

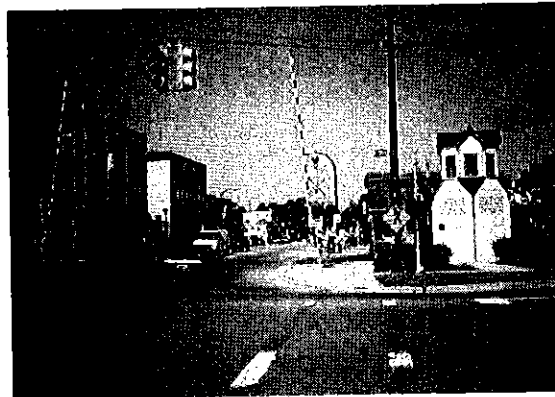
DEPOT TOWN CIRCULATION STUDY

City of Ypsilanti

Washtenaw County, Michigan

Project Manager

Ann Arbor-Ypsilanti: Urban Area Transportation Study
(UATS)



February 1999



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Section 1

Section I - Executive Summary

Hubbell, Roth & Clark, Inc. was retained to conduct extensive traffic and safety studies in the Depot Town area of Ypsilanti. This study was bounded by Forest Avenue, River Street, Cross Street, and Huron Street.

Traffic volume studies were conducted in the area and an analysis of intersection capacity showed that, even during peak traffic periods, the Depot Town area is experiencing very little delay. In traffic engineering terms, HRC found a good level of service, even during peak traffic periods.

HRC also looked extensively at the traffic crash records to identify traffic safety issues which should be addressed within a proven program. The major intersections in the study area experienced an average of 11 or less traffic crashes per year, and the accident rate, which measures traffic crash experience against the exposure is also quite favorable. Therefore, the traffic crash experience does not suggest the need for safety improvements to be incorporated in the improvement plans for the Depot Town area.

However, HRC's observation of the study area suggests several areas where traffic operations can be improved to minimize the potential for future traffic crashes. HRC recommends that several minor improvements be made to the Cross/River intersection. Most significant of these is to align the left turn lanes for the east and west legs of Cross Street. This assures that motorists making left turns have an adequate view of oncoming traffic. In addition, we suggest the addition of railroad crossing gates on to the intersection approaches not currently covered by gates. The addition of a traffic island on the south leg would help pedestrian access cross the south leg of the River/Cross intersection.

In terms of traffic operations, HRC also recommends a realignment of the Rice at the Forest intersection to create a "T" intersection. This will provide safer and more convenient access to the park area during special events.

HRC examined the intersection of Rice Street and Cross Street to determine if a flashing beacon or some other traffic control should be installed. We found that the traffic crash

experience at Cross/Rice did not warrant the installation of flashing beacons under the criteria established in the Michigan Manual of Uniform Traffic Control Devices. We also reviewed this intersection to determine whether a multi-way stop should be installed at Rice/Cross. We found that the traffic volumes and the traffic crash experience did not meet the requirements of the Michigan Manual of Uniform Traffic Control Devices for multi-way stop installations. HRC recommends that the corner site clearance of Rice/Cross be improved to provide better visibility for motorists on Rice entering Cross Street. This corner clearance will also assist motorists wishing to find the parking areas access through Rice Street.

HRC understands that a traffic signal is scheduled for installation at the Cross/Huron intersection. This signal should help reduce the potential for right angle crashes at the intersection. HRC did not find any compelling reason to make improvements to the River/Forest intersection. This intersection experiences an average of less than 5 traffic crashes per year and operates at an extremely good level of service during peak traffic periods.

Pedestrian access in and out of the park should be improved by creating a definable pedestrian path which connects Forest Avenue to Cross Street along a Rice Street alignment. A new parking area has been proposed on the west side of River Street, but east of the railroad tracks. It will be important to provide safe pedestrian access from this parking area to the businesses on Cross Street. We suggest that the crossing of the railroad tracks for pedestrians be made at the protected crosswalks at the River/Cross intersection.

Development of new facilities in the Frog Island and Freighthouse areas which attract additional trips will also require the provision of additional parking. Parking for these developments will have to be provided on a special event basis. They will require the addition of on-site parking or access to off-site parking through a shuttle service.

Section 2

Section II - Introduction

Hubbell, Roth & Clark, Inc. conducted the Depot Town Circulation Study with the assistance of Carlisle/Wartman Associates, Inc. The study focused on vehicular and pedestrian traffic patterns within Depot Town in the City of Ypsilanti, Michigan and will identify short term and long term opportunities to provide for safer and more efficient vehicular and pedestrian travel to and through Depot Town. The study will also focus on the potential development of Frog Island Park as an entertainment venue. The first figure shows the Circulation Study Area.

A. *Ypsilanti*

Ypsilanti is one of the oldest settlements in Michigan. The railroad, which arrived in 1839, brought prosperity to the settlement. The city currently has two Historic Districts on the National Register – one in downtown Ypsilanti and one in Depot Town. Modern Ypsilanti is well served by a number of transportation networks. I-94 access runs east-west and runs from Detroit to Denver and US-23 runs north-south from Saginaw to Toledo and connects to I-75. Both Detroit Metropolitan Airport and Willow Run Airport are minutes away. Industrial rail service is provided by Conrail with passenger service provided by Amtrak. Public transportation is provided by Ann Arbor Transportation Agency (AATA).

B. *Depot Town*

Depot Town is an historic district located on Cross Street between Huron and River Streets and provides residents and visitors with a variety of retail services. The area has an active rail line running along its eastern border and the Huron River meanders through Depot Town. Loft redevelopment in the second stories of commercial buildings allows people to live right in the heart of Depot Town. The area has a strong automotive history reflected in the Ypsilanti Automotive Heritage Museum and the current automotive-related businesses. The city's original railroad depot station and freight house, which are significant historical structures, are located in Depot Town.

Ypsilanti's Farmer's Market which is located at the Freighthouse adds considerably to the vibrant mix of businesses. The market is open every Wednesday and Saturday and offers fresh produce, flowers, plants along with craft items and family entertainment. The Freighthouse is also rented for special events like wedding receptions, auctions and meetings.

Frog Island Park, an important recreational asset on the Huron River, is located in Depot Town, north of Cross Street. The park currently offers a picturesque location for pedestrians, bicyclists, soccer games and picnics. Frog Island Park is connected to a larger municipal park, Riverside Park, by a pedestrian bridge over the Huron River and safety paths. The boundaries of the Depot Town Downtown Development Authority are shown in following figure.

Major events that occur in Depot Town include:

- Civil War Muster April
- Orphan Car Show May
- Ypsilanti Street Rods Show & Shine May
- Frog Island Jazz Music Festival June
- Ypsilanti Heritage Festival August
- Cruise Night for Street Rods Summer
- Farmer's Market events

Depot Town has several proposed developments that will impact the immediate area by bringing more people and therefore more traffic to the area:

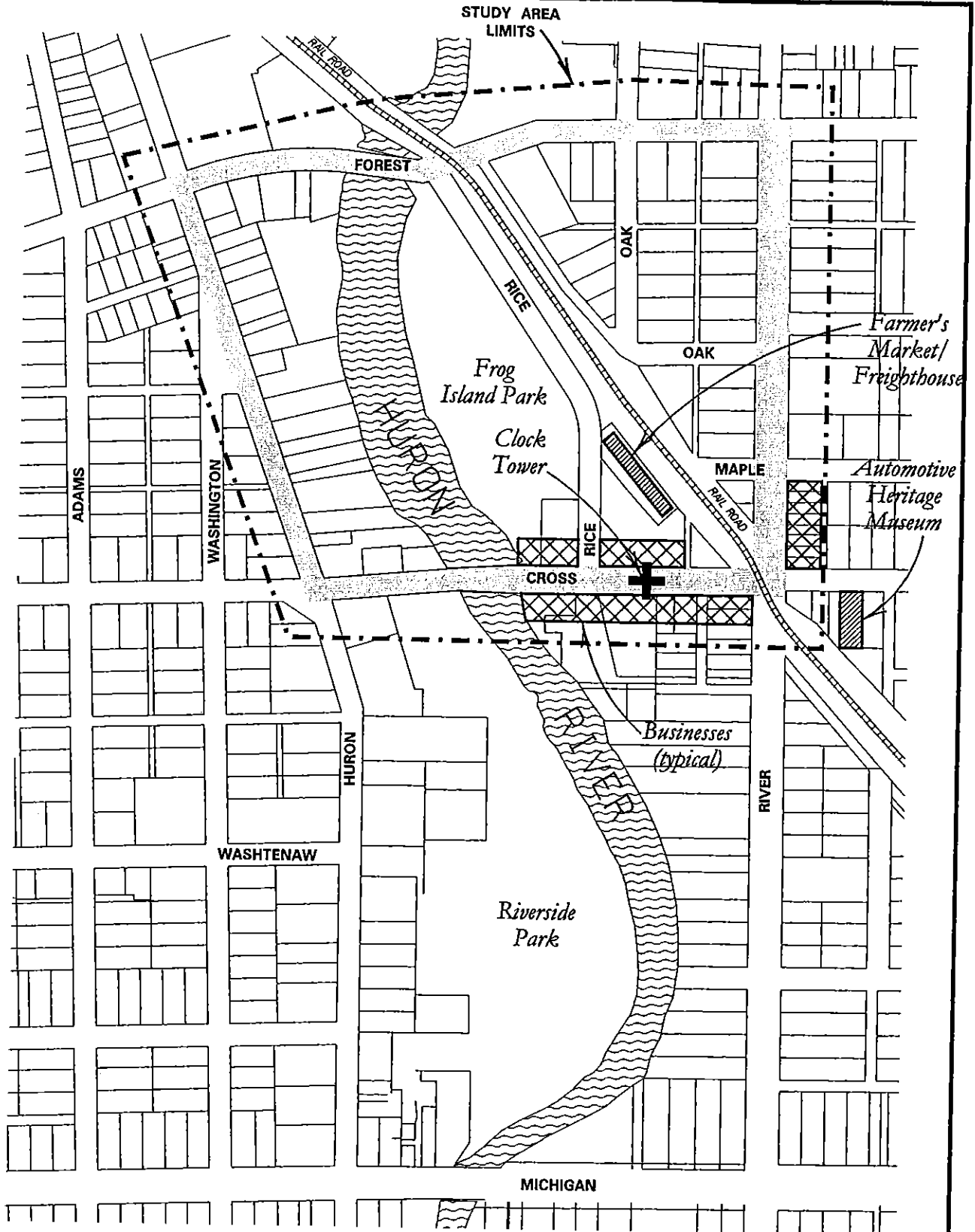
- Proposed amphitheater at Frog Island Park
- Freighthouse development and expansion
- Depot Town parking lot
- Ypsilanti Museum expansion

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PLOT NAME - N/A

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**DEPOT
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Circulation Study

STUDY AREA

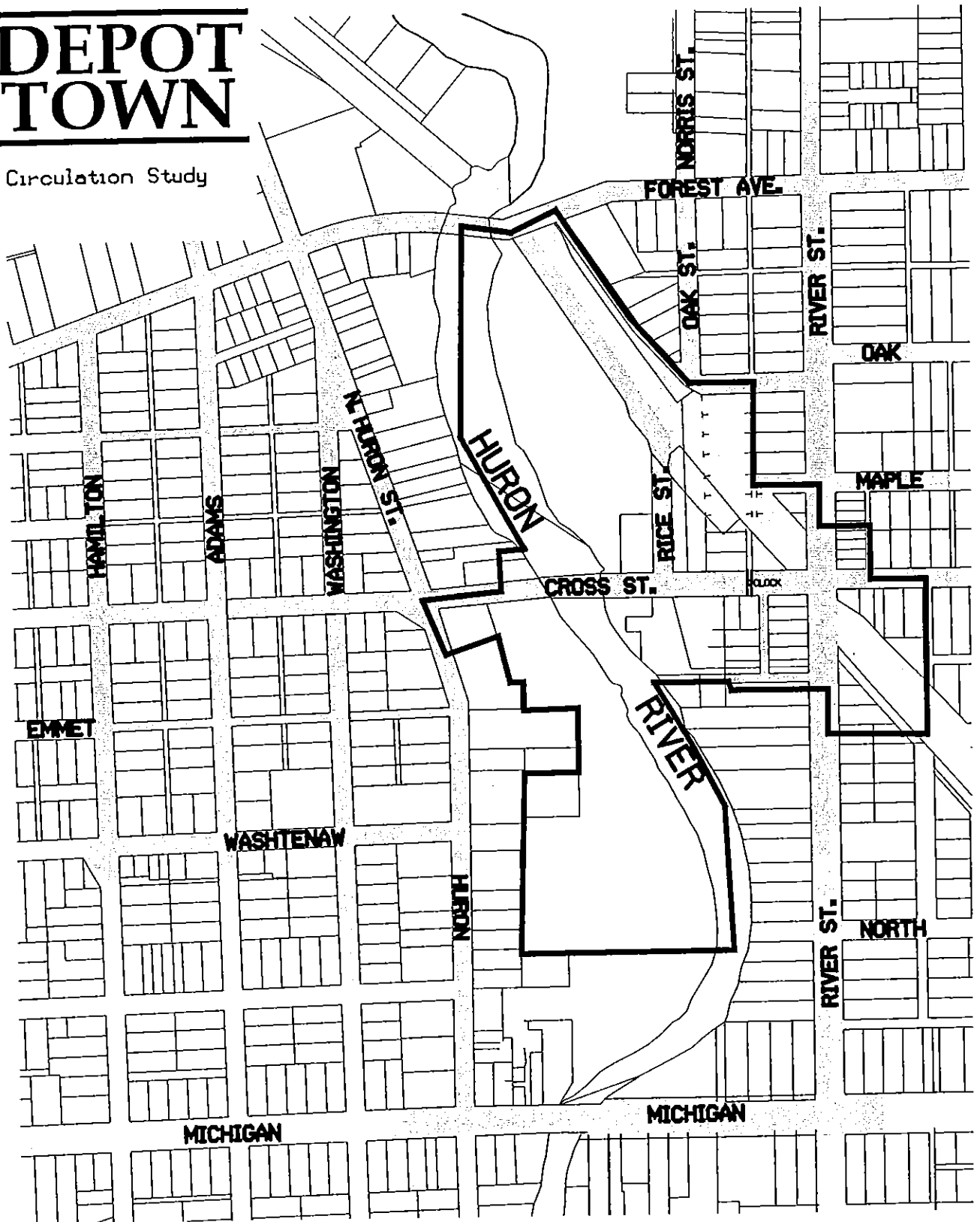


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C. Steering Committee Participants

The Ann Arbor-Ypsilanti Urban Area Transportation Study (UATS) served as project manager for the Depot Town Circulation Study. The consultants' work was guided by a Technical Steering Committee, which included representatives of the City of Ypsilanti; the Depot Town Business Association; the Depot Town Development Authority; the Ann Arbor Transportation Authority; and the Ann Arbor-Ypsilanti Urban Area Transportation Study Committee (see the table below for a list of committee members). The Steering Committee was very actively involved.

Name	Title	Company
Robert Tetens	Executive Director	Ann Arbor-Ypsilanti Urban Area Transportation Study (UATS)
Jennifer Goulet	Director Community and Economic Development	City of Ypsilanti
Ivan Harner	Chairperson	Depot Town Downtown Development Authority
Jim Curran	President	Depot Town Association
Jack Miller		Hudson Automobile Museum
Brett Lenart	Associate City Planner	City of Ypsilanti
Shanon Stumbo	Assistant to the City Manager	City of Ypsilanti
Chief Leonard Supenski	Chief of Police	City of Ypsilanti Police Department
Jon Ichesco	Fire Marshall	City of Ypsilanti Fire Department
Chris White	Service Development Manager	Ann Arbor Transportation Authority

Section 3

Section III - Issues

The purpose of this study is to prepare a comprehensive transportation circulation plan for the historic Depot Town area of the City of Ypsilanti. The multi-modal sub-area circulation plan must be sensitive to the pedestrian environment, while enhancing safety and providing reasonable capacity for the motoring public.

A. *Background Planning Efforts*

The Circulation Study conformed as much as possible to existing planning documents and in-progress planning efforts by the City of Ypsilanti. These include:

- ◆ Ypsilanti Master Plan (adopted February 1998)
- ◆ Huron River Corridor Master Plan (prepared August 1998)
- ◆ Huron-Whittaker Corridor Study
- ◆ Farmer's Market and Freighthouse development plans

A detailed comparison of the goals of the Master Plan and the recommendations of the Circulation Study can be found in the Appendix.

The Huron River Corridor Master Plan has several recommendations for Frog Island Park and Depot Town that were incorporated into the goals and objectives.

Connections to Riverside Park, Pen Park, Depot Town and the Farmer's Market should be enhanced.

Improve street access to the riverfront system through improved park entrances and new pedestrian and vehicular linkages to Downtown and Depot Town.

Ensure that the character of new buildings, structures, signs and other elements complements the historic character of the downtown, Depot Town and the neighborhoods to the extent practical.

The currently underway Huron-Whittaker Corridor Study also notes the need for a positive entryway into Depot Town and other enhancements efforts along Huron Street.

B. Public input

A kick-off meeting with the Technical Steering Committee was held on August 17, 1998. From this meeting, a list of problems and preliminary objectives were agreed upon.

Problems	Objectives
Delivery Area Locations	Calming
Boulevard on Cross, Yes & No and Pros & Cons	Safety
Rice & Cross, Vehicle Traffic Conflicts and Devices	Cross Street is Pedestrian Friendly
Consolidate Parking	Keep Vehicles on Perimeter
Congestion	Comprehensive Circulation Plan or "Vision"
Safety	
Pedestrian Circulation	

On December 14, 1998 a public workshop on the Depot Town Circulation Study was held at the Freighthouse. The inventory results were reported and public input was invited. Public comments from that workshop are summarized below:

Parking Related Statements

- Angle parking? Pros and cons? One or both sides?
- Parking on bridge? One or both sides? Angled?
- Parking in park?
- Don't eliminate parking, ensure traffic calming

Circulation And Access Related Statements

- Cross Street, two-way west of Huron?
- Prefer extended island alternative with improved access
- Museum, access, safety, signage
- Extended island alternative with improved access, utilities not a con
- Round about at Me 'N My Sister
- Access to Food Co-op
- Balance traffic calming with traffic access
- Boulevard inhibits traffic

Pedestrian Related Statements

- Pedestrian access through Riverside Arts Center
- Boulevard provides pedestrian safety

Safety Related Statements

- Traffic signal at Pearl and Huron
- Consider future traffic impacts
- Flashing lights at intersections
- Visibility for automobiles
- Weekend traffic volumes and speeds

Other

- Riverside Park plans, Huron Whittaker Study
- Case studies from other cities?
- Funding for improvements, who pays?
- Combine options?
- Ypsilanti Chamber of Commerce letter

The public comments were discussed with the Steering Committee for inclusion into the final plan.

C. Goals and Objectives

Based on the purpose stated above, conformance with existing planning efforts and numerous meetings with the Technical Steering Committee, Carlisle/Wortman developed a list of goals and objectives, which guided the entire study.

Depot Town Circulation Study

Goals And Objectives

- I. Pedestrian safety shall be enhanced for study area.
 - a. Minimize pedestrian/automobile conflicts
 - b. Provide proper pedestrian crossings including signage and pavement demarcation
 - c. Minimize driveway/pedestrian conflicts
 - d. Promote safe pedestrian crossings at rail access sites
- II. Automobile safety shall be enhanced for study area.
 - a. Reduce the incidence of traffic speeding on Cross Street
 - b. Minimize turning conflicts at intersections and driveways
 - c. Reduce automobile/rail conflicts
 - d. Improve River Street/Cross Street/Railroad intersection
- III. Improve circulation and access.
 - a. Improve overall circulation within study area
 - b. Ensure adequate access is provided to businesses and parking
 - c. Promote driveway access and continuous connection to rear of businesses
 - d. Coordinate loading/unloading to minimize conflicts and ensure access

- IV. Provide adequate parking.
 - a. Provide adequate on-street parking for easy access to business sites
 - b. Provide adequate off-street parking to service residential and business needs
 - c. Improve access to parking areas
 - d. Plan for and improve parking for special events needs
 - e. Improve visibility of off-street parking areas and consider improved signage noting locations of public parking
- V. Enhance pedestrian orientation.
 - a. Strengthen linkages within Depot Town between businesses/parking areas
 - b. Strengthen linkages to activity centers within the fringe of Depot Town including Frog Island, Riverside Park, campus, etc.
 - c. Ensure safe pedestrian access is provided to new parking lot near the train depot
 - d. Enhance pedestrian comfort with streetscape improvements including landscaping, lighting, paving, etc.
 - e. Enhance visibility and pedestrian linkage of Freighthouse and parcels north of Cross Street
- VI. Multi-modal coordination.
 - a. Ensure bus stops are strategically placed for convenience and safety
 - b. Provide bike access and bike parking
 - c. Consider rail activity in design alternatives
 - d. Consider multi-modal use of trails connecting to park areas
- VII. Maintenance/enhancement of business climate.
 - a. Traffic/parking improvements should complement economic activity and economic health of Depot Town
 - b. Ensure that traffic and parking improvements maintain historic character
 - c. Streetscape improvements must be designed in a manner which enhances the shopping/dining/outdoor cafe experience

In Section V, each of the seven major goals was compared to the proposed alternatives to determine if the objectives had been accomplished.

D. Constraints to System Development

Ypsilanti is home to one of the largest National Register Historic Districts in Michigan including two Historic Business Districts one Downtown and one in Depot Town.

The railroad which arrived in 1839 brought prosperity to these districts and development and industry spurred along the railroad tracks. The Huron River also saw a proliferation of mills and factories which relied on the Huron River for power. These elements ultimately provide constraints to system development. For example the bridges that currently cross the Huron

River will probably never be moved or changed. The railroad is being considered for a high speed rail corridor which may impede further development in the area.

Environmentally the Huron River poses a system constraint as it flows north and south through the area. It limits east-west travel through the entire Ypsilanti area to a number of major crossings in the study area at Cross, Forest, and at Michigan to name a few.

Environmentally contaminated sites including the Brownfield sites on Forest also limit potential system expansion due to the feasibility of obtaining necessary right of way.

The recreational park lands which surround the Huron River are very important to the economic viability of the area including hosting a number of the annual special events. This also creates a serious system constraint because they were most likely acquired using federal money which becomes very involved if modifications or changes are necessary.

