M-29 CORRIDOR
Planning & Research

Prepared For MDOT
In Cooperation With The City Of St. Clair

Prepared by
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January 10, 2005

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M-29 CORRIDOR RESEARCH AND PLANNING

MDOT CS 77052 JN 74272

FINAL REPORT

Michigan Department of Transportation

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City of St. Clair, St. Clair County, Michigan

Table of Contents

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Introduction

M-29 is a state trunkline that runs from Macomb County easterly into St. Clair County, then heads north along the eastern shore of Michigan into the City of Marysville. With average daily traffic varying from 4,900 to 23,300 vehicles a day, the trunkline serves several different types of communities in different capacities along its length, with varying laneage and roadside features. Within the City of St. Clair, M-29 is primarily a four-lane roadway, with short portions of a two-lane roadway at the southern and northern City Limits. It is known locally as Oakland Avenue at the south end of the City and Riverside Avenue in the business district and north end of the City. Pedestrian access is limited to narrow sidewalks, which are not continuous along the corridor. It is bordered by residential, business and recreational property which has been well-established over the past century.

The Michigan Department of Transportation (MDOT), in cooperation with the City of St. Clair (City), has undertaken the planning and research of a non-motorized path along the M-29 corridor. This study also evaluates the laneage and operational features of the roadway for potential geometric modifications. Addressing both mobility needs and community needs, this study seeks to present opportunities to optimize the transportation and aesthetic features of the corridor benefiting motorists, pedestrians and bicyclists, alike.

Background – How we got here

The M-29 Corridor Planning Committee (CPC) was appointed by the St. Clair City Council in December of 2001 with the goal of planning future improvements for the M-29 roadway. Composed of resident volunteers and City and MDOT officials, the Committee sought to look at ways the M-29 facility could enhance the riverfront community. They have a vision which embraces the needs of the residents, business owners and visitors whose experiences in the city are affected by how the M-29 corridor operates.

M-29 is an MDOT-owned facility. Clearly, the City could not pursue its objectives without the knowledge, support and involvement of MDOT. The local MDOT Transportation Service Center (TSC) Manager participates on the M-29 CPC to advise on MDOT policies and standards which must be maintained in the corridor. Meeting throughout 2002, the M-29 CPC developed a list of objectives it sought to implement and investigated possible approaches for implementation.

Additional input was solicited by the M-29 CPC at Visioning Sessions held early in 2002, at which Focus Groups were asked to provided their opinions on what corridor features where important to them. The Focus Groups were organized by three geographic areas: North Riverside (M-29) , South Riverside/Oakland (M-29) and Downtown. Public input sessions were held February 11 and February 26, 2002, for the North and South Focus Groups, respectively. The Downtown Business owners' input was solicited via a survey, to which 18 responses were received by January 18, 2002. The input gathered from the Focus Groups was used in developing the overall objectives for this study.

With the TSC Manager's support, the M-29 CPC pursued MDOT Transportation Enhancement Program funding as a means to conduct the planning and research necessary for corridor improvements. The grant was awarded in the Fall of 2002. This study is the product of the administered Enhancement Grant.

Study Objectives

With the leadership of MDOT's TSC and the insight of the M-29 Corridor Planning Committee, this study serves to provide recommendations toward setting and achieving the long-term vision for the corridor. A coordinated effort among City, County and State agencies will be necessary to develop and implement the goals. These goals, listed below, must be considered within the context of the corridor study limits and weighed against one another in order to promote a balanced approach in the development of corridor improvements.

- Plan for a continuous non-motorized path
- Reduce roadway noise
- Encourage motorists to obey posted speeds
- Improve safety at pedestrian crossings
- Improve turn movements, especially at Clinton Street
- Provide adequate parking on-street
- Improve aesthetics and suggest wayfinding signage and strategic placement of signs

Generally, the strategies and goals which MDOT sets for roadway improvements focus on safety, capacity (Level of Service) and ride quality. MDOT roadway rehabilitation projects undertake to meet these goals as a first priority. Additional supplemental corridor improvements are desirable, although many times the design schedule, budget or local participation necessary to implement those supplemental improvements are not available. The objectives set forth within this study are intended to provide recommendations for several desirable corridor improvements along M-29 which may be incorporated into future projects. This pro-active approach to providing early design input will allow the proper programming to take place and allow early consideration of these features which benefit both MDOT and the local community.

Study Methods

To meet each of the objectives previously identified, the recommendations from this study have been developed in accordance with current MDOT, FHWA and AASHTO practices, guidelines, policies and standards. The traffic operation study which was completed as a part of this research was prepared in accordance with the Transportation Research Board Highway Capacity Manual and followed standard MDOT traffic study guidelines, as well.

To formulate the recommendations, the following items were investigated:

- M-29 right-of-way limits
- Existing topographic features
- Existing non-motorized paths and destinations in the community
- Alternate geometric configurations of the roadway
- Traffic counts and future use projections
- Existing and projected Levels of Service
- Potential landscaping opportunities
- Current and proposed land uses

In addition to completing a formal traffic study and associated geometric analysis of the corridor, public information meetings and a survey were conducted to gather public input regarding the study objectives. In November 2004, two public information meetings were held to allow comment and input on the Draft Study. Comments solicited at those meetings are summarized in Appendix B.

Previous reports and committee activities were reviewed to prevent duplication of effort and build upon what has already been accomplished. Alternative corridor roadway sections were developed in an effort to meet the study objectives and are illustrated in Section 5.

Summary of Alternatives

Overall, four geometric alternatives of the roadway are presented herein. Each alternative meets the desired study objectives to differing degrees. An underlying objective inherent to all MDOT studies of this nature is maintaining an acceptable Level of Service for traffic using the facility.

How does each Alternate meet M-29 Corridor Study Objectives?

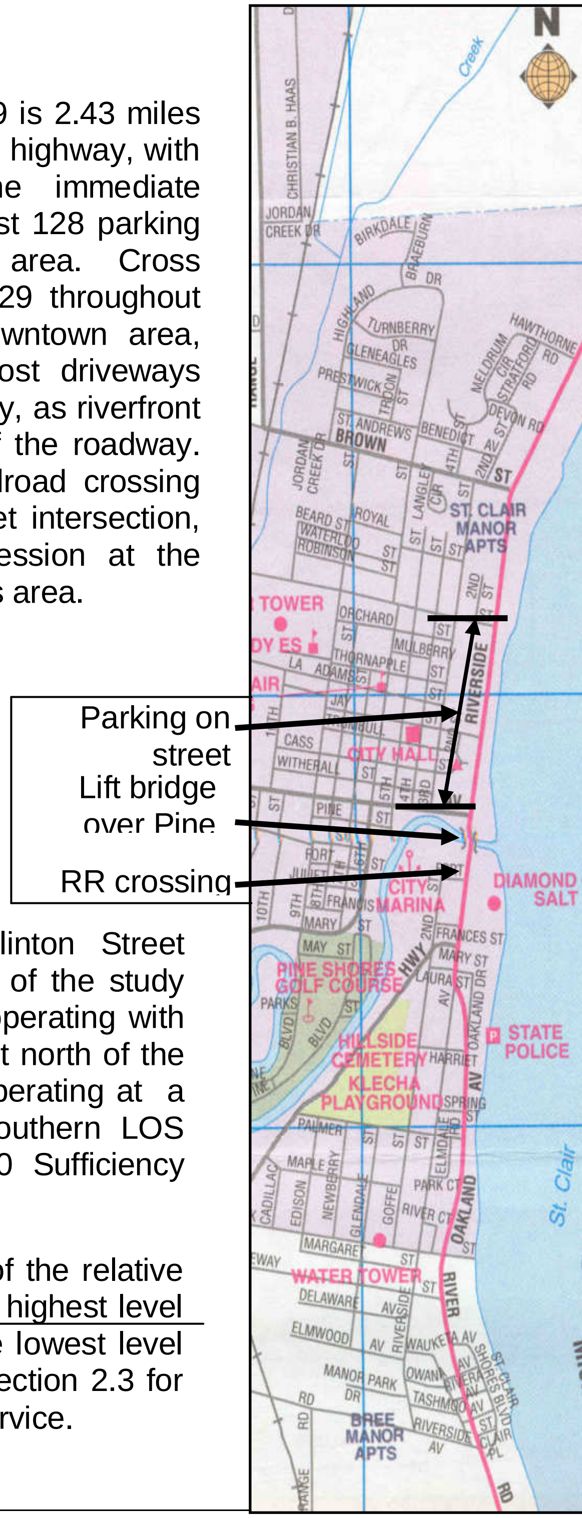
Objective…..	Alternate 1	Alternate 2	Alternate 3	No-Build Alternate
Provide a continuous non-motorized path	Alignment along Third Street or along Palmer Park, just outside of east M-29 ROW line; bike lane on shoulders north and south of Business District	Alignment along and within east side of M-29 ROW line; bike lane on shoulders north and south of Business District	Alignment along and within east side of M-29 ROW line; bike lane on shoulders north and south of Business District	No change in current non-motorized access
Reduce roadway noise	Addition of median boulevard provides landscaping and noise abatement opportunities; roadway geometry encourages slower speeds (reduces roadway noise)	Change from four to three lanes will encourage slower speeds (reduces roadway noise); opportunities for landscaping will abate roadway noise	Change from four to three lanes will encourage slower speeds (reduces roadway noise); minor opportunities for landscaping will abate roadway noise	Minor opportunities for landscaping are on east side of roadway, offering minor noise abatement benefits
Encourage motorists to obey posted speeds	Presence of median boulevard encourages slower speeds; landscaping near roadway will encourage slower speeds	Fewer through-lanes will encourage slower speeds; landscaping near roadway will encourage slower speeds	Fewer through-lanes will encourage slower speeds; landscaping around parking bays will encourage slower speeds	No expected change
Improve safety at pedestrian crossings	Minimizes pedestrian road crossings to 24 ft. wide	Minimizes pedestrian road crossings to 36 ft. wide	Minimizes pedestrian road crossings to 36 ft. wide	Pedestrian crossings remain at 70 ft. wide
Improve turn movements, especially at Clinton Street	Phase movements, allowing only one through-lane at intersection	Phase movements, allowing only one through-lane at intersection	Phase movements, allowing only one through-lane at intersection	No expected change
Provide adequate parking on-street	Provides 130 spaces, parallel parking on both sides of street	Provides 136 spaces, Parallel parking on both sides of street	Provides 101 spaces, Angled parking on east side of street	Provides 128 spaces
Improve aesthetics and suggest wayfinding signage and strategic placement of signs	Landscaping opportunities in median boulevard; signing may be placed in median or east side of roadway, limited on west side	Landscaping opportunities on west and east side of roadway; signing placed at west of east side of roadway	Landscaping opportunities limited to islands at parking bays; signing limited to east side of roadway, with minor placements on west side of roadway	Limited landscaping opportunities on east side of roadway; signage unchanged.
Maintain acceptable Level of Service (LOS)	Maintains LOS A, B during peak hours	Maintains LOS E during peak hours	Maintains LOS E during peak hours	Maintains LOS A, B during peak hours

Table 1

M-29 Corridor Planning and Research
Existing Area Profile

Traffic Characteristics

Within the St. Clair City Limits, M-29 is 2.43 miles long, primarily a four-lane, undivided highway, with parking allowed on-street in the immediate downtown busines area. There exist 128 parking spaces on M-29 in the downtown area. Cross streets and driveways intersect M-29 throughout the corridor. In the immediate downtown area, however, all cross streets and most driveways exist on the west side of the roadway, as riverfront Palmer Park abuts the east side of the roadway. Additionally, a lift bridge and a railroad crossing exist just south of the Clinton Street intersection, periodically impacting traffic progression at the south end of the downtown business area.



Traffic volume within the project limits is approximately 15,000 vehicles per day, with less than 2% commercial volume. The current Level of Service* (LOS) is at “B” or better within the four-lane section of M-29, including the overall operation of the Clinton Street intersection. At the southern limits of the study area, M-29 is a two-lane roadway operating with LOS “E”. The two-lane roadway just north of the North City Limits is also currently operating at a LOS “E”. These northern and southern LOS ratings are found in MDOT’s 2000 Sufficiency Rating report.

*Level of Service is a description of the relative density of traffic, with “A’ being the highest level of service and “F” representing the lowest level of service. Refer to Appendix A, Section 2.3 for further details regarding Level of Service.

Current Land Use and Plan

There are generally four types of land uses within the project study limits:

- Residential
- Commercial
- Industrial
- Recreational

The commercial use is focused primarily in the downtown business area. The residential areas lie north and south of the downtown area. A few industrial parcels exist immediately south of the Pine River lift bridge and the recreational area (Palmer Park) is on the east side of M-29 in the downtown business area. One vacant/agricultural parcel exists in the downtown business area, as well. See Figure 1 for a complete map of existing land uses.

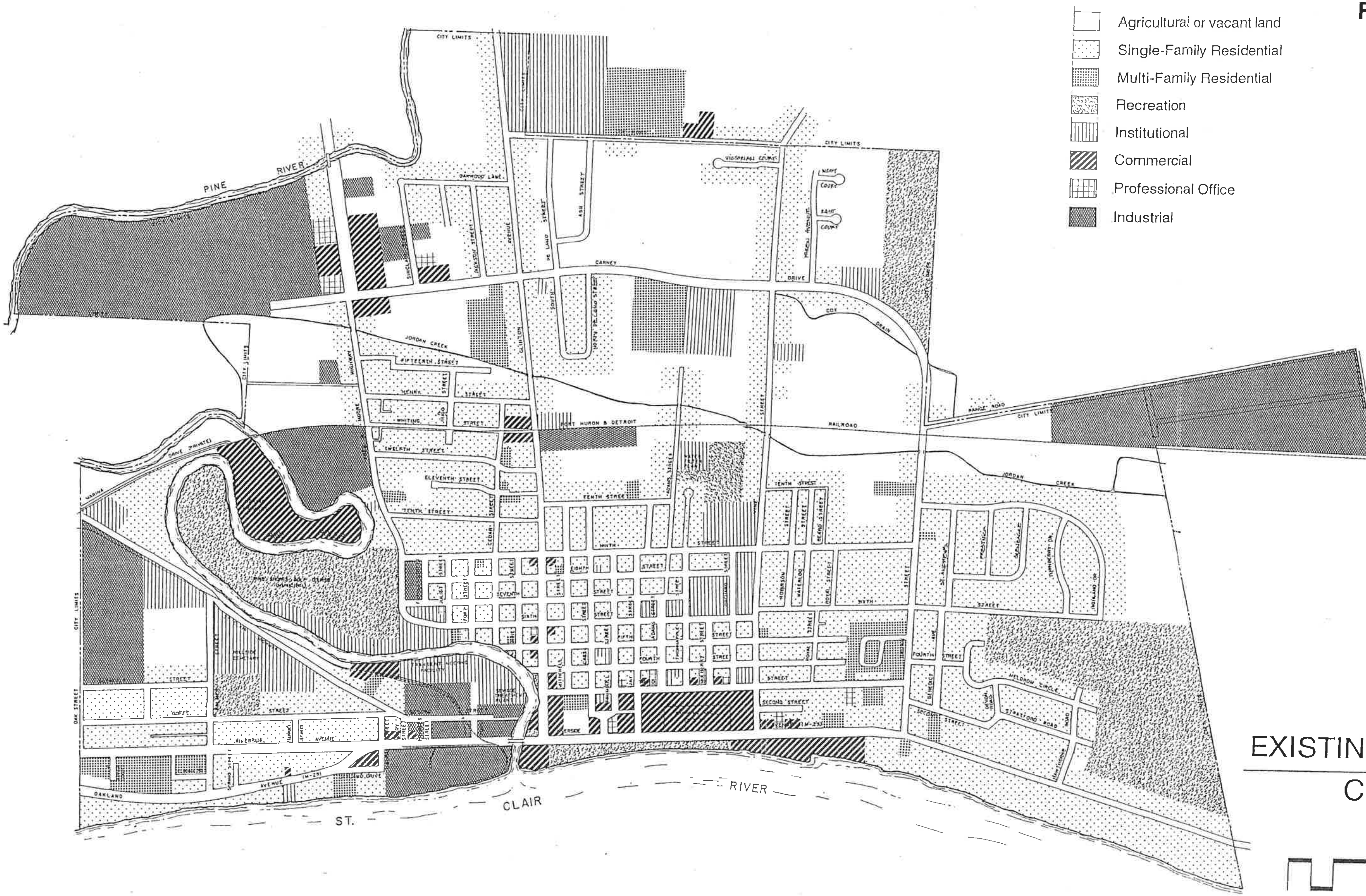
The City's Community Comprehensive Plan does not indicate a significant change with regard to the M-29 corridor. New commercial development is anticipated west of this study area, along Fred Moore Highway and Carney Drive. The existing high level of development along this segment of M-29 is expected to remain the same, with redevelopment encouraging similar land uses. The nature of commercial redevelopment in the downtown business district is intended to provide a mix of needed retail services, promote local opportunities and encourage pedestrian access and activity in the business area.

Right of Way

The public right-of-way width along the M-29 corridor varies from sixty (60) feet to one hundred and twenty (120) feet within the project limits. A field check of observed property boundaries was conducted and identified apparent conflicts compared to the right-of-way limits depicted on City tax maps (Figures 2a-c) as well as MDOT right-of-way maps (Figures 3a-c). The discrepancies in right-of-way do not alter the roadway recommendations herein, but should be verified and documented with a complete property boundary survey prior to beginning any final engineering design, as it will affect the development of roadside features.

Although not currently identified as a **Scenic Heritage Route**, the City is encouraged to apply for this corridor designation. If designated, the local community could then promote the route and its corridor to enhance tourism. Signs will be installed to identify the distinctive characteristics of the Heritage Routes, linking recreational or cultural features with a common theme. Additionally, future editions of Michigan's official map will identify the Heritage Routes.

FIGURE 1



Map 2

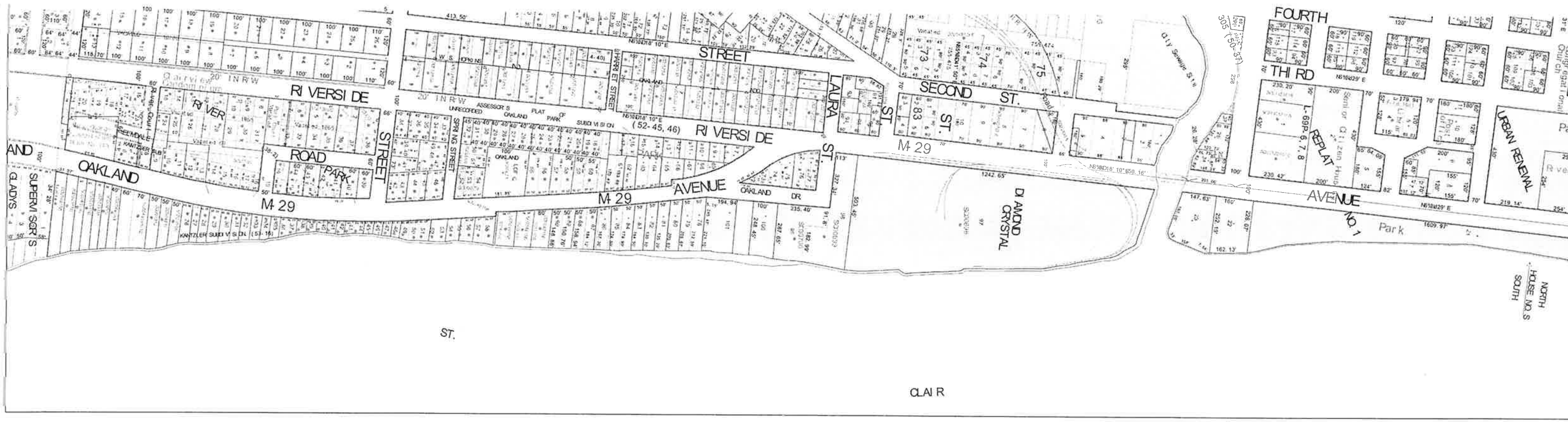
4/12/95

EXISTING LAND USE

City of St. Clair
Michigan

Carlisle Associates, Inc.
111 North Main Street, Ann Arbor, Michigan
Community Planners and Landscape Architects

FIGURE 2a



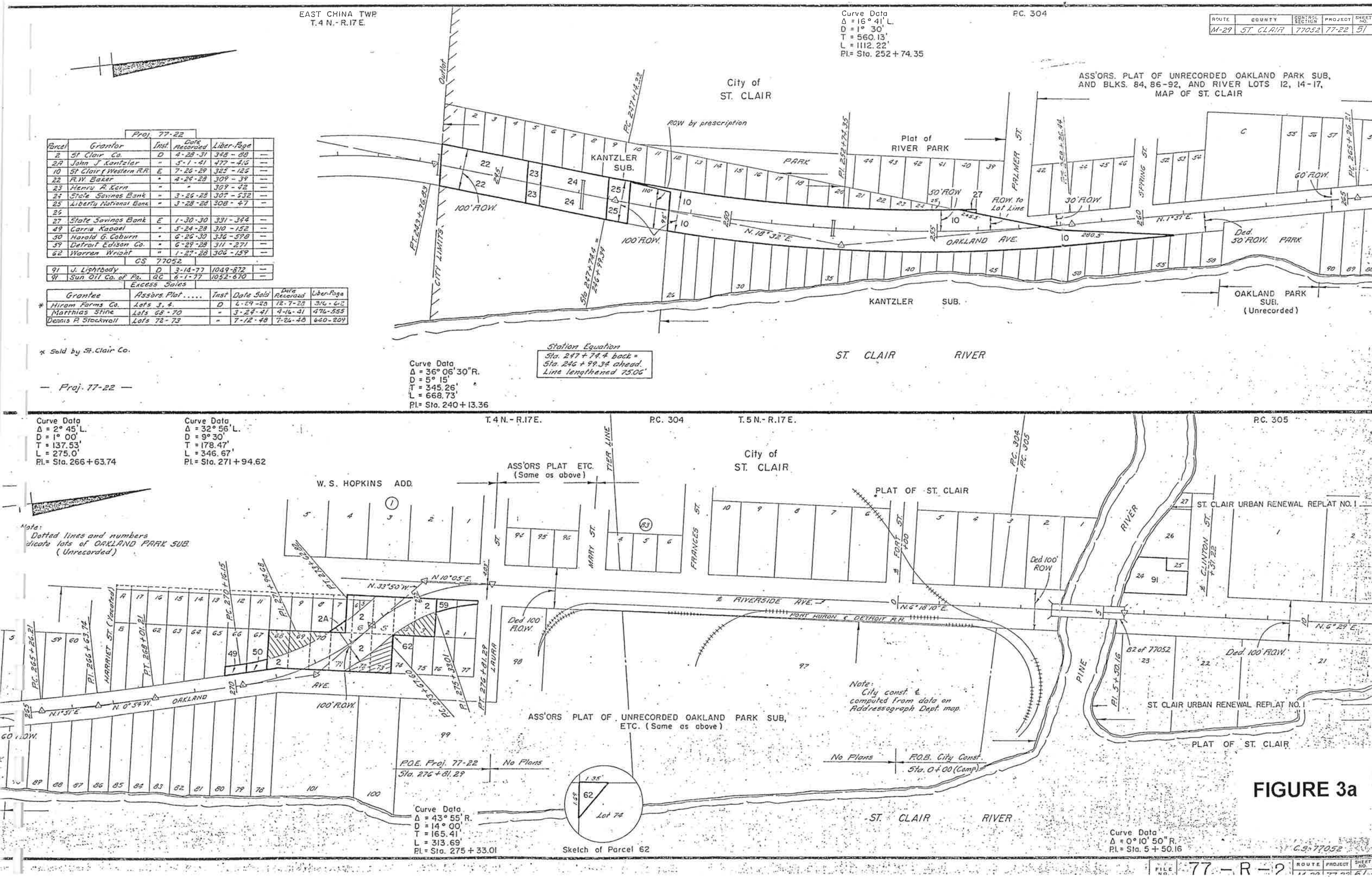
FOURTH
STREET
THIRD
RIVERSIDE
RIVERSIDE
RIVER
ROAD
PARK
STREET
SPRING STREET
LAURA
ST.
SECOND
ST.
M-29
OAKLAND
AVENUE
OAKLAND DR.
DIAMOND CRYSTAL
REPLAT
URBAN RENEWAL
AVENUE
NO. 1
Park
ST.
CLAIR

FIGURE 2b

STREET
SECOND ST.
ASSESSOR'S
AVENUE
RIVERSIDE
M-29
RIVERSIDE AVE.
PLAT
(50-35)
ST. CLAIR
(52-7)
STRATFORD
ROAD
HAWTHORNE
MELDRUM
CIRCLE
2ND ST.
3RD
ST.
Private Drive
NORTH CITY LIMITS OF ST. CLAIR
RIVER
NORTH
SOUTH
HOUSE NO.S

FIGURE 2c

RENEE DR.
RIVER POINTE ESTATES NO. 2
SOUTH RIVER POINTE LANE
RIVER POINTE ESTATES NO. 1
RIVER ROAD
SUPERVISOR'S RIVER ROAD PLAT (50-13 to 16)
BILTMORE SUBDIVISION (55-6)
RIVER ESTATES
RIVER SHORES DRIVE
RIVER SHORES CONDO. NO. 35
SUPERVISOR'S RIVER DRAKE ROAD PLAT (50-13 TO 16)
River Colony Condominium Plan No. 12
RIVER
M-29
20
RIVER



Proj. 77-22

Parcel	Grantor	Inst.	Date Recorded	Liber-Page	
2	St Clair Co.	D	4-28-31	348 - 88	—
2A	John J Kantzler	"	5-1-41	477 - 416	—
10	St Clair & Western R.R.	E	7-26-29	325 - 125	—
22	R.W. Baker	"	4-24-28	309 - 39	—
23	Henry A. Kern	"	"	309 - 42	—
24	State Savings Bank	"	3-26-28	307 - 532	—
25	Liberty National Bank	"	3-28-28	308 - 47	—
26					
27	State Savings Bank	E	1-30-30	331 - 344	—
49	Carrie Kappel	"	5-24-28	310 - 152	—
50	Harold G. Coburn	"	6-26-30	336 - 598	—
59	Detroit Edison Co.	"	6-29-28	311 - 271	—
62	Warren Wright	"	1-27-28	306 - 159	—

CS 77052

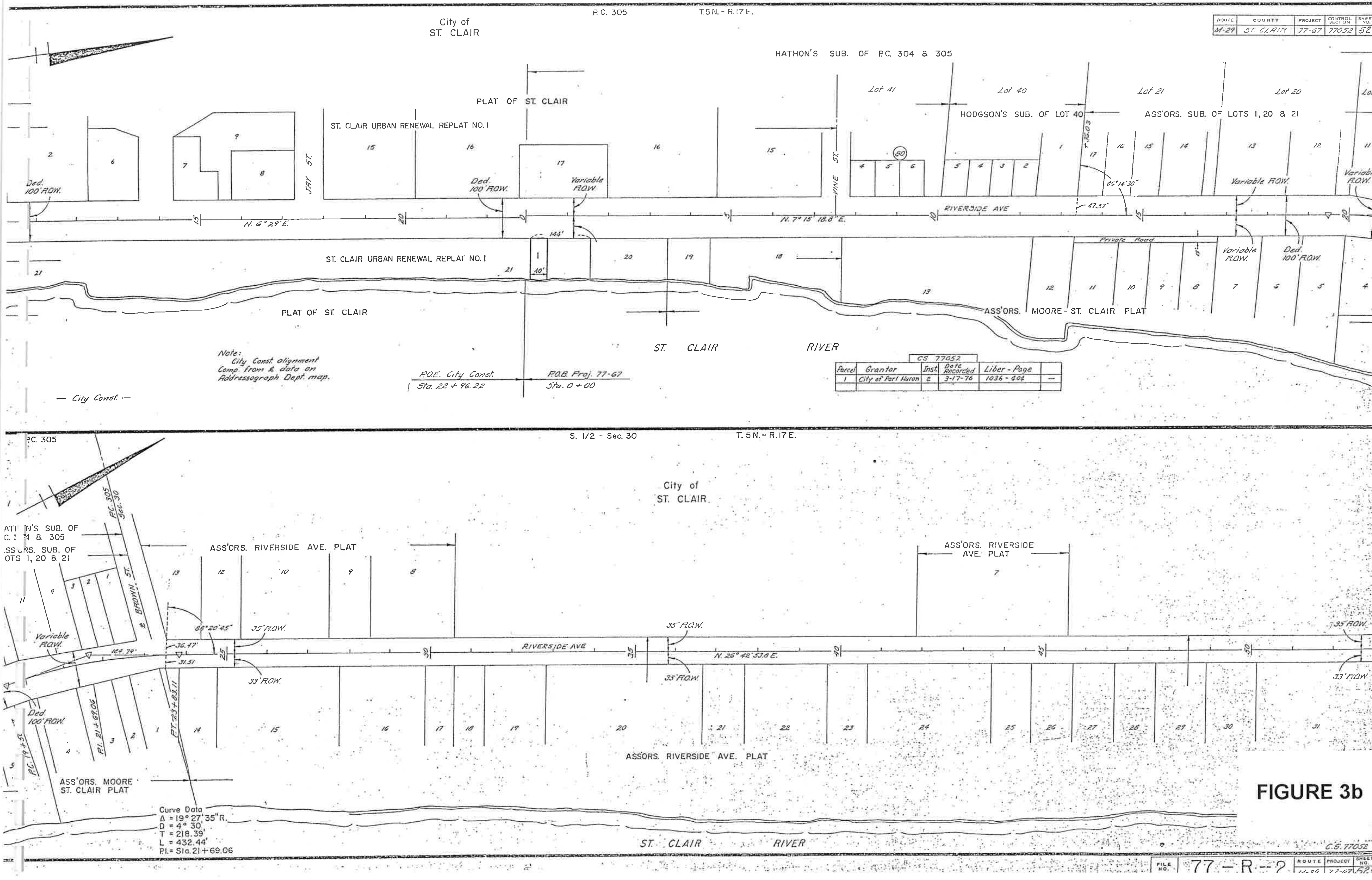
91	J. Lightbody	D	3-14-77	1049-872	—
91	Sun Oil Co. of Pa.	QC	6-1-77	1052-670	—

Excess Sales

	Grantee	Ass'ors. Plat	Inst	Date Sold	Date Recorded	Liber-Page
*	Hiram Farms Co.	Lots 3, 4.	D	6-29-29	12-7-28	316-612
	Matthias Stine	Lots 68 - 70	"	3-24-41	4-16-41	476-555
	Dennis P. Stockwell	Lots 72 - 73	"	7-12-48	7-26-48	640-204

* Sold by St. Clair Co.

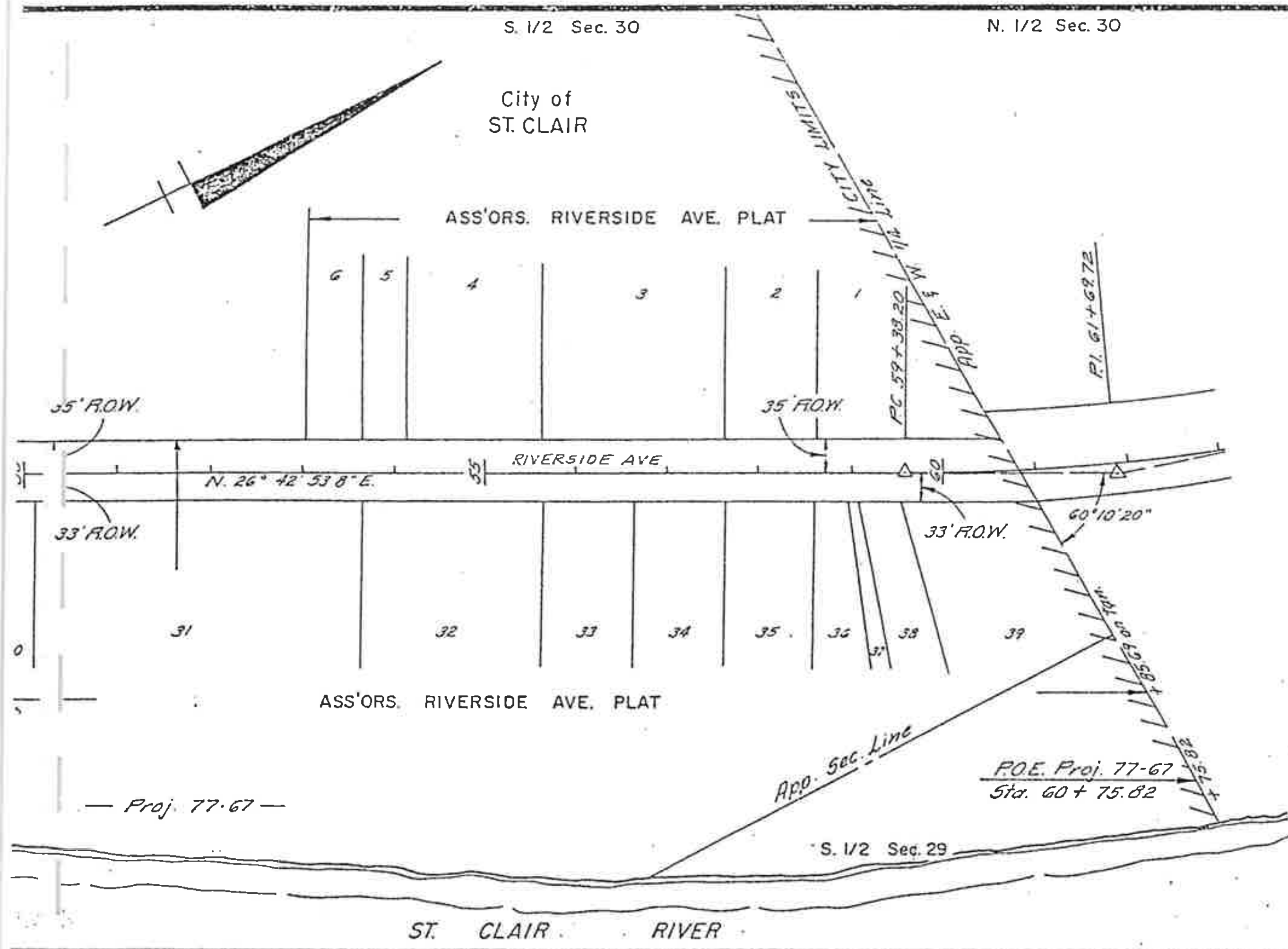
FIGURE 3a



CS 77052					
Parcel	Grantor	Inst.	Date Recorded	Liber - Page	
1	City of Port Huron	E	3-17-76	1036 - 404	—

FIGURE 3b

ROUTE	COUNTY	PROJECT	CONTROL SECTION	SHEET NO.
M-29	ST. CLAIR	77-66 77-67	77052	55



Proj. 77-66					
Parcel	Grantor	Inst	Date Recorded	Liber-Page	
1	Clarence Homberger	E	8-22-44	543 - 417	Cor.
2	John Niederhauser	"	"	543 - 419	"
4	Harold Limberg	"	"	543 - 421	"
5	Harvard Realty Co.	"	11-10-44	548 - 510	"
C-7	Frank L. Meno	"	7-25-44	541 - 530	—
13	Melville A. Kendrick	"	11-10-44	548 - 516	Cor.
14	Fred Mc Cartney	"	"	548 - 518	"
18	Frank Y. Carney	"	"	548 - 524	"
19	Jeanne C. Solis	D	"	548 - 542	—

Former DUR ROW					
21R-23R	Union Guardian Trust Co.	D	3-10-37	416 - 104	—
24R-26R	" " " "	"	"	416 - 105	—

Former DUR Parcels Sold (Not shown)

Parcel	Grantee	Inst.	Date sold	Repurchased
21R	Harvard Realty Co.	D	6-26-44	Parcel 5
22R	" " "	"	"	" "
24R	Etta C. Vories	"	12-24-40	Parcel 2

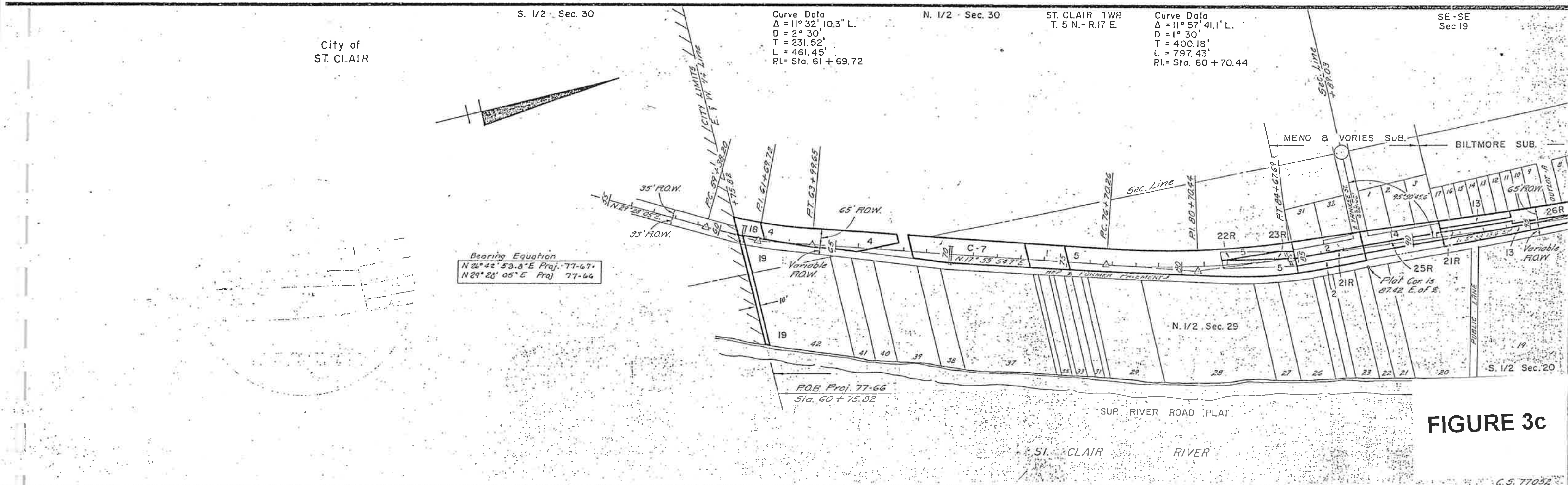


FIGURE 3c

FILE: 77 - R - 2	ROUTE	PROJECT	SHEET NO.

