Brian Vollum

System Planning & Analysis Report

M-138

TWIN CITIES

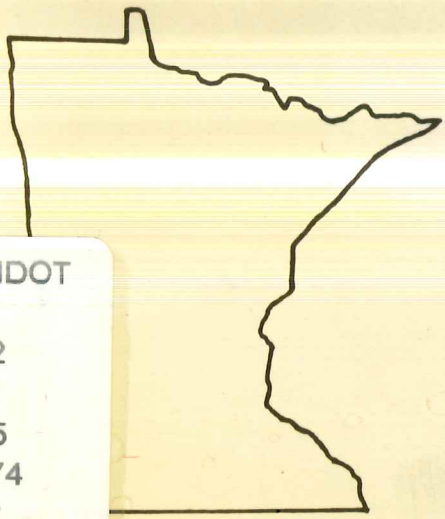
SPECIAL TRAFFIC GENERATOR SUMMARY

JANUARY, 1974

Volumes Low; ie not reflective of volumes at Christmas rush

PREPARED BY

OFFICE OF SYSTEM PLANNING



MINNESOTA DEPARTMENT OF HIGHWAYS

Twin Cities Special Traffic Generators

Table of Contents

Trip Generation for the Twin Cities

Purpose:

The purpose of this report is to assemble the available information on trip generation rates at the site of selected types of land uses. This report documents in summary form data for making rough estimates of traffic volumes at these selected types of land uses. In the case of the employment centers and the regional shopping centers, more detailed data is presented to assist in identifying the characteristics of these generators that affect travel behavior.

Scope:

The special traffic generators studied were grouped together under the following headings; Employment Centers, Shopping Centers, Discount Department Stores, Hospitals, Truck Terminals, Single Dwellings, and Multiple Dwellings. Some of the data presented herein was obtained from the special generator studies conducted by Bather-Wolsfeld, Inc. for the Twin Cities Travel Behavior Inventory. These studies involved the taking of manual and machine counts at the entrance and exit drives of selected major traffic generators. The counting period generally totaled 48 hours, and the counts were taken at various times between July, 1970 and April, 1971.

More specific data presented for some employment centers and the regional shopping centers was collected from data obtained by the Metropolitan Planning Section of the Minnesota Highway Department. This data deals with trip end locations, trip length, trip time; and dwelling units, employment, population, and income within a 5-mile ring from each generator.

Trip Generator Surveys conducted by Bather-Wolsfeld, Inc.

Bather-Wolsfeld, Inc. made special generator surveys at many different locations for the 1970 Travel Behavior Inventory Study. The results of those surveys are shown on the following thirteen pages.

The first twelve pages categorize each type of facility, and give trip data for each generator surveyed. The thirteenth page is a summary showing the range and average generation rate for each category of generators. The number of studies of each type of generator was small, frequently including no more than two sites. In case of doubt as to the applicability of the average generation rates shown in the summary, it would be advisable to refer to the individual rates shown within each category.

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
One-Occupant Office Bldg/Complex:				
Prudential Insurance	406,000	3780	9.3	8/8/70
Farmers' Union	120,605	431	3.6	8/9/70
GSA (Fed. Bldg)	674,000	9128	13.5	8/14/70
State Farm	102,267	2223	21.7	8/18/70

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Multi-Occupant Office Bldg/Complex:				
Pentagon				
Office Park	2,705,054	25,138	9.3	8/25-26/70
Hudson Road				
Office Park	120,000	1,428	11.9	8/10/70

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
One Occupant Industrial Facility				
Ford Ass'y Plant	1,080,000	4058	3.8	4/6-8/71
Brockway Glass	445,642	889	2.0	3/29-31/71

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Industrial Park				
Edina Interchange Park	1,002,000	20244	20.2	8/26-27/70
Mpls. Industrial Park	1,466,295	11755	8.0	8/28&31/70

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Regional Shopping Centers:				
Rosedale	679,699	13518	19.9	7/21-23/70
Brookdale	1,018,000	26994	26.5	7/28-30/70
Southdale ≈ 75 acres	940,000	33701	35.9	8/4-6/70
Apache Plaza	650,000	20850	32.1	8/11-12/70
Har Mar Mall	458,702	19365	42.2	8/19-20/70

