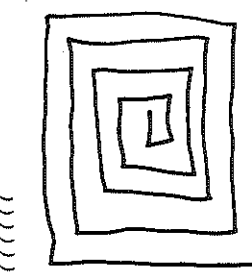
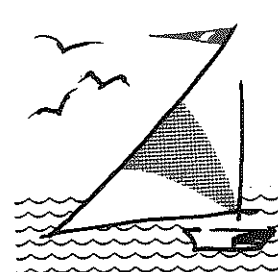
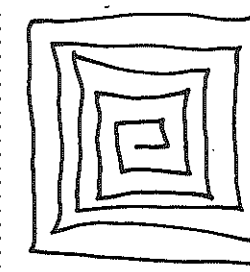
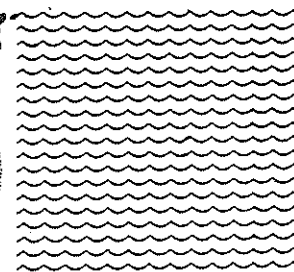
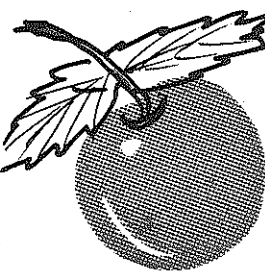
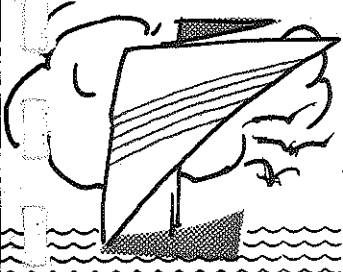
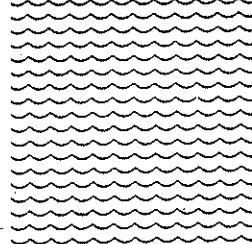
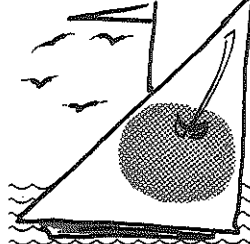
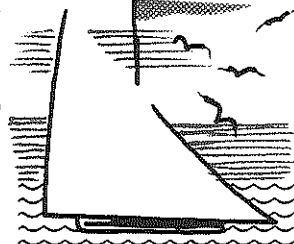
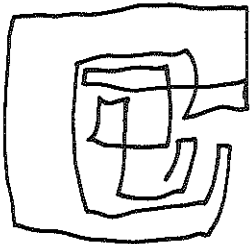
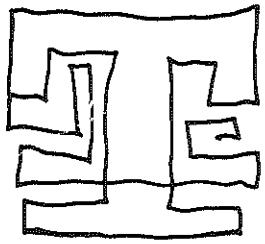


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AREA TRANSPORTATION STUDY

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AN ORIGIN - DESTINATION STUDY

FACTUAL DATA REPORT

1966

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Cooperating Agencies:

U.S. Department of Transportation
 Federal Highway Administration
 City of Traverse City
 Grand Traverse County

Townships of:

- Acme
- Blair
- East Bay
- Elmwood
- Garfield
- Peninsula

D

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PREFACE

Since 1945 comprehensive transportation studies have been conducted by the Michigan Department of State Highways in various urban areas throughout the state.

In the summer of 1966 such a study was conducted in Traverse City and its immediate environs. This area was essentially that predicted to be urban by the year 1990.

The purpose of this study was to obtain pertinent information concerning travel patterns which would be used as a basis for planning future programs to solve traffic problems.

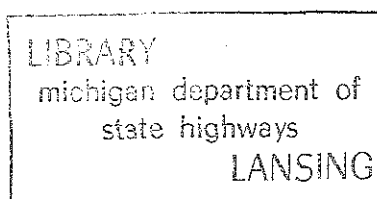
The initial phase of this report outlines the procedures used in collecting, evaluating, and adjusting the basic survey data. The remaining portion concerns base year data pertaining to household characteristics and trip making.

TABLE OF CONTENTS

Preface	III
The Survey Area	3
Terminology and Definitions	5
Selected General Statistics	8
Part I 1966 Data Compilation	9
Study Procedures	11
Data Gathering Procedures	12
Internal Survey	12
External Survey	15
Supplement Activities	17
Data Preparation Procedures	17
Data Accuracy Check Procedures	19
Data Adjustment Procedures	21
Part II 1966 O-D Study Results	29
Trip Data	30
Internal and External Surveys	31, 33
Screenline	34
Cordon Line	38
Traffic Flow Maps	43
Travel Desire Diagrams	46
External Station Desire Lines	47
Internal Desire Lines	51
Socio-Economic Data	57
Summary of Adjusted Dwelling Unit Data	57
Passenger Car Occupancy	63
Internal Survey Records	63
External Survey Records	65
Appendix A - Interview Forms	67

LIST OF TABLES

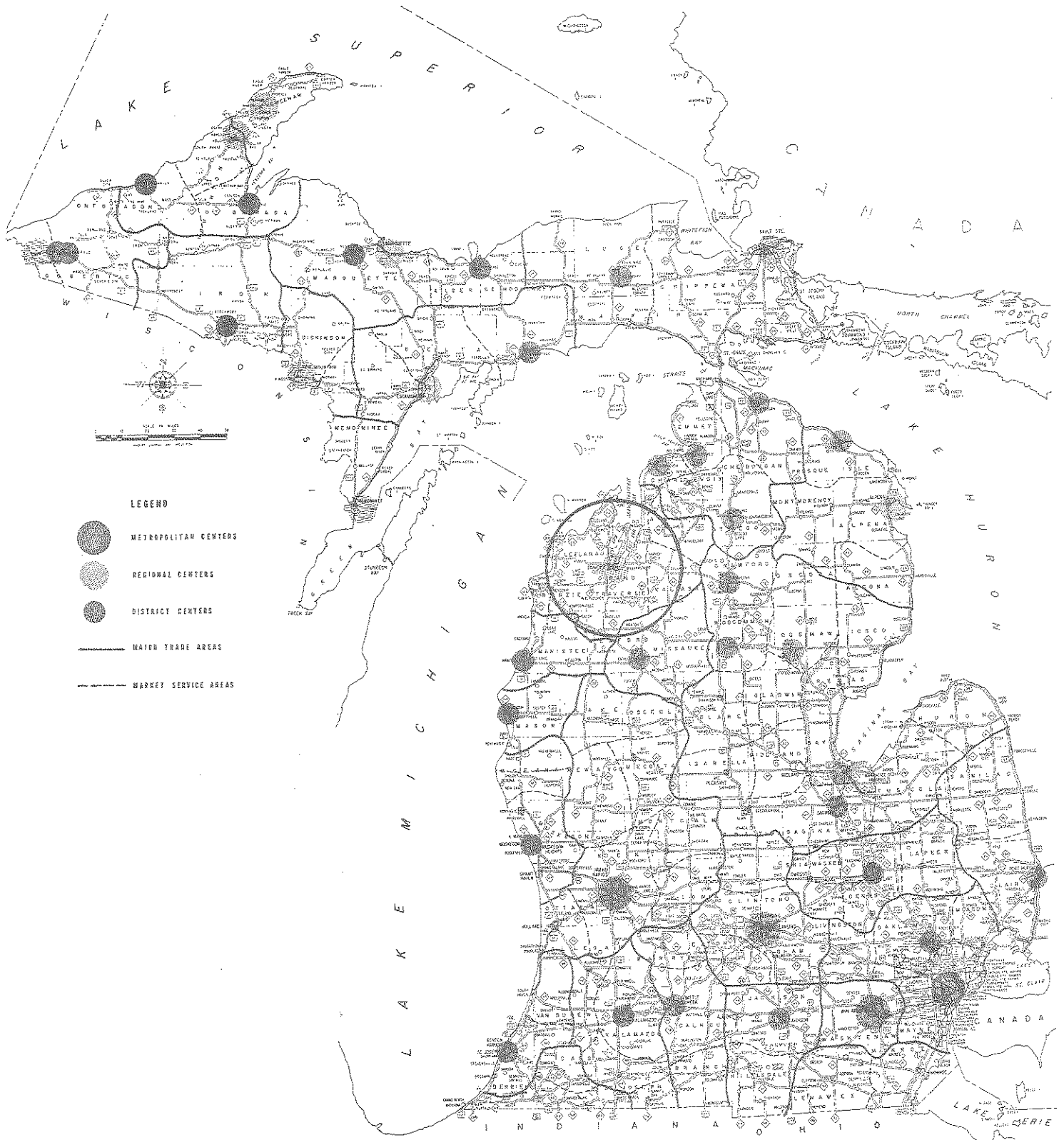
Socio-Economic Accuracy Check Ratios	19
Internal-External Cordon Comparison of Interview Data	20
Screenline Comparison of Interview Data and Classified Counts	21
Comparison of Actual Passenger Car Counts With Hourly Traffic Volumes Obtained From O-D Data (Table A-1)	31
Comparison of Actual Truck and Taxi Counts With Hourly Traffic Volumes Obtained From O-D Data (Table A-1)	32
Screenline Station Descriptions	34
Manually Classified Twenty-Four Hour Traffic Volumes by Screenline Station, By Vehicle Type	35
Manually Classified Twenty-Four Hour Traffic Volumes By Vehicle Type, By Hour Period At All Screenline Stations	35
Cordon Line Station Descriptions	39
Manually Classified Twenty-Four Hour Traffic Volumes By Cordon Line Station, By Vehicle Type	40
Manually Classified Twenty-Four Hour Traffic Volumes By Vehicle Type, By Hour Period At All Cordon Line Stations	40
Summary of Adjusted Dwelling Unit Data (Table B-1)	58
Passenger Car Occupancy By Trip Purpose (Internal Records)	64
Passenger Car Occupancy By Trip Purpose (External Records)	66



LIST OF MAPS AND GRAPHS

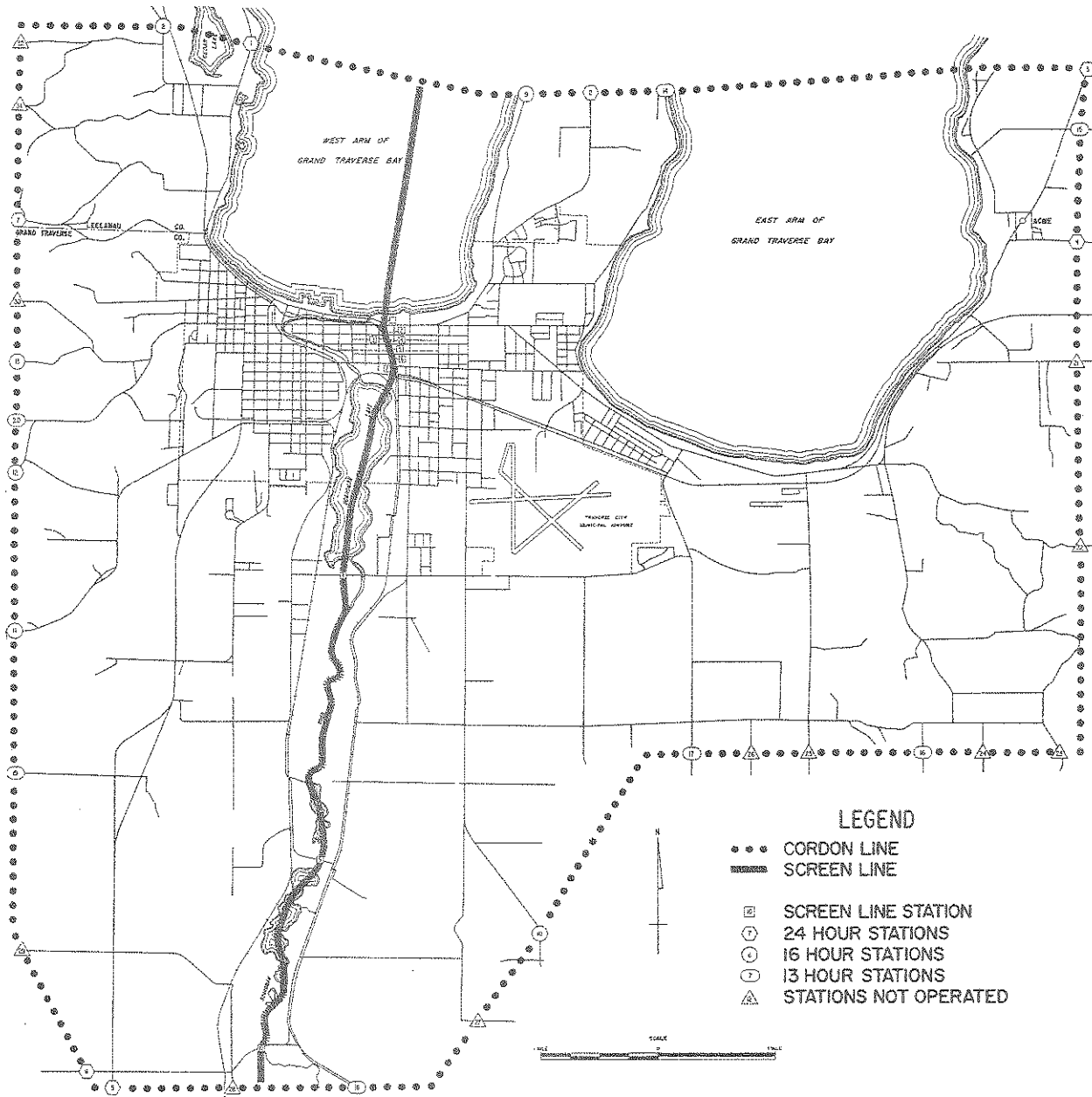
Major Trade Area Map	1
Traverse City Area Base Map	2
Traverse City Area Base Map With Tract Boundaries	13
Traverse City Area Base Map With Zone Boundaries	18
Screenline Passenger Car Comparison	23
Screenline Truck Comparison	24
Screenline Total Vehicle Comparison	25
Unadjusted Screenline Comparison	26
Adjusted Screenline Comparison	27
Trip Movements All Vehicles	30
Percent of Total Traffic At Each Screenline Station	36
Hourly Percentages of Total Screenline Traffic	37
Percentage of Total Traffic At Each Cordon Line Station	41
Hourly Percentages of Total Cordon Line Traffic	42
Traverse City Area Flow Map	44
Traverse City Area Flow Map (City Blow Up)	45
Through Traffic Interchanges on State Trunklines	48
Trips To and From External Stations at M-72 (Station 7), Temporary M-72 (Station 15), M-37 (Station 5) and M-37 (Station 2) To Principal Zones of Attraction	49
Trips To and From External Stations At M-22 (Station 1), US-31 (Station 6) and US-31 (Station 3) To Principal Zones of Attraction	50
Trips To and From the CBD and Principal Zones	52
Trips To and From The State Hospital Complex and Principal Zones	53
Trips To and From Zone 50 and Principal Zones	54
Trips To and From Zone 126 and Principal Zones	55

MAJOR TRADE CENTERS OF MICHIGAN



SOURCE: MICHIGAN HIGHWAY CLASSIFICATION STUDY

TRAVERSE CITY AREA TRAFFIC STUDY



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

SURVEY AREA

Traverse City, the county seat of Grand Traverse County, is 138 miles north of Grand Rapids located at the south end of West Grand Traverse Bay. State Trunk-lines M-37, M-72, M-22, and US route 31 service Traverse City.

Traverse City is recognized as the nation's cherry capitol. It is also the geographical and commercial center of a large resort and recreational area in Northwestern Michigan.

Summer vacationists select the Grand Traverse Bay Region because of the cool, dry climate. Fishing, bathing, sailing, and the great number of scenic drives as well as the clear lakes and streams are the chief attractions of this region.

Although summer is the peak season in the Grand Traverse Bay Region, it also experiences an influx of visitors during autumn, winter, and spring. Duck and deer hunters flock to this region during the autumn. Skiing enthusiasts from all over the middle west turn out in great numbers during the winter as do skaters and ice fisherman. Springtime sees many trout fishermen fill the region during May.

Traverse City's prosperity is founded upon its cherry, tourist, and resort industries. However, since the soils

are not particularly fitted for cherry culture a marked increase in stock raising and general farming is taking place.

The Community is served by air, rail, and bus service. The North Central Airlines maintain airmail and passenger service. Three railroads also serve the City as well as several bus lines.

The 1960 census gives Traverse City a population of 18,432 and its stores, wholesale houses, and service firms serve a population of 75,000 people throughout the year and as high as 250,000 during the vacation months.

TERMINOLOGY and DEFINITIONS

The following terms will be mentioned in the context of this report. A concise definition of each is necessary and will render a better understanding of the concepts and procedures used in an origin-destination study.

CENTRAL BUSINESS DISTRICT:

The zones comprising the concentrated commercial and retail center of the city.

CLASSIFICATION COUNTS:

Vehicles are counted and placed in categories (passenger cars, single unit trucks, etc.) at screenline and cordon line stations.

CORDON LINE:

The imaginary line enclosing the study area.

CORDON TRIP:

A trip with one terminal outside the study area and one terminal inside the study area.

DESIRE LINE:

A straight imaginary line between stations and/or zones connecting a trip origin and destination. Actual routes of travel are not considered.

DESTINATION:

The place where a trip ends.

DWELLING UNIT:

Living quarters available for occupancy. A dwelling unit may be a house, apartment, or an individual room depending on the occupants.

EXTERNAL SURVEY:

A phase of an origin-destination survey where interviews are conducted at the cordon line.

EXTERNAL TRIP:

A trip with one or both terminals outside the study area.

INTERNAL SURVEY:

The phase of the origin-destination study in which residents of the study area are interviewed (on a sample basis) at their place of residence. Basic travel patterns and socio-economic data are obtained.

INTERNAL TRIP:

A trip with both terminals within the study area.

NONRESIDENT:

A person living outside the study area.

ORIGIN:

The place where a trip begins.

ORIGIN-DESTINATION SURVEY:

A comprehensive survey of travel habits within a selected area, designed to collect detailed information regarding trip origins and destinations.

RESIDENT:

A person living within the study area.

SCREENLINE:

A line through the study area on a natural or artificial division such as a river or railroad where all traffic crossing it is counted and classified for comparison with expanded survey data.

STATION:

Point of interviews and classification counts on routes at the cordon line. Point of classification counts on routes at the screenline.

STUDY AREA:

The geographical area inclosed by the cordon line.

THROUGH 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.

ZONE:

The basic or prime subdivision of a study area having a single or dominant land use. Designated for purposes of tabulation and analysis.

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SELECTED GENERAL STATISTICS

1. The study area contained approximately 54 square miles. This included Traverse City and parts of Acme, Blair, East Bay and Garfield Townships in Grand Traverse County. Also part of Elmwood Township in Leelanau County was included in the study area.
2. The expanded survey data showed a population of 23,079 and a total of 6,888 dwelling units within the study area. This is 3.35 persons per dwelling unit.
3. Residents reported owning 9,466 passenger cars in 1966. This results in 2.44 persons per car and 1.37 passenger cars per dwelling unit.
4. There were 11.08 vehicle trips and 17.46 person trips per dwelling unit.
5. Of the total vehicle trips reported, 1.7 percent were intrazonal, 68.6 percent were zone to zone, 25.7 percent were cordon, and 3.98 percent were thru.
6. Of the 115,384 vehicle trips made, 31,043 had either an origin or destination in the CBD.
7. A total of 153,379 person trips were made. Passenger trips accounted for 24.6 percent of this total or 37,748.
8. The number of truck trips made in the study area was 16,740 (including thru movements).