DOWNTOWN BUSINESS AREA - Clinton Avenue to Vine Street

Keeping in mind the various objectives of the study, several potential roadway cross sections were evaluated. The following elements were considered as the roadway concepts were developed:

- Number of lanes
- Roadway geometrics
- Non-motorized path alignment
- Opportunities for aesthetic improvements
- Lighting
- Width of lanes
- Pedestrian crosswalks
- Parking
- Right-of-way
- Level of Service (LOS)

Of the several concepts investigated, four alternatives, including the "No-Build" alternative, were analyzed in detail. The Traffic Analysis Report evaluates all four alternatives under both current and future (2025) traffic conditions. and graphic representations were developed to clearly illustrate each of the four concepts (Figures 4-7).

When considering the LOS for each alternative, it is important to realize that the LOS is determined by a different factor for a two-lane highway than for a four-lane highway, and as such, describes different service conditions. That is, for a two-lane highway, the LOS is described as a function of the Percent Time Spent Following, or P.T.S.F., directly affecting the free-flow of a vehicle. For a multi-lane, or four-lane, highway, the LOS is described as a function of traffic volume compared to the highway's capacity, directly affecting a vehicle's ability to maneuver among other vehicles. A more detailed explanation of LOS analysis can be found in Appendix A, Section 2.3.

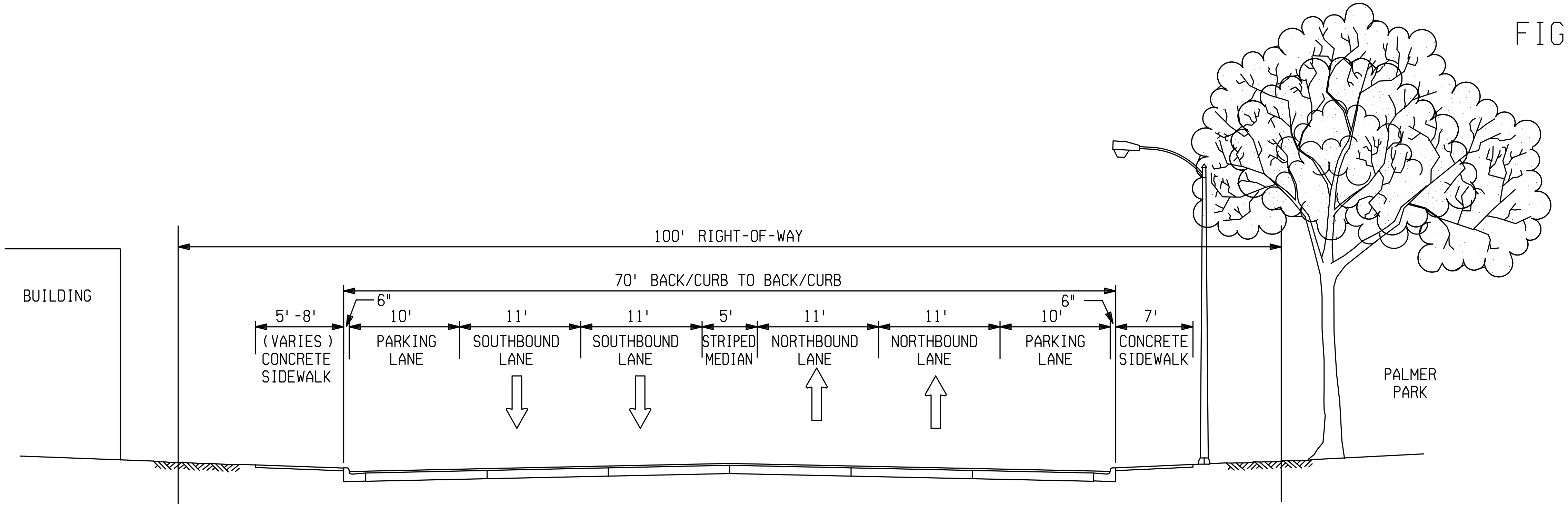
No-Build Alternative

A No-build Alternative is presented as the alternative that does not permanently alter any features within the roadway. However, it does not necessarily preclude the City of St. Clair from pursuing roadside enhancements outside of the travelled roadway. Items such as decorative lighting, walkways or bike paths are viable additions to the corridor. The No-build Alternative maintains 128 parking spaces, but offers little opportunity to add landscaping. Based on the Speed Study performed in July 2002, many drivers are comfortable driving 10 mph over the posted speed limits with the roadway geometry the way it currently exists.

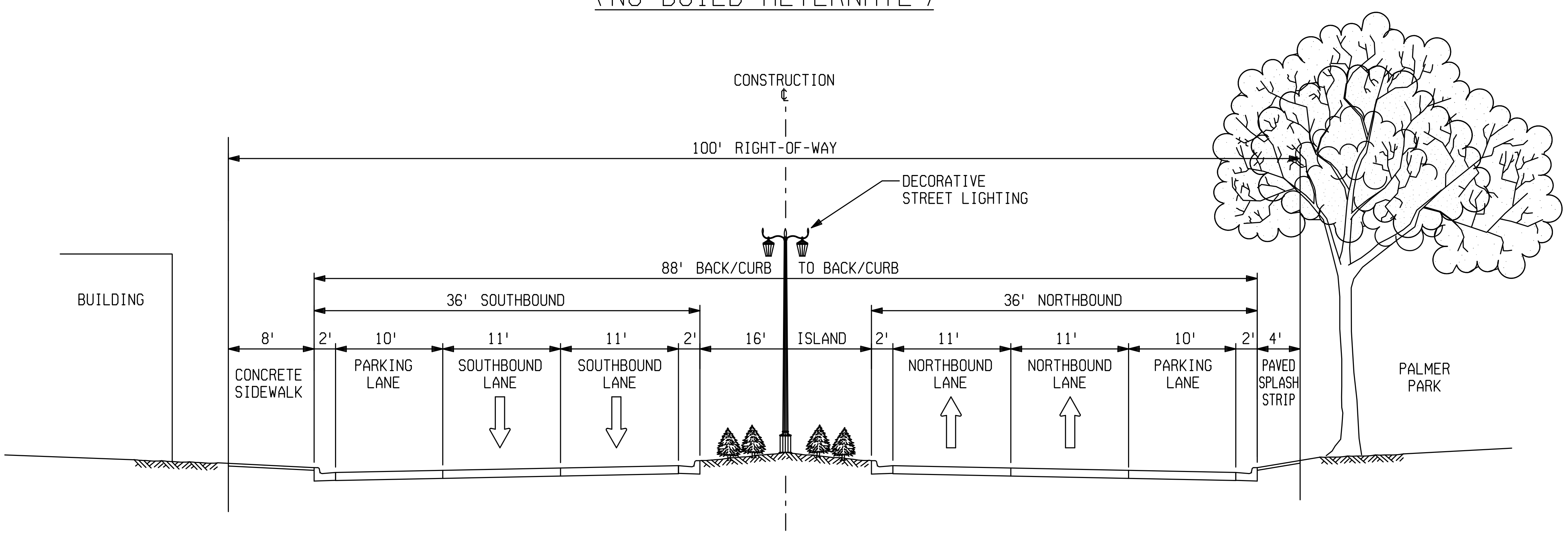
Alternative 1- (Figures 4 & 7)

This alternative maintains four lanes of through traffic as well as two parking lanes on either side of the road way, providing 130 parking spaces. With four through lanes, it maintains the same LOS as the No-build Alternative. The northbound and southbound

FIGURE 4



EXISTING M-29 TYPICAL CROSS-SECTION
(NO-BUILD ALTERNATE)



PROPOSED M-29 TYPICAL CROSS-SECTION
(ALTERNATE 1)

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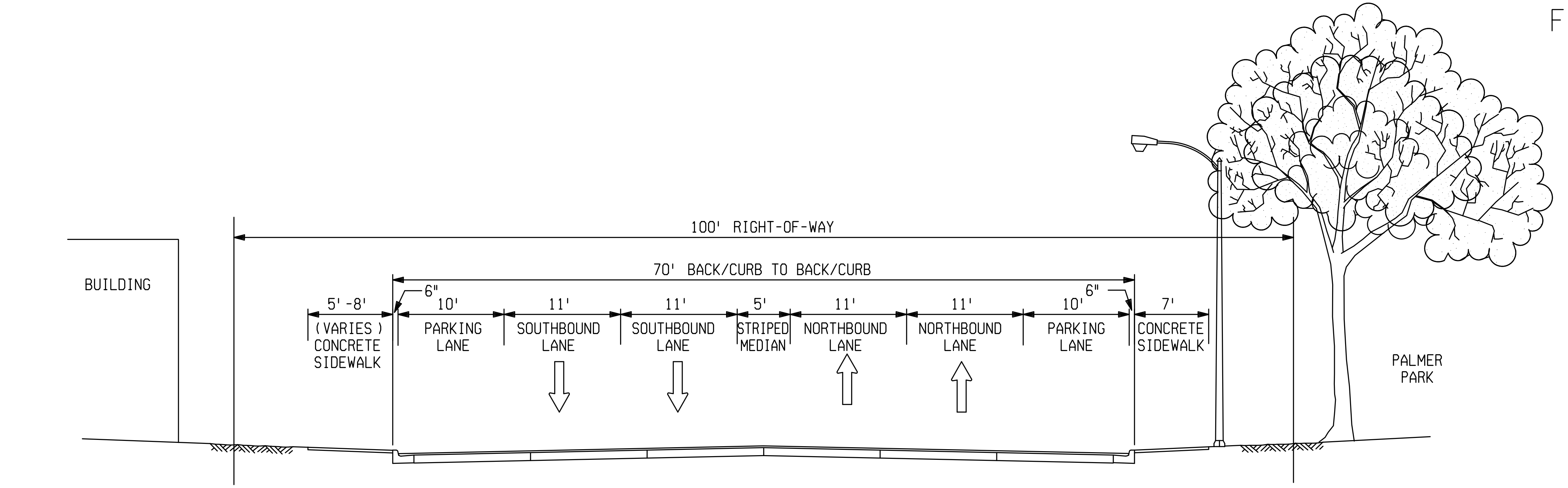
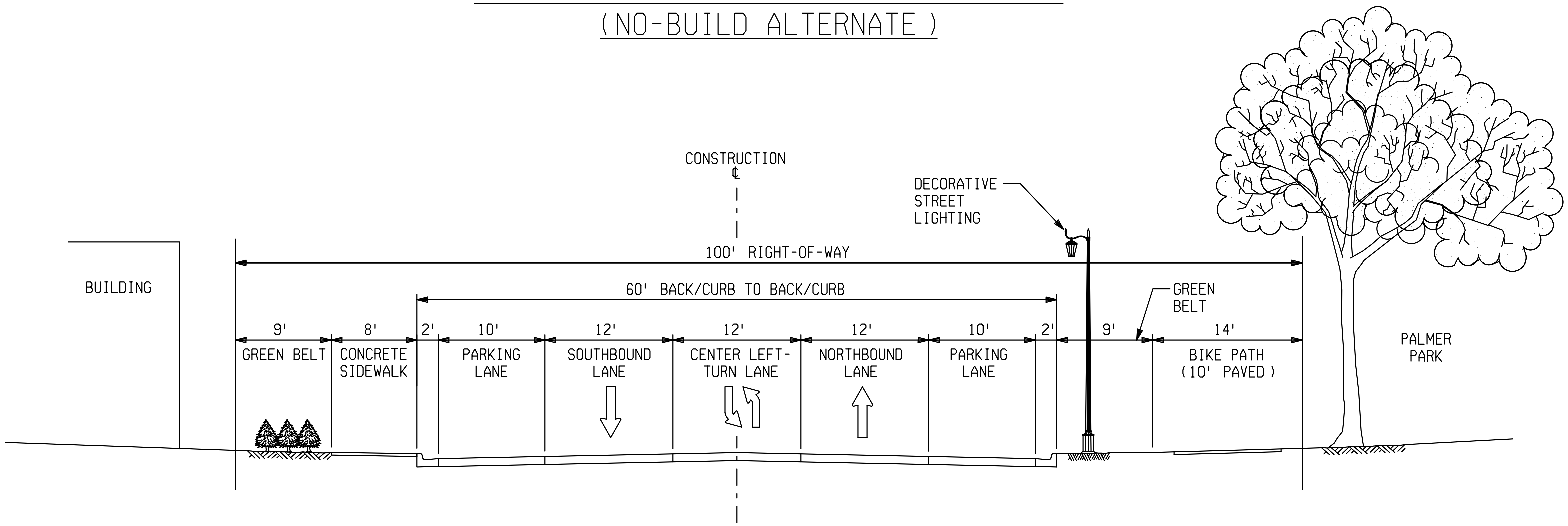
EMK 1/10/05

FIGURE 5



EXISTING M-29 TYPICAL CROSS-SECTION
(NO-BUILD ALTERNATE)



PROPOSED M-29 TYPICAL CROSS-SECTION
(ALTERNATE 2)

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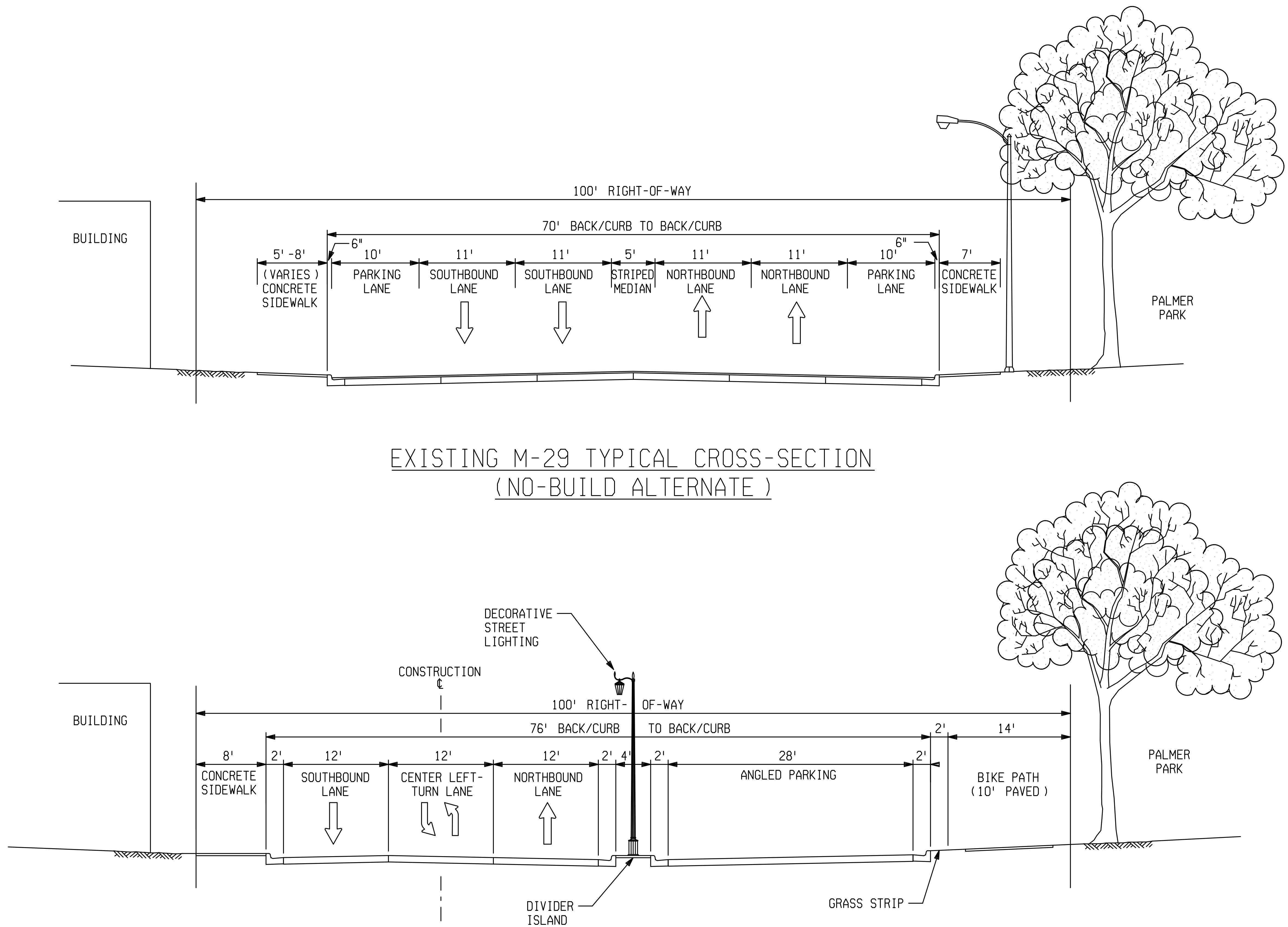
FIGURE 6



EXISTING M-29 TYPICAL CROSS-SECTION
(NO-BUILD ALTERNATE)

PROPOSED M-29 TYPICAL CROSS-SECTION
(ALTERNATE 3)

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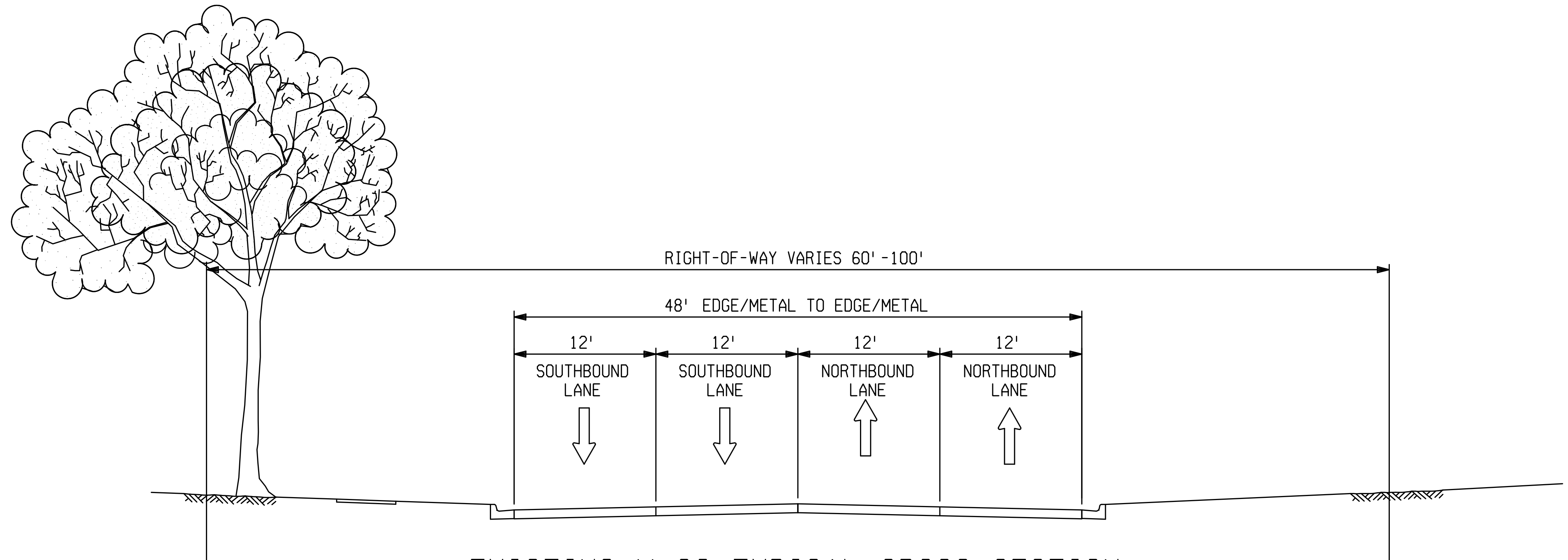
Figure 7

Alternative 1

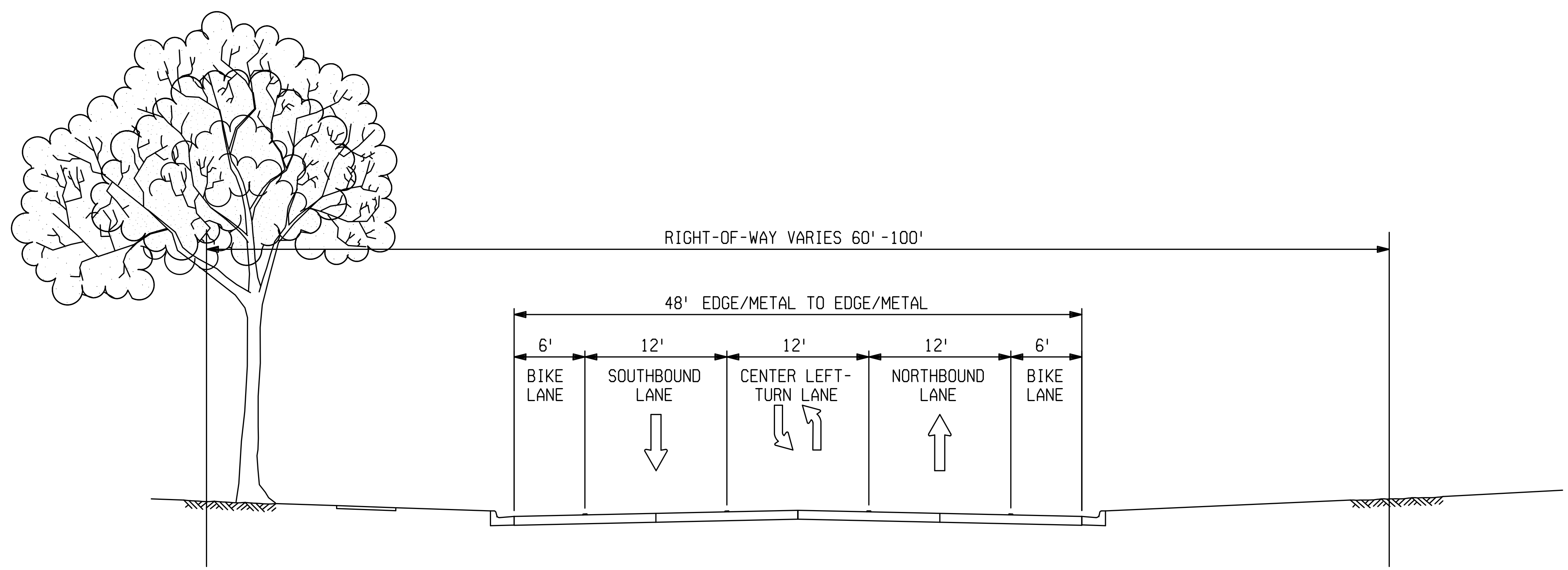
Alternative 2

Alternative 3

FIGURE 8



EXISTING M-29 TYPICAL CROSS-SECTION
NORTH & SOUTH OF DOWNTOWN BUSINESS AREA OUT TOWARDS CITY LIMITS
(NO-BUILD ALTERNATE)



PROPOSED M-29: 3-LANE VERSION ALTERNATE
NORTH & SOUTH OF DOWNTOWN BUSINESS AREA OUT TOWARDS CITY LIMITS

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Figure 9

<u>Proposed Laneage North of Downtown St. Clair</u>

M-29, North of Vine St.

lanes are divided by a 16-foot median island, however, the non-motorized path must be located outside of the M-29 right of way for this alternative. Along the west right of way line, only a concrete sidewalk will be provided . This alternative has the benefits of:

- Providing a median refuge for pedestrians crossing M-29 (crossing 2 traffic lanes)
- Creating visual interest within the wide pavement area
- Creating a sense of “narrowness” to encourage slower traffic
- Providing landscaping opportunities and buffers to roadway noise
- Providing space for low-level decorative lighting

Alternative 2 (Figures 5 & 7)

This alternative maintains two through lanes, creates a center left turn lane and maintains parking lanes on both sides of the roadway, providing 136 parking spaces. There is room within the existing right of way to include a non-motorize path on the east side of the roadway, as well as add a greenbelt along the west right of way line. The projected LOS for this alternative is lower than that of Alternative 1 or the No-build alternative. It should be noted that the accepted two-lane highway methodolgy that was used for the LOS analysis does not take into account the delay reduction from the center turn lane in a three-lane section. The analysis, therefore, yields a very conservative LOS. Actual conditions utilizing the center left turn lane would likely improve the LOS in the three-lane section. (See Appendix A, Section 3.3.2 for further details regarding traffic analysis methodology.) Furthermore, a decrease in the estimated traffic growth rate could result in minor changes to the LOS for this alternative . That is, changes in the regional traffic patterns, such as changes caused by the establishment of other north-south travel routes within the County, could affect such a decrease in the estimated growth rate. Actual development patterns within the region over the coming years should be monitored to verify if the projected traffic growth rate is realized. This alternative has the benefits of:

- Narrowing pedestrian crosswalks (crossing 3 traffic lanes)
- Creating a sense of "narrowness" to encourage slower traffic
- Creating a greenbelt on west side of roadway for landscaping
- Providing space for a bike path between east curb line and east right of way line

Alternative 3 (Figures 6 & 7)

This alternative maintains two through lanes, creates a center left turn lane and provides angled parking separated by a raised island along the east side of the roadway. 101 parking spaces are provided., however, there are minimal opportunities for landscaping or greenspaces within the right of way. A non-motorized path is included on the east side of the right of way, but only a sidewalk area is provided along the west right of way line immediately in front of the businesses. Like Alternative 2, Alternative 3 has a lower projected LOS than Alternative 1 or the no-build alternative. As described for Alternative

2, assumptions regarding the benefit of the center turn lane as well as the estimated growth rate can be made here, which may result in actual decreases in the LOS being very minor. This alternative has the benefits of:

- Narrowing pedestrian crosswalks (crossing 3 traffic lanes)
- Creating a sense of "narrowness" to encourage slower traffic
- Creating a space for a bike path between east curb line and the east right of way line
- Increases parking spaces adjacent to Palmer Park

SOUTH AND NORTH of DOWNTOWN BUSINESS AREA to CITY LIMITS

Converting four-lane roadway to three-lane roadway (Figures 8 & 9)

M-29 outside of the downtown business area is primarily a four lane roadway, with no on-street parking (except for the short segment between Vine Street and Brown Street). This four-lane roadway section continues southerly and northerly toward the City Limits, where it transitions to a two-lane roadway near or at the City Limits. As a traffic calming measure and to provide bike lanes, the M-29 Corridor Planning Committee has proposed that these segments of M-29 south and north of the downtown business area be converted from a four-lane roadway to a three-lane roadway, which includes a continuous center left turn lane and two six-foot bike lanes on each side of the through-lanes. The existing curb lines or shoulders would not be affected.

With the roadway outside of the City Limits being a two-lane roadway, it is reasonable to assume that the proposed conversion to a three-lane roadway within the City Limits would provide a better LOS utilizing a center turn lane than it's adjacent two-lane neighbor. However, standard highway capacity analysis methodology is based only on the number of through lanes available and does not account for the potential benefits of a center turn lane. Therefore, the LOS for the proposed three-lane section is considered the same as the existing two-lane roadway.

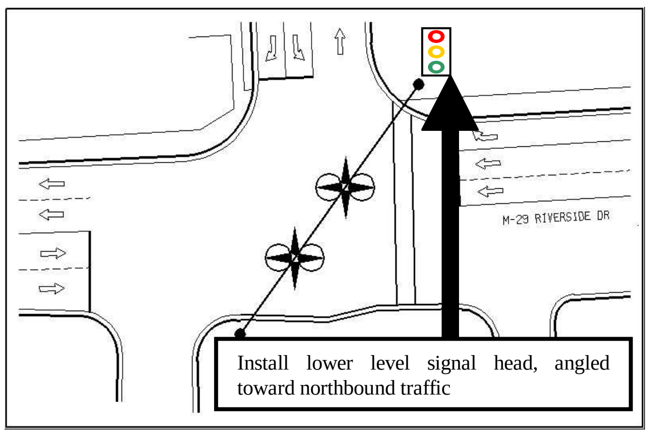
The three-lane conversion can be accomplished short-term or temporarily by modifying pavement markings, since neither the curb nor shoulder alignments are affected. For long-term conversion, the joint lines should be paved to be in alignment with lane lines.

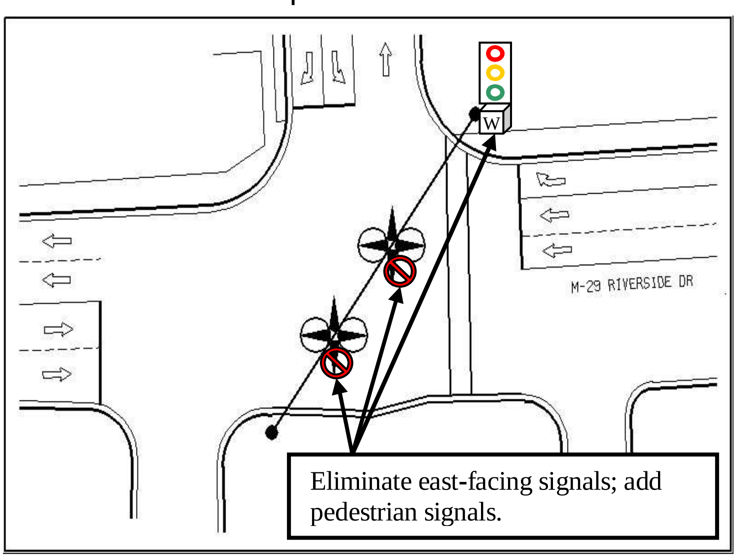
CLINTON AVENUE INTERSECTION

Clinton Avenue is an east-west road which forms a T-intersection with M-29, just north of the Pine River. Its operation is complicated by the presence of the lift bridge (B2 of 77052) to the south and a commercial driveway to the east. Currently, the intersection operates at a high level of service (LOS "B" or better for all approach roads). Under the forecast conditions (2025), the intersection operates at with an overall LOS "B" or better, for all Alternatives, including the No-build Alternative. This is considered acceptable for any intersection on the State trunkline network.

In 2003 and 2004, the signal was modified during rehabilitation of the lift bridge, providing split phases with dedicated turn phasing in the intersection. Anecdotal reports suggest that traffic movements were improved using this modified signal operation. Further signal analysis to evaluate year-round operations should be conducted before permantly modifying the signal to incorporate new phasing.

However, given the location of the driveway to the Voyager Restaurant on the east side of the intersection, some drivers appear to experience confusion as to how best to exit the driveway and proceed north through the intersection. To provide a clearer view of the signal operation, a lower-height traffic signal could be mounted to the existing pole in the northwest quadrant of the intersection, angled to face northbound traffic. Also, a sign instructing drivers exiting the driveway to proceed through the intersection only on GREEN would be helpful.





Another feature of this intersection which may cause some drivers confusion while exiting the east driveway is the lighted signal face on the east side of the signal head. Although there is no roadway approach on the east side of the intersection, it is believed that the lighted signal facing east is there to assist pedestrians wishing to cross from the east side of M-29 to the west. It is possible that drivers exiting the driveway on the east side get a glimpse of the signal face when it is in the green phase for Clinton Avenue, believing they have a green phase for M-29, instead. By providing pedestrian-activated crosswalk signal timing to this intersection, with pedestrian signals, the signal face on the east side of the signal head may be eliminated.

The span wire support system for the signals may be modified to mast arm supports to offer a moderate benefit in the placement of signal heads. The mast arm supports, in lieu of span wire support, would primarily offer an aesthetic benefit and would be considered too costly for the minor change in placement of signal heads it would afford.

ACCESS MANAGEMENT

By managing the location, design and type of access to a parcel, good access management provides proven techniques to help reduce traffic congestion, preserve existing road capacity, improve traffic safety and reduce crashes. Currently, there are 18 points of property access along M-29 in the downtown area with various spacing. Generally, the recommended spacing between access points is 185 feet for a 30 mph roadway.

Where possible, access to properties on the west side of the roadway should be provided via local cross streets. The biggest potential for access improvement exists on the east side of the roadway at the Voyager Restaurant. Relocating the driveway as far as possible from the intersection of Clinton Avenue is recommended. Because of the elevation difference between the roadway and the parking lot, this may result in a loss of parking spaces due to embankment that would need to be placed to fill in a driveway access west of the existing driveway.

At the St. Clair Inn, five access points currently exist for the property. Although access is limited due to the proximity of the river to the east, providing pass-through access between the driveways on the property may eliminate unneccesary vehicle maneuvers onto M-29 as drivers negotiate the various access decision points.

The absence of many driveways on the east side of the roadway benefits the flow of northbound traffic significantly. Should the City wish to request access points along the east side of the roadway for any future developments, careful consideration should be given to the placement and associated impacts fo such access.

Regardless of which roadway alternative is implemented, access management principles should be incorporated with any redevelopment efforts. Several effective design techniques are outlined in the 2001 Michigan Department of Transportation “The Access Management Guidebook” and is a recommended reference for any future design plans. Although not currently part of the City’s Community Comprehensive Plan, access management principles must be recognized and supported by the City as well as MDOT in order to be effective. Amending the City's Plan to adopt an M-29 corridor overlay district establishing access management standards would be helpful in implementing the principles on any future redevelopment.

AESTHETIC IMPROVEMENTS

Opportunities for additional landscaping improvements within the M-29 right of way are most prevalent in roadway Alternatives 1 and 2. The most visible planting opportunities exist in the median proposed in Alternative 1. Assuming a speed limit of 30-35 mph, both small and large plantings are possible. The actual layout of any median planting should be coordinated with plantings proposed for the Palmer Park improvements to create a uniform, cohesive image in the downtown riverfront area. Recommend plant species include, but are not limited to:

Large Deciduous Trees
- Oaks
- Hackberry
- Birch
- Honeylocust
- Hickory
- Hard Maples
- Sycamore
- Beech
- Ironwood
- Blue Beech

Ornamental Deciduous Trees
- Amelanchier
- Dogwood
- Hornbeam
- Redbud
- Hawthorn

Evergreens
- Pine
- Juniper

Large Shrubs
- Dogwood
- Viburnum
- Ninebark
- Sumac
- Witchhazel

Small Shrubs
- Euonymus
- Potentilla
- Viburnum
- Yew
- Holly
- Currant
- Juniper

Other plant materials may be considered, however the species listed here are native to Michigan and would likely require the least maintenance to thrive. Watering and maintenance of any aesthetic plantings would be the responsibility of the City. The actual location of plantings must not interfere with clear vision requirements for vehicles and pedestrians, especially at driveways and intersections. Plantings within the M-29 corridor should be specifically located during the design phase. The addition of trees and shrubs within the corridor not only add visual interest, but also provide natural sound abatement.

