

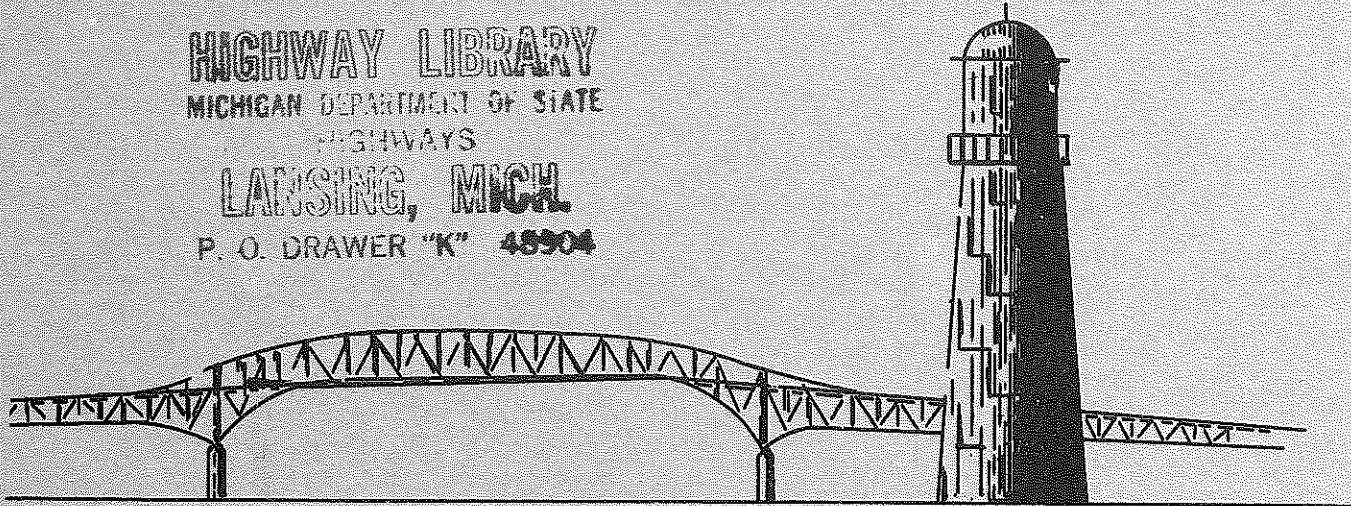
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Origin Destination Study

Screenline Adjustment Report

Port Huron - Area

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PORT HURON AREA
TRANSPORTATION STUDY

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SCREENLINE ADJUSTMENT REPORT

In Cooperation with:
U.S. Department of Transportation
Federal Highway Administration
Bureau of Public Roads

Prepared by:

Michigan Department of State Highways
Transportation Planning Division
Transportation Survey & Analysis Section
Metropolitan Unit
Kenneth Underwood, Supervisor
Norman T. Farnum
Florence Lee Daniels
Transportation Analysts

July, 1969

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INTRODUCTION

Checks on study data in the Port Huron Area Transportation Study derived from the field surveys and relating to various population characteristics such as number of occupied dwellings, family income, number of members in a household and so on, have been covered previously in "Weekday Travel Patterns," a report for Port Huron Area Transportation Study, from the Center for Urban Studies, University of Michigan, Dearborn Campus. This report also contains tables of person trips by destination zone and purpose as well as expanded housing unit data, and classification counts on the screenline and at the external stations.

The screenline adjustment report is a further step in the process of checking and adjusting the survey data.

This report has been aided by tabulations of data provided by the Center for Urban Studies. Acknowledgement is gratefully made for suggestions made by W.M. Ladd of the Center and William Hartwig, Michigan Department of State Highways.

FIGURE

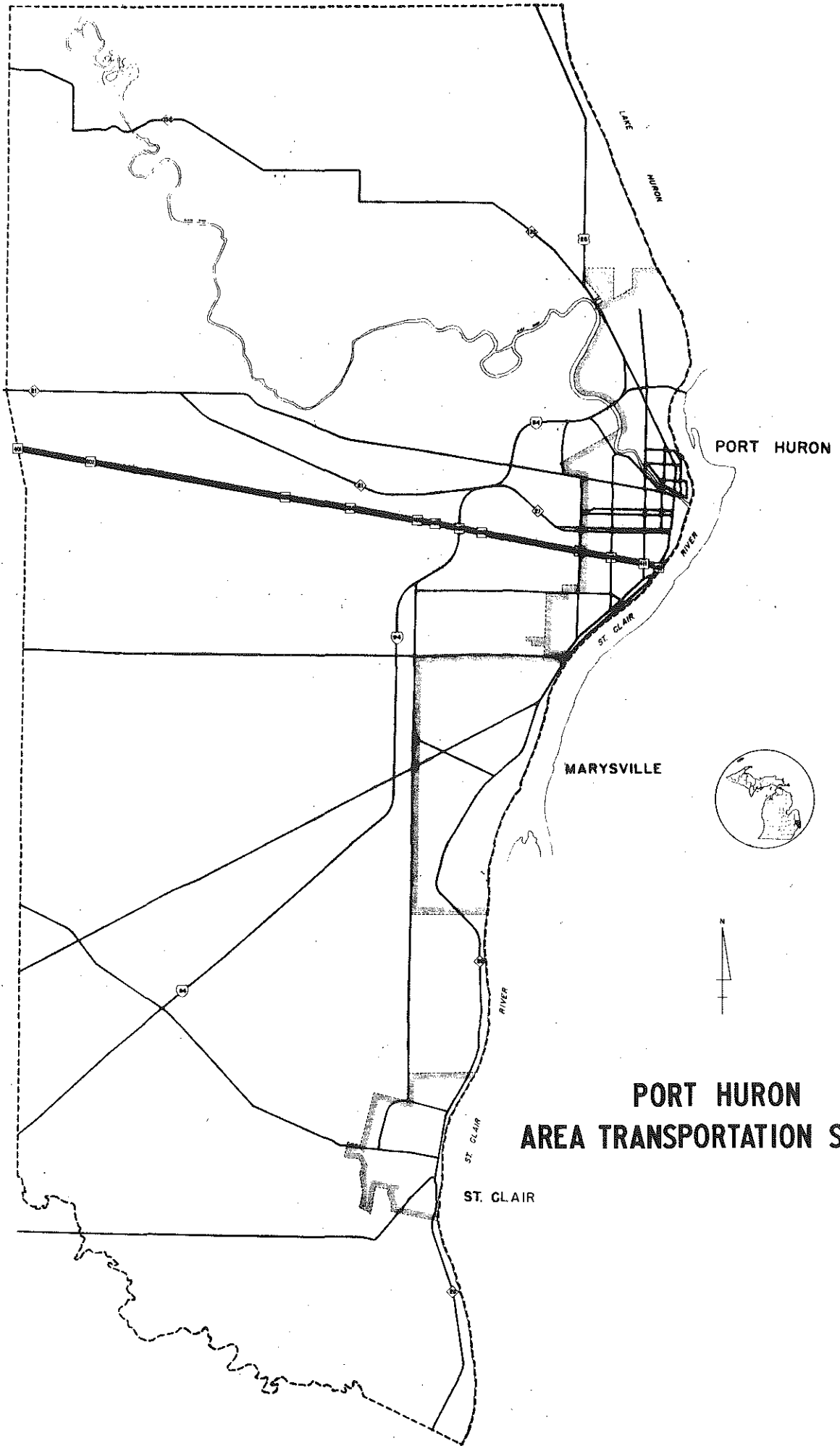
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**PORT HURON
AREA TRANSPORTATION STUDY**