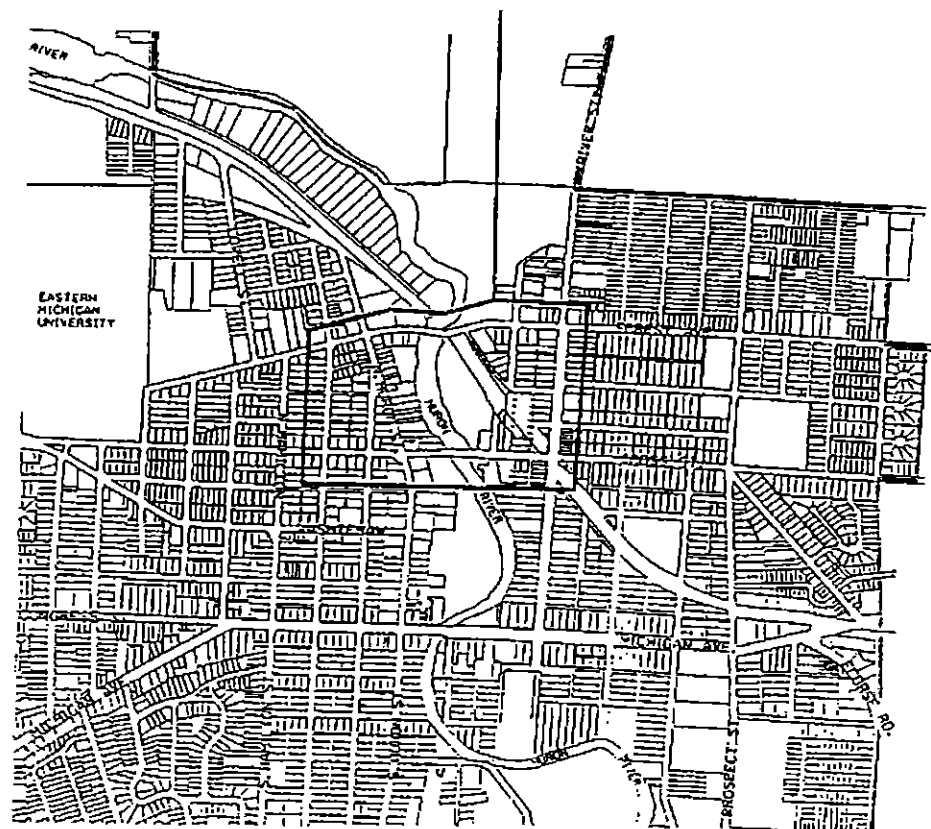
Section 4

Section IV - Roadway Network

A. Study Limits

The Circulation Study area was defined at a minimum to include the area bounded by Forest Avenue to the north, N. River Street to the east, Cross Street (M-17) to the south, and N. Huron Street to the west.

Depot Town Circulation Study Area



B. Road Description

The table below shows the functional classification of the roadways in the Circulation Study area.

Functional Classification

Street	Minor Arterials	Urban Collectors	Local
Forest Ave.	X		
N. River St.		X	
Cross St. (M-17)		X	
N. Huron St.	X		
Rice St.			X
Oak St.			X
Maple St.			X

SOURCE: Michigan Department of Transportation

The table below shows the basic configuration of the roadways in the Circulation Study.

Basic Configuration of Roadway

Street	No. of Lanes	Direction	On-Street Parking
Forest Ave.	4	2-way	
N. River St.	4	2-way	
Cross St. (M-17)	2	2-way	Both Sides
N. Huron St.	3	1-way north	
Rice St.	2	2-way	
Oak St.	2	2-way	Both Sides
Maple St.	2	2-way	Both Sides

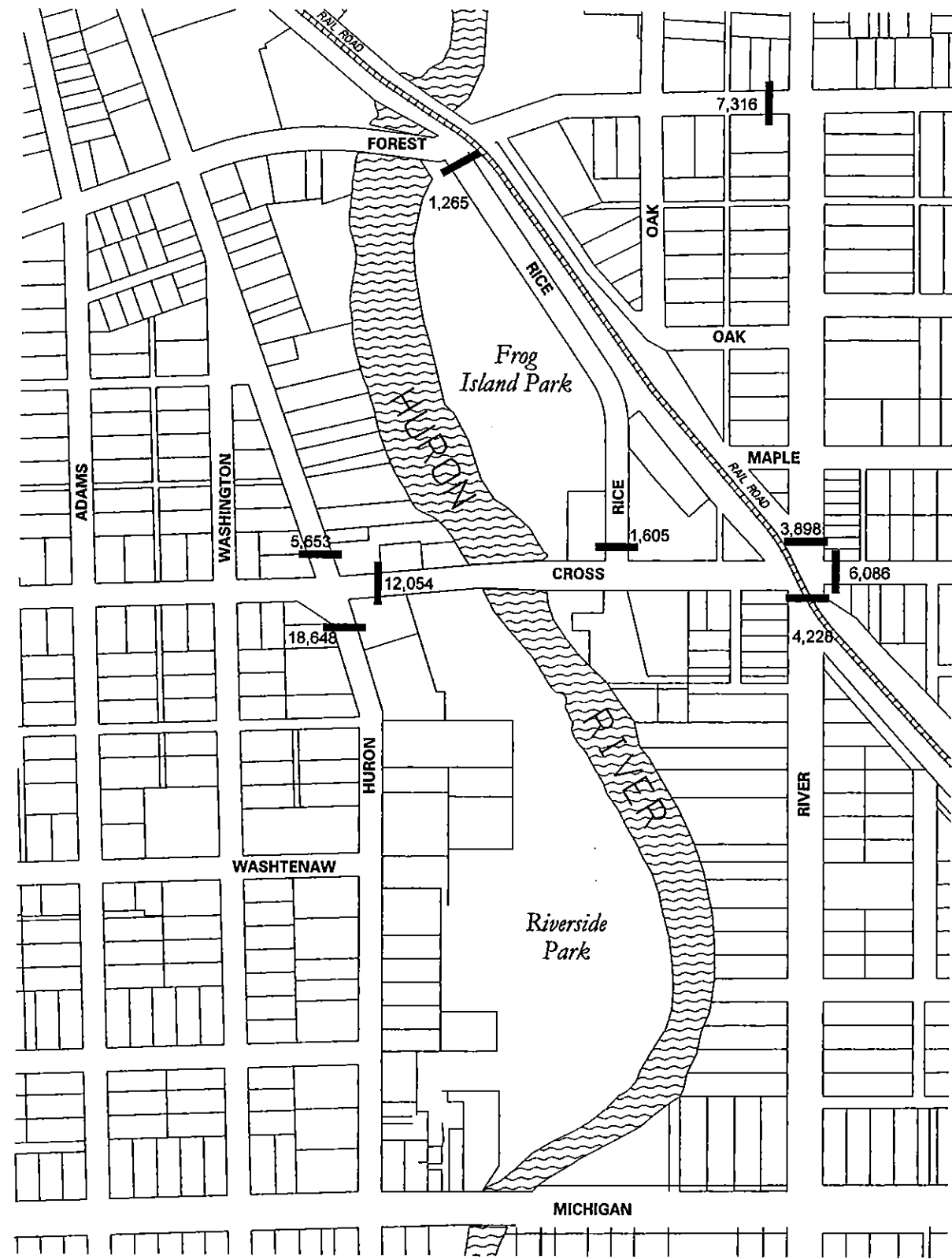
C. Average Daily Traffic

The table below shows the most current average daily traffic volumes. New machine counts were conducted in September 1998 at locations where the existing data was over two years old. All traffic and related back up data is provided in full in the Appendix.

Average Daily Traffic
1997-1998 Data

Location	ADT	AM Peak Hour	PM Peak Hour
Huron N. of Cross	5953	500	440
Huron S. of Cross	18648	1440	1460
Cross E. of Huron	12054 <i>10846-04</i>	1100	950 <i>784-05</i>
Cross E. of River	6086 <i>6420-2004</i>	400	520 <i>514-2004</i>
Forest W. of River	7316 <i>7490-2004</i>	460	670 <i>661-2004</i>
River N. of Cross	3898 <i>11652-04</i>	185	340 <i>423-04</i>
River S. of Cross	4228 <i>4095-04</i>	200	340 <i>372-04</i>
Rice N. of Cross	1605	45	95
Rice S. of Forest	1265	65	95

The average daily traffic volumes are shown graphically on the next Figure.



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Circulation Study

1997-1998 ADT



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D. Turning Movement Volumes

Turning Movement counts were conducted for four locations that were determined at the initial steering committee meeting. Morning and afternoon peak periods were counted at Rice and Forest, Rice and Cross, Cross and Huron, and Cross and River.

The counts showed the following. In general, more left turns were observed in the afternoon peak than the morning peak. The majority of northbound traffic on Huron diverts away from Depot Town by turning left onto westbound Cross; this movement is accommodated by the intersection geometry. Within the study area, the only significant left turn movement occurred at Cross and River Streets. During the afternoon peak, 90 vehicles were observed turning north from Cross to N. River and 56 vehicles turned west from River to Cross.

The exhibits with the actual counts by intersection and by time of day can be found in the Appendix.

Pedestrian counts were also included in the turning movement counts and are discussed in the next section.

E. Operational Characteristics

The Level of Service (LOS) calculation provides a measure of performance of the current roadway system and indicates the urgency for roadway improvements.

Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-min. analysis period. The criteria are given in the table below.

Level of Service Criteria for Intersections

Level of Service	Signalized Intersection Stopped Delay per Vehicle (Seconds)	Unsignalized Intersection Stopped Delay per Vehicle (Seconds)
A	<5.0	<5.0
B	5.1 to 15.0	5.1 to 10.0
C	15.1 to 25.0	10.1 to 20.0
D	25.1 to 40.0	20.1 to 30.0
E	40.1 to 60.0	30.1 to 45.0
F	>60.0	>45.0

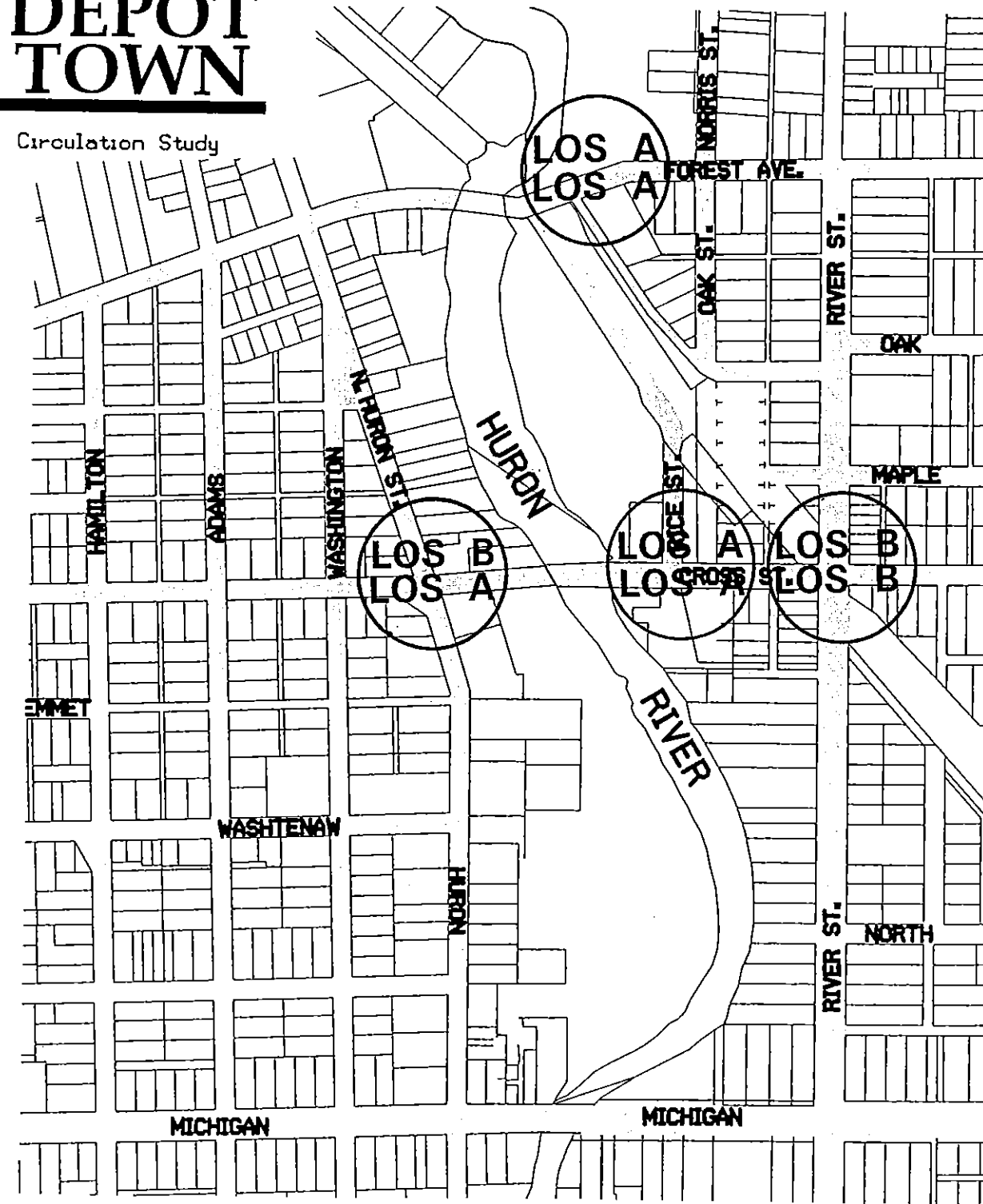
HRC calculated the LOS during the morning and afternoon peak hour for both signalized and unsignalized intersections in the Circulation Study area. The procedures for analysis were those outlined in the *Transportation Research Board Special Report 209, Highway Capacity Manual*. The table below shows the existing AM and PM Peak Hour Level of Service for the analyzed locations. The next figure maps the LOS by intersection.

Summary of the Level Of Service (LOS) for Intersections

Intersection	Type of Control	Delay in Seconds	Level Of Service
Cross – River (AM peak)	Signal	8.0	B
Cross – River (PM peak)	Signal	8.5	B
Cross – Huron (AM peak)	Stop Sign	5.5	B
Cross – Huron (PM peak)	Stop Sign	3.9	A
Cross – Rice (AM peak)	Stop Sign	0.1	A
Cross – Rice (PM peak)	Stop Sign	0.3	A
Forest – Rice (AM peak)	Stop Sign	0.2	A
Forest – Rice (PM peak)	Stop Sign	0.3	A

DEPOT TOWN

Circulation Study



AM PEAK HOUR LEVEL OF SERVICE
PM PEAK HOUR LEVEL OF SERVICE

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH. P.O. BOX 824 48303-0824	SHEET NO. OF
DATE October 1998		

F. Future Level of Service

UATS provided a 2020 Plan model which displayed volume to capacity deficiencies in the next 20 years. They have projected that Cross Street between Prospect and Huron will be deficient in the year 2000. The latest daily traffic volume count for Cross in this area was 12,000 vehicles. The actual capacity of a urban collector two lane road could be as high as 20,000 vehicles. This would mean that traffic would have to increase almost 60% in two years. It appears that the projected Cross Street capacity deficiency will be delayed beyond 2000.

G. Vehicle Classification

A vehicle classification study was conducted on Cross St. just east of River at the same time all the speed studies were conducted. The federal classification criteria were utilized which separates vehicles by axles into 15 different categories. The raw data can be seen in the Appendix. For convenience, the 15 categories were summarized into six simple categories and the data shown on the table below.

Classification of Vehicles

Cycles and Cars	Car w/ Trailer	Buses	Single Unit Truck w/ 2-4 Axles	Single Trailer Truck w/ 4-6 Axles	Multiple Trailer Truck w/ 5-7 Axles	Unclassified
79%	11%	0.5%	2.2%	0.8%	0.06%	6.4%

Of the classified vehicles, 96% are considered passenger vehicles and 4% would be considered commercial trucks.

H. Traffic Crash Data

The most critical components of a traffic study are the analysis of high accident locations and the recommendations for improvements to correct the roadway deficiencies and to make the roads safer.

The analysis of the traffic safety problem must include two pieces of information – traffic crash data and traffic volume data. HRC gathered traffic volumes and crash data for 1995 through 1997 for the entire City of Ypsilanti and analyzed it to identify areas of concern and to provide a point of reference for data pertaining to Depot Town only. HRC also computed the crash rates because these numbers provide a relationship between the crash experience and the exposure. The crash rates help put the crash experience into perspective so that priorities can be set rationally for a transportation improvement program.

A three year summary of traffic crashes at intersection in the study area are shown in the table below. The intersection of Huron & Cross has the highest frequency of crashes as well as the highest volume. However, the worse crash rate occurs at Huron & Forest because its traffic volume is so much lower and the number of accidents is almost equal to Huron & Cross. Relatively speaking, the frequency of traffic crashes within Depot Town are very low. By comparison, the intersection of Huron & Michigan, just south of the Depot Town, has an average crash frequency of 32.33 and injuries occurred on the average of 8.33 times. The higher number of injuries at Huron & Forest may warrant further investigation.

04-04
Intersection Traffic Crashes – 1995 to 1997 *04-04*

Intersection	Average Total Crashes	Volume	Crash Rate*	Average Total Injuries	Injury Rate*
Huron - Cross	11.00 <i>7</i>	24,675	1.22	1.33 <i>0.6</i>	0.15
Huron - Forest	10.33 <i>7</i>	13,447	2.10	3.33 <i>2</i>	0.68
Forest - River	4.67 <i>4</i>	9,594	1.33	1.67 <i>1.2</i>	0.48
River - Cross	3.67 <i>3.4</i>	12,055	.83	0.00 <i>0.4</i>	0.00
Cross - Rice	3.00 <i>1.2</i>	12,857	.64	0.33 <i>0</i>	0.07

*NOTE:

Units for Crash Rates and Injury Rates are "Crashes Per Million Entering Vehicles"

A three year summary of traffic crashes in links in the study area are shown in the table below. The segment of Cross between Huron and River has the highest frequency of crashes as well as the highest volume. This result is in keeping with the intersection accident experience at Cross and Huron. Again by comparison to other segments in the city, crashes in Depot Town are relatively low. For example, on Huron between Cross and Michigan, they had an average of 13.33 crashes and total injuries were involved in an average of 2.67 crashes.

Link Traffic Crashes – 1995 to 1997

Segment	Average Total Crashes	Volume	Segment Length (ft)	Crash Rate*	Average Total Injuries	Injury Rate*
Cross (bet. Huron & River)	8.33	12,054	1,315	0.0014	0.67	0.0001
Huron (bet. Forest & Cross)	5.67	5,953	1,190	0.0022	0.67	0.0003
River (bet. Forest & Cross)	5.33	3,898	1,295	0.0029	0.67	0.0004
Forest (bet. Huron & River)	1.33	7,316	1,750	0.0003	0.33	0.0001

*NOTE:

Units for Crash Rates and Injury Rates are "Crashes Per Million Entering Vehicles"

Figures displaying the total crash data by intersection and by link and the crash ratio for intersections for the period 1995-1997 can be found in the Appendix. Data for the areas around Depot Town are shown for comparison.

For each intersection, the crashes were summarized and the crash types were listed and tabulated. A summary of the reported crashes is listed in the following tables for 1995 through 1997. This more detailed analysis of traffic crashes by location allows the traffic engineer to discover patterns of traffic crashes which can be corrected.

Generally speaking, the traffic crash experience in the Depot Town Study area indicated a relatively safe environment for motorists. The traffic crash rates are below the 3.0 threshold, which typically indicate a traffic safety problem area. In particular, the area of Cross between Huron and River has very few reported crashes.

I. Traffic Speed

Ypsilanti Police Chief Leonard Supenski provided a summary of speed checks conducted in the Depot Town area on Cross Street. Average speeds observed by the police are detailed in the table below:

Ypsilanti Police Speed Study Results

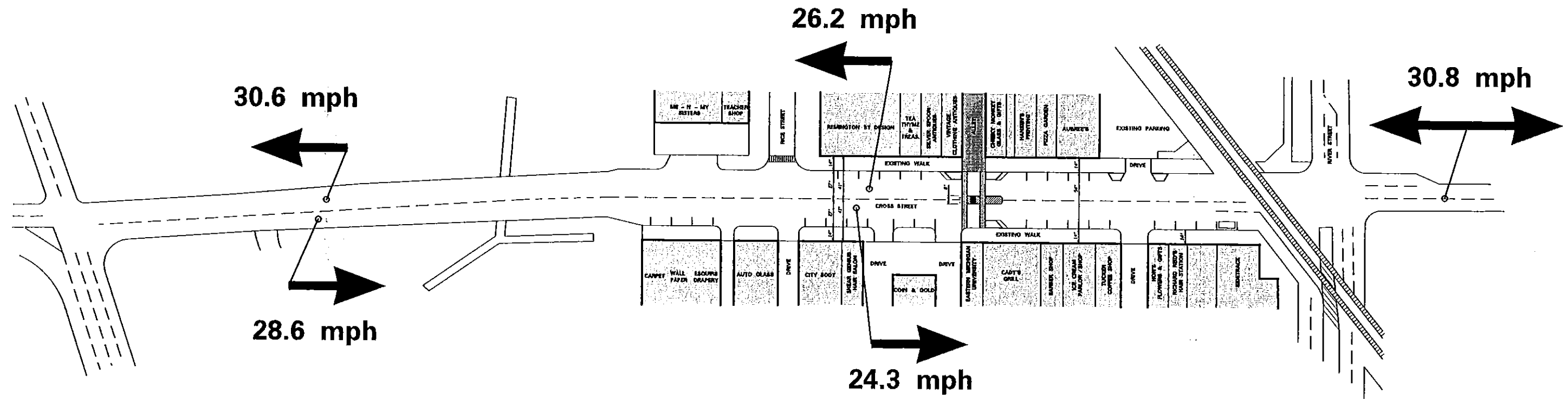
Location	Direction	Average Speed
Cross, Huron to Rice	Eastbound	38 mph
Cross, Rice to River	Eastbound and Westbound	21 mph
Cross at River	Westbound	38 mph

The steering committee asked HRC to validate these speeds by conducting an independent speed study. HRC used machine counters to quantify the speed, classification, and direction of vehicles in three areas along Cross Street for two continuous days in September 1998. The locations selected were east of Huron, west of the clock tower and east of River. The speed data is summarized below.

HRC Speed Study Results

Location	Direction	Average Speed
Cross, East of Huron	Eastbound	28.6 mph
Cross, East of Huron	Westbound	30.6 mph
Cross, West of Clock	Eastbound	26.2 mph
Cross, West of Clock	Westbound	24.3 mph
Cross, East of River	Eastbound and Westbound	30.8 mph

HRC's results showed a more consistent and lower speed along Cross Street than the police study. The actual speeds as collected by HRC were close to the posted speed of 25 MPH. A graphical display of speeds versus frequency distribution can be found in the Appendix.



AVERAGE SPEED BY DIRECTION OVER TWO WEEKDAYS

**DEPOT
TOWN**
Circulation Study

HRC

POSTED SPEED LIMIT IS 25 mph

insufficient. As development occurs in Depot Town, additional parking will have to be accommodated on and off site.

