studies have already been done here and speed limit changes were not warranted. However, due to the new South Rail Yard Development along the harbor, consideration is being given to moving the traffic signal at Genesee to Hampton. A new signal analysis will be performed, and operational considerations may warrant a change in the signal location and advance warning signs. If so, instead of rumble strips, advance warning devices will likely be needed at the top of the hill and half-way down for north and westbound traffic.

While there are several properties with too many driveways in this area (see Map 4-7), nearly a quarter of the crashes near the intersection are at driveways of the

tire center where all but one redesigned driveway should be closed. Pedestrian crossings with connections to sidewalks should be improved on both sides of the street, beginning with improved pavement markings.

Railroad Improvements

Railroad Bridge Negaunee Township

The railroad bridge in Negaunee Township over US-41/M-28 is not a standard height, it is currently 14' high (see Photo 4-6). Many trucks can not travel through this area because of the height restriction. This has created a burden on the County road system which has accommodated the trucks. In order to bypass this bridge, trucks must connect to US-41/M-28 utilizing County Road 480 or 492 which connects to US-41 further west. It is recommended that US-41/M-28 be lowered below the railroad crossing so that the depth will be a minimum of 14' 6". This will take some trucks off the County roads, but will also likely increase truck traffic through the City of Marquette and Marquette Township.

Photo 4-6: Existing 14' Railroad Crossing



Recommended Improvements

The US-41/M-28 Corridor Advisory Committee assisted the consultant team with the identification of specific traffic flow and safety improvements along the corridor. The following list of recommended improvements is presented from west to east along the corridor from the Ely Twp./Humbolt Twp. line 28.4 miles east to the junction of US-41 at M-28 in Chocolay Twp. The recommendations are listed by governmental unit. Each issue or recommendation is numbered and is visually represented on the attached Maps 4-1 to 4-8. The numbering of issues begins on the western border of each jurisdiction and proceeding to the east. The numbering is not a representation of importance of one issue over another issue; it is merely a means to organize the issues and recommendations. The list represents a collection of issues, ranging from pedestrian oriented concerns, driveway closures, intersection improvements and aesthetic concerns.

The numbered list includes the concerns talked about in the previous section, but also includes detailed issues sometimes on a parcel by parcel basis.

Each issue has been coded with an S, L or O which indicates the following: "S" indicates improvements to be made in the short term. "Short term" would be less than 5 years. "L" indicates improvements to be made in the long term. "Long term" would be anything over 5 years, ranging up to 20 years. "O" indicates improvements to be made as the opportunity arises, either as redevelopment occurs or as road improvements occur.

Ely Township

There were twenty issues identified within Ely Township. Several safety issues were identified within the Township, including the construction of bypass lanes at intersecting roads, and constructing turning lanes. County Road 496 crosses US-41/M-28 at oblique angles at several locations. These angles are recommended for adjustment. See Maps 4-1 and 4-2 for the exact location of each of the following recommendations.

1. Check right-of-way maps to indicate if a sign is in the right-of-way just east of the Humbolt/Ely Twp line (O).
2. Adequate turning and bypass lanes at the intersection of US-41/M-28 and County Road 496 (Lake Lory Road) should be constructed. This should include traffic markings that will keep the County Road traffic entering US-41/M-28 back to allow for the bypass traffic (O).
3. The intersection of County Road CKJ and westernmost part of County Road CKL (L) should be straightened (T-intersection). The intersections meet at an odd angle, and are presently too close.
4. Close one drive way and develop curb control at auto salvage on north side and close one driveway at auto salvage yard across on south side of street, also improve curbing (O).
5. Close one drive way at Derocha Steak House (O).
6. A westbound turning lane and an eastbound bypass lane on US-41/M-28 should be constructed at the County Road CKL intersection (L).
7. The passing lane beyond the west side of the intersection at County Road CKC and US-41/M-28 should be extended. This will allow for a safer ingress and egress of the County Road Commission trucks that use County Road CKC to transport gravel throughout W. Marquette County (L).
8. Build west and eastbound turning lanes at the intersection of County Road CJ and US-41/M-28 (L).
9. Close the second driveway 900' W of County Rd. CN (O).
10. Construct a passing flare at County Road CN (S).
11. Construct turning and bypass lanes at the intersection of US-41/M-28 and County Road 478 (Wawonowin Club Road). This should include proper traffic markings to make sure that traffic entering the intersection from County Road 478, stops far enough back to allow for the bypass

- traffic (L).
12. Check if signs in right-of-way (O).
 13. Close one drive at Lawry's restaurant (O).
 14. Build bypass lane for eastbound traffic at the intersection of County Road CKM and US-41/M-28. Also construct a right-turn lane for westbound traffic turning onto County Road CKM (L).
 15. Allow only southbound traffic on County Road CZ at US-41/M-28-close off northbound connection. Build a bypass lane on the north side of US-41/M-28 for traffic turning south at the County Road CZ intersection (L).
 16. Define driveway using curbs at Marathon gas station parking area (O).
 17. Fix CR496 sight distance problem when reconstructing intersection. On the northside of the road the hill west of the intersection rises up to the gas station and affects sight distance (L).
 18. Improve the turning radius at the intersection by constructing a T-intersection with CR 496 on south side (L).
 19. Improve the turning radius at the intersection by constructing a T-intersection with CR 496 and Diorite Rd (western entry). (L)
 20. Extend five-lane from Westwood Dr. in Ishpeming Twp. west through to County Road 496 west of the Carp River (L). See page 4-2 for detailed description.

Photo 4-7: Ely Township



Insert Map 4-1

Insert Map 4-2

Ishpeming Township

There were fourteen issues identified within Ishpeming Township. Ishpeming Township has an opportunity to improve the aesthetic appearance and pedestrian facilities within the residential areas. Several driveway closures are recommended, as well as, improving the turning radius of two intersections; one at US-41/M-28 and CR 496 and one at US-41/M-28 and North Lake Road. See Map 4-2 for the location of issues one, two and three. See Map 4-3 for the remaining issues four through fourteen.

1. Improve the turning radius at the intersection of CR 496 and Diorite Rd by constructing a T-intersection (eastern entry) (L).
2. Close the driveway at Westwood Dr. to US-41/M-28 for RL Balconi Co. Provide access from Westwood Dr. (O).
3. Check if the sign is in right-of-way (O).
4. Possibly create a cul-de-sac for Sello Street at Randall Drive or possibly a cul-de-sac for Rose Street instead of the awkward angled intersection to US-41/M-28 (O).
5. Sign in right-of-way is probably sign for high school (O).
6. Consider improving turning radius for Pansy, Lilac, Daisy, and/or Marigold Streets (L).
7. Redesign the internal parking at Jim's Car Wash because currently the parking along US-41/M-28 may be in the right-of-way (O).
8. Close the second driveway to church on north side of US-41/M-28 (O).
9. Avoid offering parking spaces close to the road which interferes with sight out of driveways. Put in curbs, street trees and plantings where possible (L).
10. Check if the sign is in right-of-way (O).
11. Check if the sign is in right-of-way (O).
12. A pedestrian crossing US-41/M-28 should be added at the intersection to permit safe crossing from the park to ice cream store. Because there is concern about a standard crossing in this area a tunnel could be considered. However, there is no integrated sidewalk system to connect to. The existing Ishpeming Township sidewalk system would likely need to be enhanced before this improvement were made (L).
13. Improve the turning radius at the intersection by constructing a T-intersection at North Lake Rd (L).
14. Add right-turn lanes at Cooper Lake Road for east and westbound traffic and open the radius on the turns (O).

Ishpeming

There were fifteen issues identified within the City of Ishpeming. The biggest issue is improving the intersection at Lakeshore Drive, (see discussion on page 4-3). See Map 4-3 for the location of issues one through fourteen. See Map 4-4 for the location of issue 15.

1. Relocate the existing driveway to line up across from Dione St.

Alternatively, redesign driveway location when design for street system on abutting land is proposed (O).

2. Check if there are signs in right-of-way on both sides of US-41/M-28 (O).
3. Check if billboard is located in the right-of-way (O).
4. A five-lane widening possible from Second St. to Cambria Rd and eventually to Teal Lake Road in Negaunee (L).
5. Narrow the driveway at Ralph's Deli on NE corner of US-41/M-28 and CR 573-drive that is on CR 573-drive. Entry is too close to intersection (O).
6. Better the define driveways (the driveways that open onto US-41/M-28) at Peninsula Glass on NE corner of US-41/M-28 at CR 573 (O).
7. Building is too close to road for adequate sight distance out of parking lot (O).
8. Close the driveway at Northern Veterinary Clinic at Hickory St. Open access from Elm St. (O).
9. Close driveway (O).
10. Improve eastbound right-turn curve radius of road at Hickory Street because of poor angle of turn (L).
11. On north side of US-41/M-28 possibly close access for properties that may eventually be able to take their access from Hemlock St. or Miracle Street, particularly if uses convert from residential to commercial (O).
12. Pedestrian crossings are important to City, especially at Second, but there are no sidewalks here (need to be interconnected or linked to a trail system). Check possibility of tunnel or overhead crossing not too near intersection (L).
13. Light is at 2nd Street but it is not a straight route into City. 3rd Street is a straight route downtown, but does not connect on north side of US-41/M-28 like 2nd does. The downtown businesses may prefer a traffic signal connection at 3rd instead of 2nd Street. As an alternative it may be desirable to diagonally connect 2nd Street to 3rd Street south of the railroad right-of-way (L). In any event, the signal timing and overall operation should be evaluated for providing safer turning opportunities at Second Street. Also consider constructing rear service road behind Burger King to Hickory adjacent to RR line as option for local traffic in this area.
14. As properties develop east of Moulten, assure adequate driveway separation on both sides of US-41/M-28 (S).

Photos 4-8 and 4-9 Ishpeming Township and the City of Ishpeming



Insert Map 4-3

Negaunee

There were eleven issues identified within the City of Negaunee. Negaunee has an opportunity to improve the aesthetic appearance and pedestrian facilities within the downtown area. Several driveway closures are recommended, as well as improving the turning radius of two intersections; one at US-41/M-28 and Cambria and one at US-41/M-28 and Heritage Drive. The signals in the downtown area at Teal Lake, Baldwin and Maas need to be evaluated for timing phasing. See Map 4-4 for the location of issues one through eleven.

1. Improve the turning radius at the intersection of US-41/M-28 and Cambria, by creating a T-intersection at Cambria (L).
2. Better define the intersection at Tilot Rd. or possibly close Cambria/Tilot middle access point (L).
3. Close both driveways to auto dealer 150' west of southwest corner of Teal Lake Rd. Access from Water St. Close drive to barber shop near southwest corner of Teal Lake Rd. Access from Water St. (O).
4. Possible implementation of a flashing red (instead of separate constant green arrow) to facilitate left-turns at Teal Lake. This is a tough left-out and left-in off of US-41/M-28 since there is no separate left-turn phase. Could also implement the same approach at Baldwin, and Maas (S).
5. Crosswalks are present on US-41/M-28 from Croix St. and Baldwin Ave. Sidewalks should be completed along US-41/M-28 and have adequate setback from the street where possible (L).
6. Close the east driveway of Beef-a-Roo (O).
7. Better define the driveways and curbs at Baldwin SE corner of US-41/M-28 (O).
8. Baldwin St. is difficult left-in off of US-41/M-28 (has more cross traffic than Teal Lake); possible treatment with flashing left-turn red light, instead of separate constant green arrow (see #4 above) (S).
9. A right-turn lane at Croix Street (westbound) and a possible right-turn eastbound at Maas could be created (L).
10. Check if there is a sign in the right-of-way (O).
11. Improve the turning radius at the intersection by creating a T-intersection at Heritage Drive (L).

Photo 4-10: US-41/M-28 in Negaunee



Insert Map 4-4

Negaunee Township

There were twenty-three issues identified within Negaunee Township. Primary recommendations were previously described for the former airport location near M-35 and the railroad bridge see pages 4-4 and 4-11. Other recommendations include driveway closures as well as improving the turning radius of two intersections; one at US-41/M-28 and Forest and one at US-41/M-28 and Midway Drive. See Map 4-4 for issues one and two. See Map 4-5 for the location of issues three through seventeen and see Map 4-6 for issues 18 to 23.

1. Close the driveway east of the Negaunee border. Realign the driveway to provide access from Heritage Drive. (O).
2. Better define driveways at SEMCO gas and encourage connections between parcels (O).
3. Close the driveway 450 feet west of Perala Ct. (O).
4. Close the driveway 300 feet west of Perala Ct. (O).
5. Better define the driveways and curbs 500 ft. west of Forest Dr. (O).
6. Improve the turning radius at the intersection by creating a T-intersection at Forest (L).
7. Close west drive of Vietnam Veterans of America 600' west of Airport Road (O).
8. Intersection improvement and limit access at old airport site/future casino to one main entrance. Construct a parallel service road the full length of the old airport property from Heritage Dr. to Snowfield Road. Also, consider constructing a trail from the near casino to connect with the existing trail and at the Township Hall on M-35 (S).
9. Close the west end of Midway Drive with a cul-de-sac (the end closest to the proposed casino) (L).
10. Close driveway on south side 100 feet east of intersection on Pond Road. (O).
11. Close middle driveway to M&G Party Store/Marathon on north side (O).
12. Better define curbs on south side between guard rails (O).
13. Close median opening (O).
14. Close the east driveway to the auto shop on the south side (O).
15. Extend Brebner to US-41/M-28 (L).
16. Close the west driveway of first business after Midway Dr. (Pathways) (O).
17. Check if the parking near US-41/M-28 is in right-of-way (O).
18. Improve the turning radius at the intersection by creating a T-intersection at Midway Drive. This intersection has a steep grade and cars exit Midway and must crossover three lanes (O).
19. Signs in right-of-way (O).
20. Better define the driveways and curbs across from Industrial Park Rd. (O).
21. Close County Rd. JPC approx. 100 feet east of railroad crossing (O).
22. US-41/M-28 should be lowered below the railroad crossing to a

minimum of 14' 6". This will take some trucks off the County roads (L). See page 4-11 for further discussion.

23. Widen width of median and better define median crossovers when improving boulevard from Negaunee to Marquette Twp. line (L). See page 4-2 for further discussion.

Marquette Township

There were thirty-three issues identified within Marquette Township. There were several major intersection improvements noted at the beginning of this Chapter. Following are detailed access management issues that should be addressed within Marquette Township, such as driveway closure and combining driveways. See Map 4-6 for the location of issues 1 through 36.

1. The median should be extended from the Township line east to the existing median. Median width should be expanded to meet contemporary standards where possible (L).
2. Improved pedestrian and transit access should be coordinated from Brickyard to the City of Marquette (coordinated sidewalks/pedestrian facility) (L).
3. Landscaping plan should be created from Brickyard Road to the City of Marquette with improved signage and burying of power lines. Lighting along the corridor through the mall area should be considered with costs borne by the benefited businesses through a special assessment. Such lights would likely reduce the need for the towering and bright parking lot lighting in this area. All lighting should be down directed to protect views of the night sky (L). Close drive at Honda on the north side of US-41/M-28 (O).
4. Improve turning radius by creating a T-intersection at Brickyard. Home Depot proposed for parcel on north side of US-41/M-28-would need intersection to be corrected (L).
5. Close the driveway on the north side of US-41/M-28-motel east of Brickyard (O).
6. Close the center driveway to Claws and Paws. If feasible, connect parking lots of businesses from Claws and Paws at least to Wal-Mart (better to Pier One) (O).
7. Improve and extend Brickyard on the south side of US-41/M-28 to improve rear access to existing businesses. The old rail right-of-way should be considered for this road at least to CR 492 (it would need to be carefully designed to avoid conflicts with the proposed Heritage Trail). In addition, careful consideration should be given to using the old rail right-of-way for a new road all the way to Bacon Drive in Marquette, and then extending Bacon south to Wilson. The proposed Heritage Trail would also be a part of the new design. This would provide a local street parallel to US-41/M-28 for local traffic and relieve some of the congestion (which will only increase as new development occurs around the mall) (L).

8. Close the eastern driveway of SBC next to signalized driveway (O).
9. Improvements to the right-turn lane should be considered for eastbound traffic at Wal-Mart (O).
10. Relocated county Road 492 (Target Drive) could be extended and relocated between Wal-Mart and SBC (see Intersection Improvements section earlier in this Chapter on page 4-5.) (L).
11. A fire hydrant too close to the south side of US-41/M-28 should be moved (S).
12. CR492 relocation (see options in Intersection Improvements section earlier in this Chapter on page 4-4 and 4-5) (L).
13. Improve internal circulation between parcels from Target to Commerce Dr. (L).
14. Close off left-turns from eastbound US-41/M-28 to 492 (S).
15. Close the eastern driveway to Red Lobster and connect the parking lots of Culvers Ice Cream and Red Lobster). Also connect Culvers and Red Lobster with Brookton Rd through rear access (O).
16. Close the Applebee's driveway and combine with mall access when possible. Move the current crossover opening 50 to 75 feet east to improve turning movement safety (O).
17. Mall/Commerce Drive and Brookton circulation changes (see options in Intersection Improvements section earlier in this Chapter on page 4-4 and 4-5) (L). Also right-turn signal at Kohl's needs to be corrected (see crash analysis in Appendix B).
18. Evaluate the existing speed limit westbound from the City of Marquette to Brickyard. Recommend new speed study in this area (S). See Photo 4-11 of 50 MPH speed in area of retail development

Photo 4-11: 50 MPH speed limit



19. Pedestrian connections should be established in this area. However, where to provide pedestrian crossings in this area is difficult. If at grade must be at traffic signals. Also should study possibility of tunnels instead of at grade or overhead crossings. Currently there is a 12' culvert (west of Sears by Lamplighter). It should be explored for use as a pedestrian tunnel. It should also be examined for its potential to accommodate snowmobiles. Two crossings (one on the east and one on the west end) should be examined with access from both the north and south sides (L).

20. Commerce Drive can be linked from the mall to Brookton by extending road (see options in Intersection Improvements section earlier in this

- Chapter on page 4-4 and 4-5). (L).
21. May need to reduce grade on westbound lane in front of parcels east of CITGO or rough surface to improve traction if traffic signal is moved to Commerce Drive (O).
 22. Close the west and middle driveways to Chevrolet Dealer on south side and provide on-site unloading of vehicles (O).
 23. Close the west drive way to Koupp Auto Sales on north side (O).
 24. Close the west drive way of small office building east of Brentwood Motel on south side (O).
 25. Close west drive of Golf Complete on north side; share driveways with adjoining parcels (O).
 26. Check if signs in right-of-way (O).
 27. Check if signs in right-of-way (O).
 28. The direct lefts at Erickson should be eliminated. It is the highest crash location in the Township. A new directional crossover to the west which required an indirect U-turn instead of a direct left-turn will significantly improve safety at this intersection (L). As the opportunity presents itself, consider changes to the driveway location and permitted directional movements at the Bonanza, because a driveway is too close to the Erickson intersection with US-41/M-28 (O).
 29. Check if signs in right-of-way (O).
 30. Close west driveway at Range Communications on north side (O).
 31. There are too many signs from Erickson St. to West Ridge on north side of US-41/M-28 (O).
 32. Close driveway at Kawasaki dealer on south side and eliminate parking in right-of-way (O).
 33. Right-turn lanes would be beneficial particularly on turns with a difficult angle, such as County Road HF at Pepp Motors near the Township and City border. (O) Redo access to Pepp Motors at corner of Brookton (the driveway is too close to the intersection) (O).

Photo 4-12: US-41/M-28 in Marquette Township

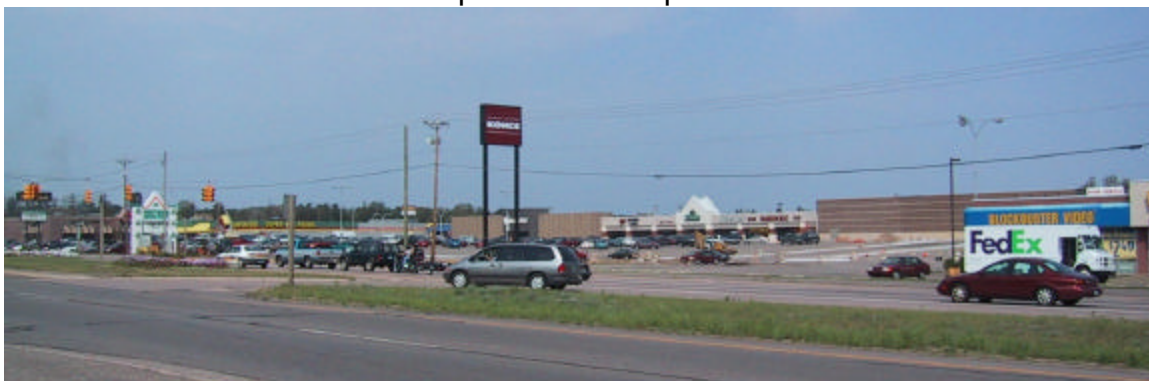


Photo 4-13: US-41/M-28 in Marquette Township (looking east)



Map 4-5

Insert Map 4-6

Marquette

There are twenty issues identified within the City of Marquette. Many of the intersections were discussed in detail at the beginning of this Chapter. There are several driveway closures suggested as well. Detailed pedestrian, recreation trail and transit issues are discussed in the next section. See Map 4-7 for the location of the recommendations 1 through 19. See Map 4-8 for recommendation number 20.

1. Consider closing one driveway and installing a frontage road from Brookton Rd. to Bacon Rd on the south side. Also consider encouraging a gasoline station here so that snowmobiles don't have to cross US-41/M-28 in front of the Holiday Inn. In addition enforcement of laws related to snowmobiles crossing of public streets and highways should be improved in this area (O).
2. Extend the curb-island and add landscaping in front of Villa Capri on north side (O).
3. Close the west driveway to Bald Eagle Harley sales (O).
4. Close the west driveway to Big Boy (redevelopment is a good opportunity for eliminating driveways-when the city implements access management via site plan review) (O).
5. US-41/M-28/W. Washington (US41 BR) intersection. See options in the Intersection Improvements section earlier in this Chapter on page 4-6 (L).
6. McClellan Ave. has the second highest crash incidence on the corridor. It has a steep grade approach to the intersection of US-41/M-28 making it hard to see coming from the north (S). See options in the Intersection Improvements section earlier in this Chapter on page 4-7.
7. Explore weather related safety issues between Front and Washington and determine if any new signs or design changes are warranted (L).
8. The proposed extension of Seventh Street across the old railroad yards will improve circulation in the City, but will also put additional hospital and university traffic into the US-41/M-28/Grove intersection. (L) See options in the Intersection Improvements section earlier in this Chapter on page 4-8.
9. Intersection improvement US-41/M-28 at Front St. (L) This intersection is stressful for drivers and will only get worse as volumes increase. See options in the Intersection Improvements section earlier in this Chapter on page 4-9.
10. Where possible, properties should take access from Champion and close access to US-41/M-28 (O).
11. The new South Rail Yard Development along the harbor will make the US-41/M-28/Genesee intersection a four-way intersection. The signal will need to be upgraded at the intersection if it is not moved to Hampton Street. Add landscaping in this area (S). Further evaluation of pavement conditions is needed with an eye to improving pavement friction qualities.