Standard traffic regulatory and warning signs along the corridor are installed and maintained by MDOT. Other signing of local interest, such as local street signs and points of interest must be erected and maintained by the City and may require an MDOT permit. Other signs visible from the corridor but not related to traffic are regulated by City ordinances. Guidelines for placing new or replacing existing signs should assist property and business owners in the design and placement of their signs. Generally, signs should be simple in design and with a succint message. Where possible, signs should be consolidated to reduce clutter and assist the reader. Materials for non-MDOT signs may be regulated to require a particular type of material or color, as the City deems appropriate. Signs with flashing or moving parts are not recommended. Overall, the City should strive to maintain a uniform look to any local signs placed.

Decorative street lighting is recommended to replace the existing high mast luminares currently along the roadway. This improvement would be the City's responsibility to fund or secure funding from other sources.

Example of building façade, signing, plantings and decorative street lighting coordinated through redevelopment effort in Romeo, Michigan.

The National Center for Bicycling and Walking reports that across the country, bicycle and pedestrian tourism is making significant contributions to local economies. Studies show that where bicycle and pedestrian tourism is fostered and promoted, and where investments are made in bicycle and pedestrian facilities, the economic impact may be even greater. A thriving tourist industry, in turn, can attract and revitalize businesses, create jobs, and increase public revenue. This is precisely the driving force behind the development of trailways within Michigan, such as the Bridge to Bay Trail in St. Clair County.

Furthermore, more communities are recognizing that the development of bicycle and pedestrian facilities has a positive effect on nearby properties through which they pass. Homebuyers and business owners are realizing the value that such facilities bring to a community.

According to research conducted by Rails to Trails Conservancy, 85 million people used rail trails in 1994 alone. Given these numbers, it is easy to understand how communities can profit by responding to trail users' needs. Indeed, many types of businesses — including restaurants, convenience stores, bicycle shops, campgrounds and bed and breakfast establishments — attribute at least part of their success to a nearby trail.

Locally and nationally, bicycle and pedestrian facilities have proven to be a cost effective use of public funds. [1] It is important to note, however, that the design requirements (specifically, width) for a non-motorized path may vary depending on the source of funding. For this reason, potential non-motorized path alignments being evaluated for this corridor will assume the most conservative requirement of ten (10) foot paved width, plus two feet clear distance on either side of the path.

Existing Paths and Plans in the Community

The Bridge to Bay Trail in St. Clair County is intended to pass through the City of St. Clair. The existing paved path along Fred Moore Highway and Carney Drive in the western part of the City is a part of this County-wide trail system. However, it currently does not complete the network, nor does it provide a continuous path through the City.

In 1997, the City of St. Clair completed a bicycle plan which summarized design standards and existing conditions for potential bicycle routes throughout the City. Regarding a path along the M-29 corridor, the recommendation at that time was to construct a 12 foot path through Palmer Park along the River and through the Park, continuing north as an 8 foot sidewalk to Brown Street., with a crossing to the west at Brown Street. Heading south from Clinton Avenue and north from Brown Street, the recommendation was to convert the four lane M-29 roadway to a three lane roadway and create bike lanes on both sides of the road.

The recommendations made in 1997 sought to create a bicycle route network which would tie into existing paths and encompass popular community destinations. Links in the routes were provided along residential streets to tie into the M-29 corridor. Those links recommended in 1997 are still valid today, however, the recommended placement of the path within the M-29 corridor is changed.

Along M-29, From Clinton Avenue to Vine Street (Downtown Business Area)

Because of the anticipated aesthetic improvements planned within Palmer Park, the alignment of the non-motorized path can no longer be planned as a continuous path along the boardwalk or within the Park, as recommended in 1997. The design concepts for the beautification of Palmer Park include a linear fountain and pavilion which conflicts with the alignment of a path near the boardwalk along the St. Clair River or within the Park.

Roadway Alternatives 2 and 3 (Figures 5 and 6) presented herein provide space within the M-29 right of way for a ten (10) foot paved path along the east side curb line, adjacent to Palmer Park. The path in this location would require the removal of several trees to keep the alignment within M-29 right of way. The path could be designed to meander around the trees, but would require dedication of property within Palmer Park for this use.

Roadway Alternative 1 (Figure 4) presented herein does not provide a path within the M-29 right of way. Because Alternative 1 maintains four lanes of traffic, includes on-street parking on both east and west sides of the roadway and includes a raised median, there is not enough room within the existing right of way to include a non-motorized path, as well. There are two potential path alignments outside of the M-29 right of way to consider: an alignment on Third Street or an alignment just inside the City Park property, immediately adjacent to the M-29 east right of way line.

Third Street, one block west of M-29, has 70 feet of roadway right of way and existing continuous sidewalk on the west side of the road. With lower traffic volumes and speeds than M-29, as well as adequate right of way, a shared lane or a separate path is viable, from Clinton Avenue to Vine or Brown Street. (see Figure 10) The path would link back to M-29 following the same recommendations set forth in the 1997 Bicycle Plan. This alignment keeps the path on the west side of M-29 and does not require the path to cross M-29.

For a path alignment on City property adjacent to M-29, the west edge of Palmer Park would be designated for the path. This may require the removal of four mature trees, if the 14-foot clear width is required for the path. Two crossings of M-29 would be necessary to continue the path northerly and southerly to the City Limits. Crossings are recommended at Clinton Avenue and Vine Street.

Along M-29, From Clinton Avenue to South City Limit

Right of way in this segment varies from 60 feet to 100 feet wide, limiting a continuous path alignment outside of the existing four-lane roadway. In the Bicycle Plan of 1997, this portion of the path was to be created by converting the four-lane section of M-29 to a three-lane section and adding a designated bicycle lane. This approach remains feasible. Conversion from four-lanes to three-lanes can be accomplished using pavement markings, however, long-term conversion should include pavement overlay or reconstruction to align joint lines with lane lines.

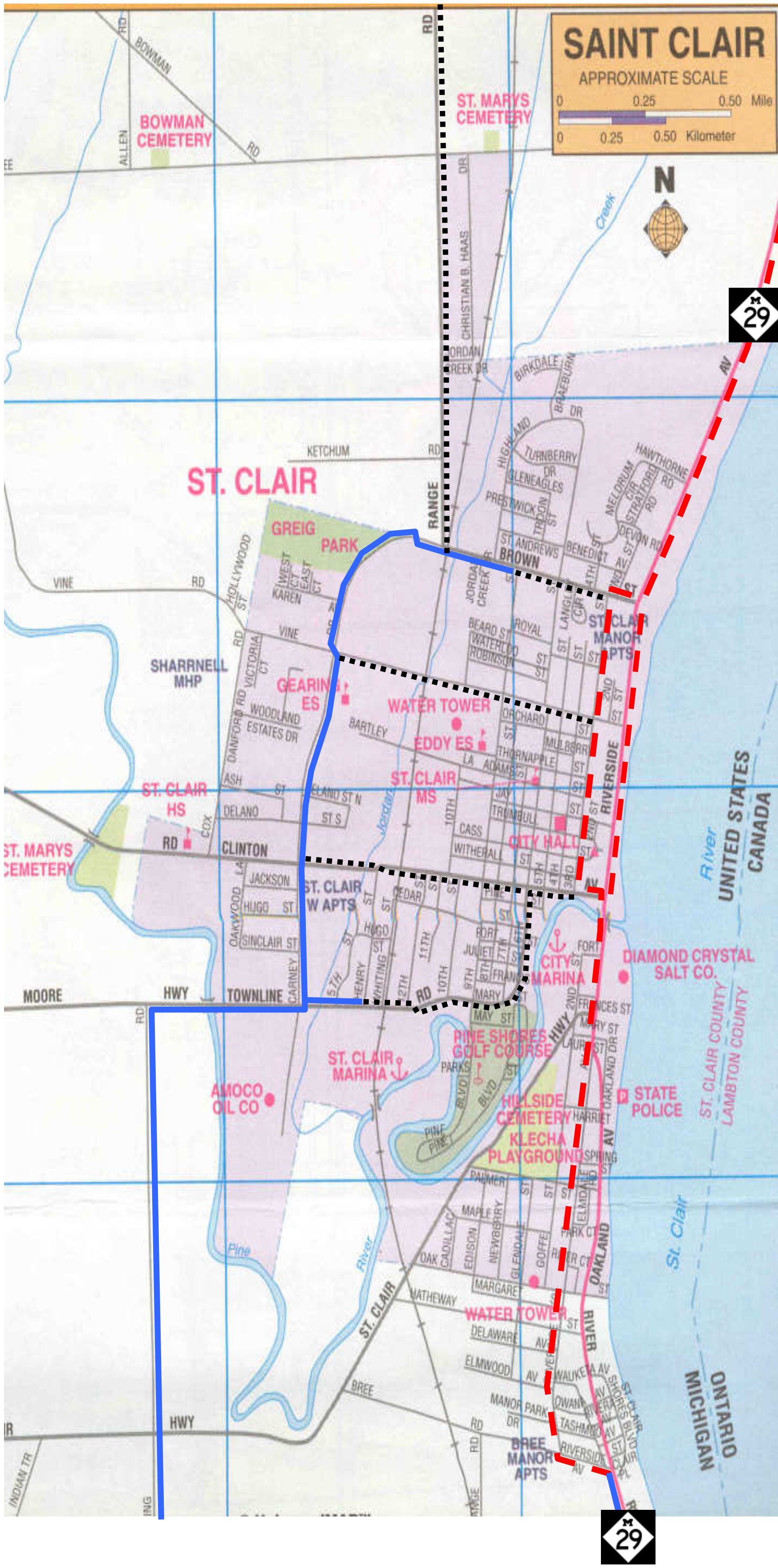
Should a path outside of the M-29 right of way be considered, a viable path alignment in this segment begins on the west side of M-29 at Clinton, heading southerly over the Pine River then veers westerly off of M-29 onto Riverside Avenue. The path continues southerly beyond the City Limit into St. Clair Township. The local Riverside Avenue right of way is 100 feet wide, with lower traffic volumes and speeds than M-29. Either a shared lane or separate path alignment is possible.

Along M-29, From Vine Street to North City limit

The M-29 right of way in this segment varies from 68 feet to 120 feet, limiting a continuous path alignment outside of the existing four-lane roadway. Existing right of way provides room for a path on the west side of the roadway near Vine Street, however, it can not accommodate a full 14 foot-wide path toward the northern end.

The Bicycle Plan of 1997 recommended converting this section of M-29 from a four-lane to a three-lane section, as well. This approach remains feasible and can be accomplished short-term with pavement markings, but long-term conversion should require paving to align joint lines with lane lines.

Another alignment, as supported by the Bridge to Bay Trail, follows Brown Street westerly to Range Road, then heads north out of the City to Davis Road before heading back easterly to M-29. This route traverses County roads and requires coordination with the St. Clair County Road Commission to pursue approval. The portion of this route on Brown Street may not accommodate a full-width path, however, and may require the relocation of utility poles.



Existing Path

Proposed Path - local

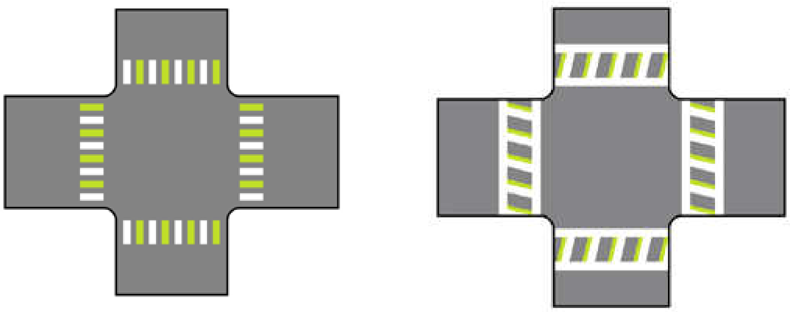
M-29 Vicinity Path

Existing and Proposed Non-motorized Paths

Figure 10

Crosswalks

Regardless of the final alignment of the non-motorized path, pedestrian crosswalks will be maintained to provide safe crossings of M-29 and intersecting local streets. Heightened delineation of all crosswalks can be accomplished by special emphasis pavement markings or by using differring pavement materials, such as brick pavers. Electronic systems to illuminate the crosswalk lines in the pavement are available, but are not currently approved for general use on State trunklines.



Special emphasis markings for crosswalks

Crosswalks are preferred at signalized intersections and stop-controlled intersections. Special consideration and delineation is required for crosswalks proposed elsewhere on M-29 and will be subject to a thorough safety analysis and approval by an MDOT Traffic and Safety Engineer.

Action items for implementation can be categorized as either immediate (0-3 years) or future (3-10 years) activities. Action items listed should be considered independent of one another and coordinated with related State and Local agency efforts. Estimated costs do not included administrative costs which may be incurred by State or Local agencies.

Comments solicited at the public information meeting held November 10, 2004, include a ranking of the corridor improvement objectives and are listed in Appendix B. Priority should be given to those action items for implementation which support the objectives ranked most important by the City and MDOT.

Immediate Action Items **(Implementation 0-3 years)**	**Cost**	Future Action Items **(Implementation 3-10 years)**	**Cost**
Restriping lane lines to convert 4 lane section to 3 lane section, north and south of downtown business area	$9,800	Construct Roadway Alternative 1	$1,880,000
Landscape existing green spaces	Varies	Construct Roadway Alternative 2	$1,549,000
Create uniform signing ordinance for non-regulatory local signing	$0	Construct Roadway Alternative 3	$1,660,000
Pursue Scenic Heritage Route designation for M-29 corridor	$0	Repave proposed north and south 3-lane sections to match joint lines with lane lines	$ 230,000
Construct bike paths off M-29 corridor (including engineering; not including ROW costs)	$32 per linear ft.		
Pursue State and Federal grant opportunities for Enhancements	$0		
Place special emphasis pavement markings at crosswalks (Clinton Ave. and at mall)	$5200		
Modify signal at Clinton Avenue to accommodate split-phasing	$18,000		

Traffic Analysis Report

TRAFFIC ANALYSIS REPORT
for the
M-29 CORRIDOR STUDY

in the

City of St. Clair, Michigan

PREPARED FOR:

MDOT

Michigan Department of Transportation

AND

PREPARED BY:

PARSONS

December 2003

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

Parsons Transportation Group Inc. of Michigan (Parsons) has completed a traffic analysis study of the M-29 Corridor Study in the City of St. Clair. The limits of the study area extend between the south and north St. Clair city limits from approximately 500 feet north of Hatheway Street to approximately 2800 feet south of Yankee Road. The study area is illustrated on Figure 1. The purpose of the study was to assess the traffic and safety impacts of proposed alternatives for improving traffic operations, pedestrian crossings and safety, traffic safety, and parking and to control traffic speeds.

One of the alternatives includes reducing M-29 from 4 lanes with on-street parking to 3 lanes with a bike path and parking alternative in order to address traffic safety issues and improve the aesthetic appeal of the riverside M-29 corridor. Although reducing lanes is not a common alternative, it is sometimes used as a traffic calming measure, and has been shown to reduce certain types of crashes according to a research report written by Michigan State University and approved by the Michigan Department of Transportation (MDOT) called "Guidelines for Four-Lane to Three-Lane Conversions".

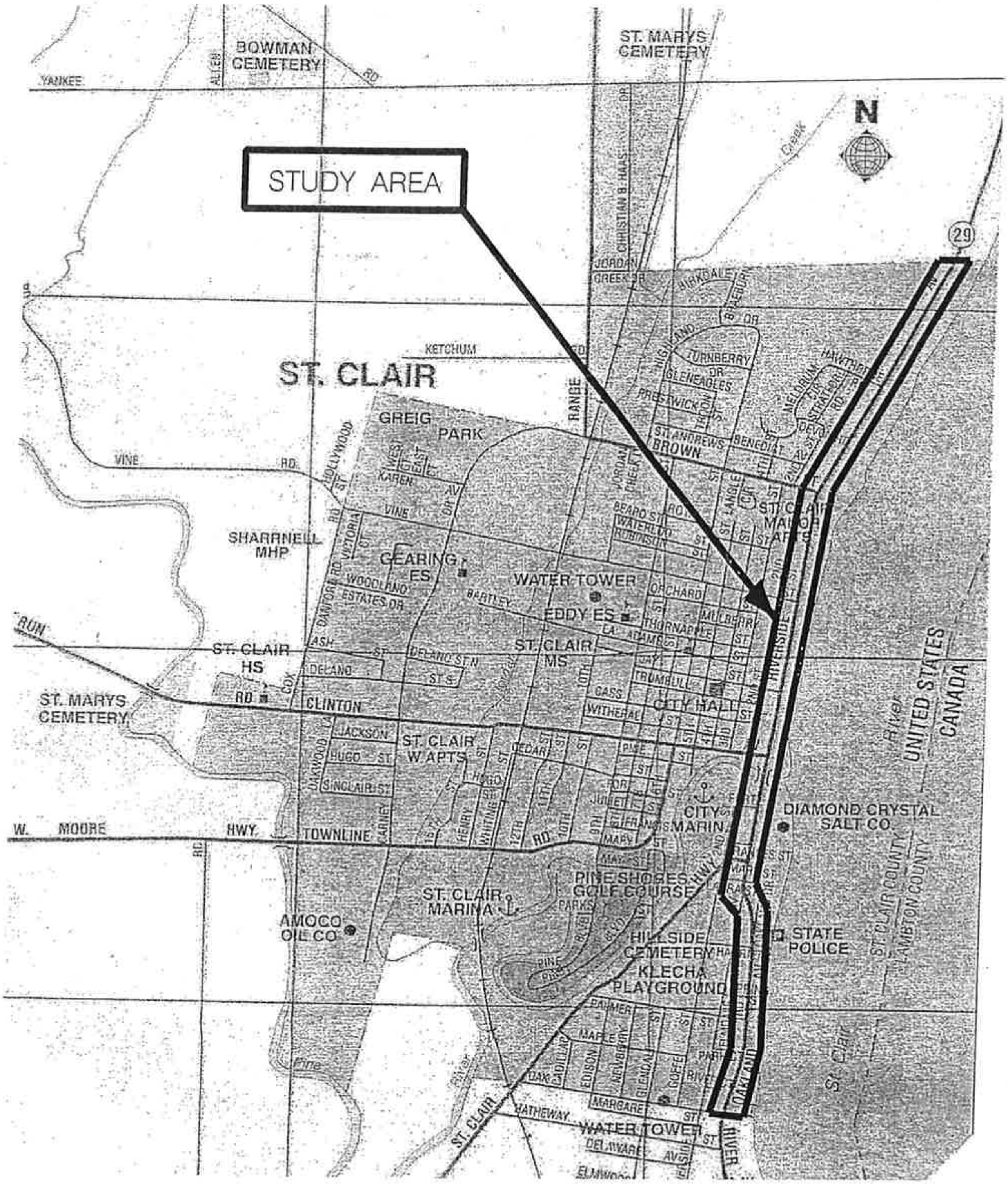
This traffic analysis study for the M-29 Corridor Study in the City of St. Clair analyzed existing traffic conditions within the study area and future (2025) conditions for the No-Build and Build Alternatives. A traffic crash analysis was also completed for the project area using the most current data available as provided by the MDOT.

2. EXISTING CONDITIONS

2.1 Area Roadway Characteristics

A field review was conducted to collect data such as number of lanes and lane use, traffic control features (signal locations, speed limits, etc.) and other conditions necessary for the traffic analysis. Observations of traffic maneuvers were made, with particular attention to the drawbridge activity during peak traffic periods. The MDOT provided the signal timing plans for the M-29/Clinton Avenue intersection. The area road network is described in the following paragraphs:

M-29 is a north-south undivided highway having a 2-lane cross-section from the southern city limit (approximately 500 feet north of Hatheway Street) to Palmer Street, where it widens to a 4-lane cross section with two lanes in each direction. M-29 remains a 4-lane cross section until the M-29/Clinton Avenue intersection, where north of Clinton, M-29 has a 4-lane cross section with a parking lane on each side from Clinton Avenue to approximately 500 feet north of Vine Street. Parking is prohibited on the west side of M-29 near Clinton Avenue to allow for an exclusive right-turn lane for southbound M-29 traffic at the Clinton Avenue intersection. M-29 transitions back to a 2-lane cross section at the northern city limit. The speed limit varies on M-29 from 40



SITE LOCATION

FIGURE 1

PARSONS

miles per hour (mph) between the southern city limit and St. Clair Highway, to 35 mph from St. Clair Highway to Clinton, to 30 mph from Clinton to Brown, and returning to 40 mph from Brown to the northern city limit. Jay, Vine and Brown are local streets that are controlled by stop signs at their intersections with M-29 in the area of downtown St. Clair, the portion of the corridor immediately to the north of Clinton Avenue.

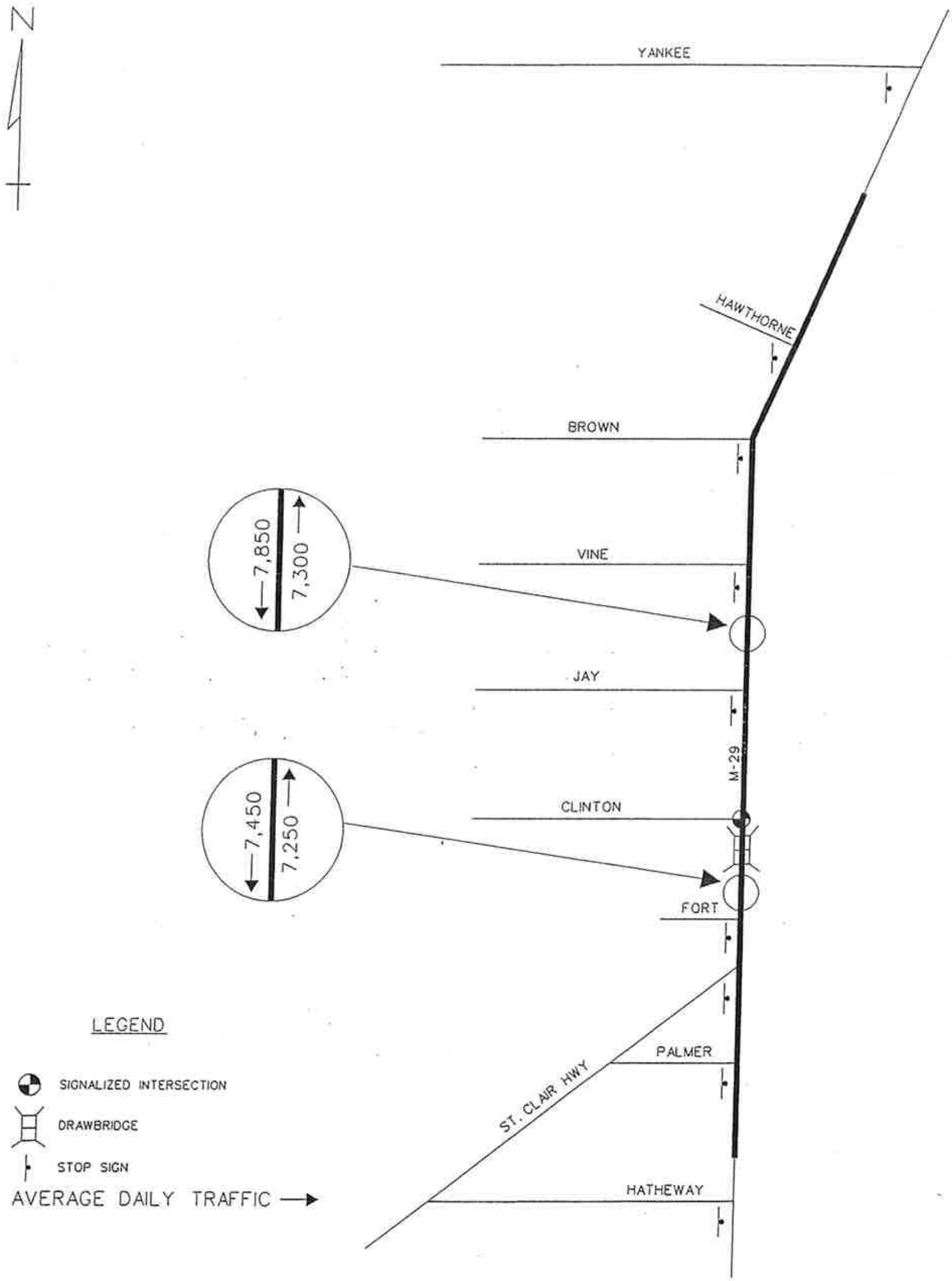
Clinton Avenue is an east-west road that forms a T-intersection with M-29. It has a two-lane cross section that widens to three lanes on the approach to the M-29 intersection. It has a left and right-turn only lane for eastbound traffic and one through lane for westbound traffic west of M-29 and the speed limit is posted at 30 mph in this area.

The M-29/Clinton Avenue intersection is the only signalized intersection that exists along the approximately 2.5 mile stretch of M-29 study corridor between the St. Clair city limits. The signal is a pre-timed signal with bridge preemption. The signal has a 60 second cycle and operates in full color mode between the hours of 6 A.M. and 2 A.M., and operates in flash mode from 2 A.M. to 6 A.M. The bridge preemption is designated for time periods when the drawbridge is raised or being raised. When this occurs, the signal turns red for all movements on all approaches except the eastbound left-turns, which receives a green arrow; the eastbound right-turn movement receives a lighted case sign "No Right Turn" message. The drawbridge is opened on demand and at a maximum frequency of once every half hour during peak demand times in the summer. The drawbridge is raised for an average of 4 to 5 minutes at a time according to information found in "Summary of Bridge Opening Times for B02 of 77052, M-29 over the Pine River in the City of St. Clair 2001-2002 Data" by Spalding DeDecker Associates, Inc.

2.2 Existing Traffic Volumes

Twenty-four hour directional traffic volume counts on M-29 were performed from June 18, 2003 through June 25, 2003 between Jay Street and Vine Street and on June 19, 2003 at approximately 1,050 feet south of the drawbridge located between Clinton and Fort Street. The twenty-four hour directional traffic volume counts collected on Thursday, June 19, 2003 in both locations on M-29 were used for the base 2003 average daily traffic, and the directional volumes are shown on Figure 2. Other traffic volume data was available from the MDOT "Vehicle Classification Reports", the MDOT "Traffic Monitoring Information" (which are hourly volume count reports), the St. Clair Police Department, and the MDOT "Historic Annual Average 24 Hour Traffic Volume Maps". The collected traffic volume data was used to analyze traffic volume trends on M-29 with respect to locations north and south of the drawbridge, and by year, month and day of the week. These volumes were used as the basis for the existing traffic analysis portion of this study, including the capacity analysis of the M-29/Clinton Avenue intersection. All traffic volume count information completed by the MDOT is contained in Appendix I, and all traffic volume count information completed by Parsons is contained in Appendix II. Anomalies in the City's traffic counts precluded their use.

At the M-29/Clinton Avenue intersection, turning movement counts were performed between the hours of 7A.M. and 9A.M. and from 3P.M. to 5P.M. on Thursday, June 19, 2003. The hours between 7:00 A.M. and 8:00 A.M. and 4:00 P.M. and 5:00 P.M. were used as the A.M. and P.M.



BASE 2003 AVERAGE DAILY TRAFFIC VOLUMES

PARSONS

FIGURE 2

peak hours, respectively for determining base 2003 turning movement volumes. The detailed turning movement counts for the A.M. and P.M. peak hours are shown on Figure 3, and the data is contained in Appendix III.

The MDOT "Vehicle Classification Reports" were used to analyze the percent trucks using the M-29 corridor. The "Vehicle Classification Reports" contain 24 hour counts distinguishing thirteen different types of vehicles. For the following analysis, only trucks with trailers were considered "trucks", while single unit trucks and passenger cars were both considered "cars". The "Vehicle Classification Reports" include data for a complete 24 hours taken on Wednesday, May 9, 2001 at a location 0.5 miles south-west of Yankee Road in St. Clair Township, and a complete 24 hours taken on Tuesday, June 4, 2002 at a location 0.5 miles north of Recor Road in E. China Township. Although the count taken north of Recor Road is not located along the study segment of M-29, it is a location just south of the study segment and aids in the estimation of the percent trucks in the area. The total number of trucks counted during the 24 hours was divided by the total number of vehicles from these reports. At the location 0.5 miles south-west of Yankee Road, the northbound traffic included 1.51% trucks and the southbound traffic included 1.83% trucks. At the location 0.5 miles north of Recor Road, the northbound traffic included 1.34% trucks and the southbound traffic included 0.80% trucks. The average of the four truck percentages is 1.37%. Therefore, a reasonable truck percentage for the M-29 corridor is 2%.

2.3 Capacity Analysis

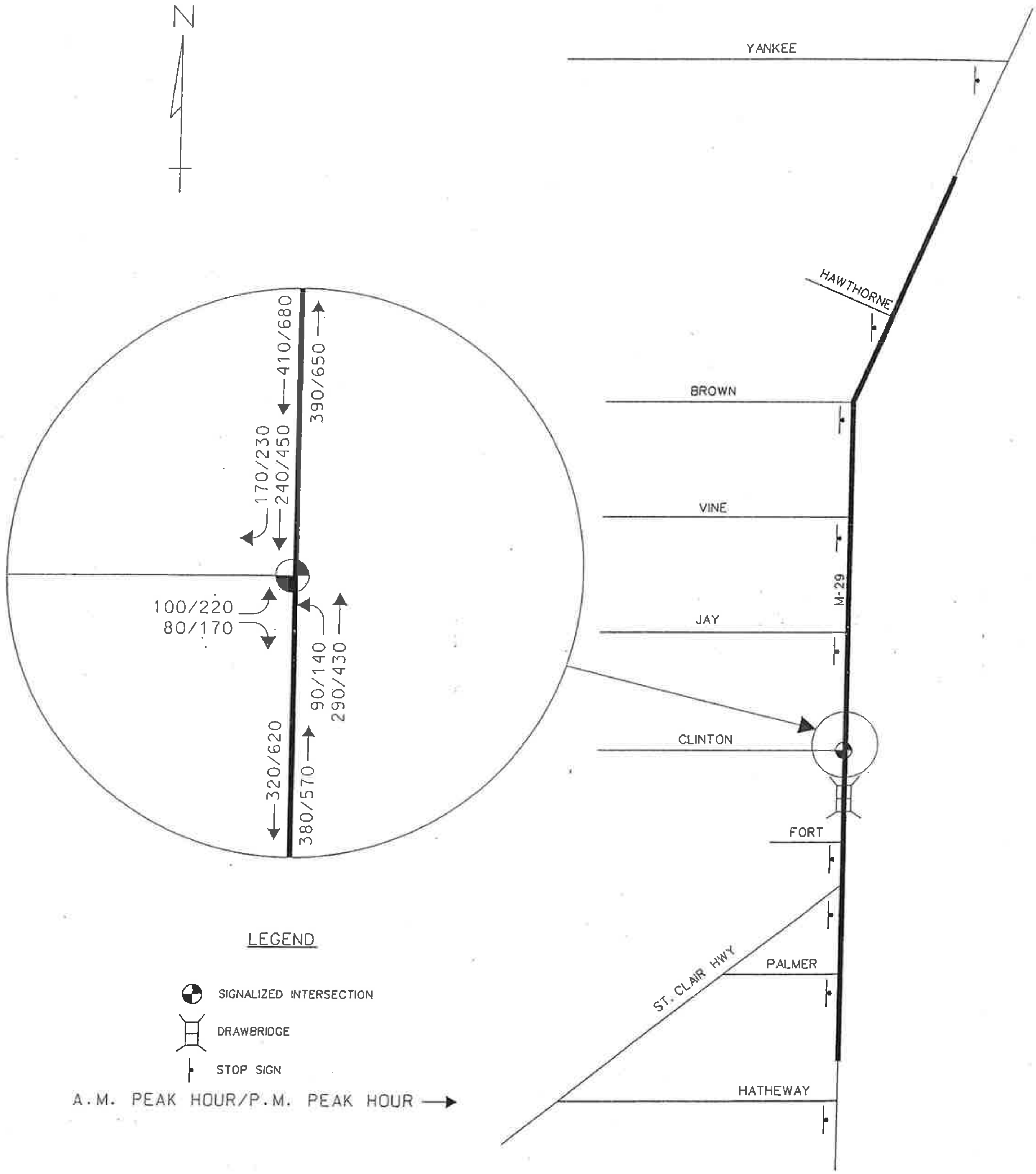
2.3.1 Intersection Capacity Analysis

The M-29/Clinton Avenue intersection was analyzed according to the methodologies published in the most recent edition of the Highway Capacity Manual. The analysis determined the "Level of Service" of the location for the existing conditions. Levels of service are expressed in a range from "A" through "F," with "A" being the highest level of service, and "F" representing the lowest level of service. Level of Service (LOS) is based on factors such as number and types of lanes, signal timing, traffic volumes, pedestrian activity, etc. Table 1 shows the thresholds for Levels of Service "A" through "F" for signalized intersections. Table 2 summarizes the capacity analysis results for the existing conditions. Copies of the capacity analysis worksheets are contained in Appendix IV.

Table 1
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service	Delay/Vehicle (seconds)	Description
A	< 10.0	Most vehicles do not stop at all.
B	10.1 to 20.0	Some vehicles stop.
C	20.1 to 35.0	The number of vehicles stopping is significant, although many pass through without stopping.
D	35.1 to 55.0	Many vehicles stop. Individual cycle failures are noticeable.
E	55.1 to 80.0	Considered to be the limit of acceptable delay. Individual cycle failures are frequent.
F	> 80.0	Unacceptable delay.

SOURCE: Transportation Research Board, Highway Capacity Manual, Special Report 209, 2000.



BASE 2003 A.M./P.M. PEAK HOUR TURNING MOVEMENTS

PARSONS

FIGURE 3

Table 2
INTERSECTION LEVEL OF SERVICE-EXISTING CONDITIONS

Intersection	Approach	AM Peak Hour Delay	AM Peak Hour LOS	PM Peak Hour Delay	PM Peak Hour LOS
M-29/Clinton (Signalized)	**Overall**	**8.1**	**A**	**10.3**	**B**
	Southbound	4.5	A	5.6	A
	Northbound	8.4	A	10.2	B
	Eastbound	15.6	B	18.5	B

It may be seen from Table 2 that all approaches during both time periods currently operate at high levels of service.

2.3.2 Segment Capacity Analysis

For purposes of calculating the segment capacities, M-29 within the St. Clair city limits was categorized into four segments depending on the road cross sections and speed limits. The segments were segregated in order to analyze the two-lane segment and the four-lane segments of M-29 separately. Their limits are described as follows: Segment 1 begins at the southern city limit (500' N. of Hatheway) and ends at Palmer, Segment 2A begins at Palmer and ends at St. Clair Highway, Segment 2B begins at St. Clair Highway and ends at Clinton, Segment 3 begins at Clinton and ends at Brown (the "downtown" segment), and Segment 4 begins at Brown and ends at the northern city limit (2800' S. of Yankee). Segment 2 had to be broken into two sections due to the change of posted speed limit from 40 mph to 35 mph at St. Clair Highway. The segments are divided similarly for the crash analysis section of this report.

The M-29 corridor between the St. Clair city limits was analyzed according to methods in the Highway Capacity Manual. Segment 1 is classified as a Class II two-lane highway segment; therefore it was analyzed using the two-lane highways methodology. Levels of service for Class II two-lane highway segments are defined in terms of average travel speed and percent time-spent-following and are expressed in a range from "A" through "F," with "A" being the highest level of service, and "F" representing the lowest level of service. Table 3 shows the thresholds for Levels of Service "A" through "F" for Class II two-lane highway segments.

Table 3
LEVEL OF SERVICE CRITERIA FOR CLASS II TWO-LANE HIGHWAY SEGMENTS

Level of Service	Percent Time-Spent-Following	Description
A	≤ 40	Motorists are able to travel at their desired speed.
B	> 40-55	The demand for passing to maintain desired speeds becomes significant.
C	> 55-70	Noticeable increases in platoon formation, platoon size and frequency of passing impediments.
D	> 70-85	Unstable traffic flow; passing becomes extremely difficult.
E	> 85	Passing is virtually impossible and platooning becomes intense.
F	Flow Rate > 1,700 pc/h	Heavily congested flow with traffic demand exceeding capacity.

SOURCE: Transportation Research Board, 2000 Highway Capacity Manual.

Segments 2, 3 and 4 are classified as multi-lane highway segments; therefore they were analyzed using the multi-lane highways methodology. Levels of service for multi-lane highway segments are defined in terms of density and are expressed in a range from "A" through "F," with "A" being the highest level of service, and "F" representing the lowest level of service. Density and Level of Service (LOS) are based on free-flow speed and flow rate, and density is measured as passenger cars per mile per lane (pc/mi/ln). Table 4 shows the thresholds for Levels of Service "A" through "F" for multi-lane highway segments. Table 5 summarizes the capacity analysis results for the existing conditions.