An inventory was also compiled of the planned or potential parking in the Depot Town area. The totals for all three categories of parking: public existing, reserved existing and future are also summarized on the aerial photo and in the table below.

Future Automobile Parking Summary

Within Primary Walking Distance to Depot Town	No. of Parking Spaces Estimates
Public Parking	198
Reserved Parking	134
Potential Parking	235
Total	547

Future parking recommendations are discussed in greater detail in Section V.

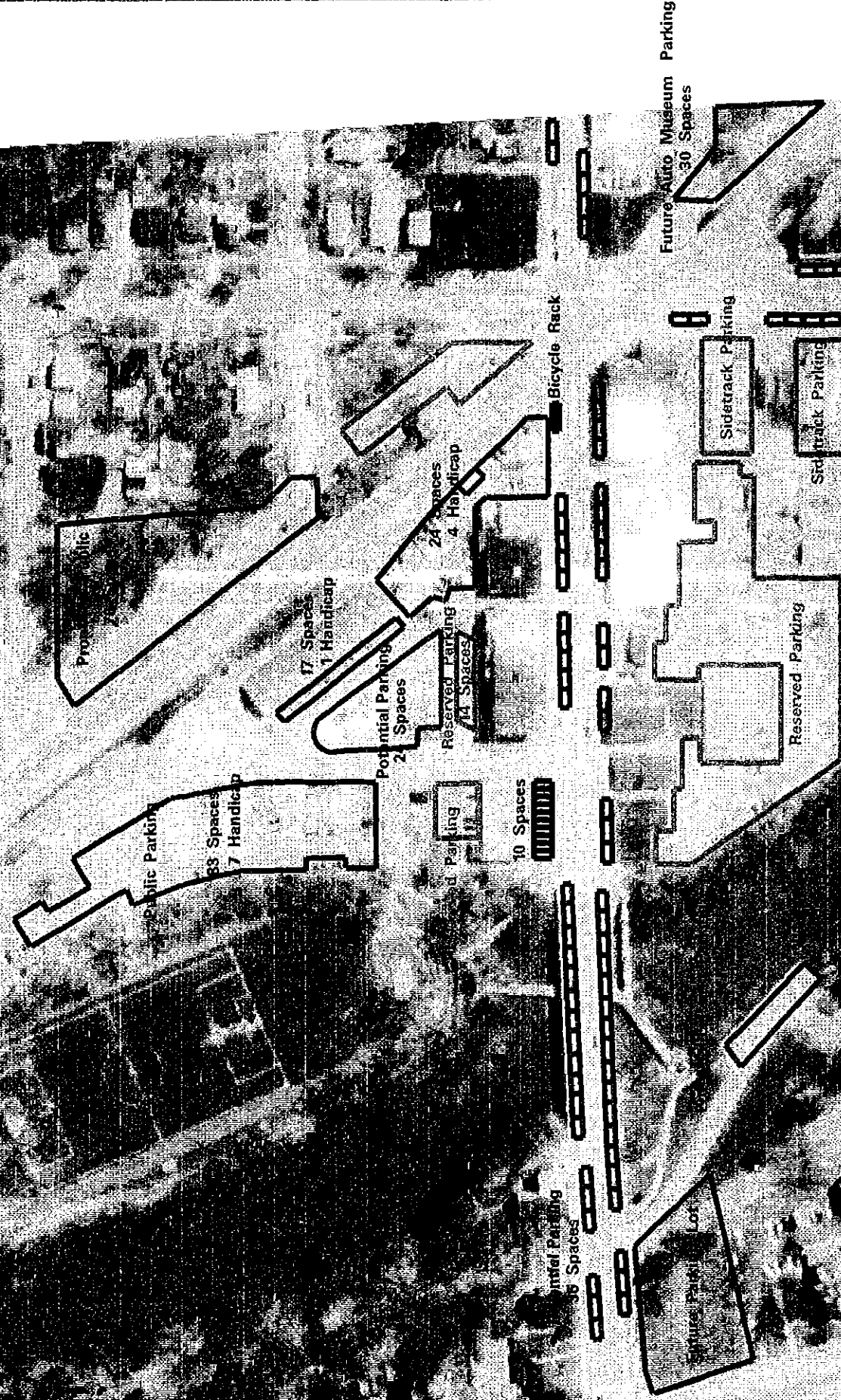
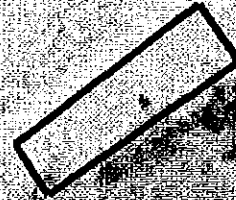
The Steering Committee explored several options for parking on the Cross Street Bridge over the Huron River. The structure is 44 ft. wide curb to curb. If parking were to be permitted, it should be on one side only to allow for two lanes of moving traffic. Although the HRC structural analysis of the bridge indicated that the load of parked cars would not be an issue, safety and parking convenience concerns suggest that other options are preferable. Because of the height of the curb, passenger car vehicle occupants would most likely exit on the roadway side of the vehicle, and this raises safety concerns. Conflicts between pedestrians and moving vehicles should be avoided. Safety concerns aside, HRC believes that parking on the bridge will not be particularly beneficial to adjacent businesses to the east. Bridge parking would provide only a few spaces, the spaces on the west half of the bridge would not be particularly attractive to shoppers, considering the other options available. Better parking options would be behind the Cross Street buildings. Also, parking on the bridge would obscure the view of the river.

An inventory of parking use in the Depot Town area may provide the community with insights on the urgency and preferred location for parking enhancements.

DEPOT TOWN

Gravel Parking

Circulation Study



Depot Town Parking

Existing Public Parking	196
Potential Parking	235
Reserved Parking	134
	567

Sam E.

Section 5

Section V - Multi-Modal Network

A. Pedestrian Activity

The pedestrian network and movement were important components of this Circulation Study. First HRC mapped and analyzed the entire current sidewalk and safety path network. This revealed where the deficiencies or gaps in the network. For example, pedestrian access to both Frog Island and Riverside Park were deficient. Currently, there is no pedestrian entrance to Frog Island from Forest. Pedestrians and bicyclists have to share the narrow drive entrance with vehicles, which is unsafe.

In 1997, at the request of the Depot Town Association, the Depot Town Downtown Development Authority installed a pedestrian refuge island in the middle of Cross Street between Rice and River. The island has a decorative clock tower on it as well. The island resulted in the loss of a few on-street parking spaces. Some of business owners in Depot Town suggested expanding the island or "boulevard" while others expressed concern that an expanded island would restrict access and eliminate additional curbside parking. This issue is discussed further in Section V.

At the time that HRC conducted the turning movement counts, pedestrian counts were taken at three of the four intersections. The pedestrian study was conducted during the morning and afternoon peak hour at Cross and Huron, Cross and River, and Cross and Rice. HRC also conducted a detailed pedestrian count at the Cross and River intersection on Saturday afternoon during the Heritage Festival held in August 14-16, 1998. The table below summarizes the counts by intersection and time of day.

Pedestrian Counts by Intersection

Intersection	AM Peak	PM Peak
Cross – Huron	4	18
Cross – Rice	10	34
Cross – River	14	4
Cross – River during Heritage Festival		532

In general, more pedestrians were observed in the afternoon peak than in the morning peak. A total of 28 pedestrians were observed crossing the three intersections in the morning and 56 pedestrians in the afternoon. However, the number of pedestrians increased dramatically during the Heritage Festival when parking was off-site and Cross Street was closed to through traffic.

Exhibits displaying the actual pedestrian counts by intersection can be found in the Appendix.

B. Bicycling

A bicycle inventory was done as part of the study. The only racks for bicycle parking were located on the north side of Cross Street just west of the railroad tracks. The two bike racks will hold 40 bicycles. HRC observed that the bike racks were utilized on a regular basis.

C. Traffic Crash Data for Pedestrians and Bicyclists

UD-10 accident reports were analyzed to determine any pattern or details about crashes involving pedestrians or bicyclists. For the three years of data, there was no more than one accident involving either a pedestrian or bicyclist a year. In fact, for the three intersections that were examined, there were more years with no accidents than years with an accident. Generally speaking, the traffic crash experience in the Depot Town Study area indicated a relatively safe environment for both motorists and pedestrians. The traffic crash rates are below the 3.0 threshold, which typically indicate a traffic safety problem area. In particular, the busiest part of the business district, the segment of Cross Street between Huron and River, has very few reported conflicts. The tables below display the type of accident by year.

Link Segment Crashes on Cross Between Huron and River

Crash Type	1995	1996	1997	Total
Rear End	0	0	0	0
Angle	0	0	0	0
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	0	0	0	0
Single (Pedestrian)	1	0	1	2
Other	0	0	0	0
Total	1	0	1	2

Cross at Rice Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	0	0	0	0
Angle	0	0	0	0
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	0	0	0	0
Single (Pedestrian)	0	0	1	1
Other	0	0	0	0
Total	0	0	1	1

Huron at Cross Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	0	0	0	0
Angle (Bicycle)	1	0	0	1
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	0	0	0	0
Single (Pedestrian)	0	0	0	0
Other	0	0	0	0
Total	1	0	0	1

D. Railroad Activity

There is a considerable amount of train traffic on the double tracks running through Depot Town. A total of 12 trains are scheduled to be on the tracks daily. Six Amtrak passenger trains pass through each day, without stopping. The three westbound trains, traveling between Dearborn and Ann Arbor, are scheduled between 7:45 AM and 6:00 PM. The three westbound trains are scheduled to pass through daily between 12:30 PM and 11:30 PM. There are six Conrail freight trains each day between 8 PM and 5 AM. Three trains are eastbound and three are westbound. The posted schedules are shown below.

Scheduled Train Activity

Time	Type	Number of Trains	Direction
LV Dearborn at 7:30 AM	Passenger	1	Westbound
LV Dearborn at 10:52 AM	Passenger	1	Westbound
LV Dearborn at 4:58 PM	Passenger	1	Westbound
LV Ann Arbor at 12:35 PM	Passenger	1	Eastbound
LV Ann Arbor at 7:50 PM	Passenger	1	Eastbound
LV Ann Arbor at 11:03 PM	Passenger	1	Eastbound
8:00 AM- 5:00 PM	Freight	3	Eastbound
8:00 AM- 5:00 PM	Freight	3	Westbound

Observed Train Experience Tuesday September 24,1998

Time	Type	Number of Cars	Direction	Speed
7:45 AM	AMTRAK Passenger	10	Westbound	50 MPH
10:30 AM	Conrail Freight	30		20 MPH
12:00 PM	AMTRAK Passenger	5	Westbound	50 MPH
5:20 PM	AMTRAK Passenger	5	Westbound	50 MPH

Two of the higher speed Amtrak trains are scheduled to pass through Depot Town during the morning or evening peak times. The rest travel during off-peak periods. The less predictable, slower and longer freight trains can affect vehicular traffic worse. However, there were no comments noted during public meetings that freight trains were a problem.

E. Public Transit Service

Public transportation in the City of Ypsilanti is provided by a contract with the Ann Arbor Transportation Authority (AATA). AATA provides travel to and from Ann Arbor seven days a week as well as four intra-city routes for local travel. Depot Town is close to downtown Ypsilanti and the transit center where the four routes meet and transfer passengers. Depot Town is served by Route 10 with bus service approximately hourly. Weekday hours of operation begin at 6 AM and end at 10 PM. On Saturday, the bus begins running at 8:30 AM and ends at 6:30 PM. There is no Sunday Service. The AATA bus stops in Depot Town are located on Cross Street between Rice and the Clock Tower. There is an inbound bus stop on the north side of Cross and an outbound stop on the south side of Cross. There is no passenger shelter at either location.

Current ridership figures indicate that usage of the Route 10 bus is low. Daily ridership for the outbound route is about 30 passengers.

During the Heritage Festival, transit service to the center of Depot Town is temporarily disrupted. Because Cross Street is closed to traffic, AATA buses are detoured to Forest and Michigan. However, at the request of the City of Ypsilanti, AATA has operated shuttle bus service to Depot Town for special events.

A Route 10 schedule and map can be found in the Appendix.

Section 6

Section VI - Recommendations

The plan recommendations are organized by sub-areas, specifically, either by intersection area or along Cross Street. The alternatives proved to be so site specific that it proved to be more logical to discuss them by sub-areas. As the study evolved, the majority of the discussion with the Steering Committee focused on alternatives for improving the safety, efficiency, accessibility and parking along Cross Street between River and Huron. Therefore, the recommendations for this sub-area are very detailed and are discussed last.

A. Forest and Rice Area

Problems	Recommendations
There is no pedestrian/bicyclist entrance into Frog Island Park or Depot Town from this approach. Having to share the narrow drive entrance with vehicles is unsafe.	Separate vehicular and pedestrian/bicyclist traffic. Install an eight-foot safety path on both sides of Rice down to existing path. Need to grade sloped area in order to install safety path.
Poor sight distance on Rice at Forest. This is not efficient or safe.	Improve alignment of Rice by making it intersect Forest at 90 degrees.
Need more parking on Frog Island Park at north end.	Pave and stripe existing gravel lot.
Signage for Depot Town is missing.	Improve guide and cultural signage here.

B. Forest and River Area

No issues or recommendations.

C. Cross and Huron Area

Problems	Recommendations
Warrants traffic control device.	Install a new traffic signal.

Forest-River Area

D. Cross and River Area

Problems	Recommendations
Want to improve the safety of the intersection for vehicles.	1. Align left turn lane on west approach with left turn lane on east approach. Then align through lanes on Cross. 2. Install new railroad gates on the north and east approaches of intersection.
Want to improve the safety of pedestrians crossing the intersection.	1. Install new pedestrian railroad gates on north and east approaches. 2. Improve pedestrian pavement markings on all approaches. 3. Install a raised concrete island on the south approach for pedestrian refuge. 4. Replace or repair missing or non-functioning pedestrian signal faces.
Want to improve the safety of pedestrians walking to the intersection.	Install an eight-foot safety path along the west side of N. River St.
Need signage to new public parking lot.	Install guide and cultural signage on Cross and River.
Deliveries block traffic lanes.	Recommend enforcing deliveries to the rear of the businesses. Recommend signage to discourage stopping.
Proposed improvements to Automotive Heritage Museum will add traffic and hazard to the intersection.	Recommend either relocating driveway or making it one-way only.

E. Maple and River Area

Problems	Recommendations
Want to safeguard the safety of pedestrians utilizing the new public parking lot.	Install an eight-foot safety path along the north side of Maple between N. River St. and the parking lot.

F. Freighthouse/Farmer's Market Area

Problems	Recommendations
Insufficient parking.	1. Develop triangular land between Oak St., Maple St. and the railroad tracks into public parking. When paved and striped, it will have approximately 70 spaces. 2. Encourage development of triangular land between the Freighthouse and Rice St. into a private parking lot. When paved and striped, it will hold approximately 24 vehicles.
Want to improve the safety of pedestrians walking to the Farmer's Market.	1. Complete the installation of eight-foot safety paths along Rice to maintain continuity in pedestrian circulation system. 2. Install new pedestrian crosswalk marking (thermoplastic) across Rice St. near entrance to Freighthouse.

G. Cross Street between River and Huron River

For the area of Cross Street between the Huron River and River Street, HRC and the Steering Committee explored several alternatives.

The range of improvement alternatives included:

- no improvements
- expanding the sidewalk width
- implementing traffic calming techniques
- extending the traffic island in the median and improving access
- expanding the width and length of the existing traffic island
- expanding the width and length of the existing traffic island and improving access

HRC and the Steering Committee prepared a summary of the modifications involved with each alternative and the advantages and disadvantages. These summaries can be found in the Appendix. Any of the alternatives could include new edge line pavement markings on the Cross Street Bridge over the Huron River. These pavement markings would make the bridge width appear more narrow and would likely reduce vehicle speeds on the bridge.

The main issues and concern from the Steering Committee were that there be no loss of parking, decreased vehicle speeds, no loss of access, and pedestrian enhancement. Alternatives that eliminated parking on the street were not considered to be feasible by the Steering Committee.

Based on the study data, the Steering Committee recommended two options for further refinement. In the first alternative, the existing traffic island would not be expanded but on-street parking would be improved. In the second alternative, additional traffic islands would be installed in the median of Cross Street and there would be a limited amount of improvements to the on-street parking. Both options would improve the aesthetics of Cross Street as well as calm traffic.

A detailed drawing of the current Cross Street layout and the two alternatives are shown on the following pages. The drawings also described the modifications and the advantages and disadvantages of each alternative.

4

2/19/2012 12:45:12 PM

STROKE TIME - 09-FEB-1999 15:30
PLOT NAME - N/A
DESIGN FILE - f:\1998\19980371\cadd\traffic\ah4.dgn
USER NAME - gsdler

MODIFICATIONS

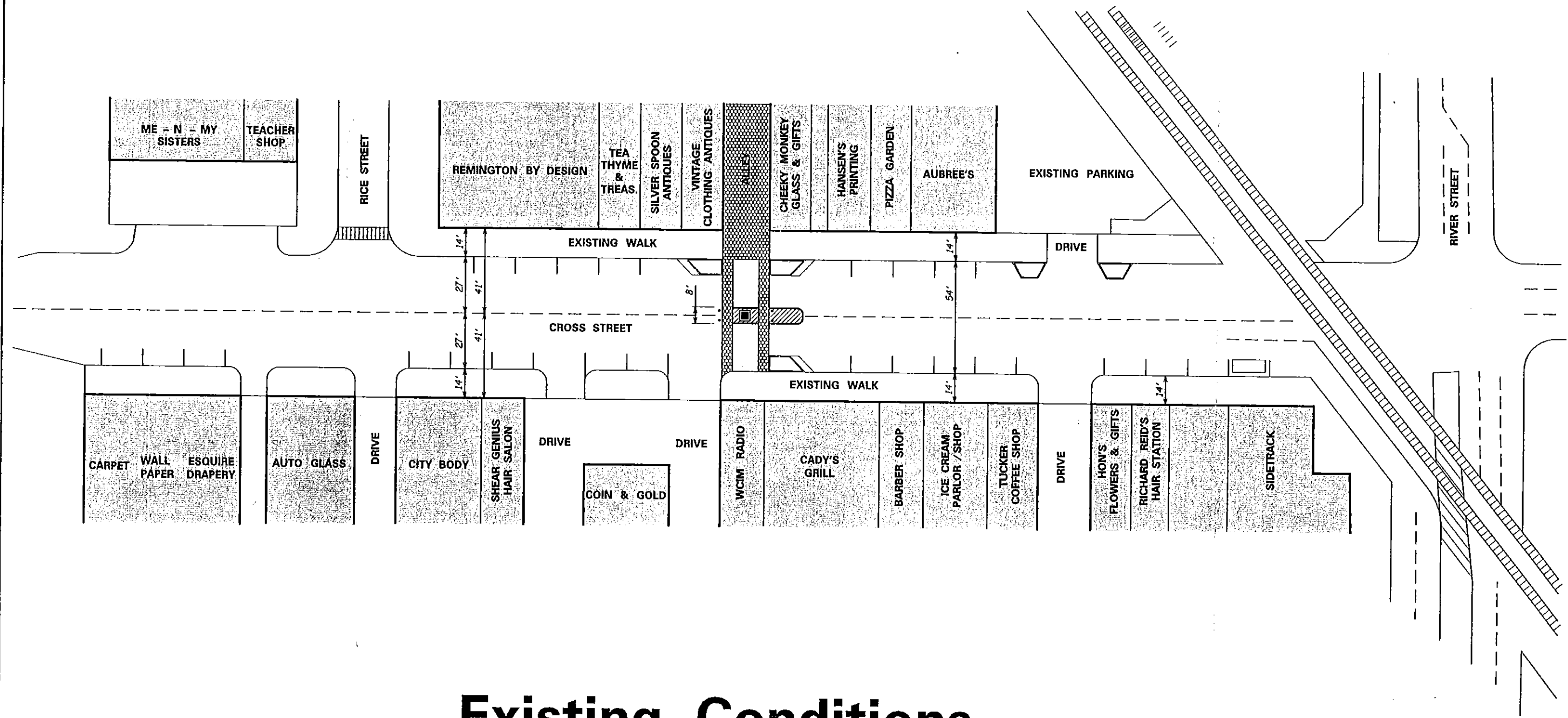
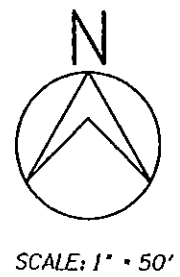
No Modifications

PROS

No Capital Costs
Existing Access
No Loss of On-street Parking

CONS

Difficult Access to East Public Parking
Rice Street Elements Hidden
Does Not Address Other Issues
No Loss of On-street Parking



Existing Conditions

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DATE October 1998		

MODIFICATIONS

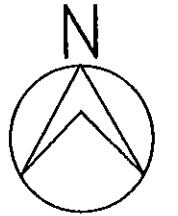
Align Lanes at Cross/River
Proposed Curb Bumpout and Ramps Incl. Trees
Remove Concrete Planters at East Driveway

PROS

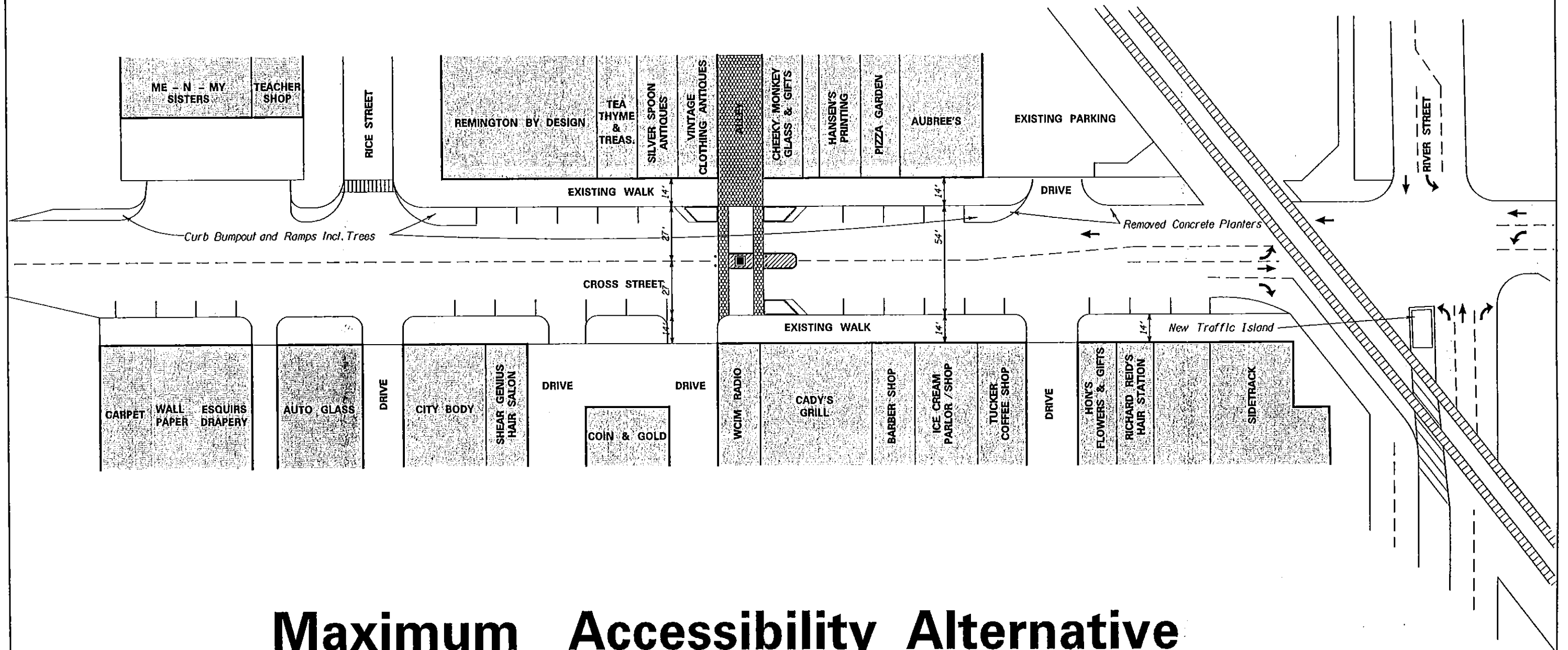
Easily Implemented
Relatively Low Cost
Minimum Loss of On-street Parking
Better Access to Public Parking
Traffic Safety Improved at Cross/River