PART I

1966 DATA COMPILATION

Collection

Preparation

Expansion

Accuracy Checks

Adjustment

STUDY PROCEDURES

In 1962 the United States congress created the Federal Highway Act. The Act authorized the Secretary of Commerce to cooperate with each state in long-range transportation planning. This involves a continuing, comprehensive transportation planning process which is carried on cooperatively by state and local communities.

The study of travel patterns is one of the major factors in the transportation planning process. This is accomplished through the use of an origin-destination study which will provide data concerning motor vehicle movements into, out of, through, and within the study area. This report will document procedures and results of the origin-destination study conducted in the Traverse City area in 1966.

DATA GATHERING PROCEDURES

Before actual field work could begin, the limits of the study area had to be defined. The Traverse City Area included Traverse City and rural lands surrounding it, anticipating future urban growth. The Traverse City study area contains approximately 54 square miles.

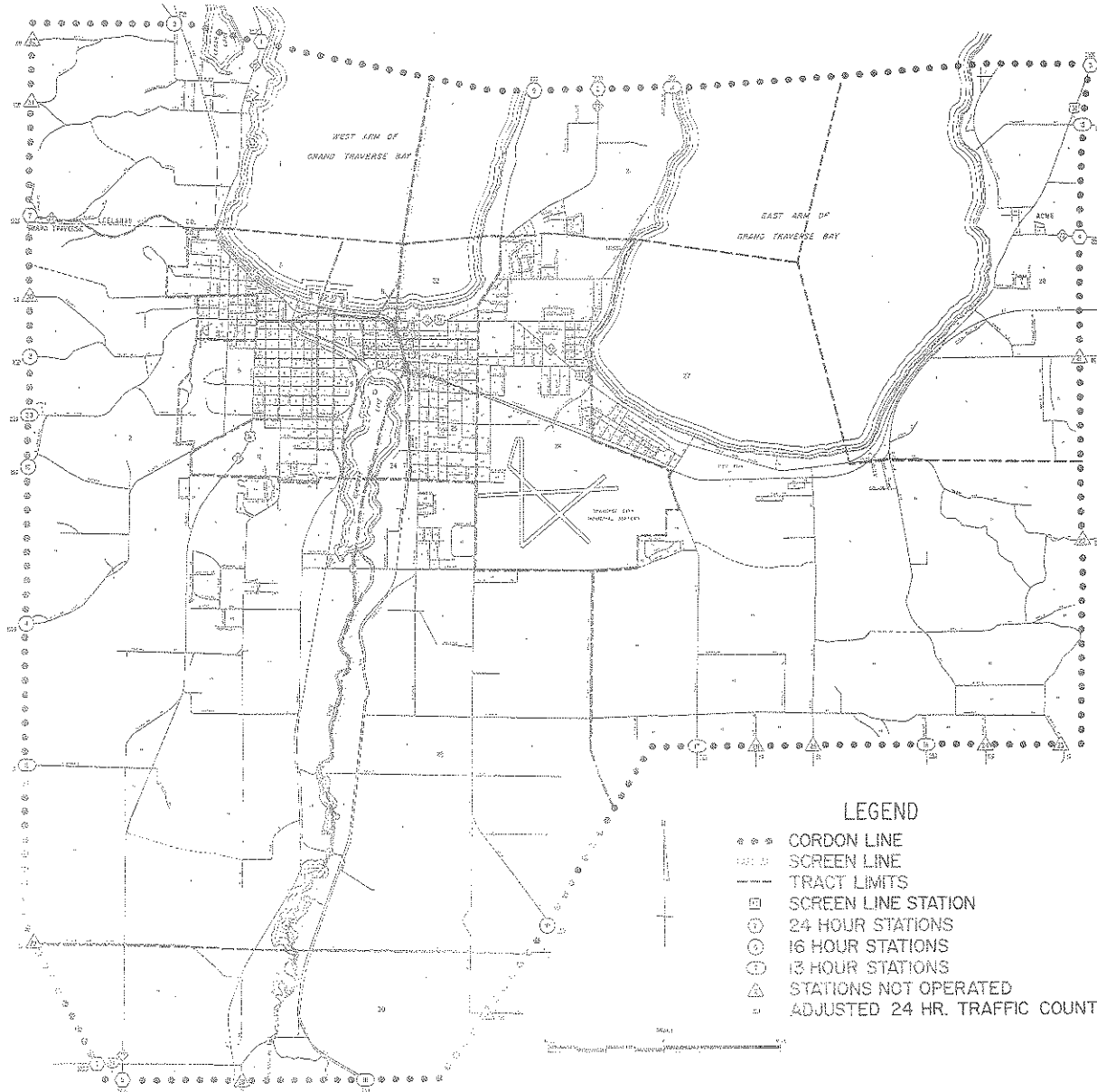
The Study area was then subdivided into twenty-three O-D tracts, corresponding where possible with census tracts. These tracts were further subdivided into blocks.

To provide a systematic method of collecting and classifying traffic data, the origin-destination study had two general divisions - Internal and External.

INTERNAL SURVEY:

The internal survey is designed to obtain trip information from residents of the study area. It was determined that a twenty percent sample would be accurate in giving sufficient trip information. An actual inventory of dwelling units was conducted in the area from which one in five was selected as a sample. Twenty percent of the canvassed dwelling units yielded 1,447 sample addresses to be interviewed.

TRAVERSE CITY AREA TRAFFIC STUDY



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

During selection of the dwelling unit survey sample, consistency (between blocks) and sample uniformity (between dwelling units in a block) were maintained. To insure sample consistency, selection was made on a block by block basis by a daily comparison of selected samples with the census block statistics.

Pertinent travel information was obtained through internal interviews for all occupants five years of age or older at each occupied sample dwelling unit. Home interviewers, calling in person at each sample dwelling unit, recorded information on both the Interview Address Summary (Form 1599 0-D2) and the Internal Trip Report (Form 1599 0-D3). Form 1599 0-D2 was filled out for each sample address, listing all persons five years of age or older, their occupation, and other descriptive information. Form 1599 0-D3 was used to record each trip made by all persons, according to the person number assigned under "D" of Form 1599 0-D2. Only one form 1599 0-D2 was needed for each sample address, while the number of Form 1599 0-D3's used varied according to the number of trips recorded. See Appendix "A" for sample copies of both forms.

Travel information for trucks and taxis was obtained from a 50 percent sample of trucks owned in the area, and a 100 percent sample of taxis. This yielded 397 truck and 7 taxi samples. Trip information was recorded by the vehicle's driver on the Trip Report for trucks and taxis (Form 1599 0-D7). All trips by each vehicle were reported for a 24-hour day. The data on Form 1599 0-D7 was then coded and recorded on the Coding Sheet for Trucks and Taxis (Form 1599 0-D8). Sample copies of both forms are in Appendix "A".

Screenline station locations are shown on the area base map. Twice, vehicle classification counts were taken for 24-hour periods at each of the ten screenline stations. These were then averaged. Because all information was recorded by hour periods, screenline counts were used as a statistical control. Thus, it was possible to test statistical characteristics of expanded screenline volumes (determined from the expanded external and internal interview data) with the actual traffic counts (obtained at the screenline) on an hourly basis. This will be discussed further in Part II under Adjustment.

EXTERNAL SURVEY:

The external survey portion of the study included; cordon line station selection, determination of interviewing hours, external interviewing and a manual classification count of vehicles at both the cordon line and screenline.

External trip data was collected at a cordon of 20 interview stations established on all important roads serving the study area. These station locations intercepted 96 percent of all external traffic; 69.3% of this was interviewed.

Preliminary traffic counts indicated that 426 hours of external interviewing were needed to obtain an adequate sample. Interviewing was scheduled at each station for a total of 24, 16, or 13 hours. Six of the seven state trunkline stations were assigned 24-hour interviewing schedules and operated for eight hour periods (6:00AM-2:00PM, 2:00PM-10:00PM, and 10:00PM-6:00AM) on three different days during the week. Twelve additional hours for each of these stations were operated on a weekend for period

9:00AM-9:00PM. The seventh state trunkline station was closed because of construction. However, the station was created on a county road which carried the diverted traffic. This station was also assigned a 24-hour interviewing schedule.

Six of the secondary (non-trunkline) stations were operated on 16-hour periods (6:00AM-2:00PM and 2:00PM-10:00PM) on two different weekdays. Each of the remaining six secondary stations was operated for thirteen hours in six and seven hour periods (7:00AM-1:00PM and 1:00PM-8:00PM) scheduled on two different weekdays. Refer to the Area Base Map for station locations.

External station operation consisted of interviewing drivers and manual vehicle classification counts. During interview operation, vehicles were stopped and the drivers interviewed as to the trip's origin, destination and purpose. All interview information, classified as to vehicle type (car, truck, etc.) and direction of travel (inbound and outbound), was recorded by hour periods. A single line of Form 1599 OD4 was used to record the information from each interview.

Although total interview hours per station varied, manual vehicle classification counts were maintained for 24-hours. All vehicles passing through the external stations were classified by type and direction of travel. This information, also recorded by hour period, provided the basis for expansion of the sample external interview data to a full 24-hour representation.

SUPPLEMENTAL ACTIVITIES:

A Speed Study of major routes in the study area was conducted to determine average travel times over each route. A summary of these results has been published. Causes of delay as well as average speed were noted for each route.

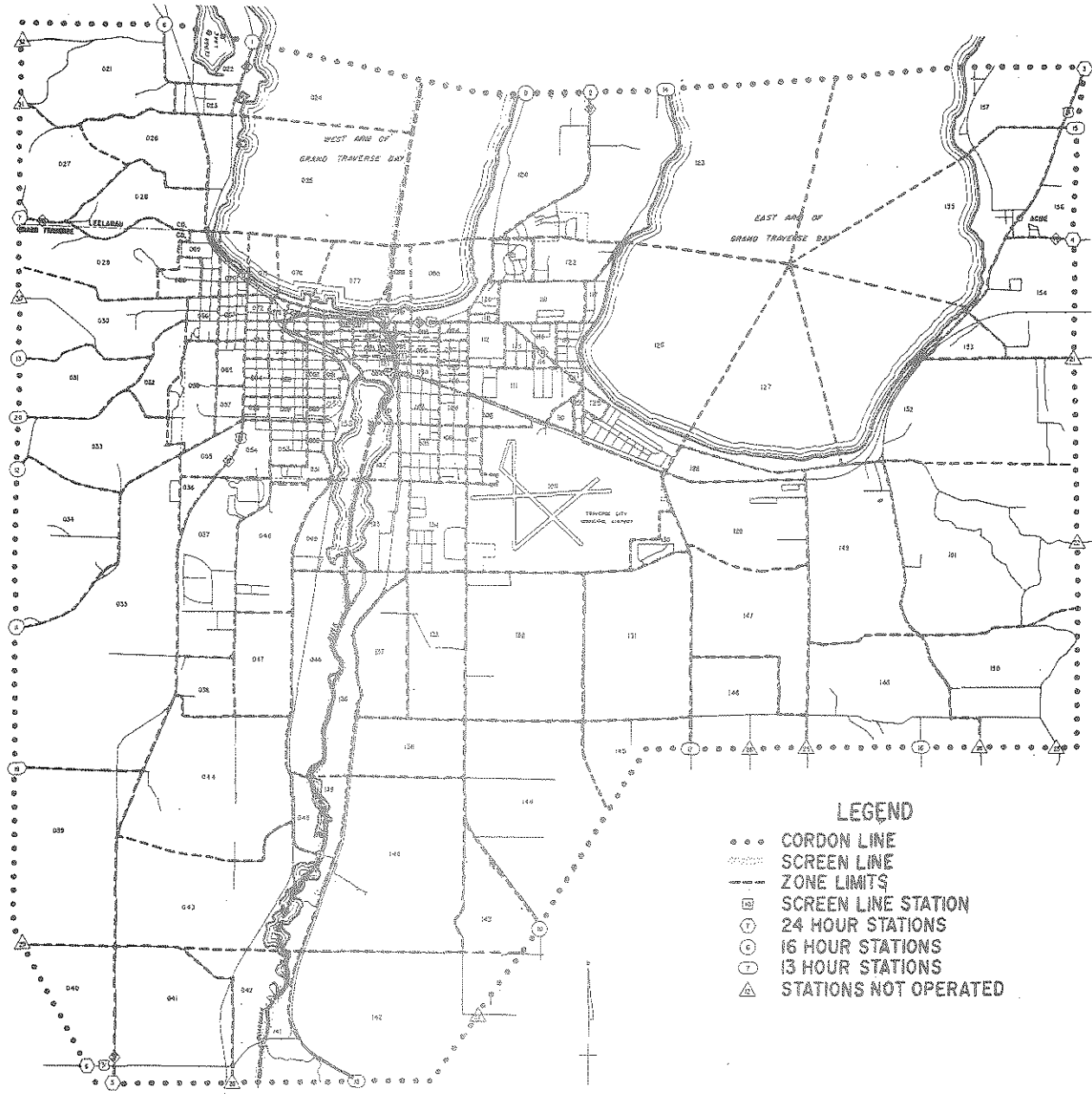
Other surveys and inventories were conducted also. These were designed to assist in future traffic assignment. Included were inventories of fire routes, truck routes, and land use.

DATA PREPARATION PROCEDURES

After the field work was completed, the data collected was processed by the Transportation Analysis Section. This involved keypunching all data on cards and loading it on a magnetic tape. The tape was used in conjunction with a computer program to detect errors as far as improper coding and keypunching was concerned. This editing procedure allowed those records which were in error to be discovered and corrected by checking them against the original interview.

After the editing procedure was completed the study area was subdivided into 159 analysis zones to check the accuracy of the data collected, to study present travel patterns, and to forecast future travel. In addition to census tract boundaries, criteria for the zones selected included existing land use, population distribution, physical barriers, and topographical barriers. Optimum homogeneity of criteria for zone selection was the basis for boundaries of the analysis zone.

TRAVERSE CITY AREA TRAFFIC STUDY



SCALE
 1" = 1/2 MILE
 MICHIGAN DEPARTMENT OF STATE HIGHWAYS

DATA ACCURACY CHECK PROCEDURES

The first series of accuracy checks concerned data recorded on the Interview Address summary from the internal interviews. These checks were a comparison of the expanded sample data from the survey with data obtained independently for the study area and its subdivisions. The results of the three accuracy checks follow:

<u>Accuracy Check</u>	<u>Accuracy Ratio</u>
Population	102.6%
Total Dwelling Units	93.1%
Automobile (city only)	97.1%

The second series of accuracy checks deal with travel patterns, i.e. trip making. This involved trip data collected at the cordon line, screenline, and home pertaining to trips made in, out, and through the area.

The internal-external cordon accuracy check is a comparison of the internal survey and the external survey in regards to cordon trips made by residents of the area.

Cordon trips by residents are recorded in the internal survey when households are interviewed. These trips are also recorded in the external survey when the resident passes through the cordon line station. Thus, this type of trip has been duplicated in the O-D study. Since the internal sampling rate was twenty percent and the percentage of vehicles interviewed compared to the number counted at all cordon stations was seventy percent the internal file for cordon trips made by residents of the area was eliminated. The comparison of the surveys for this type of trip follows.

	<u>Survey Internal</u>	<u>Survey External</u>	<u>% Comparison</u>
Passenger Car & Taxi	3,889	4,162	93.4%
Truck	790	1,722	45.9%
All Vehicles	4,679	5,884	79.5%

The next accuracy check was the screenline comparison. This comparison shows the number of trips from the internal and external surveys that were reported to have crossed the screenline and those that were counted crossing the screenline. The results of this comparison are in the following table. Also a graphical representation of these comparisons by hour period can be found on pages 23 through 25.

	<u>Ground Count</u>	<u>Reported Trips</u>	<u>% Comparison</u>
Passenger Cars	41,996	28,264	67.30%
Taxis	156	145	92.95%
Single Unit Trucks	5,817	2,599	44.68%
Combination Trucks	385	222	57.66%
All Vehicles	48,354	31,230	64.59%

DATA ADJUSTMENT PROCEDURES

Since trip data is collected on a sampling basis it is necessary that it be expanded to the universe. After expansion certain discrepancies may exist. These are detected by various means primarily through analysis of accuracy checks. Specific reasons for these discrepancies may then be detected and the data involved adjusted by using bonafide procedures.

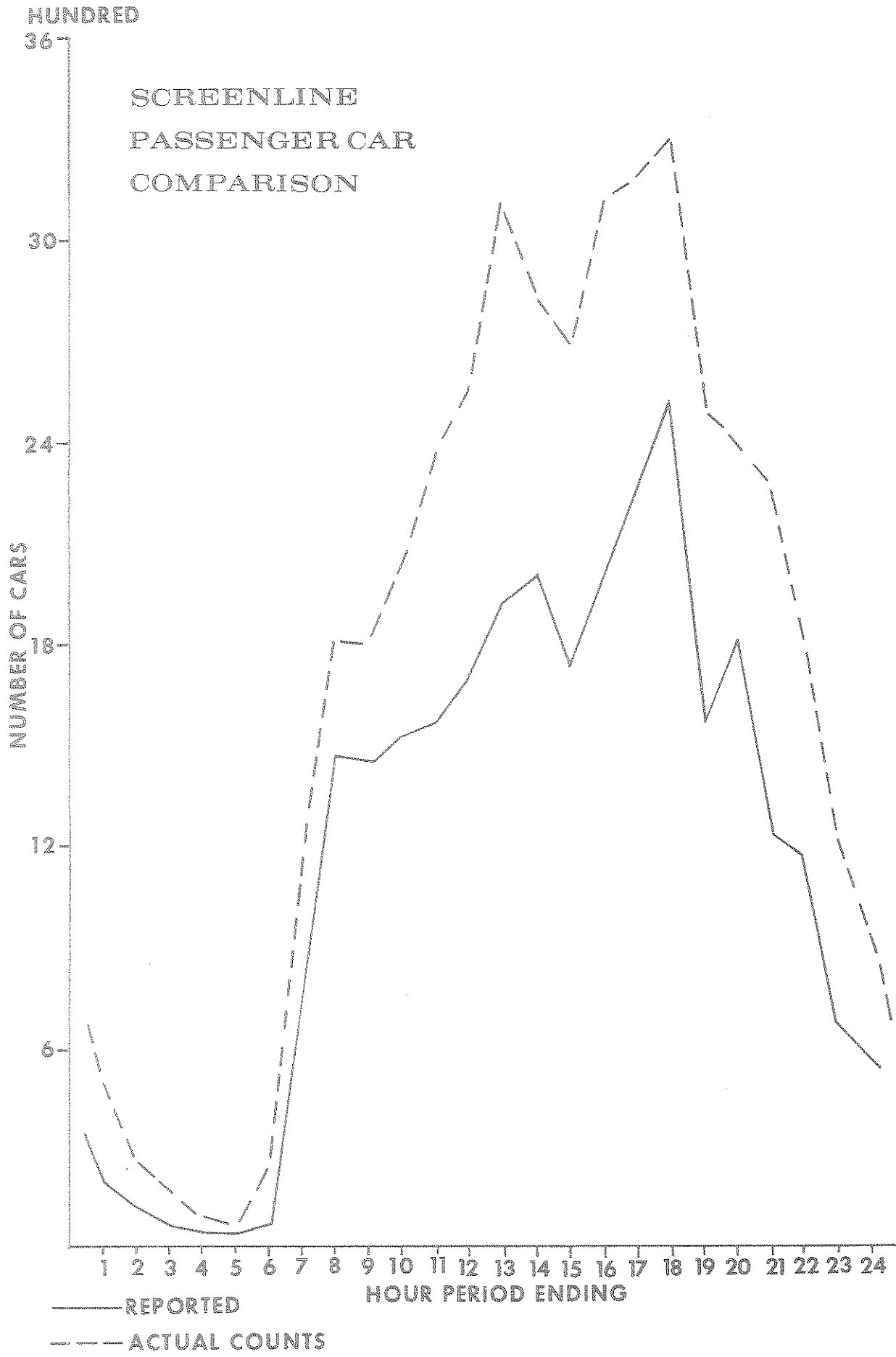
This was the case with internal trips that were reported in the internal survey. These were recognized to be under-reported and in some cases nonreported. The under-reporting and nonreporting of internal trips made by vehicles interviewed at the cordon line was also apparent.