Table 4
LEVEL OF SERVICE CRITERIA FOR MULTI-LANE HIGHWAY SEGMENTS

Level of Service	Density (pc/mi/ln)	Description
A	≤ 12.0	Completely free-flow conditions.
B	12.1 to 20.0	Free-flow conditions with noticeable presence of other vehicles.
C	20.1 to 28.0	Ability to maneuver is clearly affected by other vehicles.
D	28.1 to 34.0	Ability to maneuver is severely restricted because of traffic congestion.
E	* 34.1 to Volume-to-Capacity Ratio=1.0	Operations at or near capacity; quite unstable.
F	Accurate prediction of density is difficult.	Highly unstable and variable traffic flow.

* A volume-to-capacity ratio=1.0 is reached at different densities depending upon the free-flow speed on each segment.
SOURCE: Transportation Research Board, 2000 Highway Capacity Manual.

Table 5
SEGMENT LEVELS OF SERVICE-EXISTING CONDITIONS

M-29 Segment	Direction	AM Peak Hour			PM Peak Hour		
		P.T.S.F.[(1)]	Density[(2)]	LOS	P.T.S.F.[(1)]	Density[(2)]	LOS
Segment 1 - South City Limit (500' N. of Hatheway) to Palmer	NB	100%	-	E	94%	-	E
	SB	87%	-	E	94%	-	E
Segment 2A - Palmer to St. Clair Highway	NB	-	6.9	A	-	7.5	A
	SB	-	4.4	A	-	8.0	A
Segment 2B - St. Clair Highway to Clinton	NB	-	7.8	A	-	8.5	A
	SB	-	5.0	A	-	9.1	A
Segment 3 - Clinton to Brown	NB	-	6.5	A	-	11.1	A
	SB	-	7.2	A	-	11.7	A
Segment 4 - Brown to North City Limit (2800' S. of Yankee)	NB	-	4.9	A	-	8.4	A
	SB	-	5.5	A	-	8.9	A

(1) P.T.S.F. is an abbreviation for Percent Time Spent Following and is the determining factor of LOS for Class II two-lane highway segments.
(2) Density is the determining factor of LOS for multi-lane highway segments.

It may be seen from Table 5 that the four-lane segments (Segments 2A, 2B, 3, and 4) during both time periods currently operate at high levels of service (LOS). Due to the lack of passing zones on the 2-lane segment (Segment 1), the percent time-spent-following is high and subsequently the LOS during both time periods is an "E".

2.4 Speed Study Analysis

The MDOT Traffic and Safety Division conducted a speed study in July 2002 along the M-29 study corridor from 2000 feet south of Palmer Street to 400 feet north of Yankee Road. Along this stretch of M-29 the speed limit varies from a low of 30 mph to a high of 40 mph. The MDOT's speed study data is included in Appendix V. The provided data included the average speed and 85th percentile for each of nine stations along the M-29 study corridor. The speed at which 85% of the vehicles are traveling at or below is the 85th percentile speed.

According to this study, the average speeds were all slightly higher than the posted speed limits, but none of the average speeds were greater than 6 mph over the speed limit. However, at two of the stations the 85th percentile was found to be 10 mph over the speed limit. These stations were located near the intersections of M-29/Vine Street and M-29/Brown Street where the speed limit is posted at 30 mph. The 85th percentiles reveal that drivers are comfortable driving at 10 mph over the posted speed limit near these locations. The speed limit may need to be evaluated at these locations to see if it is appropriate, bearing in mind that the current speed limits may need to be lower than the 85th percentile due to pedestrian traffic or other factors. If any changes are made to M-29 in terms of cross-section, lane configuration, etc. in the future, collecting new speed study data along the M-29 study corridor could be helpful in determining a new appropriate speed limit along M-29.

3. FUTURE CONDITIONS

3.1 Build Alternatives

Three alternatives are proposed for the reconfiguration of M-29 from approximately 250 feet south of Clinton Avenue to approximately 550 feet north of Vine Street. Two alternatives would provide a 10 foot wide bike path on the east side of M-29 and an 8 foot wide sidewalk on the west side.

Alternative 1 consists of the installation of a 16 foot wide island dividing two northbound through lanes and two southbound through lanes, with 10 foot wide parallel parking lanes on both sides of M-29. Crossovers would be provided for left-turning traffic entering and exiting the intersecting streets and select driveways. Alternatives 2 and 3 would convert the existing 4-lane section of M-29 to 3-lanes consisting of a through lane for northbound and southbound traffic and a center left-turn lane. Alternative 2 provides 10 foot wide parallel parking lanes on the east and west sides of M-29, while Alternative 3 provides a 28 foot wide angled parking area on the east side of M-29, separated from traffic on M-29 by a four foot divider island.

3.2 Forecast Traffic Volumes

Below is a summary of the development of the annual growth rate that was applied to the base traffic volumes in order to forecast traffic volumes for the design year 2025. Alone, none of the methods available were very accurate for calculating an annual growth rate; therefore, three different methods were used and analyzed to get a reasonable annual growth rate. Table 6 summarizes the annual growth rates calculated using the three different methods, and details on the methods follow the table.

Table 6
ANNUAL GROWTH RATE DEVELOPMENT METHODS COMPARISON

	Method		Annual Growth Rate
Method #1	SEMCOG Model Traffic Volumes - M-29 N. of Clinton	NB	0.72%
		SB	0.71%
	SEMCOG Model Traffic Volumes - M-29 S. of Clinton	NB	0.39%
		SB	0.40%
Method #2	SEMCOG Model Trip Generation		1.27%
	SEMCOG Model Population		0.87%
	SEMCOG Model Households		1.27%
	SEMCOG Model Employment		1.20%
Method #3	MDOT Historic AADT Volumes - M-29 Clinton to Vine		1.05%
	MDOT Historic AADT Volumes - M-29 Vine to N. City Limit		1.04%

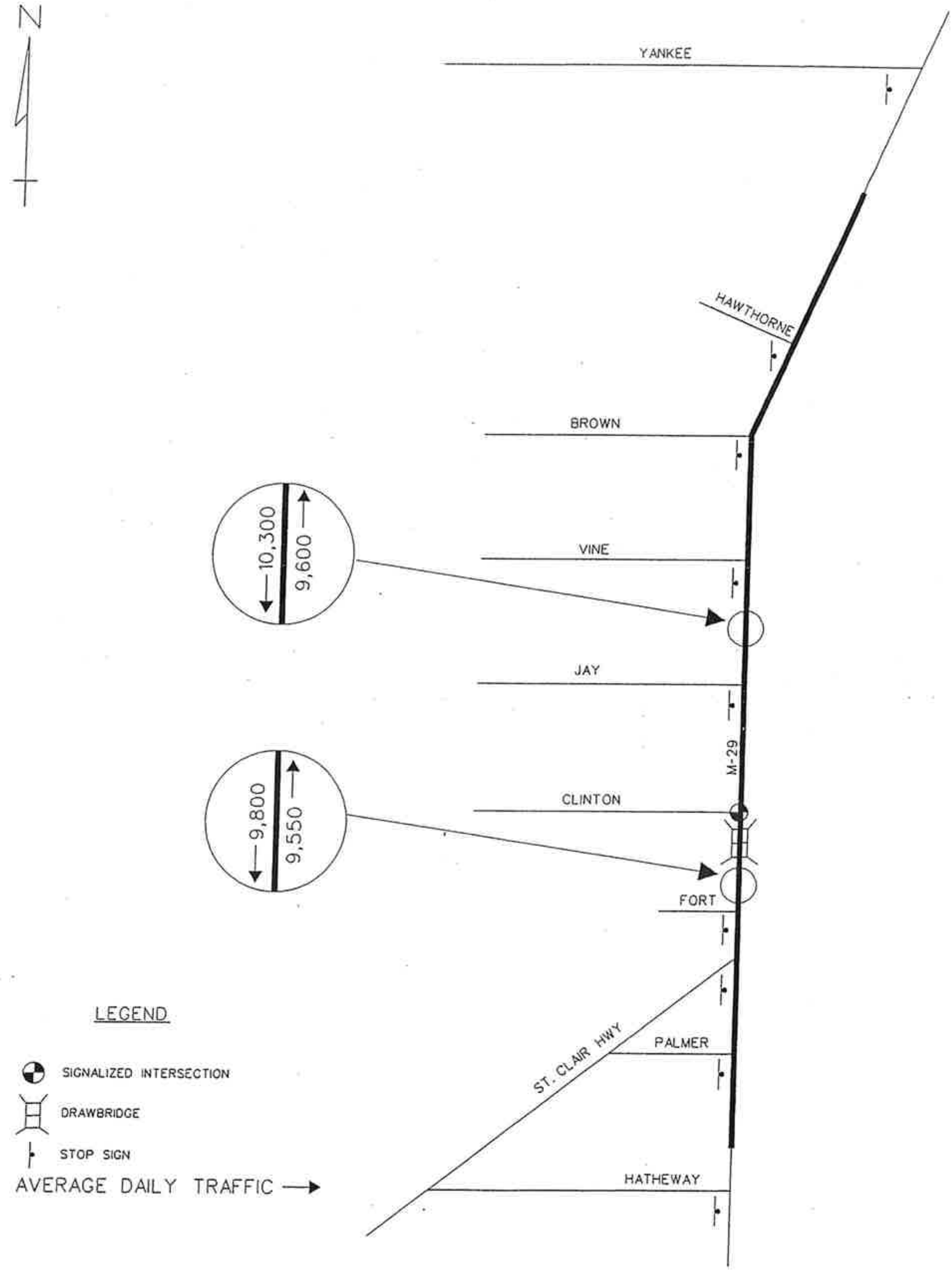
The first method used average daily traffic data from SEMCOG's regional travel demand model. SEMCOG's existing average daily traffic does not match the recently collected traffic volumes, and is lacking important details for the St. Clair area; therefore, in order for the model to give accurate results it would require a great deal of updated data. Also, it would need to be broken down into smaller zones in order to accurately model the St. Clair area. The large amount of additional data and analysis needed to make the model useable was beyond the scope of this study. However, the models forecasted traffic volumes were used to calculate an annual growth rate for M-29 just north and south of Clinton Avenue based on the difference between the models base year and forecast year directional ADT volumes.

The second method used the socioeconomic data from SEMCOG's regional travel demand model for six zones including the city of St. Clair's zone and the five surrounding zones. Annual growth rates were developed for the trips generated, population, number of households, and employment numbers based on the difference between the model's base year and forecast year numbers for the total of all six zones. This gave a good picture of the annual growth rate for many variables that influence average daily traffic volumes in the area.

The third method used data from MDOT's annually published "Annual Average 24 hour Traffic Volume" maps to calculate an annual growth rate of average daily traffic counts for the years 1989 through 2001. This historic count data was only available for two segments of M-29, from Clinton Avenue to Vine and from Vine to the north city limit. These annual growth rates represent only what has happened in the past, they don't take into account any other factors for predicting future traffic volumes.

After analyzing and reviewing all of the calculated annual growth rates, a reasonable growth rate of 1.25% for predicting future traffic on M-29 was determined. The annual growth rate of 1.25% was chosen, because most of the more applicable annual growth rates calculated were close to 1.25% and it is a more conservative rate than most of the other developed annual growth rates. Therefore, 1.25% is the annual growth rate that was applied to the base 2003 average daily traffic counts and A.M. and P.M. peak hour turning movements that were collected in June 2003, resulting in the forecasted traffic volumes for a design year of 2025. The forecast average daily traffic volumes are shown on Figure 4 and the forecast A.M. and P.M. peak hour turning movements are shown on Figure 5.

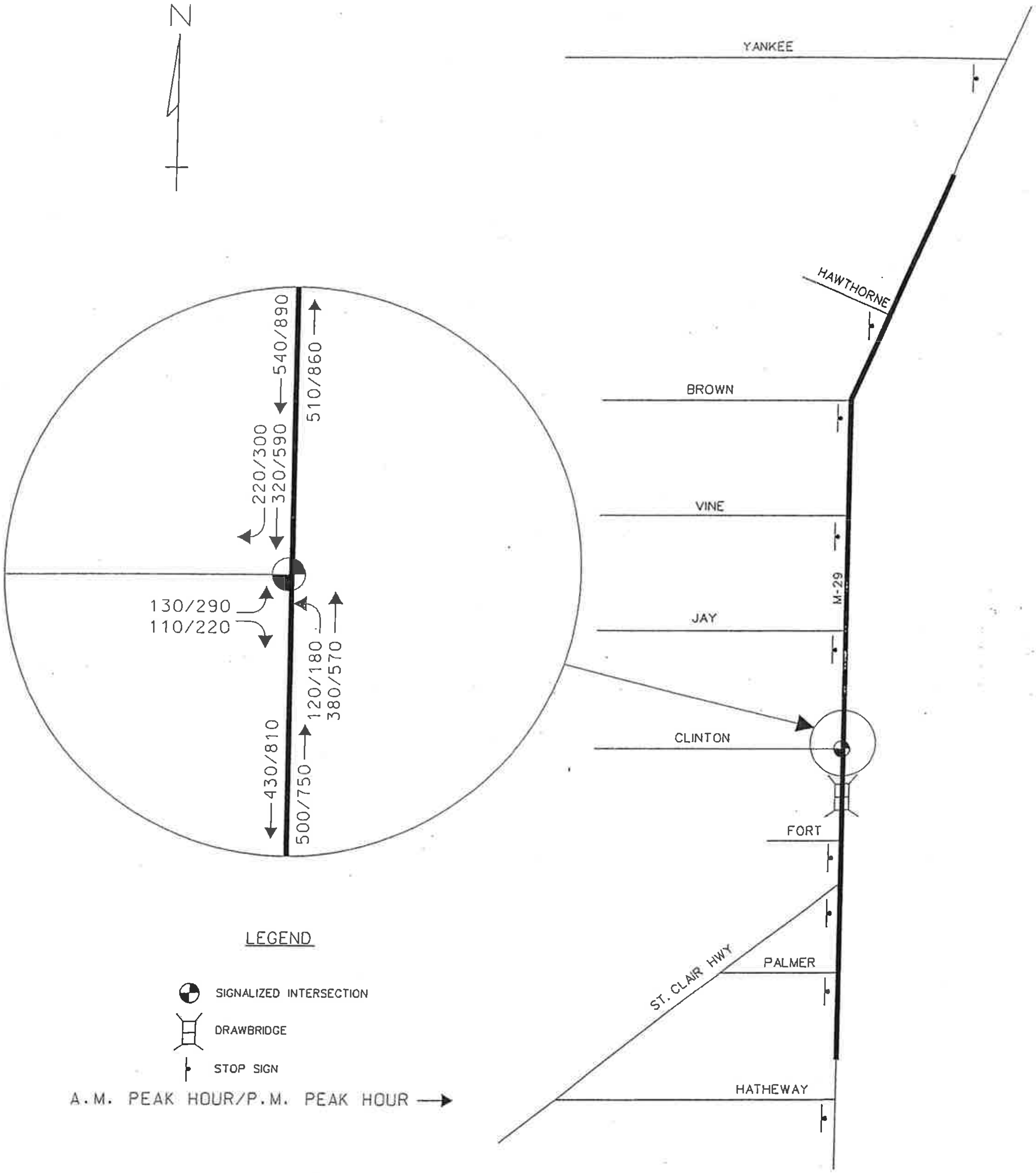
For a direct comparison of the capacity on M-29 under the existing and forecast conditions, it was assumed that the forecast traffic volumes for a no-build condition would be the same as forecast traffic volumes for a build condition, even though the traffic patterns may be slightly affected by the alternative selected for M-29. The forecast traffic is based on the same conditions and number of lanes as the existing conditions. Documented case studies have shown that conversions from 4-lane cross sections to 3-lane cross sections with a center left turn lane have resulted in a reduction of average or 85th percentile speeds and larger reductions in excessive speeding; therefore, due to slower speeds resulting from a conversion to a 3-lane cross section, traffic volumes on M-29 may level off or increase at a slower rate than if M-29 was left as a 4-lane cross section. Therefore, the assumption that traffic volumes would be the same for the no-build condition as Alternatives 2 and 3 is a conservative one and is used for the resulting analysis.



FORECAST 2025 AVERAGE DAILY TRAFFIC VOLUMES

PARSONS

FIGURE 4



FORECAST 2025 A.M./P.M. PEAK HOUR TURNING MOVEMENTS

PARSONS

FIGURE 5

3.3 Capacity Analysis

3.3.1 Intersection Capacity Analysis

The forecast conditions for the M-29/Clinton Avenue intersection were analyzed and the results summarized in Table 7. Copies of the capacity analysis worksheets are contained in Appendix VI.

Under forecast (2025) No-Build conditions, the M-29/Clinton Avenue intersection will continue to operate at an overall level of service (LOS) "A" during the morning peak hour and an overall LOS "B" in the afternoon peak hour with all approaches operating at a LOS of "C" or better. The intersection will also operate at an overall LOS "A" during the morning peak hour and an overall LOS "B" in the afternoon peak hour with all approaches operating at a LOS of "C" or better under forecast (2025) Build Alternative 1 conditions. Under forecast (2025) Build Alternative 2 conditions the intersection will operate at an overall LOS "B" during the morning and afternoon peak hours with all approaches operating at a LOS of "C" or better. The intersection will also operate at an overall LOS "B" during the morning and afternoon peak hours with all approaches operating at a LOS of "C" or better under forecast (2025) Build Alternative 3 conditions.

Under forecast (2025) No-Build and all three Build Conditions, the M-29/Clinton Avenue intersection will operate at high levels of service; therefore mitigation measures did not need to be explored. However, the capacity analyses for forecast and existing conditions could not take into account any delays caused by traffic entering and exiting a driveway located on the east side of M-29, offset approximately 30 feet south of Clinton Avenue. The stop bar for northbound traffic is currently located just south of the driveway and is to remain in the same location for all three build alternatives. This helps to keep the driveway from being blocked, but field observations revealed southbound traffic intending to turn left into the driveway occasionally blocks southbound through traffic and causes longer delays than were able to be represented in the previously discussed capacity analyses.

3.3.2 Segment Capacity Analysis

For a direct comparison of the capacity on the four M-29 segments under the existing and forecast (2025) conditions, it was assumed that the forecast traffic volumes for a no-build condition would be the same as forecast traffic volumes for a build condition, even though the traffic patterns may be slightly affected by the alternative selected for M-29. Also, the free-flow speeds recorded on all four segments under existing conditions were used for the forecast conditions, because differences between the existing free-flow speeds and estimated forecast free-flow speeds can be expected to be minimal and it allows a direct comparison. The forecast conditions for the four M-29 segments were analyzed and the results summarized in Table 8.

Table 7

INTERSECTION LEVEL OF SERVICE - FORECAST 2025 CONDITIONS

		No Build Condition				Alternative 1				Alternative 2				Alternative 3			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
Intersection	**Approach**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
M-29/ Clinton Avenue	**Overall**	**8.7**	**A**	**12.4**	**B**	**8.3**	**A**	**11.1**	**B**	**10.8**	**B**	**17.9**	**B**	**10.8**	**B**	**17.9**	**B**
	North	4.8	A	6.1	A	4.7	A	6.1	A	8.8	A	11.0	B	8.8	A	11.0	B
	South	9.3	A	13.9	B	8.2	A	10.4	B	10.3	B	24.1	C	10.3	B	24.1	C
	West	16.3	B	21.0	C	16.3	B	21.0	C	16.3	B	21.0	C	16.3	B	21.0	C

Table 8
SEGMENT LEVELS OF SERVICE-FORECAST 2025 CONDITIONS

M-29 Segment	Alternative	Direction	AM Peak Hour P.T.S.F.(1)	AM Peak Hour Density(2)	AM Peak Hour LOS	PM Peak Hour P.T.S.F.(1)	PM Peak Hour Density(2)	PM Peak Hour LOS
Segment 1 - South City Limit (500' N. of Hatheway) to Palmer	No-Build	NB	100%	-	E	95%	-	E
		SB	90%	-	E	95%	-	E
Segment 2A - Palmer to St. Clair Highway	No-Build	NB	-	9.0	A	-	9.8	A
		SB	-	5.9	A	-	10.5	A
Segment 2B - St. Clair Highway to Clinton	No-Build	NB	-	10.3	A	-	11.2	A
		SB	-	6.7	A	-	11.9	A
Segment 3 - Clinton to Brown	No-Build	NB	-	8.4	A	-	14.7	B
		SB	-	9.5	A	-	15.4	B
	Alternative 1	NB	-	8.4	A	-	14.7	B
		SB	-	9.5	A	-	15.4	B
	Alternative 2	NB	91%	-	E	95%	-	E
		SB	95%	-	E	96%	-	E
	Alternative 3	NB	91%	-	E	95%	-	E
		SB	95%	-	E	96%	-	E
Segment 4 - Brown to North City Limit (2800' S. of Yankee)	No-Build	NB	-	6.4	A	-	11.1	A
		SB	-	7.2	A	-	11.6	A

(1) P.T.S.F. is an abbreviation for Percent Time Spent Following and is the determining factor of LOS for Class II two-lane highway segments.
(2) Density is the determining factor of LOS for multi-lane highway segments.

The three proposed Build Alternatives under forecast conditions directly affect only Segment 3 (which is the "downtown" area); therefore only Segment 3 was analyzed under all three Build Alternatives and No-Build conditions. Build Alternative 1 does not change the number of through lanes in either direction from the No-Build conditions on Segment 3; therefore the results were the same as the No-Build conditions. However, Build Alternatives 2 and 3 both reduce the number of through lanes from two to one in both directions; therefore the results under Build Alternatives 2 and 3 were the same. However, realistically there will be less capacity for Alternative 2 due to parking/un-parking maneuvers, although the level of service methods cannot account for this situation.

Under the No-Build Alternative, both directions of travel on the four-lane segments (Segments 2A, 2B, 3 and 4) will operate at levels of service (LOS) "A" during the morning peak hour and at LOS "B" or better during the afternoon peak hour, while the two-lane segment (Segment 1) will continue to operate at LOS "E". Under Build Alternative 1, both directions of travel on Segment 3 will operate similarly to the No-Build Alternative; i.e., LOS "A" during the morning peak hour and LOS "B" during the afternoon peak hour.

Under Build Alternatives 2 and 3, both directions of travel on Segment 3 will operate at a LOS "E" during the morning and afternoon peak hours due to the inability to pass slower vehicles. The MDOT typically requires LOS "C" or better for planning purposes; however, it should be noted that the two-lane highway methodology that was used for the analysis gives a conservative estimate of the LOS provided on Segment 3 under Build Alternatives 2 and 3. According to the Highway Capacity Manual 2000:

> "There is no formal methodology for evaluating the traffic operational effectiveness of TWLTLs (Two Way Left Turn Lanes) on two-lane highways. Research has found that the delay reduction provided by a TWLTL depends on both the left-turn demand and the opposing traffic volume. Without a TWLTL or other left-turn treatment, vehicles that are slowing or stopped to make a left turn may create delays for following through vehicles. A TWLTL minimizes these delays and makes the roadway section operate more like two-way and directional segments with 100 percent no-passing zones… At higher-volume urban fringe sites, greater delay reduction was found with TWLTLs on a two-lane highway... As the delay reduction increases, a TWLTL can be justified for improving both traffic operation and safety."

So although the alternatives consisting of a three-lane cross section with a two way left turn lane (Build Alternatives 2 and 3) on Segment 3 had to be analyzed according to the two-lane highways methodology, this method does not take into account the delay reduction from the two way left turn lane. Nor does it take into consideration the delay increase due to parking/unparking maneuvers that would occur for Build Alternative 2. The levels of service provided on Segment 3 under Build Alternative 3 may actually be higher than LOS "E", but it is not expected it would move up more than one service level.

4. CRASH ANALYSIS

The crash history for the four-year period 1997 through 2000 was analyzed for the M-29 Corridor study area. The MDOT provided the crash data that was used to determine the critical crash locations within the study area. The crash data provided was for M-29 within the St. Clair city limits (from Hatheway Street to south of Yankee Road). The crash data received contained, by year, the total number of crashes, as well as a breakdown by the number of fatal, injury, and property damage only crashes. The data also included a breakdown of crash types by angle, rear-end, sideswipe, backing, fixed object, animal, overturn, parking, bicycle, head-on, dual left turn, and other/unknown.

4.1 Crash Frequencies in the M-29 Study Area

For purposes of calculating the intersection crash frequency, crashes within 150 feet of the M-29/Clinton Avenue intersection were considered to be intersection related crashes. For the four-year period 1997 through 2000, there were a total of 154 crashes within the study area. Thirty-one occurred in 1997, 49 in 1998, 41 in 1999, and 33 in 2000, showing no definite increase or decrease during the study period.

For purposes of calculating the segment crash frequencies, all crashes along M-29 within the city limits were categorized into four segments depending on the locations and road cross sections. The segments are divided the same way as in the existing and future capacity analysis sections of this report. The segments were broken up in order to analyze the two two-lane segments and the two four-lane segments of M-29 north and south of Clinton separately to see what effect road cross section and location north or south of Clinton had on the crash frequencies. Their boundaries are described as follows: Segment 1 begins at the southern city limit (500' N. of Hatheway) and ends at Palmer, excluding crashes within 150' of Palmer, Segment 2 begins at Palmer and ends at Clinton, excluding crashes within 150' of Clinton, Segment 3 begins at Clinton and ends at Brown, excluding crashes within 150' of Brown, and Segment 4 begins at Brown and ends at the northern city limit (2800' S. of Yankee).

Tables 9 and 10 provide summaries of crashes within the study area for the years 1997 through 2000. The crash frequency during each of the four years studied, the four-year total, and the average number of crashes per year are presented for the M-29/Clinton Avenue intersection and all segments in the study area.

Table 9
SUMMARY OF CRASH FREQUENCY FOR THE M-29/CLINTON AVENUE INTERSECTION

Intersection Description	No. of Crashes by Year 1997	1998	1999	2000	1997-2000 Total Crashes	Annual Average Crash Frequency
M-29/Clinton Avenue Intersection	7	4	2	4	17	4.25
% of Total	**41%**	**23.5%**	**12%**	**23.5%**	**100%**	

Table 10
SUMMARY OF CRASH FREQUENCY FOR SEGMENTS WITHIN THE STUDY AREA

Segment Description	Mile Point(1) From	Mile Point(1) To	Length (Miles)	No. of Crashes by Year 1997	1998	1999	2000	1997-2000 Total Crashes	Annual Average Crash Frequency
M-29 From S. City Limit (500' N. of Hatheway)To Palmer	7.50	7.83	0.33	1	0	2	2	5	1.25
M-29 From Palmer To Clinton	7.83	8.54	0.71	11	22	23	13	69	17.25
M-29 From Clinton To Brown	8.54	9.26	0.72	16	21	11	15	63	15.75
M-29 From Brown To N. City Limit (2800' S. of Yankee)	9.26	9.99	0.73	3	6	5	3	17	4.25
Total				**31**	**49**	**41**	**33**	**154**	**38.50**
% of Total				**20%**	**32%**	**27%**	**21%**	**100%**	

(1) MDOT mile points run from south to north on M-29.

4.1.1 Intersection Crash Frequencies

Detailed crash breakdowns by type and severity for the M-29/Clinton Avenue intersection are presented in Table 11. A graphical representation of percentage by crash type for the M-

29/Clinton Avenue intersection is illustrated in Figure 6. The detailed crash listings can be found in Appendix VII.

Table 11
INTERSECTION CRASH DETAIL FOR THE YEARS 1997 THROUGH 2000

Intersection	Total No. Of Crashes	Crash Type								Crash Severity		
		AN	BIKE	MSC	PRKG	RE	SS	OT	HD	Fatal	Injury	PDO
M-29/Clinton Avenue	17	2	2	2	2	5	2	1	1	0	6	11
Percent of Total *		**12%**	**12%**	**12%**	**12%**	**29%**	**12%**	**6%**	**6%**	**0%**	**35%**	**65%**

Abbreviations for Crash Type:
AN: Right Angle
BIKE: Bicycle
MSC: Crash type was coded improperly or not coded
PRKG: Parking
RE: Rear End
SS: Sideswipe/Same Direction
OT: Over Turn
HD: Head-On or Head-On Left Turn
Fatal: Crash that resulted in at least one fatality
Injury: Crash that resulted in at least one injury
PDO: Crash that resulted in property damage only (no injuries or fatalities)
* : Percentages do not add to 100% due to rounding

A review of crash severity as presented in Table 11 indicates that none of the crashes occurring at the M-29/Clinton Avenue intersection during the four-year period involved a fatality. However, over one-third (35% or 6 crashes) of the 17 total intersection crashes involved an injury.

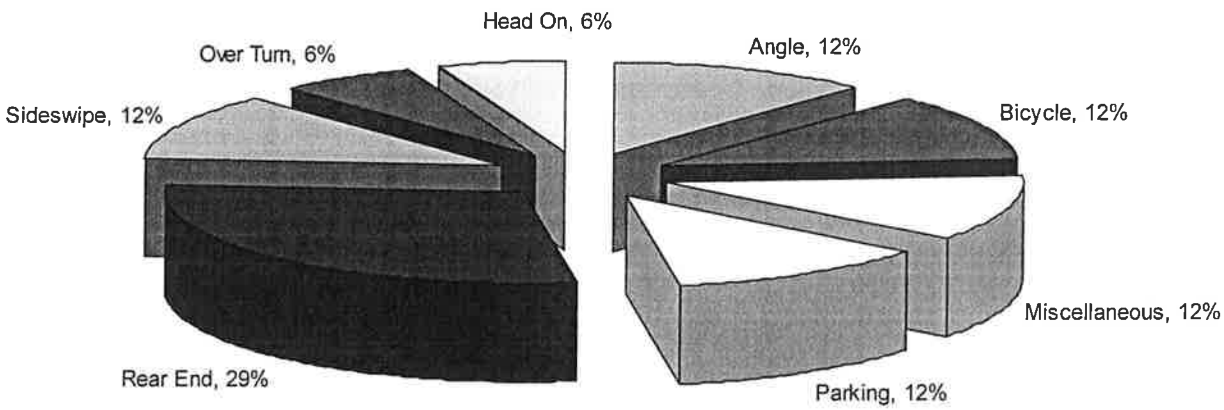


Figure 6: CRASH TYPE SUMMARY FOR M-29/CLINTON AVENUE INTERSECTION 1997– 2000

A review of Table 11 and Figure 6 indicates that 29% of all crashes at the M-29/Clinton Avenue intersection were rear-end crashes, which makes them the most frequent type of crash during the four-year study period. Rear-end crashes are a common type of crash found at intersections, due to drivers starting and stopping for the traffic signal or stopped traffic. The M-29/Clinton Avenue intersection experienced a total of 17 crashes, 5 of which were rear-end crashes and the other seven types occurred either once or twice within the four-year period. There is not an unusually high incidence of any one type of crash.

4.1.2 Segment Crash Frequencies

Detailed crash breakdowns by type and severity for each segment are presented in Table 12. A graphical representation of percentage of crashes by crash types for all segments is illustrated on Figure 7. Detailed crash listings, which include mile point, crash date, crash ID, crash area, crash location, crash type, number of injuries and number of fatalities for each crash, can be found in Appendix VII.

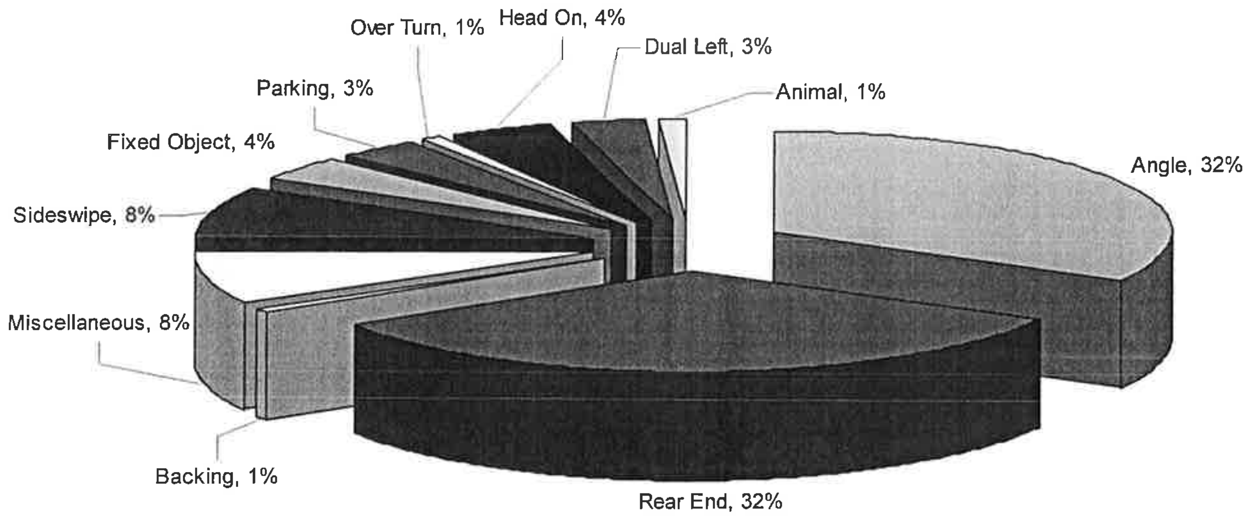


Figure 7: CRASH TYPE SUMMARY FOR ALL STUDY SEGMENTS 1997– 2000

A review of the crash severity as presented in Table 12 indicates no fatal crashes occurred on any of the study area segments during the four-year period. However, 34% (52 crashes) of the 154 total segment crashes involved an injury.

A review of Table 12 and Figure 7 indicate 32% of all segment crashes were rear-end crashes, and 32% were right angle crashes. The other nine types of crashes that occurred on the segments all occurred with much less frequency. On the segment between Palmer and Clinton Avenue it appears that many of the rear-end and right angle crashes are the result of uncontrolled access on M-29 in this area. Also, ten of the 31 angle crashes on this segment occurred at the intersection of M-29 and St. Clair Highway as the result of vehicles turning onto M-29 from St. Clair Highway. The rear-end and right angle crashes that occurred on the segments north of the bridge are likely the result of the downtown traffic becoming congested at certain times of the day causing unexpected stops, and also from turning movements in and out of the driveways on the west side of M-29. Also, four of the six over-turn crashes on the segment between Clinton Avenue and Brown occurred at the intersection of M-29 and Vine Street. With parking allowed intermittently along the east and west side of M-29 from Clinton Avenue to Vine Street, it is difficult for drivers to clearly see vehicles traveling north and south on M-29 before they exit driveways making right or left turns onto M-29.

Table 12
SEGMENT CRASH DETAIL FOR THE YEARS 1997 THROUGH 2000

Segment Description	Mile Point From	Mile Point To	Length (Miles)	Total # Of Crashes	Crash Type: AN	RE	BCKG	MSC	SS	FXOB	PRKG	BIKE	OT	HD	DU	ANML	Crash Severity: Fatal	Injury	PDO
M-29 From S. City Limit (500' N. of Hatheway)To Palmer	7.50	7.83	0.33	5	2	2	1	0	0	0	0	0	0	0	0	0	0	3	2
M-29 From Palmer To Clinton	7.83	8.54	0.71	69	31	23	0	7	3	4	1	0	0	0	0	0	0	24	45
M-29 From Clinton To Brown	8.54	9.26	0.72	63	14	19	1	6	6	0	4	2	6	3	2	0	0	19	44
M-29 From Brown To N. City Limit (2800' S. of Yankee)	9.26	9.99	0.73	17	3	6	0	0	3	2	0	0	0	1	0	2	0	6	11
Totals			**2.49**	**154**	**50**	**50**	**2**	**13**	**12**	**6**	**5**	**2**	**6**	**4**	**2**	**2**	**0**	**52**	**102**
Percent of Total *					**32%**	**32%**	**1%**	**8%**	**8%**	**4%**	**3%**	**1%**	**4%**	**3%**	**1%**	**1%**	**0%**	**34%**	**66%**

Abbreviations for Crash Types:

AN: Right Angle
RE: Rear End
BCKG: Backing Up
MSC: Crash type was coded improperly or not coded
SS: Sideswipe/Same Direction
FXOB: Fixed Object
PRKG: Parking
BIKE: Bicycle
OT: Over Turn
HD: Head-On
DU: Dual Left-Turn
ANML: Crash With Animal
Fatal: Crash that resulted in at least one fatality
Injury: Crash that resulted in at least one injury
PDO: Crash that resulted in property damage only (no injuries or fatalities)
* : Percentages do not add to 100% due to rounding

4.2 Identification of High Crash Locations

Besides crash frequency, crash rates are developed and used to form a common base to allow comparisons from intersection to intersection or segment to segment. The crash rates used in this analysis were based on the number of crashes per million entering vehicles (MEV) for intersections and the number of crashes per million Vehicle Miles of Travel (MVT) for segments.