12. The Hampton Street intersection with US-41/M-28 has no traffic signal, but is number eleven of all of the intersections within the corridor study area in number of crashes. It should be studied as the possible location of a traffic signal moved from Genesee Street. See options in the Intersection Improvements section earlier in this Chapter on page 4-10.
13. Close the north driveway of Rent All north of Genesee St and close south driveway of Cliff's Muffler Shop at Genesee (O).
14. Close the north driveway of Beef-A-Roo at Genesee St. (O).
15. Close the south driveway of Marathon gas station at Hampton St. (O).
16. Close the south driveway to Pepsi distributor at Furnace St. (O).
17. Close the driveways closest to water (O).
18. Close the north driveway at DNR building (O).
19. The City is considering constructing a new road along the Carp River by the Prison to connect McClellan to US-41/M-28. This would also open considerable land to development (L). The new intersection should be carefully located.
20. The "Rock Cut Area" actually encompasses a portion of Chocolay, a sliver of Sands Twp. and the City of Marquette. In the winter, it is a potentially significant white out area. Safety issues should be studied relative to other improvements in this area and changes incorporated into future signs and/or roadway improvements as necessary. Preservation of existing views of Lake Superior should be preserved when any options for change are considered (L).

Chocolay Township

There were seventeen issues identified within Chocolay Township. Chocolay Township currently has two intersections within the top ten crash intersections within the corridor study area, Silver Creek Road and Cherry Creek Road. Several access management recommendations are presented including driveway closures and combined driveways. See Map 4-8 for the locations of recommendations 1 through 17.

1. A bicycle path could be constructed to connect from the City of Marquette waterfront thru Chocolay on the west side of US-41/M-28 from the Rock Cut Area to Silver Creek, then on to M-28 with a tunnel to cross road. It needs to accommodate pedestrians, bikes and snowmobiles. The entire area could also be enhanced with landscaping as part of an overall system for beautification (L).
2. Close drive in front of Ace Hardware (O).
3. Close drive to Marquette Veterinary Clinic (O).
4. Construct a rear service road behind Ace and Marquette Vet. Clinic (L).
5. Combine two driveways between Larue's and CITGO gas station (O).
6. Close one driveway at Harvey Oil Co. (O).
7. Move the north driveway at Phillips 66 gas station to between Phillips 66 and Harvey Oil Co. (O).
8. Improve the turning radius on intersecting diagonal roads such as Corning (O).

9. Intersection improvements should be considered at Silver Creek Road. Minimally the intersection radius at Corning Street should be improved to square it up. The pedestrian overpass location may cause a problem with the sight of the traffic signal by busses and trucks. Since the elementary school has closed, the pedestrian overpass could be removed or relocated and pedestrian crossing strips could be put down (S). A pedestrian tunnel under US-41/M-28 at/near to Silver Creek (sewer is 14' deep there, so no rock outcrop problem) could be constructed.
10. Relocate the drive way on Silver Creek Road serving the Township Fire and Police Department (O).
11. Relocate the drive way at Dry Dock Bar (O).
12. Relocate the driveway south at Wahlstrom's Restaurant (O). See Photo 4-14 of numerous driveways along US-41/M-28 in Chocolay Township.
13. Close the north driveway at Parkway Motel (O).
14. Combine the driveways between Superior Fast Lube and Wash (O).
15. At the northeast corner of the intersection with M-28 create a service road to encompass Togo's, Holiday gas station, Snyder Drug and the plaza. Close existing drives. Create access to service road on M-28 and on US-41 between plaza and Snyder Drug (L).
16. The radial street pattern at the intersection of US-41 and M-28 should be continued (L).
17. An intersection operations study is recommended at Cherry Creek Road to identify safer left-turn opportunities.

Photo 4-14: US-41/M-28 at Wahlstrom's Restaurant looking north



Insert Map 4-7

Insert Map 4-8

Proposed Bus, Bicycle, Pedestrian, Transit and Snowmobile Improvements

Pedestrian Systems

Creating more pedestrian facilities along US-41/M-28 is needed; however, new pedestrian facilities must be designed so that the safety of the pedestrians is foremost. Presently, there aren't many sidewalks along the corridor. See Photo 4-15. And where sidewalks are available, they are often too close to the road. See Photo 4-16. There are "raised curbs" adjacent to the road in Marquette Township, Negaunee Township and Ishpeming that pedestrians reportedly utilize as a sidewalk when they aren't being used for snow storage.

Pedestrian tunnels are one option that protects the pedestrian from having to cross the highway at grade. See Photo 4-17. It is a preferred alternative where traffic speed is high, and/or traffic flow or mix issues make it difficult to safely site a crosswalk at grade, however, it is expensive. Sidewalk connections are also needed between any new crosswalks or tunnels across US-41/M-28.

Photo 4-15: Raised Curbs Instead of Sidewalks



Photo 4-16: Sidewalk Close to Street



Photo 4-17: Pedestrian Tunnel Under Construction in Houghton



Ely Township/Ishpeming Township

There are no pedestrian crosswalks in place currently because of the lack of sidewalks. Pedestrian access is presently not feasible in Ely Township because speeds are too high. However, within Ishpeming Township there is a residential area off of US-41/M-28 that would benefit from sidewalks and crosswalks to provide accessibility to commercial areas along US-41/M-28. Landscaping improvements could be implemented at the same time as pedestrian improvements.

Ishpeming

Pedestrian crossings are important to the City, especially at Second Street but there are currently no sidewalks in place. A tunnel would be a preferred option but the cost would be high, and an overhead pedestrian crossing may be viable. The City should consider a plan that links pedestrian, bike, transit and landscaping accessibility improvements for the US-41/M-28 corridor.

Negaunee

Crosswalks are present on US-41/M-28 from Croix St. and Baldwin Ave in the City of Negaunee. The City of Negaunee has the only pedestrian crosswalks outside of the City of Marquette along US-41/M-28. Sidewalks should be completed along US-41/M-28 and have adequate setback from the street where possible (L).

Negaunee Township

Pedestrian access along US-41/M-28 is not feasible in this area because speeds are too high and there are no concentrated residential areas.

City of Marquette and Marquette Township

The City of Marquette and Marquette Township should have the most extensive pedestrian systems and investment in them along the corridor, because they comprise the majority of the population and the most desired pedestrian

destinations. While historically there has been a significant lack of accommodation for pedestrians along US-41/M-28 within these jurisdictions, there has been a recent effort to implement traffic calming on adjoining streets and more pedestrian orientation in local planning.

Pedestrian and bicycle crossing of US-41 at McClellan is difficult and likely to become more of a problem as the City implements bike routes. The "*City of Marquette Master Plan Update: Walkable Communities Element*" which was authored by noted transportation planner Dan Burden, Walkable Communities Inc. suggested that McClellan Ave and US-41/M-28 be rebuilt to accommodate Americans with Disabilities Act and walkability needs. Burden suggests channelized islands for all four corners of McClellan Avenue to assist with pedestrian crossings and designating sidewalks across the median for safe pedestrian crossing on US-41/M-28. The situation is greatly complicated by the fact that the McClellan Avenue intersection is part of a designated "bypass" and it is a violation of the motor vehicle code to walk or bike across or along the bypass. Other alternatives include the following: a structure over the road. However, this would be a problem with wind, snow and ice and is not likely to be used as often as it should be. A tunnel should be explored, but because of the grade changes would be difficult and expensive to implement. The old rail bridge provides one possible opportunity for pedestrian, bicycle and snowmobile connection over US-41/M-28 near McClellan, but the route would need to diagonal back to O'Dovero Drive after US-41/M-28 were crossed. Still, this is the safest alternative and should be explored. The City of Marquette is undecided on snowmobile use of the rail trail east of the rail bridge at this time, so any trail design should not be initiated until the City makes a decision.

At other intersections along US-41/M-28 west of Washington Street in the City of Marquette and throughout Marquette Township, the median could effectively be utilized, as Mr. Burden suggests, as a mid-way point for pedestrian shelter if the crossing was properly marked. Pedestrian tunnels are preferred, but the cost may restrict their use.

Pedestrian and bicycle crossing is also a growing issue at the Grove Street intersection, and will only increase in significance if 7th Street is extended. The grades on both sides of the road lend themselves to a bridge, but it would be quite long and costly. No pedestrian or bike crossing is recommended here as it is within the bypass segment. Instead, the Altamont Street bridge should continue to be used.

Chocolay Township

A bicycle path is currently proposed to connect from the City of Marquette waterfront through Chocolay on the west side of US-41 from Rock Cut Area to Silver Creek then on to M-28. Any crossing needs to accommodate bikes, pedestrians and snowmobiles. Photo 4-18 shows a portion of the current bike trail in Chocolay Township.

Photo 4-18: Chocolay Township Bike Trail Along East Side of Road



Recreation Trails

Recreation is a significant part of the economy in the Marquette area. Recreation trails are open year round for hikers and bikers in the spring, summer and fall and snowmobiles and cross-country skiers in the winter. The existing regional system is shown on Map 4-9 and the City of Marquette's trail system is shown on Map 4-10.

Proposed Heritage Trail

There is a new Heritage Trail that is proposed to link the City of Ishpeming, City of Negaunee, Marquette Township and the City of Marquette by utilizing an abandoned rail corridor which is just south of US-41/M-28 (see Map 4-9). The Heritage Trail would travel through the downtown business districts creating more accessibility for non-motorized travel. Opening this trail to pedestrian and bicycle travel close to US-41/M-28 may also translate into more pedestrians trying to access US-41/M-28 for commercial facilities near the trail. If the trail is implemented, the City's involved would have an increased need to implement other pedestrian facilities between the trail and along US-41/M-28.

Snowmobiles

Marquette County currently has a sophisticated snowmobile trail system in place (see Map 4-9). The snowmobile trail that is of most significance to this Plan is the trail nearest US-41/M-28. Snowmobiles are used in the winter for recreational trips as well as, short trips within some of the outlying areas. Snowmobiles are only allowed within the City of Marquette on designated trails because of noise problems and safety issues.

Because US-41/M-28 speeds are high, snowmobile crossings should be planned so they are grade separated or at signals. If possible, snowmobile trails should be planned so that they are separated from the US-41/M-28 highway. Currently there are two snowmobile crossings within the study area that are below grade. The first is in the City of Ishpeming and the second is in the City of Marquette at the Carp River. The snowmobile trail dead-ends in a couple places along the

corridor, near McClellan and US-41 at the old rail bridge and in Negaunee Township.

The current at-grade snowmobile crossing is at Brickyard Road within Marquette Township. There is currently no traffic signal, and the highway is five lanes at this juncture. Coupled with the high traffic volumes in this area, this is a risky crossing for snowmobilers. An alternative crossing should be considered, if possible, further to the west. The median in Negaunee Township would provide a short refuge for the snowmobiles that cross US-41/M-28, so that they don't need to cross five lanes at once. Another underpass in this area would probably be the best solution if the existing culverts at Menard's and near Brickyard are determined to be unsuitable.

Snowmobile groups are encouraged to meet with MDOT and local government officials to identify the best solutions to these and related issues along the corridor.

Insert Map 4-9

Insert Map 4-10

Transit

The Marquette County Transit Authority (Marq-Tran) operates throughout Marquette County every day of the week. There are several fixed routes. One fixed route goes from Ishpeming to Marquette. Marq-Tran also offers door-to-door service in the greater Marquette and Ishpeming-Negaunee areas. There is limited service on Sundays and holidays. Figure 4-2 shows one of the routes from Marquette to Ishpeming.

Photo 4-19: Marq-Tran Bus on US-41/M-28



Figure 4-2: Marq-Tran Route Map



Marq-Tran seems to be successful and well-established within the community of Marquette and the surrounding area. A county-wide system is an advantage for those with low incomes that may live in outlying areas.

Marq-Tran should seize on opportunities to service tourists that come in for recreation events by offering more visible information on services, such as a downtown kiosk. Bus shelters and signs would also assist those unfamiliar with the system to try it out. Bus stop signs with schedules for the route and maps of where it goes are particularly helpful. The current system of “flag stops” can be difficult for those who are not familiar with the system or the area. Adding bike

racks on buses would also provide an opportunity to capture riders who may wish to continue a trip on a bicycle.

Marq-Tran does offer service on US-41/M-28. In some cases the bus will pull off US-41/M-28 into a shopping center to load and unload passengers. Currently, buses stop within traffic to load and unload passengers. In the future bus-pullout lanes may need to be discussed with Marq-Tran staff and MDOT to determine the safest areas for the bus to stop on US-41/M-28. Presently the lack of sidewalks in many areas does not promote the ease of dropping passengers at the curb. However, it is costly for the transit system to have to drop passengers in parking lots; it is more cost effective to drop passengers on the street. But if traffic speeds are too great, that is not a safe alternative without a bus-pullout lane.

Display of Goods in Right-of-Way

Many business establishments along the corridor display goods, products or vehicles for sale inside the right-of-way of US-41/M-28. This is an infringement on the public right-of-way and often impedes clear vision at driveways and intersections. Local zoning officials and law enforcement officials should work with MDOT to prohibit such infringement of the right-of-way and then routinely enforce all applicable laws.

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Chapter Five

COORDINATING LOCAL PLANNING AND ZONING STANDARDS

Introduction

This Chapter examines the existing land use, future land use and existing zoning for the jurisdictions along the US-41/M-28 corridor study area. The land use and zoning are also compared on the border areas between jurisdictions to determine if planned and existing uses are compatible. The land use and transportation relationship is examined through analysis of the planned uses and their design character and how they relate to the preservation of the road function.

Description of Zoning Elements to Examine

This Chapter also examines specific elements from each of the zoning ordinances with relation to roadway function, including lot size, setbacks, sign regulation, landscaping, lighting, existing access management standards and other standards that affect the function and aesthetic of the US-41/M-28 corridor.

Comparison of Land Use and Zoning and Future Land Use Maps for Jurisdictions in US-41/M-28 Study Area

Planning Efforts Along the Corridor

Most of the jurisdictions along the corridor have a Comprehensive or Master Plan in place. However, many are quite old. By law, a Comprehensive Plan should be reviewed at least once every five years, and then updated if necessary. Currently, the City of Marquette, Marquette Township, Chocolay Township and Ely Township are in the process of updating their Plans. The City of Negaunee and Negaunee Township have Comprehensive Plans that were completed in 1999. Ishpeming Township's Comprehensive Plan dates back to 1978, so an update is due.

A Comprehensive Plan should include a Future Land Use Map, which illustrates how the community vision will be carried out. The Future Land Use Map should guide rezoning changes and development in the future. The City of Negaunee, Negaunee Township, the City of Ishpeming and Chocolay Township currently have no Future Land Use Map within their Plan.

Comparison of Future Land Use Plans to Existing Zoning

Comparison of the Future Land Use Maps to the Zoning Maps provides a context for how a jurisdiction is planning for growth in the future. Future land use for each community that has adopted a Plan with a Future Land Use Map is displayed on Maps 4-1 through 4-8 in Chapter Four. The existing zoning of land along the corridor from the Zoning Maps for each jurisdiction are presented on

Maps 5-1 through 5-4. Following are observations that result from comparing local Future Land Use Maps to Zoning Maps.

City of Marquette

- A large area off of Seventh Street currently is an abandoned rail yard which is zoned industrial. The Future Land Use Map indicates future residential use in this area (which is what most of the abutting uses are to the south and east).
- The land south of downtown on US-41/M-28, on Lake Superior is zoned for more recreational space than is shown on the Future Land Use Map.

Marquette Township

- The Zoning Map and Future Land Use Maps are fairly consistent.
- The area on the western border of the Township is zoned for residential use, but the Future Land Use Map indicates a Forest/Open Space Use.
- The large commercial area from Brickyard to the City of Marquette would not be consistent with access management goals if it were allowed to develop as strip commercial with many separate driveways.

Ishpeming Twp

- This Land Use Plan is from 1978, so there isn't much that matches with the current zoning patterns. The current zoning includes much more "commercial" than planned in 1978, particularly along the US-41/M-28 corridor.

Ely Twp

- Large land areas are indicated for ore production
- There is a large area for commercial zoned along US-41/M-28 but it is not used that way. Typically it is unwise to zone land to a more intensive use class prior to its more intensive use. It leads to land speculation and future access management problems if it develops as strip commercial.
- Residential areas are indicated as bordering on "ore production" areas; is that a problem? If there are strong buffering provisions it may not be.

Compatibility of Zoning Ordinances

The Zoning Maps of the eight jurisdictions were then reviewed for compatibility at the border areas between jurisdictions along US-41/M-28. Zoning is reviewed at the border to identify any "neighboring" jurisdiction conflicts that can arise when one jurisdiction zones for a more intensive use or conflicting use at a jurisdiction border. Overall, the zoning border to border seems compatible along the corridor. Generally when one jurisdiction zones residential, the neighboring jurisdiction has zoned residential as well.

- Based on measurements from the GIS maps of land within 1,300 ft. of each side of the corridor, 30% of the land is zoned commercial. Ely Twp., Ishpeming Twp., City of Ishpeming, Negaunee Twp., Negaunee, Marquette Twp., City of Marquette and Chocolay Twp.: all have

commercial districts along US-41/M-28. Expansion of “strip” commercial development along US-41/M-28 will negatively impact traffic safety and the traffic flow along the corridor unless access is severely restricted.

- There are a few locations within individual townships that may not be compatible. For example, in Ely Township, about $\frac{3}{4}$ of a mile east of the Township border there is an area of “Residential” bordered by “Industrial”. In Ishpeming Twp., on the north side of US-41, about one mile east of the Ishpeming Twp. border, there is a zoned area of “Industrial” next to an existing residential neighborhood.

Density and Frontage Lots

The density and lot widths are particularly important because if numerous lots are allowed on the US-41/M-28 corridor, more driveways are required to serve those lots. Smaller lot sizes along the corridor can be problematic if all of the lots have separate driveways, because the driveways are too close to one another.

Typically 350-450 feet are needed between driveways to achieve the proper driveway spacing on a 45-55 MPH road. The minimum lot width standards should be enough (at least 300-400 feet) to accommodate these driveway distance separations, or shared driveways need to be required. Refer to Table 4-1 for driveway spacing guidelines and Table 5-1 for lot restrictions in each US-41/M-28 corridor study area jurisdiction. Other relevant observations follow:

- Densities vary greatly from jurisdiction to jurisdiction and within each jurisdiction. Minimum lot sizes range from 6,000 square feet to 40 acres.
- Minimum lot widths along the corridor range from 70' to 660'.
- The City of Ishpeming, City of Marquette and City of Negaunee allow the smallest residential, commercial and industrial lots.
- Ishpeming Twp., the City of Marquette and the City of Negaunee have no minimum lot size requirements for commercial and industrial lots.
- Setbacks on the corridor for all districts are 20-50'. The City of Negaunee has no setback requirement on commercial and industrial properties.
- Rear yards allowed along the corridor are 10-50'. The City of Negaunee has no rear yard requirement on any properties.
- Many of the jurisdictions require site plan review for commercial and industrial construction. See Table 5-1.

Insert Map 5-1

Insert Map 5-2

Insert Map 5-3

Insert Map 5-4

Table 5-1: Zoning Comparisons

Municipality	Zoning District on US-41	Min. Lot Size	Min. Lot Width	Front Setback	Rear yard	Site Plan Required?
Ely Township	R: Residential	20-30,000 sq. ft.	100-120'	30'	25'	Determined by Z/A
	R-2 : Residential	2 acres	165'	30'	30'	Determined by Z/A
	R-10: Residential	10 acres	330'	30'	35'	Determined by Z/A
	Town Development	20-30,000 sq. ft.	100-120'	30'	35'	Determined by Z/A
	Resource Production	20 acres	660'	30'	30'	Determined by Z/A
	Timber Production	40 acres	660'	35'	35'	Determined by Z/A
Ishpeming Township	Single Family Residential	20,000 sq. ft.	125'	30'	10'	NO
	Multi Family Residential	20,000 sq. ft.	125'	30'	30'	NO
	Rural Residential	10 acres	300'	30'	30'	YES
	Commercial	none	none	30'	20'	YES
	Industrial	none	none	40'	20'	YES
City of Ishpeming	Single Family Residential	7,500 sq. ft.	80'	25'	30'	NO
	General Commercial	6,000 sq. ft.	75'	20'	25'	YES
Negaunee	Residential A	9,600 sq. ft.	80'	20'	none	NO
	Residential B	9,000 sq. ft.	80'	20'	none	NO
	Commercial	none	none	none	none	YES
	Industrial	none	none	none	none	YES
	PUD	none	none	none	none	YES
Negaunee Twp.	R-2: Single Family Residential	43,560 sq. ft.	125'	25'	25'	YES
	B-1: Restricted Business	11,000 sq. ft.	75'	25'	25'	YES
	B-2: General Business	11,000 sq. ft.	75'	25'	25'	YES
	I: Industrial	5 acres	250'	50'	50'	YES
Marquette Twp.	Rural Residential	20-40,000 sq ft.	150'	35'	25'	Determined by Z/A
	Gen. Business District	8-20,000 sq. ft.	60-100'	25'	25'	YES
	Development District	8-20,000 sq. ft.	60-200'	25'	25'	YES
City of Marquette	Single Family Residential	10,800 sq. ft.	80'	30'	30'	NO
	General Residential	8,400 sq. ft.	70'	20'	30'	NO
	General Business	none	none	35'	20'	YES
	Office District	8,000 sq. ft.	80'	0	10'	YES
	Industrial	none	none	25'	10'	YES
	Conservation and Recreation	none	none	50'	50'	N/A
Chocolay Twp.	R-1: Residential	25,000 sq. ft.	125'	30'	35'	NO
	R-2: Residential	25,000 sq. ft.	125'	30'	25'	NO
	R-3: Residential	25,000 sq. ft.	125'	30'	25'	YES
	R-4: Residential	20 acres	none	30'	30'	YES
	C-1: Commercial	25,000 sq. ft.	125'	30'	20'	YES
	C-2: Commercial	25,000 sq. ft.	125'	40'	20'	YES
	C-3: Commercial	1 acre	150'	40'	20'	YES

Sign Requirements

Sign requirements were also examined in each jurisdiction. See Table 5-2 for the comparison information between jurisdictions. Particularly important to roadway function is the setback of signs out of the right-of-way and the consolidation of signs to minimize driver confusion. Other observations include:

- There are setback requirements for signs in most of the jurisdictions. 10-50' setback from ROW line is the typical range.
- Some jurisdictions have regulations allowing larger signs if setback further from the road.
- Negaunee Twp. has a "cluster" sign regulation, allowing for a larger sign if a group of businesses agrees to forgo their own sign on their property.

Parking Lot and Driveway Requirements

Parking lot requirements were examined in each jurisdiction for their relevance to access management. See Table 5-2 for the comparison information between jurisdictions. Few jurisdictions regulate the allowable distance to another driveway or to an intersecting road. However, restrictions on driveways may be covered within the newly adopted local access management ordinances. Other observations include:

- There are few parking requirements relating to access management concepts in the ordinances.
- The City of Marquette and the City of Ishpeming have driveway standards which give minimum distances between parking lot driveways on adjacent lots and intersections.