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Sub-Regional Shopping Centers:				
Sun Ray	214, 945	16261	75.7	8/16-18/70
Knollwood	396, 000	17190	43.4	11/9-11/70
Southtown	552, 000	23621	42.8	4/12-14/71

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Free Standing Discount Department Store				
Atlantic Mills	40,000	1552	38.8	3/17-19/71
Wards-Robbinsdale	154,000	6878	44.7	4/14-16/71
Gem-Bloomington	100,000	3298	33.0	3/31-4/2/71
Target Fridley	149,000	10411	69.9	11/18-20/70
Target Knollwood	130,000	12344	94.9	11/16-18/70
Target Roseville	94,500	11452	121.1	8/13-18/70
Gem-Maplewood	134,000	7847	58.6	8/15-17/70
Wards Robbinsdale (NW Penn Route Rider Project) July-Aug 1975	154,000	6346	41.2	

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Hospitals:				
St. Paul-Ramsey	582,500	6563	11.3	4/5-7/71
Fairview-Southdale	284,500	6020	21.2	3/31-4/2/71

SPECIAL GENERATOR SURVEYS

FACILITY	GROSS TOTAL SQ. FT.	TOTAL TRIPS	TRIPS/ 1000 SQ. FT.	DATE
Truck Terminals				
Gateway	59, 272	593	10.0	3/8-11/71
Murphy	124, 260	1811	14.6	3/24-26/71

SPECIAL GENERATOR SURVEYS

FACILITY	NUMBER OF DWELLING UNITS	TOTAL TRIPS	TRIPS/ D.U.	DATE
Residential Subdivisions				
North River Hills	714	6228	8.7	8/25-28/70
Sub-Division (Coon Rapids)	297	2366	8.0	3/8-11/71

SPECIAL GENERATOR SURVEYS

FACILITY	NUMBER OF DWELLING UNITS	TOTAL TRIPS	TRIPS/ D.U.	DATE
Mobile Home Parks				
Fridley Terrace Mobile Home Park	326	1509	4.6	3/3-5/71
Cedar Knoll Mobile Home Park	177	1122	6.3	3/29-31/71

SPECIAL GENERATOR SURVEYS

FACILITY	NUMBER OF DWELLING UNITS	TOTAL TRIPS	TRIPS/ D.U.	DATE
Apartments				
Royal Oaks Apts.	65	334	5.1	3/3-5/71
Fountainhead Apts.	180	1245	6.9	3/29-31/71
The Apartment	192	1163	6.1	3/1-3/71
Midland Terrace Apts.	420	2019	4.8	3/1-3/71
McKnight Village Apts.	432	2531	5.9	4/5-7/71

Summary of Trip Generation Rates

Trips Related to Floor Space

Type of Generator	No. Studied	Total Two-way Trips per 1000 sq. ft. (double rates for total generations)	
		Range	Ave.
Employment Centers			
1. One occupant office bldg.	4	3.6-21.7	12.1
2. Multi-occupant office complex	2	9.3-11.9	9.4
3. One occupant industrial facility	2	2.0- 3.8	3.2
4. Industrial Park	2	8.0-20.2	13.0
Shopping Centers			
1. Regional	5	19.9-42.2	30.5
2. Sub-regional	3	42.8-75.7	49.1
Discount Department Store			
1. With groceries	4	58.6-121.1	82.9
2. Without groceries	3	33.0-44.7	39.9
Hospitals	2	11.3-21.2	14.5
Truck Terminals	2	10.0-14.6	13.1

Trips Related to Dwelling Units

Type of Generator	No. Studied	Total Two-way trips per D.U.	
		Range	Ave.
Single Dwelling			
1. Residential subdivision	2	8.0- 8.7	8.5
2. Mobile home parks	2	4.6- 6.3	5.2
Multiple dwelling			
1. Apartments, under 200 units	3	5.1- 6.9	6.3
2. Apartments, over 200 units	2	4.8- 5.9	5.3

Twin Cities Special Traffic Generators

Introduction:

Further trip generation analysis was done for eight of the generators surveyed in the 1970 Travel Behavior Inventory (TBI). Four of these generators are classified as regional shopping centers, two are office complexes, and two are industrial parks.