4.2.1 Intersection Crash Rate Analysis

The rate for the M-29/Clinton intersection was calculated based on the following formula:

$$\text{Crash Rate} = \frac{(\text{Total No. Of Crashes} \div \text{No. Of Years}) \times 10^6}{365 \times \text{Total Entering Volume (in vehicles per day)}}$$

The total entering volume used was 19,272 vehicles per day and was approximated from the June 2003 average daily traffic counts and turning movement counts performed at the M-29/Clinton Avenue intersection. In order to compare the M-29/Clinton Avenue intersection crashes with regional averages, the SEMCOG Regional Segment and Intersection Analysis Report, conducted for 1988-1990 data was utilized. The intersection data of that report included 1,315 signalized intersections from different road classifications. The annual average crash frequency and rate in the SEMCOG Region is based on functional class, area and ADT volumes and the appropriate category was used for comparison. The results of the analysis are shown in Table 13.

Table 13
CRASH RATE SUMMARY FOR M-29/CLINTON AVENUE INTERSECTION

Intersection	Intersection Daily Entering Volume	Intersection Annual Avg. Crash Frequency	SEMCOG Region(1) Annual Avg. Crash Frequency	Intersection Annual Crash Rate	SEMCOG Region(1) Annual Avg. Crash Rate
M-29/Clinton Avenue	19,272	4	11	0.60	1.82

(1) From SEMCOG Regional Segment and Intersection Analysis Report, 1988-1990 data.

The M-29/Clinton Avenue intersection's annual average frequency of crashes is less than half the region-wide annual average crash frequency. Also, the intersection's annual crash rate is 0.60 crashes per million entering vehicles (MEV), while the region-wide annual average crash rate is over twice as high. Therefore, it can be concluded that the M-29/Clinton Avenue intersection would be considered a lower crash location based on frequency and rate.

4.2.2 Segment Crash Rate Analysis

Crash rates were calculated for each study segment in the area based on the following formula:

$$\text{Crash Rate} = \frac{(\text{Total No. Of Crashes} \div \text{No. Of Years}) \times 10^6}{365 \times \text{ADT} \times \text{Segment Length in Miles}}$$

The average daily traffic volumes (ADT) for the base year 2003 were used for the study segment crash rate calculations. The base year 2003 ADT from the June 2003 traffic volume counts taken at approximately 1,050 feet south of the drawbridge on M-29 were used for the segment of M-29 between the southern city limit and Palmer Street and the segment of M-29 between Palmer Street and Clinton Avenue. The base year 2003 ADT from the June 2003 traffic volume counts taken between Jay Street and Vine Street were used for the segment of M-29 between Clinton Avenue and Brown Street and the segment of M-29 from Brown Street to the northern city limit. In order to be able to compare the M-29 study segment's crashes with regional averages, the SEMCOG Regional Segment and Intersection Analysis Report conducted for 1988-1990 data was utilized. Although the data may appear dated, it is more comprehensive than more recent information available through other sources. The segment data of that report included 6,224 segment links from different road classifications. The results of the analysis are presented in Table 14, and the study area segments are sorted by descending crash rate. The annual crash rates in the SEMCOG Region, used for a comparison and found below in Table 14 are average rates calculated from given rates based on area type and averaged daily traffic (ADT), number of lanes and ADT, and functional classification and ADT.

Table 14
CRASH RATE SUMMARY AND COMPARISON FOR STUDY AREA SEGMENTS

	M-29 Area Study Segments			Annual Crash Rate
Segment Description	**ADT**	**Length (Miles)**	**Annual Crash Rate**	**In SEMCOG Region[1]**
M-29 From Palmer To Clinton	14,694	0.71	4.53	6.08
M-29 From Clinton To Brown	15,122	0.72	3.96	6.08
M-29 From Brown To N. City Limit (2800' S. of Yankee)	15,122	0.73	1.05	5.27
M-29 From S. City Limit (500' N. of Hatheway)To Palmer	14,694	0.33	0.71	5.27

(1) From SEMCOG Regional Segment and Intersection Analysis Report, 1988-1990 data.

All of the study area segments had lower crash rates than the region averages, but the M-29 segment between Palmer and Clinton had the highest crash rate (4.53) of the four study segments. A review of the detail crash data of the M-29 segment between Palmer and Clinton indicates 69 crashes occurred during the four-year period in this segment, thirty-one of which were right angle crashes and twenty-three of which were rear end crashes. Although there are more right angle and rear end crashes than any other type of crash on this segment, it does not appear unusual. Many driveways exist along this segment, and left-turns to the numerous driveways have to be made from a through lane, which could be the cause of many of the rear end crashes.

5. CONCLUSIONS

Based on the results of the traffic and crash analysis performed for this study, the following conclusions can be drawn:

1. Currently the intersection of M-29/Clinton Avenue operates at overall acceptable levels of service (LOS) "A" during the morning peak hour and "B" in the afternoon peak hour.

2. Currently both directions of travel on the four-lane M-29 segments (Segments 2A, 2B, 3, and 4 as described in Section 2.3.2) during both the morning and afternoon peak hours operate at LOS "A", while the one two-lane segment (Segment 1) operates at LOS "E" during both time periods.

3. Under forecast (2025) No-Build conditions, the M-29/Clinton Avenue intersection will continue to operate at an overall LOS "A" during the morning peak hour and an overall LOS "B" in the afternoon peak hour.

4. Under forecast (2025) conditions, the No-Build Alternative would allow both directions of travel on the four-lane segments (Segments 2A, 2B, 3 and 4) to operate at LOS "A" during the morning peak hour and LOS "B" or better during the afternoon peak hour, while the two-lane segment (Segment 1) will operate at LOS "E".

5. Under forecast (2025) Build Alternative 1 conditions, both directions of travel on Segment 3 (the "downtown" area) would operate at LOS "A" during the morning and LOS "B" during the afternoon peak hours.

6. Under forecast (2025) Build Alternative 2 and 3 conditions, both directions of travel on Segment 3 would operate at LOS "E" during the morning and afternoon peak hours due to the inability to pass and intense platooning of traffic. The MDOT typically requires LOS "C" or better for planning purposes.

7. Traffic crash data reviewed for the M-29/Clinton Avenue intersection between 1997 and 2000 indicated a total of 17 *intersection* related crashes. The notable findings from the information reviewed is as follows:

    - Thirty-five percent (6 crashes) involved an injury.
    - Twenty-nine percent of all crashes were rear-end crashes, resulting in the majority of crashes.
    - The study intersection would not be considered a high crash location when compared with region wide intersection crash data.

8. Traffic crash data reviewed for the four-year period 1997 through 2000 indicated a total of 154 crashes along the M-29 study corridor, exclusive of the M-29/Clinton Avenue intersection. The notable findings from the *segment* crash information reviewed is as follows:

- The most common types of crashes occurring on the four M-29 segments were right-angle and rear-end crashes, each of which are responsible for thirty-two percent of all of the studied segment crashes.
- The largest incidence of crashes occurred on M-29 from Palmer to Clinton (69 crashes) and on M-29 from Clinton to Brown (63 crashes). These two segments are located in the "downtown" St. Clair area and they include the only signalized intersection along M-29 within the St. Clair city limits.
- None of the segments studied, however, would be considered high crash locations based on comparisons with road segments with similar features.

APPENDIX I
MDOT TRAFFIC VOLUME COUNT DATA

Traffic Monitoring Information - Report - Microsoft Internet Explorer

Traffic Monitoring Information

06/16/2003 HOURLY COUNT REPORT

County St. Clair Station 7613 CS # 77052 CS MP 8.4

Route Desc M-29 PR # 967105 PR MP 1.232

Station Desc SOUTH OF CLINTON ST. City ST. CLAIR

Direction South Year 1996

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24HourTotal	DAY
Tuesday 9/24/96																									2730
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	586	608	437	308	269	257	163	104		
AM High: 0		AM High Hour: 01:00						PM High: 608				PM High Hour: 13:00												7527	
Wednesday 9/25/96																									7855
60	18	18	19	32	165	357	348	343	399	387	460	477	465	611	617	641	629	465	343	191	222	173	94		
AM High: 460		AM High Hour: 12:00						PM High: 641				PM High Hour: 17:00												7080	
Thursday 9/26/96																									4822
57	22	16	24	55	174	322	365	343	367	405	426	475	466	558	654	0	0	0	0	0	0	0	0		
AM High: 426		AM High Hour: 12:00						PM High: 654				PM High Hour: 16:00												0	

1 of 1

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Traffic Monitoring Information - Report - Microsoft Internet Explorer

Traffic Monitoring Information

06/16/2003 HOURLY COUNT REPORT

County: St. Clair Station 7611 CS #: 77052 CS MP: 3.504

Route Desc: M-29 PR #: 967105 PR MP: 1.335

Station Desc: 200 FT S OF CLINTON ST-CITY ST CLAIR City: ST CLAIR

Direction: Both Year: 1997

	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24HourTotal	DAY
Monday 7/7/97																										913
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	371	275	141	125		
AM High: 0 AM High Hour: 01:00 PM High: 371 PM High Hour: 21:00																									7235	
Tuesday 7/8/97																										7179
	42	18	17	13	32	113	201	414	390	378	467	429	535	478	515	647	511	459	361	353	333	240	184	120		
AM High: 467 AM High Hour: 11:00 PM High: 647 PM High Hour: 16:00																									7486	
Wednesday 7/9/97																										7579
	48	35	17	11	29	115	283	412	355	396	401	480	538	525	547	683	529	506	413	386	328	356	160	125		
AM High: 480 AM High Hour: 12:00 PM High: 683 PM High Hour: 16:00																									6956	
Thursday 7/10/97																										6006
	52	28	15	17	26	113	219	435	342	356	458	513	554	505	536	698	547	519	0	0	0	0	0	0		
AM High: 513 AM High Hour: 12:00 PM High: 698 PM High Hour: 16:00																									0	

1 of 1 8.5 x 11 in

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Traffic Monitoring Information - Report - Microsoft Internet Explorer

Traffic Monitoring Information

06/16/2003 HOURLY COUNT REPORT

County: St. Clair Station 7611 CS #: 77052 CS MP: 3.504
Route Desc: M-29 PR #: 967105 PR MP: 1.336
Station Desc: 200 FT S OF CLINTON ST-CTY ST CLAIR City: ST CLAIR

Direction: South Year: 1997

	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24HourTotal	DAY
Monday 7/7/97																										974
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	378	282	202	112		
AM High: 0 AM High Hours: 01:00 PM High: 378 PM High Hours: 21:00																									7316	
Tuesday 7/8/97																										7229
	57	23	24	14	34	170	345	376	365	357	394	398	372	521	520	521	553	553	413	367	312	288	182	100		
AM High: 398 AM High Hours: 12:00 PM High: 553 PM High Hours: 17:00																									7349	
Wednesday 7/9/97																										7447
	75	41	32	12	40	126	357	363	333	377	356	414	470	523	522	563	589	578	443	378	358	207	155	109		
AM High: 414 AM High Hours: 12:00 PM High: 589 PM High Hours: 12:00																									6801	
Thursday 7/10/97																										5812
	60	38	30	20	17	138	370	285	323	371	387	442	487	509	539	578	560	503	0	0	0	0	0	0		
AM High: 487 AM High Hours: 12:00 PM High: 603 PM High Hours: 18:00																									0	

Start | GroupWise - Mailbox | Traffic Monitoring Inform... | Traffic Monitoring Info... | 1:55 PM

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair   Control Section 77 052   Station 78   Mile pt. 10.001   Pr route #   Direction NE

Stat Desc 0.5 SW OF YANKEE RD - ST CLAIR TWP   Route Desc M-29

Construction   Count Type STATEWIDE   Truck or Tractor with

			Passenger			Single Unit Trucks					Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
0900	05/08 /2001	TUE	231	1	59	1	5	0	0	6	0	2	1	3	0	0	1	1	301
1000	05/08 /2001	TUE	210	0	77	2	0	2	0	4	1	4	0	5	0	0	0	0	296
1100	05/08 /2001	TUE	213	2	76	4	2	1	0	7	2	7	0	9	0	0	1	1	308
1200	05/08 /2001	TUE	223	0	71	3	3	1	0	7	4	4	1	9	0	0	1	1	311
1300	05/08 /2001	TUE	252	0	66	2	5	0	0	7	2	2	1	5	0	0	0	0	330
1400	05/08 /2001	TUE	259	2	78	3	3	0	0	6	5	2	1	8	0	0	1	1	354
1500	05/08 /2001	TUE	307	3	75	10	3	1	0	14	4	3	0	7	0	0	0	0	406
1600	05/08 /2001	TUE	405	1	106	5	6	1	0	12	5	2	0	7	0	0	0	0	531
1700	05/08 /2001	TUE	364	3	106	6	1	0	0	7	5	2	0	7	0	0	1	1	488
1800	05/08 /2001	TUE	356	2	80	2	3	1	0	6	5	0	0	5	0	0	0	0	449
1900	05/08 /2001	TUE	243	2	50	0	0	0	0	0	4	2	1	7	0	0	0	0	302
2000	05/08 /2001	TUE	214	6	51	2	0	0	0	2	3	1	0	4	0	0	1	1	278
2100	05/08 /2001	TUE	186	6	45	5	0	1	0	6	2	0	0	2	0	0	1	1	246
2200	05/08 /2001	TUE	135	0	21	1	0	0	1	2	0	0	0	0	0	0	0	0	158
2300	05/08 /2001	TUE	80	1	15	0	0	0	0	0	1	0	0	1	0	0	0	0	97
2400	05/08 /2001	TUE	39	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	45
0100	05/09 /2001	WED	38	0	3	1	0	0	0	1	0	0	0	0	0	0	0	0	42
0200	05/09 /2001	WED	14	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	18
0300	05/09 /2001	WED	12	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	16
0400	05/09 /2001	WED	7	0	3	1	0	0	0	1	0	0	0	0	0	0	0	0	11
0500	05/09 /2001	WED	20	0	2	2	1	1	0	4	0	0	0	0	0	0	0	0	26
0600	05/09 /2001	WED	71	3	24	2	1	0	0	3	0	1	0	1	0	0	0	0	102
0700	05/09 /2001	WED	137	1	54	0	0	1	0	1	2	0	0	2	0	0	0	0	195
0800	05/09 /2001	WED	269	1	75	2	2	2	0	6	2	0	0	2	0	0	0	0	353

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	4285	34	1150	54	35	12	1	102	48	32	5	85	0	0	7	7
%Ttl	76%	.60%	20%	.95%	.62%	.21%	.02%	22%	.85%	.57%	.09%	1.5%	0.0000%	.0000%	.12%	.12%
Passenger Car Equivalent					18.000	2.0000			96.0000	80.000	15.000		0.0000	0.0000	24.5	

TOTAL VEHICLES 5663

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair | Control Section 77 052 | Statnum 78 | Mile pt. 10.001 | Pr route # | Direction NE

Stat Desc 0.5 SW OF YANKEE RD - ST CLAIR TWP | Route Desc M-29

Construction | Count Type STATEWIDE

			Passenger			Single Unit Trucks					Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
0900	05/09/2001	WED	256	1	73	4	6	1	0	11	3	2	1	6	0	0	2	2	349
1000	05/09/2001	WED	222	0	69	6	3	2	0	11	2	1	1	4	0	1	1	2	308
1100	05/09/2001	WED	228	1	72	6	2	1	0	9	6	4	0	10	1	0	2	3	323
1200	05/09/2001	WED	256	1	83	3	1	0	0	4	8	1	0	9	0	0	0	0	353
1300	05/09/2001	WED	261	1	79	5	4	3	0	12	2	0	0	2	0	0	2	2	357
1400	05/09/2001	WED	239	5	77	3	3	1	0	7	3	2	0	5	0	0	0	0	333
1500	05/09/2001	WED	283	4	88	5	2	1	0	8	3	5	0	8	0	0	0	0	391
1600	05/09/2001	WED	342	5	109	7	5	3	0	15	6	1	0	7	0	0	0	0	478
1700	05/09/2001	WED	354	6	98	3	2	1	0	6	7	2	0	9	0	0	0	0	473
1800	05/09/2001	WED	373	4	84	5	1	1	1	8	3	0	0	3	0	0	0	0	472
1900	05/09/2001	WED	258	2	52	6	0	1	0	7	1	2	0	3	0	0	0	0	322
2000	05/09/2001	WED	257	8	53	0	1	1	0	2	3	0	0	3	0	0	0	0	323
2100	05/09/2001	WED	198	0	52	1	0	1	0	2	0	0	0	0	0	0	0	0	252
2200	05/09/2001	WED	149	0	17	1	0	0	0	1	1	1	0	2	0	0	0	0	169
2300	05/09/2001	WED	99	1	20	0	0	1	0	1	2	0	0	2	0	0	0	0	123
2400	05/09/2001	WED	37	0	10	1	0	0	0	1	0	0	0	0	0	0	0	0	48
0100	05/10/2001	THU	37	1	5	0	0	0	0	0	2	0	0	2	0	0	0	0	45
0200	05/10/2001	THU	18	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	20
0300	05/10/2001	THU	12	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	15
0400	05/10/2001	THU	13	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	17
0500	05/10/2001	THU	24	0	4	2	1	0	0	3	0	0	0	0	0	0	0	0	32
0600	05/10/2001	THU	58	1	21	1	1	1	0	3	1	0	0	1	0	0	1	1	84
0700	05/10/2001	THU	132	1	46	2	3	0	0	5	0	0	0	0	0	0	0	0	184
0800	05/10/2001	THU	262	0	69	6	4	1	1	12	5	0	0	5	0	0	0	0	348

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	4368	42	1189	68	39	20	2	129	58	21	2	81	1	1	8	10
%Ttl	75%	.72%	20%	1.2%	.67%	.34%	.03%	23%	1.0%	.36%	.03%	1.4%	0.0172%	.0172%	.14%	.17%
Passenger Car Equivalent					30.000	4.0000			116.000	52.500	6.0000		2.5000	3.0000	28.0	

TOTAL VEHICLES 5819

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair Control Section 77 052 Statnum 78 Mile pt. 10.001 Pr route# Direction SW

Stat Desc 0.5 SW OF YANKEE RD - ST CLAIR TWP Route Desc M-29

Construction Count Type STATEWIDE

			Passenger		Single Unit Trucks						Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
0900	05/08 /2001	TUE	207	1	83	7	3	1	0	11	2	2	1	5	0	0	0	0	307
1000	05/08 /2001	TUE	181	1	71	3	3	2	0	8	3	1	0	4	0	0	0	0	265
1100	05/08 /2001	TUE	176	0	72	6	3	3	0	12	10	3	0	13	0	0	0	0	275
1200	05/08 /2001	TUE	228	0	83	5	4	0	0	9	8	2	0	10	0	0	2	2	330
1300	05/08 /2001	TUE	261	0	55	3	2	1	0	6	3	2	0	5	0	0	0	0	327
1400	05/08 /2001	TUE	257	4	78	6	1	2	0	9	5	4	1	10	0	0	0	0	359
1500	05/08 /2001	TUE	303	0	80	7	7	2	0	16	3	2	0	5	0	0	1	1	405
1600	05/08 /2001	TUE	332	2	90	11	5	2	0	18	12	0	0	12	0	0	1	1	454
1700	05/08 /2001	TUE	328	2	115	8	2	1	1	12	2	2	1	5	0	0	0	0	462
1800	05/08 /2001	TUE	339	3	96	5	1	2	1	9	5	0	0	5	0	0	0	0	452
1900	05/08 /2001	TUE	251	10	40	2	0	0	0	2	4	0	0	4	0	0	0	0	307
2000	05/08 /2001	TUE	216	4	51	2	0	0	0	2	2	0	1	3	0	1	0	1	277
2100	05/08 /2001	TUE	195	3	40	3	0	0	0	3	4	0	0	4	0	0	0	0	245
2200	05/08 /2001	TUE	137	1	27	3	0	1	0	4	1	0	0	1	0	0	0	0	170
2300	05/08 /2001	TUE	101	3	17	0	1	1	0	2	0	0	0	0	0	0	0	0	123
2400	05/08 /2001	TUE	57	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	72
0100	05/09 /2001	WED	23	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	29
0200	05/09 /2001	WED	16	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	22
0300	05/09 /2001	WED	13	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	16
0400	05/09 /2001	WED	14	0	5	0	1	0	0	1	0	0	0	0	0	0	0	0	20
0500	05/09 /2001	WED	24	0	7	0	0	0	0	0	1	0	0	1	0	0	0	0	32
0600	05/09 /2001	WED	95	1	43	0	2	1	0	3	0	0	0	0	0	0	0	0	143
0700	05/09 /2001	WED	167	4	52	1	1	0	0	2	4	0	1	5	0	0	1	1	230
0800	05/09 /2001	WED	252	0	76	5	3	1	0	9	8	2	0	10	0	0	0	0	347

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	4173	39	1210	77	39	21	2	139	77	20	5	102	0	1	5	6
%Ttl	74%	.69%	21%	1.4%	.69%	.37%	.04%	24%	1.4%	.35%	.09%	1.8%	0.0000%	.0176%	.09%	.11%
Passenger Car Equivalent						31.500	4.0000		154.000	50.000	15.000		0.0000	3.0000	17.5	

TOTAL VEHICLES 5669

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair Control Section 77 052 Statnum 78 Mile pt 10.001 Pr route # Direction SW

Stat Desc 0.5 SW OF YANKEE RD - ST CLAIR TWP Route Desc M-29

Construction Count Type STATEWIDE

			Passenger		Single Unit Trucks						Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
0900	05/09 /2001	WED	279	0	98	6	5	6	0	17	4	4	0	8	0	1	1	2	404
1000	05/09 /2001	WED	258	3	76	10	3	4	2	19	7	4	0	11	1	0	2	3	370
1100	05/09 /2001	WED	211	2	70	4	4	2	0	10	6	6	0	12	0	0	1	1	306
1200	05/09 /2001	WED	219	1	69	4	2	1	0	7	3	0	1	4	0	0	1	1	301
1300	05/09 /2001	WED	243	1	91	1	2	0	1	4	5	2	1	8	0	0	1	1	348
1400	05/09 /2001	WED	241	1	73	6	3	0	0	9	1	3	0	4	0	0	0	0	328
1500	05/09 /2001	WED	301	7	87	12	6	1	0	19	8	2	1	11	0	0	0	0	425
1600	05/09 /2001	WED	368	3	111	8	5	1	0	14	3	1	0	4	0	0	0	0	500
1700	05/09 /2001	WED	334	7	114	6	1	0	0	7	3	2	0	5	0	0	0	0	467
1800	05/09 /2001	WED	343	2	88	4	2	0	0	6	6	0	0	6	0	0	0	0	445
1900	05/09 /2001	WED	308	3	85	3	0	0	0	3	5	1	0	6	0	0	0	0	405
2000	05/09 /2001	WED	237	5	49	2	0	1	0	3	2	1	0	3	0	0	0	0	297
2100	05/09 /2001	WED	220	3	41	0	2	1	0	3	3	1	0	4	0	0	0	0	271
2200	05/09 /2001	WED	143	1	33	3	0	1	0	4	0	0	0	0	0	0	0	0	181
2300	05/09 /2001	WED	79	1	20	1	0	0	0	1	0	0	0	0	0	0	0	0	101
2400	05/09 /2001	WED	58	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	73
0100	05/10 /2001	THU	18	0	4	0	1	0	0	1	0	0	0	0	0	0	0	0	23
0200	05/10 /2001	THU	14	0	2	2	0	0	0	2	0	0	0	0	0	0	0	0	18
0300	05/10 /2001	THU	15	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	20
0400	05/10 /2001	THU	15	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	18
0500	05/10 /2001	THU	26	0	9	0	1	0	0	1	0	1	0	1	0	0	0	0	37
0600	05/10 /2001	THU	82	0	41	1	2	1	0	4	0	0	0	0	0	0	1	1	128
0700	05/10 /2001	THU	183	1	57	3	2	0	0	5	3	0	2	5	0	0	0	0	251
0800	05/10 /2001	THU	296	1	71	6	9	2	0	17	2	1	1	4	0	0	1	1	390

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	4491	42	1311	82	51	21	3	157	61	29	6	96	1	1	8	10
%Ttl	74%	.69%	21%	1.3%	.84%	.34%	.05%	24%	1.0%	.47%	.10%	1.6%	0.0164%	.0164%	.13%	.16%
Passenger Car Equivalent						31.500	6.0000		122.000	72.500	18.000		2.5000	3.0000	28.0	

TOTAL VEHICLES 6107

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair Control Section 77 052 Statnum 90 Mile pt. 04.850 Pr route # 0000000 Direction N

Stat Desc 0.5 MI N OF RECOR RD/S OF HAWTHORN - E CHINA TWP Route Desc M-29

Construction Count Type STATEWIDE

			Passenger			Single Unit Trucks					Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
1400	06/03 /2002	MON	169	2	70	0	7	0	0	7	1	1	2	4	0	0	1	1	253
1500	06/03 /2002	MON	221	3	66	0	6	1	0	7	1	1	0	2	0	0	2	2	301
1600	06/03 /2002	MON	267	4	110	0	4	2	0	6	2	0	0	2	0	0	0	0	389
1700	06/03 /2002	MON	218	1	59	0	3	0	0	3	1	2	0	3	0	0	0	0	284
1800	06/03 /2002	MON	144	1	66	0	0	0	0	0	3	0	0	3	0	0	3	3	217
1900	06/03 /2002	MON	120	2	27	0	0	0	0	0	0	0	0	0	0	0	0	0	149
2000	06/03 /2002	MON	143	1	41	0	0	1	0	1	1	0	0	1	1	0	0	1	188
2100	06/03 /2002	MON	108	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	126
2200	06/03 /2002	MON	56	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	72
2300	06/03 /2002	MON	54	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	63
2400	06/03 /2002	MON	31	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	35
0100	06/04 /2002	TUE	5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	9
0200	06/04 /2002	TUE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0300	06/04 /2002	TUE	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	12
0400	06/04 /2002	TUE	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
0500	06/04 /2002	TUE	16	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	21
0600	06/04 /2002	TUE	50	0	20	0	0	0	0	0	1	0	0	1	0	0	0	0	71
0700	06/04 /2002	TUE	129	2	37	1	2	0	0	3	0	1	0	1	0	0	1	1	173
0800	06/04 /2002	TUE	205	1	74	0	2	0	0	2	2	0	0	2	0	0	3	3	287
0900	06/04 /2002	TUE	185	0	61	0	4	2	1	7	1	0	0	1	0	0	1	1	255
1000	06/04 /2002	TUE	172	1	46	0	2	0	0	2	4	1	0	5	0	0	2	2	228
1100	06/04 /2002	TUE	175	2	60	0	4	0	0	4	2	3	0	5	0	0	4	4	250
1200	06/04 /2002	TUE	158	0	63	0	5	0	0	5	1	1	0	2	0	0	2	2	230
1300	06/04 /2002	TUE	180	5	69	0	2	2	0	4	1	1	0	2	0	0	3	3	263

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	2825	26	925	1	41	8	1	51	21	11	2	34	1	0	22	23
%Ttl	73%	.67%	24%	.03%	1.1%	.21%	.03%	25%	.54%	.28%	.05%	.88%	0.0257%	.0000%	.57%	.59%

Passenger Car Equivalent 12.000 2.0000 42.0000 27.500 6.0000 2.5000 0.0000 77.0

TOTAL VEHICLES 3884

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair Control Section 77-052 Statnum 90 Mile pt. 04.850 Pr route # 0000000 Direction N

Stat Desc 0.5 MI N OF RECOR RD/S OF HAWTHORN - E CHINA TWP Route Desc M-29

Construction

Count Type STATEWIDE

			Passenger			Single Unit Trucks					Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
1400	06/04 /2002	TUE	187	3	63	0	6	0	0	6	5	0	0	5	0	0	2	2	266
1500	06/04 /2002	TUE	206	4	70	0	8	1	0	9	2	0	0	2	0	0	0	0	291
1600	06/04 /2002	TUE	274	0	120	0	4	0	0	4	3	0	0	3	0	0	0	0	401
1700	06/04 /2002	TUE	200	1	74	0	4	0	0	4	1	0	0	1	0	0	0	0	280
1800	06/04 /2002	TUE	179	2	71	0	0	0	0	0	2	0	0	2	0	0	0	0	254
1900	06/04 /2002	TUE	132	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	173
2000	06/04 /2002	TUE	133	2	42	0	0	0	0	0	0	2	0	2	0	0	0	0	179
2100	06/04 /2002	TUE	78	1	24	0	0	0	0	0	0	0	0	0	0	0	0	0	103
2200	06/04 /2002	TUE	63	0	15	0	0	1	0	1	0	1	0	1	0	0	0	0	80
2300	06/04 /2002	TUE	66	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	72
2400	06/04 /2002	TUE	46	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	55
0100	06/05 /2002	WED	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11
0200	06/05 /2002	WED	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
0300	06/05 /2002	WED	9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10
0400	06/05 /2002	WED	8	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	10
0500	06/05 /2002	WED	19	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	23
0600	06/05 /2002	WED	51	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	72
0700	06/05 /2002	WED	134	0	34	0	2	0	0	2	0	1	0	1	0	0	2	2	173
0800	06/05 /2002	WED	216	0	73	0	3	0	0	3	0	1	0	1	0	0	1	1	294
0900	06/05 /2002	WED	193	0	46	0	4	2	1	7	0	0	0	0	0	0	0	0	246
1000	06/05 /2002	WED	183	1	59	0	1	0	0	1	1	0	0	1	0	0	4	4	249
1100	06/05 /2002	WED	157	0	44	0	7	0	0	7	1	4	0	5	0	0	3	3	216
1200	06/05 /2002	WED	190	0	78	0	5	1	0	6	0	0	0	0	0	0	1	1	275
1300	06/05 /2002	WED	192	0	61	0	5	1	0	6	2	0	0	2	0	0	1	1	262

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	2930	16	958	0	49	6	1	56	17	9	0	26	0	0	14	14
%Ttl	73%	.40%	24%	.00%	1.2%	.15%	.03%	25%	.43%	.23%	.00%	.65%	0.0000%	.0000%	.35%	.35%
Passenger Car Equivalent						9.0000	2.0000		34.0000	22.500	0.0000		0.0000	0.0000	49.0	

TOTAL VEHICLES 4000

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair   Control Section 77 052   Statnum 90   Mile pt. 04.850   Pr route # 0000000   Direction S

Stat Desc 0.5 MI N OF RECOR RD/S OF HAWTHORN - E CHINA TWP   Route Desc M-29

Construction   Count Type STATEWIDE

			Passenger			Single Unit Trucks					Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
1400	06/03 /2002	MON	181	0	57	0	4	0	0	4	0	1	0	1	0	0	1	1	244
1500	06/03 /2002	MON	208	0	57	0	5	0	0	5	1	1	0	2	0	0	0	0	272
1600	06/03 /2002	MON	243	1	74	0	3	0	0	3	1	1	0	2	0	0	0	0	323
1700	06/03 /2002	MON	277	0	72	0	4	0	0	4	0	0	0	0	0	0	0	0	353
1800	06/03 /2002	MON	241	0	69	0	4	0	0	4	0	0	0	0	0	0	0	0	314
1900	06/03 /2002	MON	224	0	45	0	0	0	0	0	1	0	0	1	0	0	0	0	270
2000	06/03 /2002	MON	129	1	31	0	0	0	0	0	0	0	0	0	0	0	0	0	161
2100	06/03 /2002	MON	101	1	27	0	0	0	0	0	1	0	0	1	0	0	0	0	130
2200	06/03 /2002	MON	80	1	24	0	0	0	0	0	0	0	0	0	0	0	0	0	105
2300	06/03 /2002	MON	53	1	14	0	0	1	0	1	0	0	0	0	0	0	0	0	69
2400	06/03 /2002	MON	44	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	49
0100	06/04 /2002	TUE	24	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	31
0200	06/04 /2002	TUE	11	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	13
0300	06/04 /2002	TUE	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5
0400	06/04 /2002	TUE	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
0500	06/04 /2002	TUE	13	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	25
0600	06/04 /2002	TUE	53	0	37	0	2	0	0	2	1	0	0	1	0	0	1	1	94
0700	06/04 /2002	TUE	127	0	84	0	1	1	0	2	1	1	0	2	0	0	3	3	218
0800	06/04 /2002	TUE	141	0	45	0	2	1	0	3	0	0	0	0	0	0	0	0	189
0900	06/04 /2002	TUE	104	0	54	0	12	1	0	13	0	0	0	0	0	0	1	1	172
1000	06/04 /2002	TUE	117	0	44	0	3	1	0	4	1	1	1	3	0	0	1	1	169
1100	06/04 /2002	TUE	184	0	59	0	1	1	0	2	2	3	0	5	0	0	1	1	251
1200	06/04 /2002	TUE	169	0	66	0	6	2	0	8	1	0	0	1	0	0	2	2	246
1300	06/04 /2002	TUE	182	0	59	0	5	2	0	7	2	0	0	2	0	0	0	0	250

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	2916	5	946	0	52	10	0	62	12	8	1	21	0	0	10	10
%Ttl	74%	.13%	24%	.00%	1.3%	.25%	.00%	25%	.30%	.20%	.03%	.53%	0.0000%	.0000%	.25%	.25%
Passenger Car Equivalent					15.000	0.0000			24.0000	20.000	3.0000		0.0000	0.0000	35.0	

TOTAL VEHICLES 3960

MDOT PLANNING   Fax:517-   Jun 16 2003 16:25   P.08

Michigan Department of Transportation
Vehicle Classification Report

County St. Clair Control Section 77 052 Statnum 98 Mile pt. 04.850 Pr route # 0000000 Direction S

Stat Desc 0.5 MI N OF RECOR RD/S OF HAWTHORN - E CHINA TWP Route Desc M-29

Construction Count Type STATEWIDE

			Passenger			Single Unit Trucks					Truck or Tractor with Single Trlr				Double Trlr				Ttl
Time	Date	Day	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl	Vhcs
1400	06/04 /2002	TUE	195	1	61	0	2	1	0	3	2	1	0	3	0	0	0	0	263
1500	06/04 /2002	TUE	221	0	51	0	3	0	0	3	2	0	0	2	0	0	0	0	277
1600	06/04 /2002	TUE	267	0	79	0	8	0	0	8	1	1	0	2	0	0	0	0	356
1700	06/04 /2002	TUE	274	0	78	0	3	0	0	3	0	0	0	0	0	0	0	0	355
1800	06/04 /2002	TUE	254	1	68	0	0	0	0	0	1	0	0	1	0	0	0	0	324
1900	06/04 /2002	TUE	177	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	217
2000	06/04 /2002	TUE	144	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	174
2100	06/04 /2002	TUE	107	1	34	0	0	0	0	0	0	1	0	1	0	0	0	0	143
2200	06/04 /2002	TUE	78	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	102
2300	06/04 /2002	TUE	67	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	80
2400	06/04 /2002	TUE	41	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	52
0100	06/05 /2002	WED	21	0	8	0	0	0	0	0	0	1	0	1	0	0	0	0	30
0200	06/05 /2002	WED	9	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	15
0300	06/05 /2002	WED	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	8
0400	06/05 /2002	WED	9	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	12
0500	06/05 /2002	WED	13	0	12	0	0	0	0	0	0	1	0	1	0	0	0	0	26
0600	06/05 /2002	WED	52	2	35	0	0	1	0	1	1	1	0	2	0	0	1	1	93
0700	06/05 /2002	WED	126	0	92	0	2	0	0	2	1	0	0	1	0	0	2	2	223
0800	06/05 /2002	WED	147	0	44	0	6	0	0	6	0	1	0	1	0	0	0	0	198
0900	06/05 /2002	WED	130	0	35	0	7	1	1	9	3	2	0	5	0	0	4	4	183
1000	06/05 /2002	WED	144	0	56	0	3	1	0	4	0	3	0	3	0	0	1	1	208
1100	06/05 /2002	WED	152	0	47	0	3	2	0	5	1	1	0	2	0	0	1	1	207
1200	06/05 /2002	WED	151	0	73	0	5	0	0	5	1	0	1	2	0	0	0	0	231
1300	06/05 /2002	WED	191	0	49	0	3	2	0	5	1	0	0	1	0	0	2	2	248

	CRs	MX	PK	BS	2Ax	3Ax	4Ax	Ttl	4Ax	5Ax	6Ax	Ttl	5Ax	6Ax	7Ax	Ttl
Ttl	2975	5	952	0	45	8	1	54	14	13	1	28	0	0	11	11
%Ttl	74%	.12%	24%	.00%	1.1%	.20%	.02%	25%	.35%	.32%	.02%	.70%	0.0000%	.0000%	.27%	.27%
Passenger Car Equivalent		12.000	2.0000						28.0000	32.500	3.0000		0.0000	0.0000	38.5	

TOTAL VEHICLES 4025

MDOT PLANNING Fax:517- Jun 16 2003 16:25 P.09

APPENDIX II
PARSONS TRAFFIC VOLUME COUNT DATA

Traffic Data Collection, Inc.