Adjustment of these trip data was performed by factoring the reported trips by trip purpose by hour period (certain trip purposes are remembered by the interviewee to a higher degree than others). The factoring of these data was for the most part

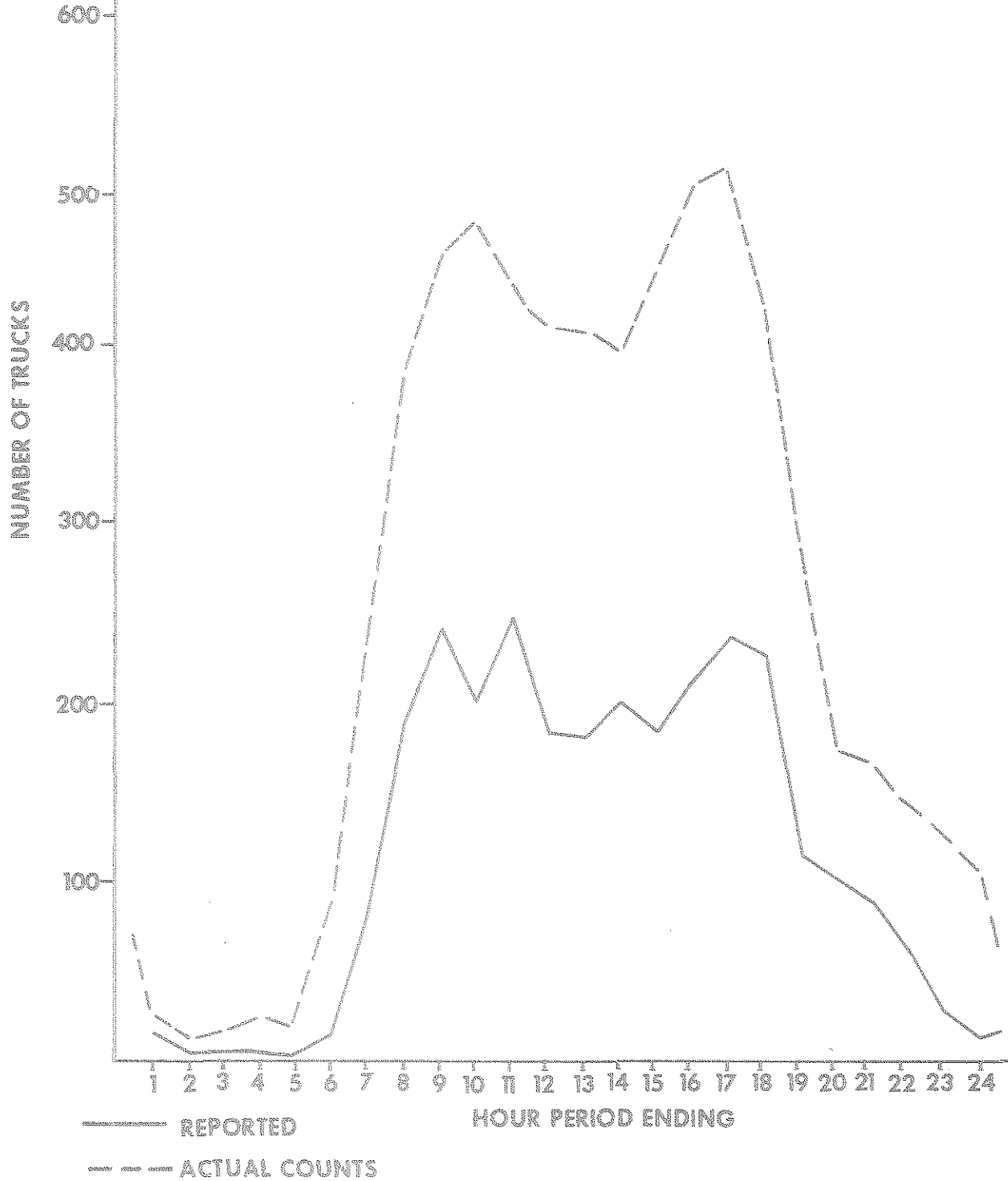
dependent on the classified counts (ground counts). Adjustment of truck and taxi trips were factored to agree with their respective ground count totals without regard for trip purpose or hour period.

The following graphs show the screenline comparisons before adjustment. These are followed by the unadjusted and adjusted comparisons for passenger cars by the auto-driver's trip purpose.

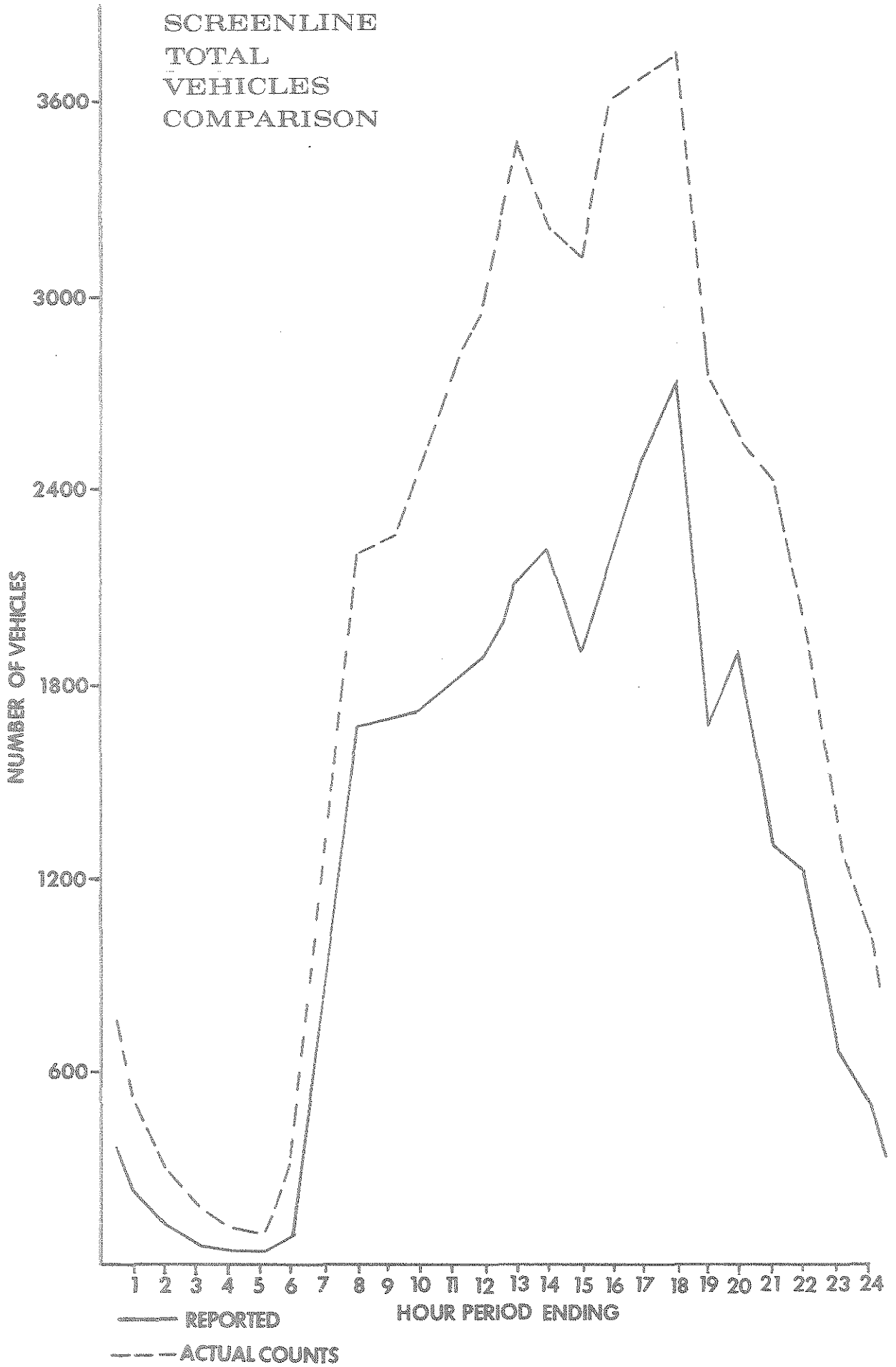
A thorough discussion of adjustment procedures for the data concerned may be found in a previously published technical report entitled "Accuracy Checks".



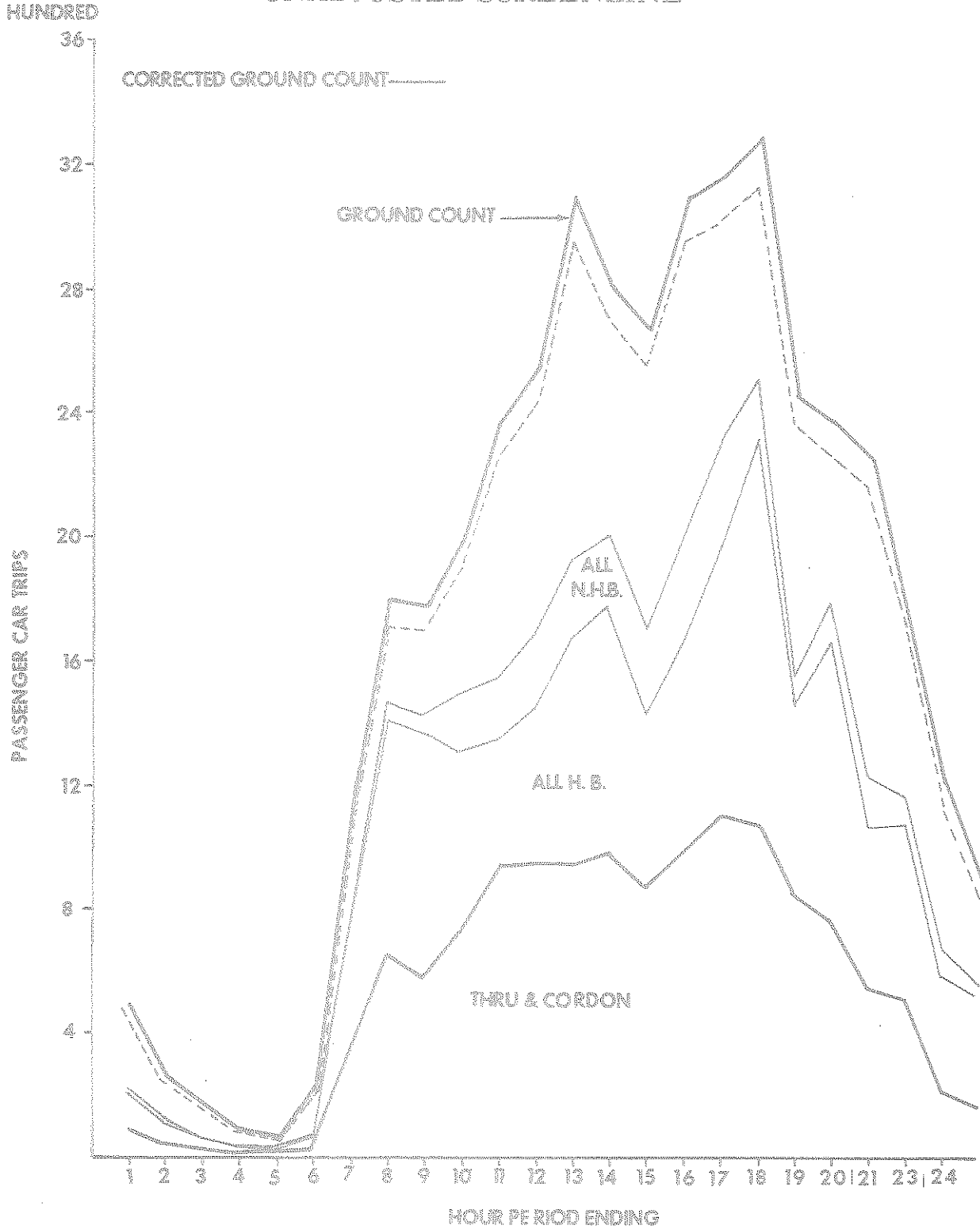
SCREENLINE
TRUCK
COMPARISON



SCREENLINE
TOTAL
VEHICLES
COMPARISON

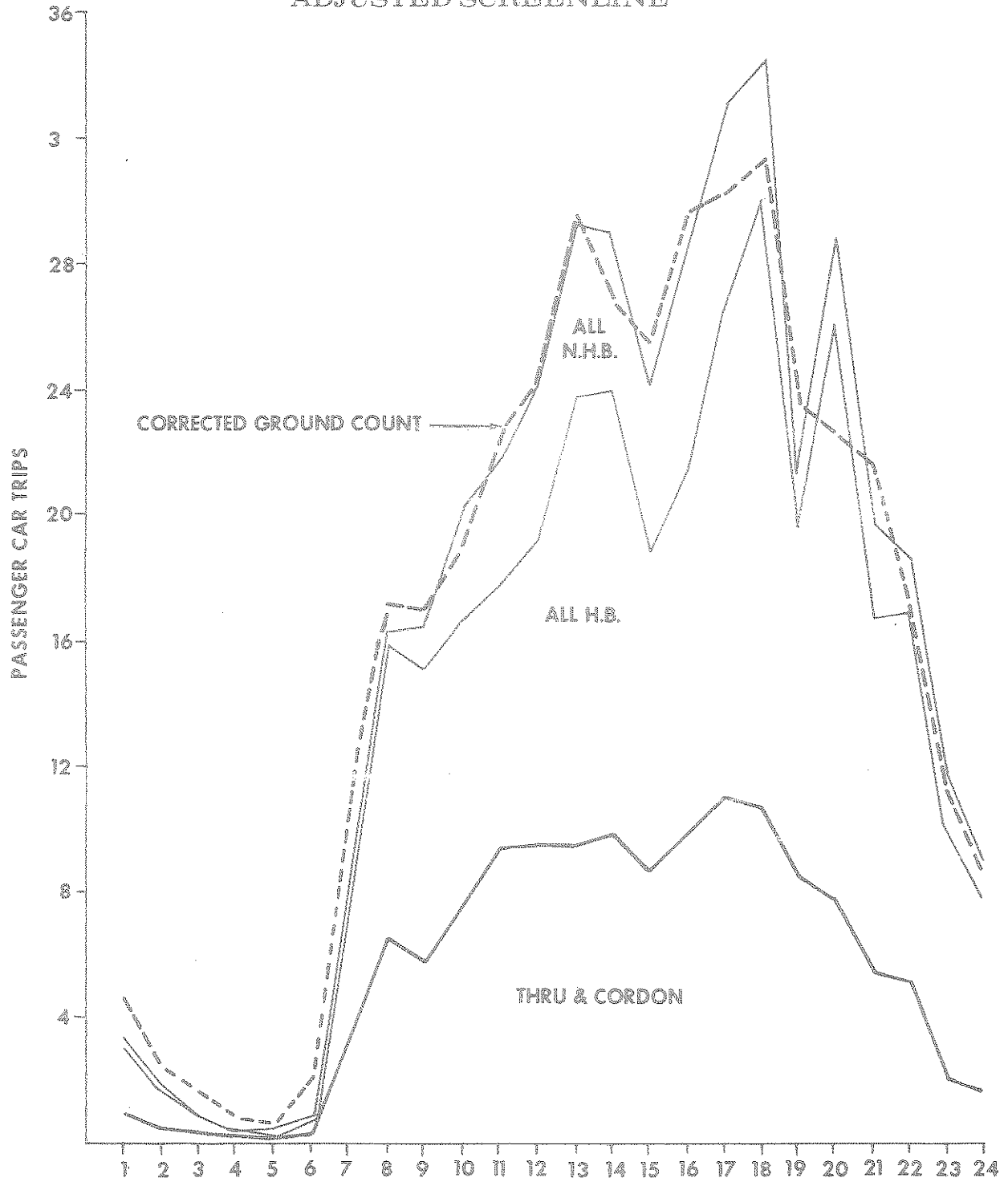


UNADJUSTED SCREENLINE



HUNDRED

ADJUSTED SCREENLINE



PART II

1966 O-D STUDY RESULTS

TRIP DATA

SOCIO-ECONOMIC DATA

TRIP MOVEMENTS ALL VEHICLES

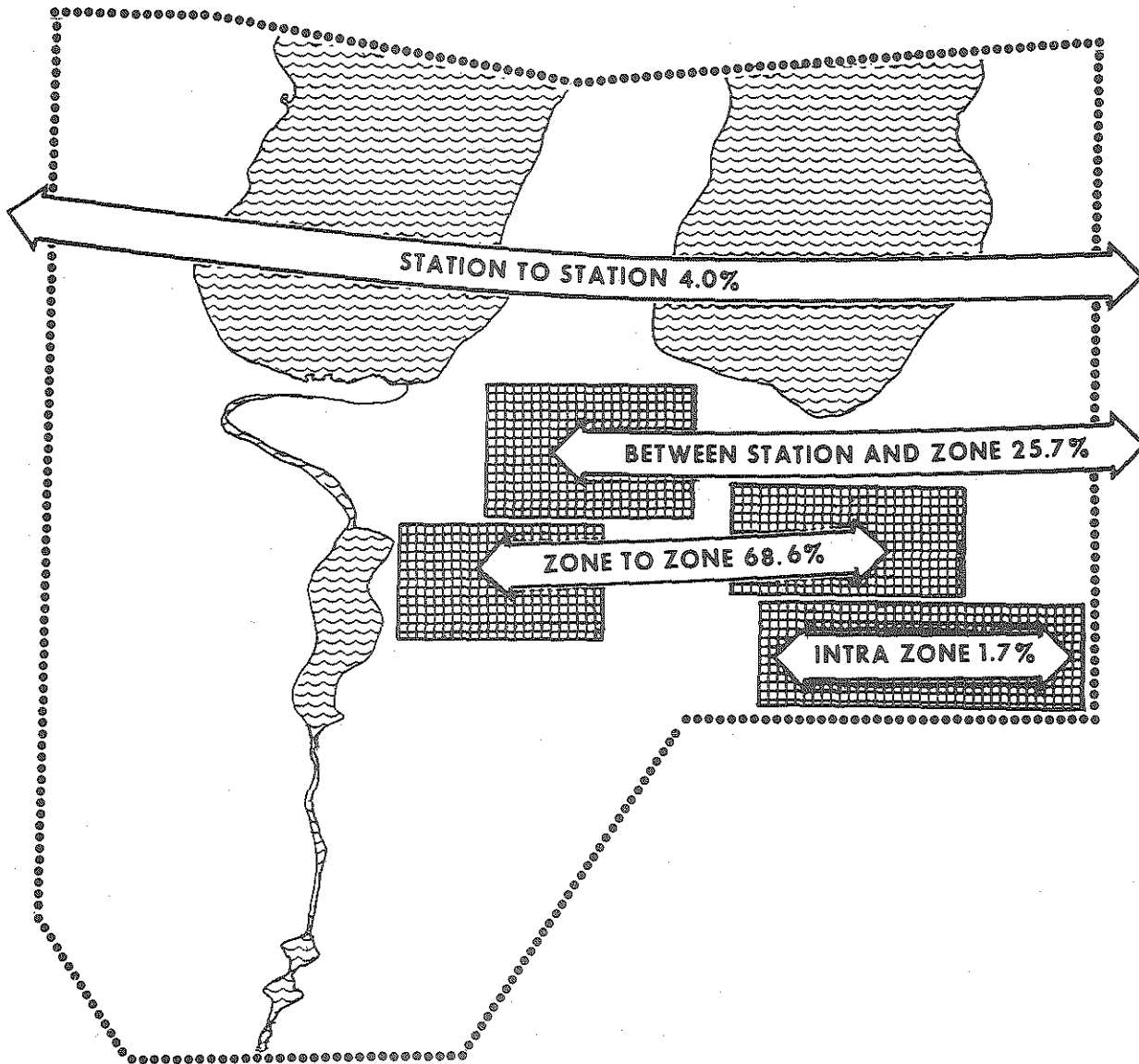


TABLE A-1

COMPARISON OF ACTUAL PASSENGER CAR
COUNTS WITH HOURLY TRAFFIC VOLUMES
OBTAINED FROM O-D DATA

Passenger car volumes recorded in the internal and external surveys as crossing the screenline are compared with manual counts classified by passenger car taken at the screenline. Volumes from the internal survey are arranged by trip purpose while external volumes are listed by cordon and thru trips. Table A-1 displays expanded external volumes with expanded and adjusted internal volumes.