CONS

Additional Plantings and Trees Require Additional Maintenance
Curb Bumpout at Rice Moves Pedestrians Closer to Traveled Way ?
Potential Vision Obstruction for Motorists entering Cross from Rice



SCALE: 1" = 50'



Maximum Accessibility Alternative

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	P.O. BOX 824 48303-0824	SHEET NO. OF
DATE October 1998			

MODIFICATIONS

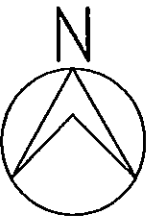
Proposed Entry Island
Proposed Curb Bumpout and Ramps Incl. Trees
Proposed Curb Island Extension with Plantings
Remove Concrete Planters at East Driveway

PROS

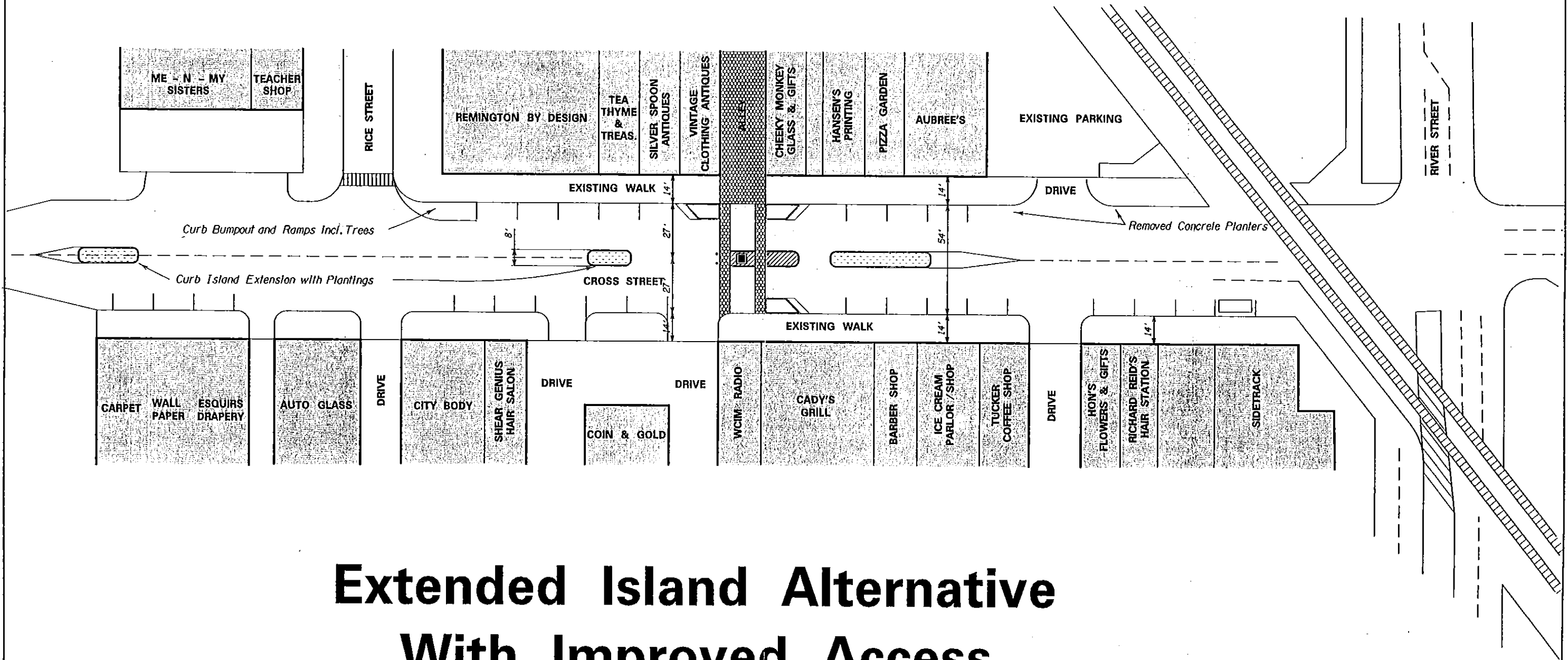
Easily Implemented
Relatively Low Cost
Matches Phase I Including Clock Tower
Construction Can be Staged
No Loss of On-street Parking
Better Access to Public Parking

CONS

Additional Plantings and Trees Require Additional Maintenance
Curb Bumpout at Rice Moves Pedestrians Closer to Traveled Way
Potential Vision Obstruction for Motorists entering Cross from Rice



SCALE: 1" = 50'



Extended Island Alternative With Improved Access

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	P.O. BOX 824 48303-0824	SHEET NO. OF
DATE October 1998			

H. Comparison of Alternatives to Study's Goals

Depot Town Circulation Study Evaluation Matrix

CROSS STREET BOULEVARD OPTIONS	Pedestrian safety shall be enhanced for study area	Automobile safety shall be enhanced for study area	Improve circulation and access	Provide adequate parking	Enhance pedestrian orientation	Multi-modal coordination	Maintenance/Enhancement of Business climate
Existing Conditions				✓			
Expanded Sidewalk Alternative	✓			✓	✓		
Traffic Calming Alternative		✓		✓			
Extended Island Alternative	✓	✓		✓	✓		
Extended Island Alternative with Improved Access	✓	✓		✓	✓		
Wide Island Alternative		✓					
Wide Island Alternative With Access		✓	✓				

Depot Town Circulation Study Evaluation Matrix

GENERAL PLAN OPTIONS

T Alignment of Rice with Forest

Alignment of left and through lanes at River and Cross

New Rail Road gates at River and Cross

Traffic calming measures at Cross

Potential increased parking for proposed Frog Island Ampitheater

Potential paved parking for Frog Island

Recommend better driveway access to automotive museum

Vehicle access to park at Cross St.

Deliveries to rear of businesses

Potential driveway access easements

Improved guide/cultural signs at Forest

Improved guide signs for proposed parking areas

Improved guide/cultural signs at Cross

Improved guide/cultural signs at Michigan Ave. at Huron and River

Bus stop relocation along south side of Cross

Pedestrian safety shall be enhanced for study area.	Automobile safety shall be enhanced for study area	Improve circulation and access	Provide adequate parking	Enhance pedestrian orientation	Multi-modal coordination	Maintenance/Enhancement of Business climate
	✓	✓				
	✓	✓			✓	
✓	✓				✓	
✓	✓	✓	✓	✓		✓
			✓			
			✓			
	✓	✓				
			✓			
	✓	✓		✓		
		✓				✓
				✓		✓
				✓		✓
				✓		✓
✓					✓	

DEPOT TOWN CIRCULATION STUDY EVALUATION MATRIX

PEDESTRIAN CIRCULATION RECOMMENDATIONS	Pedestrian safety shall be enhanced for study area.	Automobile safety shall be enhanced for study area.	Improve circulation and access	Provide adequate parking	Enhance pedestrian orientation	Multi-modal coordination	Maintenance/Enhancement of Business climate
Seperate Rice St. and pedestrian path	✓				✓		
Slope adjustment to existing Frog Island path	✓				✓		
Potential path extensions to Farmers Market	✓				✓		
New path for new parking area	✓				✓		
Improve crosswalk pavement markings at River and Cross	✓				✓		
New crosswalks within Depot Town	✓				✓		
Potential pedestrian access to Riverside Park at Art Center and along Mich. Ave.	✓				✓		

I. Summary

HRC's observation of the study area suggests several areas where traffic operations can be improved to minimize the potential for future traffic crashes. HRC recommends that several minor improvements be made to the Cross/River intersection. Most significant of these is to align the left turn lanes for the east and west legs of Cross Street. This assures that motorists making left turns have an adequate view of oncoming traffic. In addition, we suggest the addition of railroad crossing gates on to the intersection approaches not currently covered by gates. The addition of a traffic island on the south leg would help pedestrian access cross the south leg of the River/Cross intersection.

In terms of traffic operations, HRC also recommends a realignment of the Rice at the Forest intersection to create a "T" intersection. This will provide safer and more convenient access to the park area during special events.

HRC examined the intersection of Rice Street and Cross Street to determine if a flashing beacon or some other traffic control should be installed. We found that the traffic crash experience at Cross/Rice did not warrant the installation of flashing beacons under the criteria established in the Michigan Manual of Uniform Traffic Control Devices. We also reviewed this intersection to determine whether a multi-way stop should be installed at Rice/Cross. We found that the traffic volumes and the traffic crash experience did not meet the requirements of the Michigan Manual of Uniform Traffic Control Devices for multi-way stop installations. HRC recommends that the corner site clearance of Rice/Cross be improved to provide better visibility for motorists on Rice entering Cross Street. This corner clearance will also assist motorists wishing to find the parking areas access through Rice Street.

HRC understands that a traffic signal is scheduled for installation at the Cross/Huron intersection. This signal should help reduce the potential for right angle crashes at the intersection. HRC did not find any compelling reason to make improvements to the River/Forest intersection. This intersection experiences an average of less than 5 traffic crashes per year and operates at an extremely good level of service during peak traffic periods.

Pedestrian access in and out of the park should be improved by creating a definable pedestrian path which connects Forest Avenue to Cross Street along a Rice Street alignment. A new parking area has been proposed on the west side of River Street, but east of the railroad tracks. It will be important to provide safe pedestrian access from this parking area to the businesses on Cross Street. We suggest that the crossing of the railroad tracks for pedestrians be made at the protected crosswalks at the River/Cross intersection.

Development of new facilities in the Frog Island and Freighthouse areas which attract additional trips will also require the provision of additional parking. Parking for these developments will have to be provided on a special event basis. They will require the addition of on-site parking or access to off-site parking through a shuttle service.

Section 7

Section VII - Cost Estimates

No.	Proposed Recommendations	Estimated Cost
1	8 feet wide concrete pedestrian path along the railroad track alignment on both sides of Rice St. (from south of Forest to Cross St.)	\$ 28,600.00
2	New concrete pedestrian path from the proposed parking area east of the railroad tracks to the River St./Cross St. (8 feet wide)	\$ 13,000.00
3	New crosswalk marking (thermoplastic) across Rice St. between the parking area and the farmer's market	\$ 750.00
4	Raised concrete island on the south leg of the intersection of Cross St. and River St. in place of the existing painted island	\$ 6,000.00
5	Alignment of the left turn lanes (East - West direction) at Cross St. and River St. intersection	\$ 2,000.00
6	Providing a 50 feet long right turn lane (for eastbound traffic) at Cross St. and River St. intersection	\$ 1,000.00
7	Providing railroad gates both for pedestrians and traffic (for north and east approaches)	\$ 250,000.00
8	Providing pedestrian pavement markings (all approaches) at the intersection of Cross St. and River St.	\$ 3,000.00
9	Proposed public parking east of railroad tracks and north of Cross St. (for 70 parking spaces)	\$ 210,000.00
10	Aligning Rice Street (2 lane street) at 90 degrees with Forest Avenue	\$ 60,000.00
TOTAL		\$ 574,350.00

Other alternatives

Maximum accessibility alternative

1	Removal of concrete Planters at the East Driveway (located west of Railroad tracks and north of Cross St.)	\$ 16,100.00
2	Curb bumpout and ramps including trees on Cross St.	\$ 8,000.00
3	New traffic island (raised) in place of existing pavement marking on south leg of the Cross St. and River St. intersection	\$ 6,000.00
TOTAL		\$ 30,100.00

Extended Island alternative with improved access

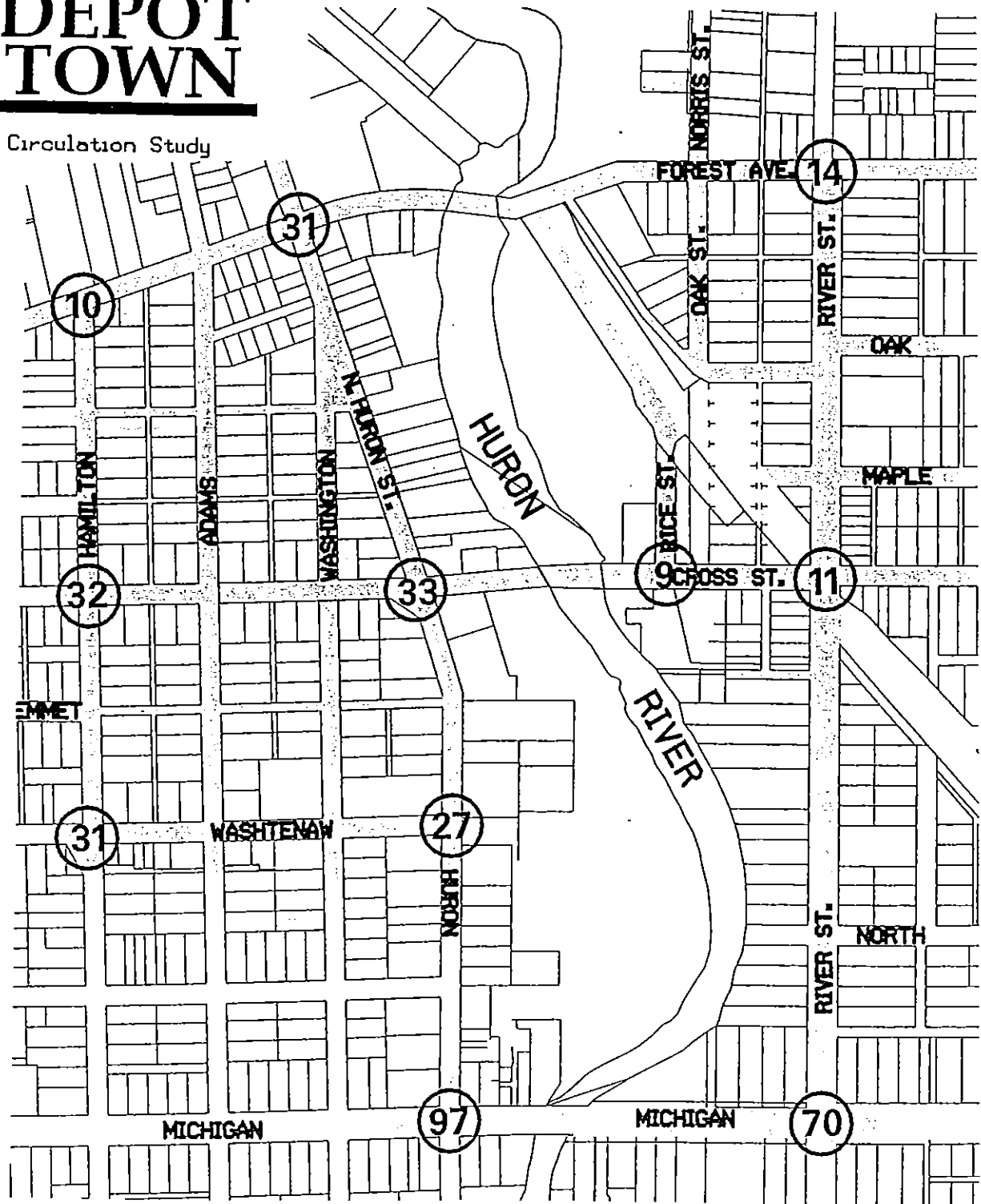
1	Islands with plantings on Cross St.	\$ 22,500.00
2	Curb bumpout and ramps including trees on Cross St.	\$ 8,000.00
3	Removal of concrete planters at east driveway (north of Cross St. and west of railroad tracks)	\$ 16,100.00
4	Sprinklers and illumination for all the islands on Cross St.	\$ 15,000.00
TOTAL		\$ 61,600.00

Appendix

Total Intersection Crashes

DEPOT TOWN

Circulation Study



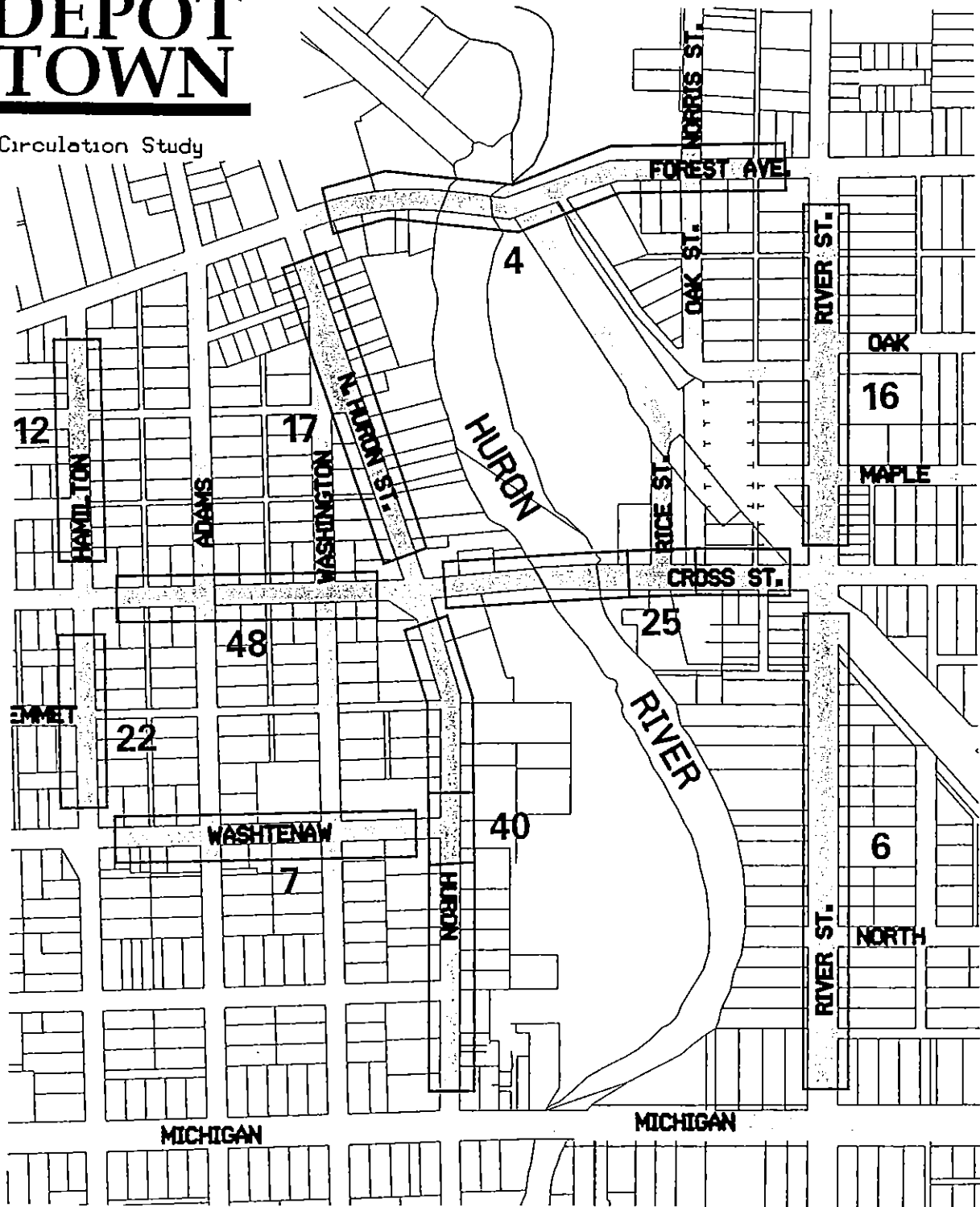
TOTAL INTERSECTION CRASHES 1995-1997

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC.		SHEET NO.
DATE October 1998	CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.		OF
	P.O. BOX 824 48303-0824		

