CHAPTER 5: Traffic Conditions

Introduction

This chapter reviews the traffic characteristics of the roads within the Alpena transportation study area. The assessment of the traffic within the study area involved the collection of various roadway attributes including speed limits, traffic controls, traffic volumes, and crash data. This section of the Transportation Plan will identify existing and/or potential future operational deficiencies among the study area's roads, streets, and intersections and offer remedial options. To some degree, this section will also address economic and aesthetic issues that relate both to traffic conditions and the development of transportation facilities to accommodate all modes of traffic.

The Alpena area is served by two state highways; US-23 is a north-south roadway; some 100 miles from I-75 at Standish. M-32 is an east-west roadway connecting to US-23 in the center of the City of Alpena and running west approximately 75 miles to US-131, 12 miles beyond I-75 at the City of Gaylord. US-23 and M-32 are "all weather" routes open year round to legal axle loads and 102" wide trailers. M-32 is considered part of the State's priority commercial network.

The Alpena Regional Airport has a 9000 foot paved main runway and 5030 foot paved crosswind runway, and is located 5 miles west of Alpena on M-32.

The area is also the end of the line for the Lake State Railway, whose service includes the Alpena area and extends south into lower Michigan.

Alpena County, including the City of Alpena, has maintained the following approximate number of roadway miles:

Rural Routes	
Principal Arterial	38 miles
Minor Arterial	26 miles
Major Collector	150 miles
Minor Collector	49 miles
Local	411 miles
	674 Rural Route miles
Urban Routes	
Principal Arterial	12 miles
Minor Arterial	13 miles
Collector	15 miles
Local	89 miles
	129 Urban Route miles

Very few lane miles have been added in the last 10 years.

Existing Conditions

This is a summary of the existing travel conditions among the streets and roads within the study area.

Speed Limits and Traffic Controls

Speed limits are set to match roadway design and area characteristics. Speed limits generally reflect the speed at which most drivers feel comfortable and safe traveling a particular roadway. Many other

factors, however, are taken into consideration such as functionality of the road, sight distances, safe stopping distances, and school zones. The speed limits in this study area vary from 25 M.P.H. within the City of Alpena to 55 M.P.H. on highways and rural roads throughout the study area. There are 14 intersections controlled by traffic signals, and two intersections have flashing signals, within the study area. The traffic signals are located at the following intersections:

- Ripley Boulevard and US-23 South
- Ripley Boulevard and Grant Avenue
- Bagley/Hobbs and Third Avenue
- Third Avenue and Ripley Boulevard
- Bagley Street and M-32
- Bagley Street and Long Rapids Road
- Long Rapids Road and US-23 North
- M-32/Washington Blvd and Ripley Boulevard
- US-23 North/Chisholm and Eleventh Avenue
- US-23 North/Chisholm and Ninth Avenue
- US-23 North/Chisholm and Second Avenue
- US-23 North/Chisholm and Third Avenue
- Park Place and Second Avenue
- Miller Street and Second Avenue

Signals with a left turn phase are located at the intersections of Bagley Street at M-32, Ripley Boulevard at US-23, and North US-23 at Long Rapids Road. Traffic signals and existing speed limits for streets, roads, and highways are displayed graphically in **Figure 5.1**, on the following page.

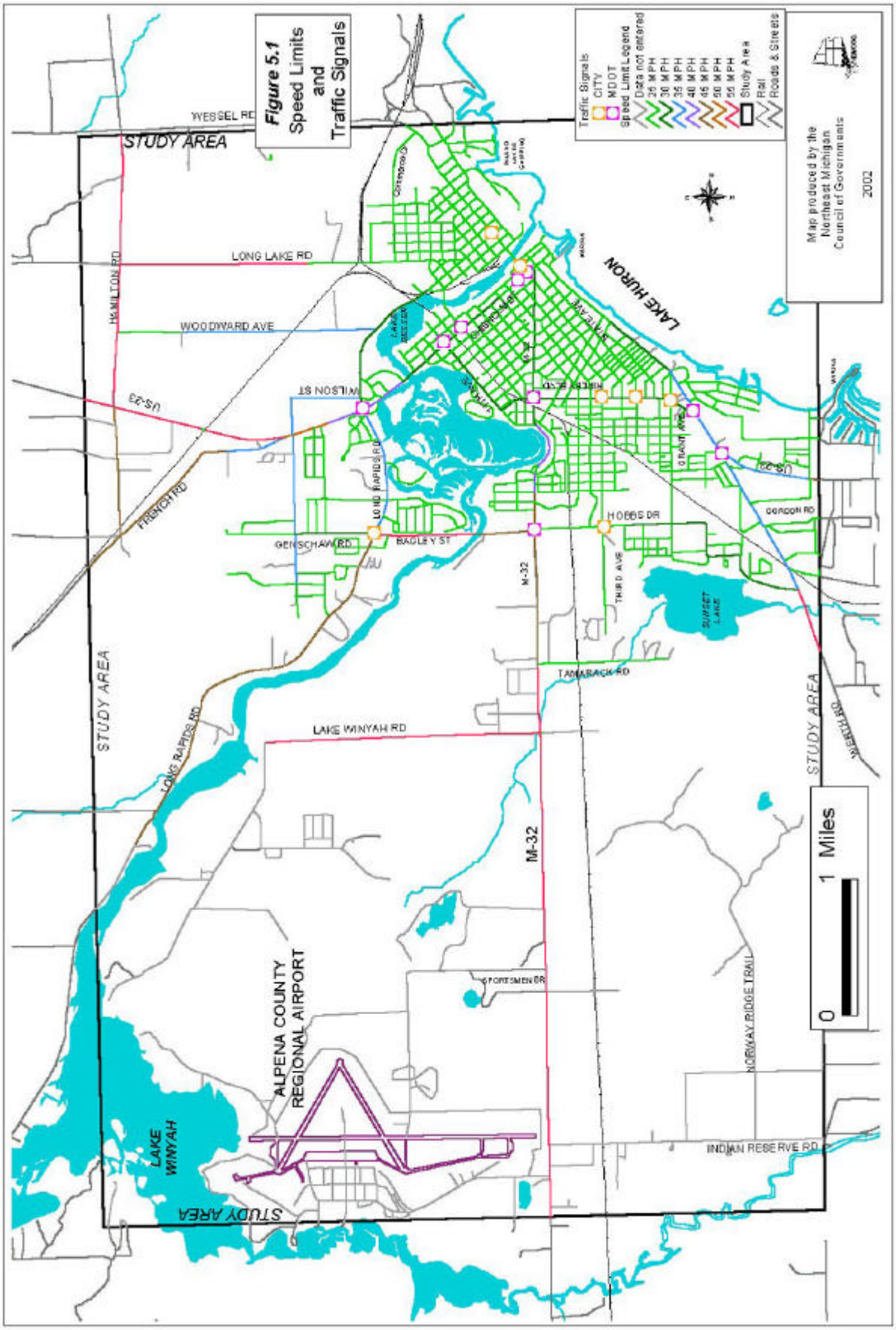
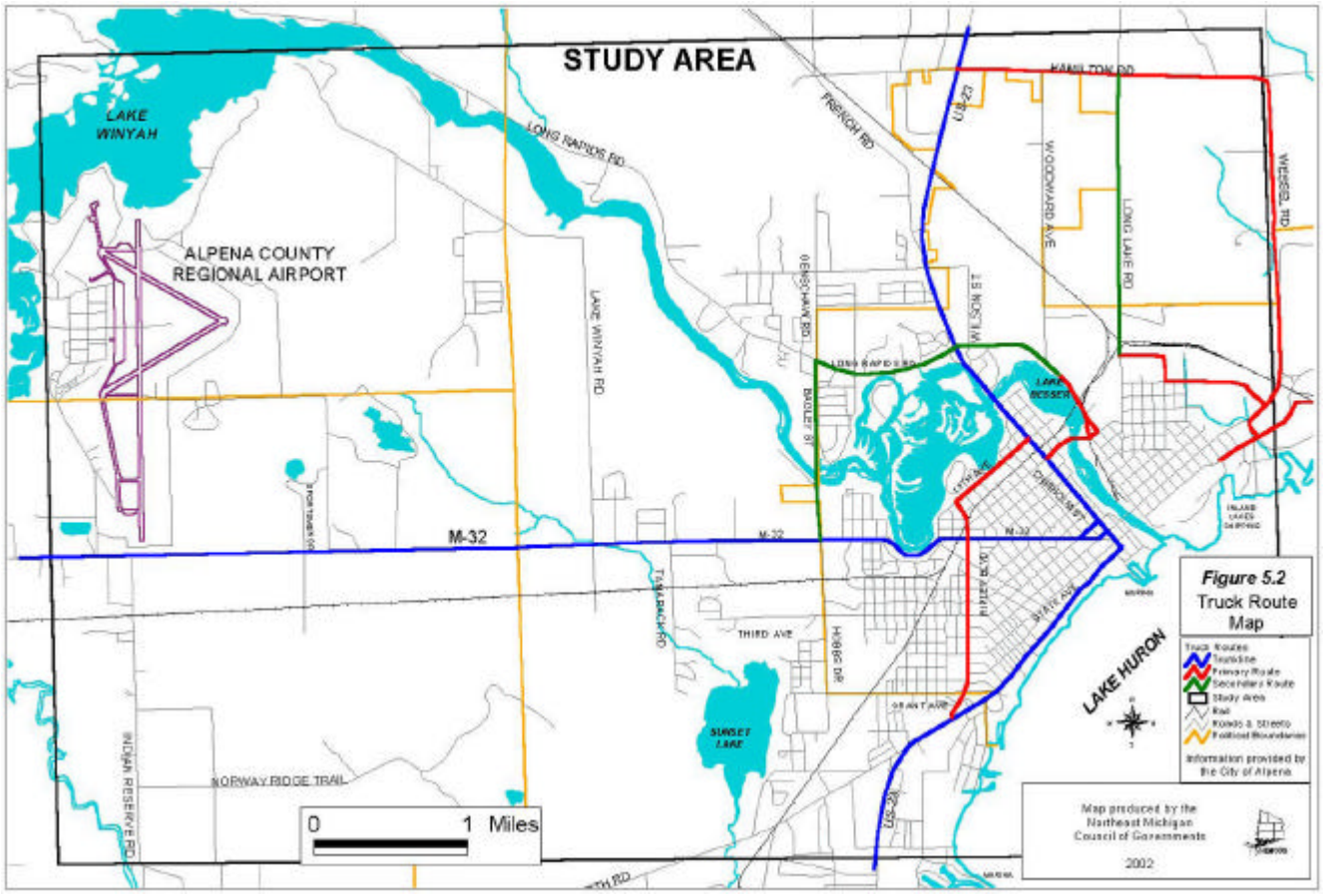