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TABLE A-1

HOUR PERIOD	EXPANDED TRIP DATA											TOTAL TRIPS	MANUAL COUNT	PER- CENT		
	ADJUSTED INTERNAL							EXTERNAL								
	TRIP PURPOSE "TO"							CORDON	THRU							
	WORK	BUSI- NESS	SHOP- PING	SCHOOL	SOCIAL	MODE CHANGE	EAT MEAL			MED- ICAL	SERVE PASS.					
AM 12-1	54		14		162		12				72	14	328	490	66.9	
1-2	28				77				37		38	3	183	262	69.8	
2-3	5				41				8		29	4	87	166	52.4	
3-4	31										15	3	49	90	54.4	
4-5									20		13	6	39	64	60.9	
5-6	22		13		14						23	12	84	220	38.2	
6-7	340	11	27		14				86		324	30	832	1111	74.9	
7-8	567	43	40		38				223		582	67	1571	1797	87.4	
8-9	653	95	51	11	105				255		474	106	1761	1782	98.8	
9-10	285	177	282	12	231				219		557	182	1987	1986	100.1	
10-11	97	256	539		163				78		687	249	2119	2356	89.9	
11-12	134	270	570	5	152				180		689	260	2405	2538	94.8	
PM 12-1	247	95	373	5	269				816		688	255	2970	3077	96.5	
1-2	382	226	403	6	388				371		720	260	2956	2814	95.2	
2-3	262	217	493		337				11		635	235	2359	2674	88.2	
3-4	333	186	579		391				28		778	220	2813	3093	90.9	
4-5	312	210	743		500				40		891	206	3258	3161	103.1	
5-6	623	245	655		358				50		855	218	3386	3270	103.5	
6-7	229	61	313		472				66		697	151	2130	2474	86.1	
7-8	151	132	407	11	1096				79		627	134	2869	2382	120.4	
8-9	44	102	303		808				25		462	81	1971	2263	87.1	
9-10	83	51	176		873						435	78	1853	1823	101.6	
10-11	79	71	14		653				12		173	28	1167	1208	96.6	
11-12	130	10			414				28		139	18	858	895	95.9	
TOTAL	5091	2458	5995	50	7556				1747	356	3359	10603	2820	40035	41996	95.3
TOTAL 6AM-10PM	4742	2377	5954	50	6195				1695	356	3038	10101	2732	37240	38601	96.5

TABLE A-2

COMPARISON OF ACTUAL TRUCK AND TAXI
 COUNTS WITH HOURLY TRAFFIC VOLUMES
 OBTAINED FROM O-D DATA

Truck and taxi volumes recorded in the internal and external surveys as having crossed the screenline are compared with manual counts classified by truck and taxi taken at the screenline. Volumes from the internal survey are listed by total trips while the external survey volumes are arranged by cordon and thru trips. Table A-2, like Table A-1, displays expanded external volumes with expanded and adjusted internal volumes.

TABLE A-2

	INTERNAL	EXTERNAL	TOTAL	COUNT	PERCENT
	Cordon Thru				
Truck	4165	1716 318	6199	6202	100.0
Taxi	157		157	156	100.6
24 Hour Total	4322	1716 318	6356	6358	100.0

SCREENLINE TRIP DATA

The screenline for Traverse City is shown on the area base map on page 2. It follows the Boardman River, through Boardman Lake into the west arm of Grand Traverse Bay. There were ten screenline stations operated during the O-D study.

The following charts and graphs show the tabulated results of the data collected at the screenline. Each screenline station was classified twice and averaged. The totals vary by a few vehicles from table to table due to averaging and rounding.

SCREENLINE STATIONS

<u>STATION NUMBER</u>	<u>ROUTE</u>	<u>LOCATION</u>
1	Front St.	.25 miles west of Hope St.
2	State St.	.25 miles east of Railroad St.
3	Washington St.	.25 miles east of Railroad St.
4	Alley "A"	.25 miles east of Railroad St.
5	Webster St.	.25 miles east of Railroad St.
6	Alley "B"	.25 miles east of Railroad St.
7	East Eighth St.	.25 miles east of Railroad St.
*8	South Airport Rd.	.5 miles west of Barlow Rd.
*9	Cass Rd.	.1 miles west of Keystone Rd.
*10	Keystone Rd.	.4 miles southwest of junction of Keystone and River Rds.

*These locations are on bridges over the Boardman River.

MANUALLY CLASSIFIED TWENTY-FOUR HOUR TRAFFIC VOLUMES

BY SCREENLINE STATION, BY VEHICLE TYPE

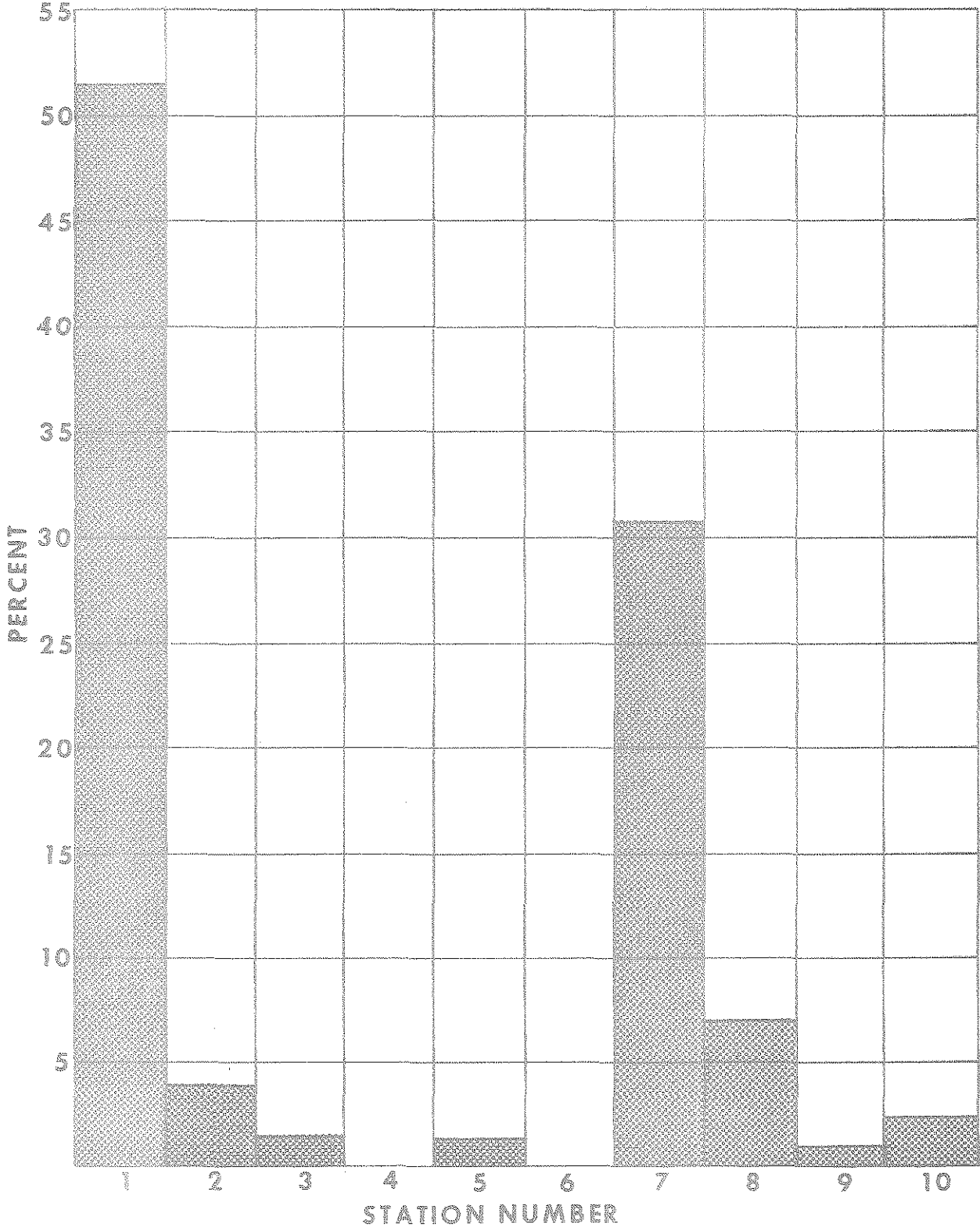
Screenline Station	Passenger Cars	%	Trucks	%	Taxis	%	Total Vehicles	Percent of Total
1	22333	89.4	2593	10.4	50	.2	24976	51.65
2	1697	87.8	223	11.5	13	.7	1933	4.00
3	678	90.3	64	8.5	9	1.2	751	1.55
4	48	88.9	6	11.1	0	.0	54	.11
5	499	77.1	136	21.0	12	1.9	647	1.34
6	65	84.4	12	15.6	0	.0	77	.16
7	12789	86.0	2012	13.5	68	.5	14869	30.75
8	2469	73.8	871	26.0	4	.2	3344	6.92
9	438	83.3	88	16.7	0	.0	526	1.09
10	980	83.3	197	16.7	0	.0	1177	2.43
TOTAL	41996	86.9	6202	12.8	156	.3	48354	100.00

MANUALLY CLASSIFIED TWENTY-FOUR HOUR TRAFFIC

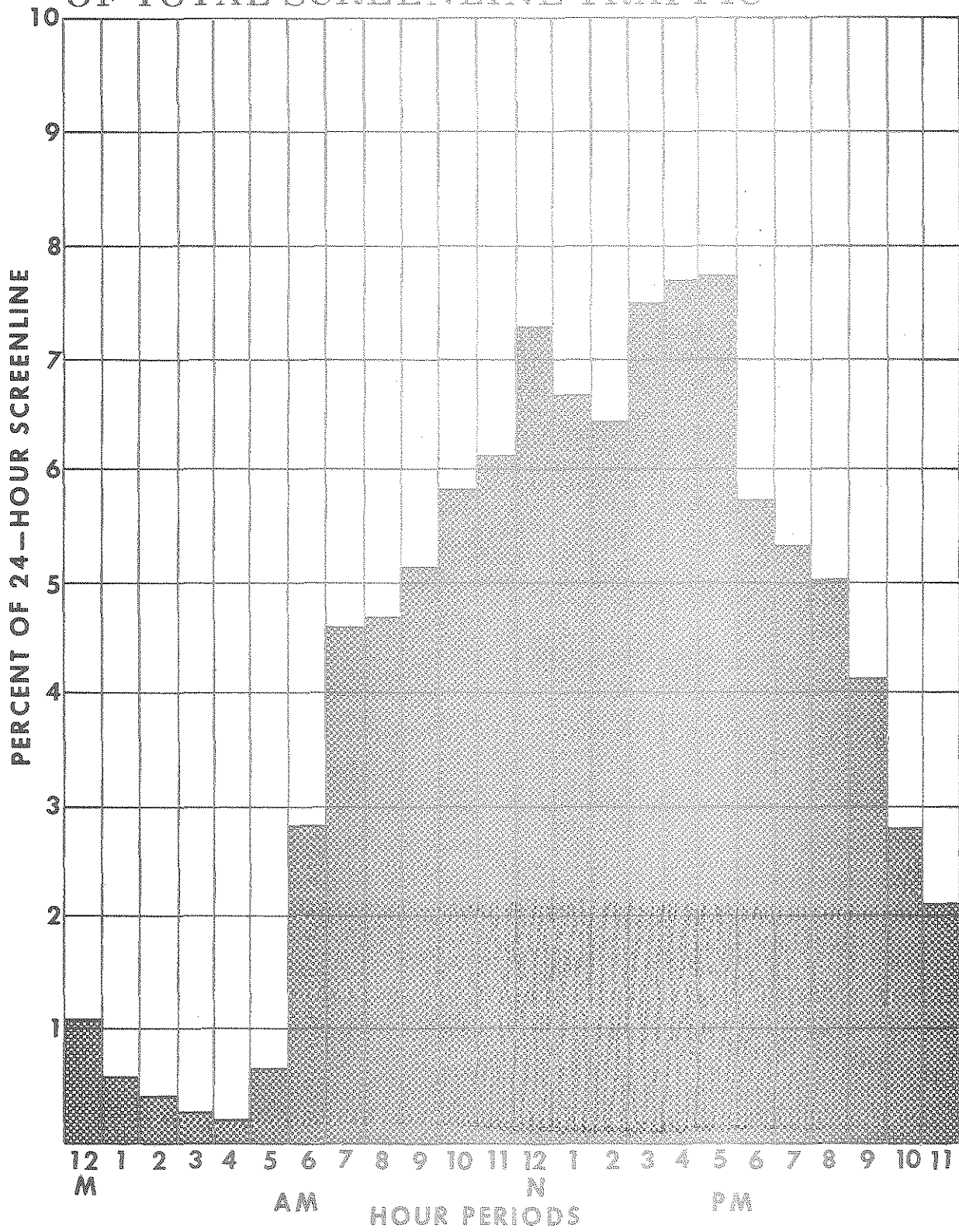
VOLUMES BY VEHICLE TYPE, BY HOUR PERIOD AT ALL SCREENLINE STATIONS

	PASSENGER CARS	%	TRUCKS	%	TAXIS	%	TOTAL VEHICLES	PERCENT OF TOTAL
AM 12-1	490	94.0	28	5.4	3	.6	521	1.08
1-2	262	94.2	13	4.7	3	1.1	278	.57
2-3	166	89.7	16	8.6	3	1.7	185	.38
3-4	90	76.9	24	20.5	3	2.6	117	.24
4-5	64	74.4	19	22.1	3	3.5	86	.18
5-6	220	70.7	87	28.0	4	1.3	311	.64
6-7	1111	83.7	211	15.9	6	.4	1328	2.75
7-8	1797	82.0	385	17.6	9	.4	2191	4.53
8-9	1782	79.6	446	19.9	10	.5	2238	4.63
9-10	1986	80.6	467	18.9	12	.5	2465	5.10
10-11	2356	84.3	430	15.4	10	.3	2796	5.78
11-12	2538	85.9	410	13.9	8	.2	2956	6.11
PM 12-1	3077	88.1	405	11.6	9	.3	3491	7.22
1-2	2814	87.5	394	12.2	9	.3	3217	6.76
2-3	2674	85.7	439	14.1	9	.3	3122	6.46
3-4	3093	85.8	503	13.9	10	.3	3606	7.46
4-5	3161	85.8	516	14.0	7	.2	3684	7.62
5-6	3270	88.5	420	11.4	6	.2	3696	7.64
6-7	2474	89.7	275	10.0	8	.3	2757	5.70
7-8	2382	93.0	172	6.7	6	.2	2560	5.29
8-9	2263	93.0	165	6.8	6	.2	2434	5.03
9-10	1823	92.6	142	7.2	4	.2	1969	4.07
10-11	1208	90.1	128	9.6	4	.3	1340	2.77
11-12	895	89.0	107	10.6	4	.4	1006	2.08
TOTAL	41996	86.9	6202	12.8	156	.3	48354	100.00

PERCENT OF TOTAL TRAFFIC
AT EACH SCREENLINE STATION



HOURLY PERCENTAGES OF TOTAL SCREENLINE TRAFFIC



CORDON LINE TRIP DATA

There were twenty cordon line stations of which nineteen were operational. Station number four was not operated. It was closed to traffic because of construction.

The following charts and graphs show data in tabular form that were collected at the cordon line. Some of the results may vary slightly because of truncating or rounding.

CORDON LINE STATIONS

<u>STATION NUMBER</u>	<u>ROUTE</u>	<u>LOCATION</u>
1	M-22 North	.9 miles north of Cherry Bend Rd.
2	M-37 North	.2 miles south of McKinley Rd.
3	US-31 North	.5 miles north of Brackett Rd.
*4	M-72 East	.4 miles west of Lautner Rd.
5	M-37 South	.1 miles south of south junction US-31 and M-37
6	US-31 West	.1 miles west of south junction US-31 and M-37
7	M-72 West	.6 miles west of junction M-22 and M-72
8	Cherry Bend Rd.	.2 miles north of Lincoln Rd.
9	Peninsula Dr.	.1 miles south of McKinley Rd.
10	Garfield Rd.	.3 miles northwest of Potter Rd.
11	Silver Lake Rd.	.2 miles northeast of Zimmerman Rd.
12	Long Lake Rd.	.1 miles east of Zimmerman Rd.
13	Cedar Run Rd.	.1 miles east of Harris Rd.
14	East Shore Rd.	.1 miles south of McKinley Rd.
+15	Brackett Rd.	.3 miles east of US-31
16	High Lake Rd.	.3 miles south of Hammon Rd.
17	Three Mile Rd.	.3 miles south of Hammon Rd.
18	River Rd.	.8 miles southeast of Keystone Rd.
19	Silverpines Rd.	.2 miles east of Silver Lake Rd.
20	Harris Rd.	.2 miles west of Long Lake Rd.

*Station was not operated. M-72 east was under construction.

+Temporary M-72 east.