ST. CLAIR



Among the various checks for the validity and accuracy of the data collected in an O-D study is that of the screenline counts. The actual counts of vehicles passing over the screenline (ground count) in twenty-four hours is compared to the count of trips crossing the screenline as reported in the home interview survey (internal file) and in the external survey (external file). Though the external file usually needs no adjustment, it is to be expected that the home interview survey counts will fall short of the ground count because of such things as forgotten trips and trips made by members of the household, unknown to the interviewee.

The internal trip file is one of the most important bases for the further development of the study. It is useful, then, to bring these home survey trips into closer agreement with those ground counts known to have crossed the screenline.

Certain steps should be taken to determine the extent of adjustment necessary on the home interview counts in a particular study. Examination of the screenline for possible multiple crossings, which would cause the ground count to be larger than it should be, is one of these steps.

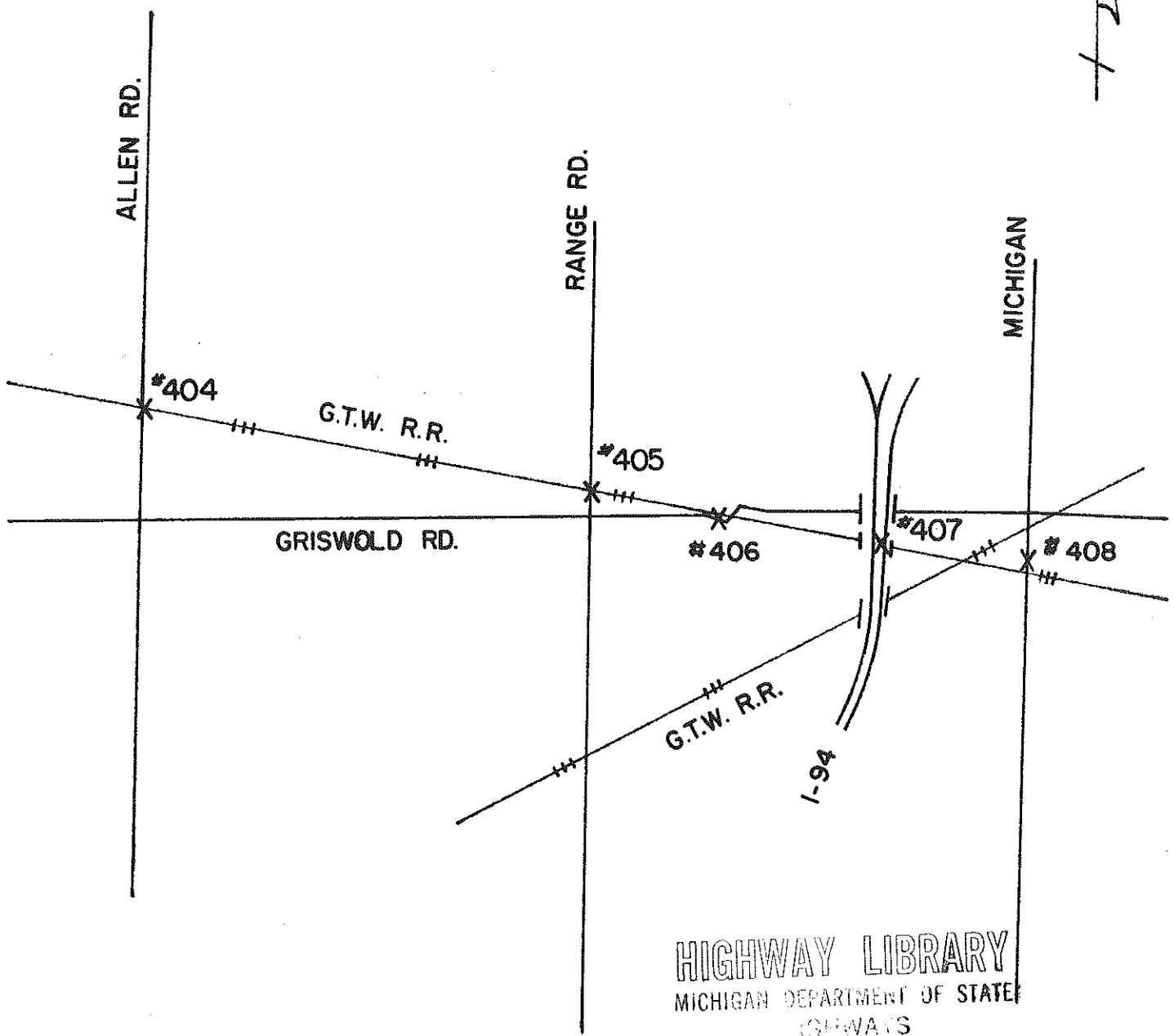
The Port Huron study screenline is located on a man-made "cut line," the Grand Trunk Western Railroad. This railroad

functions much like a river, with limited crossings and few opportunities for multiple crossings. Only at stations 405 and 406 does a situation exist where multiple crossings might easily occur. (Figures 1 and 2.) The remaining stations are so located as to make multiple crossings unlikely.

Analysis of turning movements taken at Range and Griswold Roads indicates there were approximately one hundred trips each day which might be counted at both stations (that is, turning left from south bound Range to east bound Griswold, or right from west bound Griswold to north bound Range). However, it is most unlikely that all of these trips would move between these two stations since there is a drop in volume of trips from 2,802 just east of the intersection of Range and Griswold Roads to 2,590 trips at screenline station 406. In any event, one hundred trips constitutes less than one quarter of one percent of the total trips counted on the screenline.