Total Link Crashes

DEPOT TOWN

Circulation Study



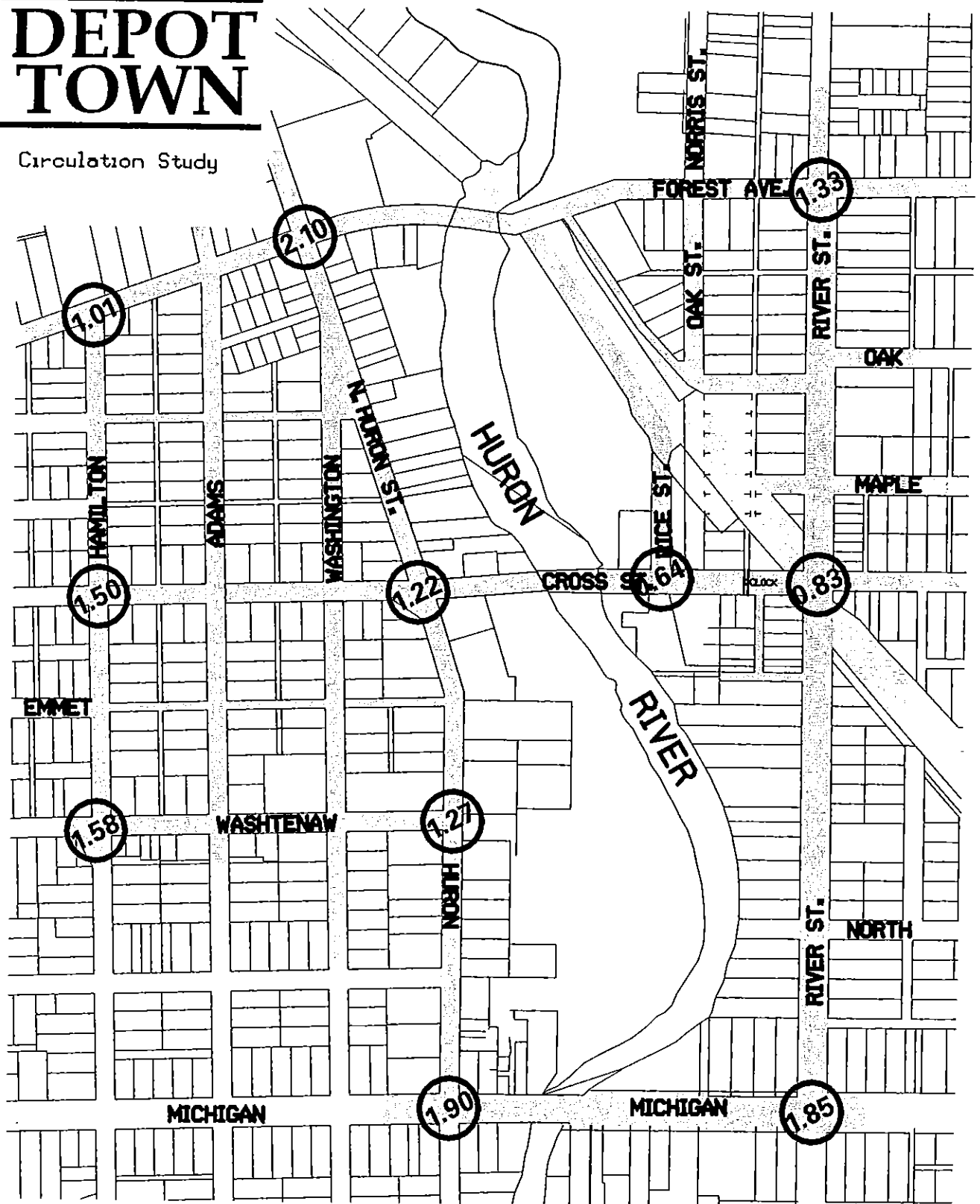
TOTAL LINK CRASHES 1995-1997

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH. P.O. BOX 824 48303-0824	SHEET NO.
DATE October 1998		OF

Intersection Crash Rates

DEPOT TOWN

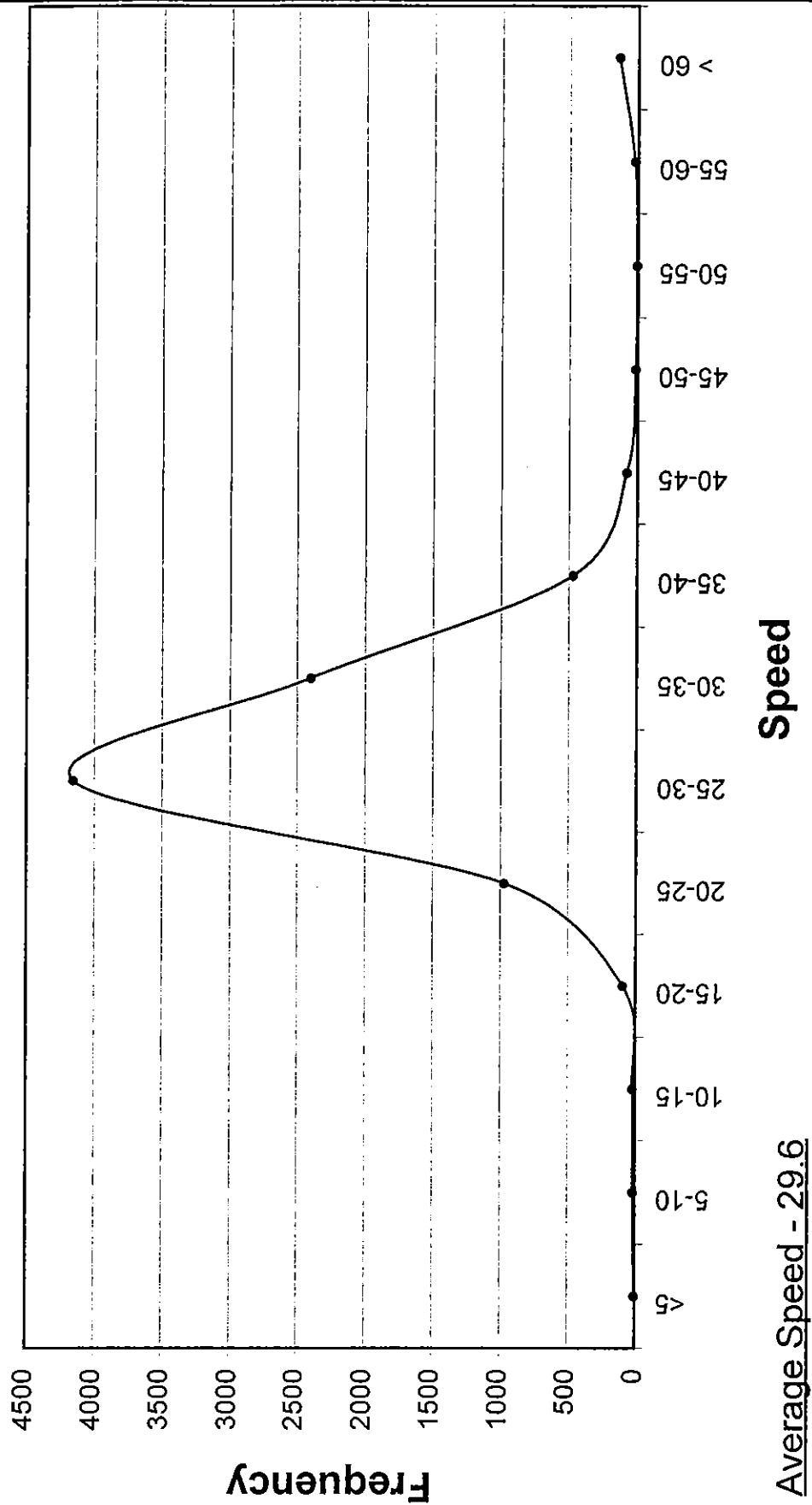
Circulation Study



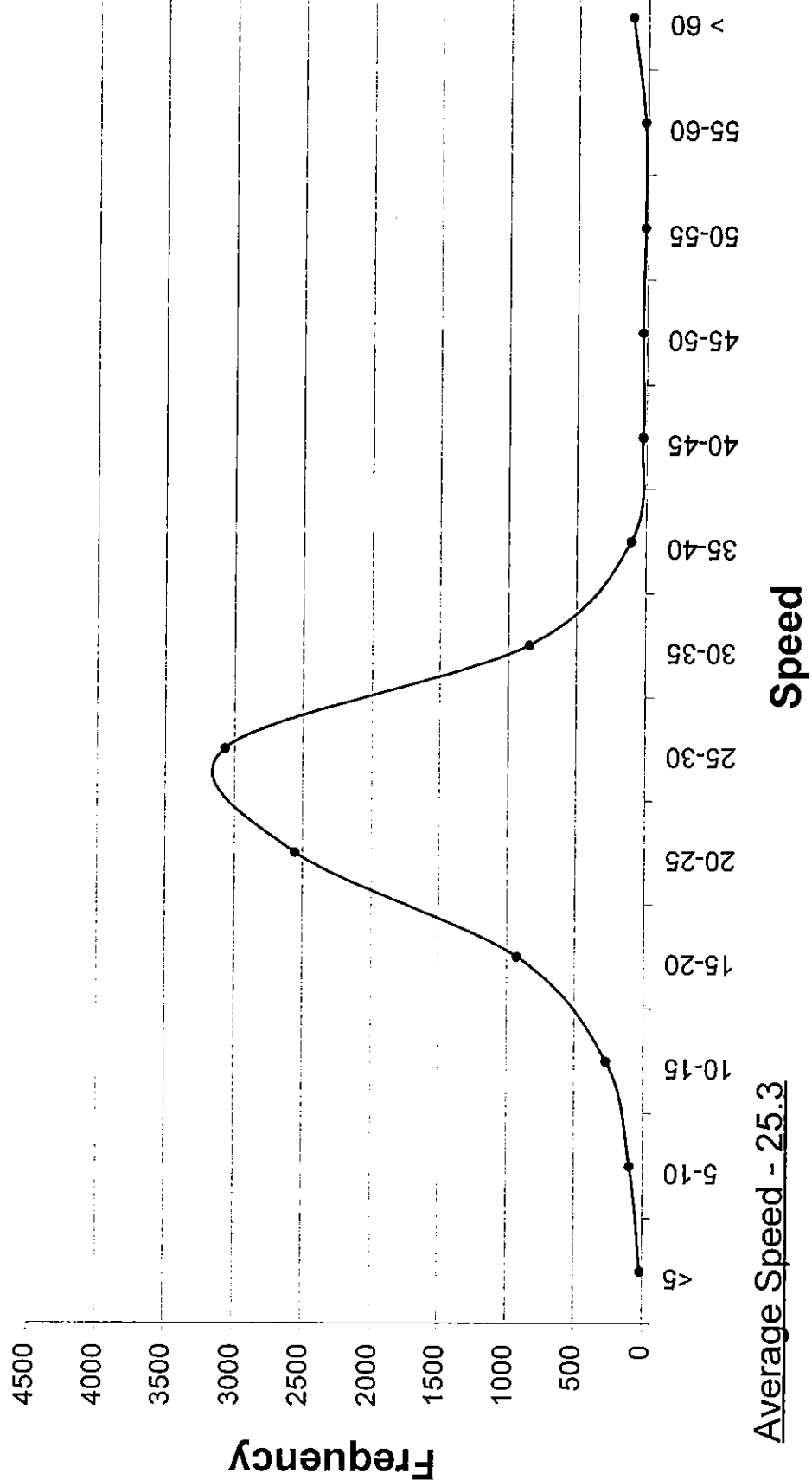
INTERSECTION CRASH RATES 1995-1997 HRC

Speed Distribution

Speed Vs Frequency (On Cross East of Huron)



Speed Vs Frequency (On Cross West of Clock)



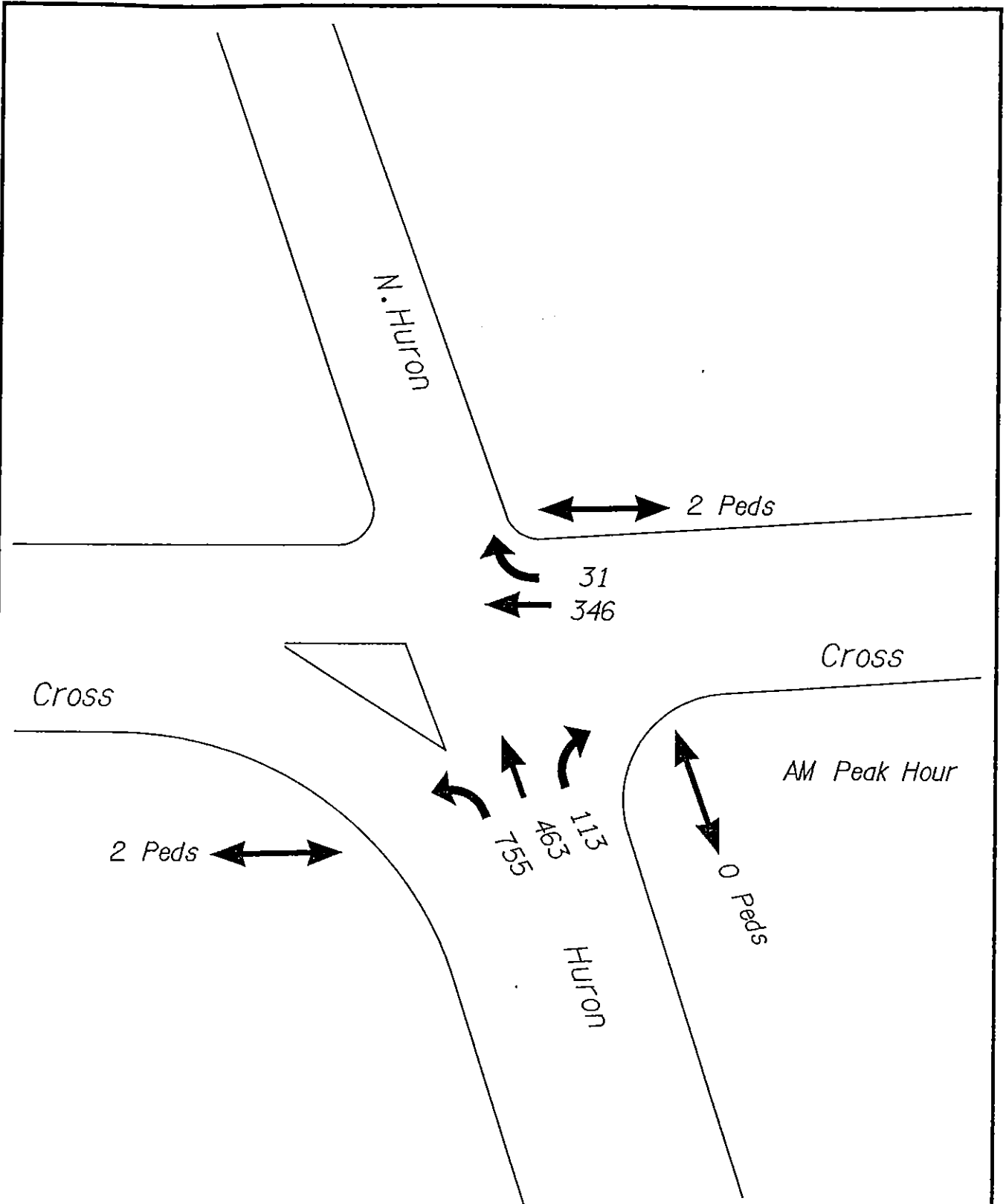
Turning Movement Counts

STROKE TIME - 08-OCT-1998 09:05

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\19980371\cadd\traff\crossdet.dgn

USER NAME - jhartman



TURNING MOVEMENT COUNTS

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH. P.O. BOX 824 48303-0824	SHEET NO. T-1 OF
DATE October 1998		

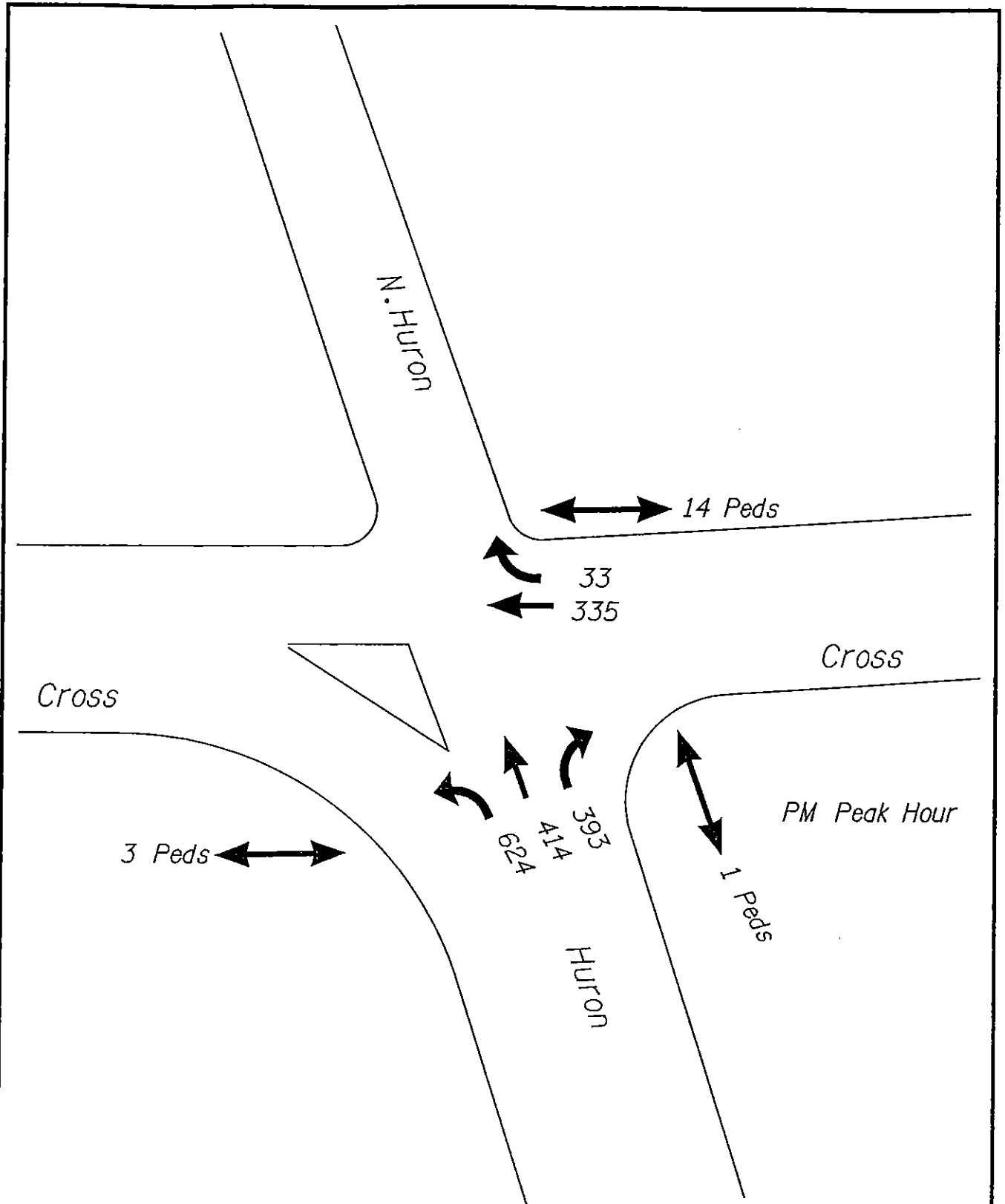
A-7

STROKE TIME - 08-OCT-1998 09:06

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\19980371\cadd\traff\crossdet.dgn

USER NAME - jharlman



TURNING MOVEMENT COUNTS

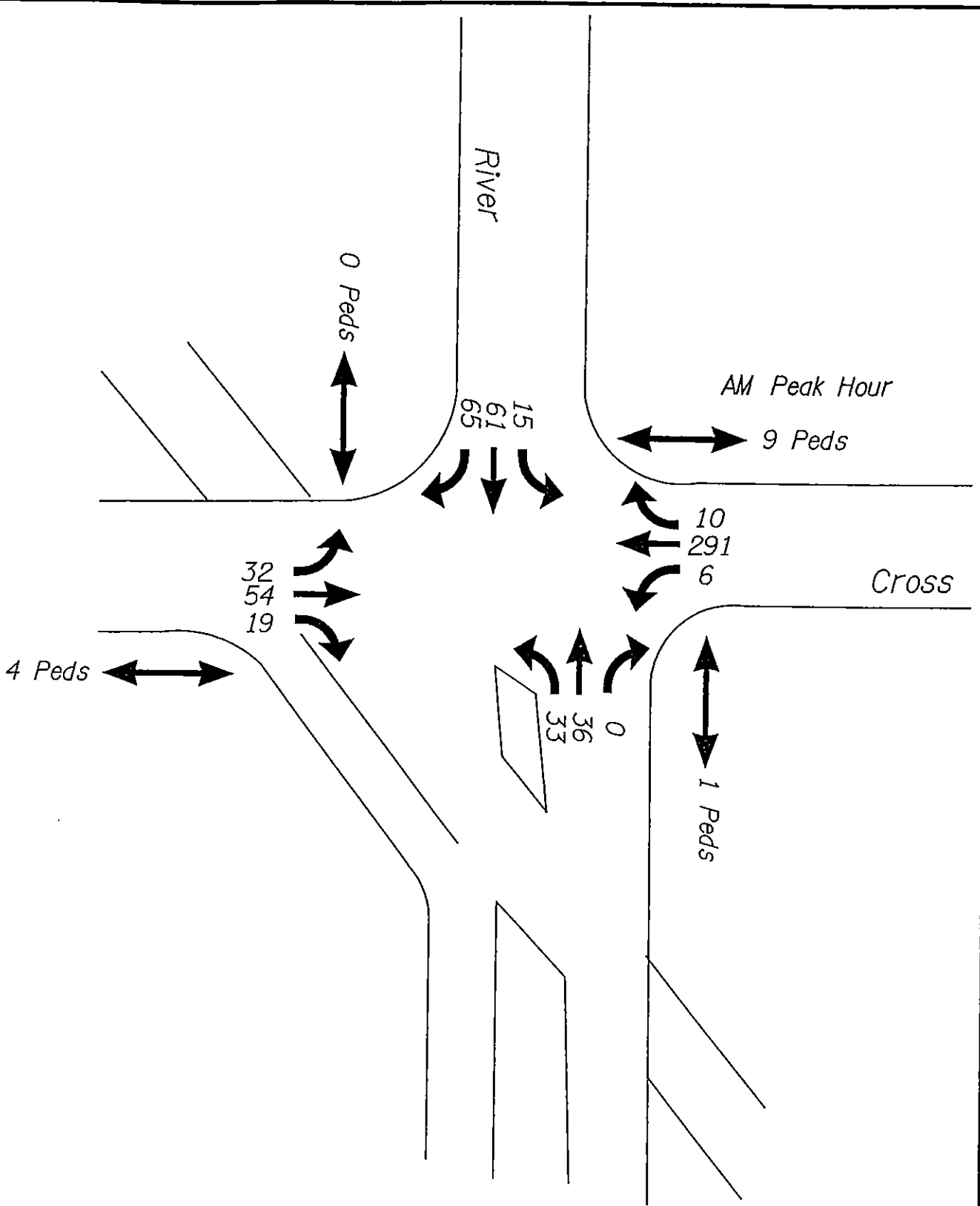
JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH. P.O. BOX 824 48303-0824	SHEET NO. T-2
DATE October 1998		OF