Figure 5.1
Speed Limits and Traffic Signals
Traffic Signals
CITY
MDOT
Speed Limit Legend
Data not entered
25 MPH
30 MPH
35 MPH
40 MPH
45 MPH
50 MPH
55 MPH
Study Area
Rail
Roads & Streets
Map produced by the Northeast Michigan Council of Governments
2002
STUDY AREA
WESSEL RD
LONG LAKE RD
HAMILTON RD
WOODWARD AVE
US-23
WILSON ST
FRENCH RD
LONG RAPIDS RD
GERSCHAW RD
BAGLEY ST
HOBBS DR
GORDON RD
THIRD AVE
M-32
TAMARACK RD
LAKE WINYAH RD
LAKE HURON
SUNSET LANE
ALPENA COUNTY REGIONAL AIRPORT
SPORTSMEN DR
NORWAY RIDGE TRAIL
INDIAN RESERVE RD
LAKE WINYAH
0
1 Miles

Truck and Commercial Traffic Routes

Alpena has long been an important industrial commerce area, which means that a significant amount of industrial truck traffic is generated here every day. There are several major producers located south and west of the Thunder Bay River that generate approximately 27 truck trips per day, however the majority of local industrial truck traffic originates on the north and east side of the Thunder Bay River, generating approximately 154 truck trips per day. Additional truck traffic is generated elsewhere in the state and country, and delivers goods and materials to the Alpena industrial sites, retail shopping centers, food distributors, fuel distributors, and warehouses.



The routes generally used by large commercial and industrial vehicles while enroute in the study area include US-23/Chisholm, Hamilton Road, Wessel Road, Long Lake Road, Johnson Street, Bagley Street, Woodward Avenue, Ford Avenue, Long Rapids Road, M-32, Ripley Boulevard, 11th Avenue, 9th Avenue, and Miller Street. The City of Alpena produces a map which displays the truck routes

Major Traffic Generators

To determine the location of significant traffic generators, assumptions were made that major employers, large trucking firms, schools, fast food restaurants and party stores, major hotels and conference centers, and large retail centers were all sources of significant traffic generation (the Existing Land Use section in **Chapter 2** discusses numbers of trips generated by type of land use). These locations have been placed on the study area map (**Figure 5.3**), and are classified by type of traffic generation.

