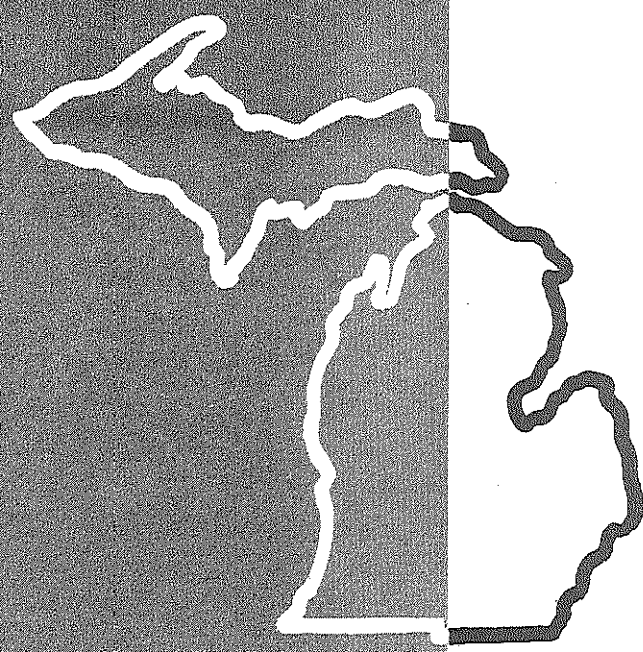


65-3293

# THE SAGINAW METROPOLITAN AREA TRAFFIC STUDY



MICHIGAN STATE HIGHWAY DEPARTMENT

CHARLES M. ZIEGLER, STATE HIGHWAY COMMISSIONER

HIGHWAY  
LIBRARY  
MICHIGAN STATE HIGHWAY  
DEPARTMENT — LANSING

MICHIGAN  
STATE HIGHWAY DEPARTMENT  
Charles M. Ziegler  
State Highway Commissioner

THE SAGINAW METROPOLITAN AREA TRAFFIC STUDY

STATE TRUNKLINE  
and  
ARTERIAL STREET SYSTEMS

Cooperating Agencies:  
The City of Saginaw  
U.S. Department of Commerce  
Bureau of Public Roads

Prepared by the  
Planning and Traffic Division  
November, 1953

## TABLE OF CONTENTS

	Page
The State Trunkline System in Saginaw	5
Terminology and Definitions	7
Summary of Facts	8
Recommendations	9
Trunkline Travel in the Tri-City Area	10
Market Area and Trunkline Service	11
The Saginaw Study Area	12
Existing Trunklines and Land Use	14
Daily Traffic Flow on Present Trunkline Streets	16
Interchange of Through Trips Between State Trunklines	18
Traffic Movements Between the Six Geographic Districts	20
Traffic Movements Between the Central Business District and the Six Geographic Districts	22
The Selected Arterial Street System	24
Traffic Between US-23 and US-10 and the Principal Zones of Attraction	26
Traffic Between M-47 and US-10 and the Principal Zones of Attraction	28
Traffic Between M-46 and the Principal Zones of Attraction	30
Traffic Between M-81 and M-13 and the Principal Zones of Attraction	32
Trailer-Combination Traffic Between the North and South Trunklines and the Principal Zones of Attraction	34
Trailer-Combination Traffic Between the East and West Trunklines and the Principal Zones of Attraction	36
Interchange of Through Trailer-Combination Trips Between State Trunklines	38
State Trunkline System Selected for Ultimate Development	40
State Trunkline Traffic to and from Saginaw Assigned to Arterial Street System	44
Total Traffic Assigned to Selected Urban Trunkline System and Other Arterial Streets	46
Selected State Trunklines and Land Use	48
Tri-City Trunkline System Selected for Ultimate Development	50
Traffic Assigned to the Selected Tri-City Trunkline System	51
Tri-City Area Traffic Study	52



## THE STATE TRUNKLINE SYSTEM IN SAGINAW

To improve the service for trunkline traffic and to assist the city in alleviating local traffic conditions that now hinder the free flow of vehicles into, out-of and through the area, a revision of the state trunkline system has been proposed. The purpose of this report is to describe the selected system and explain how the selection was made.

### The Traffic Problem

While Saginaw is concerned with the relieving of the congestion in the downtown area and moving the trunkline and local traffic through the city, the solution must come from a broader area than just the city. These problems can only be solved by considering the entire Tri-City area of Saginaw, Bay City, and Midland, and making the trunkline system for the area interconnect and serve each of the three cities.

The immediate problem in the city of Saginaw is to establish an arterial street plan and a trunkline system that will bring the trunkline traffic to the central business district but not directly through it, and to provide access to the industrial areas and trucking terminals. As the traffic volumes in the area have increased by about 30 percent since the war with indications of further increases, the final system must be selected to provide for the future as well as the present.

### 1948 Metropolitan Area Traffic Study

As a basis for planning more fundamental, long-range improvements, the department, in the summer of 1948, conducted a metropolitan area traffic study in cooperation with the Bureau of Public Roads and the cities of Saginaw and Bay City. The Origin-Destination Study was set up to observe and analyze traffic in the Saginaw-Bay City area as a single unit on the theory that the relationship between certain traffic problems in the two cities was so close as to require joint treatment. Later, however, when the analysis was started it was decided to separate the data and to deal with each city individually.

Data for the O-D study were obtained by two methods. First, the internal phase was conducted by interviews at the dwelling units in the area, to learn the local travel habits and desires. The

second or external phase of the study consisted of establishing a cordon of external stations around the area, on the important highways, where the vehicles were stopped and the drivers interviewed regarding the origin, destination, and purpose of the trips they were making.

When tabulated and analyzed, these data revealed not only the pattern of traffic as it uses existing streets, but the changes in the system that would be required to satisfy traffic needs and desires. These results were studied by the planning and traffic engineers of the City and the Highway Department and were used in the selection of the arterial street plan and the urban state trunkline system.

### Method of Study

The routes comprising the urban trunkline system in Saginaw were selected from those streets included in the city's arterial street plan. This procedure, which is followed in all cities is adopted in order that development of the selected streets shall provide improved service to both trunkline and local traffic and assure maximum benefits to both the state and to the community.

In the analysis of the traffic data and the study leading to the selection of the trunkline routes, the data compiled by the metropolitan area traffic study were used in relation to basic, accepted principles of highway planning. Numerous analyses of traffic were made of which the most significant are presented in this report in a series of charts with appropriate explanations. They are all aimed toward the determination of three fundamental facts:

1. The amount and characteristics of trunkline and local traffic in the Saginaw area.
2. The adequacy of the City's arterial street system to serve the traffic traversing Saginaw city streets.
3. Those arterial streets which will serve the trunkline traffic entering, leaving, and passing through the Saginaw area with the greatest convenience to both trunkline and city traffic.

## Principles of Urban Trunkline Selection

The selection of the urban trunkline system was based not only on the traffic patterns and needs revealed by these analyses of the traffic study data, but it conforms with certain general principles of urban trunkline planning established as the result of many studies of metropolitan traffic in Michigan and other states.

In brief, these principles are:

1. The urban state trunkline routes should connect the rural state trunklines with the central business district.
2. They should serve the principal industrial areas of the city.
3. They should interconnect within the city.
4. They should avoid as far as possible exist-

ing handicaps and hazards of commercial roadside development and guard against such development in the future.

5. They should be reasonably direct and free of numerous turns in their approach to the principal areas of objective destination.

In practically all cases, urban state trunkline routes have a secondary function; i.e., to serve the major movements of local traffic to the fullest extent consistent with their primary purpose. There is a definite similarity in the location of the objective destinations of traffic entering on the state trunklines and of the local traffic using the most important city arteries. Therefore, the dual purpose of an urban state trunkline system will best be attained by selecting its component routes from the streets included in a properly planned arterial street system.

## TERMINOLOGY AND DEFINITIONS

Central Business District:	The zones comprising the concentrated commercial and retail business center of the city.
Cordon Trip:	A trip with one terminal outside the Study Area and one terminal inside the Study Area.
Destination:	The place where a trip ends.
Downtown Area:	The zones comprising the Central Business District and its commercial-residential fringe.
External:	Outside the Study Area.
External Cordon:	The line connecting the External Stations and outlining the Study Area.
External Station:	A point on a highway at the limits of the Study Area at which the drivers of vehicles were interviewed.
External Trip:	A trip with one or both of its terminals outside the Study Area.
Internal:	Within the Study Area.
Internal (Local) Trip:	A trip with both terminals inside the Study Area.
Origin:	The place where a trip begins.
Origin-Destination Zone; O-D Zone; Zone:	A basic subdivision of the Study Area having a single or a dominant land use, designated for purposes of tabulation and analysis.
Study Area:	The entire area in which travel data were obtained by home interview.
Thru Trip:	A trip passing through the Study Area with both terminals outside the Study Area.
Trip:	One-way travel between an origin and a destination.
Trip Terminal:	The point where a trip begins or ends.

## SUMMARY OF FACTS

- \* A total of 209,589 vehicle trips into, out-of, through, and within the area were analyzed. Of this total 176,005 or 84.0 percent were within the study area.
- \* 39160 vehicles were counted at the External Cordon Stations.
- \* Of the 39160 vehicles entering and leaving the area on an average weekday, 5701 or 14.6% made through trips.
- \* 74.1 percent of the total trips across the cordon line were interviewed.
- \* 83.4 percent of the cordon traffic was passenger cars.
- \* 12.0 percent of the cordon traffic was single unit trucks.
- \* 4.6 percent of the cordon traffic was trailer-combinations.
- \* 84.3 percent of the traffic entering and leaving the area was carried on the state trunklines.
- \* Of the 39160 vehicles entering or leaving the area, 4891 or 12.5 percent had either origin or destination in the Central Business District, Zone 236.
- \* 46676 trips, which was 26.5 percent of the internal total had either their origin or destination in the Central Business District.
- \* 1547 trailer-combinations crossed the cordon line on the average 24-hour day, 1200 had either origin or destination in the study area and 347 went through the area.
- \* 17911 trips, 10.2 percent of the internal total, had either origin or destination in the six Industrial Zones.
- \* 1920 trips, 6.9 percent of the external total, had either origin or destination in the Industrial Zones.
- \* 373 trailer-combinations crossing the cordon line had either origin or destination in the Industrial Zones.



## RECOMMENDATIONS

- \* Adopt a revised trunkline system for the area with formal approval by the Saginaw City Planning Commission, the Saginaw City Council and the Michigan State Highway Department.
- \* Complete the relocation of US-10, US-23 east and north of Saginaw.
- \* Construct a bridge across the Saginaw River with approach connections on State-Davenport Streets and Johnson-Fitzhugh Streets.
- \* Establish one-way street operation on Johnson and Fitzhugh Streets from the bridge east to Fourteenth Street.
- \* Establish one-way street operation on Jefferson and Warren Streets from North Washington south to the junction of Jefferson and Sheridan, and then south on Sheridan and South Warren to Hiland Street.
- \* Construct a bridge across the Saginaw River with approach connections on Williams and Stephens Streets and Rust Avenue.
- \* Establish one-way street operation on Williams and Stephens Streets from the bridge to Gratiot Avenue, and on Ruckle and Roberts from South Warren to connect with Thirteenth and Fifteenth Street extended to Holland Avenue.
- \* Reroute M-47 east along Gratiot Avenue to Williams and Stephens, along these two as one-way streets to Michigan and Hamilton, then north on these two as one-way streets to Bristol, then converging to Michigan Avenue to Houghton, where they divide to Michigan and Fayette as one-way streets to Clark Street, then north on Michigan and Schaefer to Madison where they converge to Michigan and on north to relocated US-23 and US-10.
- \* Reroute M-13 north along Sheridan Avenue and South Warren to North Warren and Jefferson to North Washington Avenue.
- \* Reroute M-46 from Holland south on Thirteenth and Fifteenth Streets extended to Genesee Avenue, west on Ruckle and Roberts to Rust Avenue, across the new bridge and northwest on Williams and Stephens to Gratiot Avenue.