Comparison of the counted volumes and those volumes assigned to the links crossing the screenline from the expanded, but unadjusted, internal file indicates there are few logical double crossings. (The ground count totals 42,181, the assigned volumes 35,536. The trip files are approximately one sixth under reported, thus even the adjusted file will not cause more trips to be assigned to these links than have been counted there.)

SCREENLINE STATIONS IN
VICINITY OF RANGE ROAD.



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FIGURE 2

STATE OF MICHIGAN DEPARTMENT OF STATE HIGHWAYS TRANSPORTATION PLANNING DIVISION	TAR. NO.	TAR. BY
	ENGR. REP.	DRAFTED
	CON'T SEC.	DATE
	SHEET OF	UNIT

The decision having been made that the ground counts are not in need of adjusting, the determination of the factors necessary to raise the counts from the various files - internal, external, and truck - to meet the ground count can proceed. The figures for the files to be adjusted, and those at the screenline are given in Table 1.

TABLE 1

	<u>FILE</u>	<u>INTERVIEW COUNTS</u>	<u>SCREENLINE GROUND COUNTS</u>
Autos	Internal	21195	35725
	External	9309	
	Trucks	2705	4192

There are certain criteria which may be said to delineate a "good" screenline adjustment. The first, and most obvious, is an agreement in total count. This should range upwards from 97 percent. Ideally, the "trip purpose" distribution should not change, nor should the hourly distribution of volume. Another sign of a good adjustment is the holding of the AM and PM peaks to within three percent of the ground counts.

If the accuracy checks done previously to the screenline adjustment have shown the data on employment, population and so on, to be accurate, the assumption can be made that the interviewing process has been good. The trips that are made regularly, from home, such as home-based work, should be remembered by the interviewee, and would not be among the unreported trips in any magnitude. Thus, home-based work should be factored by 1.0, and factors, in general, should not be above 2.5.

An investigation of the relative counts shows no possibility of factoring with a flat rate overall, as little adjustment is needed for some hours; for others the adjustment needs to be larger. The method of applying a flat factor to all nonwork trips will not produce the results desired in the Port Huron Area Study either, since peaks need adjustment also. The method of internal survey adjustment that is indicated, then, is to do so by trip purpose.

Various methods have been used to adjust the home survey trips. In some studies, factors have been applied on a trial and error basis, with the judgment of the analyst determining those factors used. Good results have come from this method. There are also computer programs available which develop these factors; there is such a program presently operational in the Michigan Department of State Highways.

For the Port Huron O-D study, a third approach was taken. Interviews were done on the screenline to determine the trip purpose, and thus, to arrive at a breakdown by purpose of those screenline trips. This is a more concrete approach to the question of the adjustment of these trips.

The screenline interviewing was conducted in February and March of 1969 at all twelve of the study area screenline stations. A crew of interviewers operated screenline stations 407, 409, 411, and 412 for sixteen hours, from 6:00 A.M. to 10:00 P.M. These are the heavier-volume, arterial stations. The remaining eight lighter-volume stations were in operation only from 7:00 A.M. to 9:00 P.M., for fourteen hours. These hours were decided on because they cover the period of time during which most work trips are being made as well as the hours of operation of supermarkets and shopping centers in the area.

The interview form used is brief and only the minimum amount of information essential to generate the necessary data is required (Figure 3). Responses to "Where did this trip begin?," as well as to trip's end, and place of garaging, were allowed to be as simple as "Port Huron" or "St. Clair." The trip purposes were those of the I.A.S. survey. The brevity of the questionnaire and simplification of responses made it possible to

PORT HURON - MARYSVILLE TRIP PURPOSE STUDY

PORT HURON CITY NUMBER	SCREEN LINE NUMBER	HOUR PERIOD BEGINNING	1. Sun. 2. Mon. 3. Tue. 4. Wed.	5. Thur. 6. Fri. 7. Sat.	DAY OF TRAVEL	OFFICE USE ONLY
Interview Number	Where did this trip begin?	Where will this trip end?	Where is vehicle garaged?	Trip Purpose		
<input type="text"/>						
<input type="text"/>						
<input type="text"/>						
<input type="text"/>						
<input type="text"/>						
<input type="text"/>						
<input type="text"/>						

Vehicle Garaged:

- 1. Within the Cordon (study area)
- 2. Outside the Cordon line

Trip Purpose "To"

- 1. Home
- 2. Work
- 3. Pers. Bus.--Medical
- 4. Social - Recreation
- 5. Eat Meal
- 6. Shopping
- 7. School
- 8. Change Mode of Travel
- 9. Serve Passenger

Figure 3

complete an interview in as little as ten seconds, making a relatively large sampling available without holding up traffic beyond reason.

The interviewing resulted in data on approximately 27,300 trips, representing 76% of the total trips crossing the screen-line, based on the classification counts taken there in September, October, and November, 1967.

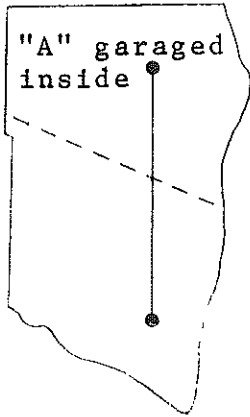
Because of the innovative nature of the interviewing process, no provision had been made for use of the electronic data processing system available to the study. Instead, the data was tabulated by hand into five categories, directly from the interview forms. These categories are diagramed in Figure 4.

Category "A" represents the trips that appear on the internal file of the Origin-Destination study.

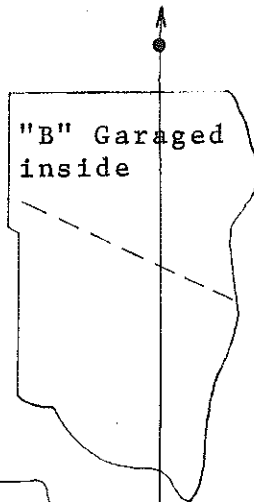
Categories "B", "C", and "E" represent trips that appear on the external file.

Category "D" represents a type of trip that might not appear on either the internal or external file, and is a possible source of unreported trips.

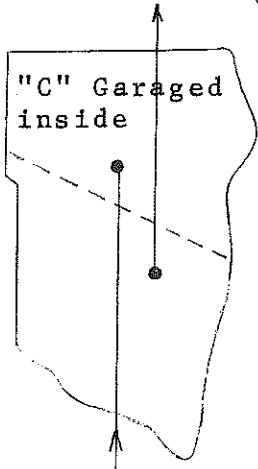
Figure 4



"A" Garaged, code "1" (garaged within the area), with trips starting and ending in the area.