Landscaping Requirements

Landscaping requirements were examined in each jurisdiction for relevance to access management. See Table 5-3 for the comparison information between jurisdictions. Landscaping was considered as a part of the zoning analysis for improved corridor aesthetics.

- Most communities along the corridor have landscaping requirements either within specific zoning districts, or as a separate element within their zoning ordinance.
- Parking lot landscaping is addressed in several zoning ordinances. See Table 5-3 for the detailed information from each jurisdiction's zoning ordinance.

Lighting Requirements

Lighting requirements were examined in each jurisdiction for relevance to access management. See Table 5-3 for the comparison information between jurisdictions. Lighting was considered as a part of the analysis for improved safety and aesthetics.

- Lighting was not a provision within many of the ordinances.
- Sign lighting was regulated in several jurisdictions.

Access Management Requirements

The US-41/M-28 Corridor Advisory Committee began the process of adapting the three MDOT sample Access Management Ordinances to fit local conditions along the corridor study area in 2002. The Committee drew from three “Sample Access Management Ordinances” that were developed within MDOT’s, **Reducing Traffic Congestion and Improving Traffic Safety in Michigan Communities: The Access Management Guidebook** for each jurisdiction. All of the jurisdictions along US-41/M-28 have committed to adding access management provisions in their zoning ordinance. This process of ordinance is expected to be complete by autumn 2004. See Table 5-3.

Some of the jurisdictions along the corridor are considering adopting access management regulations in a manner that makes them applicable to all arterials in the community, not just US-41/M-28. This is common in other parts of the state as the safety benefits of access management regulations certainly deserve to be achieved along county primary roads and major city streets as much as they do along a state highway.

Table 5-2: Sign and Parking Requirements

Municipality	Minimum Sign Setback	How Measuring Setback?	Comments on Signs	Parking Lot Setback	Temporary Signs
Ely Township	10'	ROW line	Restrictions on sign size in TD and Industrial districts	NO	Yes-removed 10 days after event
Ishpeming Twp.	50'	From the lot line	Size of sign may be increased if setback is increased (10% increase for 50' increase)	NO	Yes-under written permission of ZA
City of Ishpeming	NO	NO	Not applicable	Driveways 40' from corner and 25' from an adjacent property	NO
Negaunee	NO	NO	Not applicable	N/A	NO
Negaunee Township	50'	ROW line	Provisions for "cluster" signs-signs with a group of businesses	NO	Yes-under written permission of ZA
Marquette Township	States no signs in ROW	ROW line	Very detailed provisions on freestanding, projecting, wall, graphics.	10'-20' from the ROW	Yes
City of Marquette	No signs in ROW. No signs within 25 ft of ROW or driveway opening.	ROW line	Ordinance regulates by sign type (ground, pole, etc).	Driveways 400' from corner and 25' from an adjacent property	Yes-under written permission of ZA
Chocolay Township	5'	From the ROW line	Regulations vary by size of facility/property	NO	Yes-under written permission of ZA

Table 5-3: Access Management, Landscaping and Lighting			
Municipality	Adopted Access Management Ordinance?	Lighting	Landscaping
Ely Township	NO	For sign illumination	Yes, required planting screens (with specifications), parking lot landscaping requirements
Ishpeming Twp.	NO	For sign illumination	Yes, required planting screens (with specifications-spacing of plantings), parking lot landscaping requirements
City of Ishpeming	NO	NO	Yes, basic provisions to provide ground cover to prevent soil washing, blowing or erosion
Negaunee	NO	Street lights in sub. development	NO
Negaunee Township	Yes, used AM Guidebook model ordinance	For sign illumination	Yes, required planting screens (with specifications-spacing of plantings), parking lot landscaping requirements
Marquette Township	No, in progress	For sign illumination, exterior lighting standards within zoning districts	Yes, parking lot landscaping and landscaping within zoning districts
City of Marquette	NO- they have a draft	For sign illumination, exterior lighting standards within zoning districts	Yes, parking lot landscaping and landscaping within zoning districts
Chocolay Township	NO	For sign illumination, exterior lighting standards within zoning districts	Yes, required planting screens (with specifications), parking lot landscaping requirements

Recommendations

Planning and Zoning

The jurisdictions without current Comprehensive or Master Plans should update the Plans within the next few years. Jurisdictions without any Future Land Use Map should adopt one while conducting a Comprehensive Plan update. The US-41/M-28 Corridor Advisory Committee should review Comprehensive Plans before adoption to assure that the US-41/M-28 corridor function is protected and preserved in a manner that is consistent with this Plan. Jurisdictions that adopt one of the MDOT Model Access Management Ordinances should also amend their Plan to provide some contextual background for the Access Management Regulations or just refer to this Plan. See also the section on joint permit reviews beginning on page 6-5.

The primary zoning recommendation for each jurisdiction is to seriously reconsider the amount of commercial zoning directly adjacent the corridor. Jurisdictions should consider that the regional commercial uses can be accommodated within existing downtowns or adjacent and behind (away from the highway) existing commercial development, such as on Commerce Drive in Marquette Township. Also before rezoning more land for commercial development, keep in mind that any new commercial development may pull from the already existing businesses within neighboring jurisdictions. A lower intensity zoning like forestry is a much better classification for undeveloped land along US-41/M-28.

Access Management

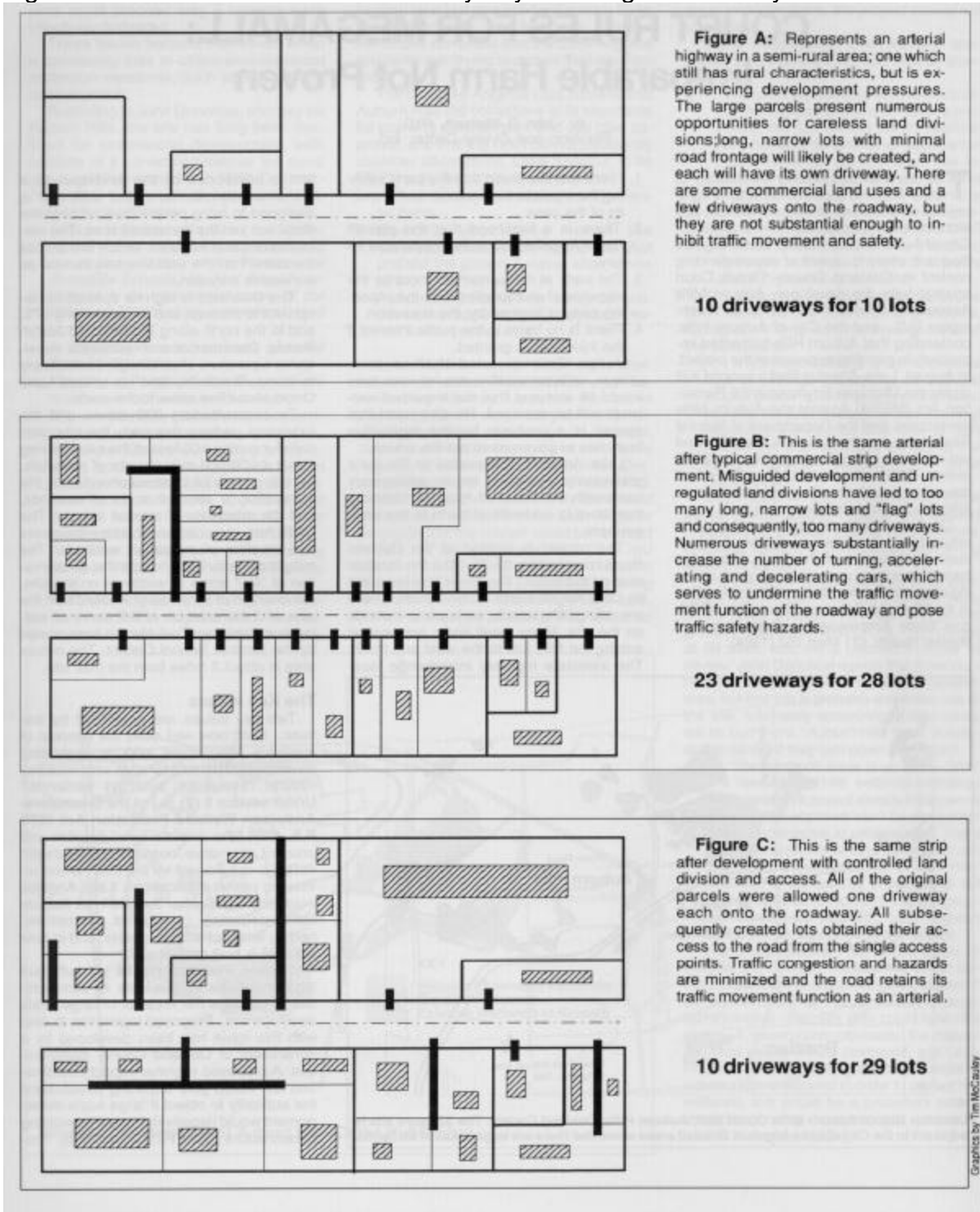
Limit the Number of Driveways

One of the most effective ways to prevent a proliferation of new driveways is to limit the number of new access points to existing parcels before extensive land division occurs. This is most effective in suburban and rural areas before large parcels are fragmented into many smaller ones. There are several areas along US-41/M-28 that have not fully developed yet, and should take advantage of this technique. It is accomplished by adding a short provision to the zoning ordinance that effectively limits to one, all future driveways in the area identified. As smaller lots are created, common driveways, access easements, or service drives are required to provide access to any new parcels. This is referred to as “locking-in” driveways. See Figure 5-1.

Proliferation of driveways along an arterial is a major access management problem. This occurs most often in areas with many narrow lots. Thus it is important to prevent the creation of narrow lots, or to provide an alternative means of access to them. If it is inappropriate in an area to require wide lots, then narrow lots should be required to have access by means of a frontage road, rear service drive, and other forms of shared access. If there are double frontage

lots, they should be permitted access only from a service drive or a local street, rather than from the arterial.

Figure 5-1: Limit the Number of Driveways by “Locking In” Driveways



Source: McCauley, Tim, “Preventing Commercial Driveways in Strip Commercial Areas”, *Planning and Zoning News*, September 1990.

The Land Division Act (PA 288 of 1967) requires that new lots not exceed a depth of four times the width, unless otherwise permitted by a local government. However, one place where deep lots are beneficial is along major arterials, because of the potential that is provided for front or rear access drives and for deep building setbacks. They also provide room for a buffer from abutting residential property. Deep lots are advantageous if the possibility exists for future road widening. Right-of-way acquisition is often impractical or very expensive if lots are shallow or buildings are located close to the roadway.

Jurisdictions along the US-41/M-28 corridor that have not adopted an Access Management Ordinance should do so soon. However, lot requirements along US-41/M-28 may need to be altered within the jurisdictions' Zoning Ordinance to preserve the current and future function of the roadway.

Lot Requirements

Minimum lot widths along US-41/M-28 should be revised, particularly in areas that have not yet developed. Use Tables 3-1 and 4-1 in Chapters 3 and 4 to set appropriate minimum lot widths that provide enough width for appropriate distance between driveways.

Building setbacks should also be more uniform throughout the corridor. Larger setbacks provide space if future expansion of the roadway occurs.

Aesthetics

Landscaping

Most of the jurisdictions already have provisions within their ordinances for landscaping. See Table 5-3. However, to give the US-41/M-28 corridor a more uniform appearance, common landscaping guidelines, could be agreed to by the US-41/M-28 Corridor Advisory Committee. The Committee could actually draft uniform landscaping requirements that require landscaping in parking lots and between different land uses. The guidelines would include providing the proper setback from US-41/M-28 to assure that sight distance for driveways and intersections is maintained.

Also included in the landscaping guidelines could be the appropriate street trees and plantings to use along the US-41/M-28 Corridor. Any plantings and trees would need to be salt tolerant species. The Committee could identify a "theme" for the species, such as a specific type of evergreen or bush. This could be planted along the entire corridor to provide a uniform landscape. Most jurisdictions currently have accepted trees within their landscaping plan; these trees include Scotch Pine, Spruce, Jack Pine, Oak, etc.

Signs

Several jurisdictions along US-41/M-28 have provisions for signs. See Table 5-2. Sign aesthetics are already addressed in many of these zoning provisions;

however, a more uniform approach along the corridor for private signs may, over time, enhance the visual quality of the corridor and reduce driver confusion.

Uniform aesthetic guidelines could include private sign provisions that might call for more “cluster” signs that group together several businesses signs rather than having individual signs for every business. See Figure 3-5 in Chapter 3 for an illustration of this technique. Uniform signs along the corridor could provide a much more pleasing scene for drivers.

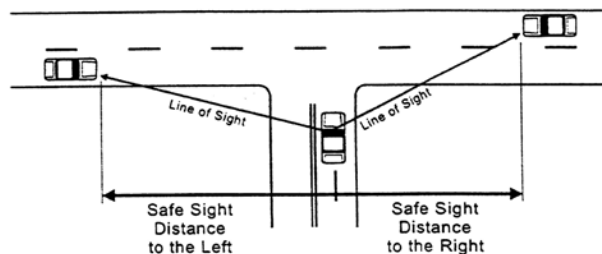
Lighting

Few of the jurisdictions along the US-41/M-28 corridor have lighting provisions within their ordinance. See Table 5-3. Uniform lighting options might be included as part of US-41/M-28 aesthetic guidelines. The lighting might include decorative roadway lighting to enhance the road’s visual appeal and pedestrian scale lighting to be implemented in downtown areas in conjunction with sidewalk improvements.

Clear View Triangles

Ely Township and Marquette Township have adopted “Clear View Triangles” at intersections, which restrict private signs and landscaping to 30 feet from the intersection. It creates a triangle of clear vision that helps motorists sight distance at intersections. Figure 5-2 illustrates the idea. This concept should be adopted in the other jurisdictions along the corridor.

Figure 5-2: Sight Distance at the Intersection



Source: National Highway Institute Course No. 15255, *Access Management, Location and Design*, April 1998, p. 3-37.

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C:/projectfiles2004/Marquette/finalplan/chapterfive3.doc

Chapter Six

IMPLEMENTATION

Introduction

This Chapter briefly reviews the principal steps that need to be taken to implement this Plan. Actions are described first for major road improvements and second for access management activities. The most important activities in each category relate to continued coordination between MDOT and local governments along the corridor.

Road Improvements

Chapter Three set forth the rationale for major road improvements along the US-41/M-28 corridor and Chapter Four detailed specific improvements to address capacity and safety issues. In many cases, especially with regard to major intersection improvements, multiple options were presented. The next step needs to be a more refined analysis of the options and dialogue between MDOT and the affected local units of government concerning the preferred option. In most cases, the selected option will probably be funded using traditional funding sources. In other cases, special funding may need to be pursued. This is most likely with regard to the roundabout options for four intersections in the City of Marquette, because the cost of these improvements is likely to be significantly more than the other options.

The first seven objectives in Chapter Two could serve as guidelines in selecting sets of potential improvements and for choosing among options for particular improvements to make in a given year. These objectives are reproduced below:

- “1. Periodically identify the cause of existing or projected congestion along the highway and following examination of alternatives, select improvements that safely preserve the traffic carrying capacity of the highway.*
- 2. When selecting from among alternative capacity improvements, give special consideration not only to cost-effectiveness, but also to uniformity in design so that driver confusion is minimized.*
- 3. When selecting from among alternatives, give special consideration to those that help preserve the investment in existing and planned improvements to the road, such as those that incorporate access management into the design.*

4. *Design and implement improvement projects in a way which minimizes disruption not only to existing traffic, but also to abutting residences, businesses and other actively used lands.*
5. *Plan traffic capacity improvement projects sufficiently far ahead, and in a manner which permits MDOT, local governments and the County Road Commission, to most effectively coordinate associated infrastructure improvements on intersecting roadways and to accommodate cost-effective utility expansions or replacement.*
6. *Implement only those traffic or intersection improvements that are consistent with this Plan.*
7. *Periodically update this Plan to ensure that it continues to guide coordinated land use and highway improvement decisions along the corridor.”*

Once the final set of improvements are decided upon, they need to be inserted into MDOT's Five-Year Transportation Plan, which is updated annually. There is no need, nor any realistic likelihood, that all the improvements identified in this Plan will all be implemented at the same time, or even that they will all be undertaken. In most cases, improvements will need to be staged over time, probably by common geographic area in order to take advantage of some economies of scale. In some cases, projects in the same area could be staged over several years, such as improvements in the commercial mall area of Marquette Township.

By far the most important consideration as local governments work with MDOT and representatives of any other funding sources to implement the improvements in this Plan, is to maintain a united front and to be mutually supportive of improvements in various parts of the corridor. Very often, projects that might not be highly rated when proposed by a single jurisdiction are much more highly rated when part of a larger plan, and when supported by a variety of jurisdictions. To this end, cooperation among the eight participating local governments and MDOT in reaching agreement on priorities and a multi-year schedule for corridor improvements will likely pay off with success for all parties.

Access Management

Chapter Three presented common access management techniques necessary to protect the investment in existing and planned improvements to US-41/M-28. Chapter Four identified specific locations in which some access management improvements are necessary; most of these are to improve safety. Chapter Five detailed existing planning and zoning provisions of the eight local governments along the corridor and the kinds of actions each could take to strengthen individual future land use plans and zoning ordinances in a manner that would assist with the implementation of this Plan. While these measures are very important, there are other important steps that will need to be taken by each of

the local governments individually, and then the group of eight local governments together in concert with MDOT.

Most of these steps are addressed in objectives 8-12 in Chapter Two. Together they represent effective guidelines for implementing the access management and intergovernmental coordination measures presented in this Plan. These objectives are reproduced below:

- “8. Ensure that land planned and zoned for intensive economic development activities is both well suited for such use and that such use is compatible with uses on adjoining lands and the physical characteristics and capacity of the segment of the highway providing access.*
- 9. Ensure that prior to approval of intensive new land uses along the corridor, that appropriate traffic impact studies are done and review is coordinated between MDOT, the local government in which the development is proposed, and affected units of government in adjoining jurisdictions.*
- 10. Ensure that prior to site plan approval for any land use along the corridor, that the proposed site plan is first reviewed by the Corridor Advisory Committee so that consistent access management decisions can be made along the corridor.*
- 11. Encourage all local units of government along the corridor to adopt and thereafter maintain (with a thorough review at least once each five years), a future land use plan, master plan or comprehensive plan of future land use that serves as the basis for future zoning and infrastructure decisions along the highway, and is carefully coordinated with similar plans in adjoining jurisdictions.*
- 12. Encourage all local units of government along the corridor to maintain (with a thorough review at least once each five years), a zoning ordinance which appropriately manages access to the highway consistent with regulations based on MDOT's model regulations and those of adjoining jurisdictions, and is consistent with the communities future land use, master or comprehensive plan.”*

More specifically, the following remedial, preventive and coordinated actions need to be taken by local governments along the US-41/M-28 corridor to successfully implement this Plan.

Remedial Measures

In the already developed parts of the corridor, there are a number of access related remedial measures that were identified in Chapter Four. Most focus on driveway consolidation, driveway closure, sharing of driveways or linking of parking lots. There are two common ways in which these measures are typically implemented. Both are opportunity driven. The first occurs as other road improvements are made. Even simple resurfacing, or rebuild projects in which no capacity improvements are made, present excellent opportunities to close unnecessary driveways and to consolidate and/or share driveways. This requires a coordinated effort between the local unit of government and MDOT to plan far

enough ahead so that a representative of each entity can visit with each of the landowners with excess driveways and explain the benefits of driveway closure and reconstruction of a contemporary driveway that meets MDOT standards. If MDOT offers to pay for the removal of the driveways to be closed and to install a new driveway in the most appropriate location and up to current standards, many landowners will agree to the closure and/or consolidation. MDOT can achieve significant cost savings when such measures are coordinated with road resurfacing or reconstruction projects. Landowners often benefit by freeing space in front for parking, snow storage and/or landscaping as well. Obviously, the same effort should be made when capacity improvements are to be undertaken in an area targeted for driveway closures.

The second common opportunity arises when a landowner comes to the local government with a project which requires local site plan approval. This is the process whereby drawings and accompanying information are reviewed to ensure conformance with local zoning requirements, as well as the requirements of county, state or federal agencies. The project could be adaptive reuse of an existing building, expanding an existing building, tearing down an existing building and constructing a new one, or constructing on undeveloped land. As long as the local government has adopted access management standards, then approval of the site plan can be conditioned upon conformance with the access management standards. In situations involving adaptive reuse or expansion of an existing facility, this could provide an opportunity to consolidate or close driveways, connect parking lots, or shift primary access to a side street where one is available. In situations where a new use or structure is involved, a single driveway, properly spaced, with a deceleration lane and correct geometry could be required. Where multiple new uses are involved, a single driveway serving multiple uses could be required instead of separate driveways for each use. In any of these situations, these are substantial ways in which the access management objectives of this Plan can be implemented.

The site plan review process can be enhanced and potential conflicts avoided by coordinating review of the site plan with MDOT and/or the County Road Commission and adjoining units of local government. A coordinated site plan review procedure is described a little later in this Chapter.

Preventive Measures

Since large segments of the corridor have not been developed, perhaps the greatest opportunity for successful application of access management techniques is in these areas. Typically that means ensuring wide minimum lot widths to keep driveways widely separated and restricting each existing parcel to only a single access point, even if it is divided in the future. This also ensures adequate driveway spacing which reduces the number of potential conflict points and turning movements, as well as helps ensure the highway traffic is able to move at design speeds--which in turn prevents future congestion. These measures are embodied in the first MDOT model access management ordinance

option which is targeted for use in rural townships. It is a simpler approach than the second MDOT model access management ordinance which is targeted for use in cities and suburbanizing townships.

Of course the most effective means of minimizing new access points and preserving the traffic carrying function of a road is to plan and zone abutting land for low intensity resource-based land uses like forestry and mining. Much of the land in the western part of the corridor is already zoned that way, and the longer it stays that way, the better the goals and objectives of this Plan will be achieved. The worst scenario for achieving the goals and objectives of this Plan is to zone more land for strip commercial or even strip residential development. Future commercial or residential development should be planned and built in clusters with the primary access by means of a single access drive, rather than separate driveways for each commercial use or residence. This will require careful coordination of both zoning and land division decisions. But first, those communities on the corridor that do not have a current future land use plan and an updated zoning ordinance with full site plan review provisions, need to get these adopted or there will be little ability to guide future land use and access management decisions consistent with this Plan. Once adopted, it is important to review and if necessary update the local future land use plan and zoning ordinance at least once each five years (which is now required for local plans).

Coordinated Permit Reviews

The "glue" that works best to ensure consistent application of access management standards over time, is a coordinated review process involving all the local government units along the corridor with each of the road authorities. The typical and preferred process is illustrated in Figure 6-1.