# STATE TRUNKLINE TRAFFIC IN TRI-CITY AREA

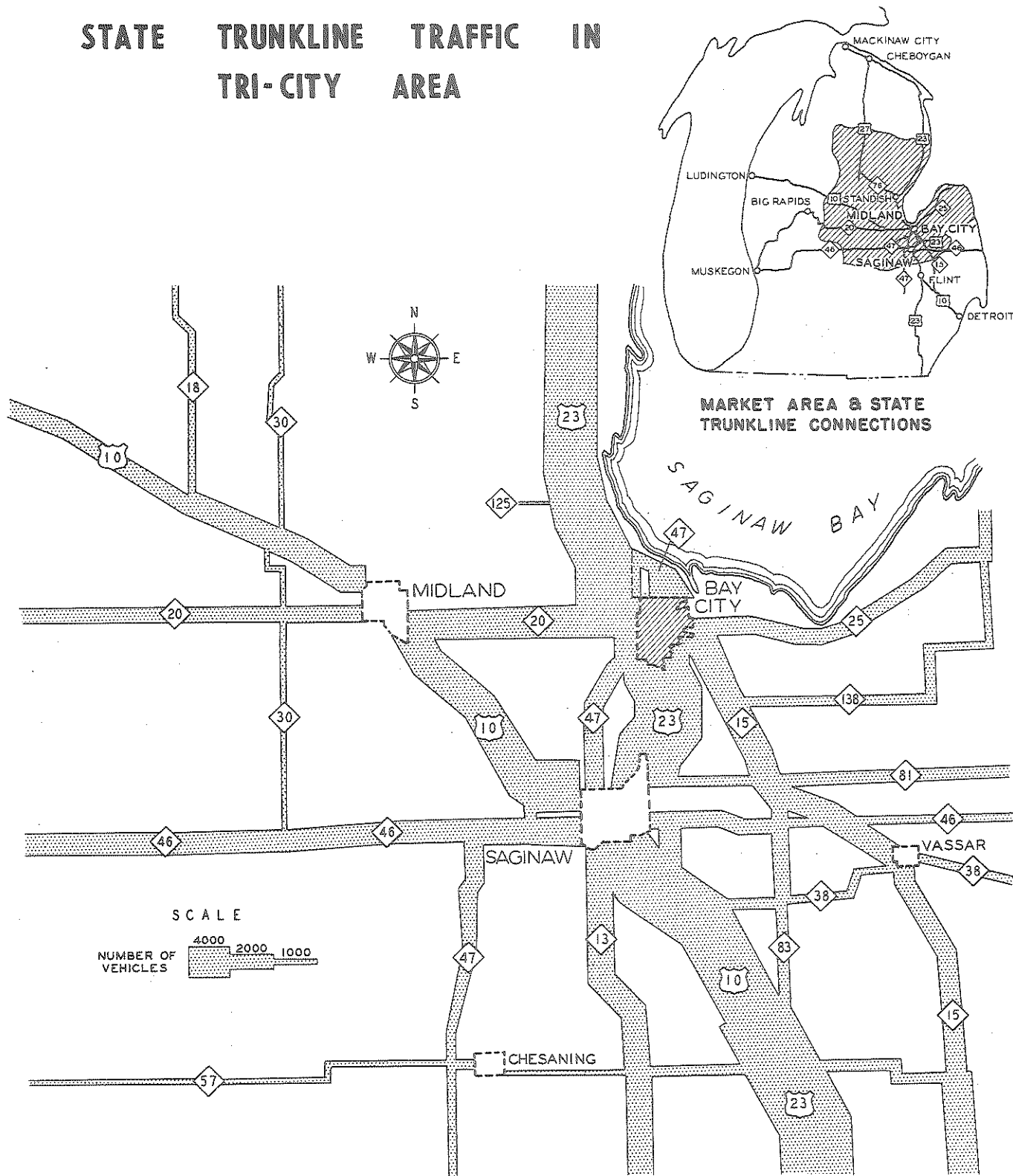


PLATE I

## SAGINAW, ITS MARKET AREA AND ITS TRUNKLINE SERVICE

Saginaw is located on the Saginaw River about 15 miles south of the lower tip of Saginaw Bay and about 8 miles south of the southern limits of Bay City. The Saginaw River follows a diagonal course from southwest to northeast just west of the central business district.

A fur trading post established in 1816 by Louis Campau was the first settlement on the site that is now Saginaw. All of the original trappers and settlers were Canadians. Other people were attracted to the spot and in 1837 the settlement was incorporated as a village. Saginaw's growth until the turn of the century was due primarily to the lumbering industry. Coal was discovered in the Saginaw Valley and in the 1890's this area was the largest coal producing field in Michigan.

Saginaw's industries now are concentrated in the grey iron foundry, automotive parts fabrication, ship building, cooking machinery, sugar beet processing, lumber fabrication, and salt production. The Saginaw Valley is also a very rich agricultural region.

The market area of the "Tri-Cities" is shown on the insert map of Plate I. Market areas for Saginaw, Bay City and Midland are grouped together as one as it is practically impossible to segregate the area served by the individual city. The Thumb section to the east is one of the richest farming areas in the state. To the west, rich farm land and the chemical and oil industries centering in Midland, Mt. Pleasant, Alma and St. Louis are the bases for a prosperous economy. Northward, livestock and dairy items are the main products, but in that section abundant year round recreational resources have created an important and growing resort industry. Together, these areas form a market area of approximately fifteen counties which extends north from the Port Huron, Flint and Lansing trade areas to include Alma to the west, Grayling and Oscoda to the north, and the larger part of the Thumb region.

Saginaw, with a population of 93,000, and Bay City, with 52,500 are the two major trade centers for this extensive market area and their influence is combined throughout most of it. Saginaw's retail, wholesale, and service establishments have most of the trade from the southern part of the trade area.

Midland, 20 miles northwest of Saginaw has considerable importance as a secondary trade center. The three cities have cooperated in the solution of several area transportation and water supply problems.

Six state trunklines enter Saginaw linking it to all parts of its market area, the rest of the state and states adjoining to the south.

US-23 is the major trunkline in the Saginaw area. It starts at Mackinaw City in the north, follows the Lake Huron shore line south to Bay City, then to Saginaw where it joins US-10 as far south as Flint, then on south to Ann Arbor, Toledo, Ohio, and as far as Jacksonville, Florida. This route carries the heavy recreational travel from the metropolitan areas south of Saginaw to the resort and recreational areas north of Bay City.

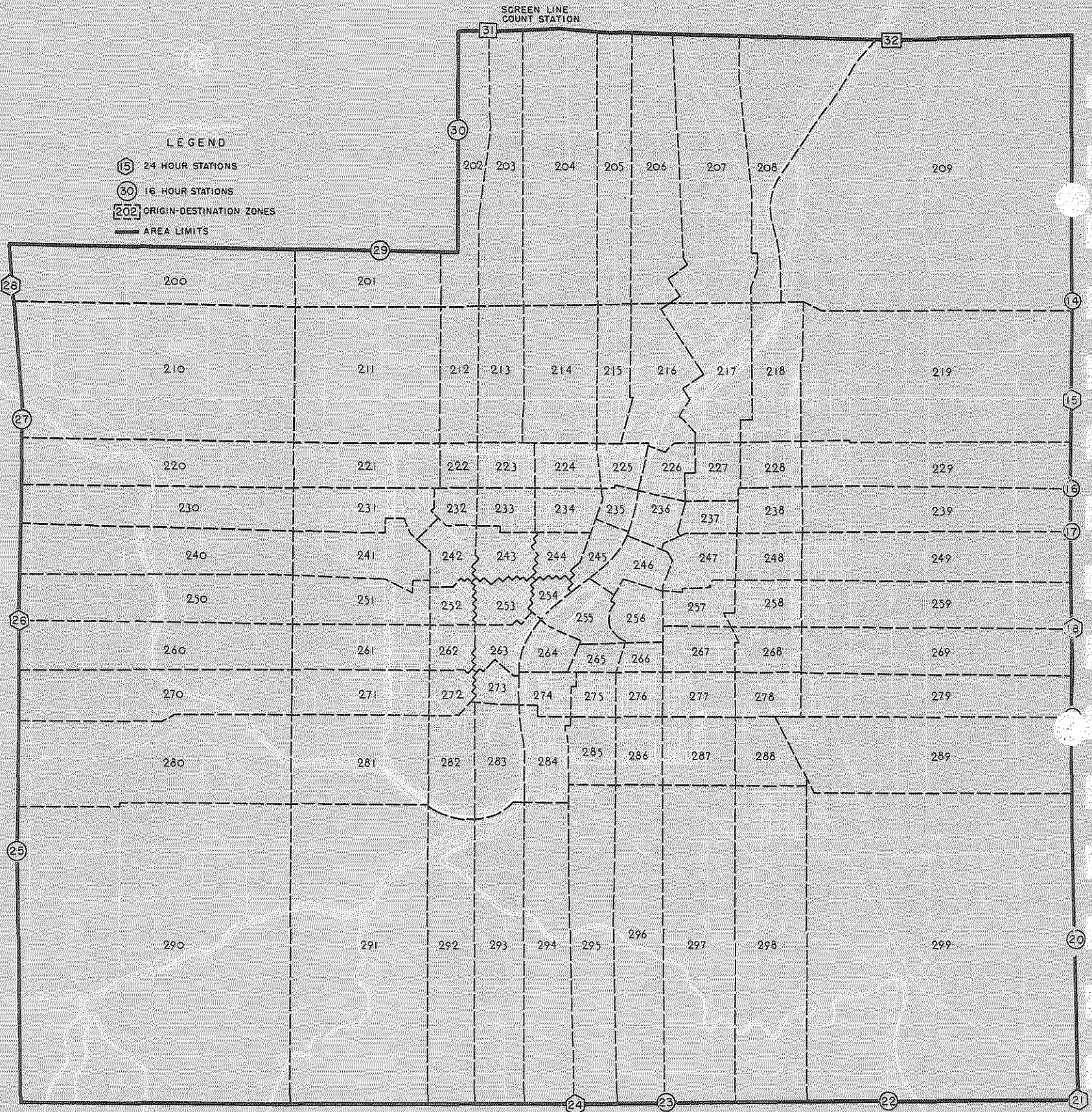
US-10 is the trunkline that has its origin in Detroit, running diagonally across the state through Pontiac, Flint, Saginaw, Midland, Clare, Reed City, Baldwin, and terminating in Ludington. Across Lake Michigan US-10 picks up again at Manitowoc, Wisconsin and extends westward to Seattle, Washington.

M-46, the principal east-west trunkline originates at Port Sanilac on the east, following a westerly course about three-fourths of the way across the state to Newaygo where it drops down south fourteen miles and then west again to Muskegon on Lake Michigan. This trunkline goes through Saginaw south of the central business district.

M-47 starting at Bay City in the north, runs southwesterly across the northwest corner of Saginaw, through Owosso to connections with M-78 at Perry and US-16 at Williamston.

M-13 is a north-south trunkline approximately half way between M-47 and US-10, starting at Saginaw in the north and terminating at its junction with M-78 thirteen miles west of Flint.

M-81, an east-west trunkline, has its western terminus in Saginaw and its eastern terminus about 45 miles east of Saginaw at the intersection of M-53 four miles east of Cass City. This trunkline carries the traffic to and from the central "Thumb" area.



THE SAGINAW STUDY AREA

Traffic on the rural state trunklines in the Saginaw-Bay-Midland County area is shown on Plate I.

The exchange of traffic between Saginaw, Bay City, and Midland is of considerable importance and it must be taken into account in planning the routes and operation of the trunkline system in the Saginaw Valley. It is through this area that traffic from the southeastern section of the state must pass to reach the northern and northeastern areas. In addition to the heavy through movement in each of the cities there are the large internal

movements and the large movements to and from all parts of the market area that must be taken into consideration.

In studying Plate I it can be seen that US-23 and US-10 combined in the southeast, US-23 in the northeast, and US-10 in the west carry approximately two-thirds of all of the traffic entering and leaving the Saginaw area on trunklines. The total trunkline traffic amounts to slightly over 33,000 trips for the average 24-hour summer weekday. M-46 and M-47 carry another 24 percent and the balance of the trips are on M-13 and M-81.



**EXISTING TRUNKLINES AND LAND USE**

## EXISTING TRUNKLINES AND LAND USE

Plate No. III shows the existing trunklines, major shopping areas, principal industrial locations, and trucking terminals. This plate clearly demonstrates that the present trunkline locations violate most of the modern principles used in establishing trunkline routes.