STROKE TIME • 08-OCT-1998 09:09

PLOT NAME • N/A

DESIGN FILE • f:\1998\199803\19980371\cadd\traff\crossdel.dgn

USER NAME • jharlman



TURNING MOVEMENT COUNTS

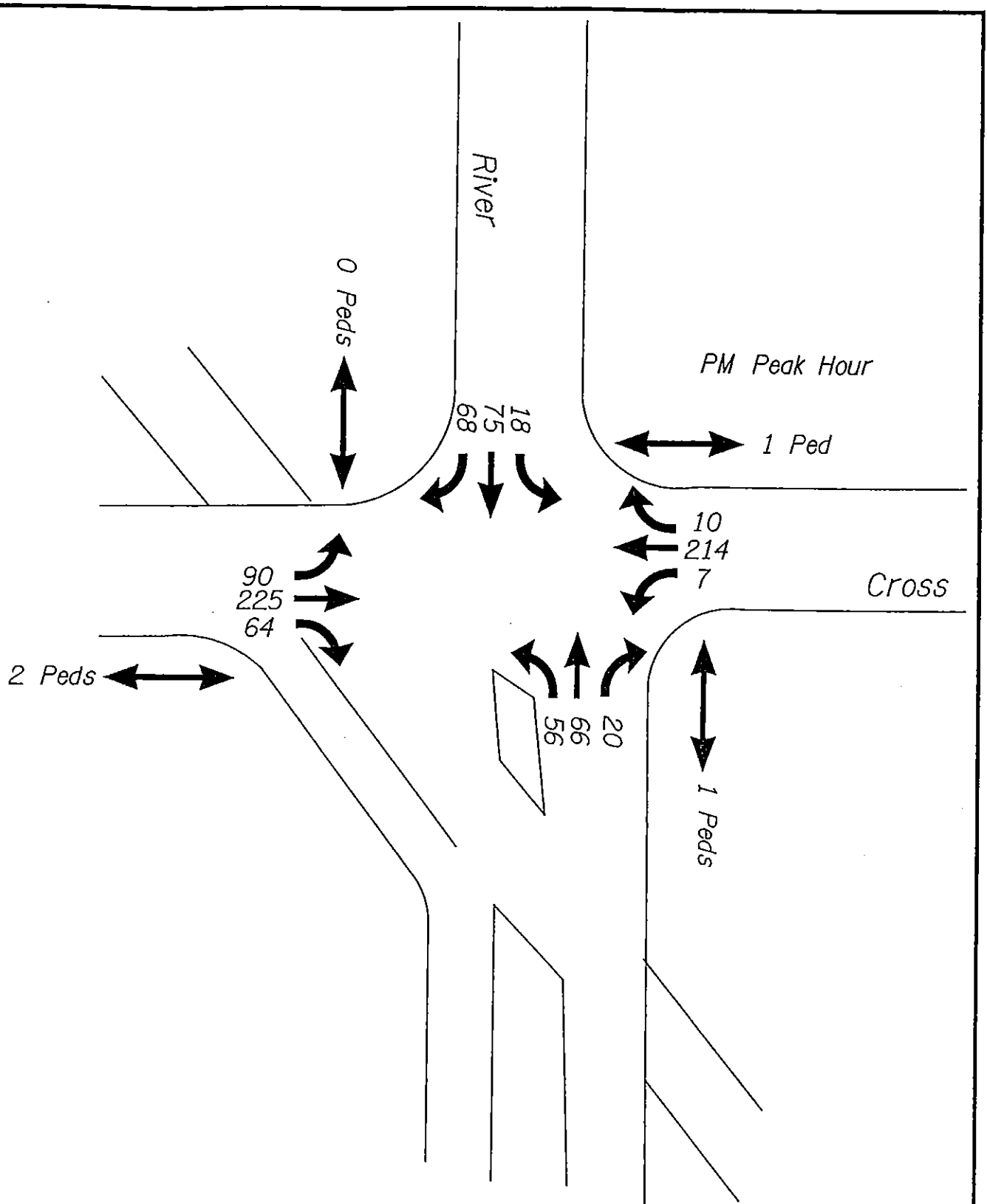
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DATE October 1998		

STROKE TIME - 08-OCT-1998 09:10

PLOT NAME - N/A

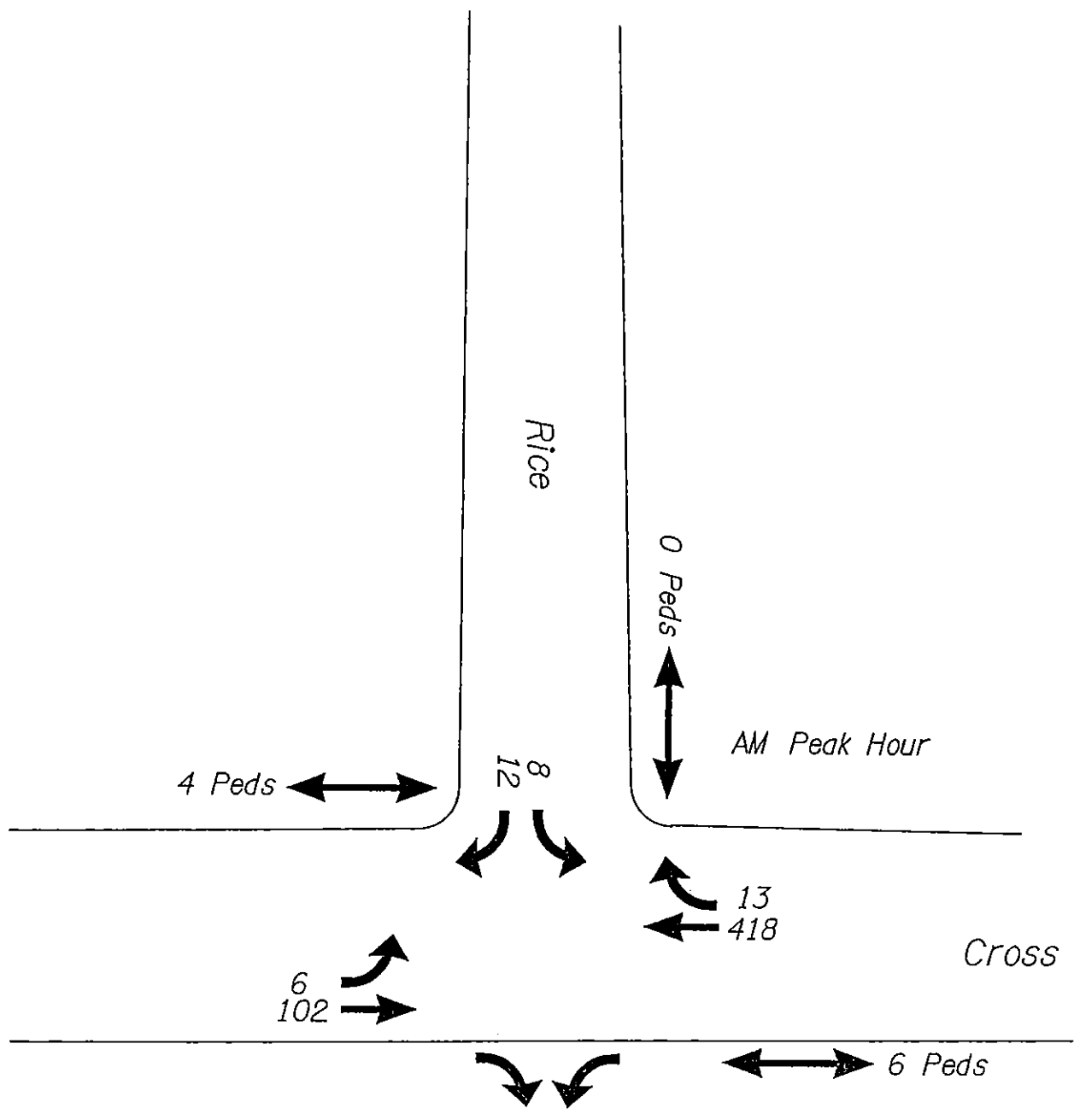
DESIGN FILE - F:\1998\1998037\1\cadd\traffic\crossdet.dgn

USER NAME - Jhartman



TURNING MOVEMENT COUNTS

JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. T-4 OF
DATE October 1998		



TURNING MOVEMENT COUNTS

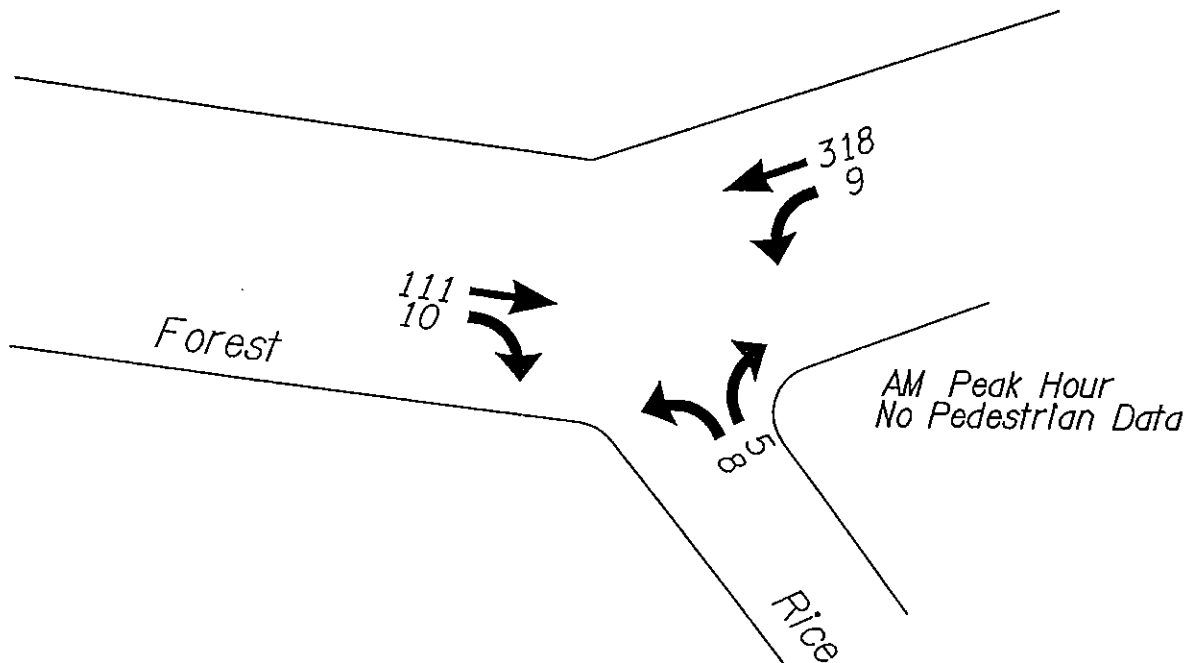
JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH. P.O. BOX 824 48303-0824	SHEET NO. T-5 OF
DATE October 1998		

STROKE TIME • 08-OCT-1998 08:55

PLOT NAME • N/A

DESIGN FILE • f:\1998\199803\19980371\cadd\traffic\crossdel.dgn

USER NAME • jhartman



TURNING MOVEMENT COUNTS

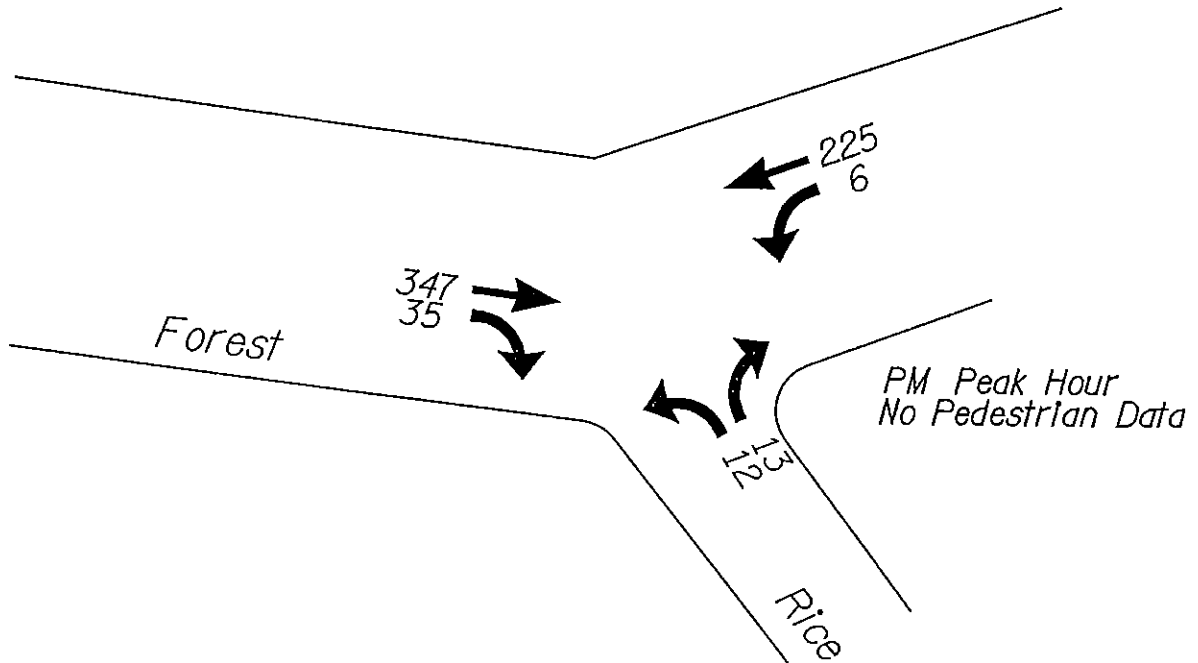
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DATE October 1998		T-7 OF

STROKE TIME - 08-OCT-1998 08:56

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\1998037\cadd\traffic\crossdel.dgn

USER NAME - jhartman



TURNING MOVEMENT COUNTS

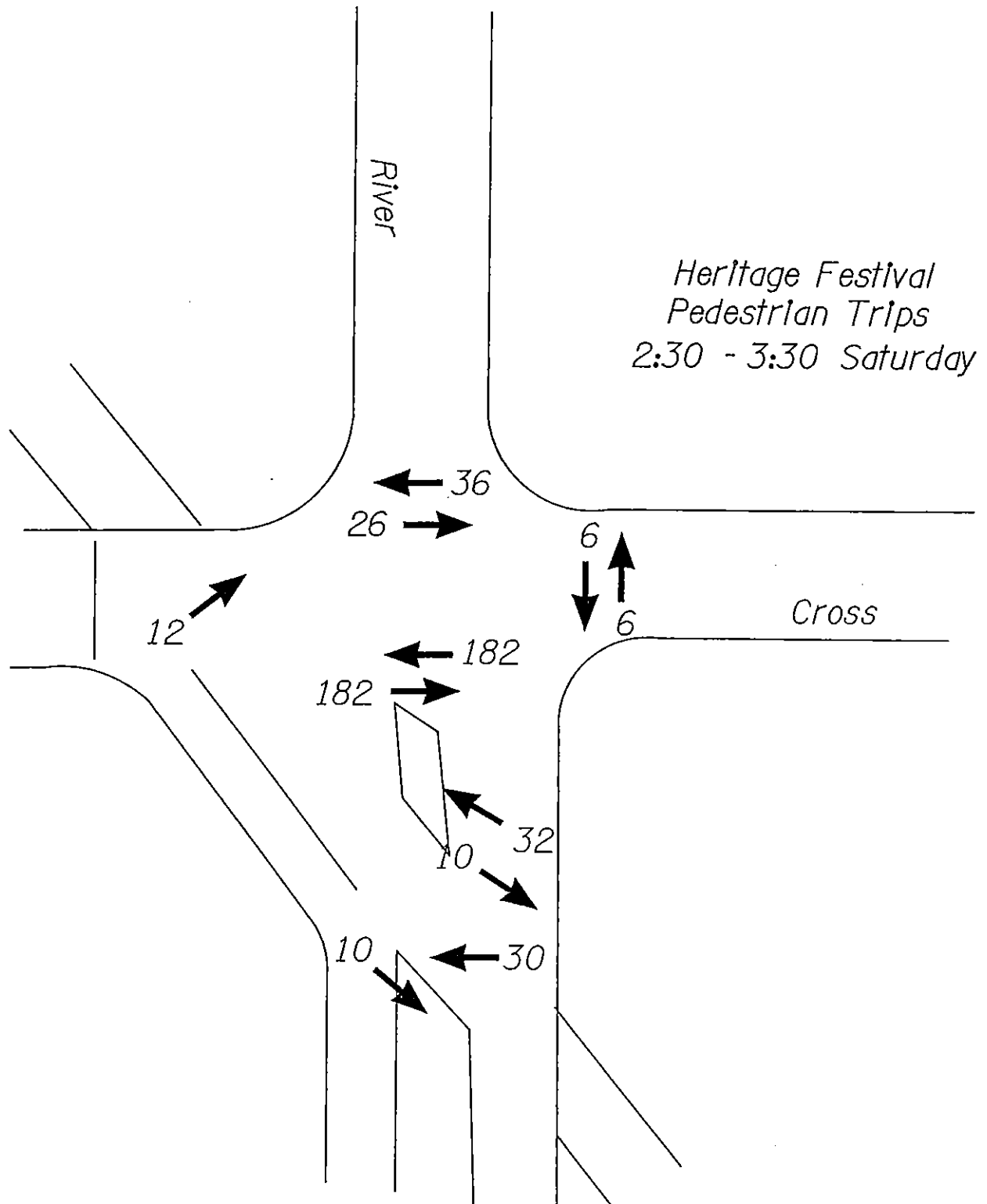
JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	P.O. BOX 824 48303-0824	SHEET NO. T-8 OF
DATE October 1998			

STROKE TIME - 12-OCT-1998 10:22

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\1998037\cadd\traffic\crossdel.dgn

USER NAME - jhartman



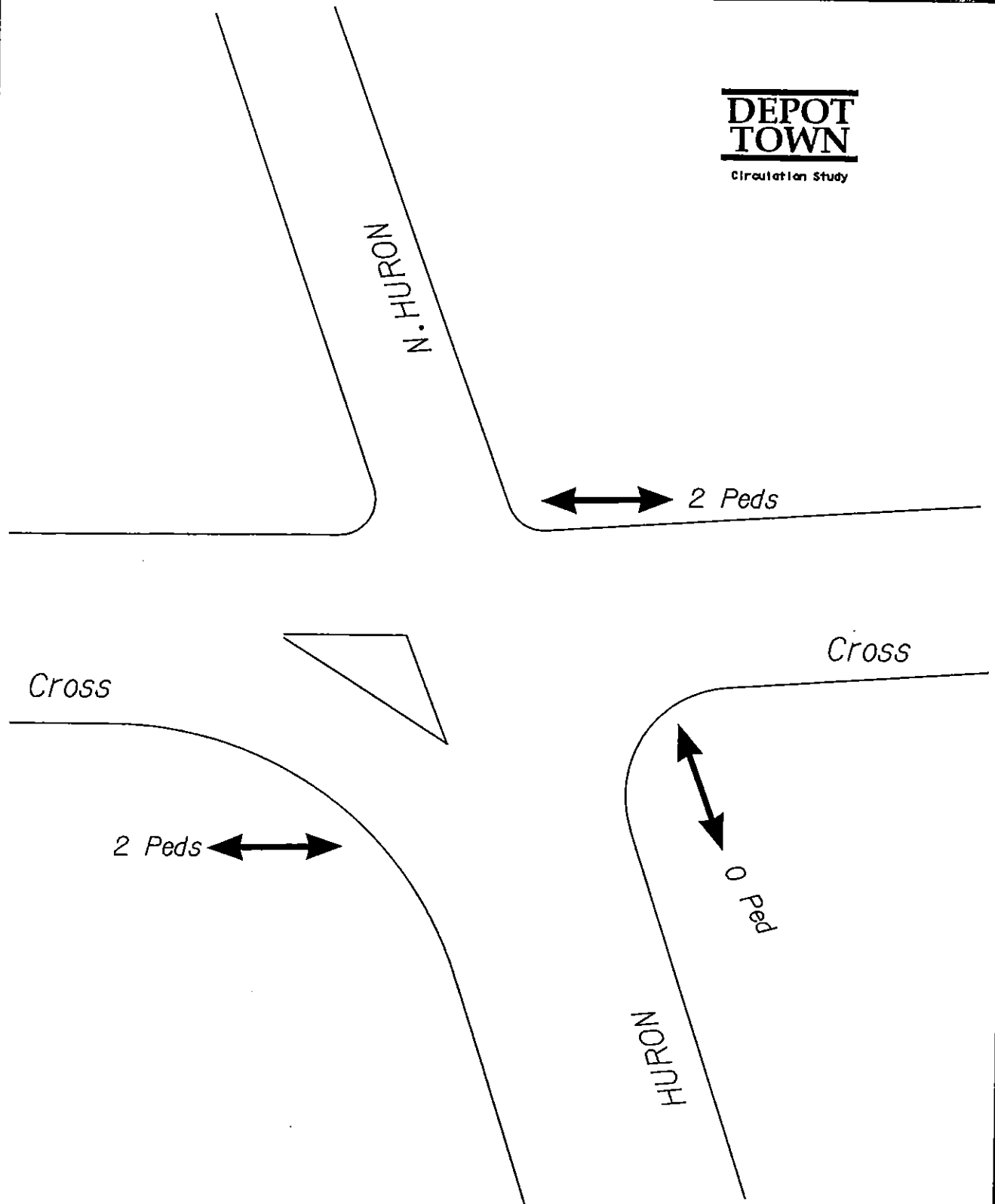
JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC.	SHEET NO.
DATE October 1998	CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	T-9
	P.O. BOX 824 48303-0824	OF

STROKE TIME - 11-FEB-1999 11:41

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\19980371\cadd\traffic\crosshurn.dgn

USER NAME - Mrcrf1



PEDESTRIAN MOVEMENT COUNTS AM PEAK HOUR



JOB NO. JOB NO.	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. <i>P-1</i>
DATE		