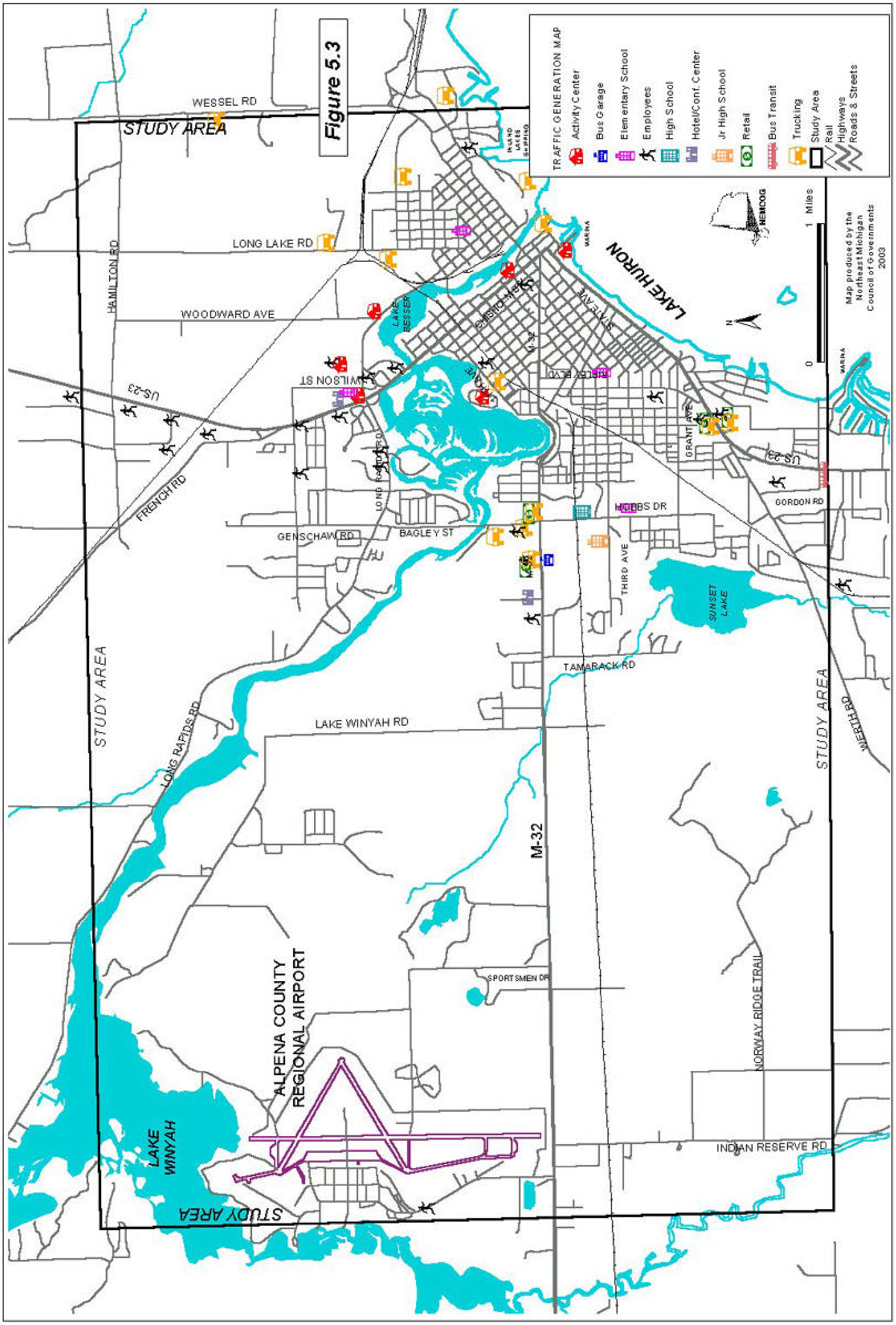


Figure 5.3
TRAFFIC GENERATION MAP
Activity Center
Bus Garage
Elementary School
Employees
High School
Hotel/Conf. Center
Jr High School
Retail
Bus Transit
Trucking
Study Area
Rail
Highways
Roads & Streets
Miles
Map produced by the Northeast Michigan Council of Governments 2003
NEMCOG
STUDY AREA
WESSEL RD
LONG LAKE RD
WOODWARD AVE
HAMILTON RD
US-23
FRENCH RD
WILSON ST
GENSCHAW RD
BAGLEY ST
LONG RAPIDS RD
LAKE WINYAH RD
LAKE HURON
LAKE BESSER
STATE AVE
GRANT AVE
HOBBS DR
GORDON RD
THIRD AVE
SUNSET LAKE
TAMARACK RD
WERTH RD
M-32
SPORTSMEN DR
NORWAY RIDGE TRAIL
ALPENA COUNTY REGIONAL AIRPORT
LAKE WINYAH
INDIAN RESERVE RD

Although residential areas also generate significant automobile traffic, the 14.5% of the land area that is residential is relatively dispersed throughout the study area, and does not warrant specific map identifier points.

Parking Facilities and Alleys

There is currently adequate municipal parking within the City of Alpena. The City owns and maintains 25 parking lots (for a total of over 1,500 parking spaces), in addition to allowing curbside parking on many streets in the downtown area. Parking is not metered in the City of Alpena. The parking lots associated with the City's parks provide not just a functional car storage area, but also promote a "gathering place" atmosphere.

In contrast, are parking areas such as those found in some retail shopping centers along US-23 South and M-32 West. These are wide expanses of asphalt in front of buildings that are set farther back from the roadway, which can discourage the safe use of the parking areas by pedestrians and bicyclists. These large parking areas appear to have more parking spaces than are needed (many remain empty throughout the day).

Alleys can perform many functions as part of a transportation network. Some of the alleys in the City of Alpena have been paved, while others exist only on paper. Retaining the right-of-way of these alleys can provide the City with alternatives for the future.

Origins, Destinations, Through Traffic

Weekday origin and destination studies were conducted by the Michigan Department of Transportation in 1962, in 1976, and again in 1987 to ascertain the movement of traffic in the Alpena urbanized area. Surveys were conducted to determine the approximate percentage of trips that had a local destination, and the percentage which were through trips to some other destination.

The 1962 study found that:
89.5% of the trip movements were local trips
10.5% were through trips to some other destination

The 1976 study found that:
91.6% of the trip movements were local trips
8.4% were through trips to some other destination

The 1987 study found that:
90% of the trip movements were local trips
10% were through trips to some other destination

In all three cases, approximately 90% of the vehicles were local traffic, and only about 10% were vehicles that were passing through the urbanized area to get to some other destination. This is in contrast to urban areas to the north and south of Alpena, which in 1987 showed Rogers City with 75% local traffic, and the City of Harrisville with 60% local traffic. There is a reasonable measure of confidence that conditions in Alpena have not significantly changed in such a way that would alter the 90% local and 10% through trip percentages at the writing of this Plan.

Employee Survey:

To plan for future transportation infrastructure needs, it is beneficial to determine which routes are most heavily used by the 90% local traffic. In order to determine where local trips originate, and which preferred routes are taken to local destinations, Capital Consultants conducted a survey of employees. Three major places of employment were asked to distribute the survey. Special appreciation is expressed to the Alpena Public Schools and Besser Company for their assistance in providing and collecting their employees' surveys. The following are questions on the survey:

1. How do you get to work?

   _____ Automobile _____ Bus _____ Other

2. Which direction do you live from your work place?

   _____ North _____ South _____ West

   North = toward Rogers City
   South = toward Tawas
   West = toward Hillman

3. Which roadways do you take to reach your work place?

   _____

4. How far is your home from your work place?

   _____ 0-5 miles _____ 5-10 miles _____ over 10 miles

5. Do you have any comments towards improving traffic operations in this area?

   _____

Survey Results (487 Respondents)

The method of commuting included:

Car/Truck	98%
Bus	5 respondents
Walk	3 respondents
Car Pool	2 respondents

Commute Distance and Direction the Resident lives from Downtown:

	0-5 Miles	5-10 Miles	Over 10 Miles
North	7%	6%	12%
South	14%	5%	12%
East	6%	-	-
West	12%	4%	12%

Roads Used most frequently by Commuters:

US-23	33%
Long Rapids	27%
Bagley	19%
M-32	14%
Werth Road	13%
Hobbs	12%

The most frequent Survey Comments included the following:

Commuters would like a second access to Thunder Bay Junior High on 3rd St. The only access is from the east by way of Bagley to 3rd street. They would prefer an access to the west (3rd to Tamarack to M-32 with Tamarack to be paved and a stop light to be placed on M-32/Tamarack).

Commuters would like to lengthen the left turn lane and include a left turn signal heading west on Long Rapids Road to Bagley Street.

Commuters would like a safer more efficient way of getting traffic in and out of the Wal-Mart and Home Depot properties. Suggestions were a second entrance off of Bagley Street, a signal at the current Wal-Mart and Home Depot entrance or to slow the speed down in the commercial area of M-32.

There were many complaints about the turn signal at 11th Street. When turning onto Chisholm (US-23 North), traffic is backed up for long periods.

Tourism Traffic

Tourism plays a role in trip generation, and evidence provided by the Alpena Convention and Visitors Bureau supports the concept that Alpena County is a chosen destination. An Alpena County tourism study was completed in 2002 by Michigan State University (MSU) that showed a 10% rise in tourism activity between 1990 and 2000. The MSU models use existing data such as lodging room taxes/assessments, government reports of tourism-related sales and employment, visitor surveys, camping data, seasonal homes data, and other information. The results of this study further show that in the year 2000, Alpena County hosted approximately 445,000 person trips, or 165,000 party trips-assuming an average of 2.6 persons per party of tourists. In this study, tourists included all travelers of more than 50 miles, including seasonal home owners and visiting friends and relatives.

Although tourism adds to the number of trips generated in the study area, the origin/destination studies show that this source of traffic does not contribute significantly more to congestion or road capacity problems than other locally generated sources.

Access Management Policies

Access management is the process of providing for access to land developments, while simultaneously preserving the safe flow of traffic on the surrounding public road system. Good access management can:

- Reduce crashes and crash potential;
- Preserve roadway capacity and the useful life of roads;
- Decrease travel time and congestion;
- Improve access to properties;
- Coordinate land use and transportation decisions;
- Improve air quality;
- Maintain travel efficiency and related economic prosperity.

Since zoning ordinances are expected to reflect community policies, and provide an enforcement mechanism for those policies, support for policies on access management should be found in the zoning language in each ordinance. It is the intent of this section to examine the zoning ordinances of each respective community in the study area for appropriate language on access management techniques. This will be indicative of each community's policies. A summary of provisions relating to access management in each ordinance is as follows:

CITY OF ALPENA

Most of the zoning ordinance regulations regarding access and access management are contained within the site plan approval standards. Within the standards there are several requirements which are intended to develop and maintain good access, provide for efficient and safe pedestrian and vehicle circulation flows and provide for adequate access for emergency vehicles. The standards are basically non-quantitative and application is based on the judgement of the Building Official or the Planning Commission. Administration of several standards requires the Planning Commission or Building Official to make specific determinations on the meaning of terms such as "adequate, excessive, adversely and effectively".