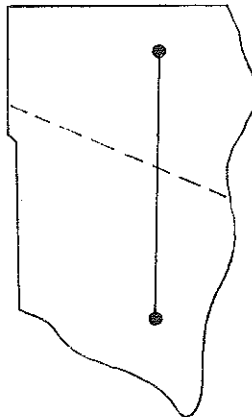


"B" Garaged, code "1" (garaged within the area), with through trips (trips that start and end outside the area).



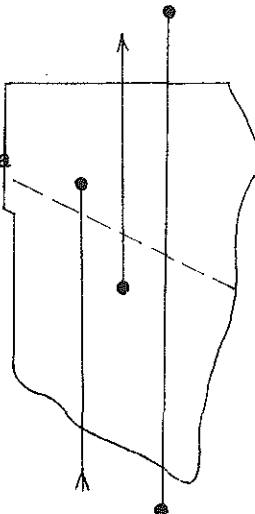
"C" Garaged, code "1" (garaged within the area), with trips starting from within the area and ending outside the area, or starting from outside the area and ending in the area.

"D" Garaged Outside the Area



"D" Garaged, code "2" (garaged outside the area), with trips starting and ending in the area.

"E" Garaged Outside the area



"E" Garaged, code "2" (garaged outside the area), with trips starting in the area and ending outside, starting outside the area and ending in the area, or through trips.

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The results of the tabulation of trips by category from the screenline interviews are as follows:

TABLE 2

<u>CATEGORY</u>	<u>NO. OF INTERVIEWS</u>	<u>PERCENT OF TOTAL INTERVIEWS</u>
A	20,139	73.8
B	22	.1
C	2,277	8.3
D	362	1.3
E	<u>4,504</u>	<u>16.5</u>
Total Interviews	27,304	100.0

As noted earlier, the categories were selected so that they could be compiled to match the internal file and external file. Category "A" represents the internal file; as shown in Table 2 it composes 73.8 percent of all cars crossing the screenline.

The "D" category represents trips that are probably unreported, or at best under reported, in any file. In this study, they were placed in the external file on the grounds that being externally garaged, these trips might exhibit more of the characteristics of external trips than those of internal ones.

The five categories were collapsed into two files and then stratified by the nine (9) purposes defined in the study. Table 3A shows the results of purpose stratification.

TABLE 3A

Purpose Stratification of
Screenline Interview Survey Trips

	<u>Purpose</u>									<u>Total</u>
	<u>Home</u>	<u>Work</u>	<u>Per Bus</u>	<u>Social</u>	<u>Meals</u>	<u>Shop</u>	<u>School</u>	<u>Chg. Mode</u>	<u>Serve Pass</u>	
INTERNAL	7959	4414	1619	3047	233	1769	403	10	685	20139
	39.5	21.9	8.0	15.1	1.1	8.8	2.0	.2	3.4	100%
EXTERNAL	2749	1712	878	1096	61	357	181	15	116	7165
	38.4	23.9	12.3	15.3	0.9	5.0	2.5	0.1	1.6	100%
TOTAL	10708	6126	2499	4143	294	2125	583	25	801	27304
	39.2	22.4	9.2	15.2	1.0	7.8	2.1	0.2	2.9	100%

TABLE 3B

Purpose Stratification of Trips Occurring Between
10:00 PM and 6:00 PM as Reported in the Home Interviews

<u>TIME PERIOD</u>	<u>Home</u>	<u>Work</u>	<u>Pers. Bus.</u>	<u>Social</u>	<u>Meals</u>	<u>Shop</u>	<u>School</u>	<u>Chg. Mode</u>	<u>Serve Pass.</u>	<u>Total</u>
10 PM	263	137	9	59		9			42	520
11 PM	308	95		35	9				52	498
12 M	283		17	17	9				17	344
1 AM	104			26					9	138
2 AM	77			8					25	111
3 AM	34									34
4 AM	17	34							17	67
5 AM	17	112							9	138
TOTAL	1104	378	26	145	18	9	0	0	171	1850
% of										
TOTAL	59.7	20.4	1.4	7.8	1.0	0.5	0	0	9.2	

In order to compare the screenline interviews with the O-D survey, the assumption must be made that the screenline interviews' percentage composition represent the actual percent by purpose of vehicles crossing the screenline. This is a safe assumption because of the high sample rate. The data was also checked for time biases due to no station operation from 10:00 P.M. to 6:00 A.M. Analysis of trips reported in the home interviews for the hours between 10 P.M. and 6 A.M. indicates that although volume was lost, the percentage makeup by trip purpose is relatively unchanged. (Table 3B) There is a larger percentage of "home" trips, and such purposes as school and shop are missing entirely, or reported in very low volumes, but this is to be expected at this time of day. In all, it seems no single purpose category has been under reported in a large amount because of differential activity during this time period.

The vehicle classification counts during the Origin-Destination survey in 1967, showed 35,725 autos crossing the screenline. These 35,725 autos were multiplied by the percentage of internal and external file composition derived from the screenline interview survey and compared to the Origin-Destination survey files in Table 4.

TABLE 4

Screenline Interviews	$73.8\% \times 35725 = 26365$	$26.2\% \times 35725 = 9360$
Origin Destination Files	21195	9309

The results of Table 4 demonstrate that the external file of the Origin-Destination study is very well reported. The O-D external file contained 9,309 auto trips and on the basis of the screenline interviews it should have contained 9,360. This represents an under reporting of less than six-tenths of one percent. The internal file of the O-D study shows an under reporting of 5,170 trips or 19.6 percent of the total internal file, showing that the factoring should be done in the internal file.

By multiplying the actual number of trips that should be on the internal and external files from Row 1, Table 4, with the percent by purpose category that should make up each file from Rows 2 and 4 of Table 3A, a comparison can be made of the actual number of trips by purpose that should appear on the files, with those appearing on the O-D file. Tables 5A and 5B below, offer a check of the accuracy of the external O-D file by purpose category by percentage of total trips (5A), and also of the internal file (5B).

TABLES 5A & 5B

Comparisons of IAS Survey trips and
Screenline Interview Survey Trips

<u>Purpose</u>	<u>5A-External File</u>									<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
O & D Survey Trips	3925	2500	390	1445	100	603	210	13	123	9309
% of Row Total	42.1	26.9	4.2	15.5	1.1	6.5	2.3	0.1	1.3	
Screenline Inter- view Trips Expanded by % by purpose to 9309	3574	2224	1145	1424	83	465	232	9	148	9309
% of Row Total	38.4	23.9	12.3	15.3	0.9	5.0	2.5	0.1	1.6	

<u>Purpose</u>	<u>5B-Internal File</u>									<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
O-D Survey Trips	7709	5353	1824	1484	463	1897	211	26	2162	21195
% of Total	36.4	25.3	8.6	7.0	1.9	9.0	1.0	.1	10.2	100%
Screenline Inter- view Trips Expanded by % by purpose to 2636	10414	5774	2109	3981	290	2320	527	53	897	26365*
% of Total	39.5	21.9	8.0	15.1	1.1	8.8	2.0	0.2	3.4	100%

1 = Home

2 = Work

3 = Pers. Business

4 = Social-Recr.