61891 Spring Circle, Washington MI. 48094
Traffic Study Performed For:
Parsons Transportation Group, Inc.

Station ID: Southbound
RIVERSIDE (M-29)
(0.20 Mile South Drawbridge)
SBRiversideS1
Site Code: 0000003
Date Printed: 26-Jun-03

Project: St. Clair
Count Type: 24 Hr. ATR Volume Count
Weather: Clear, Dry Counter#:7105
Count By: MGM Pav't: Conc. 2 Lanes

Start Time	Mon 16-Jun-0	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	*	*	*	71	*	71	*	*	71
01:00	*	*	*	33	*	33	*	*	33
02:00	*	*	*	21	*	21	*	*	21
03:00	*	*	*	10	*	10	*	*	10
04:00	*	*	*	25	*	25	*	*	25
05:00	*	*	*	118	*	118	*	*	118
06:00	*	*	*	299	*	299	*	*	299
07:00	*	*	*	312	*	312	*	*	312
08:00	*	*	*	357	*	357	*	*	357
09:00	*	*	*	397	*	397	*	*	397
10:00	*	*	*	358	*	358	*	*	358
11:00	*	*	*	**413**	*	**413**	*	*	**413**
12:00 PM	*	*	*	518	*	518	*	*	518
01:00	*	*	*	481	*	481	*	*	481
02:00	*	*	*	538	*	538	*	*	538
03:00	*	*	*	551	*	551	*	*	551
04:00	*	*	*	**603**	*	**603**	*	*	**603**
05:00	*	*	*	560	*	560	*	*	560
06:00	*	*	*	518	*	518	*	*	518
07:00	*	*	**388**	388	*	388	*	*	388
08:00	*	*	385	364	*	374	*	*	374
09:00	*	*	289	272	*	280	*	*	280
10:00	*	*	204	167	*	186	*	*	186
11:00	*	*	111	58	*	84	*	*	84
Total	0	0	1377	7432	0	7495	0	0	7495
% Avg. WkDay	0.0%	0.0%	18.4%	99.2%	0.0%	100.0%			
% Avg. Week	0.0%	0.0%	18.4%	99.2%	0.0%	100.0%	0.0%	0.0%	
AM Peak				11:00		11:00			11:00
Volume				413		413			413
PM Peak			19:00	16:00		16:00			16:00
Volume			388	603		603			603
Total	0	0	1377	7432	0	7495	0	0	7495

ADT Not Calculated

Station ID: Northbound
RIVERSIDE (M-29)
(0.20 Mile South Drawbridge)
NBRiversideS1
Site Code: 000003
Date Printed: 26-Jun-03

Traffic Data Collection, Inc.
61891 Spring Circle, Washington MI. 48094
Traffic Study Performed For:
Parsons Transportation Group, Inc.

Project: St. Clair
Count Type: 24 Hr. ATR Volume Count
Weather: Clear, Dry Counter#:7104
Count By: MGM Pav't: Conc. 2 Lanes

Start Time	Mon 16-Jun-0	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	*	*	*	48	*	48	*	*	48
01:00	*	*	*	32	*	32	*	*	32
02:00	*	*	*	11	*	11	*	*	11
03:00	*	*	*	13	*	13	*	*	13
04:00	*	*	*	34	*	34	*	*	34
05:00	*	*	*	124	*	124	*	*	124
06:00	*	*	*	185	*	185	*	*	185
07:00	*	*	*	388	*	388	*	*	388
08:00	*	*	*	354	*	354	*	*	354
09:00	*	*	*	419	*	419	*	*	419
10:00	*	*	*	403	*	403	*	*	403
11:00	*	*	*	**482**	*	**482**	*	*	**482**
12:00 PM	*	*	*	513	*	513	*	*	513
01:00	*	*	*	471	*	471	*	*	471
02:00	*	*	*	480	*	480	*	*	480
03:00	*	*	*	**617**	*	**617**	*	*	**617**
04:00	*	*	*	544	*	544	*	*	544
05:00	*	*	*	543	*	543	*	*	543
06:00	*	*	*	481	*	481	*	*	481
07:00	*	*	**408**	364	*	386	*	*	386
08:00	*	*	395	332	*	364	*	*	364
09:00	*	*	264	216	*	240	*	*	240
10:00	*	*	136	124	*	130	*	*	130
11:00	*	*	113	84	*	98	*	*	98
Total	0	0	1316	7262	0	7360	0	0	7360
% Avg. WkDay	0.0%	0.0%	17.9%	98.7%	0.0%	100.0%			
% Avg. Week	0.0%	0.0%	17.9%	98.7%	0.0%	100.0%	0.0%	0.0%	
AM Peak				11:00		11:00			11:00
Volume				482		482			482
PM Peak			19:00	15:00		15:00			15:00
Volume			408	617		617			617
Total	0	0	1316	7262	0	7360	0	0	7360

ADT Not Calculated

Traffic Data Collection, Inc.

61891 Spring Circle, Washington MI. 48094
Traffic Study Performed For:
Parsons Transportation Group, Inc.

Station ID: Southboound
RIVERSIDE (M-29)
(Bet. Jay St. & Vine St.)
SBRiversideN
Site Code: 0001
Date Printed: 26-Jun-03

Project: St. Clair
Count Type: 7 Day ATR Volume Count
Weather: Clear, Dry Counter#:8282
Count By: MGM Pav't: Asphalt 2 Lanes

Start Time	Mon 16-Jun-0	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	*	*	*	42	42	42	78	95	64
01:00	*	*	*	27	27	27	58	61	43
02:00	*	*	*	20	24	22	46	37	32
03:00	*	*	*	13	20	16	23	21	19
04:00	*	*	*	34	47	40	28	23	33
05:00	*	*	*	158	166	162	89	67	120
06:00	*	*	*	339	380	360	148	82	237
07:00	*	*	*	426	401	414	170	99	274
08:00	*	*	*	421	425	423	222	160	307
09:00	*	*	*	**464**	427	446	345	244	370
10:00	*	*	*	418	433	426	405	315	393
11:00	*	*	*	460	**482**	**471**	**431**	**362**	**434**
12:00 PM	*	*	*	505	454	480	424	399	446
01:00	*	*	*	501	517	509	453	478	487
02:00	*	*	*	561	523	542	495	486	516
03:00	*	*	*	568	574	571	**516**	**508**	**542**
04:00	*	*	*	**601**	584	**592**	492	482	540
05:00	*	*	*	561	**600**	580	426	442	507
06:00	*	*	*	511	427	469	442	443	456
07:00	*	*	369	352	405	375	379	392	379
08:00	*	*	**393**	344	367	368	353	309	353
09:00	*	*	280	227	312	273	268	240	265
10:00	*	*	201	168	216	195	211	148	189
11:00	*	*	124	115	177	139	172	84	134
Total	0	0	1367	7836	8030	7942	6674	5977	7140
% Avg. WkDay	0.0%	0.0%	17.2%	98.7%	101.1%	100.0%			
% Avg. Week	0.0%	0.0%	19.1%	109.7%	112.5%	111.2%	93.5%	83.7%	
AM Peak				09:00	11:00	11:00	11:00	11:00	11:00
Volume				464	482	471	431	362	434
PM Peak			20:00	16:00	17:00	16:00	15:00	15:00	15:00
Volume			393	601	600	592	516	508	542

Traffic Data Collection, Inc.
61891 Spring Circle, Washington MI. 48094
Traffic Study Performed For:
Parsons Transportation Group, Inc.

Station ID: Southboound
RIVERSIDE (M-29)
(Bet. Jay St. & Vine St.)
SBRiversideN
Site Code: 0001
Date Printed: 26-Jun-03

Project: St. Clair
Count Type: 7 Day ATR Volume Count
Weather: Clear, Dry Counter#:8282
Count By: MGM Pav't: Asphalt 2 Lanes

Start Time	Mon 23-Jun-0	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	41	60	42	*	*	48	*	*	48
01:00	15	25	31	*	*	24	*	*	24
02:00	12	19	28	*	*	20	*	*	20
03:00	12	9	10	*	*	10	*	*	10
04:00	43	60	48	*	*	50	*	*	50
05:00	183	203	196	*	*	194	*	*	194
06:00	362	379	381	*	*	374	*	*	374
07:00	438	540	456	*	*	478	*	*	478
08:00	437	498	407	*	*	447	*	*	447
09:00	444	544	405	*	*	464	*	*	464
10:00	436	567	402	*	*	468	*	*	468
11:00	**491**	**630**	**485**	*	*	**535**	*	*	**535**
12:00 PM	533	539	491	*	*	521	*	*	521
01:00	506	496	543	*	*	515	*	*	515
02:00	619	563	586	*	*	589	*	*	589
03:00	**666**	**681**	**599**	*	*	**649**	*	*	**649**
04:00	652	633	590	*	*	625	*	*	625
05:00	639	582	548	*	*	590	*	*	590
06:00	513	473	438	*	*	475	*	*	475
07:00	447	412	371	*	*	410	*	*	410
08:00	459	396	341	*	*	399	*	*	399
09:00	395	333	314	*	*	347	*	*	347
10:00	203	190	181	*	*	191	*	*	191
11:00	139	120	*	*	*	130	*	*	130
Total	8685	8952	7893	0	0	8553	0	0	8553
% Avg. WkDay	101.5%	104.7%	92.3%	0.0%	0.0%	100.0%			
% Avg. Week	101.5%	104.7%	92.3%	0.0%	0.0%	100.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00			11:00			11:00
Volume	491	630	485			535			535
PM Peak	15:00	15:00	15:00			15:00			15:00
Volume	666	681	599			649			649
Total	8685	8952	9260	7836	8030	16495	6674	5977	15693

ADT Not Calculated

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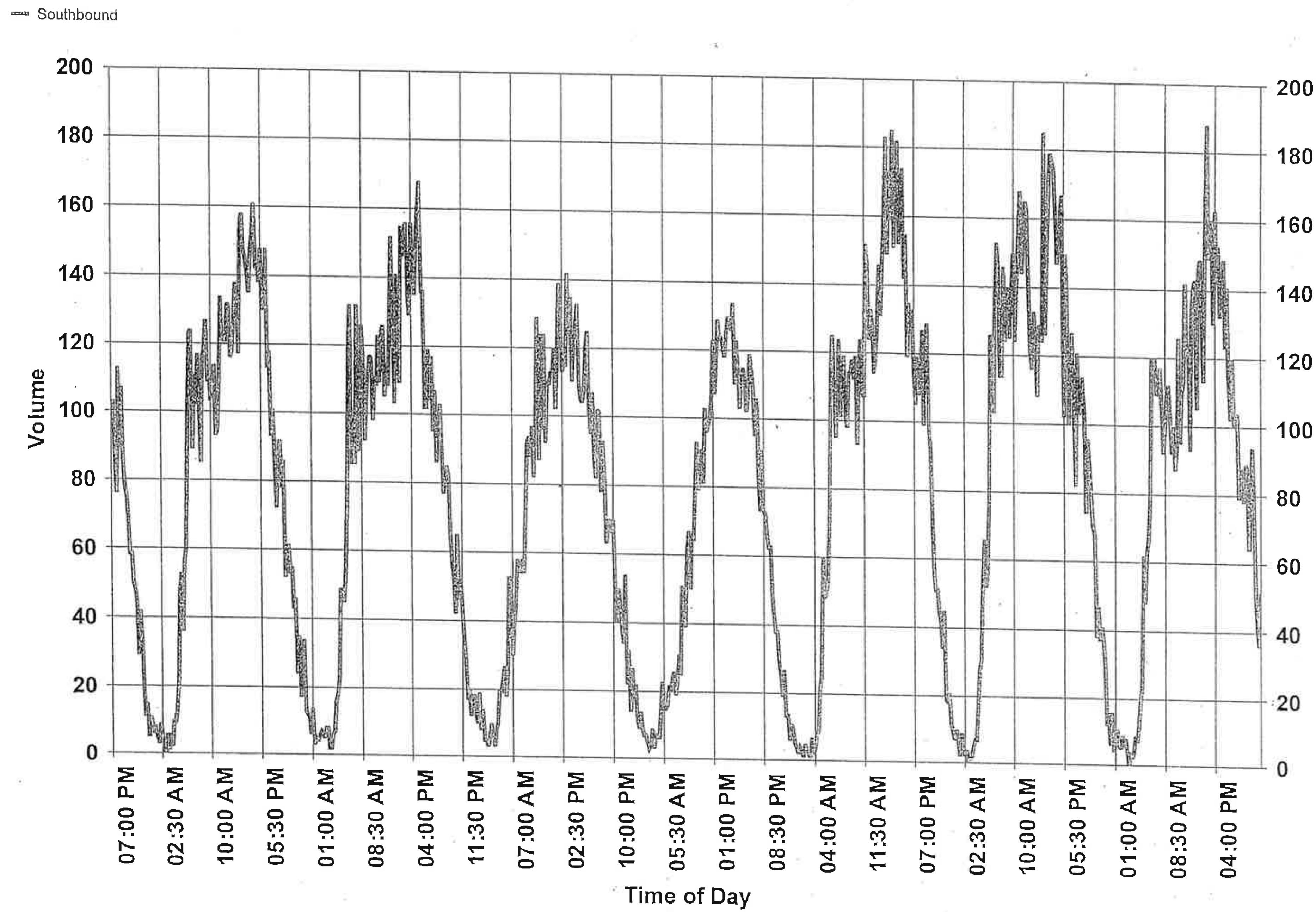

Traffic Data Collection, Inc.

61891 Spring Circle, Washington MI. 48094
Traffic Study Performed For:
Parsons Transportation Group, Inc.

Station ID: Northbound
RIVERSIDE (M-29)
(Bet. Jay St. & Vine St.)
NBRiversideN
Site Code: 000003
Date Printed: 26-Jun-03

Project: St. Clair
Count Type: 7 Day ATR Volume Count
Weather: Clear, Dry Counter#:8222
Count By: MGM Pav't: Asphalt 3 Lanes

Start Time	Mon 16-Jun-0	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	*	*	*	67	73	70	90	94	81
01:00	*	*	*	35	32	34	46	40	38
02:00	*	*	*	13	16	14	41	39	27
03:00	*	*	*	16	28	22	16	25	21
04:00	*	*	*	30	34	32	17	10	23
05:00	*	*	*	108	109	108	52	49	80
06:00	*	*	*	192	184	188	111	75	140
07:00	*	*	*	364	348	356	173	113	250
08:00	*	*	*	353	365	359	227	147	273
09:00	*	*	*	405	389	397	277	280	338
10:00	*	*	*	396	413	404	384	315	377
11:00	*	*	*	**489**	**517**	**503**	**419**	**420**	**461**
12:00 PM	*	*	*	466	448	457	488	456	464
01:00	*	*	*	527	476	502	483	438	481
02:00	*	*	*	448	508	478	487	502	486
03:00	*	*	*	585	**634**	**610**	**525**	**521**	**566**
04:00	*	*	*	581	620	600	456	422	520
05:00	*	*	*	**600**	523	562	448	438	502
06:00	*	*	*	457	542	500	417	407	456
07:00	*	*	**408**	366	392	389	405	363	387
08:00	*	*	377	305	375	352	351	315	345
09:00	*	*	277	213	382	291	302	285	292
10:00	*	*	181	169	216	189	226	148	188
11:00	*	*	121	101	132	118	141	87	116
Total	0	0	1364	7286	7756	7535	6582	5989	6912
% Avg. WkDay	0.0%	0.0%	18.1%	96.7%	102.9%	100.0%			
% Avg. Week	0.0%	0.0%	19.7%	105.4%	112.2%	109.0%	95.2%	86.6%	
AM Peak				11:00	11:00	11:00	11:00	11:00	11:00
Volume				489	517	503	419	420	461
PM Peak			19:00	17:00	15:00	15:00	15:00	15:00	15:00
Volume			408	600	634	610	525	521	566

Traffic Data Collection, Inc.
61891 Spring Circle, Washington MI. 48094
Traffic Study Performed For:
Parsons Transportation Group, Inc.

Station ID: Northbound
RIVERSIDE (M-29)
(Bet. Jay St. & Vine St.)
NBRiversideN
Site Code: 000003
Date Printed: 26-Jun-03

Project: St. Clair
Count Type: 7 Day ATR Volume Count
Weather: Clear, Dry Counter#:8222
Count By: MGM Pav't: Asphalt 3 Lanes

Start Time	Mon 23-Jun-0	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	31	75	61	*	*	56	*	*	56
01:00	25	26	26	*	*	26	*	*	26
02:00	15	12	22	*	*	16	*	*	16
03:00	18	17	15	*	*	17	*	*	17
04:00	25	27	28	*	*	27	*	*	27
05:00	124	127	122	*	*	124	*	*	124
06:00	202	236	225	*	*	221	*	*	221
07:00	381	449	387	*	*	406	*	*	406
08:00	331	448	370	*	*	383	*	*	383
09:00	128	**587**	417	*	*	377	*	*	377
10:00	205	557	336	*	*	366	*	*	366
11:00	**508**	581	**469**	*	*	**519**	*	*	**519**
12:00 PM	526	572	495	*	*	531	*	*	531
01:00	538	511	512	*	*	520	*	*	520
02:00	593	528	494	*	*	538	*	*	538
03:00	**675**	**699**	593	*	*	**656**	*	*	**656**
04:00	642	689	**612**	*	*	648	*	*	648
05:00	642	665	565	*	*	624	*	*	624
06:00	518	466	469	*	*	484	*	*	484
07:00	505	425	366	*	*	432	*	*	432
08:00	526	380	347	*	*	418	*	*	418
09:00	411	329	333	*	*	358	*	*	358
10:00	239	197	171	*	*	202	*	*	202
11:00	124	80	*	*	*	102	*	*	102
Total	7932	8683	7435	0	0	8051	0	0	8051
% Avg. WkDay	98.5%	107.9%	92.3%	0.0%	0.0%	100.0%			
% Avg. Week	98.5%	107.9%	92.3%	0.0%	0.0%	100.0%	0.0%	0.0%	
AM Peak	11:00	09:00	11:00			11:00			11:00
Volume	508	587	469			519			519
PM Peak	15:00	15:00	16:00			15:00			15:00
Volume	675	699	612			656			656
Total	7932	8683	8799	7286	7756	15586	6582	5989	14963

ADT Not Calculated

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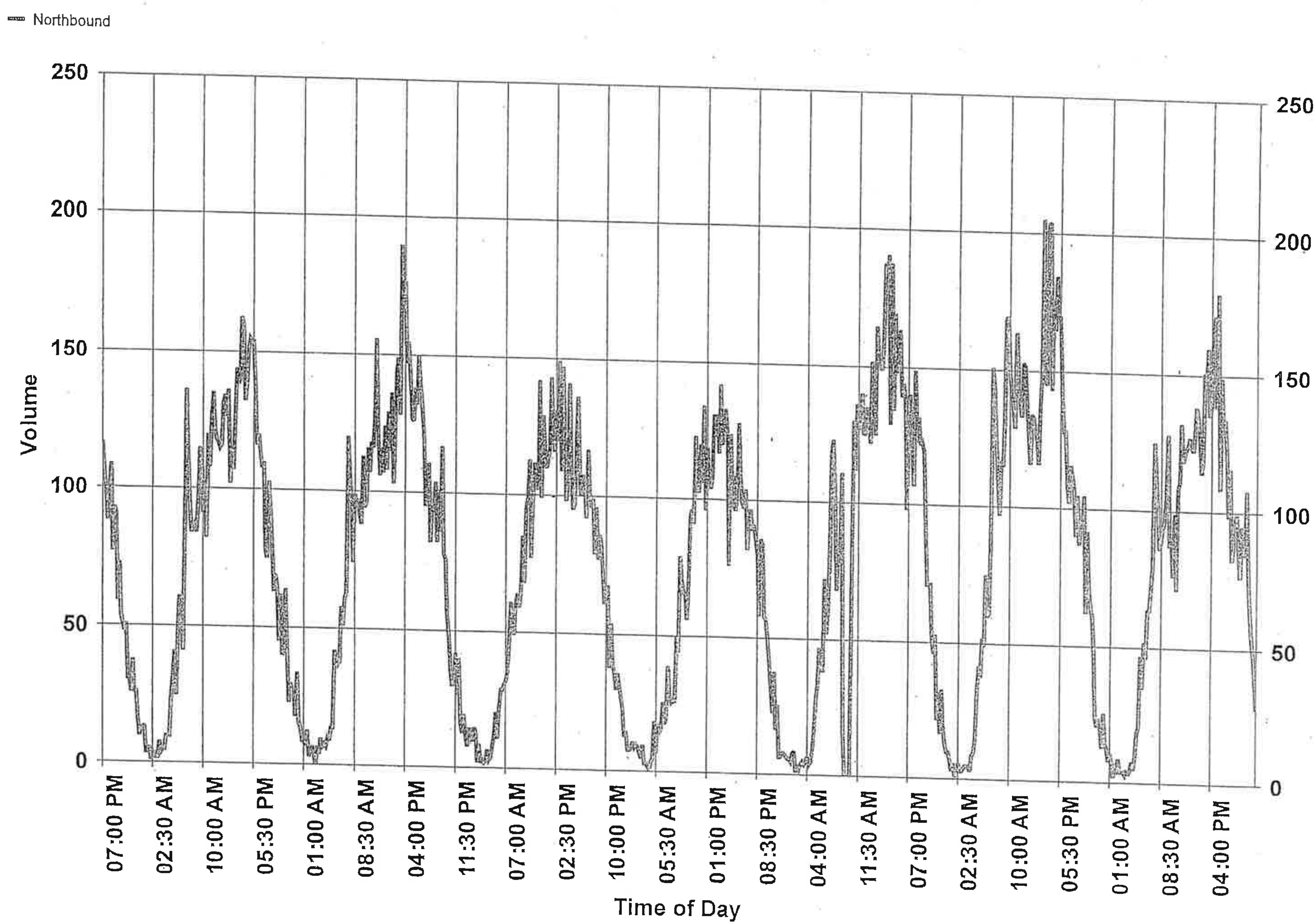


APPENDIX III
TURNING MOVEMENT COUNT DATA

Project: M-29 Corridor Study-St. Clair
Counted By: AM & LD
Weather: Clear

PARSONS
26777 Central Park Blvd., Suite 275
Southfield, MI 48076
Turning Movement Count

File Name : M29ClintonAM
Site Code : 00000000
Start Date : 06/19/2003
Page No : 1

Groups Printed- Unshifted

	M 29 From North					Sport Bar Driveway From East					M 29 From South					CLINTON From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	1	73	38	0	112	0	0	1	0	1	10	30	0	0	40	11	0	16	0	27	180
07:15 AM	0	49	41	0	90	1	0	0	0	1	24	67	0	0	91	25	0	10	0	35	217
07:30 AM	0	54	45	0	99	0	0	0	1	1	30	108	0	0	138	29	0	18	0	47	285
07:45 AM	1	60	47	0	108	0	0	0	0	0	28	84	0	0	112	31	2	31	0	64	284
Total	2	236	171	0	409	1	0	1	1	3	92	289	0	0	381	96	2	75	0	173	966
08:00 AM	0	69	33	0	102	1	0	0	0	1	14	64	0	0	78	31	1	30	2	64	245
08:15 AM	0	59	23	0	82	0	0	0	0	0	19	65	0	1	85	28	0	26	0	54	221
08:30 AM	1	65	30	3	99	0	0	1	0	1	27	62	0	0	89	27	0	28	0	55	244
08:45 AM	0	59	50	0	109	0	0	0	0	0	29	63	0	0	92	26	1	25	0	52	253
Total	1	252	136	3	392	1	0	1	0	2	89	254	0	1	344	112	2	109	2	225	963
Grand Total	3	488	307	3	801	2	0	2	1	5	181	543	0	1	725	208	4	184	2	398	1929
Apprch %	0.4	60.9	38.3	0.4		40.0	0.0	40.0	20.0		25.0	74.9	0.0	0.1		52.3	1.0	46.2	0.5		
Total %	0.2	25.3	15.9	0.2	41.5	0.1	0.0	0.1	0.1	0.3	9.4	28.1	0.0	0.1	37.6	10.8	0.2	9.5	0.1	20.6	

PARSONS
26777 Central Park Blvd., Suite 275
Southfield, MI 48076
Turning Movement Count

Project: M-29 Corridor Study-St. Clair
Counted By: AM & LD
Weather: Clear

File Name : M29ClintonPM
Site Code : 00000000
Start Date : 06/19/2003
Page No : 1

Groups Printed- Unshifted

	M 29 From North					Sport Bar Driveway From East					M 29 From South					CLINTON From West					
Start Time	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	2	91	69	2	164	3	0	10	0	13	18	102	0	0	120	32	2	29	0	63	360
03:15 PM	2	108	45	0	155	1	1	6	0	8	42	104	2	1	149	41	0	31	4	76	388
03:30 PM	0	133	86	1	220	2	0	5	0	7	64	120	0	0	184	69	0	39	1	109	520
03:45 PM	0	48	27	0	75	1	0	6	0	7	39	100	0	0	139	31	2	43	2	78	299
Total	4	380	227	3	614	7	1	27	0	35	163	426	2	1	592	173	4	142	7	326	1567
04:00 PM	0	97	60	0	157	1	0	2	0	3	42	107	1	1	151	63	2	48	3	116	427
04:15 PM	2	114	51	0	167	2	0	2	0	4	30	98	1	1	130	51	1	32	2	86	387
04:30 PM	3	120	62	0	185	0	0	0	0	0	31	112	1	0	144	44	1	38	1	84	413
04:45 PM	3	115	61	0	179	0	0	3	0	3	32	109	3	0	144	58	1	44	2	105	431
Total	8	446	234	0	688	3	0	7	0	10	135	426	6	2	569	216	5	162	8	391	1658
Grand Total	12	826	461	3	1302	10	1	34	0	45	298	852	8	3	1161	389	9	304	15	717	3225
Apprch %	0.9	63.4	35.4	0.2		22.2	2.2	75.6	0.0		25.7	73.4	0.7	0.3		54.3	1.3	42.4	2.1		
Total %	0.4	25.6	14.3	0.1	40.4	0.3	0.0	1.1	0:0	1.4	9.2	26.4	0.2	0.1	36.0	12.1	0.3	9.4	0.5	22.2	

APPENDIX IV
EXISTING CAPACITY ANALYSIS WORKSHEETS

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI — 10/02/03
M-29 and Clinton — 16:07:40
Existing 2003 Volumes & Conditions - AM Peak

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.21 Vehicle Delay 8.1 Level of Service A

```
         -------------------------
 Sq 11  |  Phase 1   |  Phase 2   |
 LG/LG   -------------------------
        |  + +       | +          |
   .    |  + +       | +          |
  /|\   | <+ +       |<+          |
   |    |    v       |   ^        |
   |    |        ^   |++++        |
 North  |     <* *   |            |
   |    |      * *   |++++        |
        |      * *   |   v        |
         -------------------------
        | G/C=0.525  | G/C=0.322  |
        | G=  31.5"  | G=  19.3"  |
        | Y+R= 4.5"  | Y+R= 4.7"  |
        | OFF= 0.0%  | OFF=60.0%  |
         -------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								4.5	A	
RT	11/1	0.208	1.000	1326	1326	189	0.143	0.2	A	9 ft
TH	22/2	0.115	0.525	1775	1779	267	0.150	7.5	A	65 ft
S Approach								8.4	A	
TH+LT	24/2	0.185	0.525	1488	1503	422	0.281	8.4	*A	109 ft
W Approach								15.6	B	
RT	11/1	0.116	0.322	412	488	89	0.182	15.5	B	57 ft
LT	11/1	0.120	0.322	468	545	111	0.204	15.6	B	71 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI
M-29 and Clinton
Existing 2003 Volumes & Conditions - PM Peak

10/02/03
16:08:12

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.37 Vehicle Delay 10.3 Level of Service B+

```
        ------------------------
Sq 11  | Phase 1   |  Phase 2   |
LG/LG  ------------------------
       | + +       |  +         |
   .   | + +       |  +         |
  /|\  |<+ +       | <+         |
   |   |   v       |    ^       |
   |   |       ^   | ++++       |
 North |    <* *   |            |
   |   |     * *   | ++++       |
       |     * *   |     v      |
       ------------------------
       | G/C=0.525 | G/C=0.322  |
       | G=  31.5" | G=  19.3"  |
       | Y+R= 4.5" | Y+R= 4.7"  |
       | OFF= 0.0% | OFF=60.0%  |
       ------------------------
```

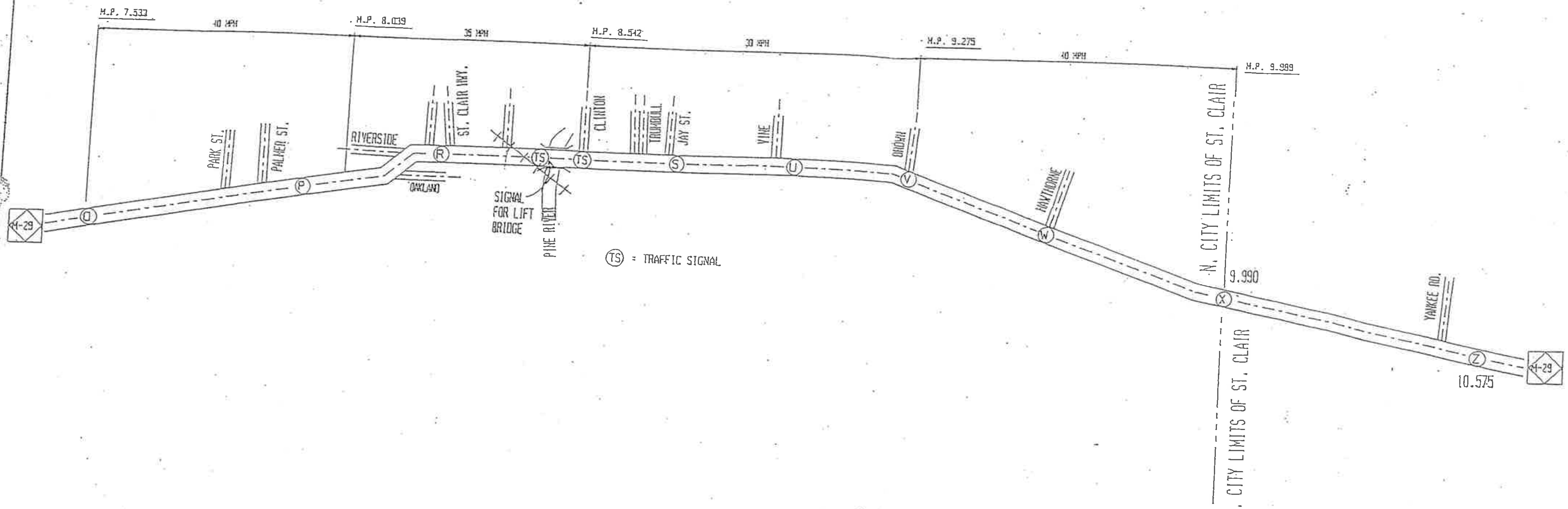
C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								5.6	A	
RT	11/1	0.256	1.000	1326	1326	256	0.193	0.3	A	13 ft
TH	22/2	0.181	0.525	1775	1779	500	0.281	8.3	A	127 ft
S Approach								10.2	B+	
TH+LT	24/2	0.284	0.525	1309	1331	634	0.476	10.2	*B+	184 ft
W Approach								18.5	B	
RT	11/1	0.185	0.322	412	488	189	0.387	18.1	B	126 ft
LT	11/1	0.200	0.322	468	545	244	0.448	18.8	B	163 ft

APPENDIX V
MDOT M-29 SPEED STUDY DATA

DATE	STATION	Q	P	R	S	U	V	W	X	Z
NOV. 1990	AVERAGE	42.1	40.7	35.3	36.0	36.4		38.7	43.2	44.6
	85%	45.5	44.6	38.5	39.4	40.5		42.4	47.4	48.4
	PACE	38/47	37/46	30/39	31/40	30/39		35/44	38/47	40/49
	SPEED LIMIT	40	40	35	30	30		40	40	40
DATE	STATION	Q	P	R	S	U	V	W	X	Z
JULY 2002	AVERAGE	42.3	40.6	35.7	31.5	35.9	35.7	41.7	43.8	50.2
	85%	46.0	45.0	40.0	35.0	40.0	40.0	46.0	48.0	54.0
	PACE	37/46	35/44	30/39	27/36	31/40	30/39	37/46	39/48	45/54
	SPEED LIMIT	40	40	35	30	30	30	40	40	50

STA.	MI.PT.	DESCRIPTION
Q	7.562	2000' SOUTH OF PALMER
P	7.940	1100' SOUTH OF RIVERSIDE
R	8.232	100' SOUTH OF ST. CLAIR HWY.
S	8.749	100' NORTH OF JAY ST.
U	9.024	200' NORTH OF VINE
V	9.260	AT BROWN
W	9.600	AT HAWTHRONE
X	9.990	AT N. CITY LIMITS
Z	10.575	400' NORTH OF YANKEE RD.



X:/DGN/TCO/SPEED/7705203.tst. 05-09-2002 mts

MICHIGAN DEPARTMENT OF TRANSPORTATION TRAFFIC & SAFETY DIVISION			SPEED STUDY DATA
OLD TCO# 77-01-80	DRAWN BY MTS (revised)	DATE 05-09-2002	M-29
NEW TCO#	CONT. SEC. 77052	SCALE 1"=1000'	CITY OF ST. CLAIR
	SHEET 1 OF 1	PLAN 77052-03	ST. CLAIR COUNTY

APPENDIX VI
FUTURE CAPACITY ANALYSIS WORKSHEETS

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI 10/02/03
M-29 and Clinton 16:08:42
Future 2025 Volumes & No Build Condition-AM Peak

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.28 Vehicle Delay 8.7 Level of Service A

```
        ------------------------
Sq 11  |  Phase 1   |  Phase 2  |
LG/LG  ------------------------
       |  + +       |  +        |
   .   |  + +       |  +        |
  /|\  | <+ +       | <+        |
   |   |    v       |      ^    |
   |   |        ^   | ++++      |
 North |     <* *   |           |
   |   |      * *   | ++++      |
       |      * *   |     v     |
       ------------------------
       | G/C=0.525  | G/C=0.322 |
       | G=  31.5"  | G=  19.3" |
       | Y+R= 4.5"  | Y+R= 4.7" |
       | OFF= 0.0%  | OFF=60.0% |
       ------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								4.8	A	
RT	11/1	0.248	1.000	1326	1326	244	0.184	0.3	A	12 ft
TH	22/2	0.141	0.525	1775	1779	356	0.200	7.8	A	88 ft
S Approach								9.3	A	
TH+LT	24/2	0.239	0.525	1411	1429	555	0.388	9.3	*A	152 ft
W Approach								16.3	B	
RT	11/1	0.140	0.322	412	488	122	0.250	16.2	B	79 ft
LT	11/1	0.141	0.322	468	545	144	0.264	16.3	B	93 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI 10/02/03
M-29 and Clinton 16:09:15
Future 2025 Volumes & No Build Condition-PM Peak