The route for US-10 and US-23 combined, entering the area from the southeast on Genesee Avenue, passes through an almost unbroken commercial and industrial development until it reaches the heart of the central business district. At the intersection of Genesee and Washington Avenues the routes separate. This intersection carries the highest vehicle volume traffic in the city and the pedestrian traffic is also very high across all four legs. US-23 makes a right-angle turn onto Washington Avenue, then proceeds through the north half of the business district and northeast through more commercial and industrial developments to the River Road and north to Bay City. US-10 crosses the busy Genesee Avenue Bridge then west on Genesee Avenue through additional business area and trucking terminals, making a right-angle turn onto Bond Street then a right-angle turn onto State Street, proceeding west to Midland.

M-46 crossing the area in an east-west direction has poor alignment with five turns at heavily traveled intersections. West of the Saginaw River the route traverses about 15 city blocks of business and commercial areas on Michigan and Gratiot Avenues. These streets carry a very high volume of internal traffic as well as the traffic having one terminal outside of the area. Traffic entering and leaving the study area on M-46 with a terminal in the central business district or in any

of the industrial areas, encounters considerable delay at the busy intersections of Holland and Genesee, Holland and Washington, Washington and Ezra Rust Drive, Court and Michigan, and Michigan and Gratiot. At the intersection of Court and Michigan at times of peak traffic volumes it becomes necessary to prohibit all left-turns making it necessary for the westbound trunkline traffic to go an additional block farther west before being able to make the two turns to bring it back to Michigan Avenue, the marked trunkline route.

The routing of M-13 on Washington Avenue has several bad features, in that Washington Avenue is the principal north-south carrier of internal traffic east of the Saginaw River. The route goes through areas of high concentration of commercial vehicle traffic and passes a large recreational area on its way to its terminal at the principal intersection in the central business district.

M-47 entering the area from the west turns north from State Street much too far to the west of the entrance to the central business district to provide the proper connection to this important terminal. There is no through connection of M-47 with the other trunklines except on US-10.

The present M-81 entering the area from the east terminates at the intersection with US-23, providing no continuous marked route to the central business district, industrial areas, or other trunklines except by connection with US-23.

Parts of the existing trunklines should be re-located to make an integrated workable system that will provide maximum usage within the Saginaw area.





## DAILY TRAFFIC FLOW ON PRESENT TRUNKLINE STREETS

During the time that the traffic study was being made the flow of traffic was being observed on the trunklines and other major streets within the study area. Turning movement counts were taken at the signalized and other important intersections. These counts when plotted as traffic flow bands as in Plate IV, show the over-all picture of total vehicular volumes on the principal streets of Saginaw. The large concentrations of traffic on Washington Avenue, Genesee Avenue and Court Street are the most significant features of the pattern.

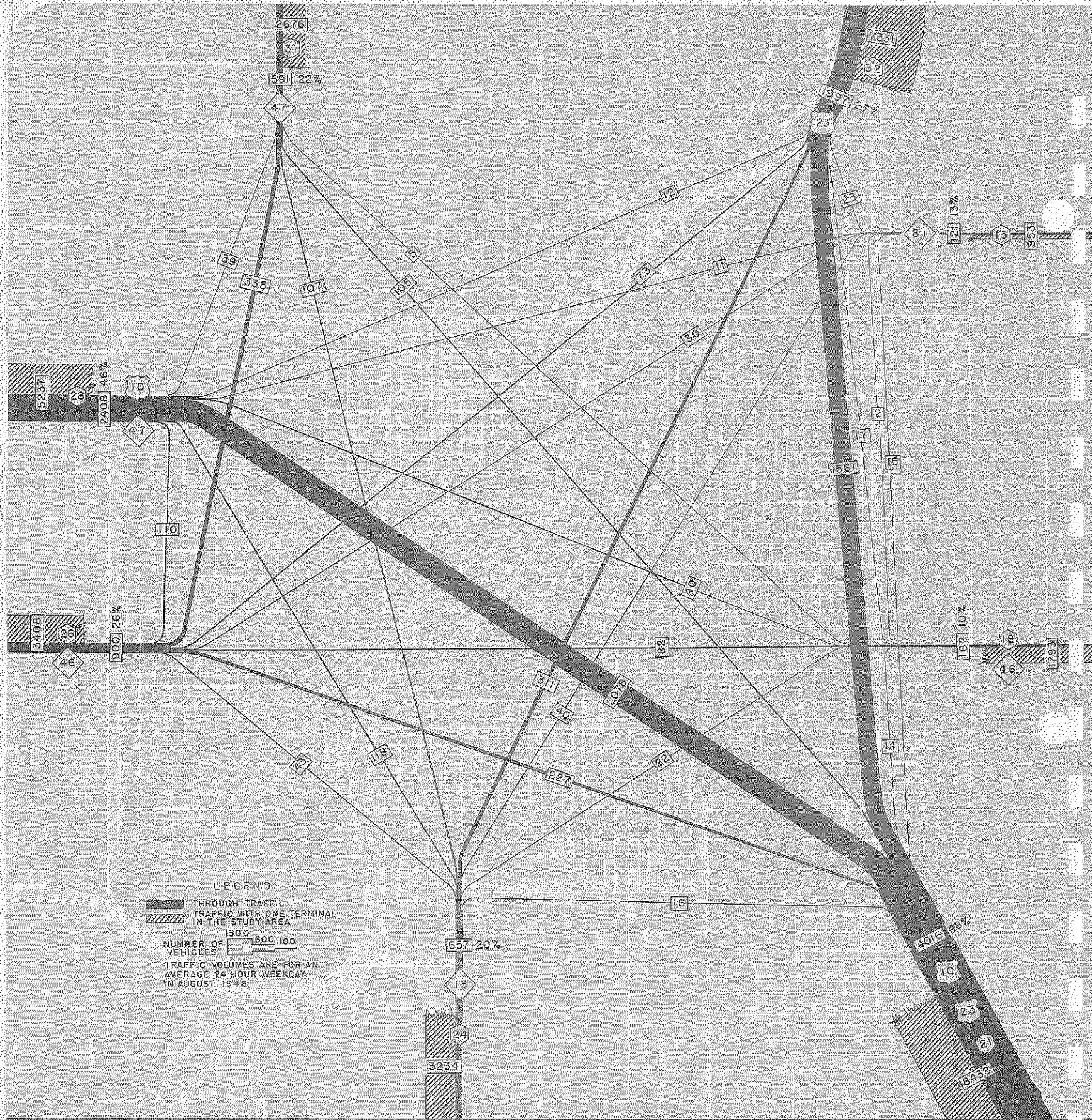
Saginaw, like Bay City, lies on both sides of the Saginaw River. This geographic feature is a basic factor in the natural routing of the traffic to the bridges located closest to the areas of traffic attraction. The city is divided approximately in half, with the central business district lying on the east side of the river along Genesee and Washington Avenues. This area is the largest traffic attractor in the city. There are two commercial areas on the west side of the river, one in the vicinity of Genesee Avenue and Michigan Avenue and the second farther south in the vicinity of intersections of Gratiot Avenue, Michigan Avenue, and Court Street.

At the time of the survey five bridges were in operation to carry the traffic across the river. In order, from the north they are the 6th Street, Genesee Avenue, Bristol Street, Court Street, and Center Street bridges. The Johnson Street bridge was closed while the survey was being made.

Traffic is the heaviest on the Genesee Avenue bridge with Court Street second, followed by Center Street, Bristol Street and 6th Street in order.

Some of the congestion in the central business district is due to the present routing of the trunklines. US-23 enters from the south on Genesee Avenue to Washington Avenue, the main intersection in the central business district, and then north-east on Washington to Bay City Road where it leaves the area to the north.

At the present time the most important trunklines funnel the traffic directly through the central business district and across the most heavily congested bridge on Genesee Avenue. US-10, US-23, M-13 and M-81 are all directly involved in the movements that are causing so much of the confusion in the central area, especially at the intersection of Genesee and Washington Avenues. In addition to being trunkline routes these two arterials carry the largest volumes of internal traffic within the city. Each of these two streets pick up additional trunkline traffic from M-46 where it crosses them on Holland Avenue and Ezra Rust Drive. On the west side of the river M-46 goes directly through the center of the business and commercial area around Michigan Avenue, Court Street, and Gratiot Avenue, and across the Court Street bridge increasing the congestion caused by the already heavy local traffic.



INTERCHANGE OF THROUGH TRIPS BETWEEN STATE TRUNKLINES

## INTERCHANGE OF THROUGH TRIPS BETWEEN STATE TRUNKLINES

The results of the external phase of the survey are shown on Plate V by straight desire line bands for through trips between the trunkline stations. Solid blocks at the stations designate cordon trips with one terminal in the study area. These desire lines clearly demonstrate the heavy through movements on US-10 and US-23 in a predominantly north-south direction. The light east-west through movements across the area are insignificant in comparison and are not an important factor in the total east-west traffic.

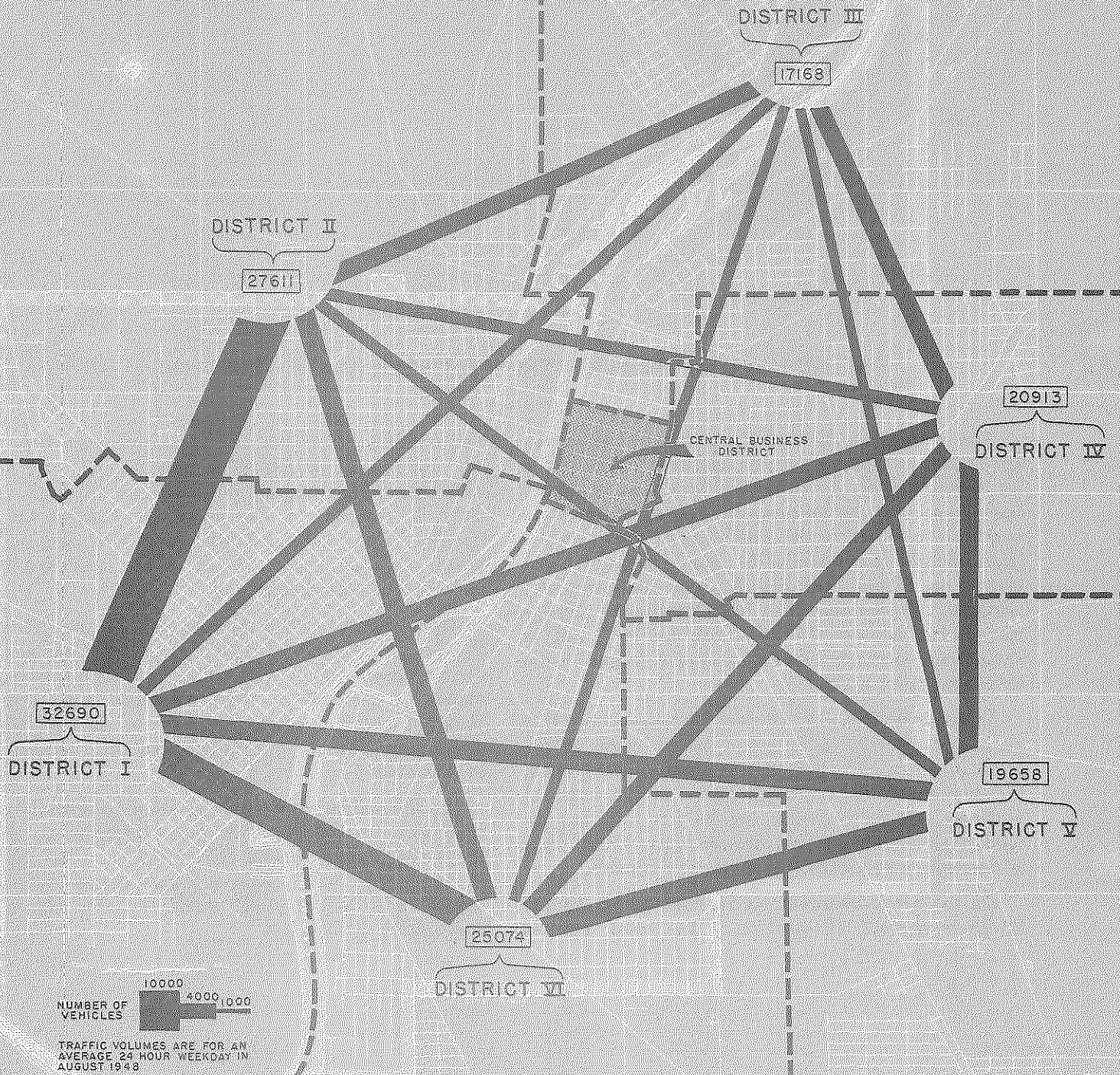
In studying Plate V, it must be remembered that each through trip is recorded twice, once at the point of entry and once at the point of exit, thus, the number of through trips shown at the external stations will total twice the values that are recorded along the internal desire lines where there is no duplication in the through trips figures.