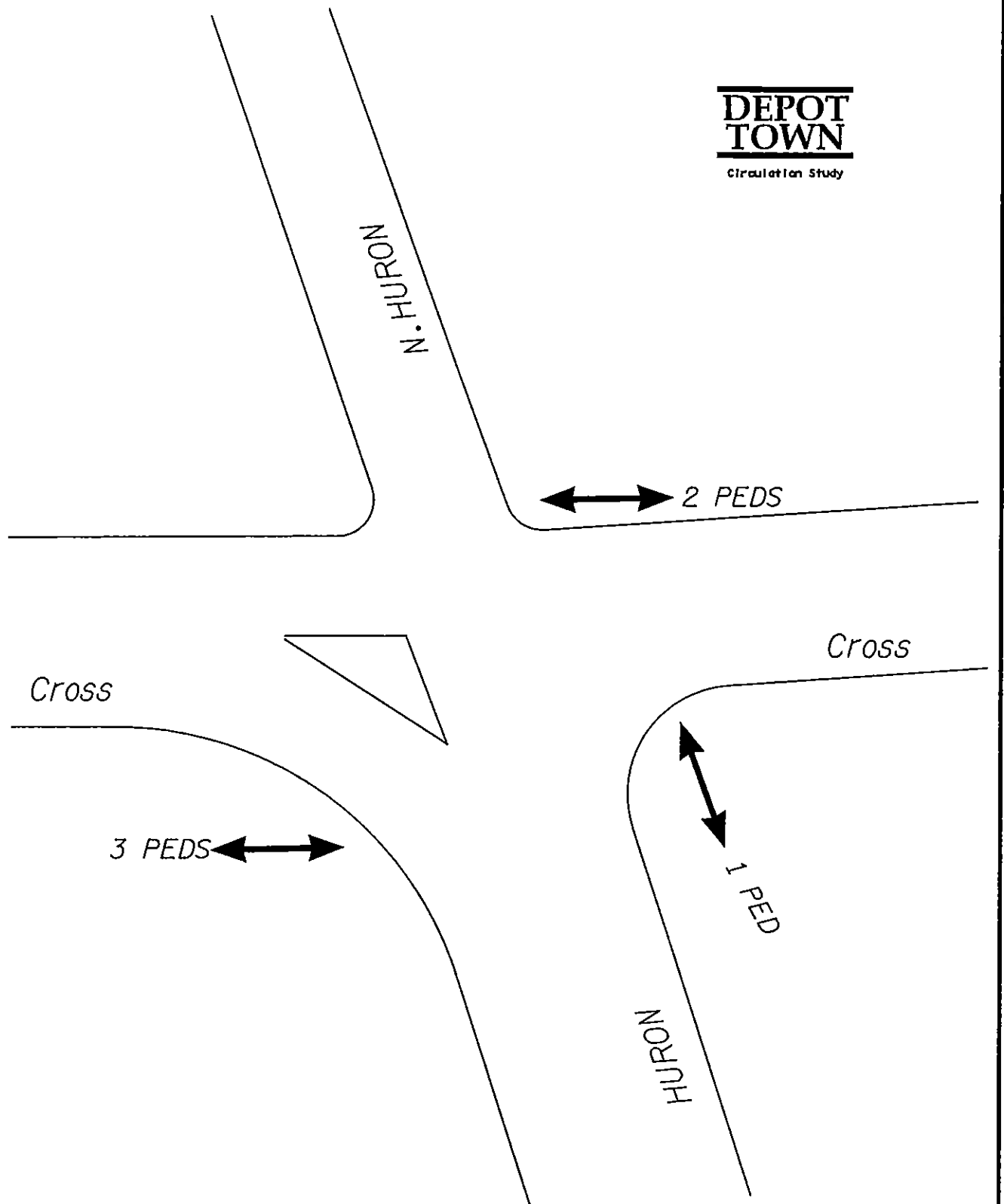
STROKE TIME - 11-FEB-1999 11:36

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\1998037\cadd\traffic\crs\shurn.dgn

USER NAME - Mrcrft

**DEPOT
TOWN**
Circulation Study



PEDESTRIAN MOVEMENT COUNTS PM PEAK HOUR



JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. P-2
DATE OCTOBER 1998		

STROKE TIME - 11-FEB-1999 11:45

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\1998037\cadd\traffic\ssr\ice.dgn

USER NAME - Mcraft

**DEPOT
TOWN**
Circulation Study

RICE

1 PED

13 PEDS

CROSS

20 PEDS

**PEDESTRAIN MOVEMENT COUNTS
PM PEAK HOUR**



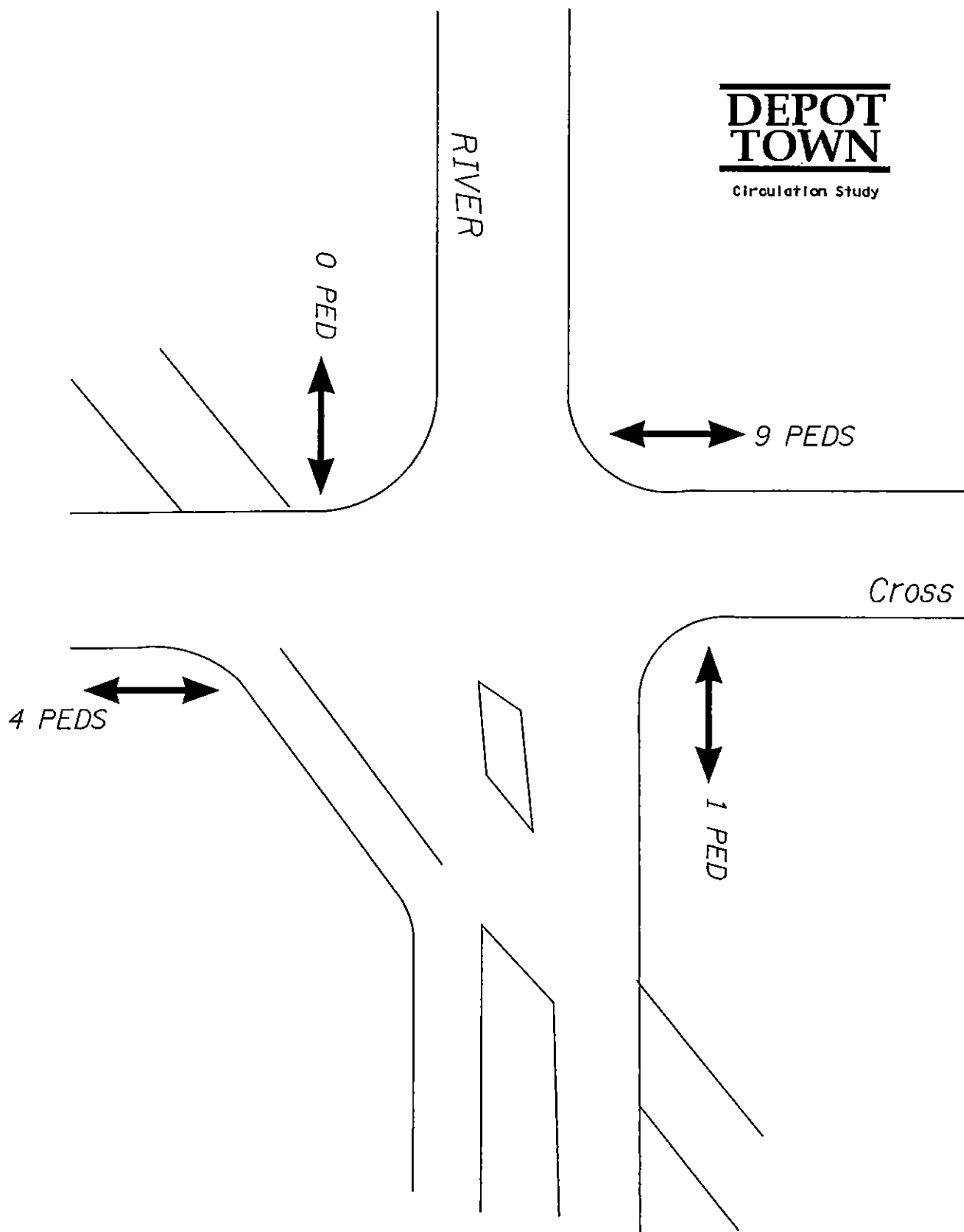
JOB NO.	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. <i>P-4</i>
DATE		

STROKE TIME - 11-FEB-1999 07:43

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\19980371\cadd\traff\cvt\ssrvr.dgn

USER NAME - Mcraft



PEDESTRIAN MOVEMENT COUNTS AM PEAK HOUR



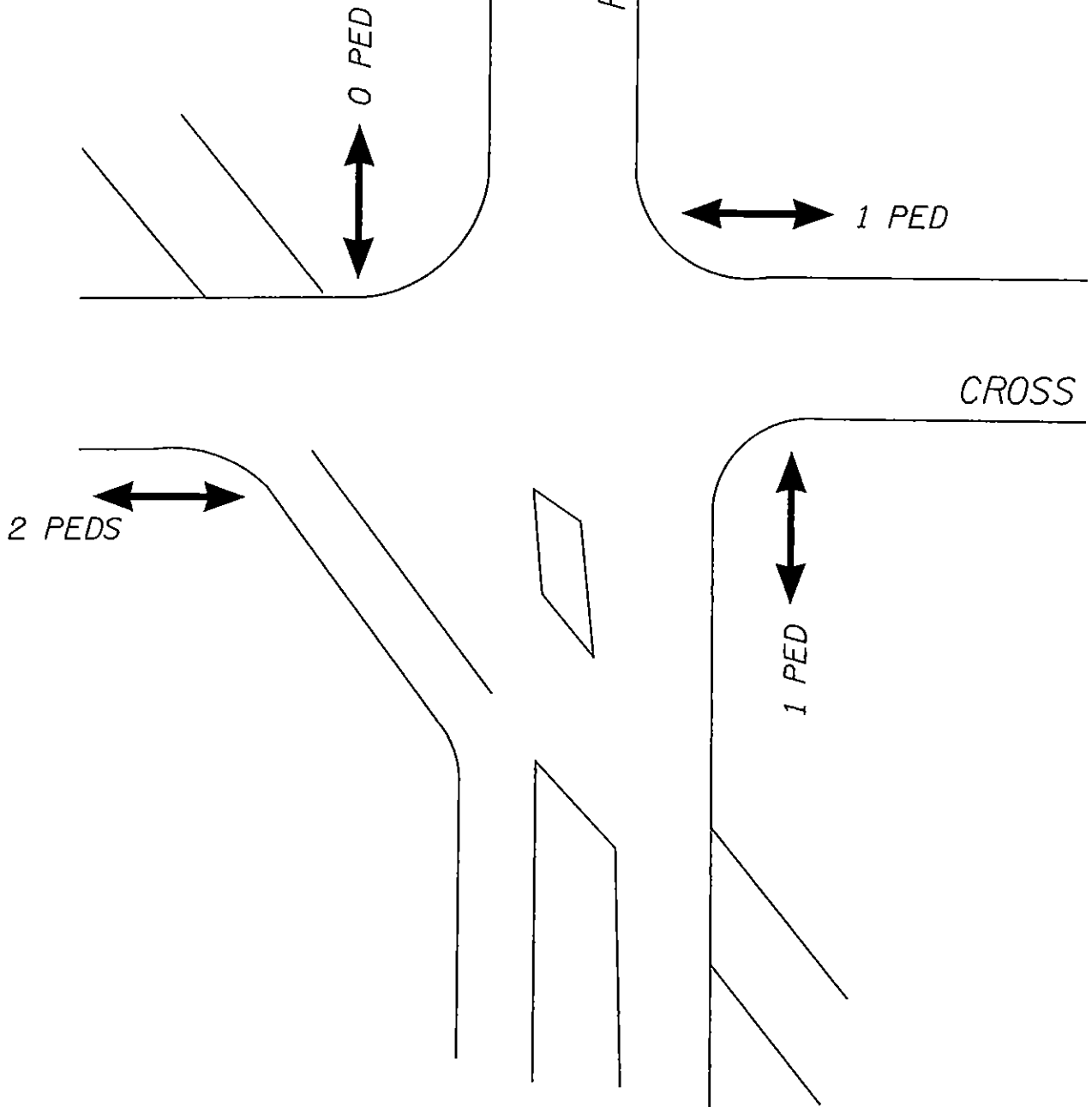
JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. <i>P-5</i>
DATE OCTOBER 1998		

STROKE TIME - 12-FEB-1999 10:12

PLOT NAME - N/A

DESIGN FILE - f:\1998\199803\1998037\cadd\traffic\arssrvr.dgn

USER NAME - Macroft

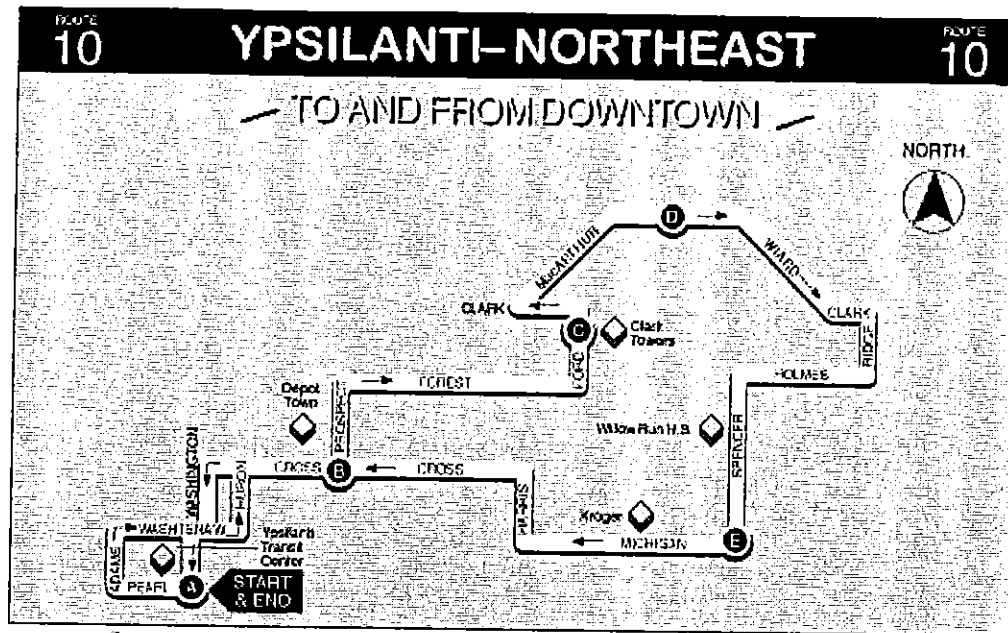


**DEPOT
TOWN**
Circulation Study

PEDESTRIAN MOVEMENT COUNTS PM PEAK HOUR



JOB NO. 19980371	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH. P.O. BOX 824 48303-0824	SHEET NO.
DATE OCTOBER 1998		P-6



	A	B	C	D	E	F	A
	DUS STARTS from Ypsilanti Transit Center	Bus arrives at Cross & Prospect	Bus arrives at Clark Towers	Bus arrives at MacArthur & Harris	Bus arrives at Michigan & Spencer	Bus arrives at Cross & Prospect	BUS ENDS at Ypsilanti Transit Center
WEEKDAYS							
AM	—	8:02	8:08	8:11	8:19	8:24	8:30
	8:20	8:28	8:31	8:37	8:48	8:51	9:00
	7:20	7:28	7:31	7:37	7:48	7:51	8:00
	8:20	8:28	8:31	8:37	8:48	8:51	9:00
	9:20	9:28	9:31	9:37	9:48	9:51	10:00
	10:20	10:28	10:31	10:37	10:48	10:51	11:00
	11:20	11:28	11:31	11:37	11:48	11:51	12:00
PM	12:20	12:28	12:31	12:37	12:48	12:51	1:00
	1:20	1:28	1:31	1:37	1:48	1:51	2:00
	2:20	2:28	2:31	2:37	2:48	2:51	3:00
	3:20	3:28	3:31	3:37	3:48	3:51	4:00
	4:20	4:28	4:31	4:37	4:48	4:51	5:00
	5:20	5:28	5:31	5:37	5:48	5:51	6:00
	6:30	6:38	6:39 *	6:43	6:49	6:53	7:00
	7:30	7:38	7:39 *	7:43	7:49	7:53	8:00
	8:30	8:38	8:39 *	8:43	8:49	8:53	9:00
	9:30	9:38	9:39 *	9:43	9:49	9:53	10:00
SATURDAY							
AM	7:30	7:36	7:39	7:43	7:49	7:53	8:00
	8:30	8:36	8:39	8:43	8:49	8:53	9:00
	9:30	9:36	9:39	9:43	9:49	9:53	10:00
	10:30	10:36	10:39	10:43	10:49	10:53	11:00
	11:30	11:36	11:39	11:43	11:49	11:53	12:00
PM	12:30	12:36	12:39	12:43	12:49	12:53	1:00
	1:30	1:36	1:39	1:43	1:49	1:53	2:00
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	4:30	4:36	4:39	4:43	4:49	4:53	5:00
	5:30	5:36	5:39	5:43	5:49	5:53	6:00
	6:30	6:36	6:39	6:43	6:49	6:53	7:00

Improvement Alternatives

Improvement Alternatives

1. Existing Conditions	2. Expanded Sidewalk Alternative
<u>Modifications</u> ❖ No modifications <u>Pros</u> ❖ No Capital Costs ❖ Existing Access ❖ No Loss of On-street Parking <u>Cons</u> ❖ Difficult Access to East Public Parking ❖ Rice Street Elements Hidden	<u>Modifications</u> ❖ Expanded Sidewalk <u>Pros</u> ❖ Low Capital Costs ❖ Existing Access ❖ Even Wider Sidewalk ❖ Increased Traffic Calming

Traffic Crash Data

Traffic Crash Data

The traffic engineer's most critical contribution to traffic safety is the analysis of high accident locations and the recommendation of improvements to correct the roadway deficiencies and to make the roads safer. In many ways, the traffic engineer's recommendations for improvements are similar to the prescriptions that doctors give to their patients. Like doctors, traffic engineers analyze the symptoms and recommends or prescribes solutions to make the roadway safer.

The traffic engineer's analysis of the traffic safety problem must include two critical pieces of information – traffic crash data and traffic volume data. HRC gathered traffic volumes and crash data for 1995 through 1997 for the City of Ypsilanti and analyzed it to identify areas of concern. It is important to compute crash rates because it provides a relationship between the crash experience and the exposure. For example, fifteen crashes at an intersection carrying 20,000 vehicles per day, may be a more serious problem than fifteen crashes at an intersection carrying 50,000 vehicles per day. The traffic volume information helps put the crash experience into perspective so that priorities can be set rationally for a transportation improvement program.

The intersection with the highest crash frequency is Huron/Michigan, just south of the Depot Town area. Within the study area Huron/Cross has the highest frequency and the highest volume.

Intersection Traffic Crashes – 1995 to 1997

Intersection	Average Total Crashes	Volume	Crash Rate	Average Total Injuries	Injury Rate
Huron - Forest	10.33	13,447	2.10	3.33	0.68
Huron - Cross	11.00	24,675	1.22	1.33	0.15
Huron - Washtenaw	9.00	19,388	1.27	1.67	0.24
Huron - Michigan	32.33	46,665	1.90	7.67	0.45
Michigan - River	23.33	34,536	1.85	8.33	0.66
Cross - River	3.67	12,055	0.83	0.00	0.00
Forest - River	4.67	9,594	1.33	1.67	0.48
Cross - Rice	3.00	12,857	0.64	0.33	0.07
Hamilton - Forest	3.33	9,000	1.01	1.00	0.30
Hamilton - Cross	10.67	19,428	1.50	1.67	0.24
Hamilton - Washtenaw	10.33	17,880	1.58	1.00	0.15

Note

Units for the crash rates are "Crashes Per Million Entering Vehicles"

Units for the Injury Rates are "Crashes Per Million Entering Vehicles"

Link Traffic Crashes – 1995 to 1997

Segment	Ave. Total Crashes	Volume	Seg. Length	Crash Rate	Ave. Total Injuries	Injury Rate
Cross (between Huron and River)	8.33	12,054	1,315	0.0014	0.67	0.0001
Forest (between Huron and River)	1.33	7,316	1,750	0.0003	0.33	0.0001
Huron (between Forest and Cross)	5.67	5,953	1,190	0.0022	0.67	0.0003
Huron (between Cross and Michigan)	13.33	18,648	1,718	0.0011	2.67	0.0002
River (between Forest and Cross)	5.33	3,898	1,295	0.0029	0.67	0.0004
River (between Cross and Michigan)	2.00	4,228	1,760	0.0007	0.00	0.0000
Washtenaw (between Hamilton and Huron)	2.33	5,000	1,170	0.0011	0.33	0.0002
Hamilton (between Forest and Cross)	4.00	6,000	932	0.0020	0.67	0.0003
Hamilton (between Cross and Washtenaw)	7.33	6,000	766	0.0044	1.00	0.0006
Cross (between Hamilton and Huron)	16.00	6,000	1,088	0.0067	2.33	0.0010

Note.

Units for the Crash Rates are "Crashes Per Million Vehicle Miles of Travel"

Units for the Injury Rates are "Injuries Per Million Vehicle Miles of Travel"

Huron at Michigan Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	13	8	7	28
Angle	11	6	10	27
Head On	1	0	1	2
Head On Left Turn	1	5	1	7
Side Swipe Same	3	9	3	15
Side Swipe Opposite	2	0	2	4
Single	2	1	0	3
Other	5	2	4	11
Total	38	31	28	97

Michigan at River Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	14	15	11	40
Angle	11	4	1	16
Head On	0	0	0	0
Head On Left Turn	2	1	0	3
Side Swipe Same	2	3	1	6
Side Swipe Opposite	0	0	0	0
Single	1	0	0	1
Other	1	1	2	4
Total	31	24	15	70

Cross at River Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	1	1	0	2
Angle	1	0	1	2
Head On	0	0	0	0
Head On Left Turn	0	0	1	1
Side Swipe Same	1	0	0	1
Side Swipe Opposite	0	2	0	2
Single	1	0	0	1
Other	2	0	0	2
Total	6	3	2	11

Forest at River Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	0	2	1	3
Angle	0	3	2	5
Head On	0	0	0	0
Head On Left Turn	0	1	1	2
Side Swipe Same	1	0	0	1
Side Swipe Opposite	0	0	0	0
Single	0	0	0	0
Other	1	1	1	3
Total	2	7	5	14

Cross at Rice Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	0	2	0	2
Angle	0	0	0	0
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	1	0	0	1
Single	0	1	2	3
Other	3	0	0	3
Total	4	3	2	9

Hamilton at Forest Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	1	1	0	2
Angle	0	0	0	0
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	1	2	1	4
Side Swipe Opposite	0	3	0	3
Single	0	0	0	0
Other	1	0	0	1
Total	3	6	1	10

Hamilton at Cross Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	5	1	4	10
Angle	1	3	5	9
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	4	1	5
Side Swipe Opposite	0	1	1	2
Single	1	0	0	1
Other	3	0	2	5
Total	10	9	13	32

Hamilton at Washtenaw Intersection Crashes

Crash Type	1995	1996	1997	Total
Rear End	3	2	1	6
Angle	7	2	4	13
Head On	2	0	0	2
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	0	0	0	0
Single	3	0	2	5
Other	1	2	2	5
Total	16	6	9	31

Link Segment Crashes On Cross Between Huron and River

Crash Type	1995	1996	1997	Total
Rear End	1	4	1	6
Angle	1	3	1	5
Head On	1	0	0	1
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	2	0	0	2
Single	2	2	2	6
Other	2	2	1	5
Total	9	11	5	25

Link Segment Crashes On Forest Between Huron and River

Crash Type	1995	1996	1997	Total
Rear End	0	0	1	1
Angle	0	0	0	0
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	0	0	0	0
Single	1	1	0	2
Other	0	0	1	1
Total	1	1	2	4

Link Segment Crashes On Huron Between Forest and Cross

Crash Type	1995	1996	1997	Total
Rear End	1	2	1	4
Angle	0	4	1	5
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	4	1	5
Side Swipe Opposite	0	0	1	1
Single	0	1	0	1
Other	1	0	0	1
Total	2	11	4	17

Link Segment Crashes On Huron Between Cross and Michigan

Crash Type	1995	1996	1997	Total
Rear End	2	5	4	11
Angle	1	5	6	12
Head On	0	0	2	2
Head On Left Turn	0	0	0	0
Side Swipe Same	3	2	3	8
Side Swipe Opposite	2	1	0	3
Single	0	1	1	2
Other	1	1	0	2
Total	9	15	16	40

Link Segment Crashes On River Between Forest and Cross

Crash Type	1995	1996	1997	Total
Rear End	2	2	0	4
Angle	1	0	3	4
Head On	0	0	0	0
Head On Left Turn	0	0	1	1
Side Swipe Same	2	0	0	2
Side Swipe Opposite	2	0	0	2
Single	1	1	1	3
Other	0	0	0	0
Total	8	3	5	16

Link Segment Crashes On River Between Cross and Michigan

Crash Type	1995	1996	1997	Total
Rear End	1	2	0	3
Angle	0	1	0	1
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	1	1	2
Side Swipe Opposite	0	0	0	0
Single	0	0	0	0
Other	0	0	0	0
Total	1	4	1	6

Link Segment Crashes On Washtenaw Between Hamilton and Huron

Crash Type	1995	1996	1997	Total
Rear End	0	0	0	0
Angle	1	1	2	4
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	0	0	0
Side Swipe Opposite	0	0	0	0
Single	0	0	0	0
Other	1	2	0	3
Total	2	3	2	7

Link Segment Crashes On Hamilton Between Forest and Cross

Crash Type	1995	1996	1997	Total
Rear End	5	1	0	6
Angle	0	0	1	1
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	0	1	1	2
Side Swipe Opposite	0	0	1	1
Single	0	0	0	0
Other	1	1	0	2
Total	6	3	3	12

Link Segment Crashes On Hamilton Between Cross and Washtenaw

Crash Type	1995	1996	1997	Total
Rear End	0	2	1	3
Angle	3	4	6	13
Head On	0	0	0	0
Head On Left Turn	0	0	0	0
Side Swipe Same	1	1	2	4
Side Swipe Opposite	0	0	0	0
Single	0	0	0	0
Other	2	0	0	2
Total	6	7	9	22

***Planning Considerations for
Pedestrian Malls and
Street Closures***

Planning Considerations For Pedestrian Malls And Street Closures

For urban street malls to be successful, they must provide a viable and attractive alternative to regional shopping malls. This can be difficult when it is considered that street malls must necessarily be planned and designed around existing roadway configurations, traffic patterns, parking, retail mix and other constraints. Street widths can be too wide, walking distances too long, and retail development poorly located to encourage the patterns and volume of pedestrian activity needed to support a successful urban mall. The regional shopping mall, on the other hand, offers a climate controlled and attractively designed environment, plentiful nearby parking, concentrated retail exposure within short walking distances, freedom from exposure to vehicular conflicts and pollution, off-street truck facilities, and other advantages over the street mall. In order to succeed, the street mall must, therefore, capitalize on its primary advantage as an outdoor activity space by promoting parades, street fairs, bicycle and track races, antique car rallies, marching band competitions, concerts, and other similar public events to encourage pedestrian activity and establish an area identity.