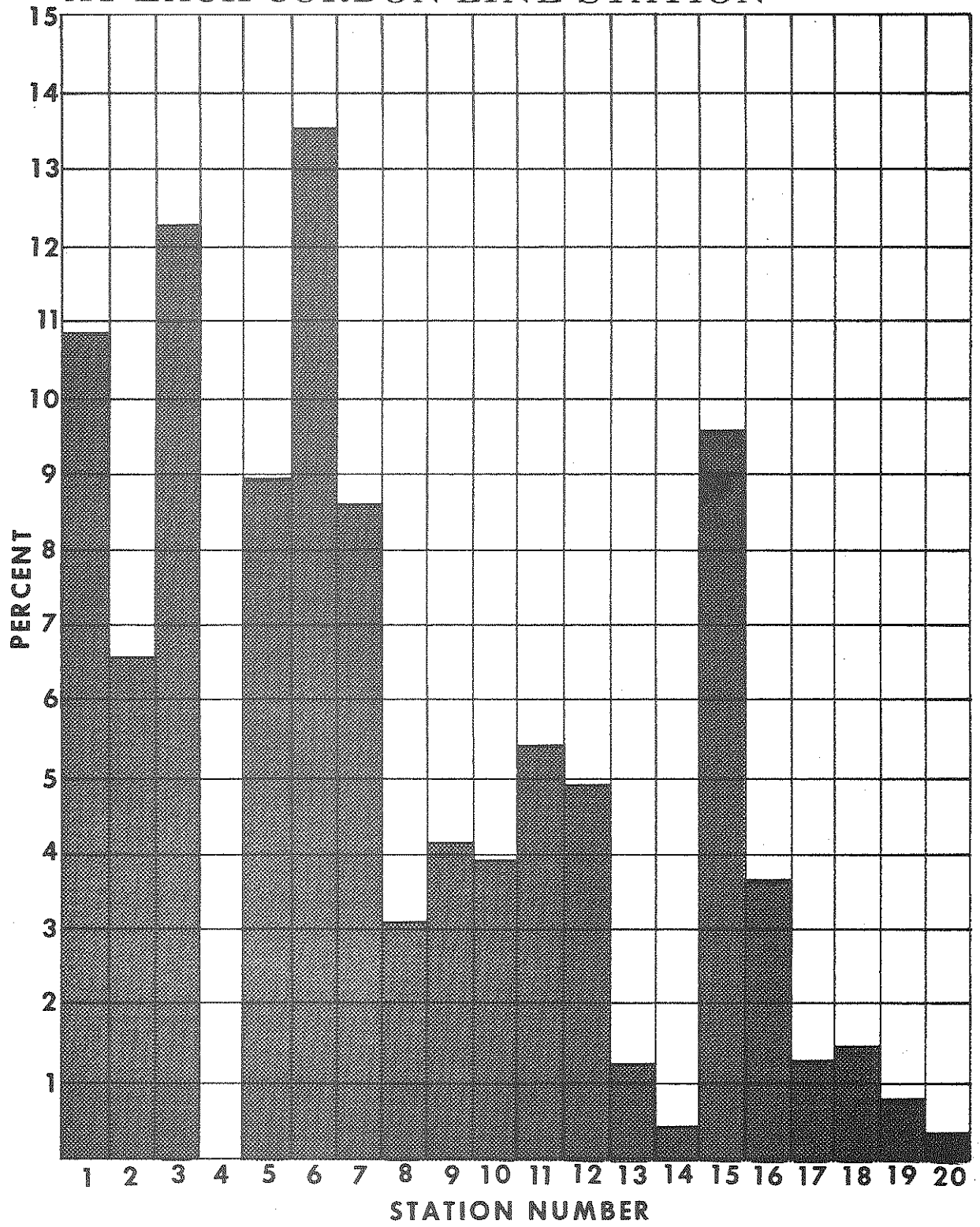
MANUALLY CLASSIFIED, TWENTY-FOUR HOUR TRAFFIC VOLUMES
BY CORDON LINE STATION, BY VEHICLE TYPE

STATION	PASSENGER CARS & TAXIS		SINGLE UNIT TRUCKS		TRAILER COMBI- NATIONS		TOTAL VEHICLES	PERCENT OF TOTAL
		%		%		%		
1	3667	87.0	494	11.7	54	1.3	4215	10.84
2	2146	84.6	370	14.6	22	.9	2538	6.53
3	4203	88.6	471	9.9	69	1.5	4743	12.20
4								
5	2906	83.3	423	12.1	159	4.6	3488	8.97
6	4593	87.6	559	10.7	93	1.8	5245	13.49
7	2954	88.6	341	10.2	38	1.1	3333	8.57
8	984	84.0	188	16.0	0	.0	1172	3.01
9	1413	88.7	178	11.2	2	.1	1593	4.10
10	1319	86.3	189	12.4	21	1.4	1529	3.93
11	1822	91.1	177	8.9	1	.1	2000	5.14
12	1662	87.3	236	12.4	5	.3	1903	4.89
13	363	81.6	82	18.4	0	.0	445	1.14
14	103	76.9	31	23.1	0	.0	134	.34
15	3244	87.3	445	12.0	27	.7	3716	9.55
16	1221	86.5	172	12.2	18	1.3	1411	3.63
17	398	83.4	78	16.4	1	.2	477	1.23
18	461	85.8	76	14.2	0	.0	537	1.38
19	237	81.4	53	18.2	1	.3	291	.75
20	86	70.5	35	28.7	1	.8	122	.31
TOTAL	33782	86.9	4598	11.8	512	1.3	38892	100.00

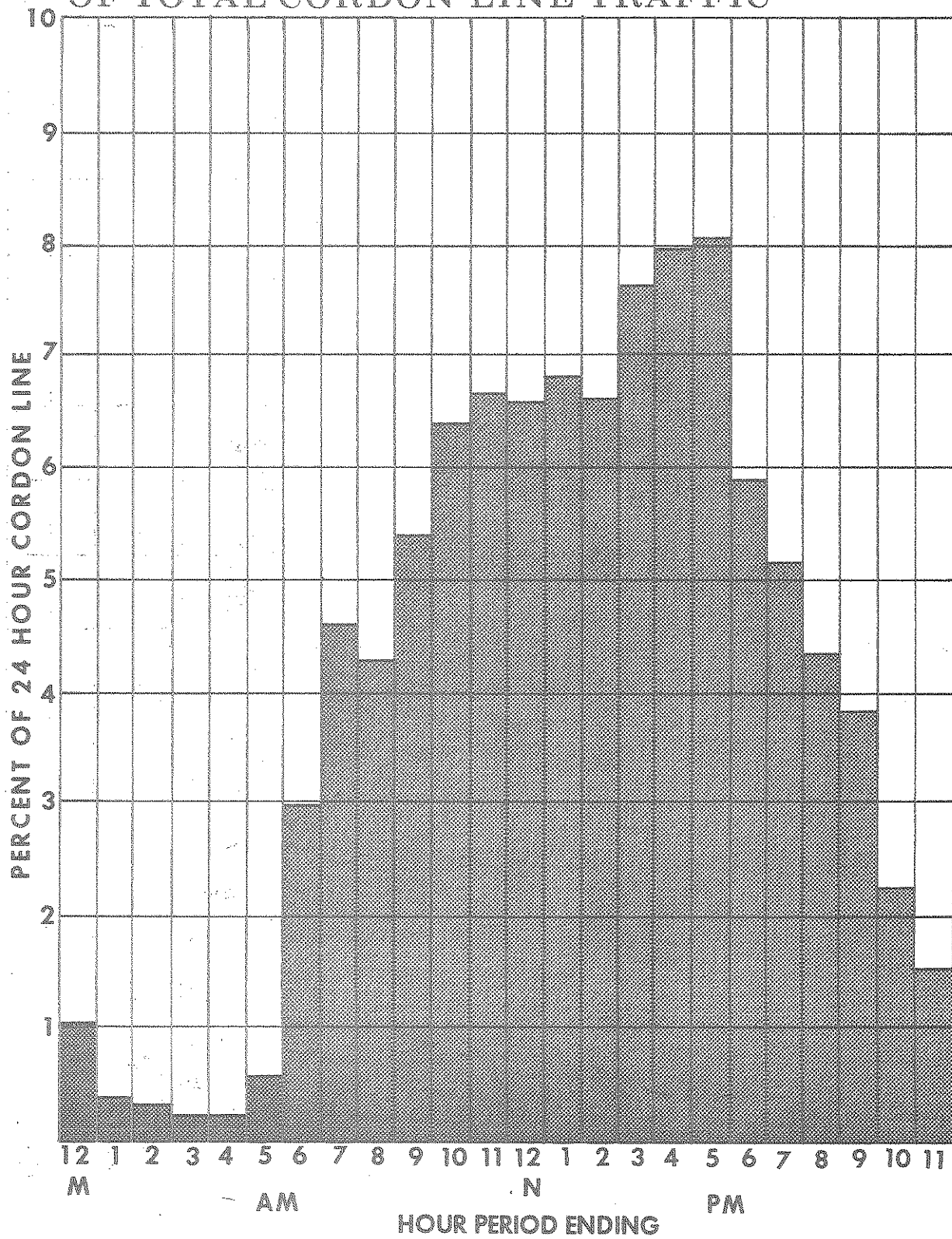
MANUALLY CLASSIFIED, TWENTY-FOUR HOUR TRAFFIC VOLUMES
BY VEHICLE TYPE, BY HOUR PERIOD AT ALL CORDON LINE STATIONS

		PASSENGER CARS & TAXIS		SINGLE UNIT TRUCKS		TRAILER COMBI- NATIONS		TOTAL VEHICLES	PERCENT OF TOTAL
			%		%		%		
AM	12-1	370	88.9	33	7.9	13	3.1	416	1.07
	1-2	144	90.0	11	6.9	5	3.1	160	.41
	2-3	109	85.8	9	7.1	9	7.1	127	.33
	3-4	68	73.9	13	14.1	11	12.0	92	.24
	4-5	74	75.5	15	15.3	9	9.2	98	.25
	5-6	172	75.8	44	19.4	11	4.8	227	.58
	6-7	938	81.1	200	17.3	18	1.6	1156	2.97
	7-8	1449	81.0	312	17.4	28	1.6	1789	4.60
	8-9	1367	81.2	282	16.8	34	2.0	1683	4.33
	9-10	1758	84.0	299	14.3	35	1.7	2092	5.38
	10-11	2139	86.0	307	12.3	40	1.6	2486	6.39
	11-12	2289	88.5	258	10.0	39	1.5	2586	6.65
PM	12-1	2277	88.1	275	10.6	32	1.2	2584	6.64
	1-2	2364	89.4	255	9.6	26	1.0	2645	6.80
	2-3	2229	86.7	317	12.3	26	1.0	2572	6.61
	3-4	2592	87.7	338	11.4	26	.9	2956	7.60
	4-5	2668	86.1	411	13.3	19	.6	3098	7.97
	5-6	2748	87.7	367	11.7	20	.6	3135	8.06
	6-7	2008	87.6	259	11.3	24	1.0	2291	5.89
	7-8	1792	88.9	207	10.3	17	.8	2016	5.18
	8-9	1500	88.3	179	10.5	20	1.2	1699	4.37
	9-10	1365	90.9	100	6.7	36	2.4	1501	3.86
	10-11	820	92.4	62	7.0	5	.6	887	2.28
	11-12	542	90.9	45	7.6	9	1.5	596	1.53
TOTAL		33782	86.9	4598	11.8	512	1.3	38892	100.00

PERCENTAGE OF TOTAL TRAFFIC AT EACH CORDON LINE STATION

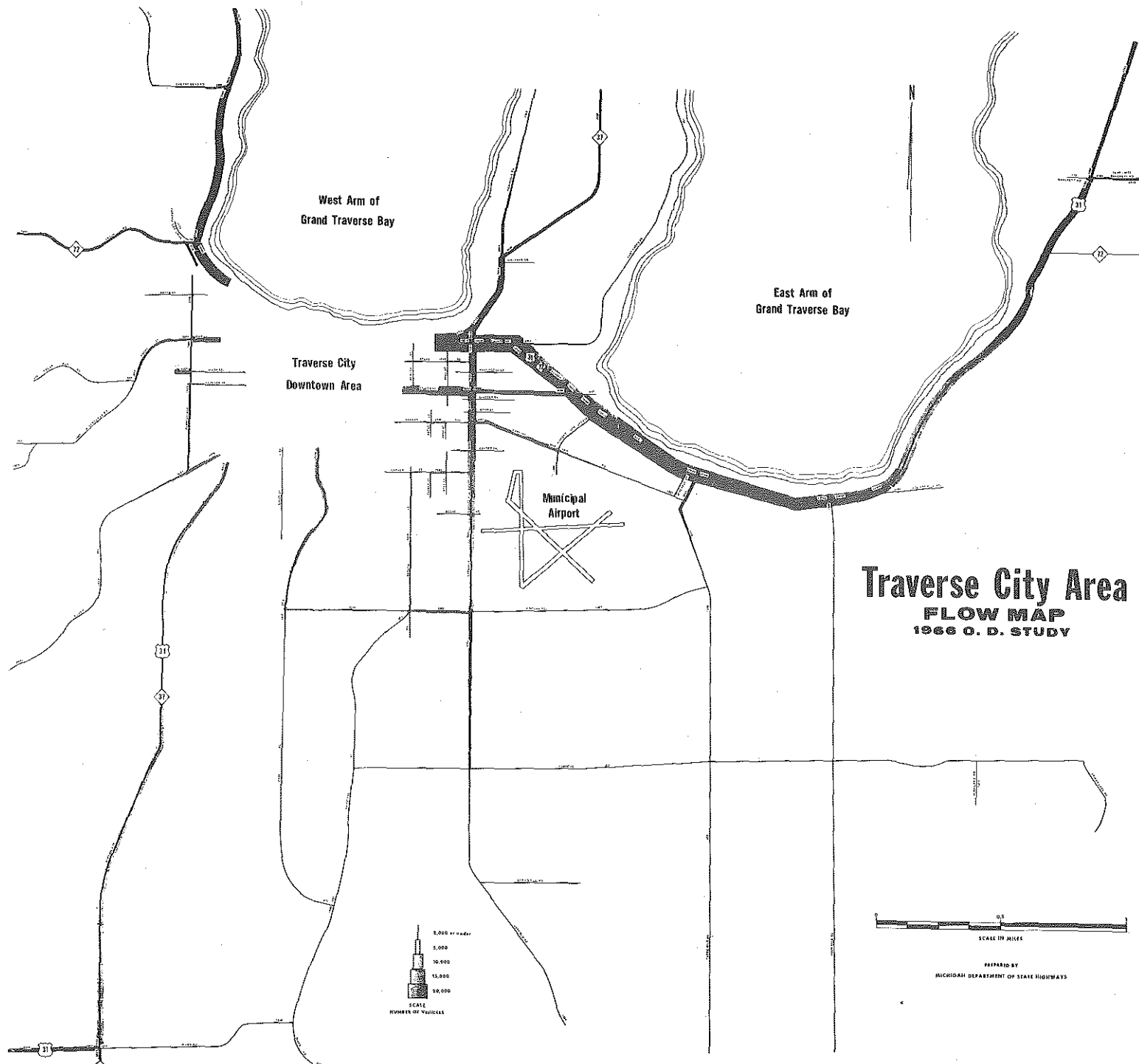


HOURLY PERCENTAGES OF TOTAL CORDON LINE TRAFFIC

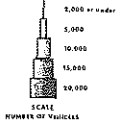


TRAFFIC FLOW MAPS

In addition to ground counts collected at the screen-line and cordon line, turning movements and machine counts were taken throughout the area on state trunklines, county primary routes, and major city streets. The following maps show the results of these by means of weighted bands.



Traverse City Area
FLOW MAP
 1966 O. D. STUDY

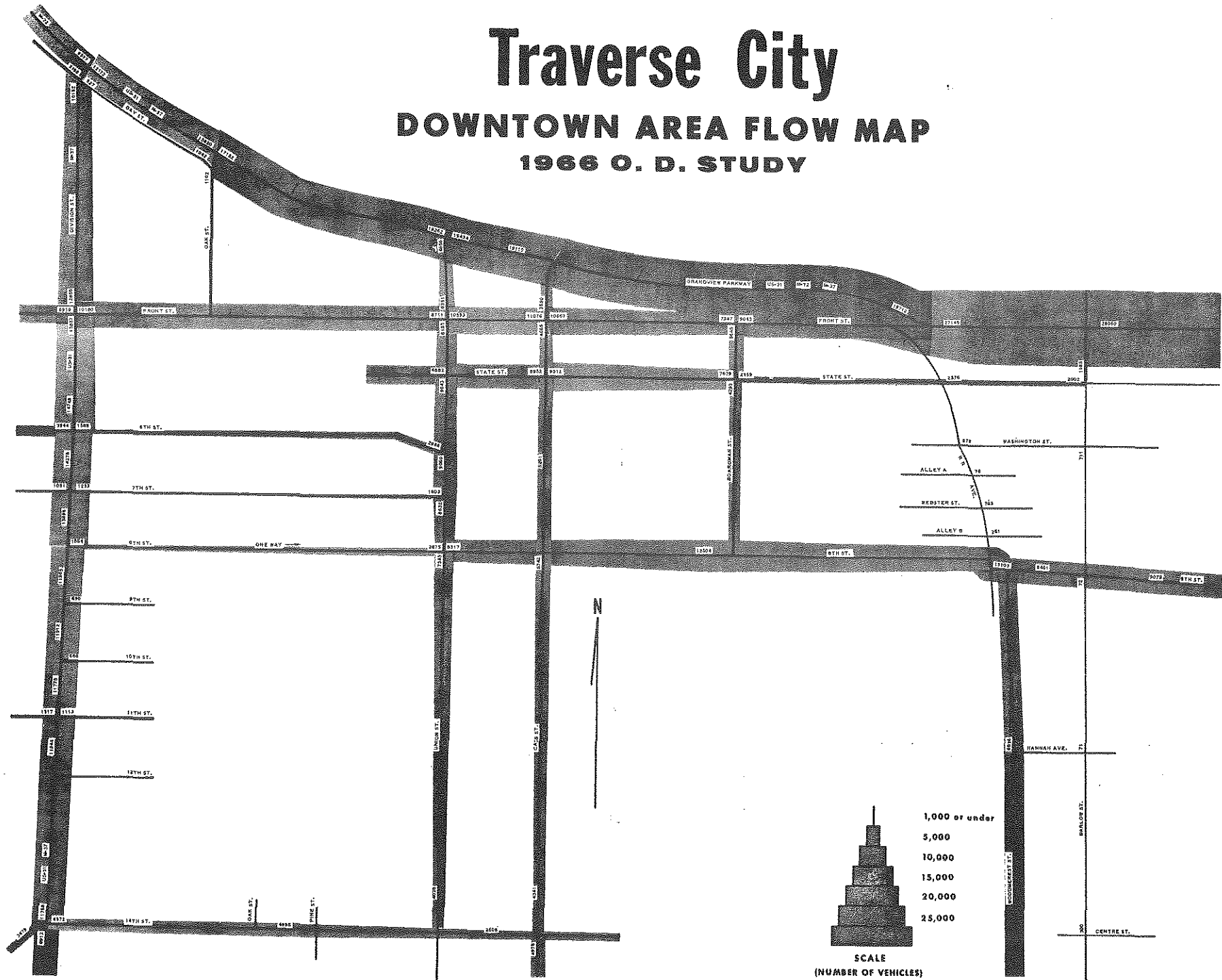


PREPARED BY
 MICHIGAN DEPARTMENT OF STATE HIGHWAYS

Traverse City

DOWNTOWN AREA FLOW MAP

1966 O. D. STUDY



TRAVEL DESIRE DIAGRAMS

A travel desire diagram is a graphic presentation of travel data. These diagrams by means of weighted lines show total trip ends between external stations and study area zones that are major trip generators. Travel desire diagrams show trip interchanges only and are not assigned to the street system as such.