5 = Meals

6 = Shop

7 = School

8 = Chg. Mode

9 = Serve Passenger

*Total count at Screenline
minus External trips at
Screenline = Internals

The check of the external file, Table 5A, by purpose, along with the percentage makeup check in Table 4, displays evidence that the external file is valid and should not be factored. The only category in Table 5A which varied significantly was personal business which reported 390 trips crossing the screenline during the O-D study, and 1,145 trips when interviewed at the screenline. There are two possible sources of this discrepancy: (a) Change may have occurred in the characteristics of the trip making up the external file between the time of the O-D study and the screenline interviews. There are, however, no immediately apparent reasons why these characteristics should change. (b) The work trip category is under reported and could have been confused during the screenline interviewing with the personal business trip purpose. This possibility seems likely but unfortunately there is no way to check.

The validity of the external file has been accepted, per se, in most Origin-Destination studies. These findings in the Port Huron O-D study would confirm that judgment and the external file is being accepted with no further factoring.

The internal file was then checked, by percentages, with the screenline interview survey file, in Table 5B. These purpose category volumes show few discrepancies except for the "serve passenger" category.

"Serve passenger" is a category which might be under reported in the on-screenline interview; e.g., a driver could say he was making a trip to a doctor (personal business) when he might indeed be taking a passenger to the doctor's office (serve passenger). Using the distribution, by percentages, of the "serve passenger" origin purpose category (Auto Trips by Origin Purpose and Destination Purpose, Table 6) trips were reclassified to bring this category to a more realistic total (see Table 7, Row 8).

The assumption being made that the split between home based, non-home based trips would be the same for the screenline survey trips as for internal survey trips, these trips were stratified by home based, non-home based on the nine purposes. These strata were than combined to form the four purpose groups upon which present day trip generation equations and trip distribution models will be cast. Continuity is thus provided through all phases of the study.

The four purpose categories formed, which were the basis for development of factors for the adjustment of the internal survey trips are:

- a. Home based work
- b. Home based shopping
- c. Home based other
- d. Non-home based

TABLE 6

AUTO TRIPS BY ORIGIN PURPOSE AND DESTINATION PURPOSE

Origin Purpose	Total	Home	Destination Purpose			Eat Meal	Shop	School	Change Mode	Serve Passen.	Per Cent Of trips
			Work	Personal Business	Social-Recreation						
Home	44,060		14,595	6,420	5,757	527	7,536	1,029	78	8,119	34.7
Work	23,707	13,331	4,471	1,236	586	1,826	1,233	26	26	972	18.7
Personal Business	12,513	5,896	698	1,973	914	223	2,145	17	9	638	9.9
Social-Recreation	11,235	6,792	327	516	1,370	199	820	26	26	1,159	8.8
Eat Meal	3,333	725	1,721	189	180	8	208	87		215	2.6
Shopping	16,315	9,550	381	1,161	1,075	197	3,176	35	9	731	12.8
School	1,445	910	60	103	42	120	78	18		122	1.1
Change Mode	191	95	9		35		43			9	.2
Serve Passenger	<u>14,270</u>	<u>6,870</u>	<u>1,445</u>	<u>871</u>	<u>1,100</u>	<u>232</u>	<u>1,119</u>	<u>182</u>	<u>9</u>	<u>2,442</u>	11.2
Total	127,069	44,168	23,707	12,469	11,059	3,332	16,350	1,420	157	14,407	
Per Cent of Trips		34.8	18.7	9.9	8.7	2.6	12.8	1.1	.1	11.3	17

Data From:

Center for Urban Studies
University of Michigan
Dearborn, Michigan, Campus

TABLE 7

PORT HURON O-D SCREENLINE ADJUSTMENT

	<u>Home</u>	<u>Work</u>	<u>Pers. Bus.</u>	<u>Soc.-Rec.</u>	<u>Meals</u>	<u>Shopping</u>	<u>School</u>	<u>Chg. Mode</u>	<u>Serve Pass.</u>	<u>TOTALS</u>
Non-Home based		2151	950	427	352	706	34	15	1067	5702
Home Based	7709	3202	874	1058	111	1193	178	9	1095	15429
Total	7709	5353	1824	1485	463	1899	212	24	2162	21131
Percent of Total-NHB		40.2	52.1	28.8	76.0	37.0	16.0	57.7	49.4	27.0
Percent of Total-HB	100%	59.8	47.9	71.2	24.0	63.0	84.0	42.3	50.6	73.0
Screenline Survey Totals	10414	5774	2109	3981	290	2320	527	53	897	26365
Change	<u>-814</u>	<u>-442</u>	<u>-230</u>	<u>-210</u>	<u>-60</u>	<u>-303</u>	<u>-20</u>	<u>-3</u>	<u>+2082</u>	
New Totals	9600	5332	1879	3771	230	2017	507	50	2979	26365

<u>Groupings for Adjustment</u>	<u>HB Work</u>	<u>HB Shopping</u>	<u>HB Other</u>	<u>Non-Home Based</u>	<u>Totals</u>
Internal File	3202	1193	11034	5702	21131
Screenline Survey	3189	1270	14787	7110	26365
Factor	1.00	1.06	1.34	1.25	
Adj. Internal File	3202	1270	14787	7119	26365
Percent of Adj. Internal Total	12.1	4.8	56.1	27.0	100.0

Screenline Survey = Adjustment Factor
Internal File

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Home based work trip volumes required no augmenting of numbers: This factor is 1.00. The home based shopping category has a factor of 1.06. Home based other trips will be factored by 1.34, and non-home based trips by 1.25. (See Table 7 for the derivation of these factors.)

On application of these factors, both to these four purpose groupings, and to the nine original survey purposes, it can be seen that the percent distribution by origin purpose and destination purpose is largely unchanged (Table 8). No purposes are changed in order of magnitude. Likewise, the hourly distribution by percent of total trips is unchanged under this factoring (Table 9).

Truck trips will be factored with a flat 1.55. These trips have a single purpose, that of work, and since the truck trips comprise only eight percent of the total vehicle trips in the area, a flat rate bringing the truck file up to the number of truck trips in the ground count is not unreasonable in its effects.