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.51 Vehicle Delay 12.4 Level of Service B+

```
       -------------------------
Sq 11 |  Phase 1   |  Phase 2   |
LG/LG -------------------------
      |   + +      |  +         |
      |   + +      |  +         |
  /|\ | <+ +       | <+         |
   |  |    v       |     ^      |
   |  |        ^   | ++++       |
North |      <* *  |            |
   |  |       * *  | ++++       |
      |       * *  |     v      |
       -------------------------
      | G/C=0.525  | G/C=0.322  |
      | G=   31.5" | G=   19.3" |
      | Y+R= 4.5"  | Y+R= 4.7"  |
      | OFF= 0.0%  | OFF=60.0%  |
       -------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								6.1	A	
RT	11/1	0.310	1.000	1326	1326	333	0.251	0.5	A	18 ft
TH	22/2	0.224	0.525	1775	1779	656	0.369	9.0	A	173 ft
S Approach								13.9	B+	
TH+LT	24/2	0.390	0.525	1178	1204	833	0.692	13.9	*B+	294 ft
W Approach								21.0	C+	
RT	11/1	0.220	0.322	412	488	244	0.500	20.1	C+	168 ft
LT	11/1	0.243	0.322	468	545	322	0.591	21.7	C+	225 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI
M-29 and Clinton
Future 2025 Volumes & Alternative 1-AM Peak

10/02/03
16:10:35

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.22 Vehicle Delay 8.3 Level of Service A

```
        ------------------------
Sq 11  |  Phase 1   |  Phase 2  |
LG/LG  ------------------------
       | + +        | +         |
   .   | + +        | +         |
 /|\   |<+ +        |<+         |
  |    |   v        |    ^      |
  |    |       ^    |++++       |
North  |    <+ *    |           |
  |    |     + *    |++++       |
       |     + *    |    v      |
        ------------------------
       | G/C=0.525  | G/C=0.322 |
       | G=  31.5"  | G=  19.3" |
       | Y+R= 4.5"  | Y+R= 4.7" |
       | OFF= 0.0%  | OFF=60.0% |
        ------------------------
```

C= 60 sec   G= 50.8 sec = 84.7%   Y= 9.2 sec = 15.3%   Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								4.7	A	
RT	11/1	0.220	1.000	1516	1516	244	0.161	0.2	A	11 ft
TH	22/2	0.141	0.525	1775	1779	356	0.200	7.8	A	88 ft
S Approach								8.2	A	
TH	24/2	0.155	0.525	1839	1840	422	0.229	8.0	*A	105 ft
LT	12/1	0.212	0.525	474	522	133	0.255	9.0	*A	67 ft
W Approach								16.3	B	
RT	11/1	0.140	0.322	412	488	122	0.250	16.2	B	79 ft
LT	11/1	0.141	0.322	468	545	144	0.264	16.3	B	93 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI 10/02/03
M-29 and Clinton 16:11:03
Future 2025 Volumes & Alternative 1-PM Peak

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.40 Vehicle Delay 11.1 Level of Service B+

```
         ------------------------
Sq 11   | Phase 1   |  Phase 2   |
LG/LG   ------------------------
        | + +       |  +         |
   .    | + +       |  +         |
 /|\    |<+ +       | <+         |
  |     |   v       |    ^       |
  |     |       ^   | ++++       |
North   |    <+ *   |            |
  |     |     + *   | ++++       |
        |     + *   |    v       |
         ------------------------
        | G/C=0.525 | G/C=0.322  |
        | G=  31.5" | G=  19.3"  |
        | Y+R= 4.5" | Y+R= 4.7"  |
        | OFF= 0.0% | OFF=60.0%  |
         ------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								6.1	A	
RT	11/1	0.275	1.000	1516	1516	333	0.220	0.3	A	16 ft
TH	22/2	0.224	0.525	1775	1779	656	0.369	9.0	A	173 ft
S Approach								10.4	B+	
TH	24/2	0.211	0.525	1839	1840	633	0.344	8.8	*A	164 ft
LT	12/1	0.381	0.525	312	362	200	0.552	15.5	*B	125 ft
W Approach								21.0	C+	
RT	11/1	0.220	0.322	412	488	244	0.500	20.1	C+	168 ft
LT	11/1	0.243	0.322	468	545	322	0.591	21.7	C+	225 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI　　10/02/03
M-29 and Clinton　　16:12:25
Future 2025 Volumes & Alternative 2-AM Peak

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.36 Vehicle Delay 10.8 Level of Service B+

```
        -------------------------
Sq 11  |  Phase 1   |  Phase 2   |
LG/LG   -------------------------
       | + +        |            |
  .    | + +        |            |
 /|\   |<+ +        |       ^    |
  |    |   v        |            |
  |    |        ^   |++++        |
North  |     <+ *   |            |
  |    |      + *   |++++        |
       |      + *   |    v       |
        -------------------------
       | G/C=0.525  | G/C=0.322  |
       | G=  31.5"  | G=  19.3"  |
       | Y+R= 4.5"  | Y+R= 4.7"  |
       | OFF= 0.0%  | OFF=60.0%  |
        -------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								8.8	A	
RT+TH	24/2	0.214	0.525	1722	1728	600	0.347	8.8	A	157 ft
S Approach								10.3	B+	
TH	12/1	0.276	0.525	933	968	422	0.436	10.2	*B+	213 ft
LT	12/1	0.271	0.525	341	391	133	0.340	10.6	*B+	72 ft
W Approach								16.3	B	
RT	11/1	0.140	0.322	412	488	122	0.250	16.2	B	79 ft
LT	11/1	0.141	0.322	468	545	144	0.264	16.3	B	93 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI 10/02/03
M-29 and Clinton 16:12:56
Future 2025 Volumes & Alternative 2-PM Peak

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.62 Vehicle Delay 17.9 Level of Service B

```
        -------------------------
Sq 11  |  Phase 1  |  Phase 2  |
LG/LG  -------------------------
       | + +       |           |
   .   | + +       |           |
 /|\   |<+ +       |     ^     |
  |    |   v       |           |
  |    |      ^    |++++       |
North  |           |           |
  |    |    <+ *   |           |
       |     + *   |++++       |
       |     + *   |     v     |
       -------------------------
       |G/C=0.525  |G/C=0.322  |
       |G=   31.5" |G=   19.3" |
       |Y+R= 4.5"  |Y+R= 4.7"  |
       |OFF= 0.0%  |OFF=60.0%  |
       -------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								11.0	B+	
RT+TH	24/2	0.319	0.525	1742	1747	989	0.566	11.0	B+	294 ft
S Approach								24.1	C+	
TH	12/1	0.379	0.525	933	968	633	0.654	13.7	*B+	368 ft
LT	12/1	0.590	0.525	169	217	200	0.922	56.7	*E+	211 ft
W Approach								21.0	C+	
RT	11/1	0.220	0.322	412	488	244	0.500	20.1	C+	168 ft
LT	11/1	0.243	0.322	468	545	322	0.591	21.7	C+	225 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI
M-29 and Clinton
Future 2025 Volumes & Alternative 3-AM Peak

10/02/03
16:13:36

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.36 Vehicle Delay 10.8 Level of Service B+

```
        -------------------------
Sq 11  |   Phase 1   |   Phase 2   |
LG/LG  -------------------------
       | + +         |             |
   .   | + +         |             |
  /|\  |<+ +         |             |
   |   |   v         |      ^      |
   |   |       ^     |++++         |
 North |    <+ *     |             |
   |   |     + *     |++++         |
       |     + *     |      v      |
        -------------------------
       | G/C=0.525   | G/C=0.322   |
       | G=   31.5"  | G=   19.3"  |
       | Y+R= 4.5"   | Y+R= 4.7"   |
       | OFF= 0.0%   | OFF=60.0%   |
        -------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								8.8	A	
RT+TH	24/2	0.214	0.525	1722	1728	600	0.347	8.8	A	157 ft
S Approach								10.3	B+	
TH	12/1	0.276	0.525	933	968	422	0.436	10.2	*B+	213 ft
LT	12/1	0.271	0.525	341	391	133	0.340	10.6	*B+	72 ft
W Approach								16.3	B	
RT	11/1	0.140	0.322	412	488	122	0.250	16.2	B	79 ft
LT	11/1	0.141	0.322	468	545	144	0.264	16.3	B	93 ft

Traffic Analysis Report - M-29 Corridor - Saint Clair, MI
M-29 and Clinton
Future 2025 Volumes & Alternative 3-PM Peak

10/02/03
16:14:06

SIGNAL2000/TEAPAC[Ver 1.01.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - M-29 & Clinton
Degree of Saturation (v/c) 0.62 Vehicle Delay 17.9 Level of Service B