This process is very familiar to the communities along this corridor as each has entered into a Memorandum of Understanding (MOU) to undertake the creation of this Plan and to coordinate review and approval of development projects along the corridor. That MOU provides in part:

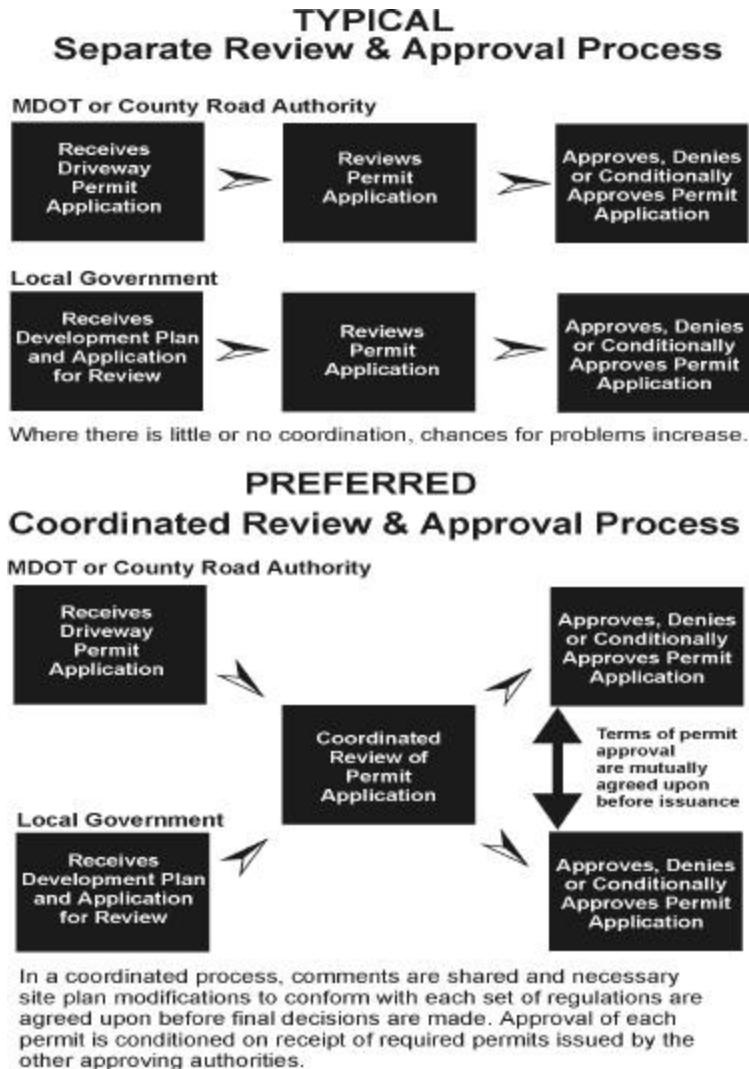
"The parties to this Memorandum of Understanding agree that they will not authorize site plan approvals, rezonings, new Planned Unit Developments, or similar projects requiring Planning Commission action in the planning area [1000 feet either side of US-41/M-28] unless and until they have met jointly to discuss and review the impact of the proposal—favorable or unfavorable—on the future development of the US-41/M-28 Corridor."

The MOU goes on to establish a procedure for calling meetings and puts time limits on reviews. It also establishes thresholds for review of projects within or adjacent to the corridor. A complete copy of the MOU is in the Appendix.

The Corridor Advisory Committee meets monthly and reviews all the pending permits and prospective development projects proposed along the corridor. The Corridor Advisory Committee includes more than just the eight local governments

and MDOT. It also includes a representative of the County Road Commission, the County Planning Commission, and the County Drain Commissioner.

Figure 6-1



Adapted from: Michigan Department of Transportation, *Improving Driveways and Access Management in Michigan*, 1996, p. 9.

Coordinated permit reviews allow zoning jurisdictions to condition site plan approval on receipt of a driveway permit from MDOT and/or the County Road Commission and those agencies can condition their permits on receipt of zoning approval from the local government. Not only does this prevent developers from sidestepping important access management standards, it also typically results in a higher level of review of pending site plans, as many experienced persons may spot important considerations than any one alone may miss. It can also point out emerging traffic safety or capacity problems that otherwise might not come to the attention of the road authority for some time. Developers typically benefit from

the coordination by not having to take matters back and forth between key agencies as often, since those agencies are already sitting down together in review of the same site plans.

Coordinated permit reviews also reduce the need for a separate monitoring and enforcement activity as all the responsible parties meet monthly, and if a permittee is not properly following through with an issued permit, it is likely that several members of the group will have observed it in their travels on the corridor. It is also a beneficial forum for discussion of any needed changes to access management standards. If over time, a particular standard is recognized as problematic in multiple jurisdictions, then it may need to be changed. If it is changed in one jurisdiction, it most likely will need to be changed in all. By keeping a uniform set of access management standards along the corridor, the development community will more quickly become familiar with the standards and will not be faced with multiple sets of standards with slight differences that are otherwise hard to keep track of.

Another benefit of the coordinated site plan review procedure becomes evident when permit applicants request a variation or deviation from particular access management standards. By sharing experiences and carefully reviewing the merits of such requests, each community will benefit from the thinking that goes into the conclusion, making it less likely that one community will err from an independent analysis and create a situation that becomes cited by permit applicants in other communities as justification for a deviation on their project.

The current MOU could be strengthened by adding MDOT commitments not to issue driveway permits in conflict with locally adopted access management standards, for all parties to condition approval of permits on the receipt of approval of permits from the other, and by establishing a periodic interval for reviewing and updating the MOU if necessary. The MOU could also be strengthened by incorporating review of site plans that don't go before local planning commission's but instead are approved administratively by local zoning administrators. These and other elements are found in the model MDOT MOU for Access Management in the Appendices to the **MDOT Access Management Guidebook**.

Coordinated Capital Improvement Planning

The last important implementation measure concerns coordinating capital improvements along the corridor. Objectives 13-15 in Chapter Two address coordinated capital improvement planning and public input into decision making. These objectives are reproduced below:

“13. Encourage all local units of government along the corridor to prepare and thereafter annually update a community wide capital improvement program that lists proposed infrastructure spending by location, cost,

source of revenue and timing, with a special focus on coordinating such spending plans with MDOT and the County Road Commission where US-41/M-28 and county roads are concerned.

- 14. Encourage MDOT to plan future road and access management improvements along the highway in a manner that is consistent with this Plan, that permits local input prior to final decision-making and that serves as a model of intergovernmental cooperation.*
- 15. Educate citizens, businesses and property owners about the basic contents of this Plan and seek their input prior to adopting any Plan updates.”*

Each of the Planning Enabling Acts make the local Planning Commission responsible for preparing and annually updating a list of proposed capital improvements consistent with the adopted local future land use, master or comprehensive plan. This is usually embodied in a local capital improvement program or CIP. Capital improvements are physical facilities like sewer or water lines, roads, or parks; or buildings, like fire halls, police stations, and township halls. Each project proposed over the next six-years is listed by type, location, cost, means of financing, and year proposed to be constructed. As one year is finished, another is added during the annual updating process.

CIP's are an excellent tool for implementing local master plans and when coordinated with neighboring jurisdictions and road authorities, they can prevent duplicate expenditures (like tearing the same section of road up two years in a row, as for a resurfacing project one year, and then to make a sewer line extension the next year), and are a great aid in phasing work so as to avoid conflicts and take advantage of economies of scale (where they exist). Coordinated local CIP's also facilitate scheduling road improvement projects, and assist the development community by interjecting clear timetables and greater predictability into infrastructure improvement decisions.

While not all jurisdictions along the corridor currently have annual CIP's, coordinating with MDOT as it prepares phasing plans for improvements on the US-41/M-28 corridor consistent with this Plan is a great time to start. Eventually, if all jurisdictions prepare a CIP and coordinate their preparation to coincide with local, MDOT and County Road Commission budgeting, available infrastructure money will be spent in the wisest, most efficient manner that least disrupts the lives of citizens in Marquette County and users of US-41/M-28.

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Chocolay Township

Signalized intersection locations on US-41/M-28 with crash summaries and collision diagrams for the years, 2000, 2001 and 2002.

	Total Crashes
US-41 at M-28 Junction and Cherry Creek Road	23
US-41/M28 at Silver Creek Road	21

US-41/M-28 & Cherry Creek Road

US-41 (south leg) and M-28 (east leg) merge at this location. The north leg (combined US-41 and M-28) and the south leg of the intersection are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by "ARROW ONLY" markings with solid yellow-skip yellow lane lines. There is curb, gutter, and asphalt pathways on both sides of the north and south legs. US-41 transitions to a two-lane roadway south of the intersection.

The east leg (M-28) has a short 100-foot long right turn lane marked at the intersection with a long taper. There are no "RIGHT LANE MUST TURN RIGHT" signs.

The west leg (Cherry Creek Road) has three lanes at the intersection including a 150-foot long left turn lane. Cherry Creek Road transitions to a two-lane roadway west of the intersection. The pavement markings on the west leg are faded.

The posted speed limits are 45 MPH on the north leg, 55 MPH on the south leg, 45 MPH on the west leg, and 55 MPH on the east leg.

The intersection is controlled by a semi-actuated traffic signal. There is a lagging protected Left Turn Green Arrow (LTGA) on the northbound and southbound approaches that is displayed simultaneously with a leading Right Turn Green Arrow (RTGA) on the westbound approach. There are detector loops in all the northbound and southbound approach lanes. Therefore the northbound and southbound approaches operate full-actuated. The loop locations are delineated with hand applied white paint which is not a standard practice.

There are no detector loops in either the eastbound or westbound approach lanes. Therefore the east-west traffic signal phase operates as fixed time.

There are no pedestrian indications or crosswalks at the intersection. There are STOP lines marked on all approaches.

Observations reveal that the major turning movements at the intersection are the southbound to eastbound left turn and the complementary westbound to northbound right turn. Conversely the northbound to westbound left turn volume is relatively light.

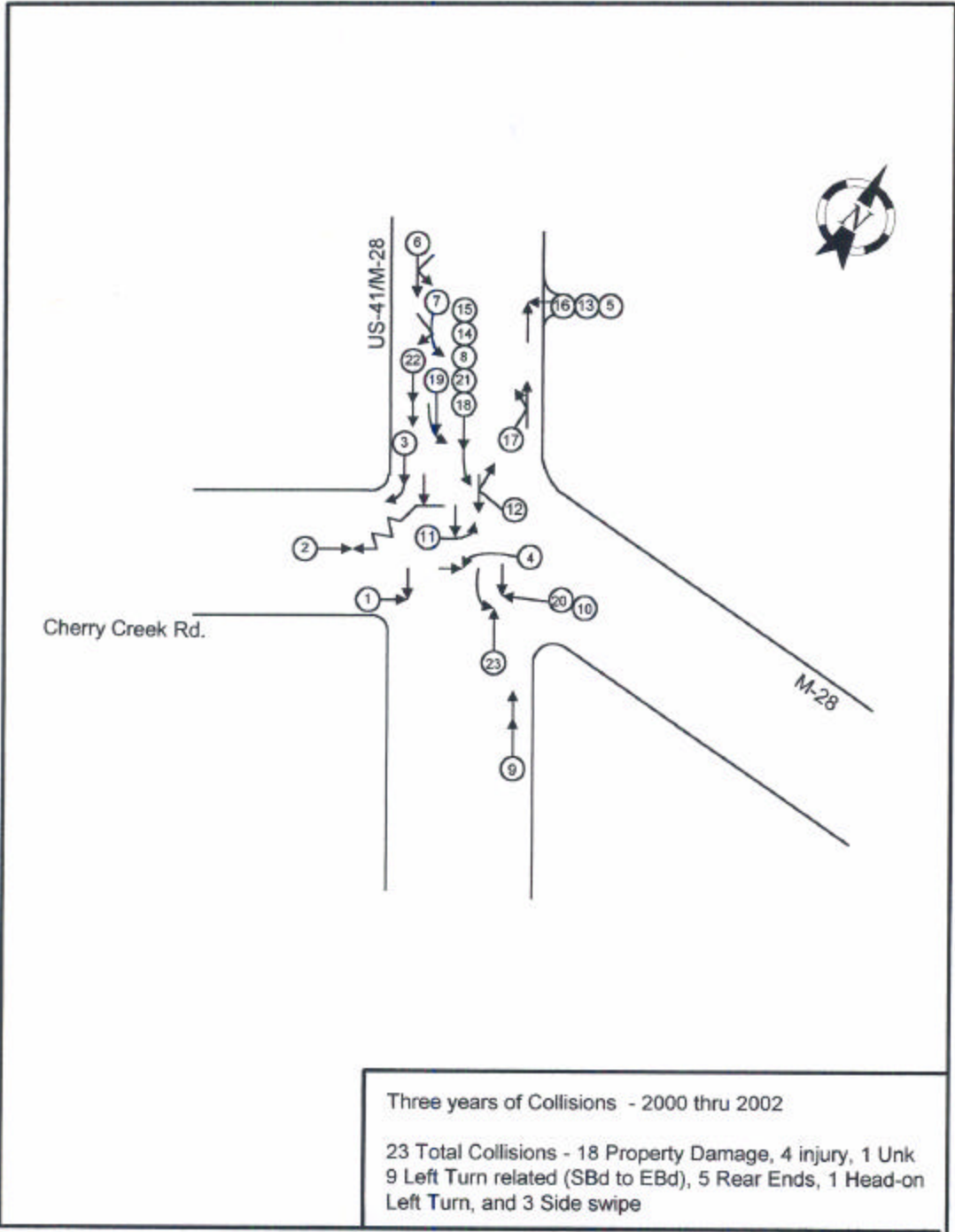
Therefore the southbound thru-right signal phase often operates simultaneously with the southbound left turn phase.

Crash Review Comments

Of the 23 crashes, 9 were southbound to eastbound left-run collisions. An intersection operations study is recommended to provide safer left-turn opportunities.

US-41/M-28 at M-28/Cherry Creek Rd
Chocolay Twp., Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/29/00	2350	PD	Rt A	2	S-E	Wet
2	5/5/00	2347	1-B,1-C,1-A	Rt A	3	E-S-W	Dry
3	5/22/00	0705	PD	RT RE	2	S	Unk
4	8/24/00	2130	Unk	Hd on LT	2	E-W	Dry
5	10/06/00	1245	PD	Dr' Angle	2	W-N	Dry
6	12/08/00	2230	PD	SS SM	2	S	Unk
7	12/14/00	1730	PD	LT SS SM	2	S	Unk
8	1/05/01	0745	1 - C	RE LT	2	SE	Wet
9	1/05/01	1145	PD	RE	2	NE	Snowy
10	1/19/01	1035	PD	Angle	2	SW-NW	Snowy
11	2/02/01	1935	PD	LT Angle	2	W-NE	Icy
12	3/10/01	1845	PD	Rt Angle	2	W-SE	Snowy
13	3/29/01	1215	PD	Dr' Angle	2	NE -SW	Dry
14	7/15/01	1100	1 - C	RE LT	2	SE	Wet
15	7/28/01	1155	PD	RE LT	2	SE	Wet
16	2/03/02	1540	PD	Dr' Angle	2	NE-SW	Snowy
17	3/03/02	1310	PD	RE	2	NE	Snowy
18	7/26/02	1800	PD	RE LT	2	SE	Dry
19	8/11/02	1050	PD	LT SS	2	SE	Dry
20	11/10/02	0005	PD	RE	2	SE - NW	Wet
21	11/24/02	1455	PD	RE LT	2	SE	Dry
22	11/30/02	1935	PD	RE	2	SE	Icy
23	12/07/02	0045	1 - C	Hd on LT	2	SE - NW	Wet



US-41/ M-28, and Silver Creek Road/Corning Street

The north and south legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb and gutter on both sides. There is an asphalt pathway on the east side only.

There are no pavement markings on the east leg (Corning Street). The westbound approach curves to the right and operates as a single wide lane at the intersection.

The west leg (Silver Creek Road) has two short approach lanes delineated only by hand painted detector loops. There are no other pavement markings. There is an overhead illuminated sign with “Left Arrow Only” legend. An access driveway to the Township offices is located on Silver Creek Road just 75 feet from the intersection.

The posted speed limits are 45 MPH on the north leg and south legs, and 25 MPH on the west leg. The speed limit on the east leg is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase semi-actuated traffic signal. There are detector loops on the side streets only.

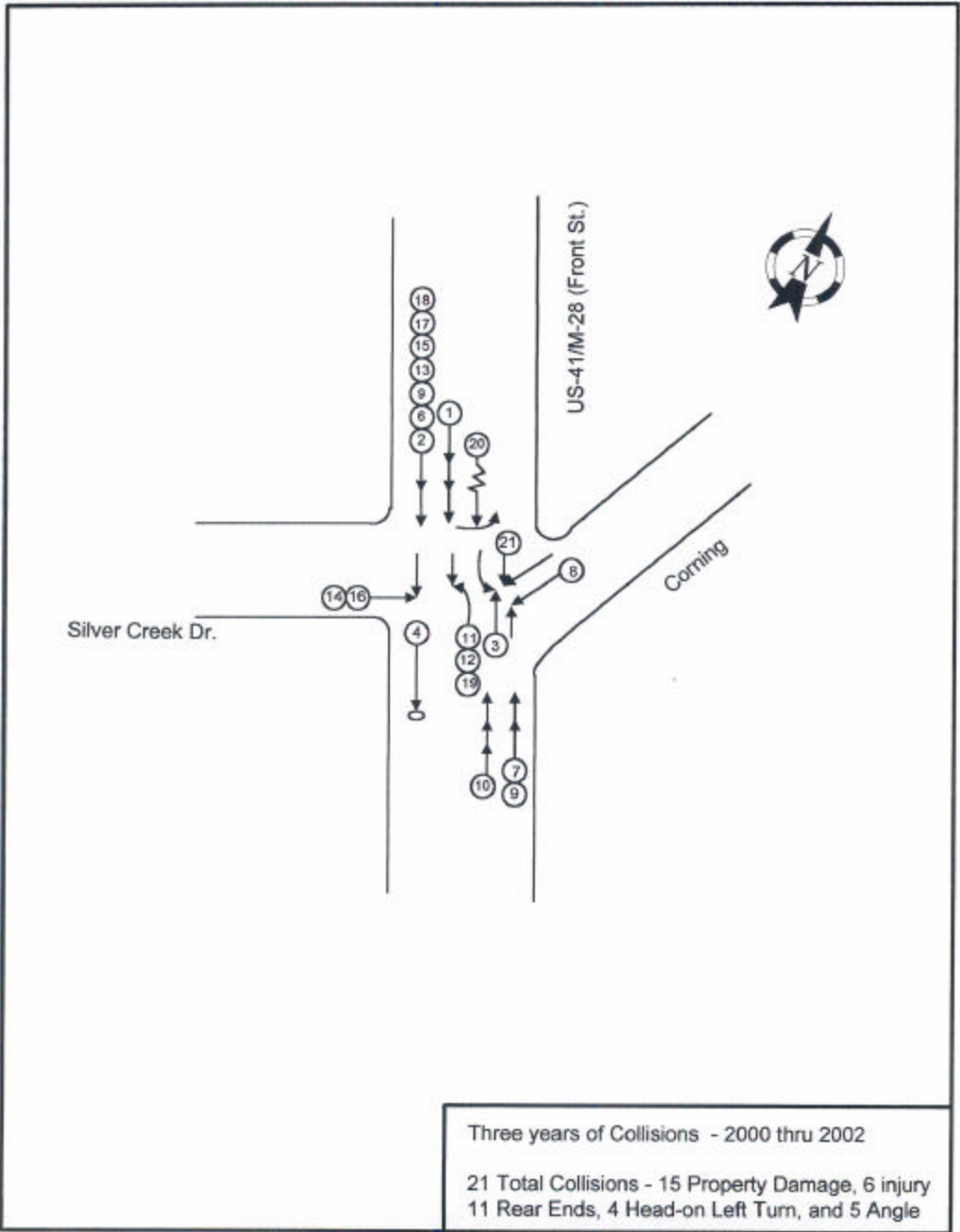
There are no pedestrian indications or crosswalks at the intersection. There are STOP lines marked on the northbound and southbound approaches only.

Traffic queues were observed on Silver Creek Road during the AM peak period. Complaints have been received from the Township relating to driveway access during the AM peak period.

There is an overhead pedestrian bridge on the north leg of the intersection. The bridge may obscure the view of the traffic signal indications for drivers of buses and trucks when approaching the intersection in the southbound direction.

Crash Review Comments

Eight of the 21 crashes were southbound rear ends, 5 were angle and 4 were head on left turn crashes. Visibility of the signal is questioned by the local agency. Improved clearance intervals may reduce left turn crashes.