In summary, the screenline adjustment factors developed above, when applied to the internal trips, give trip volumes for the four internal file purposes which compare favorably to those from the screenline interview survey and the original ground counts on the screenline. The file has been adjusted to 100% of the

TABLE 8

FACTORED AUTO TRIPS BY ORIGIN PURPOSE AND DESTINATION PURPOSE

<u>Origin Purpose</u>	<u>Total</u>	<u>Dest. Purpose</u>							<u>Chg. Mode</u>	<u>Serve Pass.</u>	(factored) % of <u>Trips</u>
		<u>Home</u>	<u>Work</u>	<u>P.Bus.</u>	<u>Soc-Rec</u>	<u>Meal</u>	<u>Shop</u>	<u>School</u>			
Home	51928		14595	8602	7714	706	7988	1379	105	10879	34.1%
Work	26301	13331	5589	1545	732	2283	1541	33	32	1215	17.3%
P. Bus	16173	7901	873	2466	1143	279	2681	21	11	798	10.6%
Soc-Rec	14657	9101	409	645	1713	249	1025	33	33	1449	9.6%
Meal	4232	972	2151	236	225	10	260	109		269	2.8%
Shop	18579	10123	476	1451	1344	246	3970	44	11	914	12.2%
School	1890	1219	75	129	53	150	88	23		153	1.4%
Chg. Mode	247	127	11		44		54			11	.2%
Serve Pass.	<u>18457</u>	<u>9206</u>	<u>1806</u>	<u>1089</u>	<u>1375</u>	<u>290</u>	<u>1399</u>	<u>228</u>	<u>11</u>	<u>3053</u>	12.1%
Total	152504	51980	25985	16163	14343	4213	19006	1870	203	18741	
% of trips (factored)		34.1%	17.0%	10.6%	9.4%	2.8%	12.5%	1.2%	.1%	12.3%	

Factors used: HBW - 1.00 HBO - 1.34

HB Shop - 1.06 NHB - 1.25

TABLE 9
ADJUSTED COUNTS AT THE SCREENLINE

by Purpose Category-by Hour

TIME	HB WORK 1.00	HB SHOP 1.06	HB OTHER 1.34	NHB 1.25	TOTAL ADJUSTED INTERNALS	EXTERNALS	TOTAL ADJUSTED TRIPS	TOTAL GROUND COUNT	% OF TOTAL GROUND COUNT	% OF TOTAL ADJ. TRIPS
1 AM			222	65	287	77	364	201	.6%	1.0%
2			126	20	146	31	177	162	.5%	.5%
3			46		46	28	74	75	.2%	.2%
4	14		46	29	89	35	124	115	.3%	.3%
5	67		30	61	158	111	269	384	1.1%	.8%
6	520		146	601	1267	394	1661	1446	4.0%	4.6%
7	813	4	553	815	2185	588	2579	2540	7.1%	7.2%
8	376	11	531	509	1427	448	1875	1918	5.3%	5.2%
9	133	108	291	329	861	563	1424	1509	4.2%	4.0%
10	104	103	525	370	1102	524	1626	1696	4.7%	4.5%
11	51	102	682	351	1186	511	1697	1962	5.5%	4.7%
12 N	176	92	702	600	1570	483	2053	2014	5.6%	5.7%
1 PM	160	91	626	435	1312	533	1845	1907	5.3%	5.2
2	175	66	663	424	1328	547	1875	2126	5.9%	5.2%
3	227	93	1490	573	2383	700	3083	3166	8.8%	8.6%
4	93	152	2216	579	3040	853	3893	3323	9.3%	10.9%
5	35	109	1727	336	2207	774	2981	2698	7.5%	8.3%
6	51	130	835	348	1364	663	2027	2276	6.3%	5.7%
7	51	81	762	344	1238	395	1633	1711	4.8%	4.6%
8		38	587	165	790	322	1112	1316	3.7%	3.1%
9		21	635	84	740	260	1000	1018	2.8%	2.8%
10	82	6	442	128	658	203	861	964	2.7%	2.4%
11	57		486	96	639	147	786	854	2.2%	2.2%
12M			419	38	457	102	559	493	1.4%	1.6%

ground counts and the percent breakdown by origin purpose and destination purpose has remained unchanged in the main. The afternoon peak in the adjusted file is a little higher, at 10.9%, than in the ground count, at 9.3% of the total daily trips. The morning peak is 7.2%, adjusted, against 7.10%, ground count. (Figures 5 and 6.)

In connection with hourly distribution of the counts, specifically in the breakdown of the total ground count to those reported on the home interview file and those from the external file, the curves in Figure 7 indicate the differential in hour period, between the hour a trip crosses the cordon line and the hour it crosses the screenline, may be one source of difficulty in the adjustment of the internals during the peaks. It is a possibility that some of the externals, crossing the cordon line between four and five P.M. are not among those crossing the screenline until the hour period five to six P.M. This might mean the number of "unexplained" trips should be larger during this peak hour, leaving more "room" for adjustment.

The factors to be used on the internal categories are: home based work, 1.00; home based shopping, 1.06; home based other, 1.34; non-home based, 1.25. The external file needs no adjustment. The factor for this group of trips will be 1.00.