EXTERNAL STATION DESIRE LINES

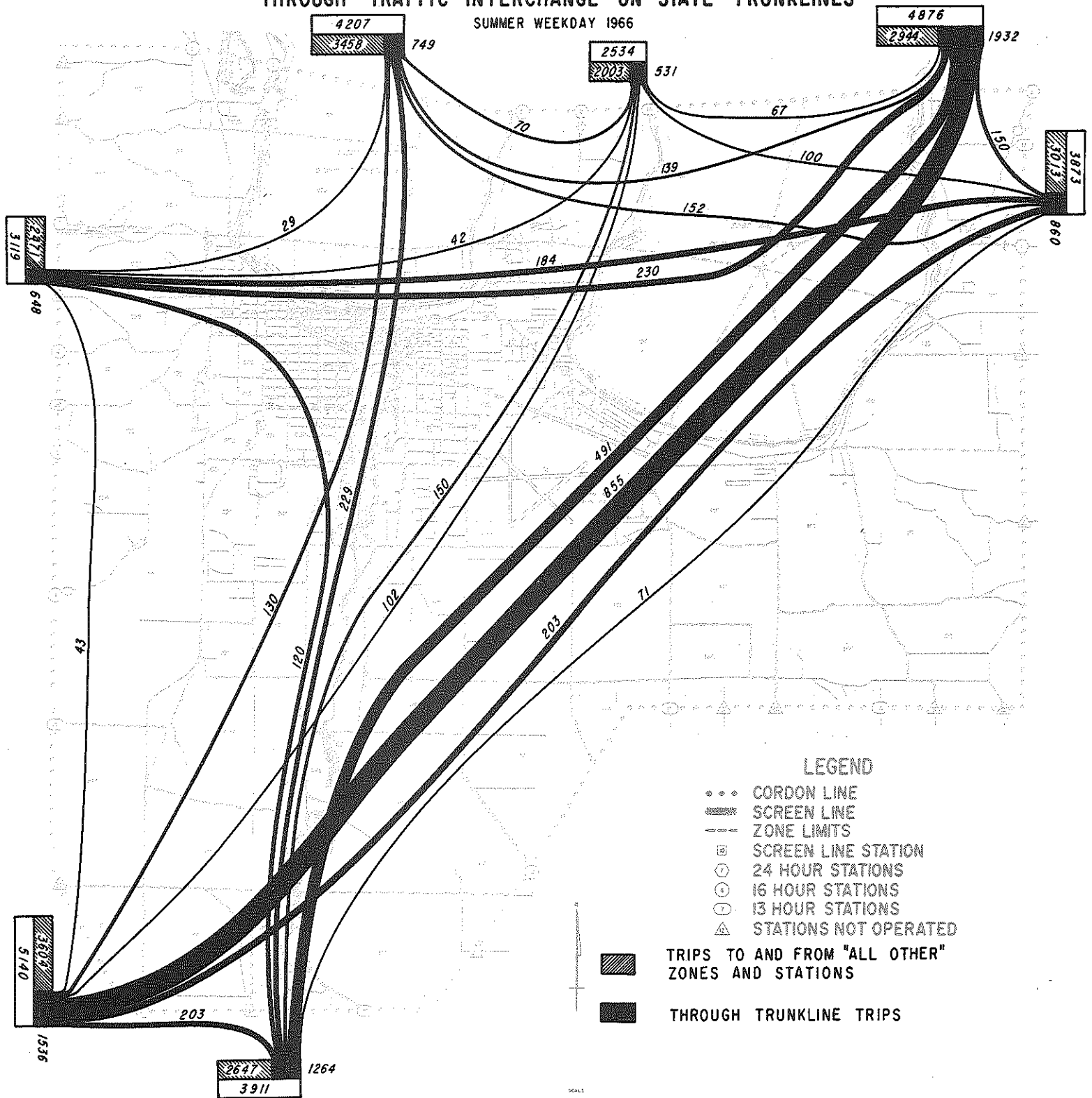
The diagram immediately following shows distribution of through traffic between external trunkline stations. It also indicates the total traffic at each external station (through trips and terminal trips).

The remaining two diagrams depict travel between the external trunkline stations and primary zones of attraction (terminal trips). Analysis of results of data collected in previous origin and destination studies has conclusively revealed that approximately fifty percent of the terminal traffic passing through each external station comes from those zones considered as major traffic generators.

TRAVERSE CITY AREA TRAFFIC STUDY

THROUGH TRAFFIC INTERCHANGE ON STATE TRUNKLINES

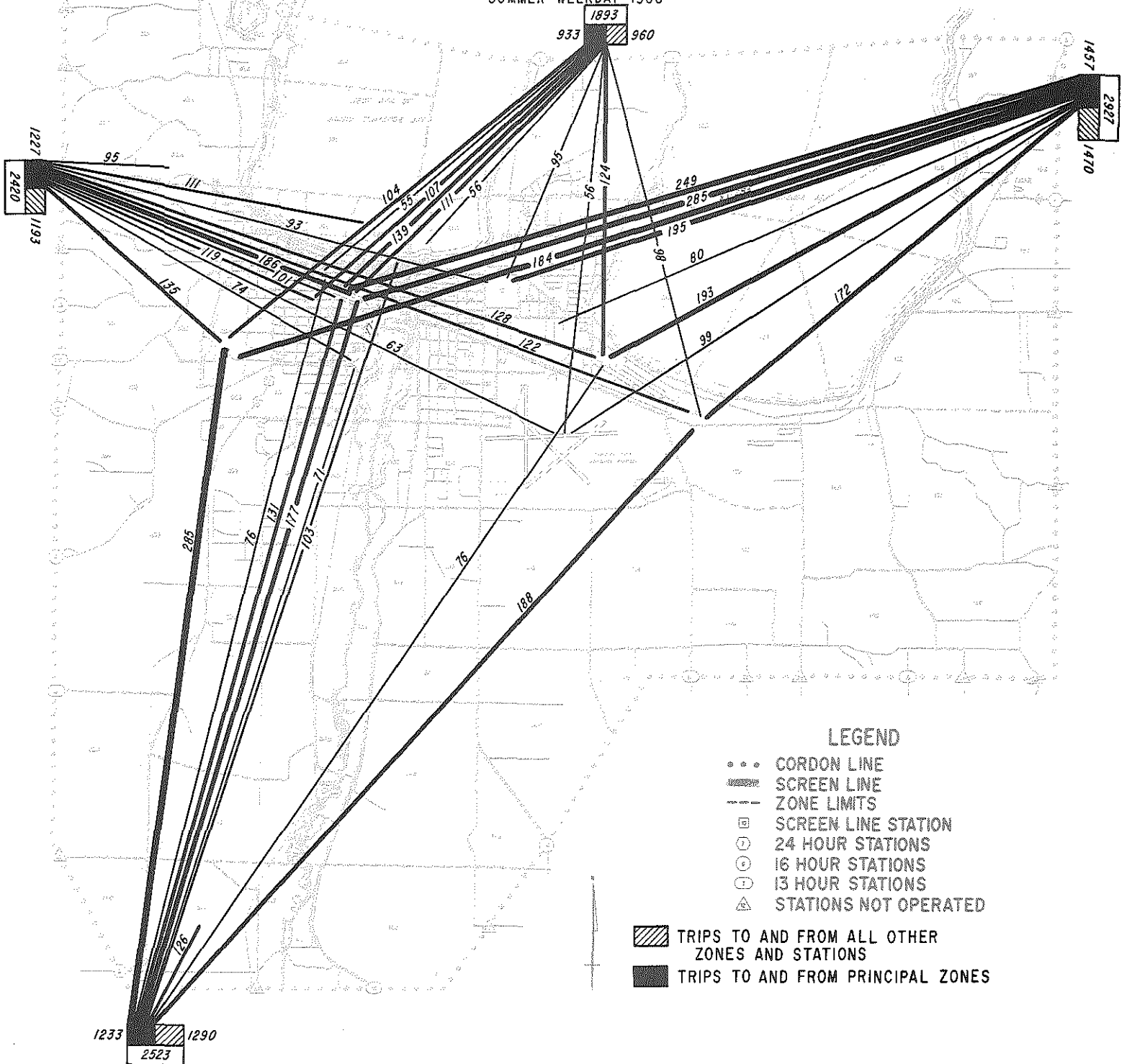
SUMMER WEEKDAY 1966



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

TRAVERSE CITY AREA TRAFFIC STUDY

TRIPS TO AND FROM EXTERNAL STATIONS AT M-72 (STA. 7), TEMPORARY M-72 (STA. 15),
M-37 (STA. 5) AND M-37 (STA. 2) TO PRINCIPAL ZONES OF ATTRACTION.
SUMMER WEEKDAY 1966

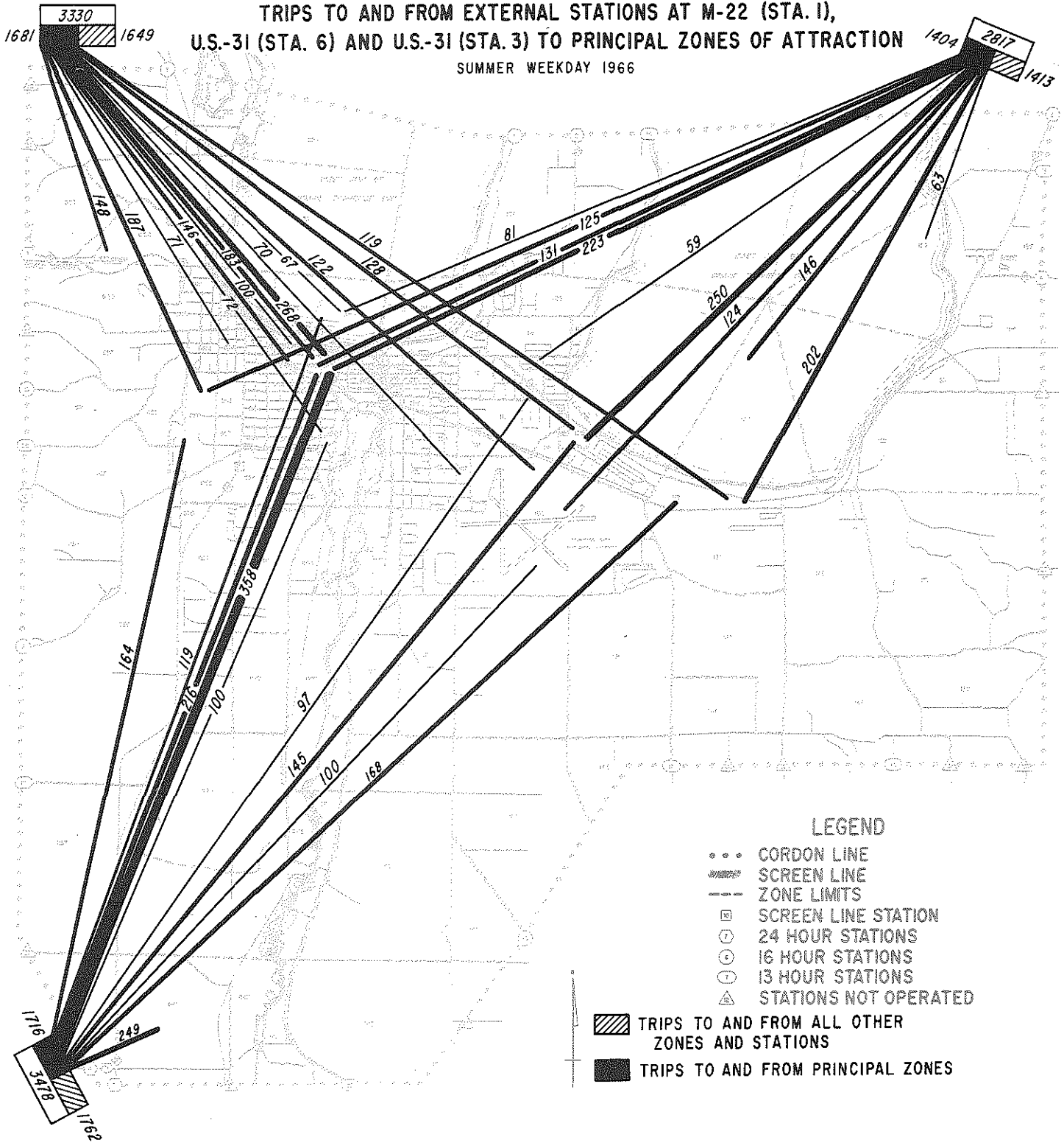


MICHIGAN DEPARTMENT OF STATE HIGHWAYS

TRAVERSE CITY AREA TRAFFIC STUDY

TRIPS TO AND FROM EXTERNAL STATIONS AT M-22 (STA. 1), U.S.-31 (STA. 6) AND U.S.-31 (STA. 3) TO PRINCIPAL ZONES OF ATTRACTION

SUMMER WEEKDAY 1966



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

INTERNAL DESIRE LINES

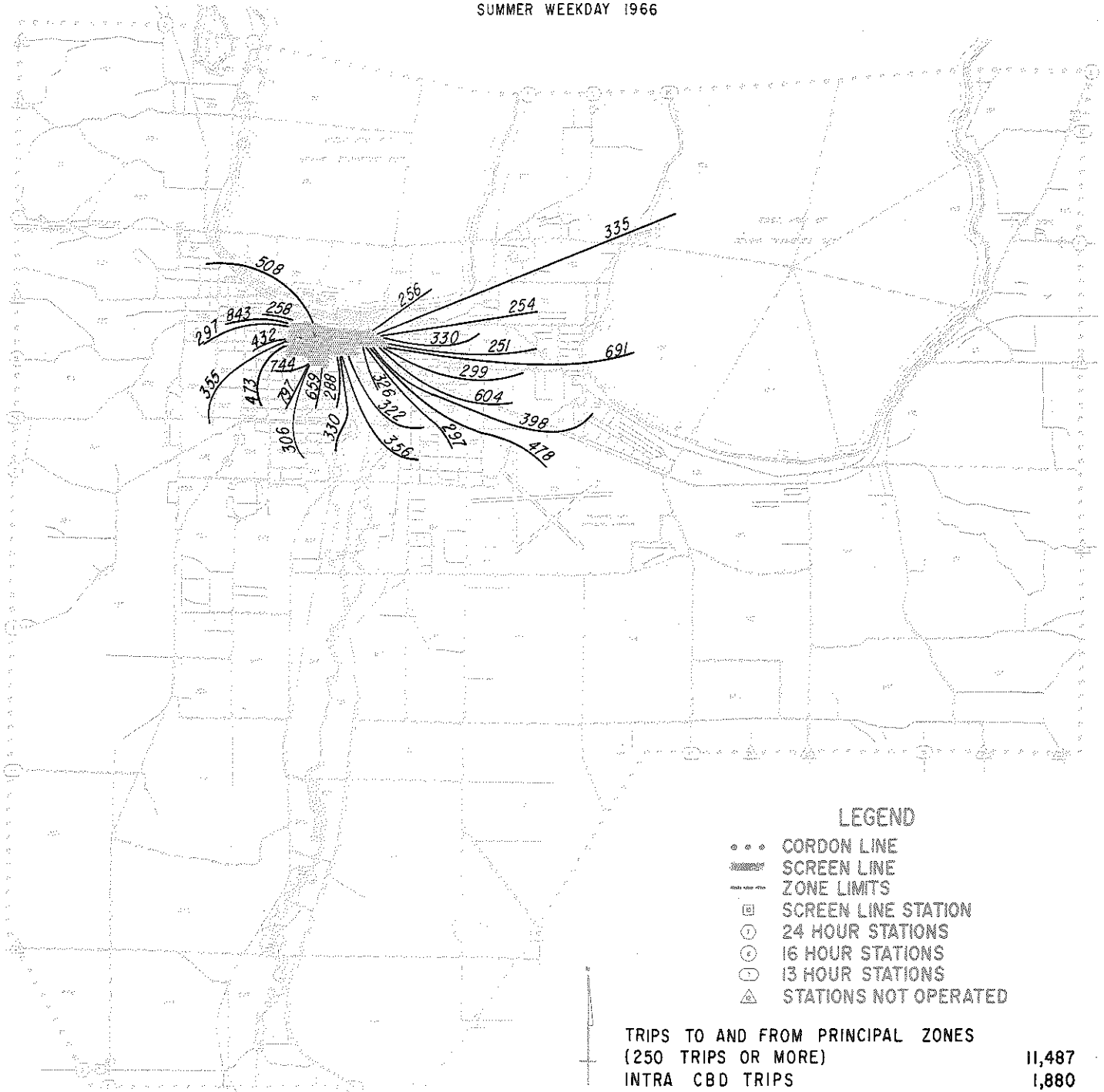
Internal desire lines show trip movements between major generators and zones attracting fifty percent of the trips.

Four internal desire line diagrams follow. The Central Business District (CBD) was defined and is an aggregate of six zones. The state hospital complex encompasses three zones. Zone 50 and Zone 126 generated enough trips to warrant individual desire line diagrams and are basically industrial and residential in land use respectively.

TRAVERSE CITY AREA TRAFFIC STUDY

TRIPS TO AND FROM THE CBD AND PRINCIPAL ZONES

SUMMER WEEKDAY 1966



LEGEND

- CORDON LINE
- ▨ SCREEN LINE
- ZONE LIMITS
- ▣ SCREEN LINE STATION
- ⊙ 24 HOUR STATIONS
- ⊙ 16 HOUR STATIONS
- ⊙ 13 HOUR STATIONS
- △ STATIONS NOT OPERATED

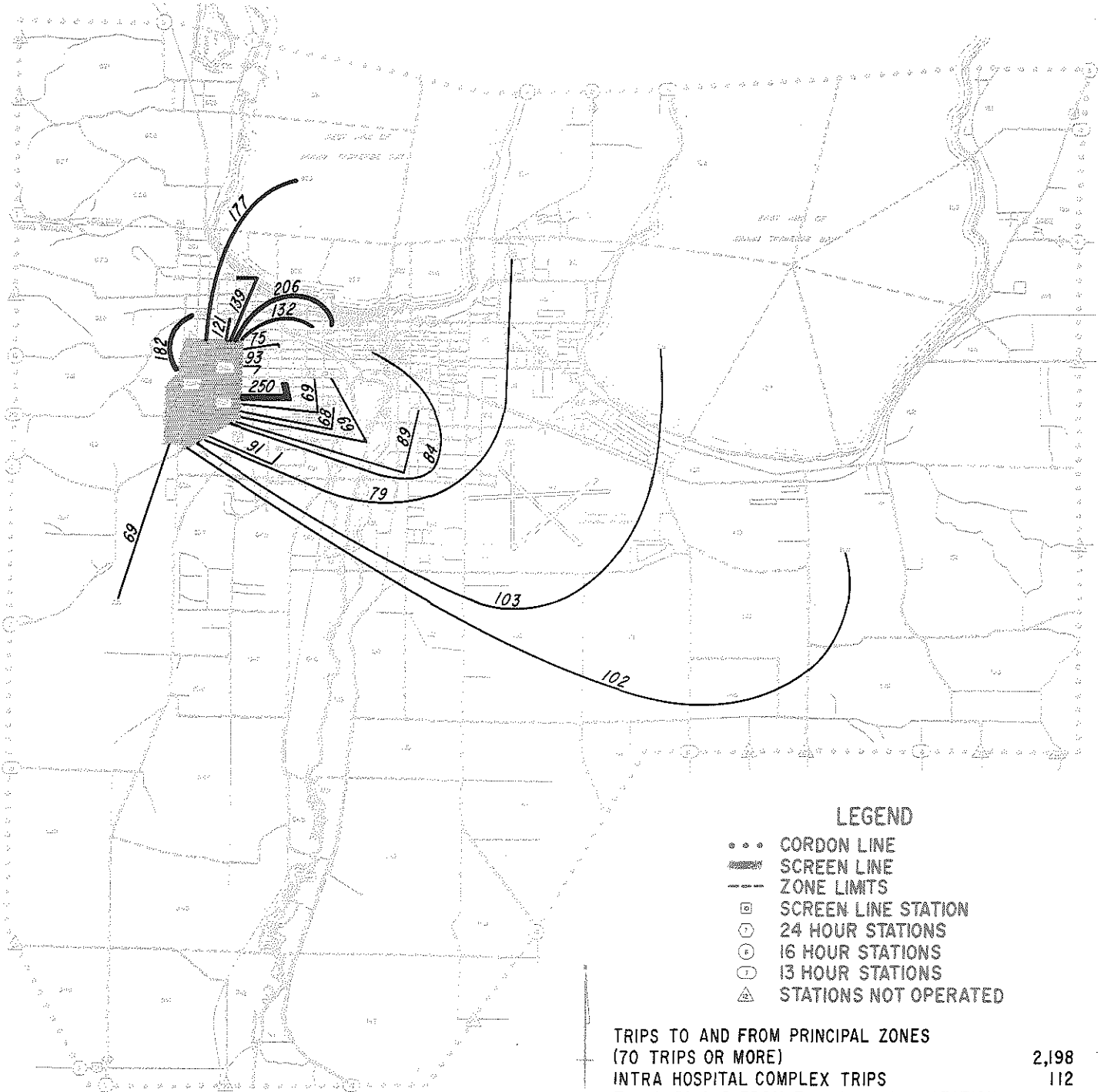
TRIPS TO AND FROM PRINCIPAL ZONES (250 TRIPS OR MORE)	11,487
INTRA CBD TRIPS	1,880
TRIPS TO AND FROM THE EXTERNAL STATIONS	6,541
TRIPS TO AND FROM "ALL OTHER" ZONES	10,890
TOTAL TRIPS GENERATED BY CBD	30,798