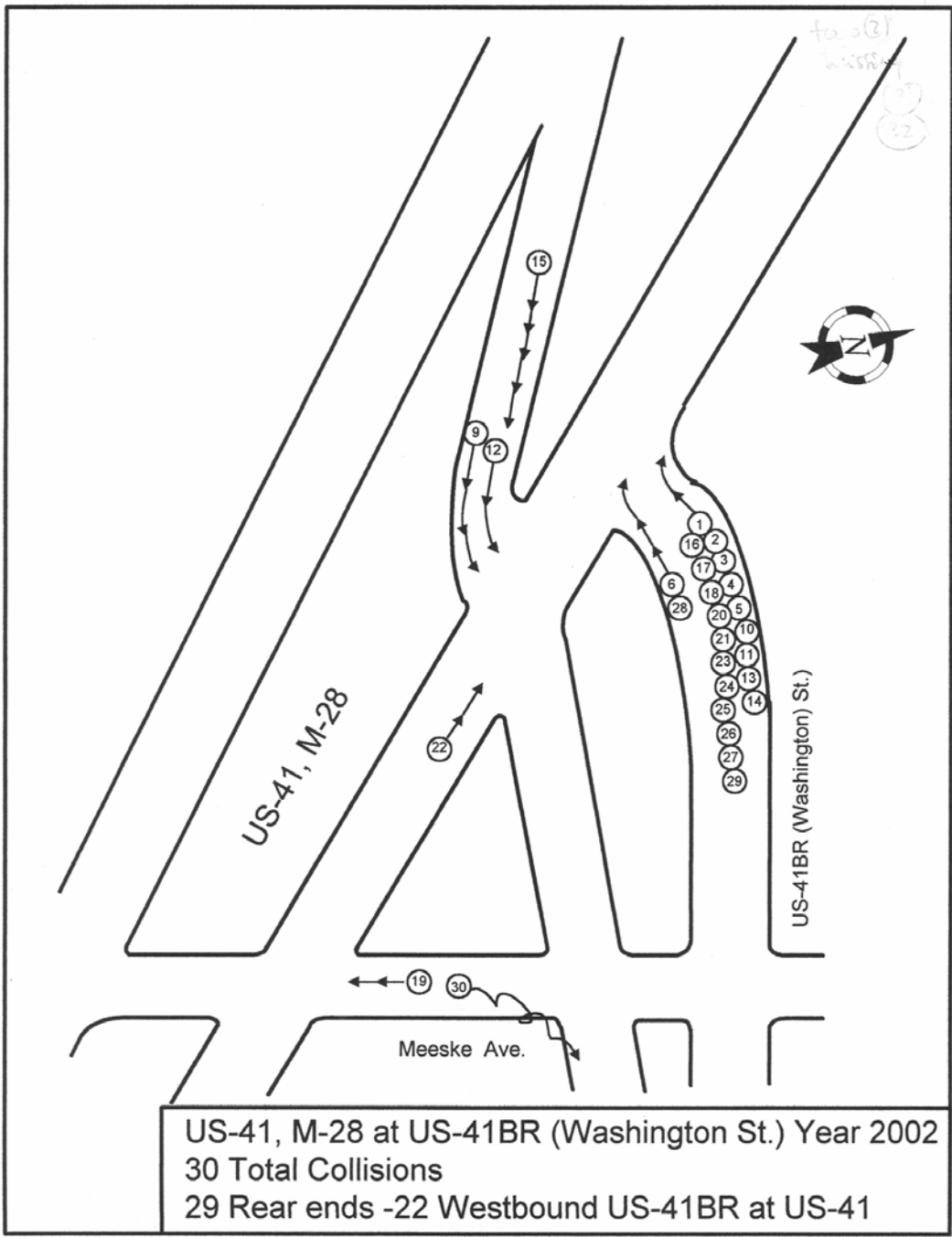


Three years of Collisions - 2000 thru 2002

21 Total Collisions - 15 Property Damage, 6 injury
 11 Rear Ends, 4 Head-on Left Turn, and 5 Angle

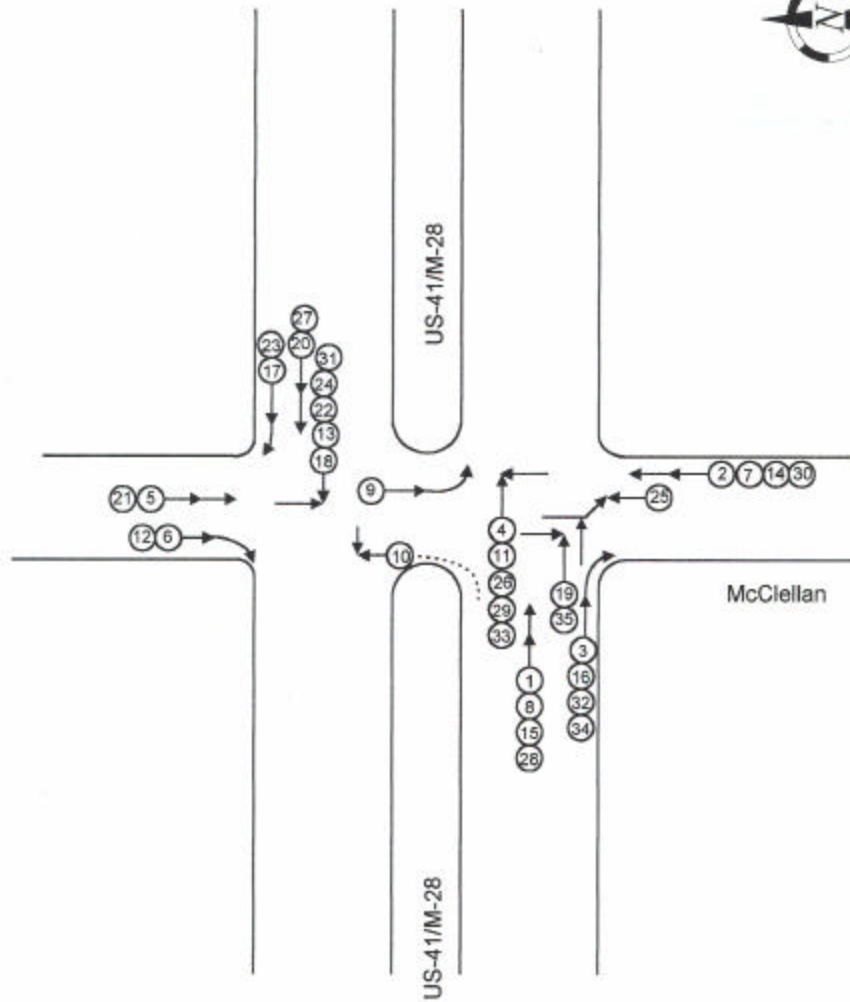
US-41/M-28 at Silver Creek Rd
 Chocolay Twp., Marquette County
 Years 2000, 2001 & 2002
 Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition	Remarks
1	3/24/00	1700	PD	RE	3	S	Wet	Raining
2	6/14/00	0855	PD	RE	2	S	Unk	
3	6/17/01	1400	PD	Hd on Lt	2	N - S	Dry	77 yr old driver
4	7/07/01	1045	PD	Misc	1	S	Dry	Obj thrown from Rdwy
5	8/13/01	1835	1 - C	RE	2	N	Dry	
6	9/07/01	1800	PD	RE	2	S	Dry	
7	10/16/01	1020	1 - C	RE	2	N	Wet	Raining
8	2/06/02	1905	PD	Angle	2	N - W	Dry	
9	3/01/02	1650	PD	RE	2	S	Dry	
10	3/12/02	1721	PD	RE	2	N	Dry	
11	5/18/02	1240	1 - C	Hd on LT	2	N - S	Dry	
12	5/20/02	1550	PD	Hd on LT	2	N - S	Dry	
13	5/29/02	1635	PD	RE	2	S	Dry	
14	7/06/02	1210	1 - C	Angle	2	N - W	Dry	
15	7/11/02	1638	PD	RE	2	S	Dry	Construction Zone
16	9/14/02	1720	PD	Angle	2	S - E	Wet	Raining
17	9/26/02	0930	1 - A	RE	2	S	Wet	Raining
18	10/30/02	1330	PD	RE	2	S	Wet	Raining
19	11/11/02	0910	PD	Hd on LT	2	N - S	Wet	
20	12/18/02	1430	PD	Angle	2	S - E	Wet	Raining
21	12/19/02	1100	1 - C	Angle	2	S - W	Wet	



US-41/M-28 at McClellan St.
City of Marquette, Marquette County
Year 2001
Collisions Supplement Sheet

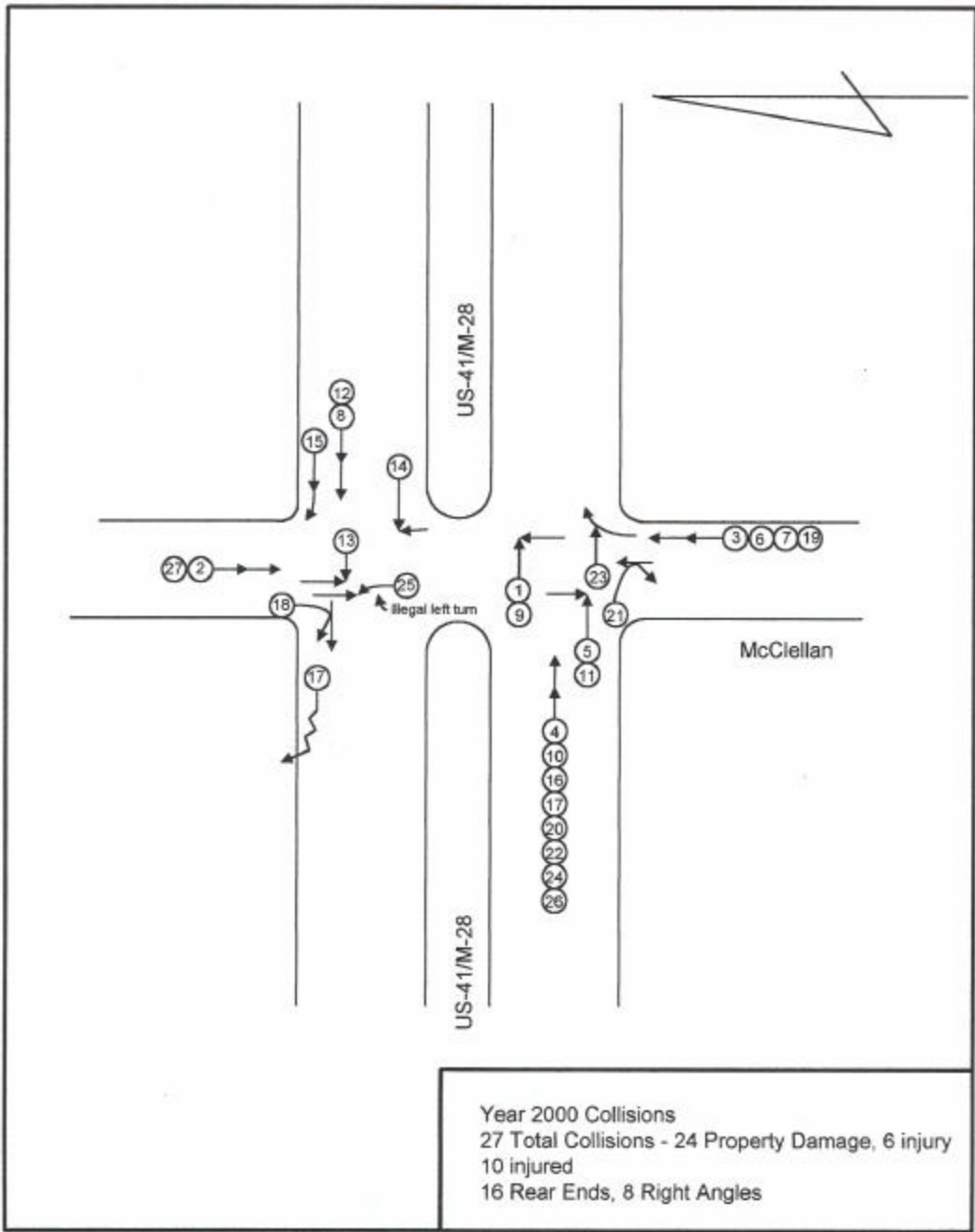
Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/05	1145	PD	RE	2	E	Icy
2	1/10	1640	PD	RE	2	N	Wet
3	1/18	1645	PD	RERT	2	E	Wet
4	1/19	0925	PD	Angle	2	W-N	Snowy
5	1/21	2030	PD	RE	2	S	Dry
6	2/15	1630	PD	RELT	2	S	Unk
7	2/17	1235	1-C	RE	2	N	Icy
8	2/21	1230	PD	RE	2	E	Icy
9	2/27	1330	PD	RELT	2	S	Wet
10	2/27	1335	1-B	Hd on LT	2	E-W	Wet
11	3/07	2300	1-C	Angle	2	N-E	Slushy
12	3/09	1450	PD	RERT	2	S	Wet
13	3/24	1202	PD	Angle	2	S-W	Wet
14	3/24	1210	1-C	RE	2	N	Wet
15	4/09	2115	PD	RERT	2	E	Dry
16	5/04	1140	PD	RERT	2	E	Dry
17	5/14	1050	PD	RERT	2	W	Dry
18	5/25	1240	1-B,1-C	Angle	2	S-W	Dry
19	7/13	0900	1-C	Angle	2	S-E	Dry
20	7/16	1735	1-C	RE	2	W	Wet
21	7/27	1545	PD	RERT	2	S	Dry
22	7/30	2300	PD	Angle	2	N-W	Dry
23	8/06	1530	PD	RERT	2	W	Dry
24	8/13	2320	PD	Angle	2	S-W	Dry
25	8/20	1948	3-C	Angle	3	S-E-N	Dry
26	8/20	2200	PD	Angle	2	N-E	Dry
27	9/17	1300	PD	RE	2	W	Dry
28	9/19	1725	PD	RE	2	E	Wet
29	10/20	1905	PD	Angle	2	E-N	Dry
30	11/05	1850	PD	RE	2	N	Dry
31	11/10	1320	PD	Angle	2	S-W	Wet
32	11/23	0130	PD	RERT	2	E	Dry
33	12/15	0916	2-A	Angle	2	E-S	Dry
34	12/15	1830	PD	RERT	2	E	Dry
35	12/26	1600	PD	Angle	2	S-E	Snowy



Year 2001 Collisions
35 Total Collisions 26 Property Damage, 9 injury
12 injured
21 Rear Ends, 13 Right Angles

US-41/M-28 at McClellan St.
City of Marquette, Marquette County
Year 2000
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/13	0843	I-B	Angle	2	N-E	Snowy
2	1/19	1330	PD	RE	2	S	Wet
3	1/24	1240	PD	RE	2	N	Slushy
4	1/31	1510	PD	RE	2	E	Wet
5	2/10	1840	PD	Angle	2	S-E	Snowy
6	3/21	1215	PD	RE	2	N	Wet
7	4/03	1250	PD	RE	2	N	Snowy
8	4/27	1150	PD	RE	2	W	Dry
9	5/07	1605	I-C	Angle	2	N-E	Dry
10	6/10	2010	PD	RE	2	N	Dry
11	7/26	0415	I-B	Angle	2	S-E	Dry
12	8/08	1330	PD	RE	2	W	Wet
13	8/29	0910	I-C	Angle	2	W-S	Dry
14	9/10	0055	PD	Angle	3	W-N	Dry
15	10/11	1150	PD	RERT	2	W	Dry
16	10/14	1330	I-A	RE	2	E	Dry
17	10/28	1630	PD	RE	2	E	Unknown
18	11/03	1715	PD	SSSM	2	W	Dry
19	11/15	1745	PD	RE	2	N	Dry
20	11/16	1800	PD	RE	2	E	Icy
21	11/19	1700	PD	RT Angle	2	E-N	Snowy
22	11/19	1700	PD	RE	2	E	Icy
23	11/25	1515	PD	RT Angle	2	N-E	Dry
24	12/04	1145	PD	RE	2	E	Dry
25	12/16	1515	PD	Hd on LT	2	N-S	Slushy
26	12/20	1610	PD	RE	2	E	Slushy
27	12/24	1545	PD	RE	2	S	Icy



US-41/ M-28 (Front Street), and Genesee Street

The north and south legs of US-41/M-28 (Front Street) are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb and gutter on both sides. There is an asphalt pathway on the east side and a concrete sidewalk on the west side. Front Street transitions to a divided four-lane roadway north of the intersection.

The intersection forms a “T”. The west leg (Genesee Street) has two approach lanes, one lane for left turns and one for right turns. There is an overhead illuminated sign with “Left Arrow Only” legend.

The posted speed limit on Front Street is 35 MPH. The speed limit on the Genesee Street is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase fixed-time traffic signal. There are pedestrian indications for crossing the south and west legs. There is a marked pedestrian crosswalk on the south leg that terminates in a flowerbed beyond the east curb line of Front Street. There is no marked pedestrian crosswalk on the west leg.

There are STOP lines marked on the northbound and southbound approaches, but not on the eastbound approach.

The Harbor Development is currently under construction on the east side of the intersection. The construction driveway is offset approximately 120 feet to the north of Genesee Street. When completed the access road to the new development should be located at the intersection directly across from Genesee Street.

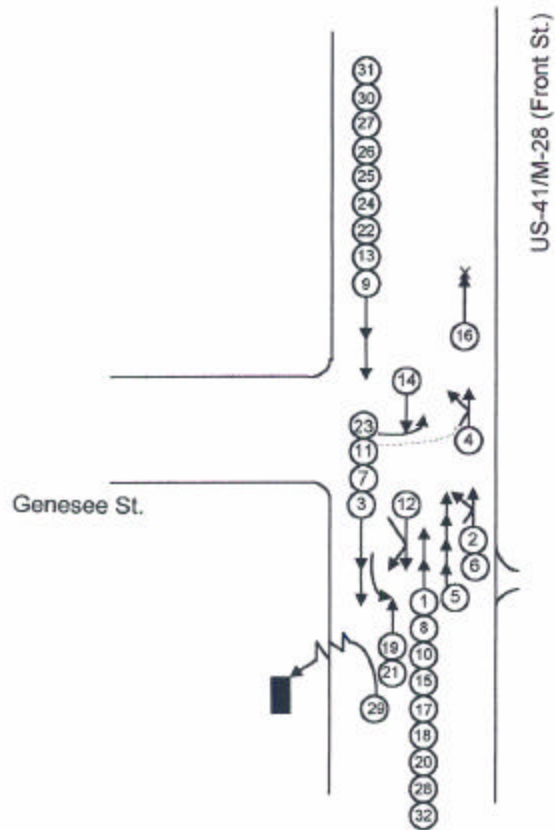
Crash Review Comments

Twenty-three [23] of the 32 collisions were rear end crashes, 18 of these have occurred on the US-41 approaches. Approximately 36% of the rear end crashes occurred on wet/snowy/icy pavement.

Further evaluation of pavement conditions is needed perhaps to improve pavement friction qualities.

US-41/M-28 at Genesee St.
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition	Remarks
1	3/15/00	1200	PD	RE	2	N	Snowy	
2	4/27/00	2245	PD	SS SM	2	N	Dry	
3	8/16/00	1700	PD	RE	2	S	Dry	
4	8/18/00	1250	PD	SS SM	2	N	Dry	
5	9/06/00	0715	PD	RE	4	N	Dry	
6	10/27/00	1515	PD	SS SM	2	N	Dry	
7	11/10/00	1725	PD	RE	2	S	Dry	
8	11/26/00	1530	PD	RE	2	N	Dry	
9	2/01/01	2000	1-C	RE	2	S	Snowy	
10	2/13/01	1600	PD	RE	2	N	Wet	
11	2/15/01	1459	2-C	RE	2	S	Wet	
12	3/14/01	1315	PD	SS SM	2	S	Dry	
13	4/03/01	1500	PD	RE	2	S	Dry	
14	5/12/01	1535	PD	LT Angle	2	E-S	Dry	
15	5/26/01	1151	1-C	RE	2	N	Wet	
16	6/21/01	1640	PD	Misc	1	N	Dry	
17	6/28/01	1420	PD	RE	2	N	Dry	
18	7/06/01	2025	1-C	RE	2	N	Wet	Raining
19	8/03/01	1320	1-C	Hd on LT	2	S-N	Dry	
20	8/31/01	0830	PD	RE	2	N	Wet	Raining
21	9/26/01	0710	PD	Hd on LT	2	S - N	Dry	
22	10/14/01	1715	1-C	RE	2	S	Dry	
23	11/08/01	1415	PD	RE	2	S	Wet	
24	11/10/01	1445	PD	RE	2	S	Wet	Raining
25	1/06/02	1110	PD	RE	2	S	Snowy	
26	2/22/02	1430	PD	RE	2	S	Wet	
27	3/22/02	0915	PD	RE	2	S	Dry	
28	4/24/02	0850	1-C	RE	2	N	Wet	
29	6/11/02	1206	PD	R O R	1	N	Dry	
30	9/20/02	1750	PD	RE	2	S	Wet	Raining
31	11/05/02	1630	1-A	RE	2	S	Wet	Raining
32	12/10/02	1800	PD	RE	2	N	Wet	



Three years of Collisions - 2000 thru 2002

32 Total Collisions - 24 Property Damage, 8 injury
23 Rear Ends, 12 during wet pavement conditions

US-41/ M-28 and BL-41 (Front Street)

The intersection forms a modified “T” with free flowing right turn movements and channelized left turn movements. The northbound to westbound left turn movement must yield to the eastbound to northbound left turn, even though the traffic volumes are substantially higher. The Champion Street Bridge spans US-41/M-28 on the west side of the intersection.

The northbound approach has two thru lanes and a channelized left turn lane. There is a channelized left turn merge lane on the north side of the intersection. The southbound approach has two travel lanes. The eastbound approach has two lanes, one for left turns and one for right turns.

The speed limit on the north and south legs is 35 MPH. The speed limit on the west leg is 55 MPH.

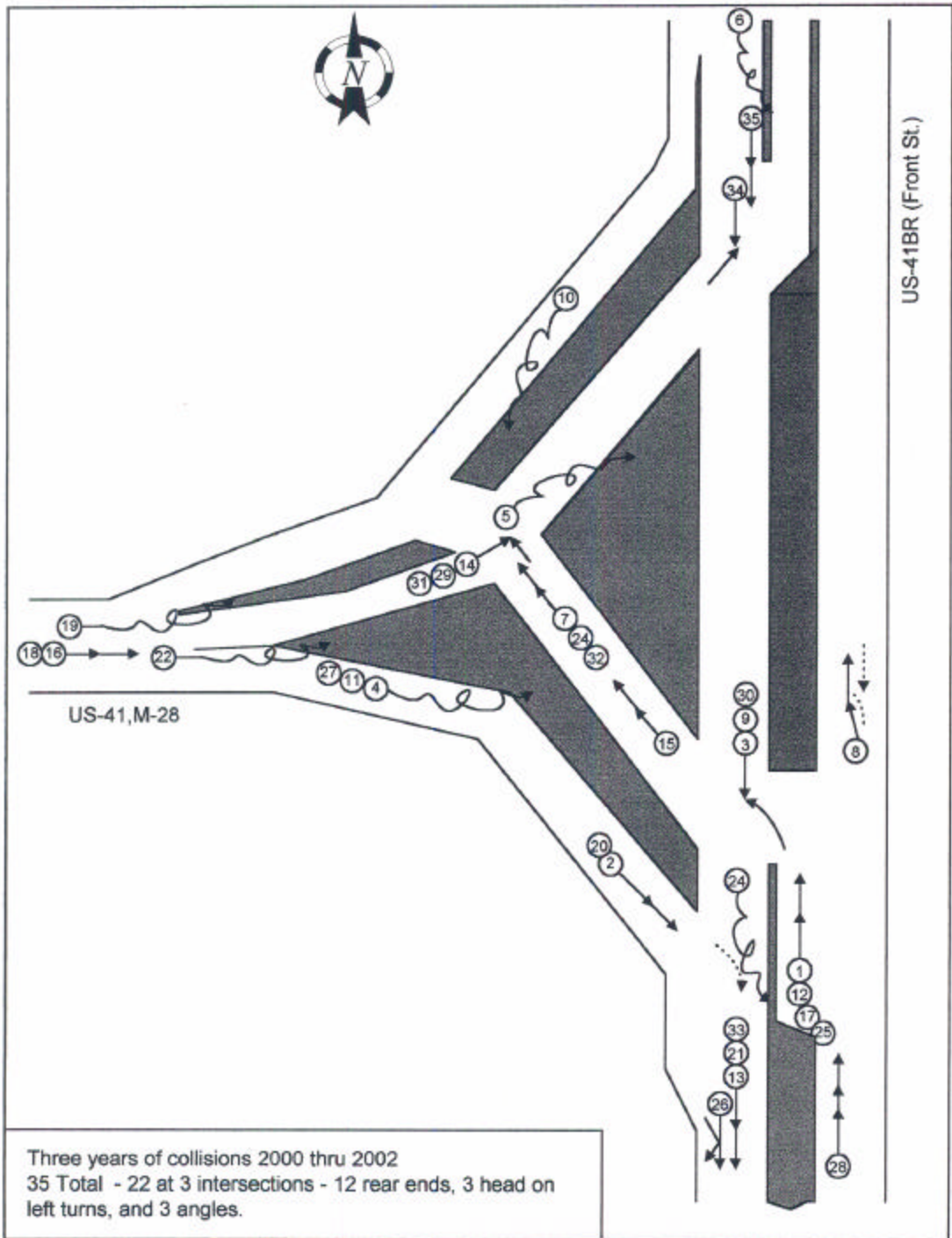
Crash Review Comments

Three [3] of the six [6] conflict points have experienced 22 of the 35 crashes in three [3] years. The conflict points are on the north to westbound lane and the east to southbound lane.