SCREENLINE ADJUSTMENT BY HOUR

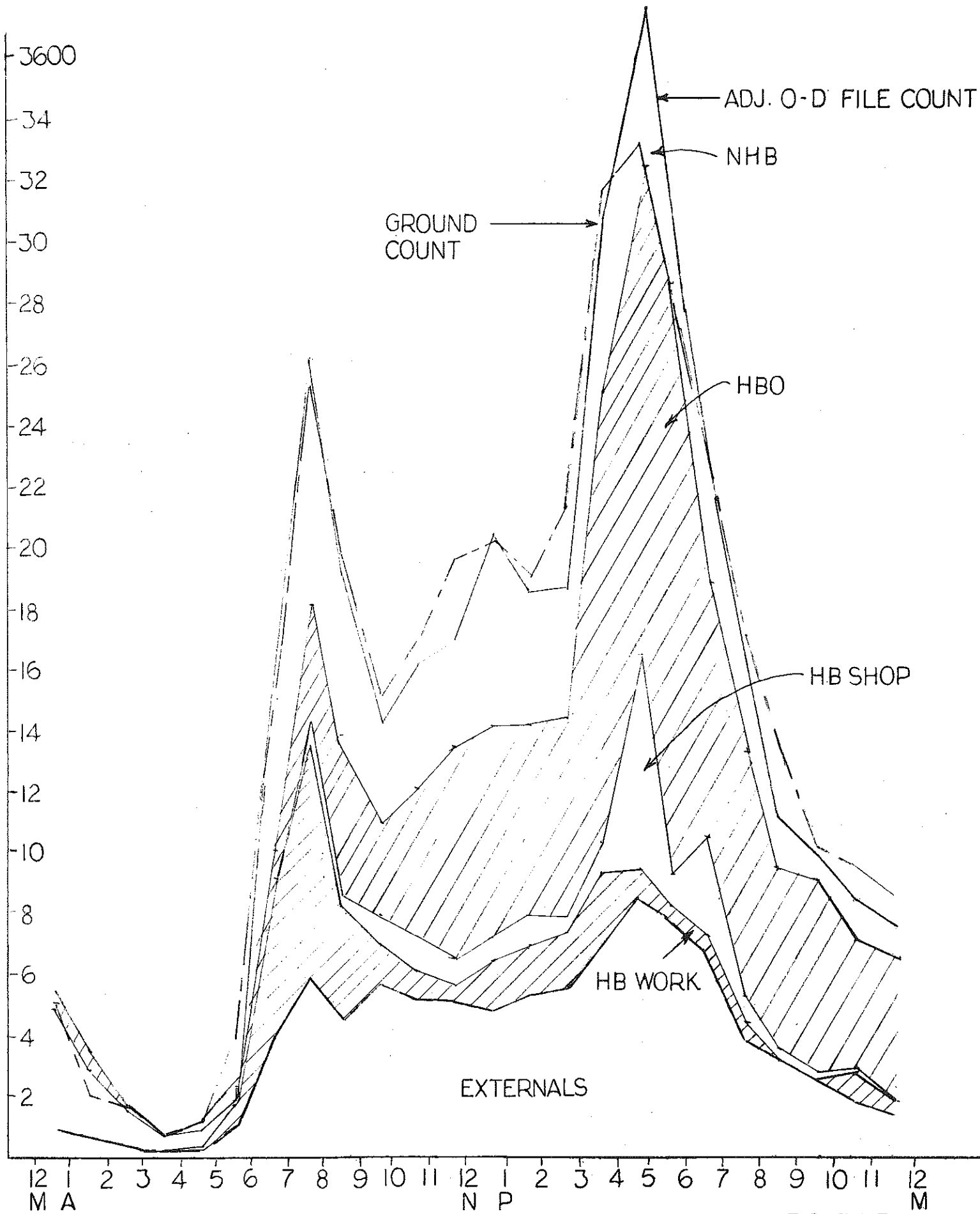


FIGURE 5

PORT HURON O-D STUDY SCREENLINE ADJUSTMENT
(HOURLY COUNTS ÷ TOTAL COUNTS) X 100%

% TOTAL - ADJUSTED O-D FILE COUNTS —————

% TOTAL - GROUND COUNTS - - - - -

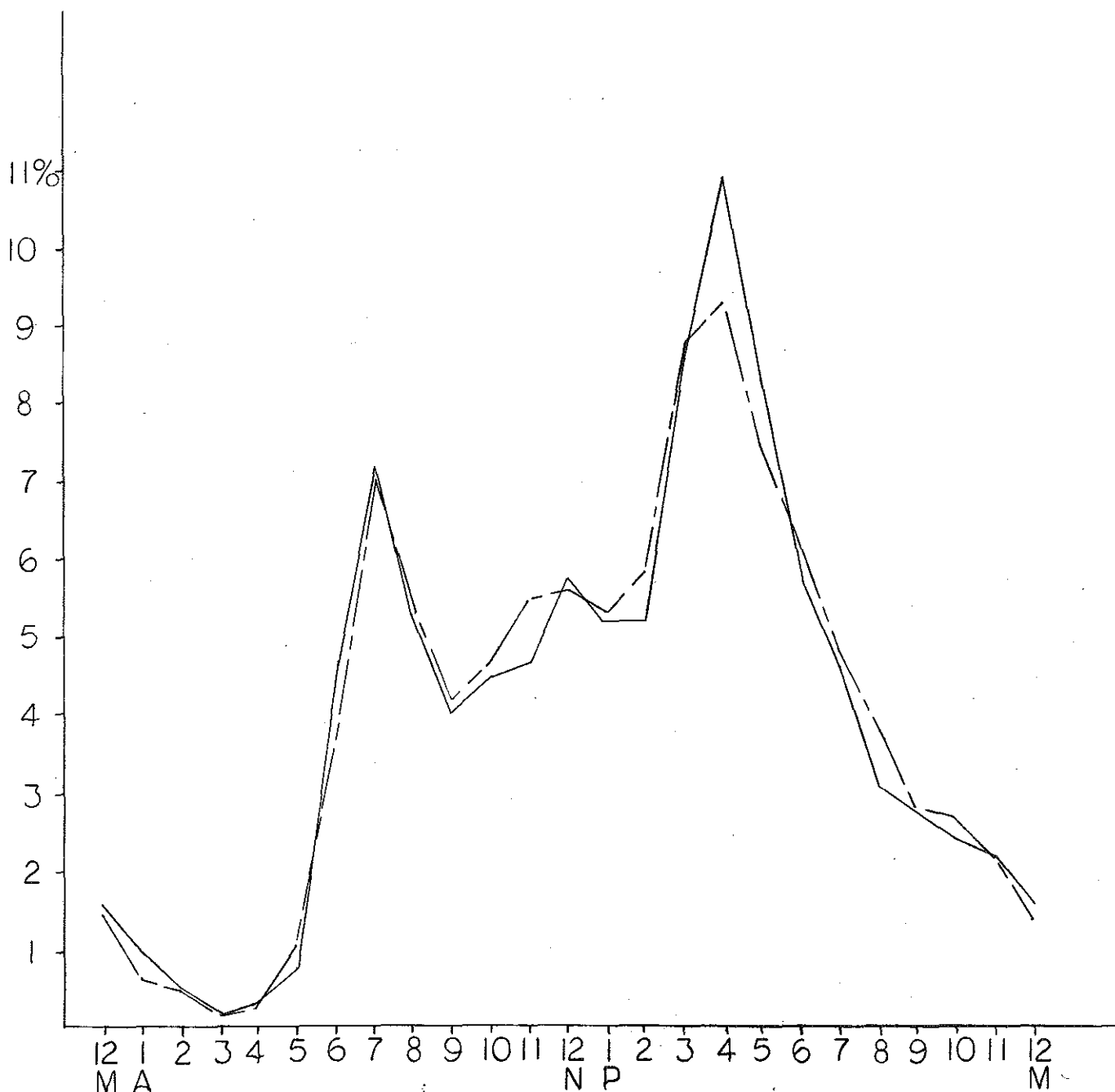
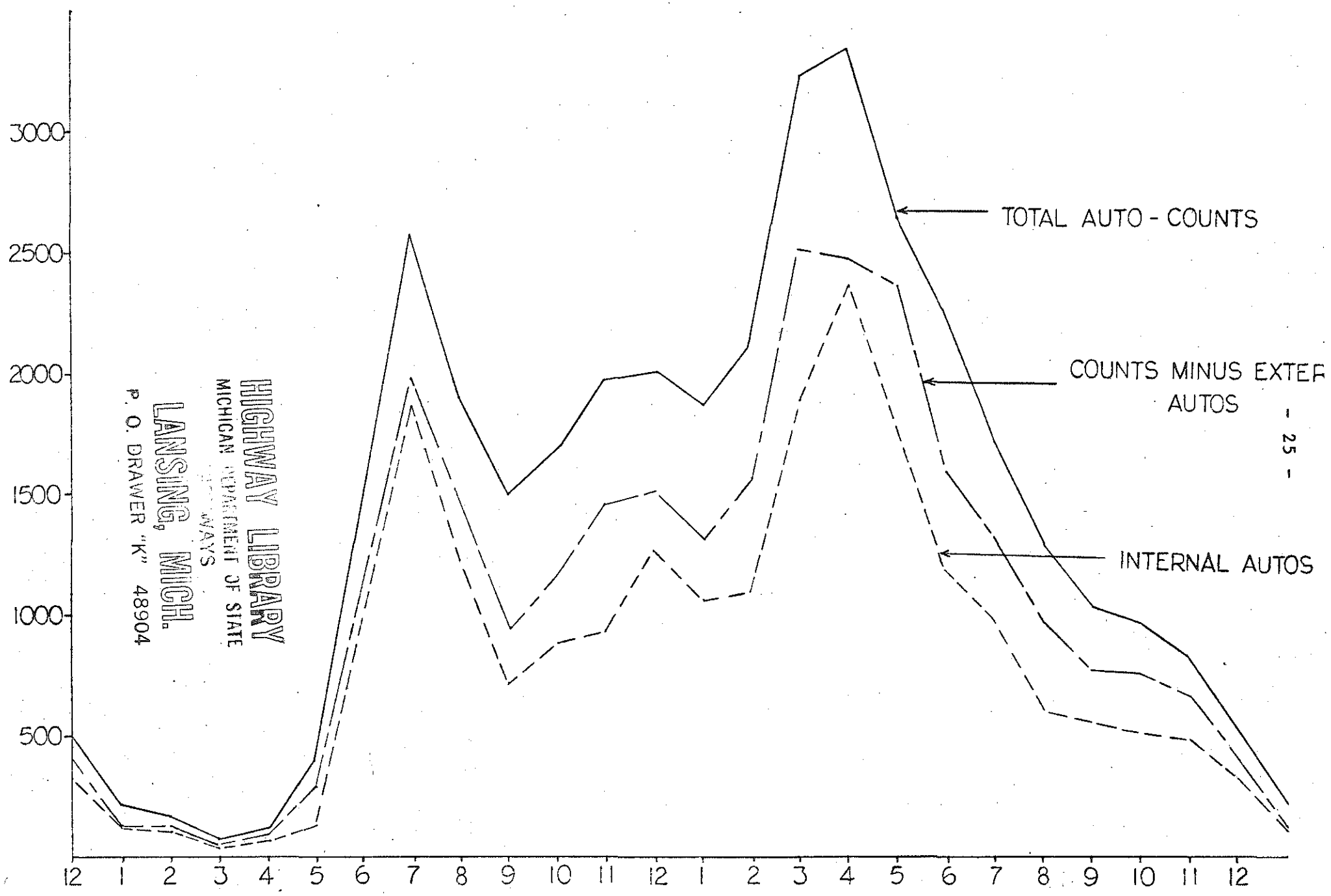