Outside of the site plan review standards, the City of Alpena Zoning Ordinance has limited language on access management and access controls. There is a regulation that requires that accesses for certain uses must be provided by using an "existing or planned major thoroughfare, freeway service

drive or collector street". The Planning Commission may waive this requirement if certain circumstances exist, or, in their judgement, substantial safety improvements can be achieved by allowing access by some other means.

Some specific access design criteria are included in the parking lot design standards. The regulations include requirements that establish limits on the number of access points (1 per each 66 feet of lot width), determine the location of access points, and provisions for maneuvering lanes that provide for safe circulation and prevent backing directly onto a street.

TOWNSHIP OF ALPENA

Contained in the site plan approval procedures, there are general statements that give the planning commission the responsibility to consider the location and design of driveways and access points to insure the safety and convenience of pedestrian and vehicle traffic and to allow for the harmonious coexistence of new and existing land uses.

In the General Provisions Article of the Ordinance there is an Access Management section. Currently the regulations only apply to M-32 and US-23, although this section is being revised to include more roads and more detailed standards. In this section, there are specific and quantitative requirements that limit the number of accesses, and design criteria is provided for the construction of driveways. The section includes regulations on spacing, width, and location of driveways, provisions for landscaping, and considerations for high traffic uses. Prior to the Planning and Zoning Commission's review of site plans that fall under these provisions, a review by the Alpena County Road Commission and the Michigan Department of Transportation is required.

There are general access requirements included in the parking lot design standards which require the zoning administrator to review and approve parking lot access to ensure the greatest possible public welfare and safety. Several of the identified special approval uses include specific access requirements that provide for the location of access points. The specific uses that have access criteria are drive-in theaters, race tracks and car washes.

WILSON TOWNSHIP

Although the Wilson Township Zoning Ordinance does not have a specific access management section, access requirements and standards are included in the site plan review, special use permit, and Planned Unit Development processes.

General access and circulation standards are listed in the site plan review approval procedures. The approval procedures require that the planning commission consider the location and design of ingress and egress, the safety and circulation of pedestrians and vehicles within the site and adjacent streets, and that the new land use fits harmoniously with existing land uses.

More detailed access review standards are included as conditions of specific uses and/or are included in the review process for special approval uses. Golf courses, colleges, churches, motels, professional offices, fraternal lodges, personal service establishments, and similar high traffic uses are required to have accesses located on either a major thoroughfare or a primary county road or state trunkline. When considering special approval uses, the Planning Commission must determine that the use will not have a detrimental impact upon surrounding land uses in regard to the potential traffic generation. Special approval uses must have suitable access to the site for truck traffic, provide for the safe movement of pedestrian traffic, and the site must not use minor residential streets to accommodate the use.

Additional access standards are applicable for plans reviewed under the Planned Unit Development (PUD) requirements. Internal traffic flow, ingress and egress, and external traffic flow are considered. The standards require that the traffic systems be designed to promote safety, convenience, easy access, and separation of vehicles from pedestrians. The review standards also promote the design of internal circulation systems within a PUD that are not connected to external street systems. The PUD requirements have specific design criteria for private streets. As previously stated, streets must be built to public road standards unless approval is received from the fire chief, sheriff, drain commissioner, and road commission. The Planning Commission must determine that any proposed deviations are not inimical to the health, safety and welfare of the Township. The PUD requirements list minimum right-of-way (ROW) and pavement widths ranging from 30 feet ROW with 18 feet of pavement to 60 feet ROW with 36 feet of pavement, depending upon the number of dwellings or use served by the street.

MAPLE RIDGE TOWNSHIP

The Maple Ridge Township Zoning Ordinance does not have a specific access management section. Minimal access and circulation standards are listed in the site plan review standards. The standards require that the zoning board consider the location and design of ingress and egress, the safety and circulation of pedestrians and vehicles, and the impacts on adjacent streets and uses. The ordinance has minimal access requirements associated with specific principle uses or conditional/special uses.

Crashes and Safety

Alpena County crash data was provided by Michigan Technological University (MTU) through their RoadSoft GIS software development program. Also, very accurate referencing and crash descriptions were secured from MDOT. The Michigan State Police (MSP) crash data was processed by MTU for the years 1995 through 1999. The data is originally from UD-10 forms that are completed by police officers at crash sites, entered into the MSP computer system, and then an automated process is used to locate approximately 70% of the crashes for use in geographic information systems (GIS). The remaining 30% of crash locations on the forms must be examined by individuals who will then manually enter the locations of crashes into the GIS. The years 2000 and 2001 crash data have gone through the automated process, but there are still about 30% of these crashes which have not yet been manually located. For this reason, the data from these years were not used for analyses in this Plan. Digital crash information includes crash type, date, time of day, and weather conditions. The scope of this Plan includes the location of crashes, and a summary of the types of crashes found in the study area.

The number of crashes occurring in the study area are as follows:

1995: 655 crashes
1996: 701 crashes
1997: 659 crashes
1998: 614 crashes
1999: 1,196 crashes

It is not known whether the number of crashes in 1999 were an anomaly or if there is a new trend toward a greater number of crashes in the Study Area. The subsequent years 2000 and 2001 crash data are needed for this determination.

A breakdown of the percentages of each type of crash for the most recent year available, 1999, is as follows:

Type of crash	*Number of crashes*	*Percent of total*
Miscellaneous single vehicle	143	12.0%
Miscellaneous multiple vehicles	497	41.6%
Overturned vehicle	5	0.4%
Head-on collision	10	0.8%
Head-on involving left turn	23	1.9%
Rear-end collision	303	25.4%
Side swipe	108	9.0%
Pedestrian involved	1	0.1%
Bicycle involved	17	1.4%
Animal involved	89	7.4%

These percentages are fairly representative of the types of crashes found in the previous years. A crash location map for the year 1999 is shown on the following page, **Figure 5.4**. The crashes appear to be relatively dispersed, and are in no apparent concentration by type, except that there are normally a greater number of crashes that occur at major intersections than occur along road segments. The reasons for this include more conflict points occurring at intersections, a certain percentage of drivers disregarding a traffic control, and drivers exceeding a safe speed when traffic ahead is slowing near an intersection.