On the south approach to Saginaw on US-10 and US-23 combined, 48 percent of the total inbound

and outbound vehicles are making through trips to all trunklines. Of the 4016 through trips, 91 percent are interchanging on US-10 and US-23 and only 9 percent to all other trunklines. US-23 carries 39 percent and US-10 carries 52 percent of these through trips, all of which traverse the central business district.

Approximately 2300 through trips are now crossing the Genesee Avenue Bridge in the heart of the central business district. This volume represents nearly 11 percent of the total trips across this bridge for the average day. These through trips make a significant contribution to the congestion in this area.

As the traffic volumes have increased since the time of the survey and the congestion is steadily increasing, some method of relief must be found for this central area. This suggests a new route for US-10 and US-23 through traffic on the east and north sides of the city.



TRAFFIC MOVEMENTS BETWEEN THE SIX GEOGRAPHIC DISTRICTS

## TRAFFIC MOVEMENTS BETWEEN THE SIX GEOGRAPHIC DISTRICTS

Data from interviews made during the survey show that approximately 176,000 individual internal trips were made within the Saginaw area on an average summer weekday in 1948. These trips are recorded by vehicle type, by direction of travel, by zone of origin, by zone of destination.

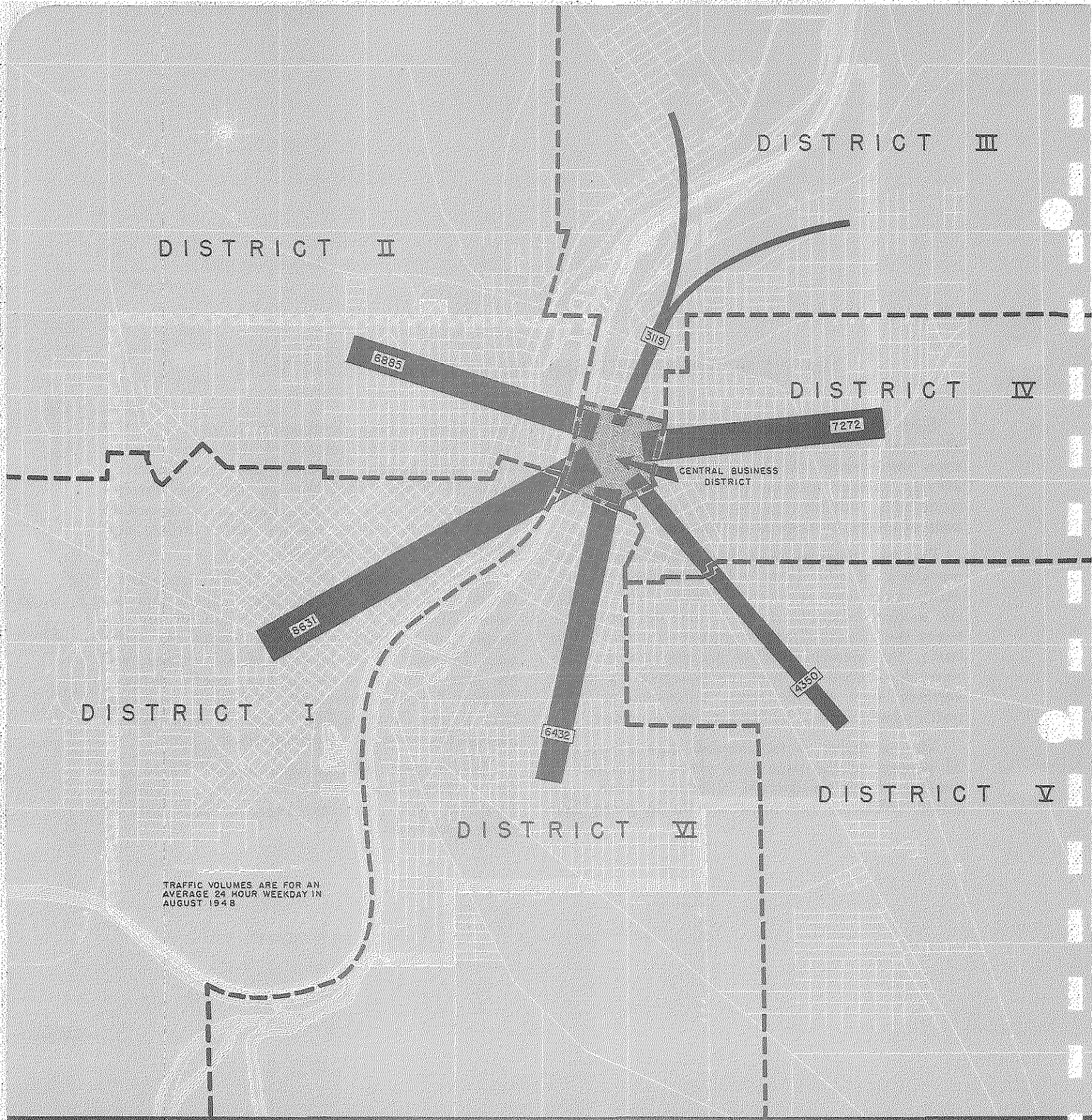
For the purpose of a broad analysis of the movement of this large volume of vehicles, the study area was divided into six districts plus the central business district, and the travel between the various districts plotted on a desire line basis. The boundaries of the geographical districts were determined as much as possible by traffic barriers such as the river, railroads, or other traffic sheds created by the city street pattern.

The tabulation of the internal trips shows that 31 percent of the trips took place within one or another of the designated districts. These trips would ordinarily use local streets in going from

their origin to their destination. A total of 71,557 trips, which is 40 percent of the internal total, was interchanged between the six districts. Plate VI demonstrates that an integrated arterial street system must be developed to accommodate this traffic to relieve the few major streets now carrying the bulk of this load.

Daily interchange between the six geographic districts is shown on this plate. Movements between Districts I and II, and I and VI are the largest interdistrict movements within the study area. Because of the location of the bridges, and the present major street system, traffic between District I and Districts III, IV and V, and District II and Districts IV, V and VI must now go through the central business district.

This diagram indicates the need of a grid system of North-South, and East-West arterial streets, including new river crossings, to take care of these movements.



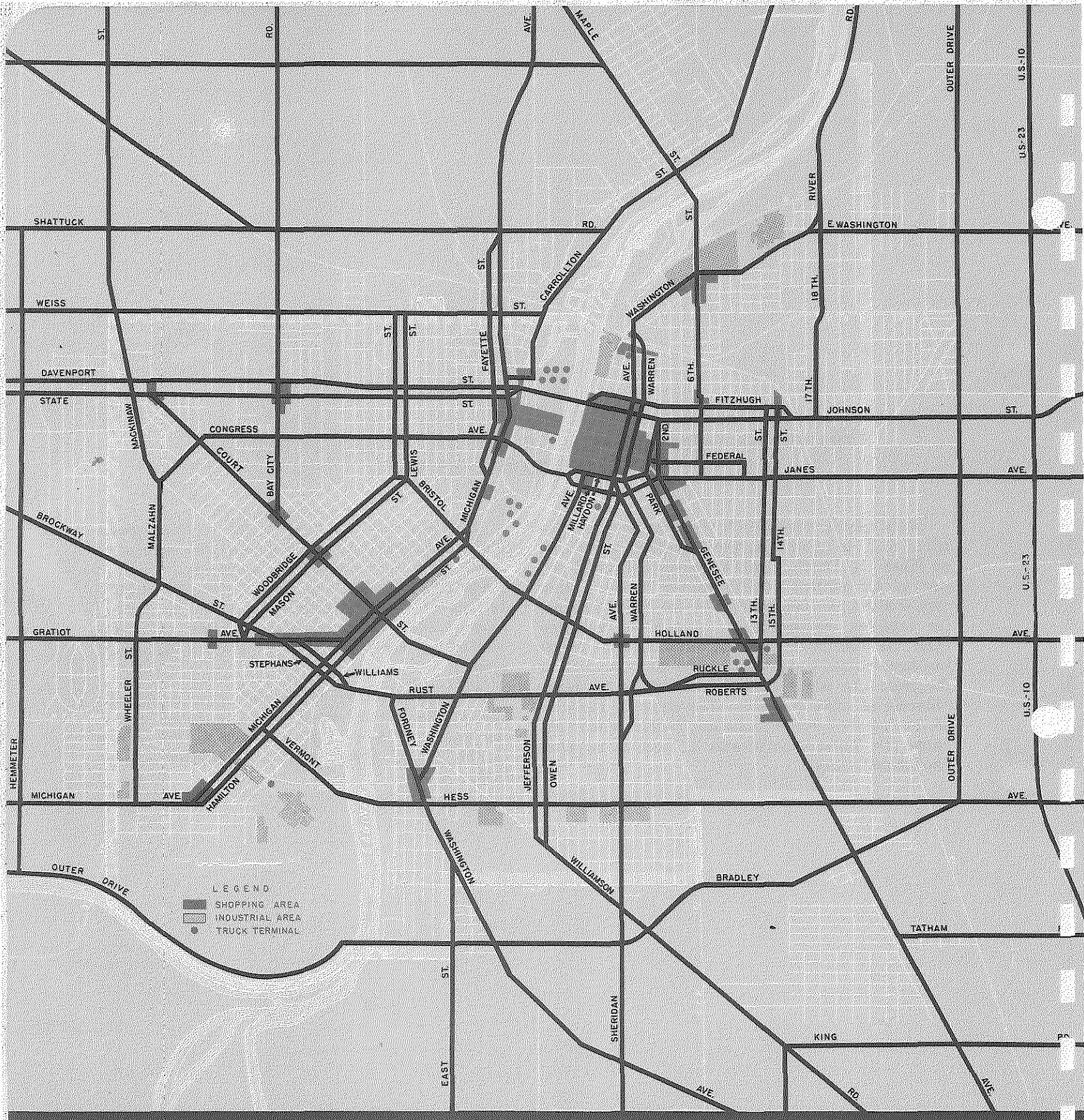
TRAFFIC MOVEMENTS BETWEEN THE CENTRAL BUSINESS DISTRICT AND THE SIX GEOGRAPHIC DISTRICTS

## TRAFFIC MOVEMENTS BETWEEN THE CENTRAL BUSINESS DISTRICT AND THE SIX GEOGRAPHIC DISTRICTS

Daily trips between each of the geographic districts and the central business district are shown on Plate VII. These 36,689 trips account for 21 percent of all internal movements. As in every other city studied, the central area is the major terminal for vehicles making local as well as trunkline trips. Because of this natural attraction, the existing street pattern evolved to give direct access to the area. The street pattern accounts for the large volumes of trips between other parts of the city traversing the central business district either because the distance is shorter or there is no other convenient route.

Approximately two-thirds of the vehicles crossing the Genesee Avenue bridge are making trips to areas other than the central business district. If these 21,000 trips could be redistributed to other bridges of the city, congestion would be greatly reduced and the central area would be more efficiently and directly served by the approved arterial streets.

Through trunkline trips that now must pass through the central area should be taken around the area. This would further reduce the congestion in the central area and on the Genesee Avenue bridge.



ARTERIAL STREET SYSTEM



## THE SELECTED ARTERIAL STREET SYSTEM

The purpose of an arterial street plan is to establish a system of traffic arteries which, when properly and adequately developed, will provide routes for the major vehicle movements to reach the principal areas where trips originate. These points of origin and destination include the routes on which the rural trunklines enter the city. Plate VIII shows the Saginaw arterial street plan in relation to the important land uses.