The special traffic generators are:

1. Rosedale, Har Mar, Target Shopping Centers *
2. Apache Plaza
3. Brookdale Shopping Center
4. Minneapolis Industrial Park
5. Prudential Insurance
6. Edina Interchange Industrial Park
7. Pentagon Park Office Complex
8. Southdale Shopping Center

* Due to the close proximity of Rosedale, Har Mar, and Target Shopping Centers, all three are grouped together as one shopping complex.

Origin and destination surveys were made at each of these generators, and the resulting trip ends** were plotted on maps showing the urban performance model districts for the seven county metropolitan area. A detailed explanation of the procedures followed in plotting these trip ends is included in this report.

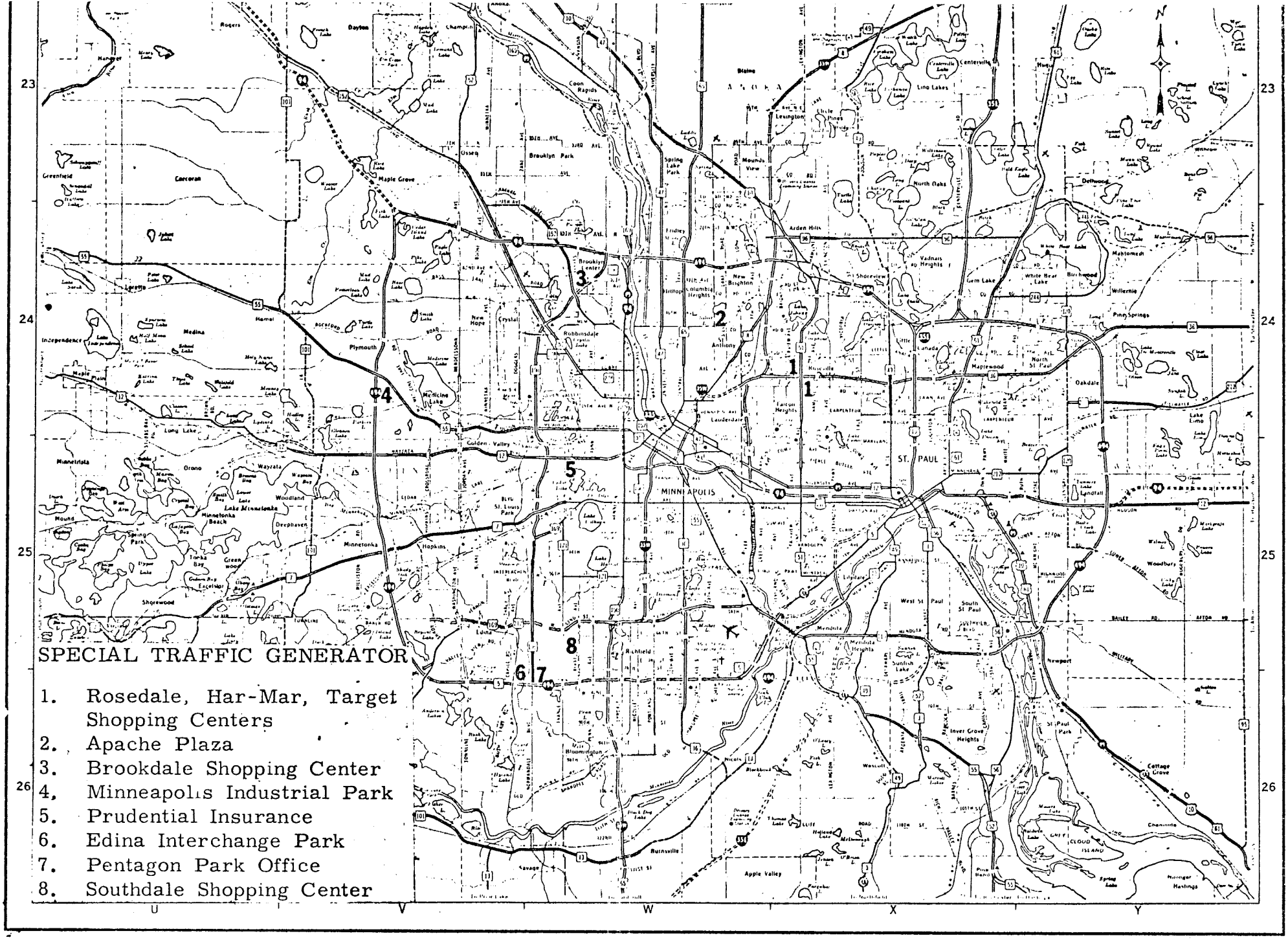
Trip ends are also shown by mile rings (up to five miles) for each generator. For the regional shopping centers, the mile rings are also used to show the relationships of trip ends to employment, dwelling units, and population. Income graphs for a five mile ring around each shopping center are also presented, as are various characteristics of each center.