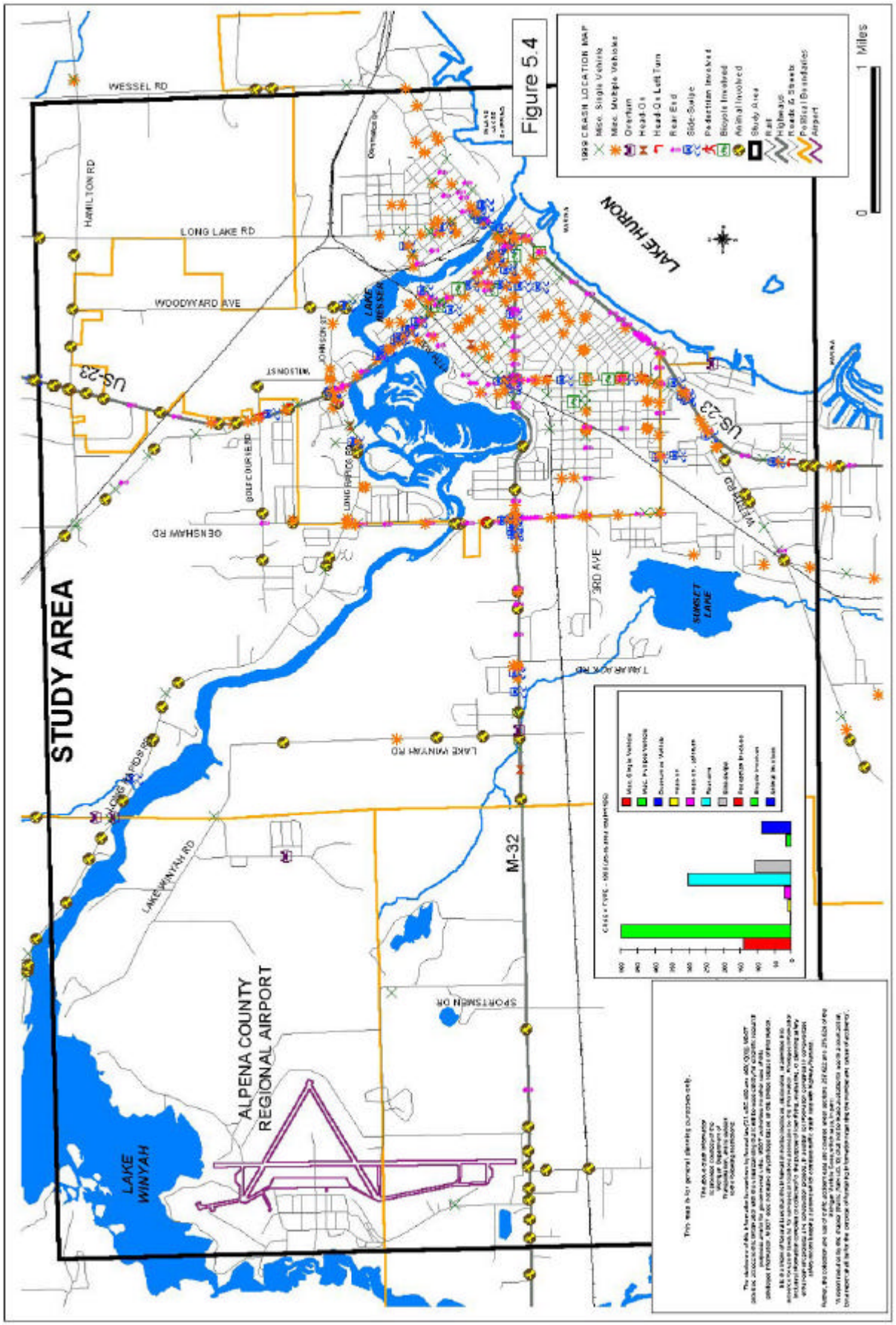


Figure 5.4
STUDY AREA
WESSEL RD
HAMILTON RD
LONG LAKE RD
WOODYARD AVE
US-23
LAKE HURON
LAKE WINYAH RD
M-32
ALPENA COUNTY REGIONAL AIRPORT
LAKE WINYAH
SUNSET LAKE
3RD AVE
SPORTSMEN DR
0
1 Miles

Historical analysis of crash data provides important information on the concentration, crash type, and severity of traffic crashes. Analyses can glean significant information from the frequency and location of "correctable" crashes that should lead to improvements to driving environments. Correctable crashes are those types of which engineers and planners are able to reduce their number and severity through signal improvements, right-of-way acquisition, site distance improvements intersection geometry, traffic control devices, and access management techniques. Access management is important because it will reduce the number of potential traffic conflicts that increase the possibility of crashes occurring. Correctable crash types can include head on-left turn, rear end, and angle crashes.

It can be seen that the correct description of crash conditions are very important to traffic engineers and planners. All agencies including the Michigan State Police, Alpena County Sheriff and Alpena City Police should coordinate efforts to report information the same way, and follow the procedure described in the UD-10 reporting manual. Necessary information includes the type of crash, whether the crash was influenced by a signal, and if the crash was within 250 feet of an intersection. Given the broad variety of roadway types and the overlapping enforcement agencies in the study area, acquiring an accurate inventory of historical crash experience can be difficult.

By analyzing the crash information, two (2) intersections were recognized as high-incidence crash locations. However, the closeness of intersections have created overlapping counts because mid-block and intersection crashes were intermixed. These locations were:

US-23 at M-32, with US-23 at 2nd Avenue
US-23 at 9th Avenue, with US-23 at 11th Avenue

Improvements have been made to these intersections during the course of this study (2002), and it is expected that these improvements will mitigate many potential problems that had previously existed.

There is also the potential for a reduction in correctable crashes at the following locations:

US-23 at 9th Avenue had 20% correctable crashes
US-23 at 11th Avenue had 28% correctable crashes
US-23 at Long Rapids Road had 40% correctable crashes
US-23 at Golf Course Road had 51% correctable crashes
M-32 at Bagley Street had 20% correctable crashes
M-32 at Ripley Boulevard had 40% correctable crashes

There were no crash tabulations available for County Roads and City Streets. Further investigation and review is warranted at intersections where at least 20% of the crashes were correctable to see if there are defined crash patterns. Investigations should include reviewing the UD-10 reports.

Current Traffic Volumes

Existing traffic data was compiled from the following sources: the Michigan Department of Transportation, the City of Alpena, the Alpena County Road Commission, and the Northeast Michigan Council of Governments. Traffic data was collected in the form of 24-hour daily traffic volumes along corridors in the study area. The traffic surveys were random and unadjusted to seasonal and daily variations. However, an attempt was made to update the data to Year 2001 volumes by adding 1% per year for older data. **Figure 5.5** graphically shows 2-way ADT traffic volumes (using volume bars of varying widths) on Alpena's major street and roadway network.

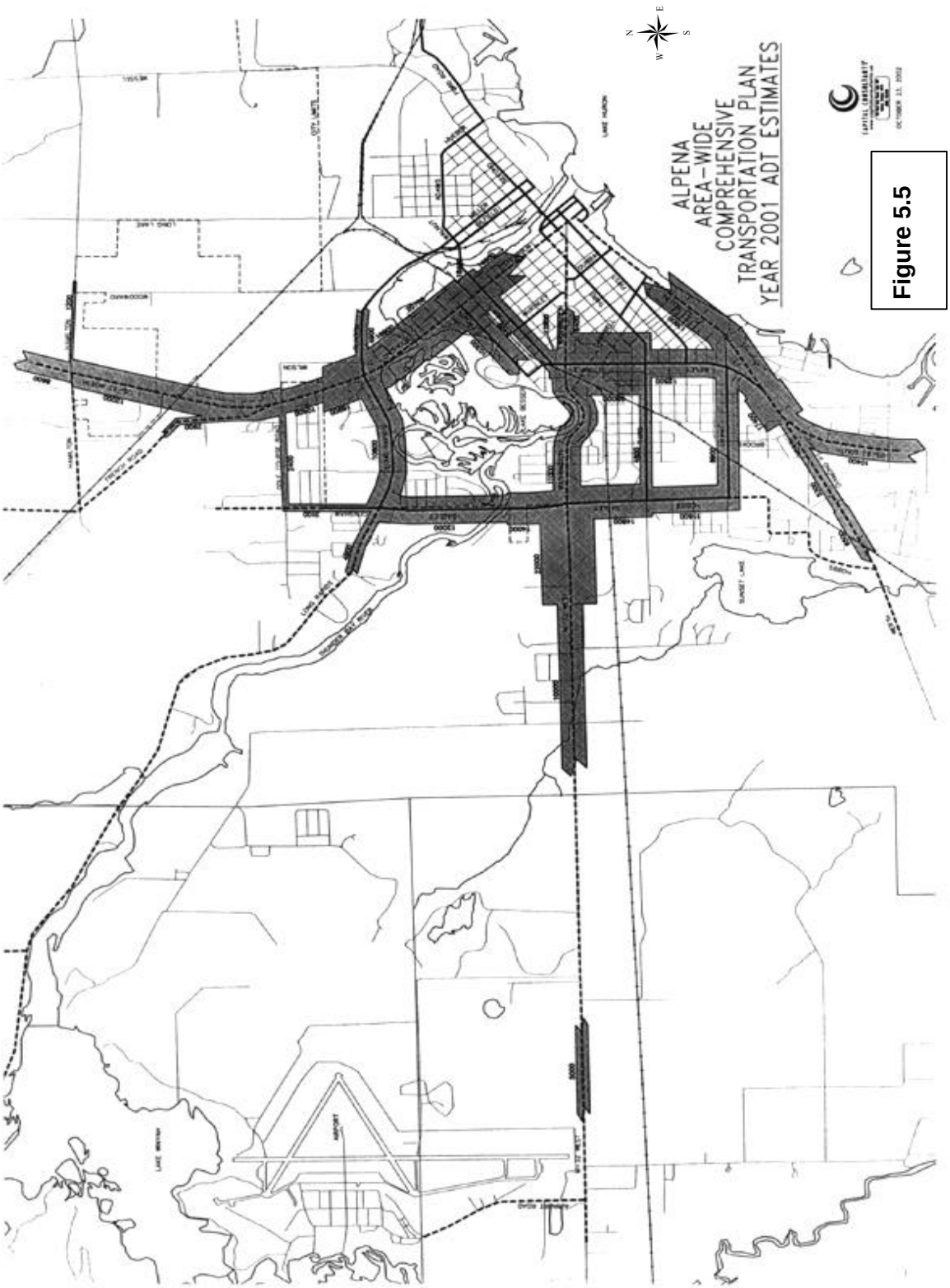

ALPENA
AREA-WIDE
COMPREHENSIVE
TRANSPORTATION PLAN
YEAR 2001 ADT ESTIMATES

Figure 5.5

Current Operating Conditions (Capacities and Potential Deficiencies)