The success or failure of an urban pedestrian mall is dependent upon many factors, some of which are directly controlled during the planning process. Providing a rigid planning framework is not possible due to the physical layout and socio-economic composition of the proposed development site. Planning considerations are, therefore, presented as a series of concerns with references, where appropriate, to concepts that have both failed and succeeded. The primary objectives of the pedestrian mall should be to reestablish or fortify an urban area's economic viability while simultaneously creating a social setting capable of responding to a variety of needs. The following considerations identify elements of planning essential to the effective realization of pedestrian malls.

Relationship of Mall to Central Area Development

Pedestrian malls succeed or fail according to their degree of accessibility either by public transit or by private automobile. The success of a pedestrian zone is also directly related to its ability to create a range of activities to suit a variety of users. For example, Albany's government mall in New York State has suffered a loss of vitality because it is only able to attract patrons during lunch break hours and is practically deserted otherwise. A more

balanced use of the area's resources over extended periods of time, a high level of urban vitality, and an increased feeling of safety can be achieved by attracting a full spectrum of users through mixed use zoning.

Cooperation and Support

Progress in implementing the planned improvements can be much more rapid when commercial and public interest can be demonstrated to coincide. Many proposals meet opposition from shop owners who believe that their trade will suffer if vehicular access is restricted along their premises. Shopkeepers are often resistant to the mall concept until they are made aware of the potential benefits. It is important to obtain the cooperation of commercial interests at the initial planning states in order to ensure viability of proposals.

Community involvement can often be generated by launching instant beautification campaigns in order to project a new image for the main downtown area to be redeveloped. Vacancies can also be temporarily eliminated by providing storefront space at nominal rents to service oriented businesses, public interest organizations, or businesses likely to increase the level of urban viability in the area. Similarly, clean-up campaigns, the elimination of signs of vandalism and neglect, wall paintings, and the introduction of landscaping elements can prove helpful in generating hope and enthusiasm for the downtown challenge. Eliciting public support during the course of the pedestrian mall development is important in guaranteeing the success of the mall. The creation of a pedestrian mall affects a wide range of user groups whose participation is vital. These groups should be consulted and involved during the early planning stages of project implementation.

Existing Vehicle Traffic Patterns

Some cities have radically altered circulation patterns in order to decrease traffic congestion and redistribute vehicular traffic flow in the area of the pedestrian mall. This can be accomplished by developing one-way streets, restricting turning movements, limiting access to certain categories of vehicles, redesigning intersections, and retiming traffic signals.

Public Transit Services

Most cities with successful pedestrian malls have introduced policies that encourage the use of public transport. The success of these policies has varied depending on the extent of traffic congestion and the efficiency of the public transportation system. As always, public transit should be inexpensive, fast, comfortable, safe and enjoyable to ride. Other tactics that can be successful are reserved lanes for public vehicles, low fares, convenient pickup and drop-off locations within the mall, and better security. Those pedestrian malls that are built as transit ways can provide increased mobility to pedestrians by dropping them at major department stores or activity centers within the mall itself.

Parking Supply

Effective parking policies have a significant impact on both the regulation of parking density and the attractiveness of parking spaces to mall users. Some cities use different strategies to meet the demands of employees seeking day-long parking and visitors looking for short-term parking. Some cities offer park-and-ride systems to allow downtown or mall employees to park their cars at the periphery of the city limit and ride to work via rapid transit or special buses. On-street parking meters and multi-level parking facilities at the edge of the pedestrian mall areas can provide short-term parking needs; time can be charged in incremental rates to promote a quick turnover.

Mobility of Goods

Oppositions of many merchants to the idea of a pedestrian mall results from the problem of delivering merchandise to stores and making it possible for customers on foot to handle the purchases easily. One of the most common strategies has been to allow structural changes in the street pattern to make possible store deliveries from courtyards and alleys as well as using time restrictions on the use of pedestrian mall space by commercial trucks. Some downtown merchants have introduced free pushcarts in order to meet customer demand for assistance in delivering their goods to either the central transportation terminal or to where their car is parked. Other establishments that sell bulk goods, such as grocery stores, should be relocated to the periphery of the mall where ready access to parked vehicles is available.

Essential Services

Essential services such as emergency fire, police, medical, refuse removal, taxis, vehicle pick-up and drop-off, truck delivery and pick-up, and mall cleaning must also be considered. Provisions must be provided to allow emergency service vehicles to quickly access areas within the pedestrian mall. Problems are often encountered in that the effective width of the street is made smaller to encourage pedestrian movement with the placement of amenities, such as benches and planters, within the street right-of-way. Additional amenities within the pedestrian mall such as canopies and covered ways will need to be sufficiently high in order to enable emergency vehicles to pass underneath. It is important, therefore, to consult with the appropriate emergency services at an early stage in the planning of the pedestrian mall. In addition to the fact that emergency vehicles will need to have access to the pedestrian mall during all hours of the day, there are also certain types of businesses that require such access for other vehicle types. For example, a hotel located on the street to be made into a pedestrian mall will need to provide continuous access to taxis for its viability. Similarly, security vehicles will need to reach banks and businesses located within the pedestrian mall during nighttime hours.

Accessibility Needs

Care must be taken that the paving system used does not provide impediments to the safe and easy movement of wheelchairs. Planters, benches and other amenities should be placed in a straight line to satisfy the expectancy of the visually impaired.

Design Considerations

Quality of design and durability of construction materials have proven to be essential elements in the success of pedestrian malls. The ideal pedestrian mall design occurs where there is a relatively narrow street right-of-way, with concentrated shopping and commercial land uses within the normally accepted walking distance limit of one-quarter mile, and larger traffic generators ("anchors") located at opposite ends of the mall to encourage walking along the mall. Excessively wide streets dilute pedestrian activity, making a mall appear dull and uninteresting, and also reduces exposure to retail edges due to the increased sight distances.

Amenities such as benches arranged in groups in small rest areas, local street maps and points of interest displays, programs of future events, transit stop enclosures, and transit system information displays will improve the convenience and attractiveness of the mall.

Some successful street malls are located in areas such as historical districts where there is an established pattern of tourist and visitor activity. When this pattern exists, it can be enhanced by design treatment of storefronts and street furniture in keeping with the "theme" of the site. Where this pattern does not exist, it is necessary to develop design and marketing strategies that will encourage downtown activities and use of the mall. The primary advantage of a street mall is the ability to conduct large-scale outdoor events. Event spaces for setting up concerts, grandstands, outdoor skating rinks, and other activities, should be considered in the mall design.

Street furniture, paving treatments, and lighting are important design considerations. In order to reduce clutter, street furniture elements should be of modular design incorporating several components in a single unit. Pavers are a popular surface treatment in malls, but the pavers must be placed on a substantial sub-base to avoid settlement or "frost-heaving" and dislodgment, which can result in tripping hazards. Since emergency vehicles require access to all parts of the pedestrian mall, the paved areas need to be designed to take the weight of service and emergency vehicles and allow them to move around easily. Pedestrian oriented lighting, with control of overhead illumination so as not to overpower shop window lighting, is preferred to restore a more intimate and natural scale to the converted street. Landscaping should be carefully chosen, not only for appearance, but for maintenance and growing characteristics. Plants or trees that interrupt sight lines and potentially provide concealment can reduce perceived security and discourage pedestrian activity at night.

Crosswalks must be provided for pedestrians in transit malls, interrupted malls, and plazas where pedestrian-vehicle conflicts are eminent. Such conflicts may be minimized through: 1) one-way cross streets, and 2) signals and warnings to the motorists, such as signs, traffic bumps, or contrasting pavements at the mall crossings.

- Where sidewalks are overcrowded and vehicle volumes are low.
- In high density downtown shopping areas with heavy pedestrian activity.
- Where vehicular traffic circulation would not be adversely affected.

Conditions where such malls are least beneficial or possibly harmful are:

- In high-crime areas.
- In high-speed areas with relatively low pedestrian activity.
- Where vehicle traffic cannot be rerouted without adversely impacting nearby streets.

Pedestrian Refuge Islands

Pedestrian Refuge Islands

Pedestrian refuge islands are defined as the areas within an intersection or between lanes of traffic where pedestrians may safely wait until vehicular traffic clears, allowing them to cross a street. Refuge islands are commonly found along wide, multi-lane streets where adequate pedestrian crossing time could not be provided without adversely affecting the traffic flow. These islands provide a rest area for pedestrians, particularly those who are wheelchair-bound, elderly or otherwise unable to completely cross an intersection within the provided signal time.

When evaluating whether a refuge island is needed, both crossing time and safety must be considered. For example, in suburban areas with long distances between intersections and traffic signals, a large proportion of pedestrian crossings occur at unsignalized intersections at midblock locations. However, with a median, a pedestrian would only have to look in one direction to cross from the median to the far side of the street. Pedestrians crossing an undivided, multilane street may experience delays 10 times longer than the delay incurred crossing a street with a median.

The effect of refuge islands and medians on pedestrian safety has been studied in the United States and abroad in recent years. A 1993 study for the Federal Highway Administration has found that streets with raised medians, in both CBD and suburban areas have lower pedestrian crash rates compared to streets with a painted two-way left turn lane or undivided streets.

Refuge islands can be beneficial under certain conditions and inconsequential or even harmful under others. The typical conditions where refuge islands are most beneficial include:

- Wide, two-way streets (four lanes or more) with high traffic volume, high travel speed, and large pedestrian volume;
- Wide streets where the elderly, people with disabilities, and child pedestrians cross regularly;

B. Parking

Figure IV-16 shows the parking available in the Depot Town area as well as the areas where additional parking has been proposed. Business owners on Cross Street have a strong desire to retain the on-street parking adjacent to their business. Factors to consider in providing on-street parking are discussed below.

Curb Parking Restrictions

On-street parking has an important relationship to pedestrian and motorist safety, the capacity and level of congestion on a street, and the economic well being of adjacent businesses. It can create a buffer, separating pedestrians on the sidewalk from motor vehicle traffic on the adjacent roadway. The presence of on-street parking may also reduce motorists' speed further enhancing pedestrian safety and comfort.

On the other hand, on-street parking typically results in less visibility between motorists and pedestrians, especially for children. The pedestrian dart-out, often involving children, is one of the most common types of midblock pedestrian collisions in residential areas. Therefore, the restriction of on-street parking in areas with pedestrian activity may improve pedestrian safety.

The issue of curb parking restrictions concerning pedestrian safety is related to the level of congestion within an urban area, the type of roadway, and the land use.

The primary documents for determining curb parking restrictions are the Uniform Vehicle Code (UVC) and Model Traffic Ordinance. The standards for most local jurisdictions state that "No person shall:

1. Stop, stand or park a vehicle:
 - a. on a sidewalk;
 - b. within an intersection;

- c. on a crosswalk;
- 2. Stand or park a vehicle, whether occupied or not, except momentarily to pick up or discharge a passenger or passengers:
 - a. within 20 feet of a crosswalk at an intersection;
 - b. within 30 feet upon the approach to any flashing signal, stop sign, yield sign or traffic control signal located at the side of a roadway."

Urban Area Characteristics

The urban areas where curb parking is typically present include the central business district (CBD), the central city and suburbs. Each has unique requirements for parking related to the type of street and the traffic control devices.

Central Business District

From the pedestrian perspective, the CBD normally has slower moving vehicles, typically 25-30 mph, marked crosswalks at most intersections, and restrictions on parking. Even where parking is permitted near the intersection, most intersections are controlled by some sort of traffic control device. Parking spaces are often governed by meters and, on occasion, may be marked on the pavement to avoid encroaching intersections and marked crosswalks. As long as the requirements of the UVC are met and enforced, no additional parking restrictions are generally needed.

Central City

The highest density of housing and thus on-street parking occurs in central city. People come home from work to find parking at a premium, which forces them to park a significant distance from their home. During the winter, this period may be during darkness with reduced pedestrian visibility. Corner parking restrictions have to be signed and enforced according to the UVC. Thus, the keys are to have an effective enforcement program and well established and maintained signs. One of the two types of signs that do not have to be

reflectorized, according to the MUTCD, is parking signs. This may adversely impact upon their effectiveness.

Roadway Type

Not only is the location within the urban area a determining factor in the type of on-street parking restrictions, but the type of roadway (major arterial streets vs. collector streets) must also be considered.

Major Arterial Streets

These streets are wider, have higher speeds and usually have parking restrictions. Pedestrians are normally accommodated at marked crossings controlled by traffic control devices or at unmarked crosswalks. The curb parking restrictions listed previously are applicable to the arterial streets.

Collector Streets

Generally the width and speed of the collector streets are lower than those of arterial streets. Collector streets tend to have more on-street parking and small neighborhood shopping centers. The neighborhood stores located along the block faces of collector streets pose a particular problem due to the high volume of pedestrian traffic and the desire of merchants to provide as much on-street parking as possible. More signing is often necessary near these small centers with particular attention given to sight distances for pedestrian crossings.

Special Land Uses

Special areas of land use also need to be addressed. The areas discussed below are not meant to be an all inclusive list of potential curb parking problem areas but are meant to alert the traffic engineer to these and other similar areas.

Loading zones

The primary vehicle using a loading zone is a truck. Not only are trucks wider than automobiles, but trucks are also taller. Whereas pedestrians can often see over or through

Coordination and Implementation of the Master Plan

Goals from master plan directly or indirectly related to development of transportation plan and circulation study for Depot Town. The table below compares Master Plan strategies with the Circulation Study findings.

MASTER PLAN STRATEGY	CIRCULATION STUDY STATUS
Objective 3.1: Enhance the physical appearance of the Downtown and Depot Town areas.	Aesthetics secondary to improving vehicular and pedestrian safety
a. Capitalize upon the Riverwalk concept to promote businesses by improving access points and amenities between Downtown, Riverside Park, Depot Town, and Frog Island such as coordinated boardwalks, benches, landscaping and lighting in these areas (see Strategies 3.2.a and 3.2.b).	Improved access for Riverside Park from East and South should be strongly considered
b. Strengthen linkages between EMU and Depot Town, EMU and Downtown, and Depot Town and Downtown (see Strategies 3.2.1 and 3.2.b).	Existing paths in place
c. Consider measures to slow traffic through the Downtown and Depot Town areas such as increased numbers of street trees, landscape islands, raised pedestrian crossings, more on-street parking or angled parking, increased speed limit enforcement, and installing "speed humps" or stop signs.	See details in .. section
d. Improve signage, lighting, and maintenance in downtown parking lots (see Strategies 3.2.a and 3.2.b).	See parking exhibit and recommendations on public, reserved and potential parking
g. Continue efforts to create landscaped boulevard for Michigan Avenue through downtown, or as an alternative, consider providing landscape islands for street trees along Michigan Avenue in the parallel parking areas.	
j. Continue pursuit of Intermodal Surface Transportation Efficiency Act (ISTEA) funding for streetscape projects in Downtown, Depot Town, and University Village. Additional funding options should be explored.	TEA-21 Funding for enhancement projects is available and should be pursued especially for safety paths

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Objective 3.2: Promote a visitor and pedestrian friendly environment and enhance orientation.	Existing green guide signs help, but also include signs for market days and special events
a. Consider developing a Signage and Orientation Master Plan which coordinates orientation, pedestrian crossings, informational kiosks, and parking identification at key entrance points in the downtown, Depot Town, University Village, and Riverside Park areas. This effort could include the installation of an inlaid city map in a city sidewalk.	Marked crosswalks and common elements will help orient and inform
c. Reevaluate one-way street system in order to slow traffic, improve the pedestrian experience, and enhance business (see Strategy 6.2.a).	One way street system not considered as part of this study
d. Further evaluate parking time limits and meter requirements to encourage longer customer stays in Downtown, Depot Town, and University Village.	Detailed parking study and associated elements out of project scope
e. Evaluate methods to reroute truck traffic to lessen impacts on Downtown.	Businesses rely on truck traffic. Deliveries to the rear of businesses has been proposed
f. Increase pedestrian and bike access from surrounding neighborhoods with cross walks and consistent sidewalk ramps at key locations along Washtenaw, Hamilton, Huron, Cross/Packard, Prospect, LeForge, and Huron River Drive.	Existing network in place
h. Evaluate feasibility of providing time-limited on-street parking along Cross Street to enhance business in the University Village area.	Parking limits in Depot Town extremely discouraged by steering committee
Objective 3.3: Attract business and facilitate housing opportunities.	
g. Continue revitalization efforts for Depot Town.	Mixed land use with improved pedestrian and vehicular operation should draw people to Depot Town
h. Continue downtown residential parking program which allows parking in municipal lots.	Residential parking could be expanded to private lots.
Objective 4.1: Promote a positive community identity.	Identity is good and pedestrian and vehicular movement does not discourage people currently, parking issues may possibly.
a. Identify key image corridors and entryways such as Washtenaw Avenue, East and West Michigan Avenue, Huron Street, Huron River Drive, Packard/Cross Street, Prospect Street, and LeForge Road and develop/maintain these areas in a manner which reflects a desired image (coordinate with proposed Signage Master Plan, see Strategies 3.2.a and 3.2.b).	Common elements, signs, and markings can only improve these areas
b. Emphasize the river corridor as key component of community identity and improve river edges in keeping with goals of the Recreation Master Plan.	
f. Promote and continue support of the Ypsilanti	Increased frequency of special events may discourage use and circulation in the

Huron River corridor.	
d. Continue to monitor the current transit system to see if it meets the needs of seniors, students, handicapped, low income residents, and other transit users.	Agree
e. Complete the city-wide sidewalk assessment and develop a prioritized list of needed improvements based upon available resources and public safety concerns, and pursue additional sidewalk improvements utilizing property owner assessments.	Greater detail at implementation level vs. study level
f. Review the need for pedestrian activated lights at all major intersections.	Low pedestrian crash experience
Objective 7.2: Develop and maintain adequate facilities for the community.	
a. Consider development of a city-wide capital improvements program to budget and plan for needed improvements including roadways, city facilities, parks, etc.	Good Idea
d. Continue sidewalk improvement program.	Good idea

There are two different planning efforts which relate to the Depot Town Circulation Study, the Huron River Corridor Master Plan, and the currently underway Huron-Whittaker Corridor Study.

The Depot Town Circulation Study considers the issues raised in the Huron-Whittaker Corridor Study in terms of a need for a positive entryway into Depot Town and other enhancement efforts along Huron Street. The Corridor Study has not been completed at this time, however, recommendations from the Depot Town Circulation Study will likely be referenced in the Corridor Study upon completion.

The Depot Town Circulation Study is coordinated with several of the issues and goals developed in the Huron River Corridor Master Plan. The following statement from the Plan is from the issues and opportunities section for Frog Island:

Connections to Riverside Park, Pen Park, Depot Town and the Farmer's Market should be enhanced.

The Depot Town Circulation study proposes several pedestrian related improvements that should result in improved connections to Frog Island Park.

The Huron River Corridor Plan also has two goals which relate to the Depot Town Circulation Study:

Improve street access to the riverfront system through improved park entrances and new pedestrian and vehicular linkages to Downtown and Depot Town.

Ensure that the character of new buildings, structures, signs and other elements complements the historic character of the downtown, Depot Town and neighborhoods to the extent practical.

As noted above, pedestrian circulation recommendations have been included in the Depot Town Circulation Study. All new signage or other improvements will be coordinated with the existing historic character of the Depot Town area.

Priorities

Based on discussions with the Steering Committee, the area of Cross Street between the river and River Street appears to be the greatest area of interest. This study did not identify problems of traffic safety or traffic capacity in this area, but there is certainly abiding interest in improving the attractiveness and accessibility of this area.

The traffic engineering analysis suggests that improvements be made to the intersection of River and Cross to reduce the potential for traffic crashes. HRC recommends aligning the left turn lanes for the east and west approaches to the intersection, providing a right turn lane for eastbound traffic, adding railroad gates, and adding pedestrian pavement markings. Based on our review, this intersection should have a high priority for improvement when allocating resources for improvements in the study area.