Frequency distribution of travel time graphs are included. These graphs relate for each generator trip length to percentage of total trips.

** Trip End: Either a trip origin or a trip destin ation (i.e. - Each trip has two trip ends).

Location of Special Trip Generators

All eight special generators are located on three different base maps of the metropolitan area. The first map locates the generators on the metropolitan roadway system. The second map locates the generators on the metropolitan area political boundaries map. The third map locates the generators by Urban Performance Model Districts (UPMD). This base map is used to plot the trip ends for each of the special generators.


SPECIAL TRAFFIC GENERATOR
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23
24
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26
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V
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Y

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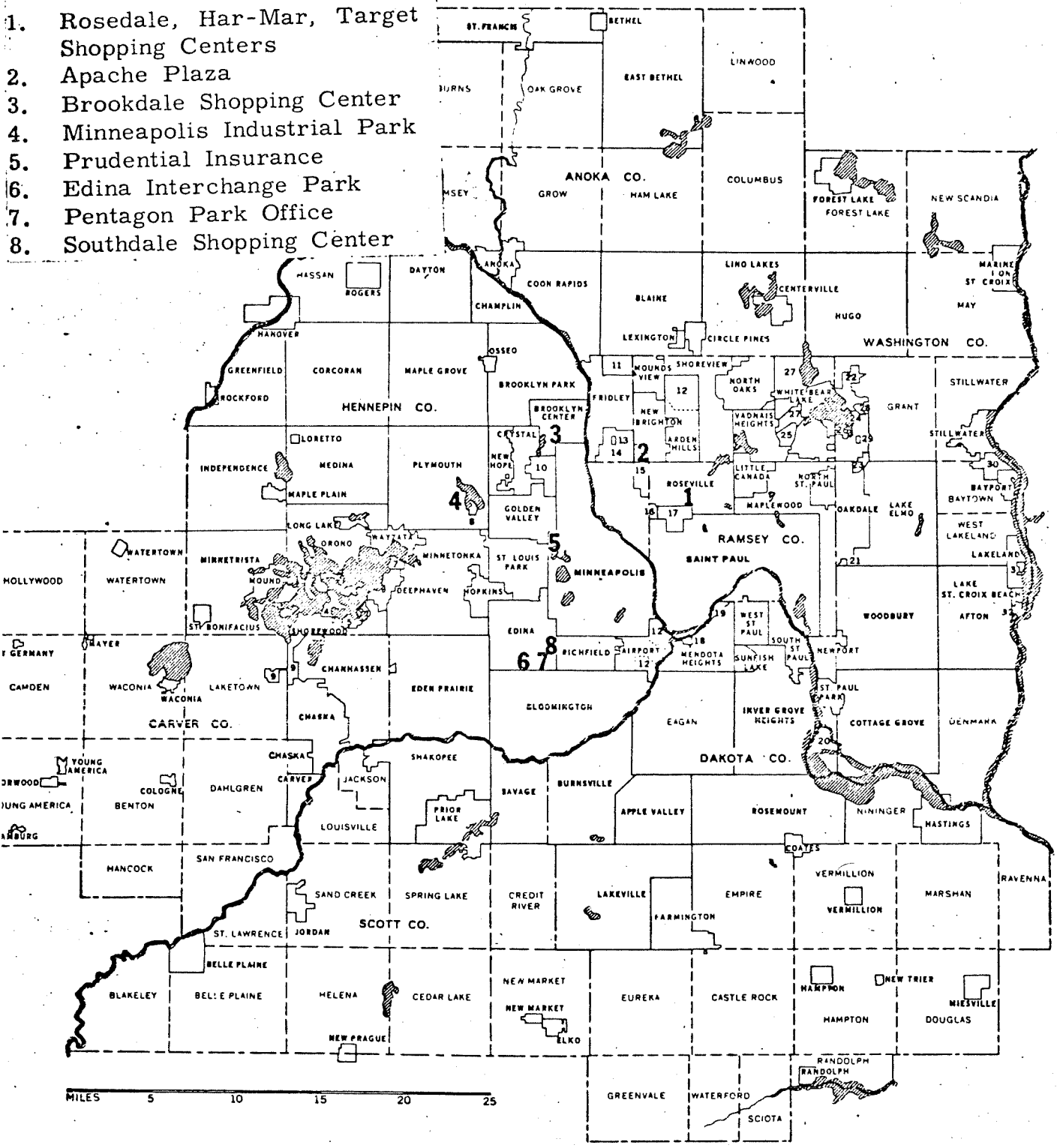