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

TRAVERSE CITY AREA TRAFFIC STUDY

TRIPS TO AND FROM THE STATE HOSPITAL COMPLEX AND PRINCIPAL ZONES

SUMMER WEEKDAY 1966



- LEGEND**
- CORDON LINE
 - SCREEN LINE
 - ZONE LIMITS
 - SCREEN LINE STATION
 - 24 HOUR STATIONS
 - 16 HOUR STATIONS
 - 13 HOUR STATIONS
 - △ STATIONS NOT OPERATED

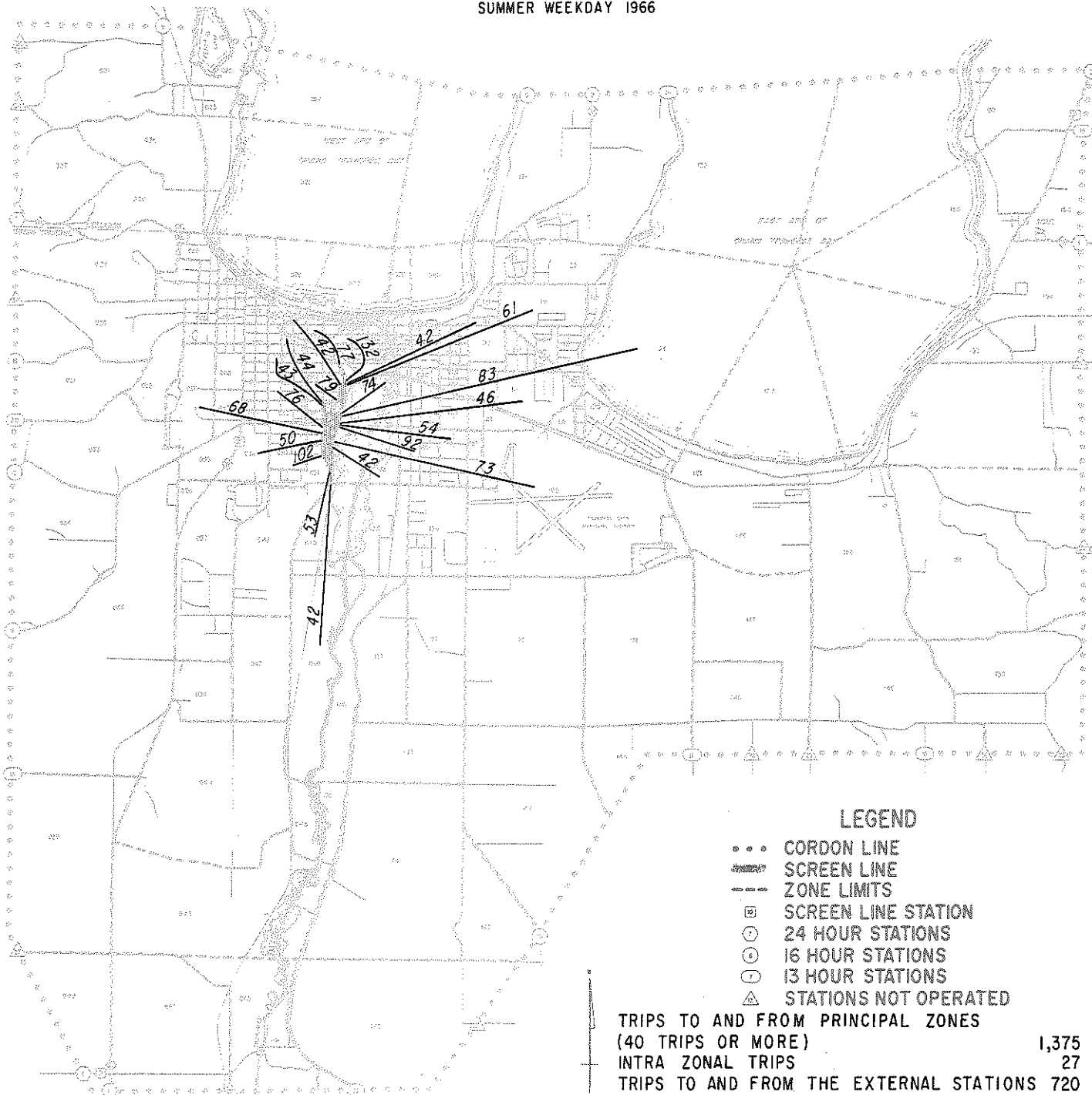
TRIPS TO AND FROM PRINCIPAL ZONES (70 TRIPS OR MORE)	2,198
INTRA HOSPITAL COMPLEX TRIPS	112
TRIPS TO AND FROM THE EXTERNAL STATIONS	1,894
TRIPS TO AND FROM "ALL OTHER" ZONES	2,147
TOTAL TRIPS GENERATED BY THE HOSPITAL COMPLEX	6,351

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

TRAVERSE CITY AREA TRAFFIC STUDY

TRIPS TO AND FROM ZONE 50 AND PRINCIPAL ZONES

SUMMER WEEKDAY 1966



LEGEND

- CORDON LINE
- ▬ SCREEN LINE
- ZONE LIMITS
- ⊠ SCREEN LINE STATION
- ⊙ 24 HOUR STATIONS
- ⊙ 16 HOUR STATIONS
- ⊙ 13 HOUR STATIONS
- △ STATIONS NOT OPERATED

TRIPS TO AND FROM PRINCIPAL ZONES (40 TRIPS OR MORE)	1,375
INTRA ZONAL TRIPS	27
TRIPS TO AND FROM THE EXTERNAL STATIONS	720
TRIPS TO AND FROM "ALL OTHER" ZONES	1,164
TOTAL TRIPS GENERATED BY ZONE 50	3,286

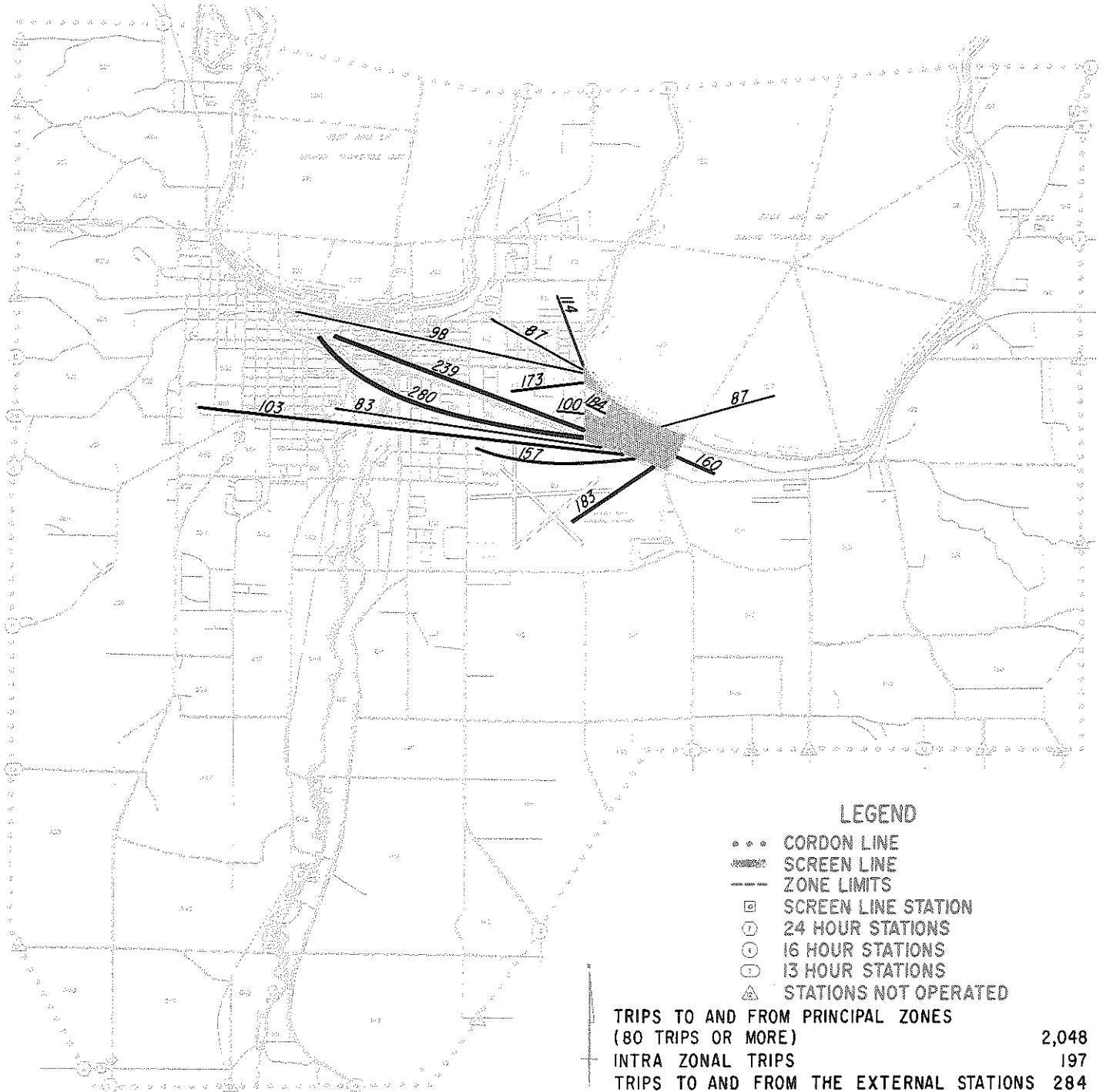
SCALE

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

TRAVERSE CITY AREA TRAFFIC STUDY

TRIPS TO AND FROM ZONE 126 AND PRINCIPAL ZONES

SUMMER WEEKDAY 1966



SCALE

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

TABLE B - 1

SUMMARY OF ADJUSTED DWELLING UNIT DATA

The Summary of Adjusted Dwelling Unit Data Table presents population, occupied dwelling units, passenger cars, total trips, and other data gathered during the internal portion of the survey. These data are listed by O-D zone.

TABLE B - 1

SUMMARY OF ADJUSTED OCCUPIED DWELLING UNIT DATA

ZONE	OCCUPIED DWELLING UNIT	PASSENGER CARS	TOTAL PERSONS	PASS CARS PER D.U.	PERSONS PER D.U.	PERSONS PER CAR	PASSENGER CAR TRIPS	PASSENGER TRIPS	VEHICLE TRIPS/D.U.	TRIPS PER D.U.
21	30	54	127	1.80	4.20	2.33	406	30	13.43	14.43
22	60	97	205	1.60	3.40	2.13	682	403	11.29	17.96
23	91	157	314	1.73	3.47	2.00	1088	309	12.01	15.42
24	12	24	42	2.00	3.50	1.75	203	0	16.82	16.82
25	54	79	169	1.44	3.11	2.15	597	316	10.98	16.79
26	42	91	127	2.14	3.00	1.40	553	359	13.08	21.56
27	12	12	48	1.00	4.00	4.00	108	293	8.97	33.25
28	18	18	54	1.00	3.00	3.00	136	0	7.52	7.52
29	11	11	43	1.00	4.00	4.00	179	109	16.46	26.46
30	33	54	98	1.67	3.00	1.80	361	214	11.07	17.65
31	11	5	38	0.50	3.50	7.00	71	136	6.50	19.01
32	16	16	38	1.00	2.33	2.33	65	146	4.00	12.94
33	16	22	38	1.33	2.33	1.75	247	0	15.13	15.13
34	22	33	60	1.50	2.75	1.83	306	49	14.07	16.32
35	60	87	206	1.45	3.45	2.37	553	154	9.25	11.83
36	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
37	71	98	337	1.38	4.77	3.44	862	677	12.22	21.81
38	5	5	22	1.00	4.00	4.00	0	0	0.00	0.00
39	22	27	71	1.25	3.25	2.60	135	65	6.21	9.22
40	6	12	23	2.00	4.00	2.00	101	29	17.33	22.33
41	17	29	64	1.67	3.67	2.20	0	0	0.00	0.00
42	12	17	41	1.50	3.50	2.33	271	110	23.28	32.73
43	5	16	33	3.00	6.00	2.00	183	54	33.67	43.67
44	22	38	76	1.75	3.50	2.00	396	195	18.23	27.20
45	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
46	11	16	43	1.50	4.00	2.67	52	11	4.75	5.75
47	16	22	54	1.33	3.33	2.50	87	27	5.33	7.00
48	98	49	152	0.50	1.56	3.11	262	81	2.68	3.52
49	22	38	60	1.75	2.75	1.57	204	81	9.37	13.12
50	44	50	121	1.13	2.75	2.44	306	224	6.90	11.98

SUMMARY (Continued)

ZONE	OCCUPIED DWELLING UNIT	PASSENGER CARS	TOTAL PERSONS	PASS CARS PER D.U.	PERSONS PER D.U.	PERSONS PER CAR	PASSENGER CAR TRIPS	PASSENGER TRIPS	VEHICLE TRIPS/D.U.	TRIPS PER D.U.
51	40	68	268	1.71	6.71	3.92	670	732	16.80	35.15
52	65	75	199	1.17	3.08	2.64	750	783	11.62	23.74
53	160	211	416	1.32	2.61	1.97	1649	902	10.33	15.98
54	51	63	194	1.22	3.78	3.09	317	126	6.18	8.64
55	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
56	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
57	5	5	26	1.00	5.00	5.00	0	0	0.00	0.00
58	52	73	162	1.40	3.10	2.21	482	277	9.19	14.49
59	74	91	200	1.23	2.69	2.19	410	388	5.54	10.77
60	32	48	145	1.50	4.50	3.00	557	204	17.25	23.55
61	110	143	363	1.30	3.30	2.54	1668	609	15.16	20.70
62	113	108	366	0.95	3.24	3.40	839	688	7.43	13.51
63	275	367	981	1.33	3.57	2.68	3495	2065	12.71	20.23
64	162	231	571	1.42	3.52	2.48	1653	931	10.18	15.91
65	105	110	194	1.05	1.85	1.76	672	577	6.41	11.92
66	131	148	388	1.13	2.96	2.62	986	400	7.51	10.56
67	148	211	497	1.42	3.35	2.35	1235	646	8.32	12.67
68	34	40	98	1.17	2.83	2.43	162	29	4.71	5.55
69	103	138	339	1.33	3.28	2.46	1154	541	11.17	16.40
70	103	132	270	1.28	2.61	2.04	791	448	7.66	12.00
71	6	0	6	0.00	1.00	0.00	0	0	0.00	0.00
72	86	103	264	1.20	3.07	2.56	597	145	6.93	8.62
73	127	160	473	1.26	3.74	2.97	1605	863	12.69	19.51
74	138	182	490	1.32	3.56	2.70	1399	1077	10.17	18.01
75	17	17	86	1.00	5.00	5.00	63	11	3.67	4.33
76	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
77	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
78	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
79	11	17	33	1.50	3.00	2.00	164	61	14.90	20.40
80	5	0	5	0.00	1.00	0.00	0	0	0.00	0.00

59

SUMMARY (Continued)

ZONE	OCCUPIED DWELLING UNIT	PASSENGER CARS	TOTAL PERSONS	PASS CARS PER D.U.	PERSONS PER D.U.	PERSONS PER CAR	PASSENGER CAR TRIPS	PASSENGER TRIPS	VEHICLE TRIPS/D.U.	TRIPS PER D.U.
81	44	33	88	0.75	2.00	2.67	281	149	6.40	9.79
82	6	0	11	0.00	2.00	0.00	0	0	0.00	0.00
83	17	6	28	0.33	1.67	5.00	84	166	5.11	15.14
84	52	64	289	1.22	5.56	4.55	596	747	11.45	25.82
85	104	127	405	1.22	3.89	3.18	560	523	5.38	10.40
86	75	110	208	1.46	2.77	1.89	431	309	5.74	9.85
87	64	52	156	0.82	2.45	3.00	400	93	6.29	7.75
88	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
89	5	5	11	1.00	2.00	2.00	103	0	19.40	19.40
90	53	80	176	1.50	3.30	2.20	421	475	7.91	16.85
91	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
92	48	69	144	1.44	3.00	2.08	365	218	7.61	12.17
93	74	90	239	1.21	3.21	2.65	435	170	5.84	8.12
94	69	74	229	1.08	3.31	3.07	869	267	12.56	16.42
95	43	48	118	1.13	2.75	2.44	370	191	8.60	13.05
96	91	91	231	1.00	2.53	2.53	571	240	6.25	8.89
97	81	113	285	1.40	3.53	2.52	1061	587	13.18	20.47
98	48	54	124	1.11	2.56	2.30	470	204	9.72	13.94
99	43	59	118	1.38	2.75	2.00	390	81	9.07	10.94
100	54	64	161	1.20	3.00	2.50	526	229	9.80	14.07
101	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
102	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
103	137	153	422	1.12	3.08	2.76	1847	1042	13.48	21.09
104	47	63	174	1.33	3.67	2.75	532	255	11.22	16.58
105	174	237	675	1.36	3.88	2.84	2544	1560	14.63	23.60
106	121	174	395	1.43	3.26	2.27	1218	329	10.04	12.76
107	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
108	50	61	168	1.22	3.33	2.73	610	523	12.13	22.53
109	28	45	106	1.60	3.80	2.38	546	341	19.54	31.73
110	11	22	34	2.00	3.00	1.50	235	101	21.04	30.09

09

SUMMARY (Continued)