The storage lane of the north to west traffic volume needs to be lengthened and a study of merging lanes needed.

US-41/M-28 at US41BR (Front St.)
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram #	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/25/00	0850	PD	RELT	2	N	Snowy
2	2/18/00	1205	PD	RE	2	SE	Wet
3	3/09/00	0940	PD	Hd on LT	2	S-NW	Snowy
4	3/09/00	1600	P1-BD	ROR	1	SE	Icy
5	3/26/00	0415	1-B	ROR	1	NE	Wet
6	4/24/00	0120	PD	ROR	1	S	Dry
7	6/24/00	1300	PD	RE	2	NW	Wet
8	7/07/00	0800	PD	RE	2	N	Dry
9	12/12/00	1900	PD	Hd on LT	2	S-NW	Slushy
10	12/15/00	1050	PD	ROR	1	SW	Snowy
11	12/15/00	2030	PD	ROR	1	SW	Slushy
12	12/27/00	1345	PD	RE	2	N	Icy
13	5/06/01	2010	PD	SSSM	2	S	Dry
14	6/30/01	1420	PD	Angle	2	NE-NW	Dry
15	7/09/01	1215	1-C	RE	2	NW	Dry
16	7/26/01	1845	PD	RE	2	E	Dry
17	9/07/01	1720	PD	RELT	2	N	Wet
18	11/10/01	1320	PD	RE	2	E	Wet
19	1/06/02	1415	PD	ROR	1	E	Icy
20	2/11/02	1655	PD	RE	2	SE	Dry
21	2/21/02	1529	PD	RE	2	S	Wet
22	3/03/02	1030	PD	ROR	1	E	Icy
23	3/09/03	2130	PD	RE	2	NW	Snowy
24	3/17/02	1940	PD	ROR	1	S	Wet
25	4/28/02	1240	PD	RELT	2	N	Wet
26	5/24/02	1340	PD	SSSM	2	S	Dry
27	5/25/02	1400	PD	ROR	1	SE	Wet
28	6/07/02	1444	PD	RE	3	N	Dry
29	6/18/02	1129	PD	Angle	2	NW-NE	Dry
30	6/22/02	1700	PD	Hd on LT	2	S-NW	Dry
31	6/29/02	1615	PD	Angle	2	NW-NE	Dry
32	7/04/02	1215	PD	RE	2	NW	Dry
33	9/11/02	1840	PD	RE	2	E	Dry
34	10/04/02	0715	PD	Angle	2	NE-S	Wet
35	11/25/02	1410	PD	RE	2	S	Slushy



US-41/ M-28 and Grove Street (County Road 500)

The east and west legs of US-41/M-28 are divided four-lane roadways with a channelized left turn lane at the intersection. The left-turn lanes are delineated by “ARROW and ONLY” markings. There are overhead illuminated “LEFT” signs mounted above the left turn traffic signal heads. There are exclusive right turn lanes on both the eastbound and westbound approaches. There are no “RIGHT LANE MUST TURN RIGHT” signs. There is paved shoulder on both sides.

There are two approach lanes on the north and south legs of Grove Street, one lane for thru traffic and one lane for right turns. The northbound and southbound approach lanes are marked with “THRU ARROWS” and “RIGHT ARROWS”, but there are no “ONLY” markings. There are no pavement markings in the median to indicate lane usage.

Left turns are allowed in all directions at the intersection because the median does not have sufficient width to provide median crossovers to accommodate indirect left turns.

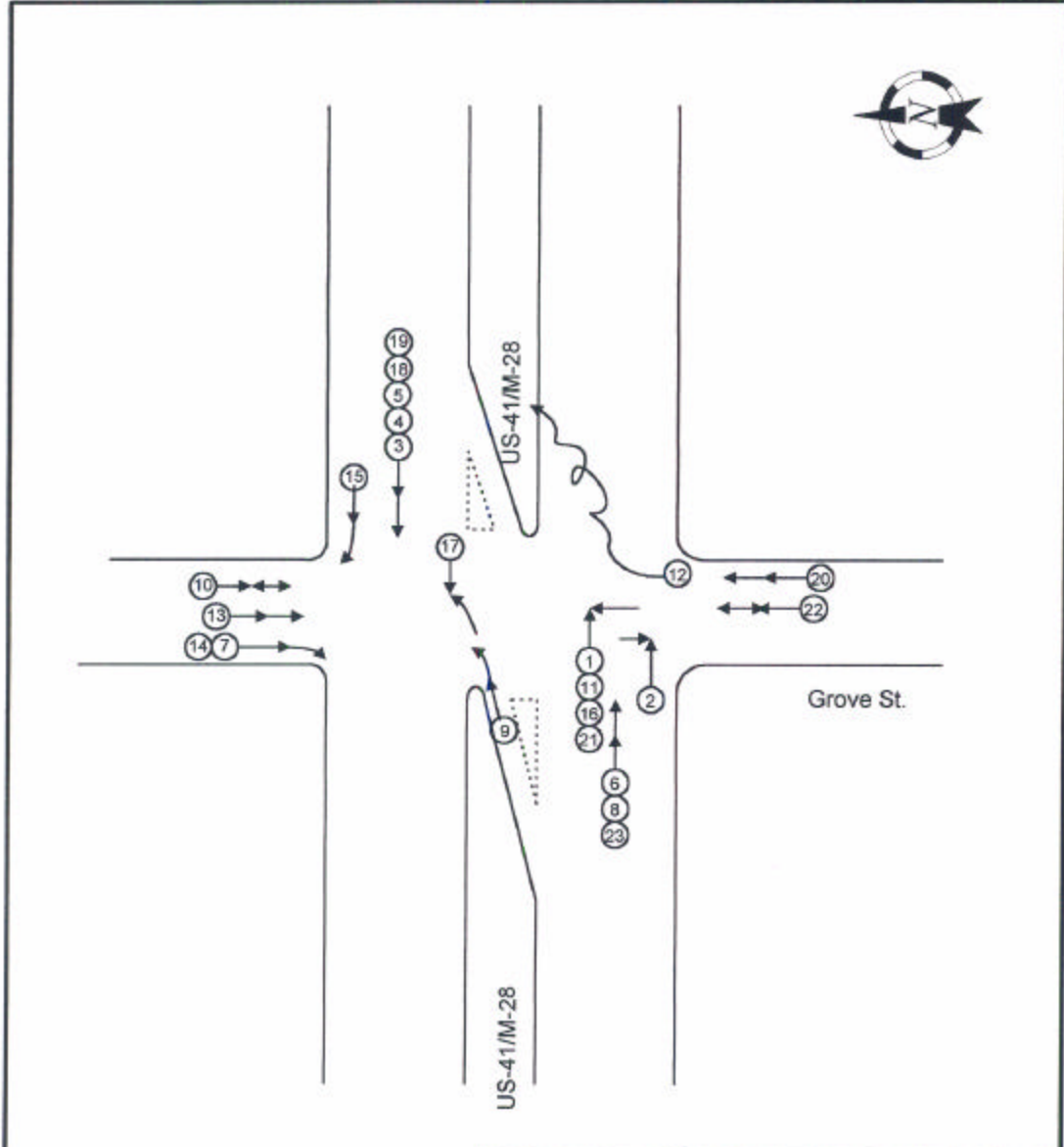
The posted speed limit on US-41/M-28 is 55 MPH. The posted speed limit on south leg of Grove Street is 25 MPH. The speed limit on the north leg is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a three-phase semi-actuated traffic signal. There are detector loops on both the northbound and southbound approaches on Grove Street and in the left turn lanes on US-41/M-28. There is a leading protected left turn phase on US-41/M-28. Left turns are not permitted during the thru phase. (The Signal Timing Permit on file is for a fixed-time signal and therefore does not match the field operation.)

There are no pedestrian indications or marked crosswalks. There are STOP lines on all approaches.

US-41/M-28 at Grove St.
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram #	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	1/31/00	2300	PD	Angle	2	N-E	
2	2/11/01	0945	PD	Angle	2	N-W	
3	3/24/00	1800	PD	RE	2	W	
4	3/31/00	1615	1-C	RE	2	W	
5	4/14/00	1810	1-C	RE	2	E	
6	5/22/00	1750	PD	RE	2	E	
7	9/18/00	0900	PD	RE	2	S	
8	11/20/00	1415	PD	RE	2	E	
9	12/05/00	1510	PD	RELT	2	E	
10	12/30/00	1100	PD	Backing	2	S	
11	12/30/00	1237	1-A, 1-B	Angle	2	N-E	
12	1/31/01	1155	PD	ROR	1	N	
13	2/06/01	1210	PD	RERT	2	S	
14	3/14/01	1205	PD	RE	2	SW	
15	10/01/01	1620	PD	RERT	2	N-E	
16	12/18/01	2305	PD	Angle	2	E-W	
17	12/20/01	1805	1-C	Hd on LT	2	W	
18	4/12/02	1455	PD	RE	2	W	
19	5/26/02	1200	PD	RE	2	N	
20	6/12/02	1315	PD	RE	2	N-E	
21	8/08/02	1225	PD	Angle	2	N	
22	10/30/02	1530	PD	Backing	2	N-E	
23	12/24/02	1520	PD	RE	2	E	



Three years of Collisions - 2000 thru 2002

23 Total Collisions - 19 Property Damage, 4 injury
 5 injured
 15 Rear Ends, 5 Right Angles

US-41/M-28 at Hampton Street

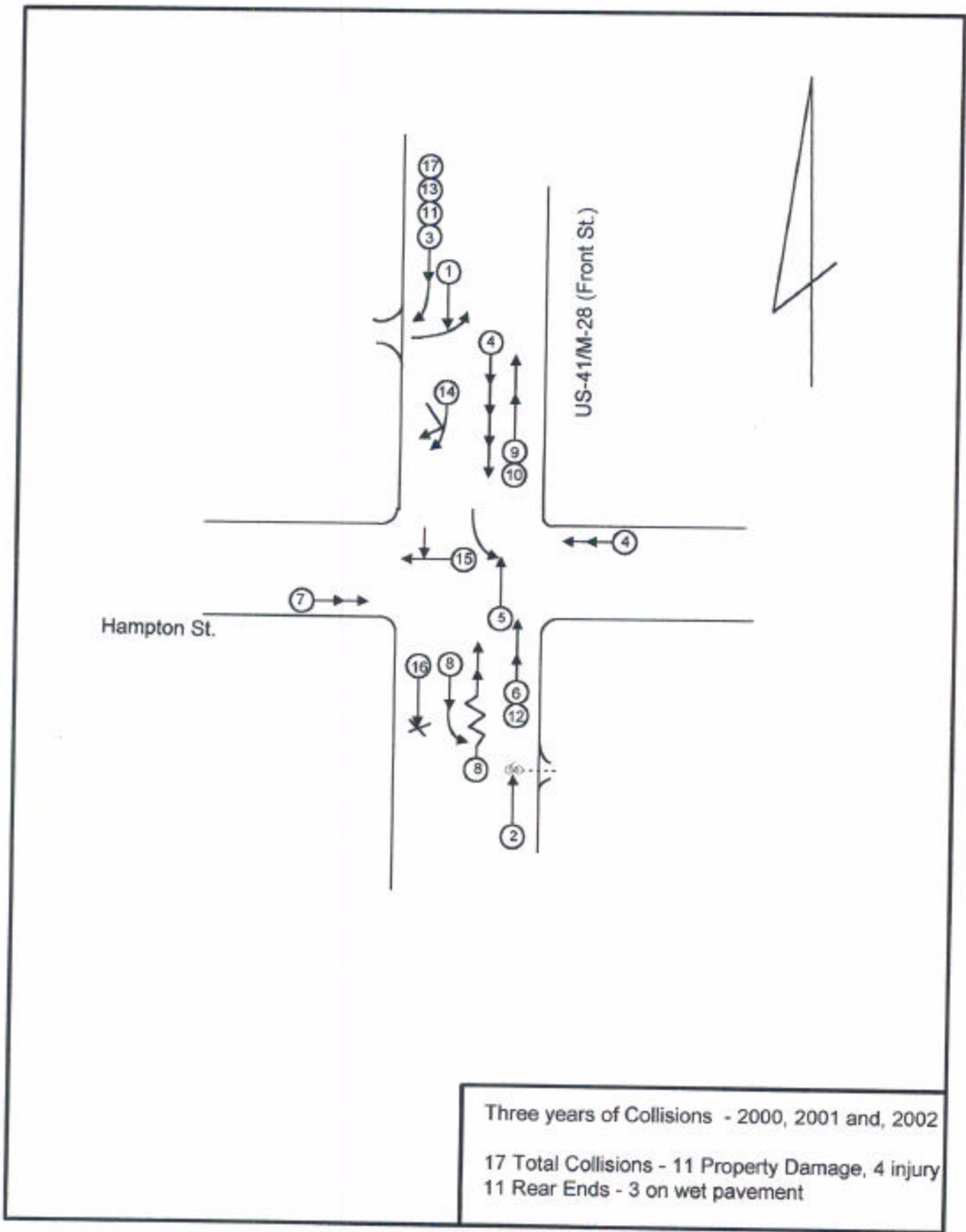
This intersection is approximately 400 feet south of the Genesee Street signal. Hampton Street is controlled by STOP signs in both legs. US-41 operation is similar to Genesee Street description except the north bound US-41 speed changes from 50 MPH to 35 MPH at Furnace Street that is one [1] block south of Hampton Street.

Crash Review Comments

Crash pattern is similar to Genesee Street except this intersection is NOT signalized. However, several [4] collisions occurred at the driveways of a tire center. These driveways should be closed.

US-41/M-28(Front) at Hampton St.
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	3/11/00	1730	PD	Dr' Rt A	2	S-E	Dry
2	6/25/00	1210	PD	Misc	1	NBd	Dry
3	7/19/00	1640	PD	Dr' RE RT	2	SBd	Dry
4	8/23/00	1900	Unk	RE	4	SBd	Dry
5	11/21/00	0800	Unk	Hd on LT	2	N-S	Wet
6	12/05/00	0930	Unk	RE	2	NBd	Icy
7	12/08/00	1515	PD	RE	2	Ebd	Icy
8	12/18/00	1155	1-C	Dr' RE LT	2	SBd	Slushy
9	1/06/01	0955	1-C	RE	2	NBd	Slushy
10	2/01/01	0715	PD	RE	2	NBd	Wet
11	3/21/01	0750	PD	Dr' RE RT	2	SBd	Wet
12	6/01/01	1000	PD	RE	2	NBd	Wet
13	8/31/01	1348	1-C	Dr' RE RT	2	SBd	Dry
14	3/10/02	1900	PD	SS SM	2	SBd	Icy
15	4/18/02	1725	1-C	Angle	2	S-WBd	Dry
16	8/22/02	2100	PD	Misc	1	SBd	Dry
17	10/24/02	2045	PD	Dr' RE RT	2	SBd	Dry



Marquette Township

Signalized intersections were reviewed as well as adjacent intersections with unique operations.

The signal operation at the WalMart/Target drive was analyzed for existing and future capacity levels [Level of Service {LOS} measures]. Current intersection geometry and laneage will provide satisfactory service in the future when Co. Rd. 492 is re-routed into the north leg of this intersection.

US-41 and Commerce Drive

The intersection of US-41 and Commerce Drive forms a “T” and is controlled by a STOP sign on Commerce Drive. Since the center median on US-41 is closed at this location, all traffic on Commerce Drive must turn right at the intersection. There is a “RIGHT TURN ONLY” sign posted in advance of the intersection. The sign should be relocated and placed below the existing STOP sign at the intersection for greater clarity.

There is a right turn lane on westbound US-41 at the intersection. However it is not marked or signed properly. There are no “ARROW ONLY” pavement markings or “RIGHT LANE MUST TURN RIGHT” signs.

The posted speed limits are 50 MPH on US-41/M-28 and 35 MPH on Commerce Drive. The ADT on Commerce Drive is 1,148 vehicles per day (2001).

Commerce Drive connects to County Road 492 (Wright Road) to the north. There is currently a proposal under consideration to open the median and extend Commerce Drive southward to Brookton Road. Under this proposal the existing traffic signal at US-41/M-28 at Westwood Mall (Kohl’s) would be removed and a new signal installed at Commerce Drive. This in effect would provide a direct route for straight-thru traffic on County Road 492.

Currently there are median crossovers on US-41/M-28 to the east and west of Commerce Drive. A decision must be made as to whether left turns will be permitted at the new signalized intersection or directed to the median crossovers. The median left turn lanes are currently formed opposite Commerce Drive. The location of the existing median crossovers does not meet the MDOT standard of placing crossovers 600 feet distant from a signalized intersection.

Commerce Drive is 36 feet wide (from edge of pavement). If two approach lanes are to be provided to operate under traffic signal control, the road must be widened.

US-41/M-28 at Median Cross-over at Westwood Mall (Kohl’s)

The intersection of US-41/M-28 and the median cross-over at the Westwood Mall (Kohl’s) entrance-exit driveway is controlled by a semi-actuated two-phase traffic signal.

The signal operates on an 80-second background cycle to maintain co-ordination with the traffic signal at Target Drive-Wal-Mart.

The median cross-over on US-41 services the left turn movement from eastbound US-41 into the mall entrance. The median cross-over also services the U-turn maneuver from eastbound US-41 to westbound. Heavy commercial vehicles when conducting a U-turn comes very close to vehicles queued at the southbound STOP line.

There is a right turn lane on westbound US-41 at the intersection. The right turn lane is marked with "Arrow Only" but not signed.

The mall driveway is divided by a center median. The twenty-two foot wide southbound mall exit operates as two approach lanes to the intersection. However there are no lane line markings only marked detector loops.

All traffic exiting the mall must turn right. Right turn green arrow (RTGA) indications are displayed to the northbound approach. A circular green indication is displayed simultaneously to southbound cross-over traffic. According to the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), "A steady GREEN ARROW indication shall be used only to allow vehicular movements which are completely protected from conflict with other vehicles moving on a green or yellow indication..." Since U-turns on US-41 may be conducted when a RTGA is displayed to traffic exiting the mall, the traffic signal operation is in violation of the standards set forth in MMUTCD. Therefore the right arrow signal indications should be replaced with circular indications.

The ADT on the mall entrance-exit driveway is 4285 vehicles per day (2001).

US-41/M-28 and County Road 492 (Wright Street)

The intersection of US-41 and County Road 492 (Wright Street) is controlled by STOP signs on County Road 492. There is a median cross-over on eastbound US-41 to service the left turn movement from eastbound to northbound. Therefore all traffic on the northbound and southbound approaches must turn right at the intersection. Northbound and southbound straight-thru traffic on County Road 492 is **NOT** permitted at the intersection. Northbound approach traffic with travel destination to the north or west must use the median cross-over located 1200 feet to the east of the intersection (i.e. at the Westwood Mall entrance). Similarly southbound approach traffic with travel destination to the south or east must use the median cross-over located 1300 feet to the west of the intersection. Therefore the total adverse travel for each indirect movement is nearly one-half mile distance.

The southbound County Road 492 approached is marked as two lanes. However southbound traffic queues in the right lane only and does not utilize the second (left) lane.

There are right turn lanes on both the eastbound and westbound US-41/M-28 approaches to the intersection. However neither right turn lane is signed or marked.

The posted speed limit on Wright Road is 45 MPH.

Crash Review Comments

Two-year crash summary indicates mostly rear end collisions. The geometrics of median crossover are substandard and it should be closed.

US-41/M-28 and Target Drive-Wal-Mart

The intersection of US-41/M-28 and Target Drive-Wal-Mart driveway serves as the primary access points to the Wal-Mart store located on the south side of US-41 and the Target store located on the north side. The intersection is controlled by a six-phase actuated traffic signal. There are left turn green arrow (LTGA) indications on both the eastbound and westbound approaches on US-41. There are right turn green arrow (RTGA) indications on both the northbound and southbound approaches which are displayed concurrently with the LTGA indications. The left turn phase operates as a leading protected phase. Left turns are not permitted on the thru green indication. The signal operates on an 80-second background cycle.

The westbound US-41 approach to the intersection has four lanes; one lane for left turns, two lanes for thru traffic, and one lane for right turns. The eastbound approach has three lanes including one lane for left turns. Both the northbound and southbound approaches to the intersection have three lanes; one lane for left turns, one lane for thru traffic, and one lane for right turns.

The westbound US-41 right lane is signed as “RIGHT LANE MUST TURN RIGHT”. However there are no “Arrow and Only” markings on the pavement.

The westbound US-41 left turn lane is delineated with “ARROW ONLY” pavement markings, but there are no “LEFT LANE MUST TURN LEFT” signs. The speed limit on US-41/M-28 transitions to 55 MPH west of the intersection.

The ADT on Target Drive is 2,808 vehicles per day (2002).

US-41/M-28 and Erickson Avenue

This is a mid-block location where Erickson Avenue forms a "T" intersection with US-41. A directional crossover is located directly across from Erickson Avenue for eastbound traffic. Erickson Avenue is controlled by a STOP sign.

Crash Review Comments

Twenty-three [23] crashes occurred at this intersection in the last two [2] years [2001 & 2003]. Half of the crashes were angle collisions, attempting a left turn via the media opening. Thirteen [13] of the crashes were on wet/snowy pavement. There is notable problem with driveway related crashes.

US-41/M-28 at Erickson St.
Marquette Twp., Marquette County
Years 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	1/07/01	1105	PD	R O R	1	W	Snowy
2	1/24/01	1640	1-C, 1-B	Angle	2	S-W	Wet pavement
3	2/05/01	1218	PD	SS SM	2	W	
4	4/07/01	1440	PD	SS SM*	2	S	Wet pavement
5	4/24/01	1000	PD	R O R	1	Unk	Wet pavement
6	8/20/01	1420	PD	Angle	2	S-W	
7	9/25/01	0809	PD	Misc	1	W	
8	11/17/01	1907	PD	Misc	1	SE	
9	11/27/01	0840	PD	RE	2	W	Snowy
10	1/31/02	1435	PD	Angle	2	S-W	
11	2/01/02	2035	PD	RE	2	S	Icy pavement
12	2/13/02	1310	1-C	Angle*	2	S-E	Wet pavement
13	3/20/02	0345	1-B	RE RT*	2	W	Wet pavement
14	5/01/02	1530	PD	Angle RT*	2	S - W	
15	5/08/02	1705	PD	SS SM	2	S	Wet pavement
16	6/02/02	1430	PD	SS SM	2	N	
17	6/03/02	1650	PD	Angle	2	S-W	
18	7/30/02	0940	1-A, 1-C	LT Angle	2	S-E	
19	8/09/02	2210	PD	RE	2	W	
20	8/20/02	1720	PD	Angle*	2	S-W	Wet pavement
21	11/21/02	1031	PD	RE RT*	2	W	Wet pavement
22	12/06/02	1602	2-C	Angle	2	S-W	Wet pavement
23	12/23/02	1450	PD	SS SM	2	S	Wet pavement

* collisions of motorists using driveways

City of Negaunee

Signalized intersection locations on US-41/M-28 with crash summaries and collision diagrams for the years 2000, 2001 & 2002.