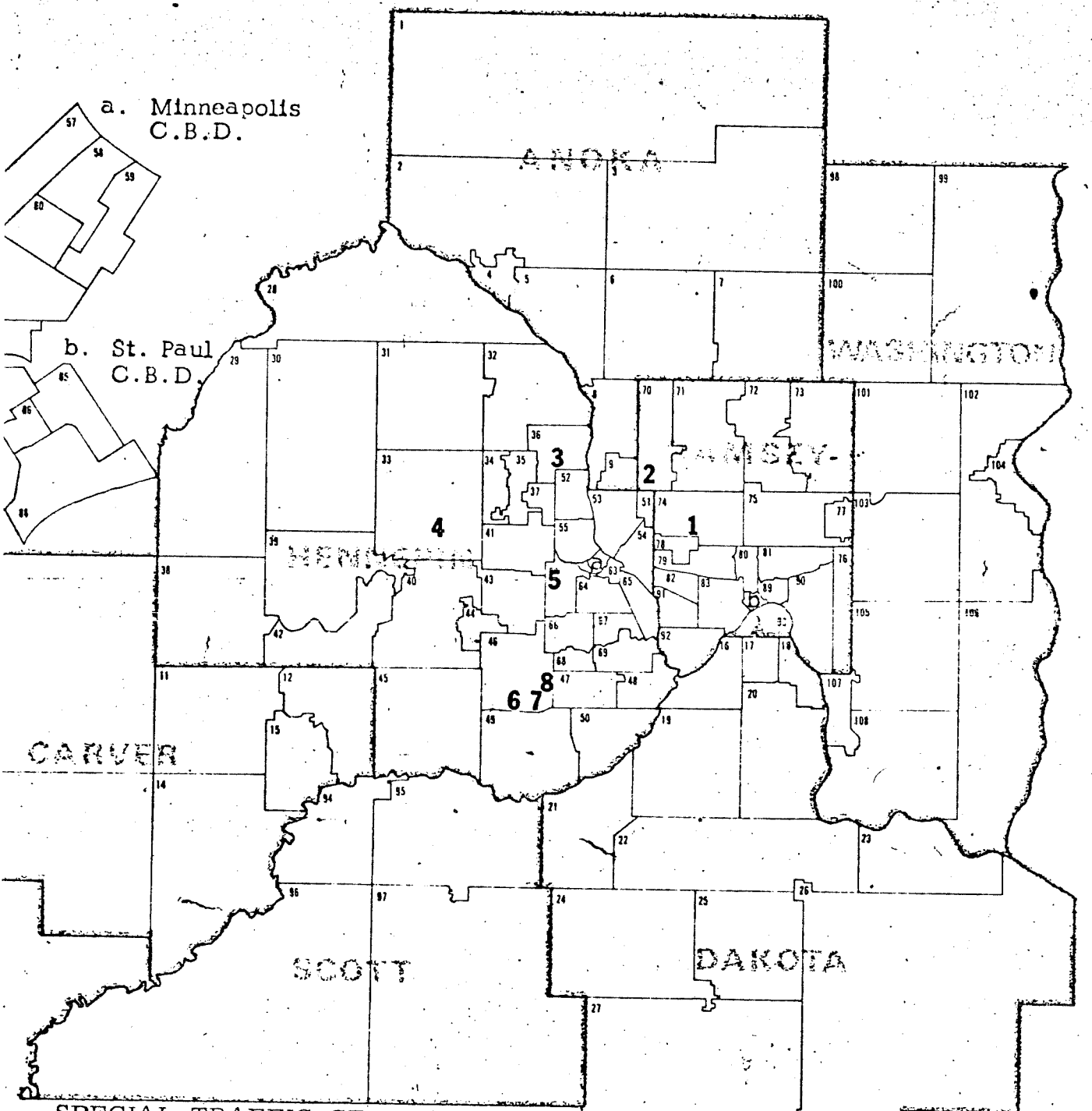
TWIN CITIES METROPOLITAN AREA,

Political Boundaries, 1972

1 SPRING PARK
2 ORONO
3 MINNETONKA BEACH
4 TONKA BAY
5 EXCELSIOR
6 GREENWOOD
7 WOODLAND
8 MEDICINE LAKE
9 VICTORIA
10 ROBBINSDALE
11 SPRING LAKE PARK
12 U S GOVT
13 HILLTOP
14 COLUMBIA HEIGHTS
15 ST ANTHONY
16 LAUDERDALE
17 FALCON HEIGHTS
18 MENDOTA
19 LILYDALE
20 GREY CLOUD
21 LANDFALL
22 DELLWOOD
23 PINE SPRINGS
24 MAHTOMEDI
25 GEM LAKE
26 BIRCHWOOD
27 WHITE BEAR
28 LINCOLN
29 WILLERNIE
30 OAK PARK HEIGHTS
31 LAKELAND SHORES
32 ST MARY'S POINT

ANOKA ——— County
GRANT ——— Township
OSSEO ——— Municipality

URBAN ACTIVITY FORECAST DISTRICTS



SPECIAL TRAFFIC GENERATOR

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Explanation of Trip End Distribution and Plotting Procedures

The following discussion explains how trip distributions and plottings were made for the special traffic generators under consideration.

The first step was making traffic counts at all entrances and exits to each traffic generator. This procedure was done by the consulting firm of Bather-Wolsfeld, Inc. of Minneapolis. Each access drive was assigned a station number. Manual traffic counts were made and trip interview post cards were handed out at each station for specified hours of the day. Note that the hours vary between different generators, but are constant for every station at each generator. The hours of the manual count and post card interviews are called the Interview Period. Machine counts were made for the daily hours not included in the Interview Period. The purpose for these counts was to determine the ADT for each traffic generator. In some cases the machine counts had to be adjusted for accuracy due to the geometrics of the driveways at some stations. Most generators were counted for 48 hours. All traffic counts were tabulated by the consultant and sent to the Minnesota Highway Department for analysis.

The post cards handed out during the interview period at each generator were filled out and returned to the consultant. These cards indicated the trip end away from the generator for the trip that was being made when the card was handed out. Many of the cards handed out were not returned, and of those returned, some were incorrectly filled out and therefore discarded. Cards that had no discernable errors were then coded for a computer program and key-punched. These computer cards were then sent to the Minnesota Highway Department for analysis.