ZONE	OCCUPIED DWELLING UNIT	PASSENGER CARS	TOTAL PERSONS	PASS CARS PER D.U.	PERSONS PER D.U.	PERSONS PER CAR	PASSENGER CAR TRIPS	PASSENGER TRIPS	VEHICLE TRIPS/D.U.	TRIPS PER D.U.
111	173	235	587	1.35	3.39	2.50	2714	2927	15.66	32.55
112	45	56	84	1.25	1.88	1.50	318	112	7.11	9.61
113	89	140	285	1.56	3.19	2.04	1230	749	13.76	22.12
114	56	56	112	1.00	2.00	2.00	468	364	8.38	14.90
115	73	112	235	1.54	3.23	2.10	1241	731	17.07	27.13
116	89	123	324	1.38	3.63	2.64	920	876	10.28	20.07
117	61	89	173	1.45	2.82	1.94	670	381	10.90	17.10
118	11	22	50	2.00	4.50	2.25	309	208	27.65	46.22
119	6	11	50	2.00	9.00	4.50	95	34	17.01	23.01
120	50	95	190	1.89	3.78	2.00	1007	344	20.02	26.86
121	112	173	414	1.55	3.70	2.39	1862	781	16.65	23.64
122	34	56	134	1.67	4.00	2.40	447	554	13.32	29.85
123	114	193	529	1.70	4.65	2.74	1536	847	13.50	20.94
124	91	125	319	1.38	3.50	2.55	1179	465	12.95	18.06
125	17	33	83	2.00	5.01	2.51	392	276	23.62	40.22
126	255	412	927	1.62	3.64	2.25	3985	1777	15.64	22.62
127	27	43	103	1.60	3.80	2.37	436	157	16.10	21.88
128	27	49	65	1.80	2.40	1.33	482	80	17.78	20.74
129	81	119	282	1.47	3.47	2.36	733	319	9.02	12.94
130	11	16	33	1.50	3.00	2.00	92	0	8.50	8.50
131	54	114	222	2.10	4.10	1.95	677	372	12.49	19.34
132	78	105	238	1.36	3.07	2.26	902	848	11.64	22.56
133	89	122	360	1.38	4.06	2.95	686	601	7.74	14.52
134	139	205	449	1.48	3.24	2.19	1510	677	10.90	15.79
135	22	28	83	1.25	3.75	3.00	163	150	7.38	14.13
136	11	22	50	2.00	4.50	2.25	132	11	11.94	12.94
137	11	11	44	1.00	4.00	4.00	64	0	5.78	5.78
138	11	11	55	1.00	5.00	5.00	210	276	18.93	43.80
139	11	17	17	1.50	1.50	1.00	11	0	1.00	1.00
140	17	33	61	2.00	3.67	1.83	61	0	3.70	3.70

SUMMARY (Continued)

<u>ZONE</u>	<u>OCCUPIED DWELLING UNIT</u>	<u>PASSENGER CARS</u>	<u>TOTAL PERSONS</u>	<u>PASS CARS PER D.U.</u>	<u>PERSONS PER D.U.</u>	<u>PERSONS PER CAR</u>	<u>PASSENGER CAR TRIPS</u>	<u>PASSENGER TRIPS</u>	<u>VEHICLE TRIPS/D.U.</u>	<u>TRIPS PER D.U.</u>
141	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
142	15	30	55	2.00	3.67	1.83	209	188	13.91	26.43
143	6	6	11	1.00	2.00	2.00	58	0	10.50	10.50
144	17	28	66	1.67	4.00	2.40	108	258	6.49	22.04
145	5	5	11	1.00	2.00	2.00	27	0	5.00	5.00
146	11	27	49	2.50	4.50	1.80	201	136	18.56	31.06
147	16	27	65	1.67	4.00	2.40	208	127	12.79	20.59
148	16	27	65	1.67	4.00	2.40	395	283	24.32	41.73
149	70	125	228	1.77	3.23	1.83	849	237	12.06	15.42
150	22	43	157	2.00	7.25	3.63	420	435	19.39	39.47
151	38	54	136	1.43	3.57	2.50	513	371	13.51	23.29
152	65	108	253	1.67	3.92	2.35	907	393	14.02	20.09
153	27	54	81	2.00	3.00	1.50	560	85	20.78	23.94
154	27	38	97	1.40	3.60	2.57	432	495	16.05	34.41
155	102	167	329	1.63	3.21	1.97	964	324	9.41	12.58
156	11	11	27	1.00	2.50	2.50	162	40	15.05	18.81
157	43	75	162	1.75	3.75	2.14	604	289	14.00	20.69
158	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
159	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00
TOTAL	6888	9466	23079	1.37	3.35	2.44	76343	43953	11.08	17.46

PASSENGER CAR OCCUPANCY BY TRIP PURPOSE

INTERNAL SURVEY RECORDS

This table is compiled from expanded dwelling unit data to show the average car occupancy by trip purpose. These tables also show the number of vehicles, percent of vehicles, and number of occupants.

The driver of each vehicle is included in the number of occupants, and the trip purpose of the driver is used for the tabulation.

All trips were made within the area by residents on a week day in the summer of 1966.

PASSENGER CAR OCCUPANCY BY TRIP PURPOSE

INTERNAL RECORDS

<u>PURPOSE OF TRIP - TO</u>	<u>NUMBER OF VEHICLES</u>	<u>% OF VEHICLES</u>	<u>NUMBER OF OCCUPANTS</u>	<u>AVERAGE OCCUPANCY</u>
Work	8415	11.0	9403	1.12
Business	4686	6.1	6819	1.46
Shopping	12281	16.1	19438	1.58
School	65	.1	65	1.00
Social-Rec.	12044	15.8	24802	2.06
Change Mode	11		11	1.00
Eat Meal	4234	5.5	5691	1.34
Medical/Dental	480	.6	728	1.52
Serve Passenger	6118	8.0	13494	2.21
Sub-Total	48334	63.3	80451	1.66
Home	27988	36.7	46288	1.65
TOTAL	76322	100.0	126739	1.66

PASSENGER CAR OCCUPANCY BY TRIP PURPOSE
EXTERNAL SURVEY RECORDS

Two tables were derived from data obtained from the external survey. The first table shows the passenger occupancy of vehicles owned by residents of the area making trips across the cordon line. The second table shows the same data for vehicles owned by non-residents and garaged outside of the study area.

Both tables show the number of vehicles, total number of passengers, the percentage of vehicles, and the average occupancy all by trip purpose. The driver of each vehicle is included in the occupants. The trip purpose is for the driver.

LIBRARY
michigan department of
state highways
LANSING

PASSENGER CAR OCCUPANCY BY TRIP PURPOSE

EXTERNAL RECORDS

VEHICLES OWNED INSIDE THE AREA

<u>PURPOSE OF TRIP - TO</u>	<u>NUMBER OF VEHICLES</u>	<u>% OF VEHICLES</u>	<u>NUMBER OF OCCUPANTS</u>	<u>AVERAGE OCCUPANCY</u>
Work	1541	35.7	2188	1.42
Business	131	3.0	254	1.94
Shopping	149	3.5	348	2.34
Vacation	119	2.8	323	2.71
Social-Rec.	2368	54.9	5584	2.36
All Other	7	.2	13	1.86
TOTAL	4315	100.0	8710	2.02

VEHICLES OWNED OUTSIDE THE AREA

<u>PURPOSE OF TRIP - TO</u>	<u>NUMBER OF VEHICLES</u>	<u>% OF VEHICLES</u>	<u>NUMBER OF OCCUPANTS</u>	<u>AVERAGE OCCUPANCY</u>
Work	6769	26.7	10074	1.49
Business	1346	5.3	2991	2.22
Shopping	5481	21.6	13743	2.51
Vacation	5385	21.2	17796	3.30
Social-Rec.	6366	25.1	16825	2.64
All Other	26	.1	39	1.50
TOTAL	25373	100.0	61468	2.42

———— TRIP TABLES ————

Trip tables by zone are contained in a separate report.

APPENDIX A

INTERVIEW FORMS

METROPOLITAN AREA TRAFFIC STUDY
INTERVIEW SAMPLE LISTING

CITY NO. FORM NO.

1	2

1
3

RECORDER _____ DATE _____

TRACT NO.

4	5

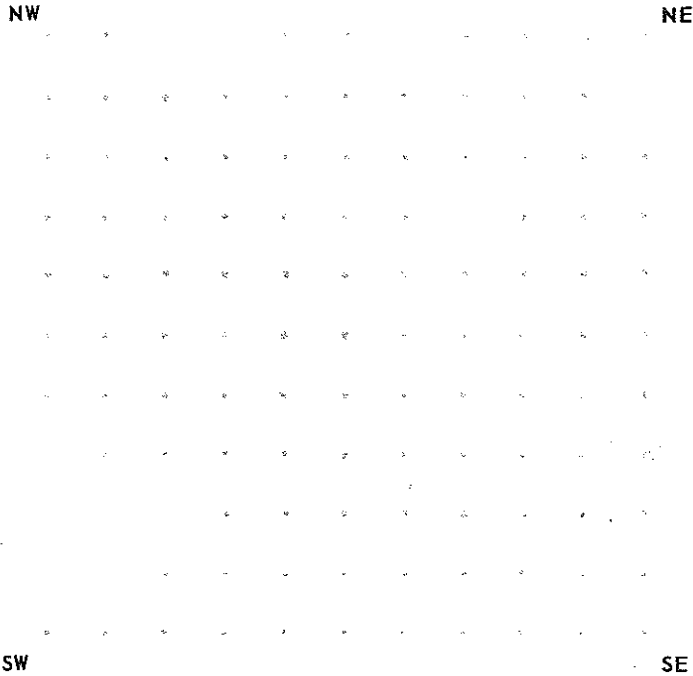
BLOCK NO.

6	7	8	9

BEGINNING AT THE _____
INTERSECTION OF _____

POST OFFICE ADDRESS

10	11	12	13	14



PREVIOUS TRACT NO. _____ BLOCK NO. _____

NEXT TRACT NO. _____ BLOCK NO. _____

SURVEY DWELLING UNIT COUNT

15	16	17

CENSUS DWELLING UNIT COUNT _____

PERCENT LAND USE BY BLOCK

RESIDENTIAL	18	<input type="text"/>	SCHOOLS	24	<input type="text"/>			
MANUFACTURING	19	<input type="text"/>	SOC-REC	25	<input type="text"/>			
UTILITIES	20	<input type="text"/>	PARKS	26	<input type="text"/>			
AUTO PARKING	21	<input type="text"/>	RESOURCE & EXTRACTION	27	<input type="text"/>			
COMMERCIAL	22	<input type="text"/>	UNDEVELOPED	28	<input type="text"/>			
SERVICE	23	<input type="text"/>						
			LAND USE	60	61	62	63	64

SAMPLE NO. HOUSE NO. DIRECTION N. S. E. W. STREET OR OTHER IDENTIFICATION STARTING CARRY OVER DATE ATT. INTER VIEWED DATE ATT. QUES. RET. PHONE NO. ATT. QUES. RET

1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
0																			

- STRUCTURE TYPE
- (1) SINGLE & DOUBLE DU'S
 - (2) GROUP QUARTERS
 - (3) RESIDENTIAL HOTELS
 - (4) MOBILE HOMES
 - (5) TRANSIENT LODGINGS
 - (6) MULTIPLE HOUSING

ENDING CARRY OVER

--

INTERVIEW ADDRESS SUMMARY

STATE OF MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

- 1. Sunday
- 2. Monday
- 3. Tuesday
- 4. Wednesday
- 5. Thursday
- 6. Friday

City No. 1-2

Form No. 3-4

Tract No. 5-6

Block No. 7-10

Sample No. 11-12

Day and Month Of Travel 13-15

Interview Address: _____ ADDRESS _____ CITY _____

Type of Structure 1

- (1) Single & Double Households
- (2) Group Quarters
- (3) Residential Hotels
- (4) Mobile Homes
- (5) Transient Lodgings
- (6) Multiple Housing
- (9) Other Residents

ADMINISTRATIVE RECORD

Interviewer: _____

CALLS

	Date	Time
(1)	_____	_____
(2)	_____	_____
(3)	_____	_____
(4)	_____	_____

REPORT SUBMITTED INCOMPLETE

Date _____

Reason _____

Supervisor's Comment _____

Remarks: _____

Report Completed _____ (Date) _____ (Initial)

Interview Checked _____ (Initial)

Coded By _____ (Initial)

Coding Checked By _____ (Initial)

Phone Number _____

A. Number of Passenger Cars at this Address: Owned Company Owned

Car Mileage per year 1 2 3 4 6 7

B. Number of Persons Living at this Address _____

C. Number of Persons 5 Years of Age or Over _____

D. Household Information: How Long Lived at this Address (years) _____

Rent or Own Home 0 - Rent 1 - Own

Home and Land Value or Monthly Rent _____

Education of Household Head _____

Number of Persons Employed _____

Household Income (ask this question last): 0 1 2 3 4 5 6 7 8 9

E. Data for Persons 5 Years of Age or Over

PERSON NO.	SEX & RACE	PERSON IDENTIFICATION	CODE			INDUSTRY AND OCCUPATION	MADE TRIPS			AGE
							YES	NO		
1		38			39-41					
2		43			44-46					
3		48			49-51					
4		53			54-56					
5		58			59-61					
6		63			64-66					
7		68			69-71					
8		73			74-76					

DRIVERS LICENSE INFORMATION

- 1. Male White
- 2. Female White
- 3. Male Colored
- 4. Female Colored
- 5. Male Other
- 6. Female Other
- A. Male White
- B. Female White
- C. Male Colored
- D. Female Colored
- E. Male Other
- F. Female Other

Total Number of Trips Reported at this Address

INTERNAL TRIP REPORT

City Number 1-2

Form Number 3

Tract Number 4-5

Block Number 6-9

Sample Number 10-11

70

1 PERSON NUMBER	2 TRIP NUMBER	3 MODE OF TRAVEL	4 WHERE DID THIS TRIP BEGIN? (ORIGIN)	5 LAND USE ORIGIN	6 WHERE DID THIS TRIP END? (DESTINATION)	7 LAND USE DESTINATION	8 TIME OF		9 TRIP PURPOSE		10-12 FOR DRIVERS ONLY			13 CAR POOL 1. YES 2. No
							START	ARRIVAL	FROM	TO	NO. IN CAR	KIND OF PARK.	SCREEN	
			H <input type="text"/>	<input type="text"/>	H <input type="text"/>	<input type="text"/>	____ AM ____ PM	____ AM ____ PM						
			H <input type="text"/>	<input type="text"/>	H <input type="text"/>	<input type="text"/>	____ AM ____ PM	____ AM ____ PM						
			H <input type="text"/>	<input type="text"/>	H <input type="text"/>	<input type="text"/>	____ AM ____ PM	____ AM ____ PM						
			H <input type="text"/>	<input type="text"/>	H <input type="text"/>	<input type="text"/>	____ AM ____ PM	____ AM ____ PM						
			H <input type="text"/>	<input type="text"/>	H <input type="text"/>	<input type="text"/>	____ AM ____ PM	____ AM ____ PM						

- 0. Walk To Work
- 1. Auto Driver
- 2. Auto Pass.
- 3. Bus Pass.
- 4. Taxi Pass.
- 5. Truck Pass.
- 5. School Bus

LAND USE
See "Land Use"
Manual for the above
codes.

- TRIP PURPOSE**
- 1. Work
 - 2. Transact Business
 - 3. Shopping
 - 4. School
 - 5. Social Recreation
 - 6. Change Mode of Travel
 - 7. Eat Meal
 - 8. Medical-Dental
 - 9. Serve Passenger
 - 0. Home

- KIND OF PARKING**
- 1. Street Free
 - 2. Street Metered
 - 3. Lot Free
 - 4. Lot Paid
 - 5. Let Municipal
 - 6. Parking Garage
 - 7. Service-Rear
 - 8. Residence Property
 - 9. Not Parked
 - Y. Cruising

EXTERNAL INTERVIEW

STATE OF MICHIGAN
DEPARTMENT OF STATE HIGHWAYS
TRAFFIC DIVISION

City Number	1	2	Form Number	4	Hour Period Ending	() AM or () PM	4	5	Inbound	1-White	2-Green	6	Station	7	8	Day of Travel	9					
1	2	3	4	5				6	7			8		9	10	11	12	13	14			
Interview Number	State of Registration	Vehicle Type	No. in Vehicle	Where did this trip begin? Origin				Land Use	Where will this trip end? Destination			Where is this vehicle garaged?		Trip Purpose	Screen	Route of Exit or Ent.	Stops in area	Purpose	Intermediate Stop Location			
	1 Michigan 2 Other			_____					_____								1 Yes 2 No		_____			
	1 Michigan 2 Other			_____					_____								1 Yes 2 No		_____			
	1 Michigan 2 Other			_____					_____								1 Yes 2 No		_____			
	1 Michigan 2 Other			_____					_____								1 Yes 2 No		_____			
	1 Michigan 2 Other			_____					_____								1 Yes 2 No		_____			

71

1. Passenger Car
2. Single Unit-Single Rear Tire
3. Single Unit-Dual Rear Tire
4. Single Unit-3 or 4 Axle
5. TT-ST Combination
6. TK-TR Combination
7. TT-ST-TR Combination
8. Bus Not C.C.
9. Taxi

- Vehicle Garaged At
1. Within the cordon
 2. Outside the cordon at origin
 3. Outside the cordon at destination
 4. Outside the cordon at neither origin or destination

1. Work
2. Pers. Business
3. Shopping
4. Vacation
5. Other Soc. or Rec.
6. All Other

1. Course of Work
2. Transact Business
3. Social-Recreation
4. Eating
5. Gas-Oil Service
6. Serve Passenger
7. Secure Lodging
8. Shopping

- DAY OF TRAVEL
- | | |
|--------|---------|
| 1 Sun. | 4 Wed. |
| 2 Mon. | 5 Thur. |
| 3 Tue. | 6 Fri. |
| | 7 Sat. |

STATE OF MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

Miles Driven Per Year _____ Trip Report For Trucks For Taxis Sample No. _____

City of _____	*	
	*	
Interview No. _____		Owner _____
Garaged at _____		Address _____
Industry & Business _____		License No. _____
Vehicle Type _____	Single Unit-Single Rear Tire Single Unit-Dual Rear Tire Single Unit 3 or 4 Axle	TT-ST Comb. TK-TR Comb. TT-ST-TR Comb.
Rated Capacity _____		Make _____ Year _____
Day of the Week _____		Date of Travel _____
		Trips for 24 Hours Starting At 6:00 A.M. _____

Enter here the address of the beginning of the first trip. (First sheet only) Trip No.	Trip Purpose	Land Use	Time of Leaving	Time of Arrival	For Office Use Only *	
					XXXX	
Enter below each stop in the order made:						
1			XXXX			
Same				XXXX	XXXX	XXXX
2			XXXX			
Same				XXXX	XXXX	XXXX
3			XXXX			
Same				XXXX	XXXX	XXXX
4			XXXX			
Same				XXXX	XXXX	XXXX
5			XXXX			
Same				XXXX	XXXX	XXXX
6			XXXX			
Same				XXXX	XXXX	XXXX
7			XXXX			
Same				XXXX	XXXX	XXXX
8			XXXX			
Same				XXXX	XXXX	XXXX
9			XXXX			
Same				XXXX	XXXX	XXXX
10			XXXX			
Same				XXXX	XXXX	XXXX
11			XXXX			
Same				XXXX	XXXX	XXXX
12			XXXX			
Same				XXXX	XXXX	XXXX
			XXXX			

Use as many sheets as necessary, and enter the last address on the next sheet.

1. To & From Work
2. Shopping
3. Pers. Business
4. Pick Up Goods
5. Deliver Goods
6. Pick Up and Deliver Goods
7. Service & Other Work Connected with Business
8. To Base of Operation
9. Vacation

INTERVIEWER _____

STATE OF MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

ORIGIN-DESTINATION MANUAL CLASSIFICATION

ROUTE _____ LOCATION DESCRIPTION _____ CITY _____

DSP NO.	CONTROL SEC.	MILE STA.	RD. SYS.	YR.	MONTH	DATE	DAY	CITY NO.	STA. NO.	SCREEN LINE OR STATION NO.	RECORDER											
M	C																					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

DIRECTION	TIME HOUR PERIOD		PASSENGER CARS				MAIL CARS POLICE & ETC.		SINGLE UNIT TRUCKS			TRUCK COMBINATIONS			BUSSES		TAXI		FORM O-D 9	SCREEN LINE SEQUENCE	TOTAL											
	START-ING	ENDING	(1)				SINGLE REAR TIRES (2)		DUAL REAR TIRES (3)		3 & 4 AXLE (4)		TT-ST (5)		TK-TR (6)		TT-ST -TR (7)					CC (8)		OTHER (8)		(9)						
24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54		
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COLS. 33 AND 34
WILL NOT BE USED
AT SCREEN LINES