US-41/M-28 @ Maas	Operational review only
US-41/M-28 @ Baldwin	Operational review and crash analysis; 18 crashes in three [3] years.
US-41/M-28 @ Teal Lake/Croix	Operational review only

US-41/ M-28 and Mass Street

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The north and south legs of Mass Street has two approach lanes, including a short 60-foot long left turn lane. The approach lanes are delineated with “ARROWS and ONLY” pavement markings and lane usage signs.

The posted speed limit on US-41/M-28 is 45 MPH. The posted speed limit on the south leg of Mass Street is 25 MPH. The speed limit on the north leg is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase semi-actuated traffic signal. There are detector loops on the north and south approaches of Mass Street delineated with white paint. There are pedestrian indications on all four legs. There are push buttons available for crossing US-41/M-28. There are no marked pedestrian crosswalks.

There are STOP lines marked on all approaches.

US-41/ M-28 and Baldwin Avenue

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The north and south legs of Baldwin Avenue has two approach lanes, including a short 80-foot long left turn lane on the north leg and a 100-foot long left turn lane on the south leg. The approach lanes are delineated by faded lane lines. There are no “ARROWS and ONLY” pavement markings. However there is side mounted lane usage signs and overhead illuminated signs with “Left Arrow Only” legend at the intersection.

The posted speed limit on US-41/M-28 is 45 MPH. The speed limit on the Baldwin Avenue is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase semi-actuated traffic signal. There are detector loops on the north and south approaches of Baldwin Avenue delineated with white paint. There are pedestrian indications on all four legs. There are push buttons available for crossing US-41/M-28. There are marked pedestrian crosswalks on the east and west legs only.

There are STOP lines marked on all approaches. However the STOP lines on the north and south legs of Baldwin Avenue are faded.

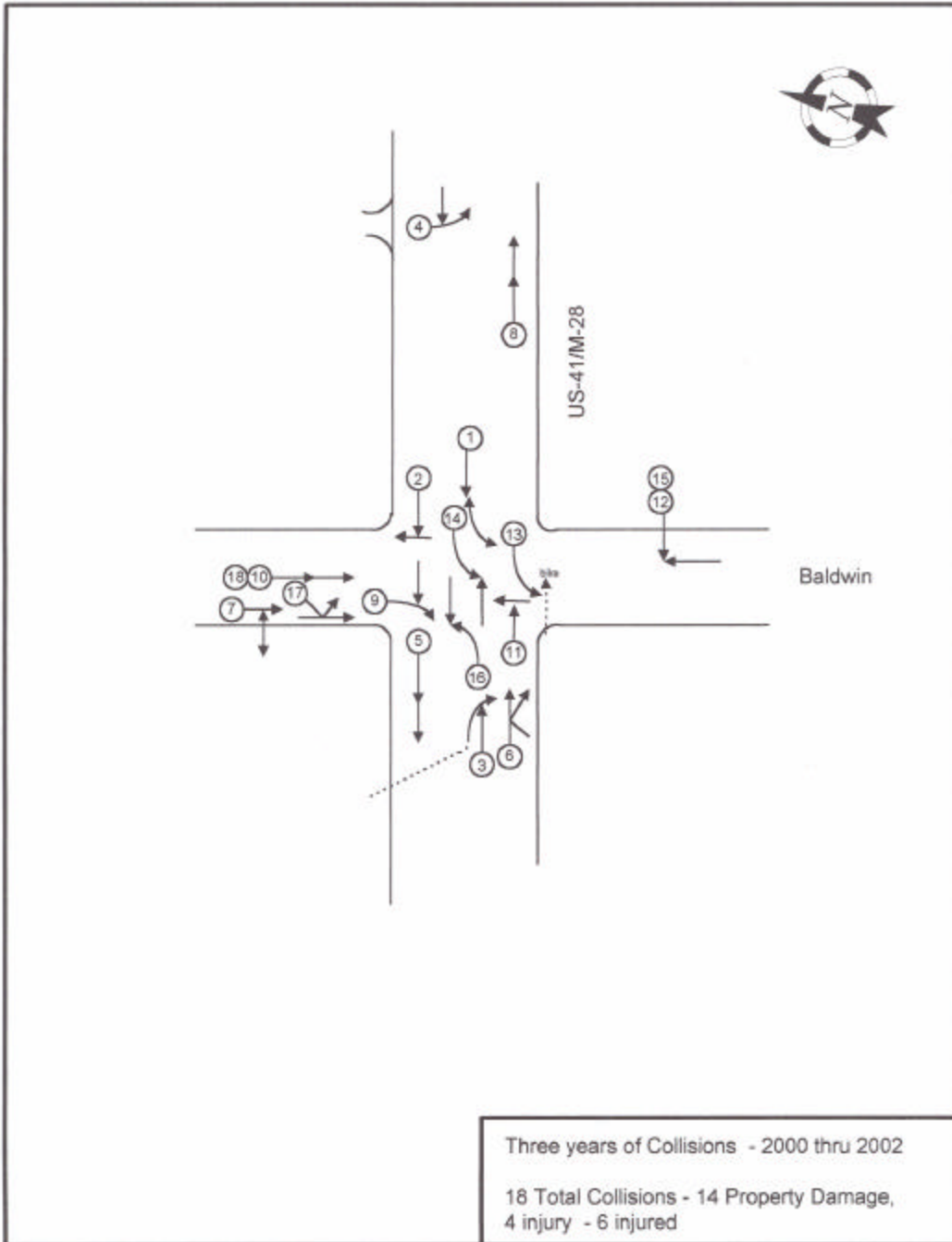
Crash Review Comments

Eighteen [18] of the crashes were angle collisions. The turning movements at this intersection should be studied further.

US-41/M-28 at Baldwin St.
City of Negaunee, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	3/03/00	1715	PD	Backing	2	WBd	
2	6/09/00	2021	PD	Angle	2	N-WBd	
3	2/04/01	0939	PD	RT Angle	2	S-Ebd	Snow
4	4/27/01	1530	PD	LT Angle	2	S-WBd	250ft E. of Baldwin
5	6/28/01	1740	PD	RE	2	WBd	Const Zone
6	8/08/01	1331	PD	SS SM	2	Ebd	
7	9/07/01	1700	PD	Backing	2	S-WBd	Wet pavement
8	10/16/01	1600	PD	RE	2	Ebd	
9	10/25/01	1402	PD	RT Angle	2	S-WBd	Wet pavement
10	2/26/02	1725	PD	RE	2	SBd	Snow
11	4/09/02	1730	PD	Angle	2	N-Ebd	
12	4/26/02	1600	1-C	Angle	2	N-WBd	Driveway-
13	5/22/02	1730	1-B	LT Bike	1	W-Ebd	
14	7/06/02	1849	2-C's	Hd on LT	2	W-Ebd	
15	7/11/02	1035	PD	Angle	2	N-WBd	Driveway-
16	7/16/02	1449	1-C	Hd on LT	2	E-WBd	
17*	2/16/01	10-11A	PD	SS SM	2	SBd	
18*	2/26/02	5-6P	PD	RE	2	SBd	

* = Drawn from the MDOT General Crash Program - one line listing



US-41/ M-28 and Teal Lake Avenue (BL-28)/Croix Street

The east leg of US-41/M-28 is a five-lane roadway with center lane for left turn. The center left-turn lane is delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The west leg of US-41/M-28 is undivided four-lanes with a marked 100-foot long left turn pocket at the intersection. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is a paved shoulder on both sides.

The south leg (Teal Lake Avenue) has two approach lanes including a 120-foot long left turn lane. The approach lanes are delineated by “ARROWS and ONLY” pavement marking and side mounted lane usage signs. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection.

The north leg (Croix Street) has two approach lanes including a short 90-foot long left turn lane. The approach lanes are delineated by “ARROWS and ONLY” pavement marking and side mounted lane usage signs. The thru-right option pavement marking in the right lane is faded.

The posted speed limit on US-41/M-28 is 45 MPH. The speed limit transitions to 55 MPH west of the intersection. The posted speed limit on both Teal Lake Avenue and Croix Street is 25 MPH.

The intersection is controlled by a two-phase fixed-time traffic signal. There are pedestrian indications on east and south legs. There is a marked pedestrian crosswalk on the east leg but not on the south leg.

There are STOP lines marked on all approaches.

City of Ishpeming

Signalized intersection locations with crash summaries and collision diagrams for the years 2000, 2001 & 2002.

Crash Totals

US-41/M-28 @ Second St./Deer Lake	30
US-41/M-28 @ Lakeshore Drive	40

US-41/ M-28 and Second Street

The east leg of US-41/M-28 is a five-lane roadway with center lane for left turn. An “ARROW” marking with solid yellow-skip yellow lane lines delineates the center left-turn lane. There is no corresponding “ONLY” marking. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The west leg of US-41/M-28 is five lanes with a marked 125-foot long left turn pocket marked at the intersection. There is an “ARROW” pavement marking but no corresponding “ONLY” marking. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is a paved shoulder on both sides.

The north and south legs of Second Street has two approach lanes, including a short 90-foot long left turn lane on the north leg and a 70-foot long left turn lane on the south leg. There are “ARROW” markings in the left turn lanes but no corresponding “ONLY” markings. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection.

The posted speed limit on US-41/M-28 is 45 MPH. The speed limit transitions to 55 MPH west of the intersection. The posted speed limit on north leg of Second Street is 25 MPH. The speed limit on the south leg of Second Street is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase fixed-time traffic signal. There are no pedestrian indications.

There are no marked pedestrian crosswalks.

There are STOP lines marked on all approaches.

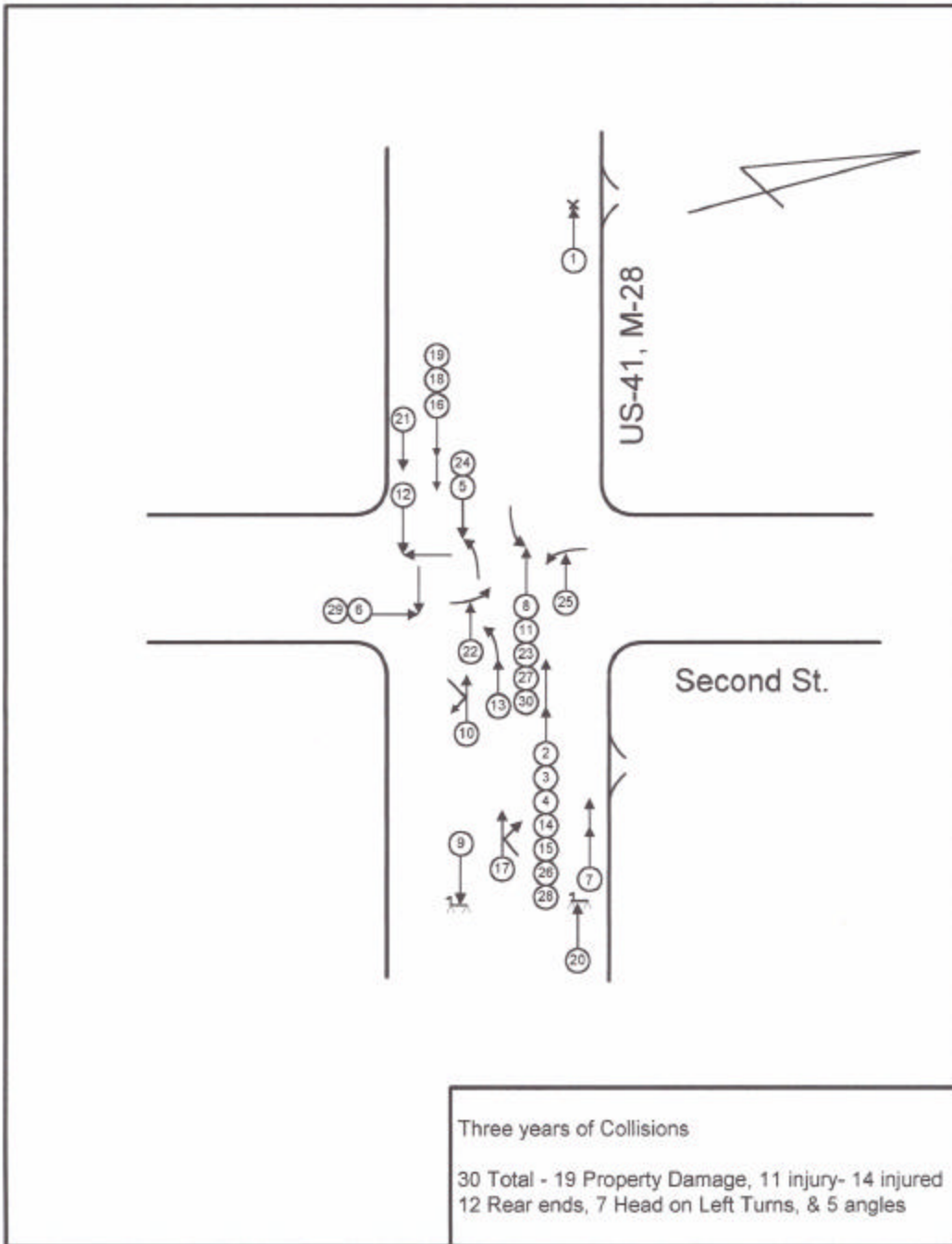
Crash Review Comments

Fifty percent [50%] of the crashes were angle collisions. The signal timing and overall operation should be evaluated for providing safer turning opportunities.

US-41/M-28 at Second St.
City of Ishpeming, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement condition
1*	1/17/00	9-10P	PD	Misc	1	WBd	Snowy
2	1/22/00	1758	PD	RE	2	EBd	Icy
3*	2/13/00	5-6P	PD	RE	2	WBd	Icy
4*	2/26/00	3-4P	1-C	RE	2	WBd	Wet
5*	7/01/00	4-5P	PD	Hd on LT	2	W-EBd	Dry
6*	7/22/00	4-5P	1-C	Angle	2	N-EBd	Dry
7*	9/24/00	N-1P	1-C	Drive RE	2	WBd	Dry
8*	10/06/00	11A-N	1-A, 1-B	Hd on LT	2	E-WBd	Dry
9*	10/27/00	11P-M	PD	Deer	1	Ebd	Dry
10*	11/19/00	5-6P	PD	SSOP	2	W-Ebd	Icy
11*	12/08/00	4-5P	2-C	Hd on LT	2	W-Ebd	Slushy
12	1/07/01	0110	1-C	Angle	2	E-SBd	Snowy
13	1/14/01	1755	PD	RELT	2	Ebd	Snowy
14	2/09/01	1039	1-C	RE	2	WBd	Snowy
15	2/22/01	0853	PD	RE	2	WBd	Icy
16	3/05/01	0915	1-C	RE	2	Ebd	Snowy
17	3/19/01	1710	PD	RELT	2	WBd	Dry
18	4/04/01	1135	PD	RE	2	WBd	Dry
19	5/11/01	0745	PD	RE	2	Ebd	Dry
20*	5/23/01	2-3A	PD	Deer	1	WBd	Dry
21	7/23/01	0630	1-A	Misc	1	Ebd	Unknown
22	8/21/01	1935	1-C	Angle	2	N-WBd	Dry
23	8/25/01	1500	PD	Hd on LT	2	E-WBd	Wet
24	9/14/01	2040	PD	Hd on LT	2	E-WBd	Dry
25	3/28/02	0600	PD	Angle	2	S-WBd	Dry
26	7/07/02	1910	PD	RE	2	WBd	Wet
27	9/09/02	1619	2-B's	Hd on LT	2	E-WBd	Dry
28	10/20/02	1315	PD	RE	2	WBd	Wet
29*	12/17/02	8-9A	PD	Angle	2	N-Ebd	Dry
30	12/20/02	1441	PD	Hd on LT	2	E-WBd	Wet

* = Data from MDOT General Crash Program



US-41/ M-28 and Lakeshore Drive (BL-28)

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid white lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There are right turn pockets in both directions. However there are no pavement markings in the right turn lanes or complementary lane use signs. There is a paved shoulder on both sides.

The north and south legs of Lakeshore Drive has two approach lanes, including a 100-foot long left turn lane on the north leg and a short 60-foot long left turn lane on the south leg. There are “ARROW and ONLY” markings in the left turn lanes and corresponding lane use signs. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. The centerline on the north leg has faded away. The south leg of Lakeshore Drive (BL-28) serves as a grand entrance into the City of Ishpeming.

The posted speed limit on US-41/M-28 is 55 MPH. The posted speed limit on north leg of Lakeshore Drive is 25 MPH. The posted speed limit on the south leg of Lakeshore Drive (BL-28) is 35 MPH.

The intersection is controlled by a two-phase fixed-time traffic signal. There are no pedestrian indications.

There are no marked pedestrian crosswalks.

There are STOP lines marked on all approaches.

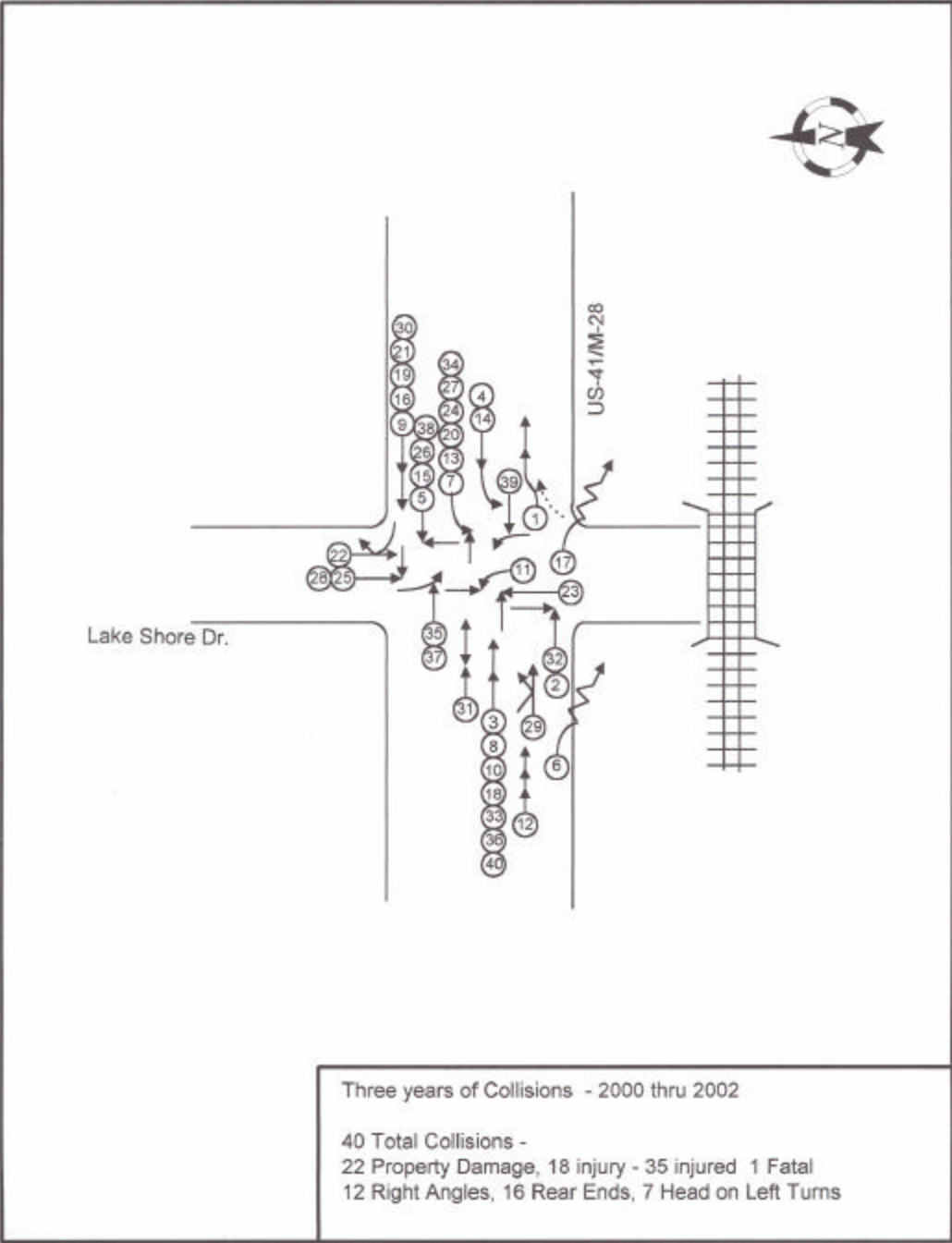
Crash Review Comments

This is the third highest crash concentration in the Study Area [and in Marquette County]. The types of collisions indicate a problem with signal timing i.e. providing safer left turn opportunities.

Twenty-one of the 40 crashes were angle collisions. Twelve of those included multiple injuries.

US-41/M-28 at Lake Shore Dr.
City of Ishpeming, Marquette County
Years 2000 thru 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	2/04/00	1900	PD	SS+RE	3	E	Wet Pavement
2	2/07/00	1540	PD	Angle	2	S-E	
3	2/13/00	1035	PD	RE	2	E	Snowy
4	2/16/00	1920	PD	RELT	2	W	Wet Pavement
5	3/04/00	0823	1-B, 1-C	Angle	2	N-W	
6	3/15/00	2015	PD	ROR	1	E	Wet Pavement
7	4/30/00	1720	1-C	Hd on LT	2	E-W	
8	8/26/00	0625	1-B, 1-C	RE	2	E	Wet Pavement
9	9/02/00	1710	PD	RE	2	W	
10	10/12/00	1803	3-C	RE	2	E	
11	10/19/00	1544	PD	Hd on LT	2	N-S	
12	11/07/00	1841	PD	RE	3	E	
13	11/10/00	2145	PD	Hd on LT	2	E-W	
14	3/05/01	1700	PD	RE LT	2	W	Snowy
15	3/30/01	1604	2-B, 1-C	Angle	2	N-W	
16	4/04/01	1558	2-B, 1-C	RE	2	WBd	
17	6/01/01	1805	PD	R O R	1	E	
18	6/10/01	1555	1-C	RE	2	E	Wet pavement
19	8/24/01	1640	PD	RE	2	W	
20	9/28/01	1538	PD	Hd on LT	2	E-W	
21	10/29/01	1202	4-C	RE	3	W	
22	11/26/01	2000	PD	RT	2	W-S	Snowy
23	12/23/01	1225	PD	Angle	2	N-E	Icy
24	2/23/02	1935	PD	Hd on LT	2	W-E	Wet pavement
25	3/16/02	1655	1-B, 1-C	Angle	3	S-W	
26	4/12/02	2355	2-A, 3-C	Angle	2	N-W	
27	4/24/02	1652	2-C	Hd on LT	2	E-W	wet pavement
28	5/03/02	1819	PD	Angle	2	S-W	
29	5/21/02	0750	PD	SS SM	2	E	
30	7/12/02	1610	PD	RE	2	W	
31	7/28/02	1550	PD	Backing	2	E	
32	9/29/02	1307	1-C	Angle	2	S-E	
33	11/12/02	1140	1-C	RE	2	E	
34	12/01/02	2056	PD	Hd on LT	2	E-W	Snowy
35	12/02/02	1836	1-C	Angle LT	2	S-E	93 yr old driver
36	12/05/01	2-3P	1-C	RE	2	E	
37	10/25/01	11-N	1-F, 1-C	LT Angle	2	S-E	
38	5/12/01	6-7A	1-C	Angle	2	N-W	
39	2/17/01	2-3P	1-B	LT Angle	2	N-W	
40	1/26/01	8-9P	PD	Drive RE	2	E	Snowy



CRASH CONCENTRATIONS
in the US-41/M-28 Corridor
Marquette County, MI
Years 2000, 2001 & 2002

Location	# of Crashes
1. Washington St. City of Marquette	97
2. McClellan City of Marquette	81
3. Lakeshore Drive City of Ishpeming	40
4. Front St. City of Marquette	35
5. Genesee City of Marquette	32
6. Second St./Deer Lake City of Ishpeming	30
7. Grove City of Marquette	23
8. M-28 Junction and Cherry Creek Rd. Chocolay Township	23
9. Silver Creek Road Chocolay Township	21
10. Baldwin City of Negaunee	18
11. Hampton City of Marquette	17

City of Marquette

Signalized intersection locations on US-41/M-28 with crash summaries and collision diagrams for the years 2000, 2001 & 2002.