FIGURE 6

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 WAYS
 LANSING, MICH.
 P. O. DRAWER "K" 48904



SCREENLINE AUTO COUNT COMPOSITION

FIGURE 7

Trucks will be factored by 1.55. The area wide figures are displayed in Table 10. The factors for the home based groups confirm the logic in the idea that, in general, home based trips are reported better than non-home based ones. While the factor placed on home based other trips (admittedly a heterogeneous group) is 1.34, the over all factor for the three home based purposes is 1.17, while non-home based trips are factored at 1.25.

The screenline interview survey was useful in the adjustment of the O-D interview files. The costs of conducting the interviewing, and tabulating the results therefrom, amounted to approximately \$14,000. This sum is broken down as follows:

\$8534	Interviewing and Coding Salaries
1924	Tabulation Salaries
<u>3428</u>	Substances and equipment
\$13,886	TOTAL

The cost per interview was \$.51, with 27,000 interviews obtained on the screenline. The cost per interview in the external survey was \$.63, with 30,000 interviews being taken. The comparison may not hold if additional information were asked for at the screenline, but the costs should be in the same order of magnitude.

TABLE 10
TOTAL AREA TRIPS

<u>TRIP PURPOSE</u>	<u>UNADJUSTED TRIPS</u>	<u>ADJUSTMENT FACTOR</u>	<u>ADJUSTED TRIPS</u>
Home Based Work	25054	1.00	25054
Home Based Shop	16444	1.06	17431
Home Based Other	41589	1.34	55729
Non-Home Based	37378	1.25	46723
External	33167	1.00	33167
Trucks	10616	1.55	16454
TOTAL TRIPS	<u>164248</u>		<u>194558</u>

Given the closely comparative costs, and the utility of the screenline interviewing, it would be valuable to consider taking fewer external interviews, and adding the screenline interviews, in setting up the design for new studies. Certainly the external survey interview is a necessity in collecting data for an origin-destination study, but the desirability of screenline interviewing might suggest a reduction in sampling rate on the externals to make funds available for screenline interviewing, if this is a factor.

There are a few changes which might be made in the design of the project to enhance the value of the results. Asking for addresses for both origin and destination as well as place of residence, would make the home based, non-home based split possible on the basis of screenline interviews rather than the split found in the home interviews. If origin purpose as well as destination purpose were determined, the purpose split might also be more easily accomplished. Vehicle occupancy rate is another group of data which might be useful, especially if trip generation is to be done on a person trip basis.

The Midland (Michigan) Area Transportation Study is not getting occupancy figures, but has included the other suggested changes, in the screenline interviewing just completed there.

This has increased the time per interview to thirty seconds and will make the tabulation of data more complex. The results may well make these changes worthwhile.

When the interviewing is tabulated, and the screenline adjustment made in the Midland Study, a comparison of the results obtained in that study and those of the Port Huron study should be useful in empirically solving the problem of adjustment of the home interview trip counts to the counts at the screenline. At that time, an examination of factors resulting from screenline interviews would be useful in evaluating the output of computer adjustment programs as well as in setting useful upper bounds for these programs.