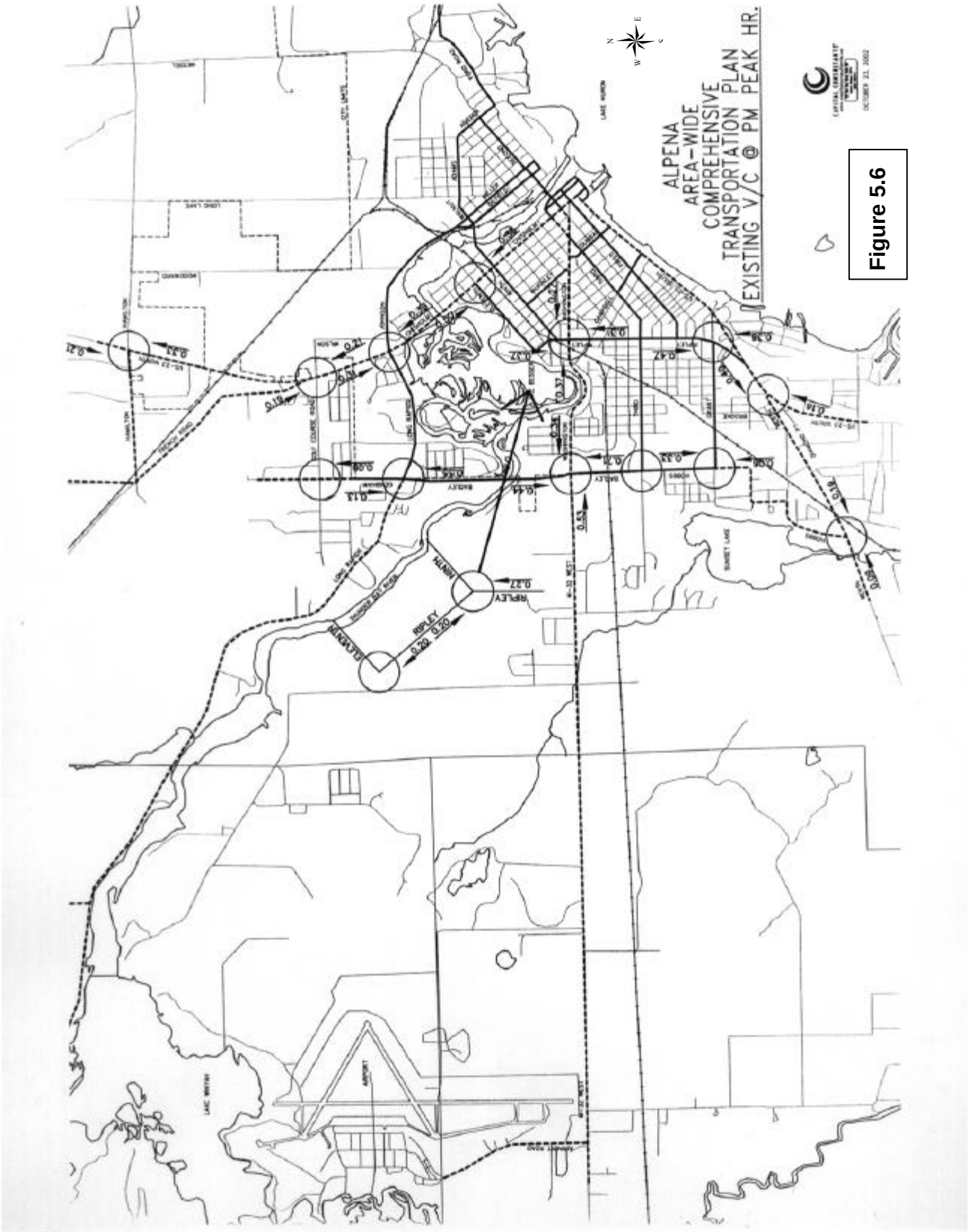
Important facts worth noting of the traffic volume collection and evaluation process are as follows:

- State highways US-23 and M-32 carry the largest percentage of traffic volumes and most of the intersectional congestion and related crashes.
- Ripley Boulevard in the City of Alpena carries the highest single daily traffic, approximately 28,000 vehicles per day (vpd) south of 5th Avenue.
- Traffic volumes occurring in the City's center have seen a slight decline.
- Commercial Developments (especially Home Depot and Super Wal-Mart) on M-32 west of Bagley Street have increased traffic by 25% in the past three (3) years from 17,600 vpd to 22,000 vpd.
- The majority of traffic generation and activity centers are situated on or near the two state highways, M-32 and US-23 (over 80%).
- There is a lack of adequate access management as evidenced by the high volume of turning in-out-in-out traffic on the state highways and a few major streets such as South Bagley Street, from M-32 to Grant Avenue.

Figure 5.6 shows existing volume/capacity (V/C) ratios at the PM Peak Hour flow. The ratio has a general threshold value of 0.50 showing congestion is beginning to become a problem. Current ADT values show only four (4) intersection locations with a ratio equal to or greater than 0.50.

M-32 and Bagley Street from the south.
M-32 and Bagley Street from the west.
Long Rapids Road and Bagley street from the south (prior to 2002 improvements).
US-23 and 11th Avenue from the north.

The only major congested area (based on numbers only) is the intersection of M-32 and Bagley Street from the south.


ALPENA
AREA-WIDE
COMPREHENSIVE
TRANSPORTATION PLAN
EXISTING V/C @ PM PEAK HR.
Figure 5.6

Planned Improvements and Anticipated Transportation Infrastructure Needs (MDOT, County Road Commission, City of Alpena, Townships, Alpena Community College)

There are important improvements planned over the next several years that will affect the study area's transportation system. It is anticipated that some of these projects will affect more than one jurisdiction and that there will be a cooperative effort between jurisdictions, where possible, to ensure mutually beneficial outcomes. The following projects are dependent on jurisdictional cooperation and on necessary funding to be available.

Michigan Department of Transportation

2003 Add right turn lane at 11th and Chisholm Street if City of Alpena obtains right of way
Signage upgrade on US-23 in Alpena County, started late 2002
2004 US-23 reconstruction project from Island Drive to Timm Road
Widen US-23 (State Street) from 2 to 3 lanes from Grant Street to Blair Street
Signage upgrade on M-65 (outside of this study area, but mentioned as an existing north-south route)
2005
2006 Widen and reconstruct M-32 to five lanes from Bagley Street to Walter Street, and from three lanes from Walter Street to Lake Winyah Road

Anticipated needs:

-Widen M-32 from 2 to 3 lanes from 8th Ave. to 11th Ave. and improve radii at the Washington and Ripley Boulevard intersection
-Re-align French Road at US-23, and widen US-23 from 2 to 3 lanes from French Road north to Hamilton Road
-A coordinated signal timing system for Ripley Boulevard to improve traffic progression (City of Alpena)
-Reconfigure US-23 (Chisholm Street) to be all 3-lanes instead of the present configuration of 2, then 3, then 2 lanes again in the downtown area.