All of the data sent to the Minnesota Highway Department now consisted of traffic counts and a sample trip-end distribution for each traffic generator. To be of use, the trip-end distributions had to be expanded for all trips made during the respective interview periods at each generator.

This expansion was made on the computer by a factoring program written by Minnesota Highway Department staff. This computer program was originally written for an external

O-D study, but was easily adapted for this special generator study. A brief explanation of the factoring process in the program is included here, and a detailed report on its method of computation is on file in the Metropolitan Planning Section of the Minnesota Highway Department. Its title is Card 3 Factor Program.

The program outputs an hourly factor by station which can be multiplied by the number of corresponding interviews to give the counted volume of traffic at that station for that hour. i.e. - given: station number

given: hour during interview period

$$\text{Factor} = \frac{\text{Traffic Counted}}{\text{Number of Interviews}}$$

Actually, two factors are computed. One is for the interview period only, and the other is for a 24-hour period. The 24-hour factor should not be used in special generator analysis due to the assumption that trip distribution for "after business hours" trips is not the same as "during business hours" trips. (The 24-hour factor is used in the program where cordon or screen line studies are being made and trip distribution is relatively constant). The program requires a greater than 1% sample of number of interviews to number of cars counted to compute an expansion factor. In the case where this criterion is not met, the expansion factor is set to zero and the corresponding trips counted are thereby ignored in the trip distribution process. This is the major reason why there is a difference between the number of trips distributed (see next paragraph) and the number of trips counted.

Once the appropriate expansion factors are computed, another computer program is run which outputs the distribution of trip ends away from the traffic generator. The output is in the form of a trip table by 1282 data collection zones covering the entire seven county metropolitan area. Internal zones are numbered 1-1,281, and zone 1,282 is any place outside the seven county area. The appropriate expansion factors are multiplied by each post card interview and output in the trip table. All trip ends are thereby located by data collection zones, and totals are provided at the end of each trip table.