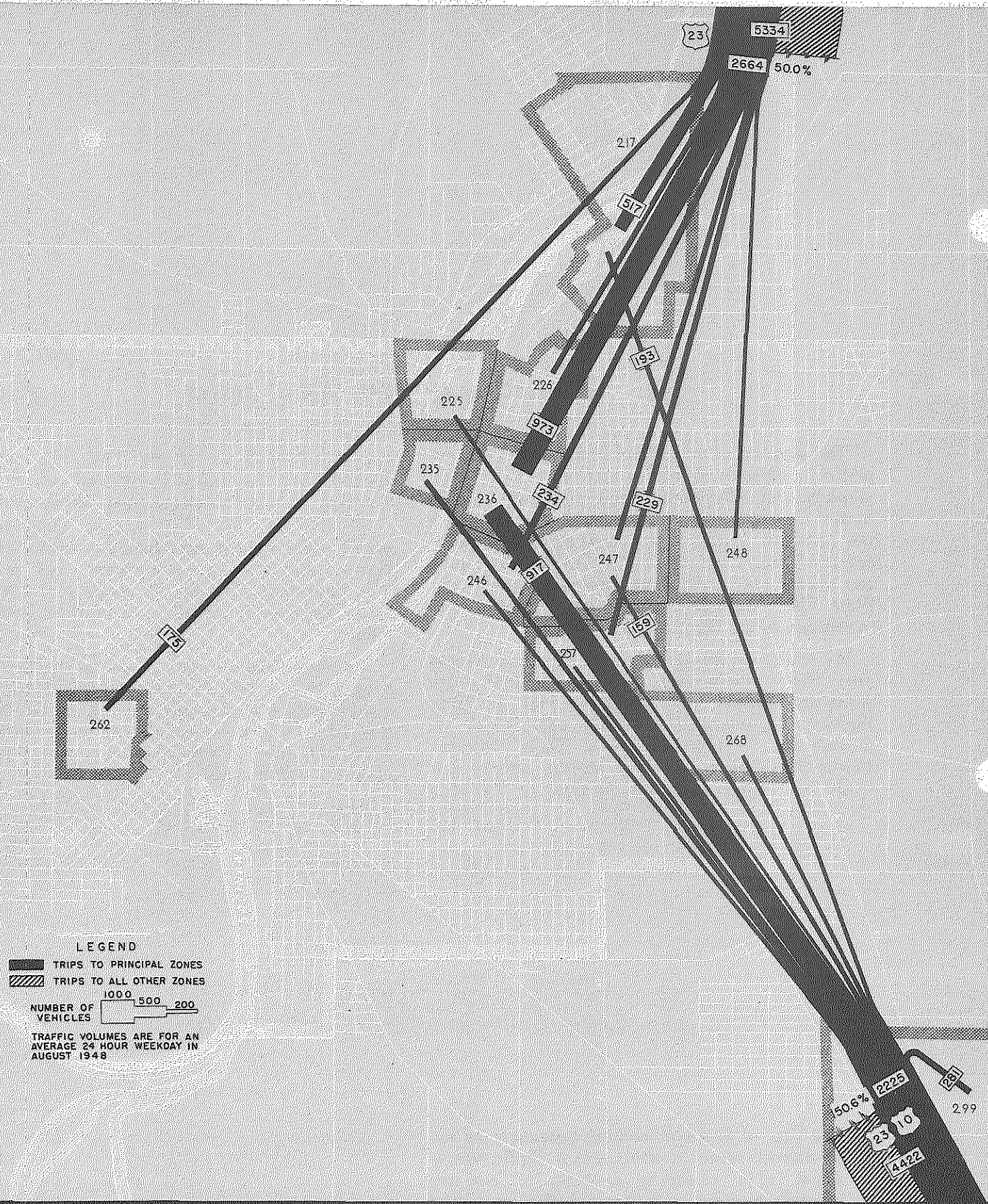
As soon as tabulated data on the metropolitan area traffic study was available in 1949, city planning officials, in cooperation with the State Highway Department, started the analysis to determine the local traffic needs. Their objective was to formulate a system of arterial streets that would best serve the traffic desires of the trips

within, into and out of the area. The plan developed has the official approval of the City Planning Commission and the City Commission. <sup>1/</sup>

To put the planned system in operation will entail widening and resurfacing of some streets, new construction in some cases, and two new river crossings, one in the vicinity of Congress Street and one in the vicinity of Rust Street extended.

On the eight succeeding plates traffic desire patterns are shown for the internal trips and the cordon trips entering and leaving on the present trunklines. These plates will reveal the extent to which the planned arterial streets will serve the principal traffic needs.

<sup>1/</sup> The City of Saginaw found it necessary to use an arterial street system with a traffic operational plan including systems of one-way streets in order to provide sufficient traffic capacity for turning movements.



TRAFFIC BETWEEN U.S.-23 & U.S.-10 AND THE PRINCIPAL ZONES OF ATTRACTION

## TRAFFIC BETWEEN US-23 AND US-10 AND THE PRINCIPAL ZONES OF ATTRACTION

Plate VI and Plate VII indicate the service that is needed on the arterial street system by the local traffic within the study area. This service, plus the trunkline trips that will be shown on the six plates that follow should make the determination of the final location of the arterial streets needed to provide access to all parts of the city.

The desire lines shown on Plate IX were determined by selecting from the traffic entering and leaving on each trunkline, trips to the various zones. They were selected in descending order of volumes until at least half of them had been taken. The first fifty percent of the trips are well concentrated in the central business district and the industrial zones. Beyond this point, the trips are scattered to all the rest of the study area and graphic presentation would result in no set pattern. The total trips on each of the trunklines is the

same as shown on Plate V as "Trips With One Terminal in the Area".

Both ends of US-23 and the south end of US-10 are shown on this plate as the movements are predominantly north and south on the east side of the river. The indicated major desires are for diagonal streets from the external stations to the central area of the city. These two desires are satisfied by Washington Avenue from the north and Genesee Avenue from the south but both of these streets were demonstrated to be undesirable for State Trunkline service.

Rerouting this traffic over a new route east of the city and connecting to several East-West cross streets would provide better distribution and avoid considerable turning in the interior congested area.



**LEGEND**  
 TRIPS TO PRINCIPAL ZONES  
 TRIPS TO 1000 400 100  
 NUMBER OF VEHICLES  
 TRAFFIC VOLUMES ARE FOR AN AVERAGE 24 HOUR WEEKDAY IN AUGUST 1948

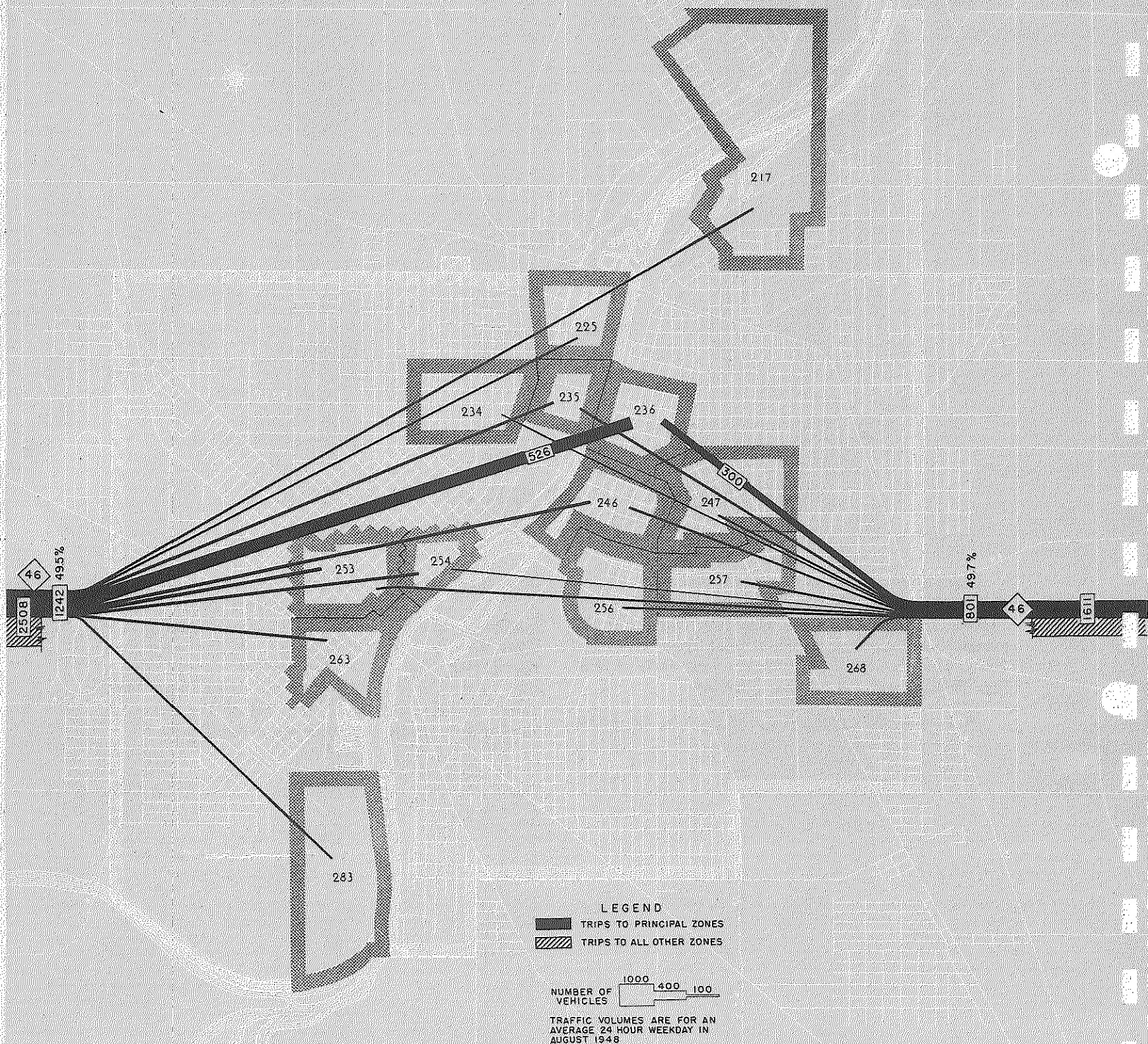
TRAFFIC BETWEEN M-47 AND U.S.10 AND THE PRINCIPAL ZONES OF ATTRACTION

### TRAFFIC BETWEEN M-47 AND US-10 AND THE PRINCIPAL ZONES OF ATTRACTION

Cordon trips on both the north end of M-47 and the west end of M-47 and US-10 are the second highest in volume of total trunkline trips. For the purpose of diagramming this traffic flow, M-47 and US-10 are shown on State Street just east of Midland Road where the two are combined.

In plotting fifty percent of the trips to the zones

of attraction in descending order of volumes, shown on Plate X, a concentration is found in the central business district, the shopping areas west of the river and the industrial zones. A comparison of the desire lines with the arterial streets shows that with the exception of the trips from M-47 north to industrial zone 272, all of the trips are served directly by the approved arterial plan.