Alpena County Road Commission

2003
2004
2005
2006 (resurface or reconstruct..) French Road from US-23, north 1 ½ miles

City of Alpena

2003 Pedestrian lighting upgrade, street amenities, downtown (DDA, continuing through 2008…)
Signage (DDA)
Cemetery road paving (continuing through 2008…)
Marina amenities and aesthetics improvements
Thin overlay resurfacing project
Intersection improvements (continuing through 2008…)
High-use alley paving (through 2005)
Johnson Street reconstruction (through 2004)

Park Place resurfacing
Sidewalk improvement program (continuing through 2008…) (Marina sidewalk, through 2006)
2004 Downtown streetscape improvements, Washington Avenue and Second Avenue (DDA)
Island View Drive resurfacing
Hueber Street resurfacing
Chip seal gravel streets
Long Rapids Road, Oxbow Development
2005 Tuttle Street resurfacing
Wisner Street resurfacing
June Street resurfacing
Long Lake Avenue resurfacing
Walnut Street resurfacing
Carter Street resurfacing
2006 Fair Street resurfacing
Cavanaugh Street resurfacing
Dawson Street resurfacing
Ripley Boulevard improvements (continuing through 2007)
2007 River Street reconstruction
Merchant Street reconstruction
Bagley corridor improvements

Alpena Township

2003
2004
2005
2006 Sidewalks along M-32 from Bagley Street to Walter Street

Alpena Public Schools

Anticipated Needs:

A rail-trail crossing is needed, south of the M-32 bus garage to the Junior High School. Approximately 70% of the bus fleet would use this crossing in the morning, and 37% in the afternoon.

Alpena Community College
(Comprehensive plan is not available at the time of this writing)

2003
2004
2005
2006
2007

Projected Conditions

Future Traffic Volumes

To determine long-term traffic growth in the Alpena area the following references were reviewed and applied:

- MDOT Statewide Model Growth Roles for US-23 and M-32 (Tranplan).
- *Michigan Sub-State Area Long Range Plan*, 1995-2015.
- Population data from the US Census, Years 1980, 1990 and 2000.
- ADT comparisons between 1997 and subsequent years.
- MDOT Sufficiency Rating documents from 1988 and 1999.

The overall conclusions toward establishing a rational and defendable yearly growth were as follows:

- Alpena County is slowly gaining population annually.
- The City of Alpena is seeing a slight reduction in population annually.
- Traffic flow growth in the last five (5) years was directly related to new commercial developments on M-32 west of Bagley Street and a desire to traverse through the City efficiently using Ripley Boulevard.
- Economic indicators, based on 2015 Statewide Model estimates are negative except for the growing percentage of second homes and an increase in service jobs (commercial and retail).

On major state roads for the Alpena area, there were no capacity deficiencies discovered for the current years through the Statewide Traffic Model.

It was determined that future traffic volumes should be calculated at 1% growth per year (**Figure 5.7**) to establish the basis for capacity and congestion calculations that are subsequently presented. Projected traffic conditions were established based on 2020 projected traffic volumes for the study area corridors. The following is a summary of the projected travel conditions along these corridors.

Future Operating Conditions-2020 (Capacities and Potential Deficiencies)

It is generally expected that suburban areas around the perimeter of the City will have increased traffic, but the City population and traffic will stay about the same. **Figure 5.8** shows future V/C (volume/capacity) ratios at the PM Peak Hour flow. As stated previously, the ratio has a general threshold value of 0.50 showing congestion is beginning to become a problem. Future ADT values show only seven (7) intersection locations with a ratio equal to or greater than 0.50.

M-32 and Bagley Street from the south.
M-32 and Bagley Street from the west.
M-32 and Bagley Street from the north (analysis was completed prior to 2002 improvements).
Long Rapids Road and Bagley Street from the south (analysis was prior to 2002 improvements).
11th Avenue and US-23 from the northwest.
Grant Avenue and Ripley Boulevard from the north.
Grant Avenue and Ripley Boulevard from the south.

The major congested area (based on numbers only) is the M-32 & Bagley intersection from the south.