```
          ------------------------
 Sq 11   |  Phase 1   |  Phase 2   |
 LG/LG   ------------------------
         |  + +       |            |
   .     |  + +       |            |
  /|\    | <+ +       |            |
   |     |    v       |     ^      |
   |     |        ^   | ++++       |
 North   |     <+ *   |            |
   |     |      + *   | ++++       |
         |      + *   |     v      |
          ------------------------
         | G/C=0.525  | G/C=0.322  |
         | G=  31.5"  | G=  19.3"  |
         | Y+R= 4.5"  | Y+R= 4.7"  |
         | OFF= 0.0%  | OFF=60.0%  |
          ------------------------
```

C= 60 sec G= 50.8 sec = 84.7% Y= 9.2 sec = 15.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								11.0	B+	
RT+TH	24/2	0.319	0.525	1742	1747	989	0.566	11.0	B+	294 ft
S Approach								24.1	C+	
TH	12/1	0.379	0.525	933	968	633	0.654	13.7	*B+	368 ft
LT	12/1	0.590	0.525	169	217	200	0.922	56.7	*E+	211 ft
W Approach								21.0	C+	
RT	11/1	0.220	0.322	412	488	244	0.500	20.1	C+	168 ft
LT	11/1	0.243	0.322	468	545	322	0.591	21.7	C+	225 ft

APPENDIX VII
TRAFFIC CRASH DATA

MICHIGAN DEPARTMENT OF TRANSPORTATION
CRASH LIST

Crashes Selected: InterChange Intersection Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)

Location : 77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1 Dir	Veh1 Intent	Veh1 Impact	Veh 2 Dir	Veh 2 Intent	Veh 2 Impact	Fatal	Injury	Crash Day	Crash Date	Crash Hour	Crash Report	Reel	Frame
77052	7.13	0966704	6.61	FXOBJ	N	GO ST	REAR-R						SUN	03/08/1998	1PM-2PM	7271789	195	0813
77052	7.13	0966704	6.61	AN-ST	W	GO ST	FRONT-R	S	GO ST	FRONT			WED	01/13/1999	5PM-6PM	7269428	238	1260
77052	7.13	0966704	6.61	AN-DR		ERROR	ERROR	N	ERROR	FRONT			FRI	06/26/1998	MID-1AM	6554265	210	5648
77052	7.19	0966704	6.67	AN-TN	N	TNLT	SIDE-R	S	GO ST	FRONT-R			WED	12/29/1999	10PM-11PM	7272459	275	4819
77052	7.20	0966704	6.68	PED	S	GO ST	SIDE-R		ERROR	ERROR		1	TUE	01/27/1998	5AM-6AM	7271934	188	3471
77052	7.35	0966704	6.83	SS-SM	S	CHG LN	SIDE-L	S	GO ST	FRONT-R		1	THU	10/07/1999	6AM-7AM	9433820	265	1407
77052	7.40	0966704	6.88	HD-LT	N	TNLT	FRONT-R	S	GO ST	FRONT-L		3	WED	10/04/2000	8AM-9AM	0838333	531	1303
77052	7.43	0966704	6.91	MSC-MLT	S	GO ST		N	GO ST	FRONT-R			THU	01/13/2000	9AM-10AM	0296653	501	1451
77052	7.45	0966704	6.93	RE-ST	N	S/STOP RD	FRONT	N	STOP RD	REAR			WED	04/26/2000	5PM-6PM	0297511	539	5784
77052	7.45	0966704	6.93	AN-DR	N	GO ST	FRONT-L	S	GO ST	FRONT		1	TUE	02/18/1997	4PM-5PM	6555351	146	2388
77052	7.46	0966704	6.94	FXOBJ	S	GO ST	REAR-R						THU	02/25/1999	5AM-6AM	9067002	238	4191
77052	7.46	0966704	6.94	RE-ST	N	S/STOP RD	NONE	N	STOP RD	REAR			THU	07/08/1999	3PM-4PM	7269899	256	3099
77052	7.47	0966704	6.95	FXOBJ	S	GO ST						1	THU	06/08/2000	1AM-2AM	0837435	527	1173
77052	7.47	0966704	6.95	FXOBJ	S	TNRT	FRONT-L					1	SUN	01/09/2000	1AM-2AM	0297280	503	3480
77052	7.47	0966704	6.95	HD-LT	E	TNLT	FRONT-L	S	GO ST	FRONT			FRI	10/01/1999	3PM-4PM	9066923	266	2410
77052	7.50	0966704	6.98	AN-DR	S	GO ST	FRONT	S	GO ST	SIDE-R		1	TUE	05/27/1997	4PM-5PM	5769196	157	7719
77052	7.51	0966704	6.99	RE-LT	N	ERROR	SIDE-L	S	GO ST	FRONT-R		1	FRI	11/10/2000	10PM-11PM	0895442	535	3142
77052	7.58	0966704	7.06	RE-ST	N	S/STOP RD	REAR	N	S/STOP RD	FRONT			SUN	12/03/2000	3PM-4PM	0214753	544	4907
77052	7.63	0966704	7.11	AN-TN	N	TNLT	FRONT-R	S	GO ST	FRONT		1	WED	02/10/1999	5PM-6PM	7481727	238	7207
77052	7.74	0967101	0.05	BCKNG	N	BACKING	REAR	E	AVD AN	FRONT-R			FRI	01/08/1999	10PM-11PM	7444111	235	0293
77052	7.83	0966704	7.31	AN-DR	E	TNLT	REAR-L	S	GO ST	FRONT		1	WED	10/06/1999	7AM-8AM	9433819	265	1406

MICHIGAN DEPARTMENT OF TRANSPORTATION
CRASH LIST

Crashes Selected:
InterChange
Intersection
Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)
Location :
77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1			Veh 2			Fatal	Injury	Crash			Crash Report	Reel	Frame
					Dir	Intent	Impact	Dir	Intent	Impact			Day	Date	Hour			
77052	7.83	0966704	7.31	RE-LT	N	GO ST	FRONT	N	TNLT	REAR		1	MON	09/18/2000	4PM-5PM	0214677	529	1544
77052	7.83	0966704	7.30	RE-ST	N	GO ST	FRONT-L	N	STOP RD	REAR-R			SAT	01/10/1998	10AM-11AM	1434599	188	6761
77052	7.84	0966704	7.32	RE-DR	S	GO ST	FRONT	S	STOP RD	REAR			WED	04/14/1999	7AM-8AM	7443996	246	5885
77052	7.85	0966704	7.33	RE-DR	S	S/STOP RD	NONE	S	S/STOP RD	REAR			THU	07/23/1998	11AM-NOON	7444051	211	5157
77052	7.87	0966704	7.35	MSC-ML1	S	GO ST	FRONT-R		PASSING	ERROR			SUN	10/31/1999	3PM-4PM	4861794	271	1025
77052	7.92	0966704	7.40	SS-SM	N	CHG LN	SIDE-R	N	ERROR	FRONT-L			SUN	11/14/1999	7AM-8AM	9433845	271	1023
77052	8.08	0966704	7.56	MSC-SN(	S	GO ST	UNDER						THU	01/20/2000	7AM-8AM	0214378	504	4701
77052	8.08	0966704	7.56	MSC-ML1	S	GO ST	FRONT-R		CHG LN	SIDE-R			WED	10/28/1998	8AM-9AM	7444106	221	8587
77052	8.11	0966704	7.59	MSC-SN(	E	GO ST	FRONT						SUN	03/08/1998	5AM-6AM	1434594	196	9669
77052	8.13	0966704	7.61	FXOBJ	N	LV RD	SIDE-R						FRI	02/06/1998	1AM-2AM	4910356	194	1081
77052	8.13	0966704	7.61	MSC-SN(	S	GO ST	FRONT-R						SAT	08/26/2000	5AM-6AM	0214487	525	0880
77052	8.13	0966704	7.61	RE-ST	S	CHG LN	FRONT	S	S/STOP RD	REAR			MON	12/14/1998	3PM-4PM	7444136	228	4822
77052	8.15	0966704	7.63	FXOBJ	N	GO ST	FRONT						FRI	12/18/1998	7AM-8AM	1434738	228	4826
77052	8.16	0966704	7.64	FXOBJ	S	GO ST	REAR-R						THU	04/17/1997	2AM-3AM	4910533	153	1618
77052	8.23	0967105	1.06	RE-LT	N	TNLT	REAR	N	GO ST	FRONT			MON	06/01/1998	4PM-5PM	4862544	208	0199
77052	8.25	0967105	1.08	MSC-ML1	N	STOP RD	REAR-L					1	WED	04/14/1999	10AM-11AM	7443998	245	5184
77052	8.25	0967105	1.08	RE-DR	S	GO ST	FRONT	S	TNRT	REAR			TUE	08/18/1998	10AM-11AM	7444054	213	6820
77052	8.25	0967105	1.07	PRKNG	N	LV PRK	FRONT-R	S	GO ST	FRONT-R		1	SAT	02/21/1998	6PM-7PM	1434653	194	1077
77052	8.26	0967105	1.09	AN-DR	E	TNLT	FRONT-L	S	GO ST	REAR-R		1	WED	06/28/2000	1PM-2PM	0214506	519	3010
77052	8.26	0967105	1.08	RE-DR	S	GO ST	FRONT		S/STOP RD	REAR		1	WED	09/15/1999	6AM-7AM	9433791	263	8553
77052	8.26	0967105	1.09	AN-ST	E	START RD	FRONT	S	GO ST	REAR-R			TUE	07/11/2000	NOON-1PM	0214285	522	2164

Crashes Selected:
InterChange
Intersection
Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)
Location :
77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1 Dir	Veh1 Intent	Veh1 Impact	Veh 2 Dir	Veh 2 Intent	Veh 2 Impact	Fatal	Injury	Crash Day	Crash Date	Crash Hour	Crash Report	Reel	Frame
77052	8.26	0967105	1.08	AN-DR	E	TNRT	FRONT	S	GO ST	FRONT-R		1	SAT	05/15/1999	2PM-3PM	9433777	248	4619
77052	8.26	0967105	1.08	AN-DR	E	TNLT	FRONT-L	S	GO ST	FRONT-R		1	SAT	05/01/1999	2PM-3PM	7444024	245	5180
77052	8.26	0967105	1.08	AN-TN	NE	TNLT	SIDE-L	S	GO ST	FRONT		3	MON	03/29/1999	2PM-3PM	7444095	242	0855
77052	8.26	0967105	1.08	SS-SM	S	TNRT	FRONT-L	E	STOP RD	SIDE-L			MON	02/22/1999	6AM-7AM	1434698	239	4120
77052	8.26	0967702	12.79	AN-ST	S	GO ST	SIDE-R	E	TNLT	FRONT			THU	10/30/1997	5PM-6PM	1434684	175	1996
77052	8.26	0967105	1.09	AN-ST	E	ENT RD	FRONT-L	S	GO ST	FRONT			TUE	11/03/1998	4PM-5PM	7443973	223	6731
77052	8.26	0967105	1.08	AN-ST	E	ERROR	REAR-L	S	GO ST	FRONT-L			TUE	12/29/1998	6PM-7PM	1434702	228	4819
77052	8.26	0967105	1.08	AN-TN	E	TNLT	FRONT	S	GO ST	SIDE-R		1	SUN	07/30/2000		0214288	525	0876
77052	8.26	0967105	1.08	AN-ST	E	GO ST	FRONT	N	GO ST	REAR-L			THU	01/29/1998	4PM-5PM	1434742	188	6754
77052	8.27	0967105	1.09	AN-ST	N	GO ST	SIDE-R	S	ERROR	FRONT-R			SAT	03/06/1999	3PM-4PM	7444163	242	1515
77052	8.27	0967105	1.09	AN-DR	S	GO ST	FRONT-L	S	GO ST	SIDE-L			SAT	07/12/1997	3PM-4PM	4910520	165	9874
77052	8.27	0967105	1.10	AN-ST	S	GO ST	SIDE-L		DRVLESS	REAR			FRI	02/13/1998	2PM-3PM	1434646	194	1083
77052	8.34	0967105	1.16	AN-DR	E	ENT RD	OTHER	S	GO ST	OTHER			WED	10/27/1999	3PM-4PM	9433840	266	8211
77052	8.34	0967105	1.16	AN-DR	N	GO ST	FRONT	W	TNRT	SIDE-L		1	FRI	01/09/1998	7AM-8AM	1434656	188	6760
77052	8.35	0967105	1.18	RE-DR	N	GO ST	FRONT	N	STOP RD	REAR			FRI	05/30/1997	NOON-1PM	4910434	157	0522
77052	8.40	0967105	1.22	RE-ST	N	GO ST	FRONT	N	STOP RD	REAR			FRI	06/11/1999	6PM-7PM	7444147	250	6155
77052	8.41	0967105	1.23	AN-DR	E	ERROR	SIDE-L	S	GO ST	FRONT		2	FRI	10/15/1999	NOON-1PM	9433823	266	8215
77052	8.41	0967105	1.23	SS-SM	N	CHG LN	REAR-L	N	GO ST	FRONT-R			MON	10/12/1998	NOON-1PM	4910374	221	8585
77052	8.41	0967105	1.23	AN-TN	E	TNLT	REAR-L	S	GO ST	FRONT			THU	12/11/1997	5PM-6PM	1434671	182	5482
77052	8.42	0967105	1.25	RE-ST	S	GO ST	FRONT	S	STOP RD	REAR			THU	11/11/1999	6PM-7PM	4861798	271	1021
77052	8.48	0967105	1.30	AN-DR	W	ENT RD	SIDE-R	S	GO ST	FRONT		1	THU	08/17/2000	9AM-10AM	0214453	525	0873

MICHIGAN DEPARTMENT OF TRANSPORTATION
CRASH LIST

Crashes Selected:
InterChange
Intersection
Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)
Location :
77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1 Dir	Veh1 Intent	Veh1 Impact	Veh 2 Dir	Veh 2 Intent	Veh 2 Impact	Fatal	Injury	Crash Day	Crash Date	Crash Hour	Crash Report	Reel	Frame
77052	8.50	0967105	1.32	MSC-SN(	S	GO ST	OTHER						THU	01/06/2000	4PM-5PM	0214326	504	4704
77052	8.50	0967105	1.33	RE-DR	N	STOP RD	FRONT	N	GO ST	REAR			MON	07/28/1997	4PM-5PM	4910447	165	9880
77052	8.51	0967105	1.34	RE-DR	N	CHG LN	FRONT-L	N	STOP RD	REAR-R			FRI	08/18/2000	2PM-3PM	0214316	525	0875
77052	8.52	0967105	1.35	RE-ST	N	STOP RD	REAR-L	N	STOP RD	REAR-L		2	WED	03/31/1999	9PM-10PM	7444167	246	5887
77052	8.52	0967105	1.35	RE-ST	S	GO ST	FRONT	S	STOP RD	REAR			SUN	07/05/1998	7PM-8PM	7444027	218	1469
77052	8.52	0967105	1.35	AN-DR	S	GO ST	SIDE-L	W	TNLT	FRONT-R			SUN	03/29/1998	2AM-3AM	1434712	196	9675
77052	8.53	0967105	1.36	AN-DR	E	TNLT	REAR-L	N	GO ST	FRONT		1	WED	06/14/2000	5PM-6PM	0214503	519	3008
77052	8.53	0967105	1.35	RE-ST	N	GO ST	FRONT	N	STOP RD	REAR			TUE	06/13/2000	NOON-1PM	0214282	519	3001
77052	8.53	0967105	1.35	RE-ST	N	GO ST	NONE	N	STOP RD	REAR			SAT	03/25/2000	4PM-5PM	0214309	510	3626
77052	8.53	0967105	1.36	RE-ST	N	STOP RD	FRONT	N	PASSING	REAR-R		2	WED	12/08/1999	6AM-7AM	9433792	278	6465
77052	8.53	0967105	1.35	FXOBJ	S	ERROR	FRONT						THU	12/02/1999	NOON-1PM	9433741	274	4860
77052	8.53	0967105	1.35	AN-DR	N	GO ST	FRONT	E	TNLT	REAR-R		5	FRI	09/10/1999	5PM-6PM	7444058	263	8554
77052	8.53	0967105	1.35	RE-ST		START RD	ERROR	N	STOP RD	REAR		1	WED	07/21/1999	11AM-NOON	9433734	254	7961
77052	8.53	0967105	1.36	AN-TN	E	TNLT	SIDE-R	N	GO ST	FRONT			WED	03/31/1999	4PM-5PM	7444166	242	5060
77052	8.53	0967105	1.35	AN-DR	E	TNLT	FRONT	N	GO ST	FRONT			MON	03/22/1999	NOON-1PM	7444122	242	0851
77052	8.53	0967105	1.36	AN-TN	W	TNLT	SIDE-R	S	GO ST	FRONT		1	WED	01/20/1999		1434699	235	0296
77052	8.53	0967105	1.35	RE-ST	S	GO ST	NONE	S	STOP RD	REAR		1	SAT	09/26/1998	NOON-1PM	7444128	217	3720
77052	8.53	0967105	1.35	RE-ST	N	STOP RD	REAR	N	START RD	NONE		2	MON	08/24/1998	NOON-1PM	7444076	213	6689
77052	8.53	0967105	1.36	AN-ST	E	GO ST	SIDE-L	S	GO ST	FRONT-R		2	SUN	08/23/1998	5PM-6PM	6556982	213	2119
77052	8.53	0967105	1.36	AN-TN	E	TNLT	FRONT-L	N	GO ST	FRONT-L			THU	08/20/1998	5PM-6PM	7444055	213	6818
77052	8.53	0967105	1.36	AN-DR	W	ENT RD	FRONT-L	N	GO ST	FRONT-R			MON	12/15/1997	NOON-1PM	1434670	182	5481

Crashes Selected: InterChange Intersection Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)

Location : 77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1			Veh 2			Fatal	Injury	Crash			Crash Report	Reel	Frame
					Dir	Intent	Impact	Dir	Intent	Impact			Day	Date	Hour			
77052	8.53	0967105	1.36	RE-ST	N	STOP RD		N	S/STOP RD	FRONT			WED	12/10/1997	1PM-2PM	4910548	182	5484
77052	8.53	0967105	1.36	AN-TN	W	TNLT	FRONT-R	S	GO ST	FRONT-L			THU	04/20/2000	6PM-7PM	0214276	511	6733
77052	8.53	0967105	1.36	AN-TN	S	TNLT	ERROR	N	GO ST	FRONT		2	THU	10/30/1997	6PM-7PM	1434661	175	1995
77052	8.53	0967105	1.36	AN-DR	S	TNLT	REAR-L	N	GO ST	FRONT-L			FRI	10/17/1997	5PM-6PM	1434689	175	1997
77052	8.53	0967105	1.36	RE-ST	N	STOP RD	NONE	N	STOP RD	REAR		3	THU	06/26/1997	3PM-4PM	4910442	161	5416
77052	8.54	0967105	1.36	AN-TN	W	TNLT	REAR-R	S	GO ST	FRONT-R			THU	11/09/2000	3PM-4PM	0214291	537	2921
77052	8.54	0967105	1.36	BIKE	N	START RD	FRONT-R		XING INT	OTHER			TUE	10/03/2000	3PM-4PM	0214680	531	6998
77052	8.54	0967105	1.37	MSC-MLT	W	UTURN		N	GO ST	SIDE-R		1	MON	08/07/2000	1AM-2AM	0214430	525	0870
77052	8.54	0967105	1.37	AN-ST	S	GO ST	FRONT	W	TNLT	REAR-R			THU	09/16/1999	7AM-8AM	9433812	263	8556
77052	8.54	0968804	14.62	PRKNG	NW	LV PRK	REAR-R	W	PASSING	SIDE-L			FRI	01/08/1999	8PM-9PM	7444110	235	0294
77052	8.54	0967105	1.37	RE-DR	S	GO ST	FRONT	S	STOP RD	REAR			THU	10/22/1998	10AM-11AM	7443972	221	8589
77052	8.54	0967105	1.36	RE-LT	S	TNLT	REAR-R	S	CHG LN	FRONT-L		3	WED	07/08/1998	5PM-6PM	4862547	211	5159
77052	8.54	0967105	1.36	SS-SM	E	TNRT	FRONT-L	S	TNRT	REAR-R			FRI	02/20/1998	6PM-7PM	1434595	194	1076
77052	8.54	0967105	1.36	PRKNG	W	LV PRK	REAR-L	N	GO ST	FRONT-R			SUN	01/11/1998	1AM-2AM	1434598	188	6762
77052	8.54	0967105	1.36	RE-ST	N	STOP RD	REAR	N	GO ST	FRONT		1	FRI	10/24/1997	5PM-6PM	1434606	175	1994
77052	8.54	0968804	14.64	BIKE	E	STOP RD	FRONT-R	N	GO ST	ERROR		1	MON	07/14/1997	4PM-5PM	4910446	165	9877
77052	8.54	0967105	1.36	OT-DR	S	GO ST	SIDE-L	W	TNLT	FRONT		1	WED	07/09/1997	4PM-5PM	4910497	165	9875
77052	8.54	0967105	1.36	RE-ST	S	STOP RD	REAR-R	S	S/STOP RD	FRONT-L			WED	04/26/2000	10PM-11PM	0214382	511	6738
77052	8.54	0968804	14.64	MSC-MLT	S	TNRT	UNDER	E	STOP RD	FRONT-L			THU	06/26/1997	8PM-9PM	4910444	161	4410
77052	8.54	0968804	14.63	RE-ST	E	S/STOP RD	FRONT	E	STOP RD	REAR			TUE	06/10/1997	8PM-9PM	4910493	161	4406
77052	8.54	0968804	14.63	SS-OP	S	TNRT	NONE	E	START RD	FRONT-L			MON	06/02/1997	3PM-4PM	4910436	161	4402

MICHIGAN DEPARTMENT OF TRANSPORTATION
CRASH LIST

Crashes Selected: InterChange, Intersection, Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)

Location : 77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1 Dir	Veh1 Intent	Veh1 Impact	Veh 2 Dir	Veh 2 Intent	Veh 2 Impact	Fatal	Injury	Crash Day	Crash Date	Crash Hour	Crash Report	Reel	Frame
77052	8.54	0967105	1.36	HD-LT	S	GO ST	FRONT-R	N	TNLT	SIDE-R		1	TUE	05/20/1997	2PM-3PM	4910517	157	0524
77052	8.55	0967105	1.38	PRKNG	N	LV PRK	FRONT-R	N	GO ST	FRONT			SUN	12/20/1998	6PM-7PM	1434704	229	9778
77052	8.55	0967105	1.38	RE-DR	S	GO ST	FRONT-R	S	STOP RD	REAR-L			TUE	05/26/1998	8AM-9AM	4910371	208	0196
77052	8.55	0967105	1.38	RE-DR	S	S/STOP RD	FRONT-R	S	PASSING	REAR-L			THU	05/14/1998	5PM-6PM	1434707	208	0195
77052	8.55	0967105	1.37	RE-ST	S	START RD	FRONT	S	S/STOP RD	REAR			SAT	05/10/1997	5PM-6PM	4910515	157	0517
77052	8.58	0967105	1.40	AN-ST	S	GO ST	SIDE-R	E	TNRT	FRONT			FRI	04/23/1999	2PM-3PM	7444021	245	5183
77052	8.62	0967105	1.45	HD-LT	S	GO ST	FRONT	W	TNLT	SIDE-R		2	THU	11/27/1997	10PM-11PM	1434605	179	9349
77052	8.65	0967105	1.47	DU-LT	N	TNLT	SIDE-L	N	TNLT	REAR-R			FRI	07/24/1998	3PM-4PM	4862550	213	6825
77052	8.66	0967105	1.48	RE-ST	N	TNLT	REAR	N	GO ST	FRONT-L			THU	07/23/1998	6PM-7PM	7443964	211	5163
77052	8.67	0967105	1.49	RE-ST	S	GO ST	FRONT	S	TNLT	REAR			SAT	09/30/2000	6PM-7PM	0214679	528	0129
77052	8.70	0967105	1.52	RE-ST	N	GO ST	FRONT	N	S/STOP RD	REAR			SAT	11/06/1999	NOON-1PM	7444059	271	1027
77052	8.70	0967105	1.52	OT-DR	E	ENT RD	FRONT	N	GO ST	FRONT-L		1	THU	10/02/1997	10AM-11AM	1434666	174	9728
77052	8.71	0967105	1.53	HD-ON	S	GO ST	FRONT	N	GO ST	FRONT		2	TUE	09/15/1998	7AM-8AM	7444080	217	3719
77052	8.71	0967105	1.53	RE-DR	N	GO ST	REAR	N	GO ST	FRONT			MON	08/03/1998	4PM-5PM	7443969	213	6691
77052	8.72	0967105	1.54	AN-TN	W	TNLT	SIDE-R	S	GO ST	FRONT-L			THU	06/10/1999	11AM-NOON	9433728	250	6154
77052	8.72	0967105	1.54	RE-DR	N	GO ST	FRONT-R	N	STOP RD	REAR-L			FRI	01/08/1999	3PM-4PM	7444153	235	0291
77052	8.72	0967105	1.54	AN-ST	S	GO ST	FRONT-R	E	TNLT	FRONT		1	WED	07/23/1997	3PM-4PM	4861785	165	9879
77052	8.74	0967105	1.56	AN-ST	N	PARKED	REAR-L	N	TNLT	SIDE-R			TUE	09/19/2000	3PM-4PM	0214455	529	1553
77052	8.74	0967105	1.56	RE-DR		S/STOP RD	FRONT-L	N	ERROR	ERROR			FRI	09/24/1999	9AM-10AM	9433815	263	8549
77052	8.83	0967105	1.66	MSC-MLT		GO ST		S	PARKED	SIDE-L			THU	08/17/2000	3PM-4PM	0214315	525	0874
77052	8.85	0967105	1.67	SS-SM	NW	UTURN	FRONT-L	N	GO ST	FRONT-R		1	SAT	10/03/1998	8PM-9PM	7444038	221	8603

Crashes Selected:
InterChange
Intersection
Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)
Location :

77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1 Dir	Veh1 Intent	Veh1 Impact	Veh 2 Dir	Veh 2 Intent	Veh 2 Impact	Fatal	Injury	Crash Day	Crash Date	Crash Hour	Crash Report	Reel	Frame
77052	8.92	0967105	1.75	AN-DR	S	TNLT	FRONT-R	N	GO ST	SIDE-R		1	SUN	09/06/1998	9PM-10PM	7444103	217	3718
77052	8.93	0967105	1.76	PRKNG	E	LV PRK	FRONT-L	S	GO ST	FRONT-R		1	TUE	07/04/2000	3PM-4PM	0214386	522	2172
77052	8.95	0967105	1.77	RE-DR	N	STOP RD	FRONT	N	GO ST	REAR		1	MON	12/04/2000	3PM-4PM	0214491	544	4908
77052	8.95	0967105	1.78	MSC-MLT	N	UTURN	FRONT-L	N	GO ST	FRONT-R			FRI	07/31/1998	1AM-2AM	7444002	213	6824
77052	8.95	0967105	1.77	SS-SM	S	ENT RD	FRONT	S	PARKED	REAR-L			THU	10/30/1997	11AM-NOON	1434686	174	9730
77052	8.96	0967105	1.79	SS-SM	N	UTURN	FRONT-R	S	GO ST	SIDE-L			WED	08/05/1998	11AM-NOON	7444004	212	4945
77052	8.97	0967105	1.80	MSC-MLT	S	CHG LN	SIDE-R	S	GO ST	FRONT-L			FRI	12/29/2000	10PM-11PM	0214436	544	7271
77052	8.97	0967105	1.79	MSC-MLT	E	STOP RD	FRONT	E	BACKING	REAR			THU	08/31/2000	3PM-4PM	0214319	529	1547
77052	8.97	0967105	1.79	AN-ST	E	ENT RD	FRONT	S	GO ST	SIDE-R			WED	03/15/2000	7AM-8AM	0214306	510	3624
77052	8.97	0967105	1.80	AN-DR	E	GO ST	FRONT-L	S	ERROR	NONE			MON	07/26/1999	2PM-3PM	1434693	254	8799
77052	8.97	0967105	1.79	DU-LT	S	TNLT	FRONT-L	S	TNLT	FRONT-R			WED	07/07/1999	7AM-8AM	9433811	254	8793
77052	8.97	0967105	1.79	RE-ST	N	GO ST	FRONT-R	N	TNLT	REAR-L			SUN	08/30/1998	8PM-9PM	7444011	214	7464
77052	8.97	0967105	1.79	OT-DR	N	GO ST	FRONT	E	TNLT	FRONT-R			FRI	08/14/1998	3PM-4PM	7444008	213	6821
77052	8.97	0967105	1.80	OT-DR	N	CHG LN	REAR-L	N	GO ST	FRONT-R			FRI	06/05/1998	NOON-1PM	7443976	208	0200
77052	8.97	0967105	1.79	AN-ST	E	ENT RD	FRONT	S	GO ST	SIDE-R			SAT	02/28/1998	3PM-4PM	1434645	194	1084
77052	8.97	0967105	1.79	RE-DR	N	GO ST	FRONT	N	STOP RD	REAR		2	WED	09/08/1999	2PM-3PM	9433785	263	8547
77052	8.97	0967105	1.80	OT-DR	N	TNLT	FRONT-L	S	GO ST	FRONT-R		3	WED	12/17/1997	3PM-4PM	1434604	182	5479
77052	8.97	0967105	1.79	OT-DR	S	TNLT	FRONT-L	N	GO ST	FRONT		2	SUN	06/01/1997	NOON-1PM	4910435	161	4404
77052	8.97	0967105	1.79	AN-DR	S	ERROR	SIDE-L	N	GO ST	ERROR		1	FRI	05/02/1997	3PM-4PM	4910537	157	0518
77052	8.97	0967105	1.79	AN-TN	E	TNLT	FRONT	S	GO ST	REAR-R			FRI	03/07/1997	7AM-8AM	4910526	152	6571
77052	8.98	0967105	1.81	BCKNG	S	BACKING	REAR-R	N	PARKED	FRONT-L			THU	11/30/2000	8AM-9AM	0214752	537	2913

MICHIGAN DEPARTMENT OF TRANSPORTATION
CRASH LIST

Crashes Selected: InterChange, Intersection, Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)

Location : 77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1 Dir	Veh1 Intent	Veh1 Impact	Veh 2 Dir	Veh 2 Intent	Veh 2 Impact	Fatal	Injury	Crash Day	Crash Date	Crash Hour	Crash Report	Reel	Frame
77052	8.98	0967105	1.80	SS-SM	N	GO ST	FRONT-L	N	GO ST	REAR-R			SAT	09/02/2000	7PM-8PM	0214651	529	1548
77052	9.01	0967105	1.83	AN-ST	S	CHG LN	REAR-L	S	GO ST	FRONT-R			TUE	06/27/2000	7AM-8AM	0214284	519	3012
77052	9.01	0967105	1.83	RE-DR	N	S/STOP RD	NONE	N	S/STOP RD	FRONT-R			TUE	11/30/1999	7AM-8AM	9433850	272	4718
77052	9.01	0967105	1.83	AN-DR	N	GO ST	FRONT-L	S	LV PRK	SIDE-L			TUE	06/16/1998	3PM-4PM	7443959	208	0193
77052	9.22	0967105	2.04	RE-DR	N	GO ST	FRONT	N	TNLT	REAR		1	SUN	06/28/1998	1PM-2PM	7443984	208	0190
77052	9.26	0967105	2.08	RE-DR	N	GO ST	FRONT-R	N	STOP RD	REAR		2	THU	09/21/2000	7AM-8AM	0214701	529	1551
77052	9.26	0967105	2.08	RE-DR	N	GO ST	FRONT	N	STOP RD	REAR		2	THU	07/01/1999	4PM-5PM	9433732	254	8794
77052	9.26	0967105	2.08	AN-TN	E	TNLT	FRONT	S	GO ST	SIDE-R			MON	11/23/1998	4PM-5PM	7444014	225	5798
77052	9.26	0967105	2.08	RE-ST	N	STOP RD	REAR	N	GO ST	FRONT			MON	06/15/1998	1PM-2PM	7443978	208	0203
77052	9.26	0967105	2.08	AN-TN	W	TNLT	FRONT-R	S	GO ST	FRONT			MON	07/14/1997	11AM-NOON	4910499	165	9873
77052	9.27	0967105	2.10	RE-ST	N	S/STOP RD	FRONT	N	CHG LN	REAR			SAT	08/01/1998	2PM-3PM	7443968	213	6819
77052	9.31	0967105	2.13	RE-ST	N	GO ST	FRONT	N	ERROR	ERROR			THU	09/16/1999	10AM-11AM	9433813	263	8555
77052	9.51	0967105	2.33	SS-SM	N	TNRT	FRONT-R	N	GO ST	SIDE-L		1	THU	06/18/1998	9AM-10AM	7443980	208	0207
77052	9.52	0967105	2.35	AN-DR	W	ENT RD	SIDE-L	N	GO ST	FRONT			SUN	06/18/2000	10PM-11PM	0214505	519	3007
77052	9.56	0967105	2.38	HD-ON	S	GO ST	FRONT	N	GO ST	ERROR		1	TUE	12/28/1999	NOON-1PM	9433794	275	8891
77052	9.67	0967105	2.50	FXOBJ	S	GO ST	SIDE-R						THU	11/04/1999	9PM-10PM	9067128	271	1026
77052	9.72	0967105	2.54	SS-SM	S	S/STOP RD	SIDE-L	S	PASSING	SIDE-R		1	SAT	12/04/1999	NOON-1PM	6552348	274	7015
77052	9.75	0967105	2.57	ANIML	S	GO ST	FRONT-L						TUE	06/09/1998	7AM-8AM	9068404	205	7870
77052	9.75	0967105	2.57	ANIML	N	GO ST	SIDE-R						TUE	06/09/1998	7AM-8AM	9068403	205	7869
77052	9.75	0967105	2.58	FXOBJ	S	GO ST	FRONT						THU	11/27/1997	1AM-2AM	4910306	182	5224
77052	9.80	0967105	2.62	SS-OP	N	PASSING	SIDE-L	N	GO ST	FRONT-R			FRI	04/11/1997	8AM-9AM	4910532	153	1620

Crashes Selected:
InterChange
Intersection
Segment

Time Period : 01/01/1997 thru 12/31/2000 (4 Years)
Location :
77052 7.13-9.99

Control Section	Mile Point	PR Number	Mile Point	Crash Type	Veh1			Veh 2			Fatal	Injury	Crash			Crash Report	Reel	Frame
					Dir	Intent	Impact	Dir	Intent	Impact			Day	Date	Hour			
77052	9.85	0967105	2.67	RE-ST	N	GO ST	FRONT	N	STOP RD	REAR		1	MON	09/25/2000	7AM-8AM	0214729	529	1703

Michigan Department of Transportation

CRASH SUMMARY REPORT

06/17/2003

Crashes Selected	Time Period: 01/01/1997 thru 12/31/2000 (4 Years)
InterChange Intersection Segment	**Location:** 77052 7.13-9.99

Approach Direction	Total	Number of Crashes By Type									
		Head On	Head On-Lt	Angle Str	Angle Turn	Rear End	Rear Turn	Ped	Park	Drive	Other
E	26	0	1	8	5	1	0	0	0	9	2
E	7	0	0	2	1	0	0	0	1	2	1
N	63	0	2	2	2	20	3	0	2	16	16
NE	1	0	0	0	1	0	0	0	0	0	0
NW	2	0	0	0	0	0	0	0	1	0	1
S	50	2	0	3	1	7	1	0	0	14	22
W	9	0	1	1	3	0	0	0	1	3	0
W	5	0	0	0	2	0	0	0	0	2	1
Other	6	0	0	0	0	1	0	1	0	2	2
Total	169	2	4	16	15	29	4	1	5	48	45
Average Per year	42.3	0.5	-1.0	4.0	3.8	7.3	1.0	0.3	1.3	12.0	11.3
Percent of Total	100.0	1.2	2.4	9.5	8.9	17.2	2.4	0.6	3.0	28.4	26.6
1997	32	0	2	2	4	5	0	0	0	12	7
1998	52	1	0	6	2	9	2	1	3	14	14
1999	47	1	1	4	6	8	0	0	1	15	11
2000	38	0	1	4	3	7	2	0	1	7	13

MICHIGAN DEPARTMENT OF TRANSPORTATION
SUMMARY OF CRASH CHARACTERISTICS

Crashes Selected Time Period: 01/01/1997 thru 12/31/2000 (4 Years)

InterChange
Intersection
Segment

Location:

77052 7.13-9.99

TYPE OF CRASH

YEAR	REAR-END LEFT TURN		HEAD-ON LEFT TURN		REAR-END		ANGLE		SIDESWIPE		PEDES-TRIAN		HEAD-ON		DRIVE-RELATED		FIXED OBJECT		OTHERS	
1997	0	0%	2	6%	5	16%	6	19%	3	9%	0	0%	0	0%	12	38%	2	6%	2	6%
1998	2	4%	0	0%	9	17%	8	15%	5	10%	1	2%	1	2%	14	27%	3	6%	9	17%
1999	0	0%	1	2%	8	17%	10	21%	4	9%	0	0%	1	2%	15	32%	3	6%	5	11%
2000	2	5%	1	3%	7	18%	7	18%	1	3%	0	0%	0	0%	7	18%	2	5%	11	29%
Total	4	2%	4	2%	29	17%	31	18%	13	8%	1	1%	2	1%	48	28%	10	6%	27	16%

PAVEMENT CONDITION

YEAR	DEBRIS		DRY		ICY		MUDDY		SLUSHY		SNOWY		WET		OTHERS	
1997	0	0%	25	78%	0	0%	0	0%	0	0%	1	3%	6	19%	0	0%
1998	0	0%	42	81%	1	2%	0	0%	0	0%	2	4%	7	13%	0	0%
1999	0	0%	33	70%	3	6%	0	0%	0	0%	6	13%	5	11%	0	0%
2000	0	0%	27	71%	0	0%	0	0%	0	0%	3	8%	8	21%	0	0%
Total	0	0%	127	75%	4	2%	0	0%	0	0%	12	7%	26	15%	0	0%

LIGHT CONDITION

YEAR	DARK LIGHTED		DARK UN LIGHTED		DAWN		DAYLIGHT		DUSK		OTHERS	
1997	5	16%	0	0%	0	0%	25	78%	2	6%	0	0%
1998	13	25%	1	2%	0	0%	37	71%	1	2%	0	0%
1999	9	19%	1	2%	3	6%	33	70%	1	2%	0	0%
2000	6	16%	2	5%	1	3%	29	76%	0	0%	0	0%
Total	33	20%	4	2%	4	2%	124	73%	4	2%	0	0%

CRASH SEVERITY

YEAR	FATAL CRASHES		NUMBER KILLED	INJURY CRASHES		NUMBER INJURED	PROPERTY DAMAGE		OTHERS		TOTAL CRASHES	TOTAL INJURIES
1997	0	0%	0	14	44%	21	18	56%	0	0%	32	21
1998	0	0%	0	12	23%	17	40	77%	0	0%	52	17
1999	0	0%	0	18	38%	29	29	62%	0	0%	47	29
2000	0	0%	0	14	37%	17	24	63%	0	0%	38	17
Total	0		0	58		84	111		0		169	84

MICHIGAN DEPARTMENT OF TRANSPORTATION
CRASH TABULATIONS

Crashes Selected	Time Period: 01/01/1997 thru 12/31/2000 (4 Years)	
InterChange	Location:	
Intersection		
Segment		77052 7.13-9.99

MONTHLY DISTRIBUTION	FATAL	INJURY	P . DAMAGE	# CRASHES	PERCENT
JANUARY	0	4	10	14	8.28
FEBRUARY	0	3	6	9	5.33
MARCH	0	2	9	11	6.51
APRIL	0	1	7	8	4.73
MAY	0	5	4	9	5.33
JUNE	0	7	15	22	13.02
JULY	0	8	12	20	11.83
AUGUST	0	4	11	15	8.88
SEPTEMBER	0	9	6	15	8.88
OCTOBER	0	8	10	18	10.65
NOVEMBER	0	2	10	12	7.10
DECEMBER	0	5	11	16	9.47
UNK	0	0	0	0	0.00
TOTAL	0	58	111	169	100.01

DAY					
SUNDAY	0	6	11	17	10.06
MONDAY	0	7	13	20	11.83
TUESDAY	0	7	14	21	12.43
WEDNESDAY	0	16	12	28	16.57
THURSDAY	0	10	28	38	22.49
FRIDAY	0	6	22	28	16.57
SATURDAY	0	6	11	17	10.06
UNK	0	0	0	0	0.00
TOTAL	0	58	111	169	100.01

LIGHT					
UNCODE / ERROR	0	0	0	0	0.00
DAYLIGHT	0	42	82	124	73.37
DAWN	0	1	3	4	2.37
DUSK	0	0	4	4	2.37
DARK LIGHTED	0	13	20	33	19.53
DARK UNLIGHTED	0	2	2	4	2.37
OTHER	0	0	0	0	0.00
TOTAL	0	58	111	169	100.01

Crashes Selected	Time Period: 01/01/1997 thru 12/31/2000 (4 Years)	
InterChange	Location:	
Intersection		
Segment	77052 7.13-9.99	

TIME	FATAL	INJURY	P. DAMAGE	# CRASHES	PERCENT
MID-1AM	0	0	1	1	0.59
1AM-2AM	0	3	4	7	4.14
2AM-3AM	0	0	2	2	1.18
3AM-4AM	0	0	0	0	0.00
4AM-5AM	0	0	0	0	0.00
5AM-6AM	0	1	3	4	2.37
6AM-7AM	0	3	1	4	2.37
7AM-8AM	0	5	12	17	10.06
8AM-9AM	0	1	4	5	2.96
9AM-10AM	0	2	2	4	2.37
10AM-11AM	0	2	4	6	3.55
11AM-NOON	0	1	5	6	3.55
NOON-1PM	0	6	9	15	8.88
1PM-2PM	0	2	3	5	2.96
2PM-3PM	0	5	5	10	5.92
3PM-4PM	0	6	19	25	14.79
4PM-5PM	0	6	9	15	8.88
5PM-6PM	0	6	8	14	8.28
6PM-7PM	0	2	8	10	5.92
7PM-8PM	0	0	2	2	1.18
8PM-9PM	0	1	4	5	2.96
9PM-10PM	0	2	1	3	1.78
10PM-11PM	0	2	5	7	4.14
11PM-MID	0	0	0	0	0.00
ERRORS	0	0	0	0	0.00
UNKNOWN	0	2	0	2	1.18
TOTAL	0	58	111	169	100.01

WEATHER					
ERROR	0	1	1	2	1.18
CLEAR	0	30	52	82	48.52
CLOUDY	0	21	40	61	36.09
FOG / SMOKE	0	0	0	0	0.00
RAIN	0	4	6	10	5.92
SNOW/BLOW	0	2	11	13	7.69
SEVERE WND	0	0	0	0	0.00
SLEET/HAIL	0	0	0	0	0.00
OTHER	0	0	1	1	0.59
TOTAL	0	58	111	169	99.99

Crashes Selected	Time Period: 01/01/1997 thru 12/31/2000 (4 Years)
InterChange	Location:
Intersection	
Segment	77052 7.13-9.99

SURFACE	FATAL	INJURY	P . DAMAGE	# CRASHES	PERCENT
ERROR	0	0	0	0	0.00
DRY	0	44	83	127	75.15
WET	0	11	15	26	15.38
ICY	0	1	3	4	2.37
SNOWY	0	2	10	12	7.10
MUDDY	0	0	0	0	0.00
SLUSHY	0	0	0	0	0.00
DEBRIS	0	0	0	0	0.00
OTHER	0	0	0	0	0.00
TOTAL	0	58	111	169	100.00

CONDITION					
IN CNST ZONE	0	0	1	1	0.59
IN UTIL ZONE	0	0	0	0	0.00
OTHER	0	58	110	168	99.41
TOTAL	0	58	111	169	100.00

HWY TYPE					
INTERSECTION	0	47	88	135	79.88
MID-BLOCK	0	11	23	34	20.12
NON-TRAFFIC	0	0	0	0	0.00
TOTAL	0	58	111	169	100.00

RELATIONSHIP TO ROAD					
ERROR	0	0	0	0	0.00
IN GORE	0	0	0	0	0.00
IN MEDIAN	0	0	0	0	0.00
ON ROAD	0	56	105	161	95.27
ON SHOULDR	0	0	2	2	1.18
OUTSD SHDR	0	1	3	4	2.37
UNKNOWN	0	1	1	2	1.18
TOTAL	0	58	111	169	100.00

Crashes Selected	Time Period: 01/01/1997 thru 12/31/2000 (4 Years)
InterChange	Location:
Intersection	
Segment	77052 7.13-9.99

MDOT CRASH TYPE	FATAL	INJURY	P . DAMAGE	# CRASHES	PERCENT
ERROR	0	0	0	0	0.00
OTURN	0	0	0	0	0.00
TRAIN	0	0	0	0	0.00
PED	0	1	0	1	0.59
BIKE	0	1	1	2	1.18
FXOBJ	0	2	8	10	5.92
O-OBJ	0	0	0	0	0.00
PKD-V	0	0	0	0	0.00
ANIML	0	0	2	2	1.18
MSC-SNG	0	0	4	4	2.37
MSC-MLT	0	2	8	10	5.92
AN-ST	0	2	14	16	9.47
AN-TN	0	5	10	15	8.88
HD-LT	0	3	1	4	2.37
RE-ST	0	8	21	29	17.16
RE-LT	0	3	1	4	2.37
RE-RT	0	0	0	0	0.00
DU-LT	0	0	2	2	1.18
DU-RT	0	0	0	0	0.00
HD-ON	0	2	0	2	1.18
SS-SM	0	4	7	11	6.51
SS-OP	0	0	2	2	1.18
AN-DR	0	13	10	23	13.61
RE-DR	0	6	13	19	11.24
OT-DR	0	4	2	6	3.55
BCKNG	0	0	2	2	1.18
PRKNG	0	2	3	5	2.96
TOTAL	0	58	111	169	100.00

TOTAL LANES					
1	0	1	1	2	1.18
2	0	9	17	26	15.38
3	0	2	5	7	4.14
4	0	45	87	132	78.11
5	0	0	0	0	0.00
6	0	1	1	2	1.18
7	0	0	0	0	0.00
8	0	0	0	0	0.00
9	0	0	0	0	0.00
99	0	0	0	0	0.00
TOTAL	0	58	111	169	99.99

Appendix B

Public Comments

M-29 CORRIDOR PLANNING AND RESEARCH
Public Information Meeting Summary
City of St. Clair - City Hall
November 10, 2004

Meeting attendees were asked to fill out a brief survey that included a list of eight issues. Attendees were asked to rank these issues from 1 to 8 in the order of importance to them, 1 being the most important and 8 being the least important. The following rankings list the overall opinion of the entire group.

1	Improve safety at pedestrian crossings
2	Encourage motorists to obey posted speeds
3	Improve turn movements, especially at Clinton Street
4	Improve aesthetics and suggest way-finding signage; strategic sing placement
5	Reduce roadway noise
6	Provide a continuous non-motorized path along the M-29 Corridor
7	Provide adequate parking on-street
8	Maintain existing traffic flow rate (level of service)

-Objectives ranked in order of importance; based on 41 surveys received November 10, 2004

Attendees were also provided with space for comments and observations. The following is a listing of the comments written by these attendees.

I cannot tell you how many times I cross that street in the course of one day! I'm sorry but this issue appears to be so ridiculous. The road goes through a city, so why would you raise the speed? What about traffic flow for our businesses? If you eliminate traffic, you eliminate clients and customers.

There is currently no safe way for residents in my area to ride a bike or walk to downtown St. Clair from our neighborhood. There are no bike paths or sidewalks.

I would prefer Alternative 2 or 3 for the downtown area, and agree with the proposed plans north and south.

Possibly eliminate the in/out driveways at the mall parking lot. Make entry only on Jay/Vine or Second. With all the parking available in the mall, there are plenty of places to park. Prefer Alternative 3 without parking spaces.

Enforce current speed limits. We approve north of downtown plan.

As the community grows in size and more people are coming to the downtown area, is having only 1 lane in each direction going to provide enough driving space to not discourage people coming due to congestion? Having a sidewalk along Palmer Park is absolutely necessary, but not necessarily as part of the "Bay and Bridge" plan.

Speeds leaving town south and north increases above posted speed limits. Speed limits should reflect pedestrian safety.

North Riverside Proposal is a good idea. We like the decrease of 3 lanes. East side of Riverside is very difficult to cross over 4 lanes of traffic with small children on bikes. Need a bike path/sidewalk.

Like the idea of Burm downtown and also bike paths and parking. Slowing downtown traffic is main concern!

Traffic flows alright now. Traffic is backed up to our house now, when the bridge is up. It will take 2-3 changes in the lights to clear traffic. With the four lanes in front of our office, it gives us the option of waiting in the center and cars will move to the other lane to give us even more time.

Love the North Riverside proposal! Alternate 1 is good balance between parking, amenities.

We live within city limits. When we exit or enter our front door, the first thing we view is a 50 MPH sign, which is within city limits. Cars are traveling at a rate of 60 MPH due to lack of ticketing. Truck noise is too much.

Need more crosswalks with signals.

Speed limit should now be lowered to 25 MPH and enforced—this would make it safe. We need downtown more parking friendly for pedestrians who come for our events. We need more parking for business fronts and park.

I think this is a stupid idea. Leave it the way it is. I'm against any change to M-29.

Slow down traffic and enforce speed limits. Enforce noise ordinances.

Very disappointed in plan, especially south side. Thought plan would involve a "major rebuilding of M-29." Any future plans must include placing all above ground utilities underground especially on South Oakland. Plan will not solve many of the "identified problematic issues."

Prefer Alternateive 2.

Prefer Alternative 1.

Changing the state highway 29 to 3 lanes increases congestion, makes passing impossible. What about garbage pick-up and school bus stops? More accidents. A step *backward. Place signs and lights telling cars when they can exit restaurant parking lots. Do no obstruct traffic flow with parked cars.*

Have an adequate sidewalk now, waste of money to provide more. I'm also a bike rider and have no problem. This is a state highway—slowing traffic is no solution. As now, provide parking only in commercial and park area. Signs are always helpful. Raise gas to 4 bucks a gallon. Seriously, maybe people will change to smaller cars. Population growth, more cars, everybody in a hurry. Reducing to three lanes from four is a step backwards. Traffic flow people are long against it. Middle lane is a suicide lane. See: old Gratiot, was three now two. Boulevard? Two thumbs DOWN! Like many, this is an old community with outmoded roads and other utilities and we have to live with some inconvenience and change slowly. Taxes are high and can be better spent on healthcare reform and aid for the poor. $100,000 for this study seems largely a waste to me.

Have lighting on both sides of the street.

I believe we mostly have adequate on-street parking. Noise is a problem for us, but if traffic is reduced to 2 lanes, we will never be able to get out of our driveways. People usually do a rolling stop or do not stop at Brown onto M-29, which does not give us easy exit from our driveways. We sit and sit, usually I will just edge out onto M-29 into the closest lane south and they will go around or into passing lane. Forget getting onto M-29 and going north from our house! Maybe better enforcement would slow traffic? I really like the first alternate for downtown and I like the idea of bike lanes on the north side of town, but what can be done about the Brown St. turning issue?

Get ride of all new "No Parking" signs and reduce number of speed limit signs. I prefer Alternative 1, but have a paved 9 or 10 foot path next to the road on the east side.

I like north and south alternatives and I like Alternative 1 for downtown. I would like to minimize any problems that could arise at the St. Clair Inn due to going from 2 lanes to boulevard.

I am leaning towards Alternative 1. I like the idea of a decorative landscape median which would provide some safety crossing the 4 lanes and it would enhance St. Clair. I would also be for the decorative median north of town.

MDOT has trashed N. Riverside with a tremendous amount of signs. I suggest eliminating all signs except 40 MPH in city limits, where speed changes. Install "quaint" street lights through city on M-29.

I think the only issue that needs to be addressed are speed limits and enforcement!!!

Three lanes starting north of Vine St. will cause a problem for traffic getting in and out of the St. Clair Inn, because we are just north of Vine Street.

Walk-ability and pedestrian safety are important, as well as reducing traffic speed. Both could be accomplished with these options. I prefer Alternative 1, but feel Alternative 3 would be more practical for St. Clair. (7th Street)

Design must provide a connection between commercial area and residential neighborhoods with the park and riverfront. Non-motorized traffic should be encourages and protected with the appropriate design.

I really liked Alternative 3.

Eliminate commercial traffic on Vine and Brown!

I am more concerned with traffic (large trucks) coming down Vine.

Narrow the internal freeway!

Appendix C

Cost Estimates of Roadway Alternatives

	SDA JOB NUMBER:	RB03-006			
	JOB NAME:	M-29 Corridor - Planning and Research			
	JOB LOCATION:	City of St. Clair, St. Clair County, Michigan			
	905 South Blvd East		**Revised:**	11/5/04	
	Rochester Hills, MI 48307				
	Prepared by: ZK/EMK				

Estimated Construction Costs

Limits for Estimate: Along M-29 from south side of lift bridge to north spring point of Vine St.

Alternative 1 -

Removal Items					
2020002	Tree, Rem, 19 inch to 36 inch	10	Ea	$500.00	$ 5,000
2020004	Tree, Rem, 6 inch to 18 inch	41	Ea	$200.00	$ 8,200
2030011	Dr Structure, Rem	15	Ea	$350.00	$ 5,250
2030015	Sewer, Rem, Less than 24 inch	480	Ft	$15.00	$ 7,200
2040011	Pavt, Rem	19900	Syd	$6.00	$ 119,400
2040013	Sidewalk, Rem	3980	Syd	$4.00	$ 15,920
Earthwork Items					
2050010	Embankment, CIP	2500	Cyd	$5.00	$ 12,500
2050016	Excavation, Earth	19000	Cyd	$6.00	$ 114,000
2050041	Subgrade Undercutting, Type II	2000	Cyd	$23.00	$ 46,000
Erosion Control Items					
2080005	Erosion Control, Inlet Protection, Sediment Trap	26	Ea	$110.00	$ 2,860
2080025	Erosion Control, Silt Fence	2560	Ft	$2.00	$ 5,120
Paving Items					
3010002	Subbase, CIP	12900	Cyd	$15.00	$ 193,500
3020016	Aggregate Base, 6 inch	23865	Syd	$6.00	$ 143,190
5020045	HMA, 3E3	5050	Ton	$38.00	$ 191,900
5020051	HMA, 4E3	2790	Ton	$39.00	$ 108,810
5020057	HMA, 5E3	2035	Ton	$40.00	$ 81,400
5020061	HMA Approach	230	Ton	$75.00	$ 17,250
8020016	Curb and Gutter, Conc, Det B2	3100	Ft	$15.00	$ 46,500
8020021	Curb and Gutter, Conc, Det C2	5150	Ft	$11.00	$ 56,650
8030002	Sidewalk, Conc, 4 inch	35308	Sft	$3.00	$ 105,924
8030011	Sidewalk Ramp, ADA	532	Sft	$4.50	$ 2,394
Drainage Items					
4010668	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	1	Ea	$600.00	$ 600
4020987	Sewer, Cl IV, 12 inch, Tr Det B	652	Ft	$32.00	$ 20,864
4020988	Sewer, Cl IV, 15 inch, Tr Det B	300	Ft	$35.00	$ 10,500
4020989	Sewer, Cl IV, 18 inch, Tr Det B	300	Ft	$38.00	$ 11,400
4020993	Sewer, Cl IV, 24 inch, Tr Det B	96	Ft	$60.00	$ 5,760
4030000	Dr Structure, 24 inch dia	16	Ea	$700.00	$ 11,200
4030005	Dr Structure, 48 inch dia	5	Ea	$1,100.00	$ 5,500
4030051	Dr Structure Cover	12230	Lbs	$2.00	$ 24,460
4040073	Underdrain, Subgrade, 6 inch	5114	Ft	$5.50	$ 28,127
Bike Path Items					
8060001	Bicycle Path, Grading	400	Ft	$9.00	$ 3,600
8060006	Bicycle Path, Aggregate, LM	80	Cyd	$12.00	$ 960
8060010	Bicycle Path, HMA	85	Ton	$60.00	$ 5,100
Restoration Items					
8160055	Sodding	2500	Syd	$5.00	$ 12,500
8160061	Topsoil Surface, Furn, 3 inch	2500	Syd	$2.00	$ 5,000
Miscellaneous Landscaping		1	lsum	$30,000.00	$ 30,000
Maintenance of Traffic		1	lsum	$20,000.00	$ 20,000
Utility Relocations		1	lsum	$10,000.00	$ 10,000
Signing and Striping		1	lsum	$10,000.00	$ 10,000
	Subtotal				$ 1,504,539
	Contingencies				$ 301,000
	Mobilization, Max 5%				$ 75,000
	TOTAL (Alternative 1)				**$ 1,880,539**

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	905 South Blvd East		**Revised:**	11/5/04	
	Rochester Hills, MI 48307				
	Prepared by: ZK/EMK				

Estimated Construction Costs

Limits for Estimate: Along M-29 from south side of lift bridge to north spring point of Vine St.

Alternative 2 -

Removal Items					
2020002	Tree, Rem, 19 inch to 36 inch	10	Ea	$500.00	$ 5,000
2020004	Tree, Rem, 6 inch to 18 inch	34	Ea	$200.00	$ 6,800
2030011	Dr Structure, Rem	15	Ea	$350.00	$ 5,250
2030015	Sewer, Rem, Less than 24 inch	480	Ft	$15.00	$ 7,200
2040011	Pavt, Rem	17214	Syd	$6.00	$ 103,284
2040013	Sidewalk, Rem	3980	Syd	$4.00	$ 15,920
Earthwork Items					
2050010	Embankment, CIP	2500	Cyd	$5.00	$ 12,500
2050016	Excavation, Earth	14540	Cyd	$6.00	$ 87,240
2050041	Subgrade Undercutting, Type II	1500	Cyd	$23.00	$ 34,500
Erosion Control Items					
2080005	Erosion Control, Inlet Protection, Sediment Trap	13	Ea	$110.00	$ 1,430
2080025	Erosion Control, Silt Fence	2547	Ft	$2.00	$ 5,094
Paving Items					
3010002	Subbase, CIP	10440	Cyd	$15.00	$ 156,600
3020016	Aggregate Base, 6 inch	16980	Syd	$6.00	$ 101,880
5020045	HMA, 3E3	3360	Ton	$38.00	$ 127,680
5020051	HMA, 4E3	1950	Ton	$39.00	$ 76,050
5020057	HMA, 5E3	1465	Ton	$40.00	$ 58,600
5020061	HMA Approach	230	Ton	$75.00	$ 17,250
8020021	Curb and Gutter, Conc, Det C2	5094	Ft	$11.00	$ 56,034
8030002	Sidewalk, Conc, 4 inch	32000	Sft	$3.00	$ 96,000
8030011	Sidewalk Ramp, ADA	512	Sft	$4.50	$ 2,304
Drainage Items					
4010668	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	1	Ea	$600.00	$ 600
4020987	Sewer, Cl IV, 12 inch, Tr Det B	540	Ft	$32.00	$ 17,280
4020988	Sewer, Cl IV, 15 inch, Tr Det B	300	Ft	$35.00	$ 10,500
4020989	Sewer, Cl IV, 18 inch, Tr Det B	300	Ft	$38.00	$ 11,400
4020993	Sewer, Cl IV, 24 inch, Tr Det B	100	Ft	$60.00	$ 6,000
4030000	Dr Structure, 24 inch dia	8	Ea	$700.00	$ 5,600
4030005	Dr Structure, 48 inch dia	5	Ea	$1,100.00	$ 5,500
4030051	Dr Structure Cover	6990	Lbs	$2.00	$ 13,980
4040073	Underdrain, Subgrade, 6 inch	5100	Ft	$5.50	$ 28,050
Bike Path Items					
8060001	Bicycle Path, Grading	2500	Ft	$9.00	$ 22,500
8060006	Bicycle Path, Aggregate, LM	465	Cyd	$12.00	$ 5,580
8060010	Bicycle Path, HMA	495	Ton	$60.00	$ 29,700
Restoration Items					
8160055	Sodding	5100	Syd	$5.00	$ 25,500
8160061	Topsoil Surface, Furn, 3 inch	5100	Syd	$2.00	$ 10,200
Miscellaneous Landscaping		1	lsum	$30,000.00	$ 30,000
Maintenance of Traffic		1	lsum	$20,000.00	$ 20,000
Utility Relocations		1	lsum	$10,000.00	$ 10,000
Signing and Striping		1	lsum	$10,000.00	$ 10,000
	Subtotal				$ 1,239,006
	Contingencies				$ 248,000
	Mobilization, Max 5%				$ 62,000
	TOTAL (Alternative 2)				**$ 1,549,006**

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	905 South Blvd East		**Revised:**	11/5/2004	
	Rochester Hills, MI 48307				
	Prepared by: ZK/EMK				

Estimated Construction Costs

Limits for Estimate: Along M-29 from south side of lift bridge to north spring point of Vine St.

Alternative 3 -

Removal Items					
2020002	Tree, Rem, 19 inch to 36 inch	10	Ea	$500.00	$ 5,000
2020004	Tree, Rem, 6 inch to 18 inch	34	Ea	$200.00	$ 6,800
2030011	Dr Structure, Rem	15	Ea	$350.00	$ 5,250
2030015	Sewer, Rem, Less than 24 inch	480	Ft	$15.00	$ 7,200
2040011	Pavt, Rem	19900	Syd	$6.00	$ 119,400
2040013	Sidewalk, Rem	3980	Syd	$4.00	$ 15,920
Earthwork Items					
2050010	Embankment, CIP	850	Cyd	$5.00	$ 4,250
2050016	Excavation, Earth	15530	Cyd	$6.00	$ 93,180
2050041	Subgrade Undercutting, Type II	1500	Cyd	$23.00	$ 34,500
Erosion Control Items					
2080005	Erosion Control, Inlet Protection, Sediment Trap	13	Ea	$110.00	$ 1,430
2080025	Erosion Control, Silt Fence	2561	Ft	$2.00	$ 5,122
Paving Items					
3010002	Subbase, CIP	11380	Cyd	$15.00	$ 170,700
3020016	Aggregate Base, 6 inch	12805	Syd	$6.00	$ 76,830
5020045	HMA, 3E3	4170	Ton	$38.00	$ 158,460
5020051	HMA, 4E3	2305	Ton	$39.00	$ 89,895
5020057	HMA, 5E3	1730	Ton	$40.00	$ 69,200
5020061	HMA Approach	230	Ton	$75.00	$ 17,250
8020016	Curb and Gutter, Conc, Det B2	4000	Ft	$15.00	$ 60,000
8020021	Curb and Gutter, Conc, Det C2	5122	Ft	$11.00	$ 56,342
8030002	Sidewalk, Conc, 4 inch	20480	Sft	$3.00	$ 61,440
8030011	Sidewalk Ramp, ADA	512	Sft	$4.50	$ 2,304
Drainage Items					
4010668	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	1	Ea	$600.00	$ 600
4020987	Sewer, Cl IV, 12 inch, Tr Det B	580	Ft	$32.00	$ 18,560
4020988	Sewer, Cl IV, 15 inch, Tr Det B	300	Ft	$35.00	$ 10,500
4020989	Sewer, Cl IV, 18 inch, Tr Det B	300	Ft	$38.00	$ 11,400
4020993	Sewer, Cl IV, 24 inch, Tr Det B	100	Ft	$60.00	$ 6,000
4030000	Dr Structure, 24 inch dia	16	Ea	$700.00	$ 11,200
4030005	Dr Structure, 48 inch dia	5	Ea	$1,100.00	$ 5,500
4030051	Dr Structure Cover	12230	Lbs	$2.00	$ 24,460
4040073	Underdrain, Subgrade, 6 inch	5100	Ft	$5.50	$ 28,050
Bike Path Items					
8060001	Bicycle Path, Grading	2520	Ft	$9.00	$ 22,680
8060006	Bicycle Path, Aggregate, LM	490	Cyd	$12.00	$ 5,880
8060010	Bicycle Path, HMA	532	Ton	$60.00	$ 31,920
Restoration Items					
8160055	Sodding	2845	Syd	$5.00	$ 14,225
8160061	Topsoil Surface, Furn, 3 inch	2845	Syd	$2.00	$ 5,690
Miscellaneous Landscaping		1	lsum	$30,000.00	$ 30,000
Maintenance of Traffic		1	lsum	$20,000.00	$ 20,000
Utility Relocations		1	lsum	$10,000.00	$ 10,000
Signing and Striping		1	lsum	$10,000.00	$ 10,000
	Subtotal				$ 1,327,138
	Contingencies				$ 265,000
	Mobilization, Max 5%				$ 66,000
	TOTAL (Alternative 3)				**$ 1,658,138**