TRAFFIC BETWEEN M-46 AND THE PRINCIPAL ZONES OF ATTRACTION

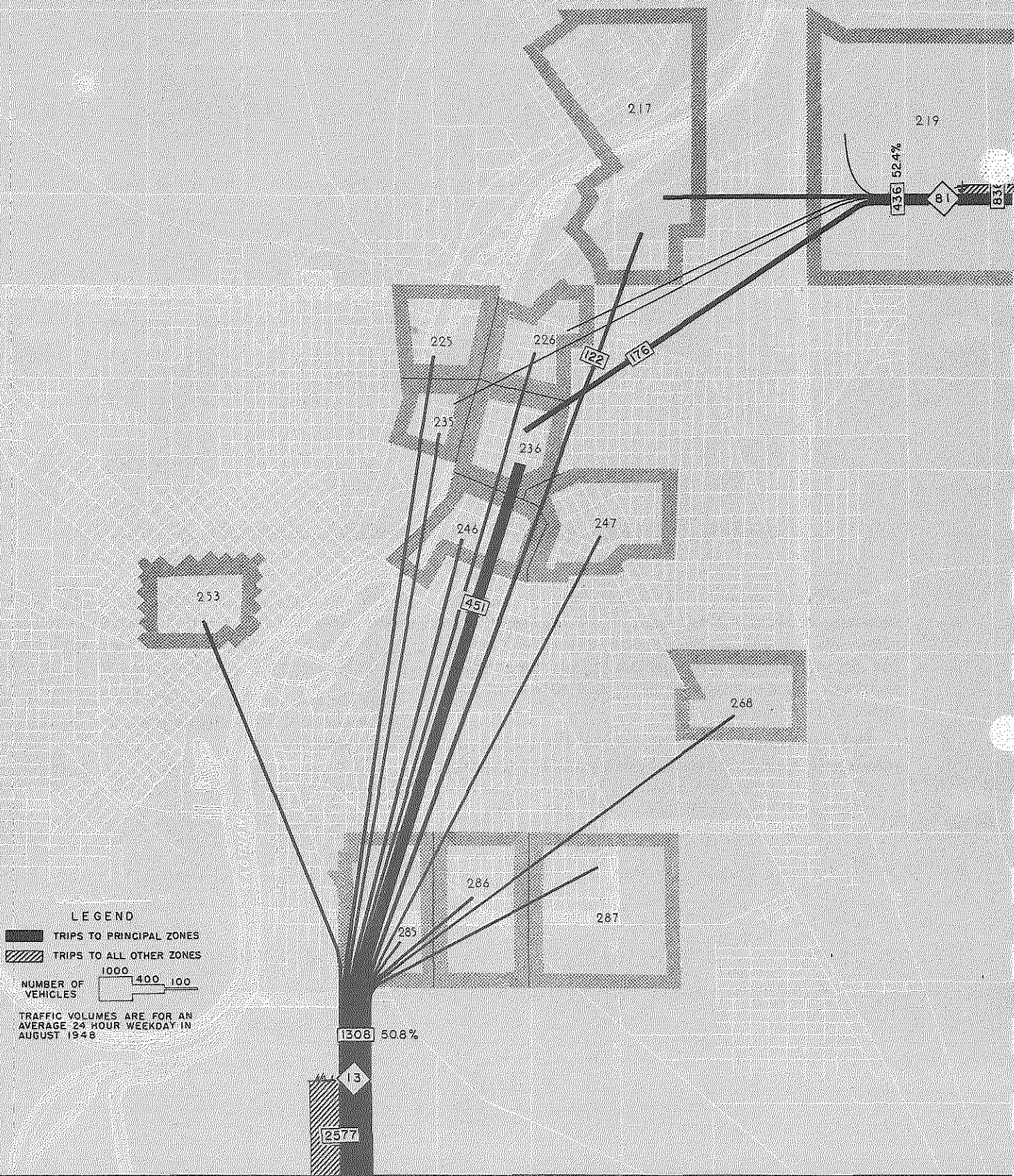
## TRAFFIC BETWEEN M-46 AND THE PRINCIPAL ZONES OF ATTRACTION

Trunkline M-46 is an east-west route that crosses the study area south of the center of the city. As in the case of the other trunklines, the principal zones of attraction are the central business district and the industrial areas on both sides of the river.

From the east, ninety percent of the traffic has either origin or destination in the area and from the

west seventy-four percent are in the same category. Only 2.4 percent of the total vehicles on the west and 4.6 percent on the east end made trips entirely through the area on this trunkline.

M-46 will serve the central business district and industrial areas by connections to other North-South trunklines.



TRAFFIC BETWEEN M-81 AND M-13 AND THE PRINCIPAL ZONES OF ATTRACTION



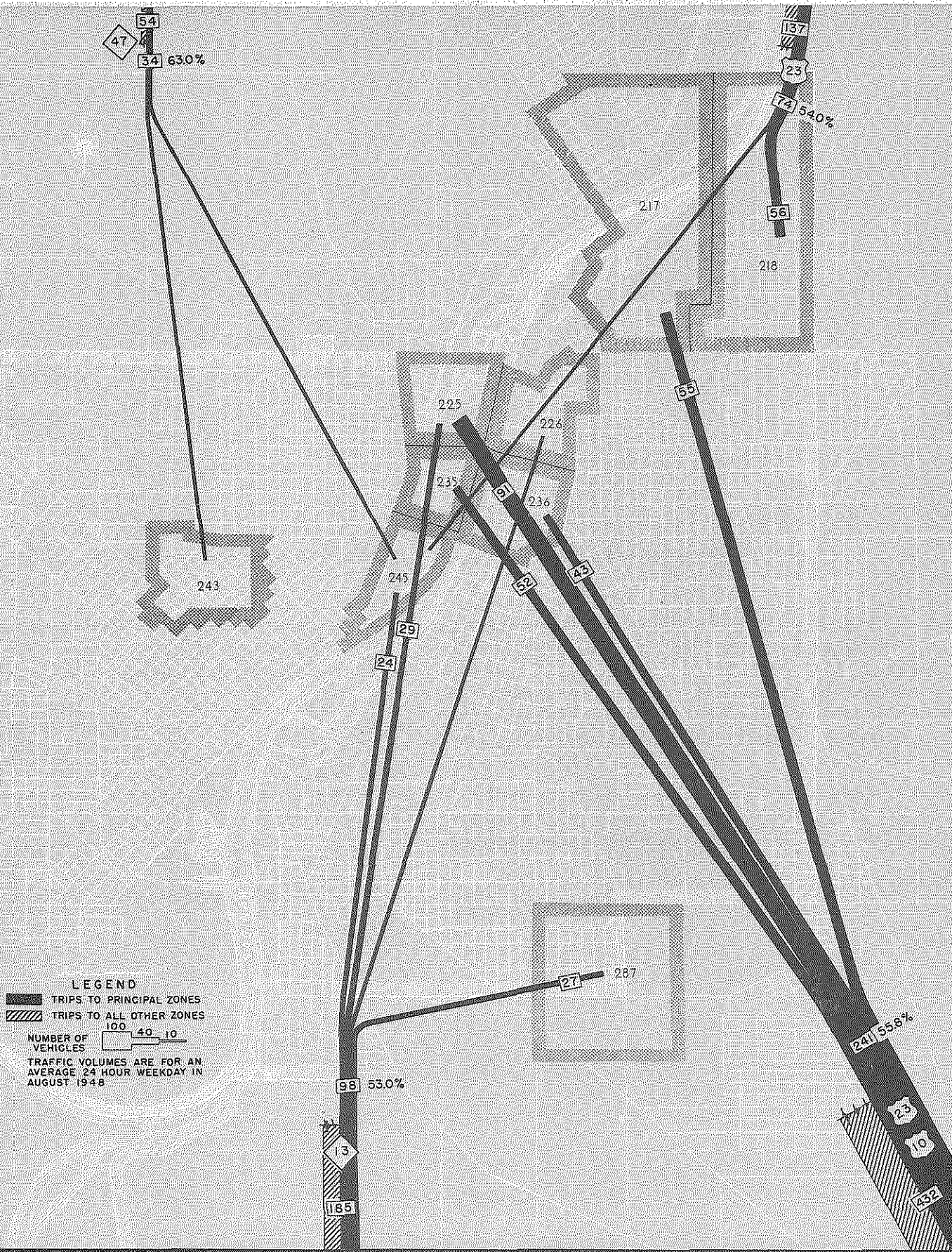
### TRAFFIC BETWEEN M-81 AND M-13 AND THE PRINCIPAL ZONES OF ATTRACTION

Both M-13 from the south and M-81 from the east terminate in Saginaw at their junctions with US-23. M-13 goes directly to the central business district for its terminal at Genesee Avenue, and M-81 terminates at the intersection of Washington Avenue and Bay City Road, north and east of the central area.

M-81 carries the smallest volume of traffic of any of the trunklines in the area but the pattern of trips to the central business district and the

industrial areas is the same. Washington Avenue provides the arterial street service for nearly all of the trips entering and leaving on this route.

From the south, M-13 with 18 percent of its total traffic going to the central business district, also follows the pattern of most of the trips terminating in the central area and the industrial areas. Its arterial service is provided by East Street, Washington Avenue and Ezra Rust Drive.



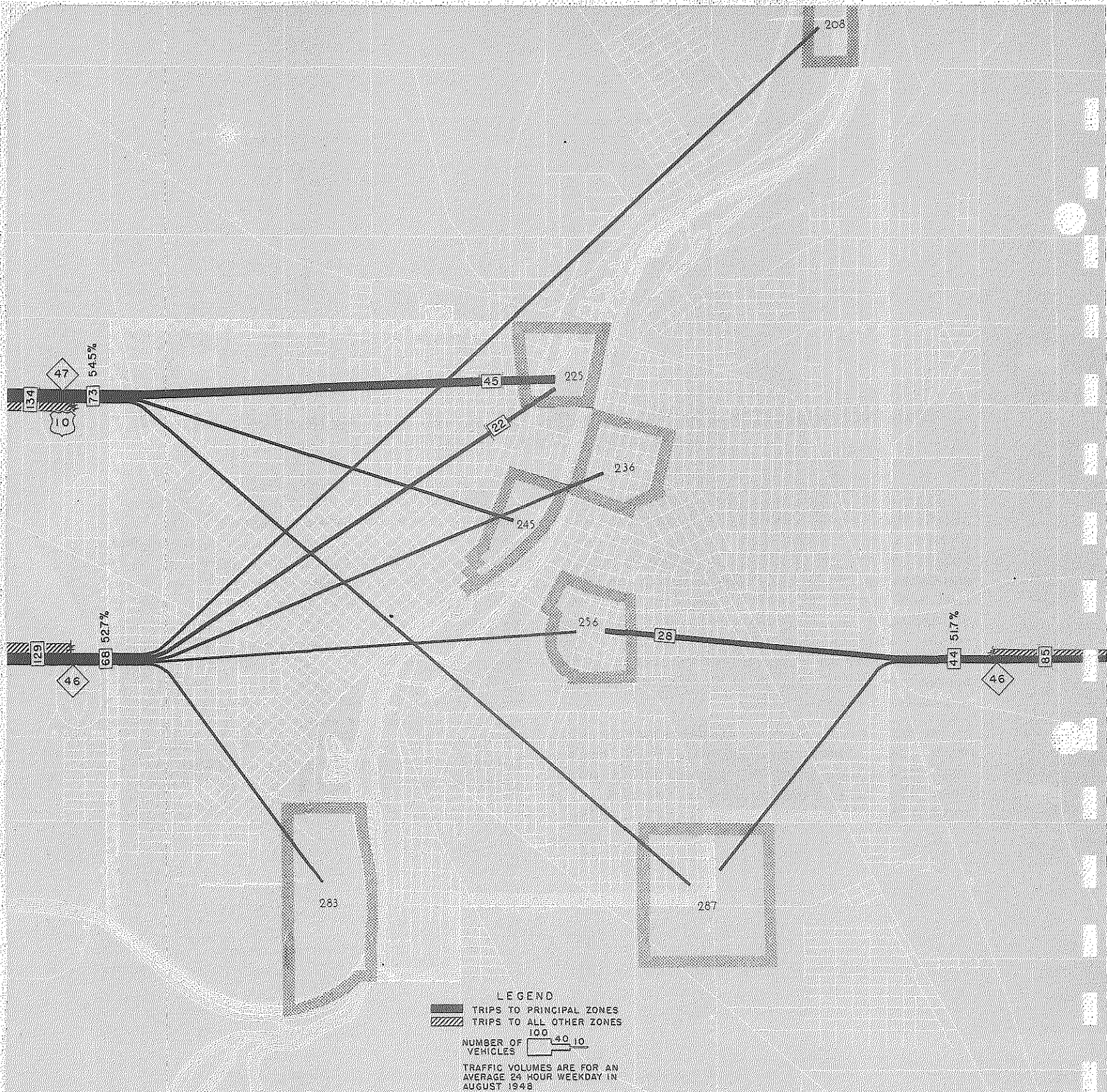
TRAILER - COMBINATION TRAFFIC BETWEEN THE NORTH AND SOUTH TRUNKLINES AND THE PRINCIPAL ZONES OF ATTRACTION

## TRAILER-COMBINATION TRAFFIC BETWEEN THE NORTH AND SOUTH TRUNKLINES AND THE PRINCIPAL ZONES OF ATTRACTION

Trips made by trailer-combinations have special significance in the planning and operation of an arterial street and trunkline system. These heavy freight haulers are of great importance to industry and business and as their termini are in the industrial and commercial areas of the city, the routes of approach to these locations must be given special consideration. Their size and weight characteristics are factors that contribute to the special designing necessary to provide facilities to handle this type of traffic.

On the average summer weekday when the 1948 study was made, approximately 1525 trailer-combinations entered or left Saginaw on the trunklines. This total includes the 376 vehicles going entirely through the area.