Crash Totals

US-41/M-28 @ Washington	97
US-41/M-28 @ McClellan	81
US-41/M-28 @ Front	35
US-41/M-28 @ Genesee	32
US-41/M-28 @ Grove	23
US-41/M-28 @ Hampton [non signalized]	17

US-41/ M-28 and BL-41 (Washington Street)

Both the east and west legs of US-41/M-28 are divided roadways. There are four lanes on the eastbound approach, two lanes for left turns and two lanes for thru traffic. The dual left turn lanes are delineated with “ARROW and ONLY” pavement markings, but there are no “LEFT LANES MUST TURN LEFT” signs. There are two thru lanes on the westbound approach with a free flow right turn lane in advance of the intersection.

The east leg of Washington Street is a divided four-lane roadway. The westbound approach has two lanes that must turn right at US-41/M-28. There is a channelized median left turn lane in advance of the intersection opposite Meeske Avenue.

The posted speed limits are 45 MPH on US-41/M-28 and 35 MPH on Washington Street.

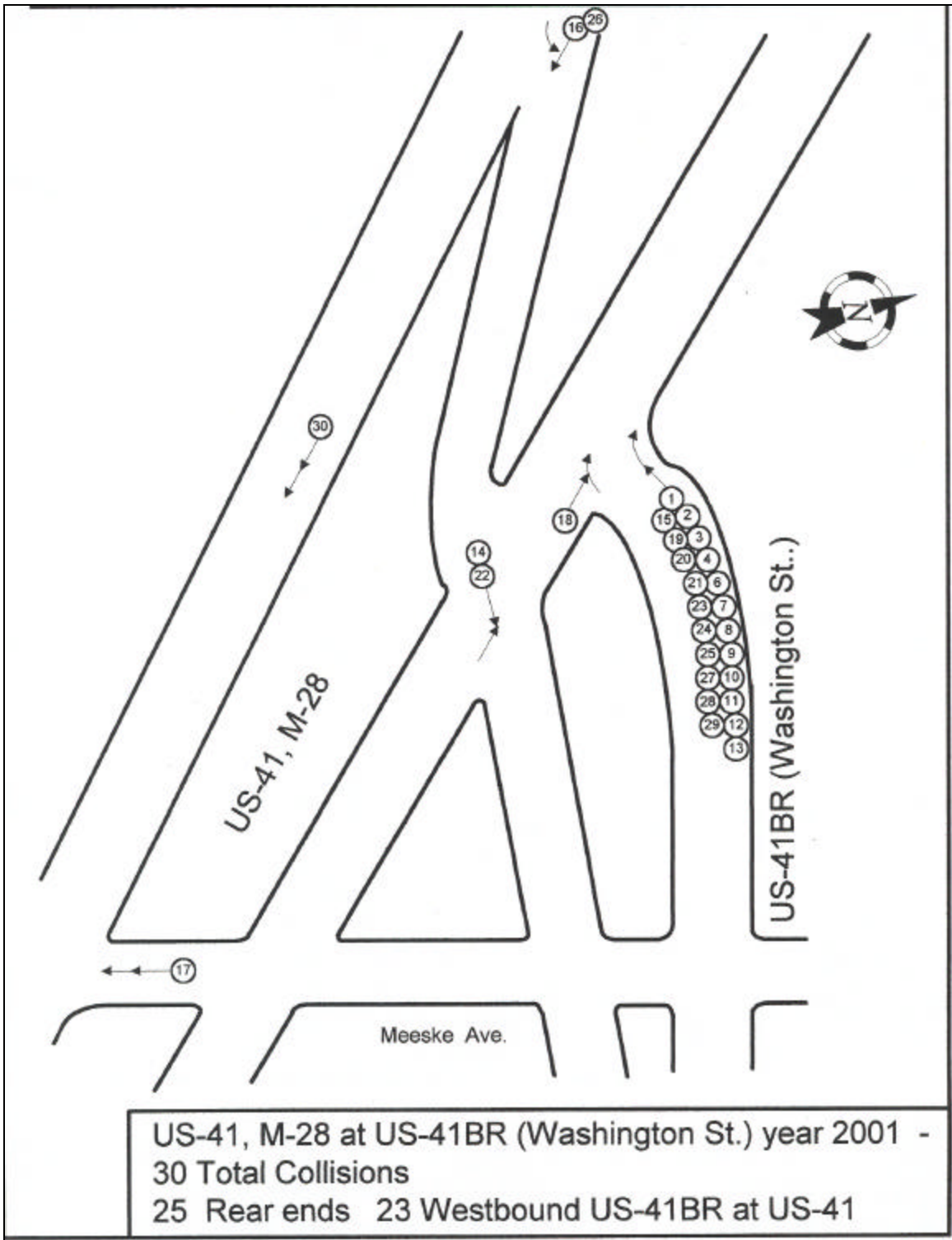
There is a traffic signal which operates as two-phase fixed time that controls the eastbound left turn and westbound thru movements on US-41/M-28. The westbound Washington Avenue dual right turn movement is under STOP control.

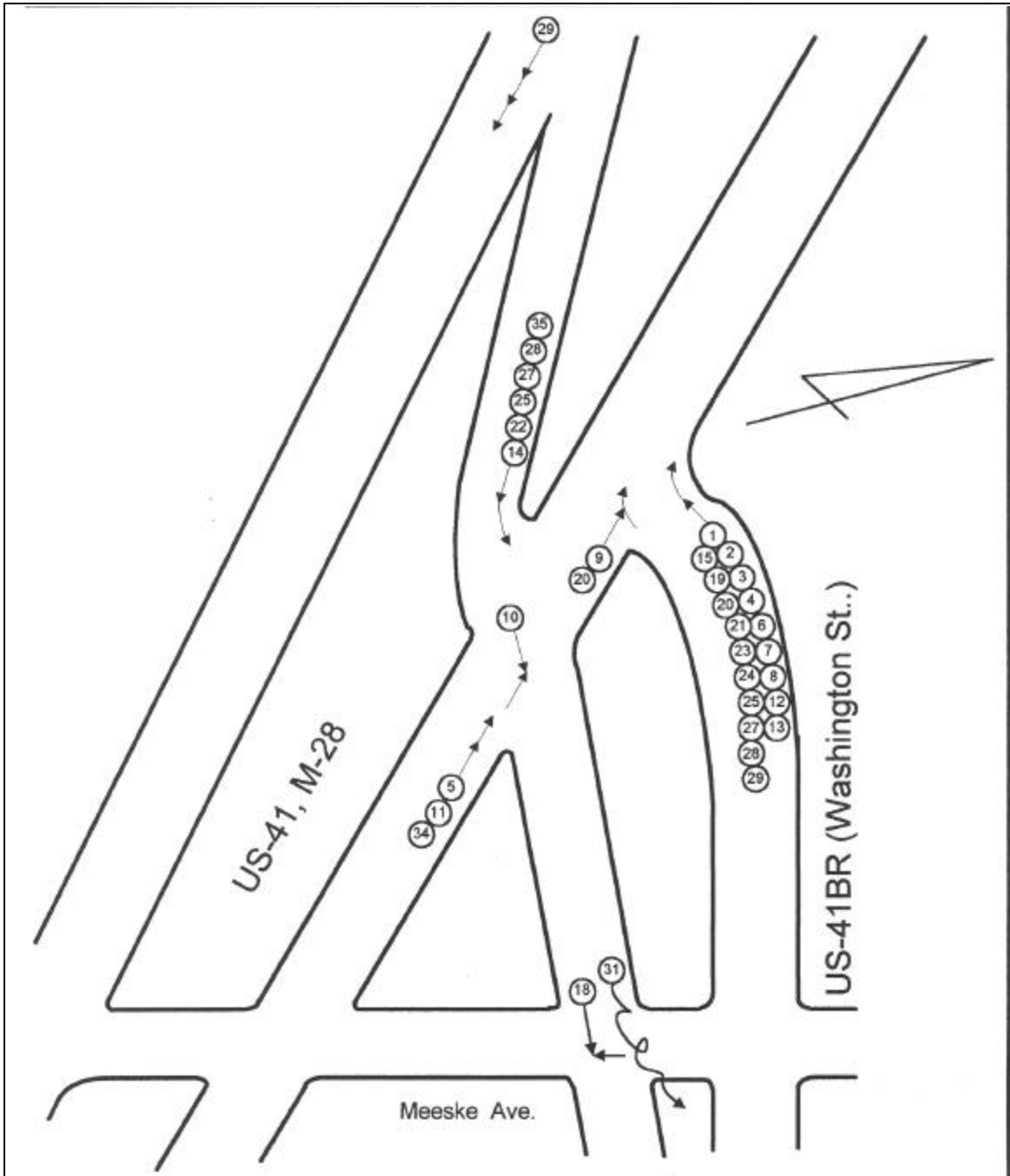
There are no pedestrians signal indications or marked crosswalks. There are STOP lines on all major approaches under traffic control. However there are no STOP lines at any of the three locations where the westbound Washington Street to eastbound US-41/M-28 left turn is required to stop.

Crash Review Comments

Of the 97 crashes, over 60 were rear ends westbound approaching US-41 which is STOP controlled.

The westbound US-41 approach speed is 45 MPH and higher which contributes to westbound rear end crashes.





US-41, M-28 at US-41BR (Washington St.) year 2000 -
 35 Total Collisions
 28 Rear ends 20 Westbound US-41BR at US-41

US-41/M-28 at US-41BR/Washington
City of Marquette, Marquette County
Year 2002
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/03/02	1440	PD	RERT	2	W	Wet
2	1/06/02	1500	PD	RERT	2	W	Icy
3	1/06/02	1645	PD	RERT	2	W	Icy
4	1/08/02	1411	PD	RERT	2	W	Wet
5	1/09/02	1120	PD	Angle	2	W-NW	Wet
6	1/18/02	1230	PD	RERT	3	W	Dry
7	1/29/02	1830	PD	RERT	2	W	Slushy
8	2/09/02	1012	2-C	RERT	2	W	Wet
9	2/09/02	1312	1-C	RELT	3	E	Wet
10	2/16/02	1600	1-C	RERT	2	W	Wet
11	3/09/02	1550	PD	RERT	2	W	Icy
12	3/09/02	1610	PD	RELT	2	E	Icy
13	3/18/02	1630	PD	RERT	2	W	Dry
14	3/24/02	0950	PD	RERT	2	W	Icy
15	3/24/02	1235	2-C	RE	5	E	Icy
16	3/24/02	1330	PD	ROR	1	E	Snowy
17	4/11/02	0925	PD	RERT	2	W	Wet
18	5/03/02	1805	PD	RERT	2	W	Dry
19	5/13/02	1545	PD	RERT	2	W	Dry
20	5/14/02	1500	PD	RELT	2	S	Dry
21	5/24/02	1715	PD	SSSM	2	W	Dry
22	6/07/02	1520	1-C	RERT	2	W	Dry
23	6/14/02	1720	PD	RERT	2	W	Dry
24	6/19/02	1455	1-C	RE	2	NW	Dry
25	7/08/02	1307	2-C	RERT	2	W	Dry
26	7/11/02	1725	PD	RERT	2	W	Dry
27	7/26/02	1020	PD	RERT	2	W	Dry
28	9/19/02	1630	1-C	RERT	2	W	Dry
29	10/04/02	1520	PD	RERT	2	W	Wet
30	10/06/02	1630	PD	RERT	3	W	Wet
31	11/16/02	1515	PD	RERT	2	W	Dry
32	12/02/02	0915	PD	ROR	1	E	Snowy

US-41/M-28 at US-41BR/Washington
City of Marquette, Marquette County
Year 2001
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	01/01/01	1900	PD	RERT	2	W	Wet
2	02/03/01	1555	PD	RERT	2	W	Wet
3	02/06/01	1800	PD	RERT	2	W	Wet
4	02/15/01	1620	1-C	RERT	2	W	Wet
5	02/21/01	1530	PD	RERT	2	W	Wet
6	03/28/01	1035	PD	RERT	2	W	Dry
7	03/31/01	1512	PD	RERT	2	W	Dry
8	04/04/01	0855	PD	RERT	2	W	Dry
9	04/11/01	1320	PD	RERT	2	W	Dry
10	05/01/01	1710	PD	RERT	2	W	Dry
11	05/17/01	1615	PD	RERT	2	W	Wet
12	06/26/01	1700	1-C	RERT	2	W	Dry
13	07/01/01	1340	PD	RERT	2	W	Dry
14	07/08/01	1422	1-C	Angle	2	E-NW	Dry
15	07/11/01	1200	1-C	RERT	2	W	Dry
16	08/28/01	0830	PD	Angle	2	S-E	Dry
17	09/08/01	1615	PD	RELT	2	S	Dry
18	10/02/01	1345	PD	Angle	2	NW-W	Dry
19	10/02/01	1445	PD	RERT	2	W	Dry
20	10/02/01	1637	PD	RERT	2	W	Dry
21	10/15/01	1040	PD	RERT	2	W	Dry
22	10/17/01	1245	1-C	Angle	2	E-NW	Dry
23	10/19/01	1030	PD	RERT	2	W	Dry
24	11/30/01	1320	PD	RERT	2	W	Unknown
25	12/05/01	1115	PD	RERT	2	W	Wet
26	12/11/01	1600	PD	SSSM	2	SE	Dry
27	12/16/01	1550	PD	RERT	2	W	Wet
28	12/17/01	1030	PD	RERT	2	W	Dry
29	12/23/01	1810	3-C	RERT	2	W	Unknown
30	12/29/01	1340	PD	RE	2	E	Snowy

US-41/M-28 at US-41BR/Washington
City of Marquette, Marquette County
Year 2000
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/10/00	1015	PD	RERT	2	W	Wet
2	1/10/00	1700	1-C	RERT	2	W	Wet
3	1/22/00	1525	PD	RERT	2	W	Snowy
4	1/25/00	1720	PD	RERT	2	W	Icy
5	2/17/00	1245	1-C	RE	2	NW	Dry
6	3/19/00	1305	PD	RERT	3	W	Dry
7	3/22/00	1215	PD	RERT	2	W	Dry
8	3/26/00	1530	PD	RERT	2	W	Dry
9	3/28/00	1620	PD	Angle	2	NW-W	Dry
10	5/09/00	0550	PD	Angle	2	NW-E	Dry
11	5/26/00	1815	PD	SSSM	2	NW	Dry
12	6/29/00	1030	PD	RERT	2	NW	Dry
13	8/19/00	1505	PD	RERT	2	W	Dry
14	9/06/00	1710	1-C	RE	2	E	Dry
15	9/22/00	1320	1-C	RERT	2	W	Wet
16	9/27/00	0905	PD	RERT	2	W	Wet
17	10/06/00	1340	PD	RERT	2	W	Dry
18	10/11/00	0855	PD	Angle	2	E-W	Dry
19	10/30/00	1538	PD	RERT	2	W	Dry
20	11/10/00	1130	PD	Angle	2	NW-W	Wet
21	11/18/00	1400	PD	RERT	2	W	Dry
22	11/19/00	1615	PD	RELT	2	E	Snowy
23	12/01/00	1005	PD	RERT	2	W	Wet
24	12/06/00	1415	PD	RERT	2	W	Snowy
25	12/08/00	0050	PD	RELT	2	E	Icy
26	12/08/00	1158	PD	RELT	2	E	Icy
27	12/08/00	1315	PD	RELT	2	E	Icy
28	12/08/00	1400	PD	RELT	2	E	Snowy
29	12/08/00	1419	PD	RE	3	E	Icy
30	12/12/00	1345	1-C	RERT	2	W	Snowy
31	12/16/00	0435	PD	ROR	1	E	Snowy
32	12/16/00	1715	PD	RERT	2	W	Icy
33	12/18/00	1650	PD	RERT	2	W	Icy
34	12/22/00	1339	PD	RE	2	NW	Icy
35	12/27/00	1515	PD	RE	2	E	Icy

US-41/M-28 and McClellan Avenue

The east and west legs of US-41/M-28 are divided four-lane roadways. Left turns are prohibited at the intersection. There are exclusive right turn lanes on both the eastbound and westbound approaches. There are no "ARROW and ONLY" pavement markings or "RIGHT LANE MUST TURN RIGHT" signs. There is paved shoulder on both sides.

There are two approach lanes on the north and south legs of McClellan Avenue, one lane for thru traffic and one lane for right turns. Left turns are prohibited at the intersection. There are guide signs posted directing indirect left turning movements to the median cross-overs. The northbound and southbound approach lanes are marked with "THRU ARROWS" and "RIGHT ARROWS", but there are no "ONLY" markings.

There are median cross-overs on US-41/M-28 located to the east and west of the intersection. The corresponding left turn lanes are neither marked nor signed.

The posted speed limit on US-41/M-28 is 55 MPH. The posted speed limits on McClellan Avenue is 35 MPH on the south leg and 25 MPH on the north leg.

The intersection is controlled by a two-phase fixed time signal.

There are no pedestrian signal indications or marked crosswalks. There are STOP lines on all approaches.

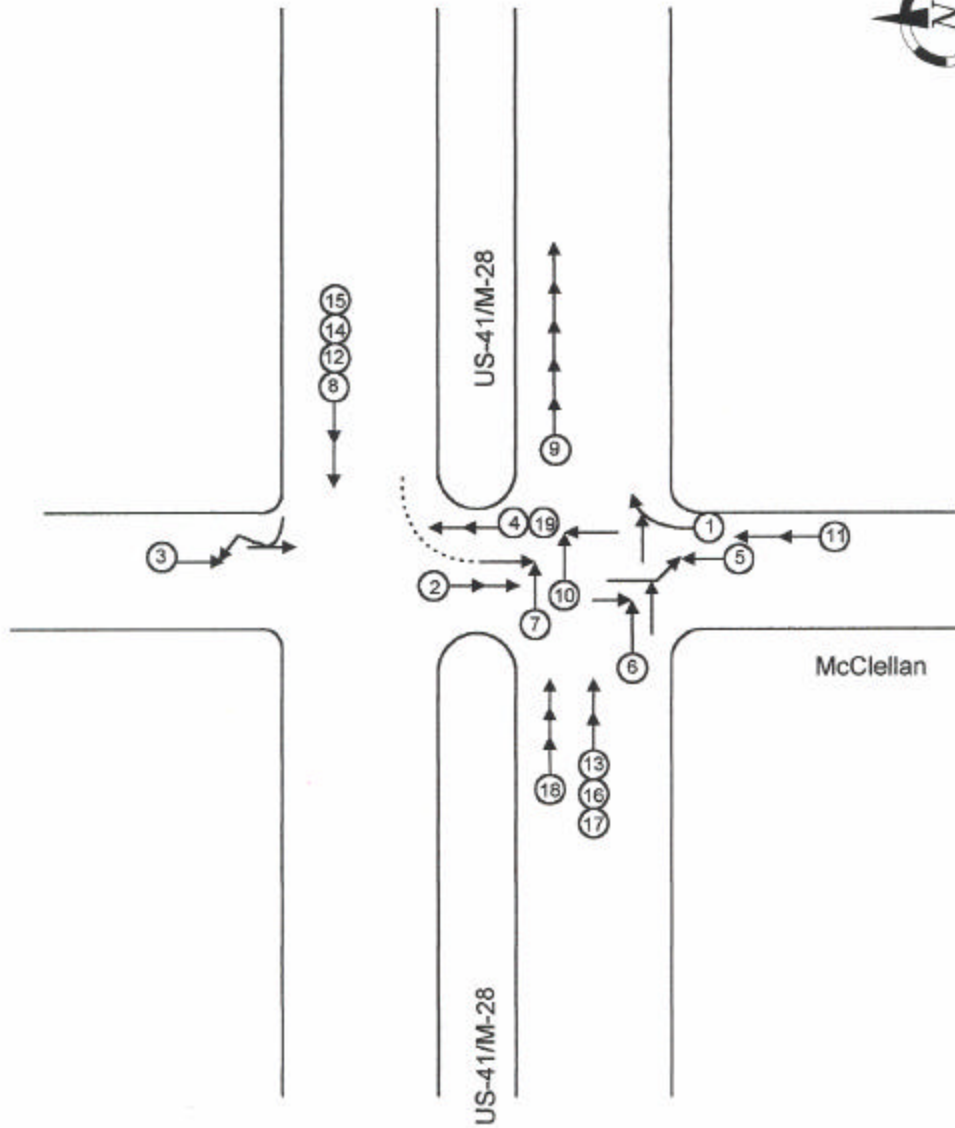
Crash Review Comments

Of the 81 crashes in three [3] years, 27 were right angles, which occurred during the STOP & GO operation. Southbound traffic has a difficult time to travel uphill and then stop for the signal.

A signal timing study is **recommended to evaluate traffic clearance intervals.**

US-41/M-28 at McClellan St.
City of Marquette, Marquette County
Year 2002
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/08	1648	PD	Angle	2	N-E	Wet
2	1/28	2145	PD	RE	2	S	Icy
3	1/30	0900	PD	RT Angle	3	W-S	Slushy
4	2/12	2140	PD	RE	2	N	Snowy
5	3/08	1910	PD	Angle	3	N-E-S	Icy
6	3/10	1143	PD	Angle	2	S-E	Icy
7	4/14	1850	1-C	Hd on LT	2	E-W	Dry
8	5/01	0740	PD	RE	2	W	Dry
9	6/05	1722	PD	RE	5	E	Dry
10	6/18	1015	PD	Angle	2	E-N	Dry
11	7/25	1205	PD	RERT	2	N	Dry
12	9/21	1630	PD	RE	2	W	Dry
13	7/22	1345	PD	RE	2	E	Dry
14	9/22	2326	PD	RE	2	W	Dry
15	9/26	1430	PD	RE	2	W	Wet
16	9/26	1700	PD	SS SM	2	E	Wet
17	9/30	0955	PD	RE	2	E	Wet
18	9/25	1710	PD	RELT	3	E	Wet
19	11/14	1315	PD	RE	2	N	Dry



Year 2002 Collisions
19 Total Collisions, 18 Property Damage, 1 injury
1 injured
13 Rear Ends, 5 Right Angles