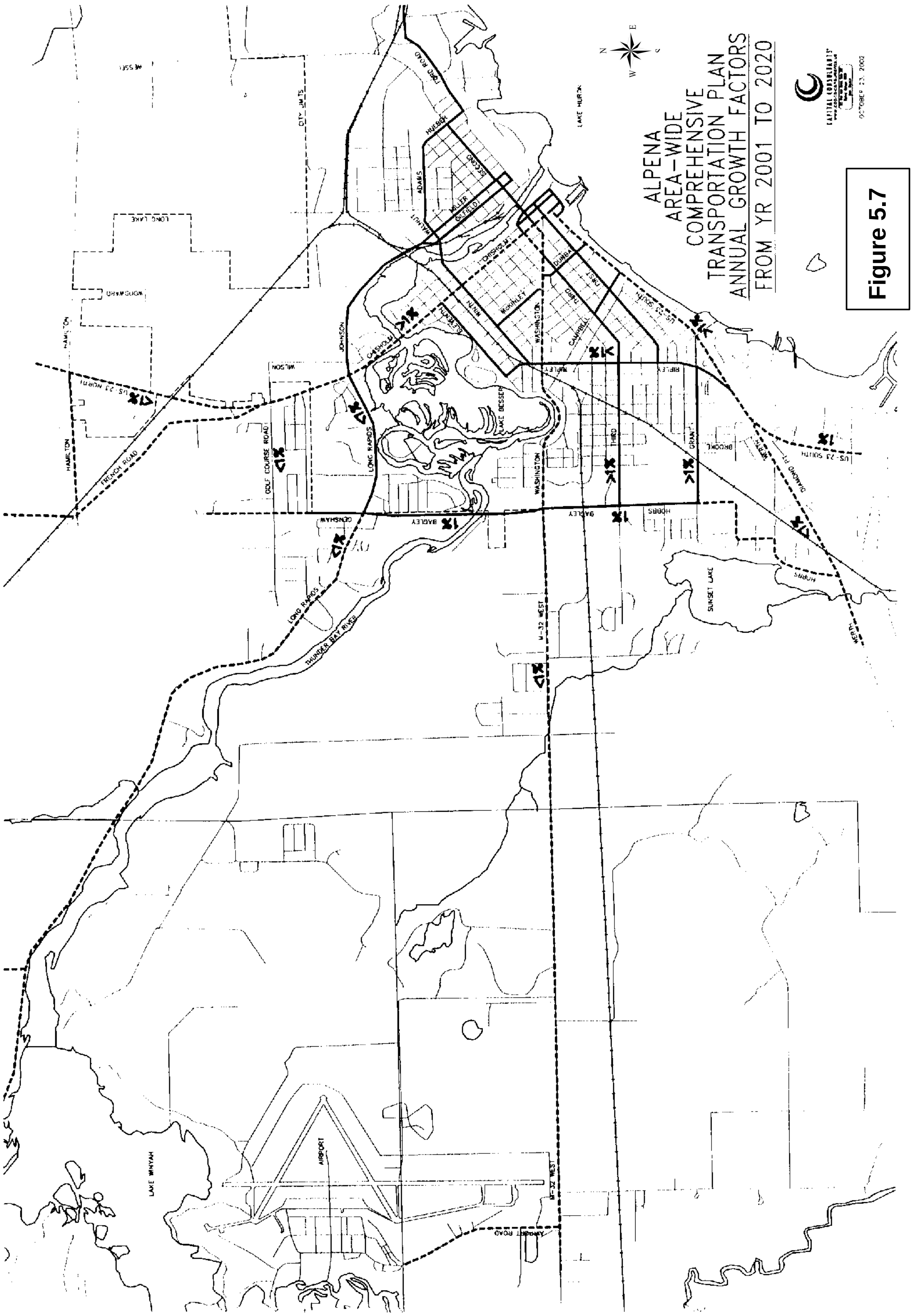

ALPENA
AREA-WIDE
COMPREHENSIVE
TRANSPORTATION PLAN
ANNUAL GROWTH FACTORS
FROM YR 2001 TO 2020

Figure 5.7

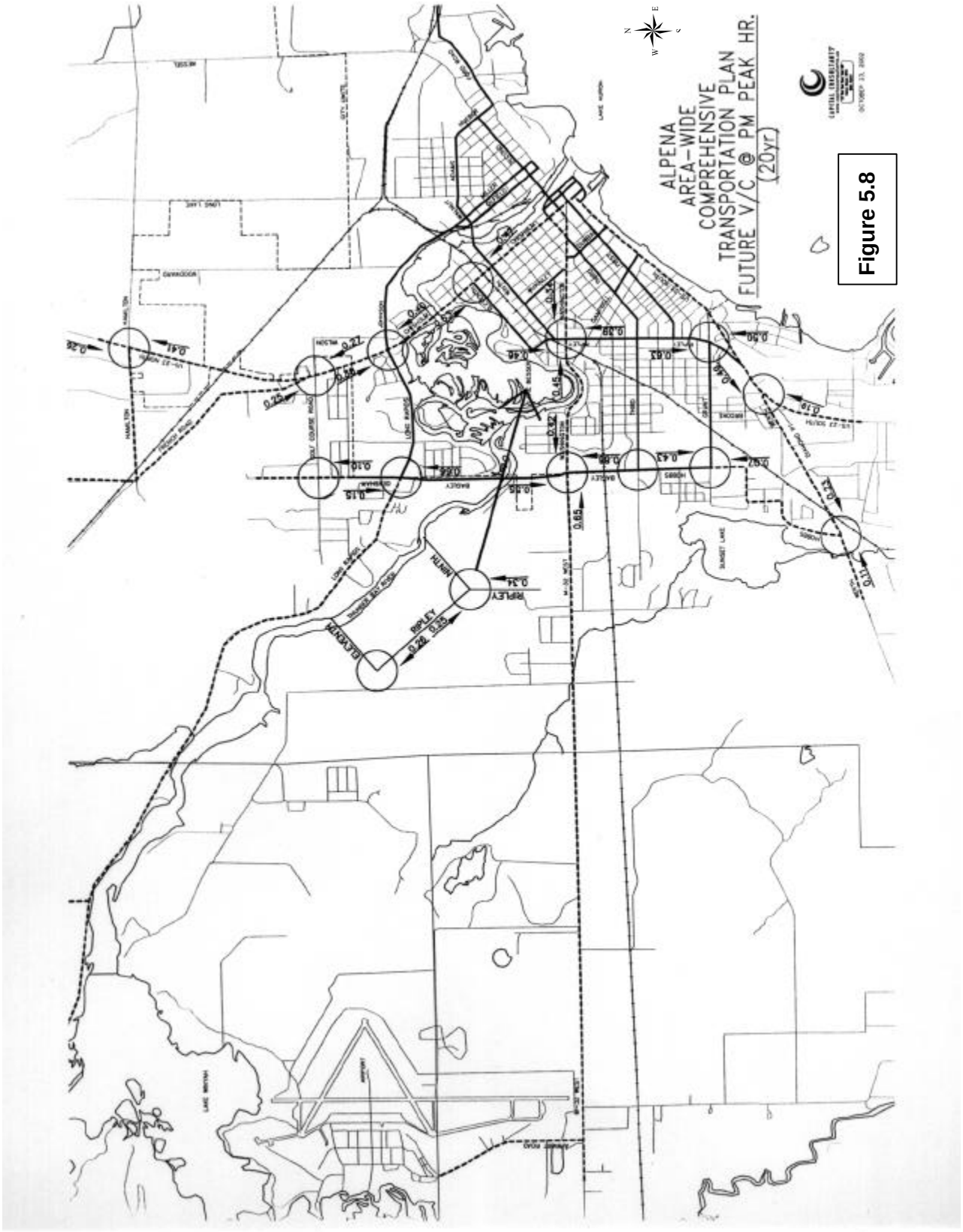

ALPENA
AREA-WIDE
COMPREHENSIVE
TRANSPORTATION PLAN
FUTURE V/C @ PM PEAK HR.
(20yr)

Figure 5.8

From an engineering standpoint, certain monitoring of the roadway/street operations will be required to maintain the transportation system, and include the following:

1. A Crash Analysis (to be done by local agencies) in which three (3) years of historical crash data is collected and reviewed for concentration, crash types, injury rates and in some cases rate per 100 million vehicle miles.

   This analysis is a retro-look of failures in the traffic flow and/or signatures of flows in the vehicles-operating environment. The analysis is very effective in determining which are the "correctable crashes" that can lead to direct corrective action.

2. Traffic Volume Surveys are important for growing and changing communities. A monitoring of traffic volumes can discover changing traffic patterns due to congestion or home-to-work travel needs.

   Correlation of traffic volume growth with census data and/or housing statistics can provide valuable information on work place shifts, land-use changes and an indication of sudden volume peaks, which may require urgent attention.

3. Congestion Measures
   Peak-hour traffic volumes (V) divided by the probable roadway capacity (C) provides the V/C measure, which is an indicator of roadway congestion. This fraction at 1.00 indicates total capacity utilization (i.e., a 'stand still' vehicle flow). Therefore, a ratio of 0.5 to 0.6 represents an average utilization of peak-hour roadway capacity. When the ratio is greater than 0.5, a Level Of Service (LOS) study is recommended.

4. Traffic Impact Studies
   To evaluate the impact of new developments, a Traffic Impact Study is needed. In this effort, existing traffic conditions are defined, background traffic growth is projected to date of project completion and the development site-related traffic is calculated. The increase in traffic is mitigated by roadway improvements.

   A critical part of this analysis is the calculation of LOS for each vehicle movement. This is the indication of time delays encountered by the various turning movements. See **Chapter 6**, which includes "Thresholds for Requiring Traffic Impact Studies".

Community or regional transportation issues may require the development of any one or more of these analyses to effectively manage traffic flows on streets and roadways.

Efficient traffic progression is essential on major roadways to maximize the safety and capacity of a roadway segment. Many variables are in effect when analyzing a roadway segment, including signal spacing, cycle length, and roadway speeds. Optimum traffic signal progression can be achieved depending on the cycle length and travel speeds. Long cycle lengths and the distances between them are proportional with high travel speeds, while shorter cycle lengths and the distances between them are proportional with lower speeds. According to the National Highway Institute, the following table (**Table 5.1**) displays the optimum signal spacing as a function of roadway speed and cycle length.

Table 5.1, Length of Signal Cycle

Cycle Length (sec)	Speed, MPH 25	30	35	40	45	50	55
	Spacing in Feet						
60	1,100	1,320	1,540	1,760	1,980	2,200	2,420
70	1,280	1,540	1,800	2,060	2,310	2,590	2,830
80	1,470	1,760	2,060	2,350	2,640	2,940	3,230
90	1,650	1,980	2,310	2,640	2,970	3,300	3,630
100	1,840	2,200	2,570	2,940	3,300	3,670	4,040
110	2,020	2,420	2,830	3,230	3,630	4,040	4,440
120	2,200	2,640	3,080	3,520	3,960	4,400	4,840

The number of vehicles that can flow on a roadway in a safe and effective manner defines its operating guidelines. Roadway capacity is defined based on prevailing conditions that include the type of roadway, types of traffic, and control measures, including distance between signals. Capacity usually is best based on reasonable daily events, and can be difficult to configure to seasonal variations or special events. It should be noted that it is not practical to design to the greatest capacity of a given roadway. According to the Institute of Transportation Engineers, roadway capacity guidelines include the following volumes (**Table 5.2**) per the type of road segment per hour:

Table 5.2, Roadway Capacity Guidelines

Roadway Type	2-lane (9 samples) max total volume	4-lane (6 samples) one-way volume	5-lane (1 sample) one-way volume
Urban	NA	2,100-3,800 vehicles	2,100 vehicles
Rural	1,500-3,100 vehicles	NA	NA

Many options are available to improve the operating conditions of the less productive road segments or intersections. A traffic engineer can choose to install a left turn lane or left turn signal phase, add a tapered right turn lane, or improve intersection radii. If suitable conditions exist, roundabouts are another way to improve an intersection, since by their design, they improve safety by eliminating left turn conflicts and reducing the opportunities for crashes, without the cost of traffic signals. Simple adjustments made to traffic signal controls can also improve the way an intersection or road segment is working. These suggestions when combined with access management and traffic calming techniques greatly assist in reducing vehicular conflicts with pedestrians, bicycles, and other vehicles. See **Chapter 6**, Access Management, for techniques that will increase roadway capacity, maintain the smooth flow of traffic, and increase overall safety for all modes of traffic. See **Chapter 8**, Improvement Strategies and Recommendations, which offers specific recommendations for improving the Alpena area's transportation system.