The heaviest movements are in the north-south directions with the major terminals in the industrial areas along the river. Most important of these movements is on US-10 and US-23 combined, in the south-east along Genesee Avenue, where 28 percent of the total trailer-combination trips with one terminal in the area enter or leave. In their order of importance M-13 is second with 12 percent of the total, followed by US-23 north, with 9 percent and M-47 north with just over 3 percent. The major movements, totaling 50 percent or more of the trips on each of these trunklines, are shown as desire lines on Plate XIII. Movements of the balance of these trips are not shown as they are scattered and follow no definite traffic pattern.



TRAILER - COMBINATION TRAFFIC BETWEEN THE EAST AND WEST TRUNKLINES AND THE PRINCIPAL ZONES OF ATTRACTION

## TRAILER-COMBINATION TRAFFIC BETWEEN THE EAST AND WEST TRUNKLINES AND THE PRINCIPAL ZONES OF ATTRACTION

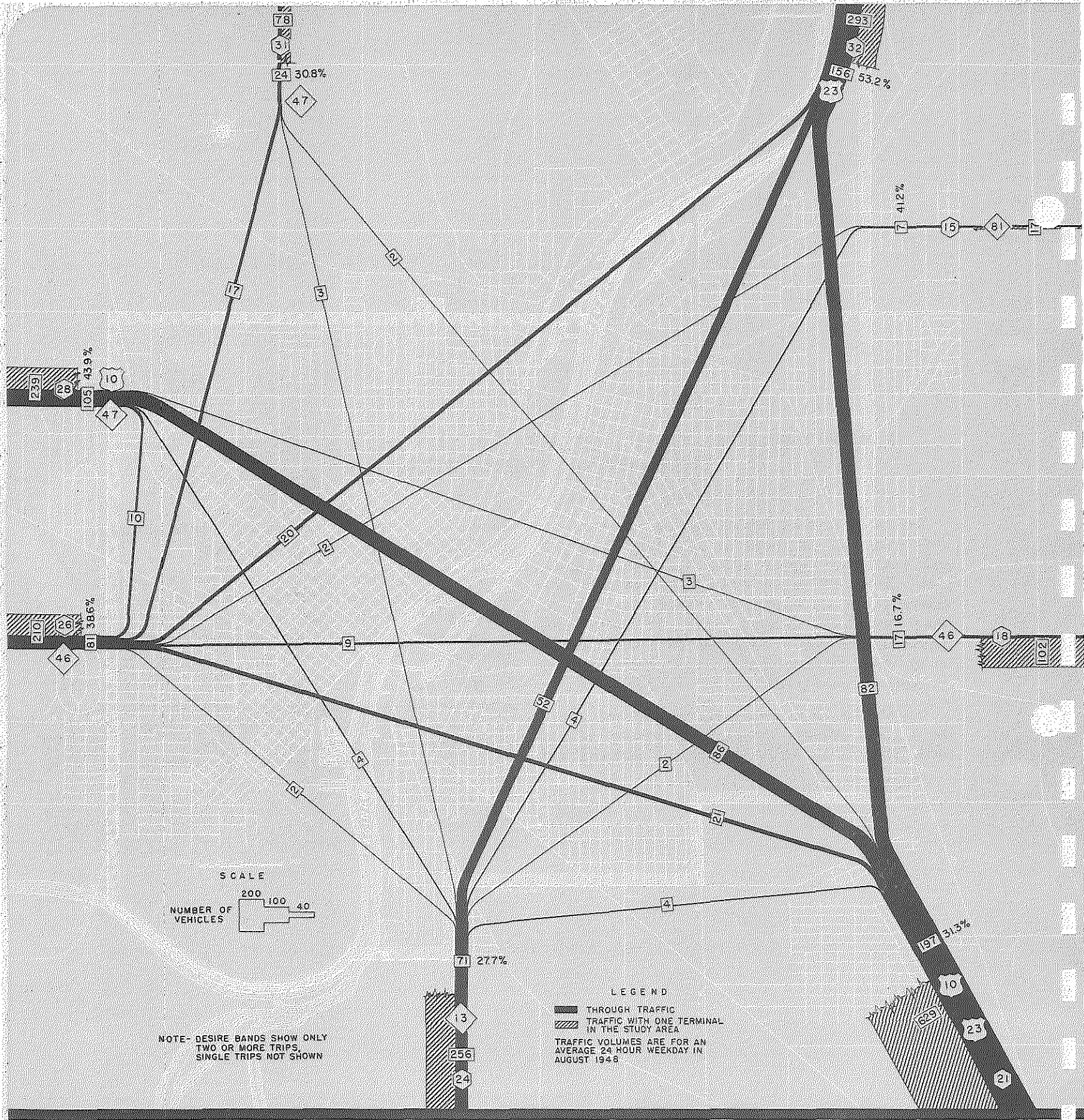
Travel by trailer-combinations on the east and west trunklines is lower in total than the north and south movements shown on the preceding plate. The volumes are sufficient to warrant consideration in the trunkline system, however, as these trunklines connect with the north-south routes and the vehicles use the north-south routes to and from their terminals in the industrial and commercial areas as shown on Plate XIV.

US-10 and M-47 combined, on the west, have the highest volume, carrying 8.5 percent of the total. M-46 west, follows with 8.3 percent, and

M-46 east, last with 5.6 percent. These volumes do not include any of the through trips.

The desire lines show the distribution of 50 percent or more of the trips on each trunkline. The balance of the trips are scattered and in such small volumes that they do not show any distinct pattern.

M-81 has a total volume of only 10 trailer-combinations in twenty-four hours and this total is too low to be included in the analysis of the trip distribution.



INTERCHANGE OF THROUGH TRAILER-COMBINATION TRIPS  
BETWEEN STATE TRUNKLINES

## INTERCHANGE OF THROUGH TRAILER-COMBINATION TRIPS BETWEEN STATE TRUNKLINES

The interchange of trailer-combination through trips on the state trunklines is an important factor in the selection of the routes through or around the city. In the Saginaw area, 78 percent of the trailer-combination trips entering and leaving have either their origin or destination in the area. The remaining 22 percent go entirely through the area with both origin and destination outside of the cordon line.

This comparatively low percentage of through trips is contrary to the usual belief that most of the trailer-combinations on the trunklines are making long distance through trips. Industries in Saginaw are of such nature that most of the raw materials are brought in by truck and the finished products are shipped out by truck. There are also several truck terminals where the loads from other cities are brought in and redistributed to other trucks for further shipment. Numerous trucks supply the retail stores with all sorts of merchandise, including groceries, meats, and other food stuffs. They must travel the city streets. It has been said the average city would be without food in less than a week if the truck supply were suddenly shut off.

On the through trip diagram on Plate XV, the

same as Plate V, it must be remembered that each through trip is recorded twice, once at the point of entry and once at the point of exit. The number of through trips shown at the external stations will total twice the values that are recorded along the internal desire lines where there is no duplication in the through trip figures.

Through trip desire lines between the trunklines are shown on Plate XV. This diagram shows that there are only five desire lines with volumes of twenty or more trips, with the two most significant volumes of 86 and 82 trips in twenty-four hours on US-10 and US-23. By comparing these desire lines with the recommended trunkline system on Plate XVI, the only through trailer-combination trips that will be carried on the relocated trunkline east of the city limits, are the trips that will be interchanged on and between US-10 and US-23.

Minor volumes will be interchanged with M-47, M-81, and M-46. The balance of the trips, those with an origin or destination in the area, must continue to use the city streets, but the use of the selected trunkline system will distribute this traffic to routes that will reduce the congestion on the present trunkline streets.



STATE TRUNKLINE SYSTEM SELECTED FOR ULTIMATE DEVELOPMENT



## STATE TRUNKLINE SYSTEM SELECTED FOR ULTIMATE DEVELOPMENT

An ultimate system of urban state trunklines is shown on Plate XVI. The routes on this system were selected from the approved arterial street system on the basis of usage as indicated by the desire of trunkline trips with termini in the study area, and of trips going through the area. One-way streets are incorporated in the trunkline system to provide more vehicle capacity and more freedom of movement, especially for the turning movements at intersections. Based on these considerations this selected system should improve the street operation throughout the Saginaw area.

The state trunkline routes within the study area and shown on this plate are described as follows:

### US-23

From the southeast, the trunkline approaches the area on the present route to a point east of the village of Bridgeport where it turns north on a new alignment approximately one mile east of the Saginaw city limits to one mile north of M-81, then northwest across the Saginaw River and north of the village limits of Carrollton to a junction with US-10BR and M-47 on Michigan Avenue extended, on a relocated section that passes to the west of Bay City.

### US-23BR

From the east, the Business Route starts at the intersection of Johnson Street extended, and US-23 about one-mile east of the city limits, west on Johnson to Fourteenth Street, then west on Johnson and Fitzhugh as a pair of one-way streets to intersections with North Warren and North Jefferson Streets, then north on these two as a pair of one-way streets to Washington Avenue, east and north on Washington Avenue to River Road where it turns north, crossing US-23 and continuing north to Bay City.

The relocation of this trunkline would take a large volume of trips away from the congested areas all along Genesee Avenue. By having the route outside of the city the through trips will be eliminated from the central business district and the trips with an origin or destination in the study area will be distributed from four access streets instead of the two formerly used. A good connec-

tion is made to the central business district on US-23BR by means of the pair of one-way streets from the east. The large volume of trips that have been funneled through the intersection of Genesee and Washington Avenues would be moved away from the heart of the business district and the large volumes of turning movements that were concentrated in that one intersection would be divided and placed on four separated corners. The pedestrian movements on these four intersections would be considerably lighter than they were on the single crossing.

### US-10

From the southeast, the trunkline approaches the area on the present route to a point east of the village of Bridgeport where it turns north on a new alignment approximately one mile east of the Saginaw city limits to one mile north of M-81, then northwest across the Saginaw River and north of the village limits of Carrollton to a junction with US-10BR and M-47 on Michigan Avenue extended, on a relocated section that passes to the west of Bay City.

### US-10BR

From the east, the Business Route starts at the intersection of Johnson Street extended, and US-23 about one-mile east of the city limits, west on Johnson to Fourteenth Street, then west on Johnson and Fitzhugh as a pair of one-way streets to Water Street, across the Saginaw River, on a new bridge to connect with State and Davenport as a pair of one-way streets to intersections with Michigan Avenue and Fayette Street, north on these two as a pair of one-way streets to Clark Street, then north on Schaeffer and Michigan Avenue as a pair of one-way streets, to the vicinity of Madison Street where they converge and proceed north on Michigan Avenue extended, to a junction with US-10 and US-23 north and west of Carrollton.

Rerouting US-10 to the east of Saginaw along with US-23 gives this route the same advantages as relocated US-23. The Business Route is removed from the center of the business district and is carried on a pair of one-way streets along the northern edge of the district across a new bridge that is also north of the now heavily traveled

Genesee Avenue Bridge. West of the river the route passes to the north of the commercial area and the truck terminals but makes a connection close to this area with M-47, and goes north on Michigan and Fayette as a pair of one-way streets to join the trunkline north of Carrollton.

#### M-13

This trunkline approaches the area from the south on Sheridan Road to Hiland Street, then north on Sheridan and Warren Avenue as a pair of one-way streets to Hayden Street, continuing north on Jefferson and Warren as a pair of one-way streets to its terminal at Fitzhugh Street.

Removing this route from Washington Avenue and placing it on Sheridan Avenue eliminates two bad turns and three intersections of high turning movements. The trunkline traffic will pass along the eastern edge of the central business district on a pair of one-way streets, missing the congested shopping area along Washington Avenue.

#### M-81

M-81 enters the area from the east on the present route on East Washington Avenue to the intersection of North Jefferson and North Warren Avenues, south on these two as a pair of one-way streets to intersections with Johnson and Fitzhugh, west on these two as a pair of one-way streets to Water Street, across the Saginaw River on a new bridge to connect with State and Davenport as a pair of one-way streets, west on these two to join M-47 and terminate at North Fayette Street.

Instead of terminating at the intersection of Washington Avenue and the River Road as it does now, the trunkline will have a direct connection to the central business district, the commercial area and the truck terminals west of the river, as well as direct connections with US-10, US-23, M-13 and M-47.

#### M-47

From the north the trunkline enters the area from Bay City on Michigan Avenue extended, south on Michigan to the vicinity of Shattuck Road, then south on Michigan and Schaeffer as a pair of one-way streets to Clark Street, then south on Michigan and Fayette as a pair of one-way streets to Houghton Street where they converge to Michigan, then south on Michigan to Bristol, south-west on

Michigan and Hamilton as a pair of one-way streets to Williams and Stephens, then north-west on these two as one-way streets to Gratiot where it turns west leaving the area on the present route.

M-47 being moved from State Street and Bay City Road to the Gratiot Avenue and Michigan Avenue location removes the heavy turning movement from the intersection of State Street and Bay City Road. This intersection being in a commercial development of fairly high concentration of origins and destinations of internal trips has always been a bottleneck for trunkline traffic. This route will be shorter and more direct to the shopping area west of the Saginaw River. Access to the area east of the Saginaw River, including the Central Business District, will be across five bridges instead of just the Genesee Avenue bridge. Better interconnection with the other trunklines will be obtained and the route will be integral with the new route for US-10 and US-23 west of the Saginaw River to Bay City.

#### M-46

From the east this trunkline enters the area on Holland Avenue, the present route, west to intersections with Fifteenth and Thirteenth Streets, south on these two as one-way streets to intersections with Ruckle and Roberts, west on these two as a pair of one-way streets to Bagley where they converge to a new divided facility, with connections to Sheridan and Warren Avenues, and continuing west on Rust Avenue crossing the Saginaw River on a new bridge to connect to the northwest with Stephens and Williams as a pair of one-way streets to Gratiot Avenue, west on Gratiot, the present route.

The rerouting of this trunkline to Ruckle-Roberts, Rust and Williams-Stephans eliminates five bad intersections that are concentrated in about two miles. Where it crosses Genesee Avenue on Ruckle and Roberts the traffic and turning movements will be at two separated intersections, and at the crossing of M-13 there will be two separated intersections at Warren and Sheridan Avenues. At the intersection of Rust and Washington there will be a single four-leg intersection with the trunkline traffic going straight through, instead of the two dead end intersections with all of the attendant turning movements that are necessary on the present route. On Michigan Avenue the two

right-angle turns at Court Street and Gratiot Avenue are eliminated with the turns being shifted to the one-way street intersections of Williams and

Gratiot and Stephans and Gratiot to the west of the shopping center away from the congested area.

NUMBER OF VEHICLES  
4000 2000 1000

TRAFFIC VOLUMES ARE FOR AN AVERAGE 24 HOUR WEEKDAY IN AUGUST 1948



STATE TRUNKLINE TRAFFIC TO AND FROM SAGINAW  
ASSIGNED TO ARTERIAL STREET SYSTEM

## STATE TRUNKLINE TRAFFIC TO AND FROM SAGINAW ASSIGNED TO ARTERIAL STREET SYSTEM

Plate XVII presents the estimated traffic flow from the rural trunklines and the important local road connecting Saginaw and Midland, to the selected urban trunklines and other arterial streets. The flow bands shown are the total of the inbound, outbound, and through trunkline trips assigned to the arterial street system. This estimate is based on the following assumptions:

1. The driver picks the shortest route.
2. He uses the route with the fewest turns.
3. He avoids the central business district and other congested areas if routes are available which do not involve adverse distance.

Much better service for trunkline traffic is provided with the relocation of the rural trunklines east of the Saginaw River. With the trunkline traffic redistribution as shown, large volumes of vehicles would be routed away from the shopping, commercial and industrial areas. The traffic removed from

these areas consists of the trunkline trips with origin or destination in the study area but not in the commercial, shopping or industrial areas, and the through trips that wish to bypass the city.

Better distribution is achieved over the entire area by relocating the principal north-south trunkline east of the city limits, with three parallel streets carrying the east-west traffic to and from terminals inside of the area. There is more ease of access to the central business district on the Business Routes that skirt this area without going directly through it. Inside of the city through trips are reduced to a minimum with the heavy through movement on US-23 and US-10 being routed around the city instead of through it on the streets that normally carry a high volume of internal traffic.

This Plate shows that the selection of the streets for the urban state trunkline system is correct, by the indication of their heavy usage by traffic to and from the rural state trunklines.

15000 8000 2000  
 NUMBER OF VEHICLES  
 TRAFFIC VOLUMES ARE FOR AN AVERAGE 24 HOUR WEEKDAY IN AUGUST 1948



TOTAL TRAFFIC ASSIGNED TO SELECTED URBAN TRUNKLINE SYSTEM AND  
 OTHER ARTERIAL STREETS

## TOTAL TRAFFIC ASSIGNED TO SELECTED URBAN TRUNKLINE SYSTEM AND OTHER ARTERIAL STREETS

In any street system the proof of its adequacy is in the way that the traffic uses it and the degree to which this usage improves the traffic condition in the area as a whole.

Plate XVIII shows the estimated traffic assigned to the urban state trunklines and other arterial streets. This traffic includes all vehicles making trips entirely within the area, trips with one terminal in the area and one terminal outside of the area and trips that pass through the area with both origin and destination outside of the area. The trips entering and leaving on the rural state trunklines are the same as on Plate XVII. When the local trips are added to the trunkline trips the result is the flow map as shown. Directional flow on the one-way streets is not shown because the proximity of the streets and the width of the bands would cause the bands to overlap. In all cases the flow in one direction is the same as the flow in the opposite direction. The flow band scale has been increased over Plate XVII to avoid overlapping.

Traffic across the Genesee Avenue Bridge is

greatly reduced with the traffic being distributed to the Johnson Street Bridge and the new bridge at the south edge of the central business district. With this redistribution, the traffic pattern is much better balanced over the entire city and congestion in the downtown area is considerably reduced. The only portion of the trunkline traffic that is in the central business district has an origin or destination in that area. The rest of the trunkline traffic on US-10BR, US-23BR, M-13 and M-81 goes around the central area on three pairs of one-way streets, Fitzhugh and Johnson Streets to the north, Jefferson and Warren to the east, and Hayden and Midland to the south.

With the additional river crossings and the improvement of some of the city streets to arterial standards the large volumes of internal traffic are redistributed more evenly over the entire arterial system. Better utilization of the existing streets is attained and with the operation of the one-way street systems circulation is speeded up with less confusion and congestion in the areas of high traffic concentration.



LEGEND  
 ■ SHOPPING AREA  
 ▨ INDUSTRIAL AREA  
 ● TRUCK TERMINAL

SELECTED STATE TRUNKLINES AND LAND USE



## URBAN STATE TRUNKLINES AND LAND USE

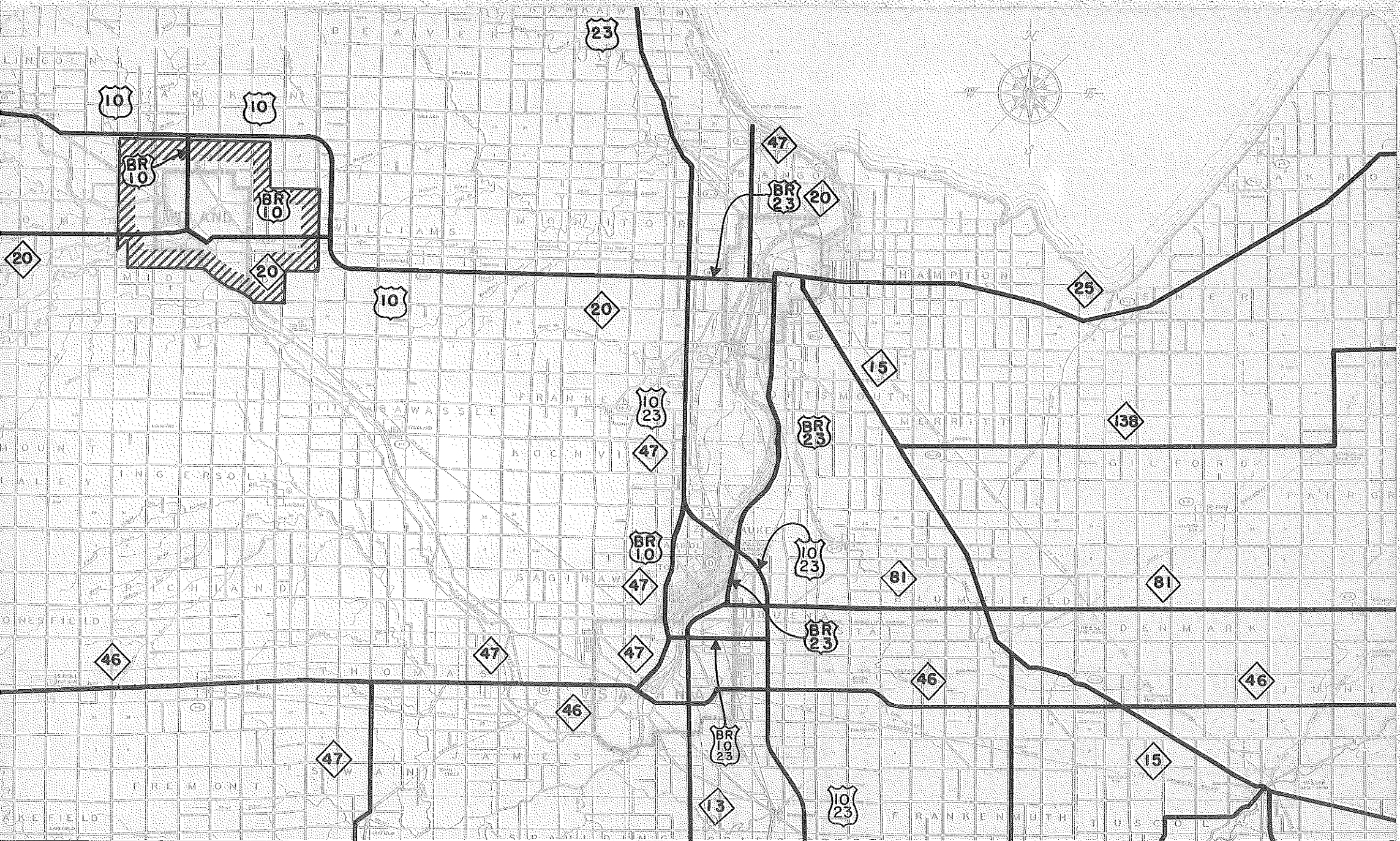
Plate XIX shows the urban state trunkline system and land use in the Saginaw area. These routes, which were described in detail on the preceding pages, satisfy the following planning principles for urban trunkline location:

1. They connect the rural state trunklines with the central business district.
2. They serve the principal industrial areas of the city.
3. They avoid, as far as possible, existing

handicaps and hazards of commercial roadside developments.

4. They interconnect within the city.
5. They are reasonably direct in their approach to the principal areas of objective destinations.

Any major deviation from the selected locations should be undertaken only after careful consideration of the traffic requirements and the operation of the complete system.



## TRI-CITY AREA TRUNKLINE SYSTEM SELECTED FOR ULTIMATE DEVELOPMENT

NOTE :- CITY LIMITS EXTENDED-1953

PLATE **XX**



# TRAFFIC ASSIGNED TO THE SELECTED TRI-CITY AREA TRUNKLINE SYSTEM

NOTE:-  CITY LIMITS EXTENDED-1953

PLATE XXI

## TRI-CITY AREA TRAFFIC STUDY

Plates XX and XXI are included in this report for two purposes. First, to show the planned revision of the state trunklines in the Tri-City area, which was a determining factor in some phases of the urban trunkline selection, and second, to show how well the system selected for Saginaw is integrated with the Tri-City traffic pattern, as it would be under the proposed revision.

The trunkline system shown on Plate XX has been approved in principle by the Michigan State Highway Department and the planning authorities of the Bay City-Saginaw-Midland area for the improvements of state trunkline connections and service in the Tri-City area. This system includes a projected route for US-10 and US-23 east of Saginaw, across the Saginaw river north of Saginaw, and north to join the present US-23 northwest of Bay City. At a point west of Bay City the route

intersects and joins a projected highway, located one-half mile south of the present location of M-20. US-10 and M-20 are routed over this new location west to Midland. All northbound trunkline trucks using the new route will be removed from State and Davenport streets west of Fayette Street in Saginaw.

Traffic flow bands on the three-county map on Plate XXI indicate the close traffic relationship that exists between Bay City, Saginaw, and Midland. Due to the location and importance of this triangle of cities it is necessary to interconnect them with a network of trunklines and also provide the means to conduct the considerable quantities of through trips around them.

Selection of an urban trunkline system in Saginaw was directed toward obtaining satisfactory integration with the Tri-City area system.