Following is a more detailed explanation of the trip table output. Trip tables for all of the special trip generators are bound together under one cover titled TBI Special

Trip Generators for 1,282 Data Collection Zones. This is filed with the Metropolitan Planning Section (Rm. 810) of the Minnesota Highway Department. The output for each generator is broken into two parts. The first is a listing of each zone with the number of trips to and/or from the zone in which the special generator is located. The second part is a summary of the same information in trip table form. This part is therefore more useful when using the information.

Anyone using the trip tables should use care in interpreting the output. Two different methods of distributing trips are used; one for the employment centers, and one for the shopping centers. This is due to the different interview procedures used for these two generator categories. At the employment centers, interview postcards were handed out only to inbound vehicles at the generator. This is also the way the employment generator trip table is set up. All of the trips in the employment generator trip table are shown as one-directional inbound at the generator. This may be misleading, because the values shown in the trip table represent trips moving in both directions, inbound and outbound at the generator. At the shopping centers, interview postcards were handed out to vehicles both inbound and outbound. The shopping center trip tables are set up showing trips in both directions.

Five columns make up the trip table. These are labeled Zones, Total Ins, Total Outs, Intrazonals, and Trip Ends.

The Zones column lists each zone number, 1-1,282, in ascending order.

Total Ins is the next column. When trips distributed in one direction* are tabulated, all numbers in this column are zero, except for the zone that contains the special generator. (If another zone is given a numerical value, this is a mistake, and that value should be assigned to the Total Outs column. This does occur occassionally, but is generally negligble.) The numerical value given to the zone that contains the special generator, is made up of all inbound trips at the generator from any origin (i.e. - inter-zonals plus intra-zonals). When trips distributed in both directions** are used, the

* Employment generator trips
** Shopping generator trips

numerical value for each zone (excluding the generator zone) in the Total Ins column represents the number of trips that left the special generator and ended in that zone. The numerical value for the special generator zone equals all inbound trips at the generator from any origin (i.e. - inter-zonals plus intra-zonals).

The third column is Total Outs. The numerical values in this column for each zone, excluding the generator zone, indicate the number of trips that left the zone and went to the special generator. The Total Outs number for the zone containing the generator include the number of trips that left the special generator for any destination (i.e. - inter-zonals plus intra-zonals). For trips distributed in one direction, this number should equal the number of intra-zonals trips for the special generator zone. For trips distributed in both directions, this number should equal the total trips that left the special generator for any destination (i.e. - inter-zonals plus intra-zonals). (Due to some minor coding errors, this number may not be exactly correct in all cases, but the errors are generally negligible.)

The next column is Intra-zonals. This should be equal to zero for every zone except the zone containing the special generator. The numerical value for that zone is equal to the number of trips that had one trip end at the generator and the other in the same zone (i.e. - the entire trip was self-contained in the special generator zone).

The last column is Trip Ends. Each numerical value in this column indicates the number of distributed trip ends located in each zone. It is the sum of the Total Ins and Total Outs columns.

At the end of each trip table, totals are printed. Total Ins and Total Outs indicate the number of trips distributed for each special generator during the interview period, and are in all cases equal to each other. The Trip Ends total is equal to the sum of Total Ins and Total Outs.

Following is a discussion of each special trip generator individually. All trip information shown comes from the material described above.

Rosedale Shopping Center

Four information stations (51-54) were required to collect trip data at Rosedale. Various traffic counts were made on 7/21/70 (Tuesday), 7/22/70 (Wednesday), and 7/23/70 (Thursday). Hourly manual traffic counts were taken between 8:30 a.m. - 9:30 p.m., and machine counts between 9:30 p.m. - 8:30 a.m. Interview post cards were handed out during the manual count hours, and the interview period was set at 9:00 a.m. - 9:00 p.m. This is required because partial hours cannot be accurately factored and expanded. The traffic counts were based on 48 hours, and yield:

13,518 trips ADT

11,841 trips (9:00 a.m. - 9:00 p.m.)

The expansion and distribution of the trips was made for the 12 hour interview period, and yield:

11,411 trips (9:00 a.m. - 9:00 p.m.)

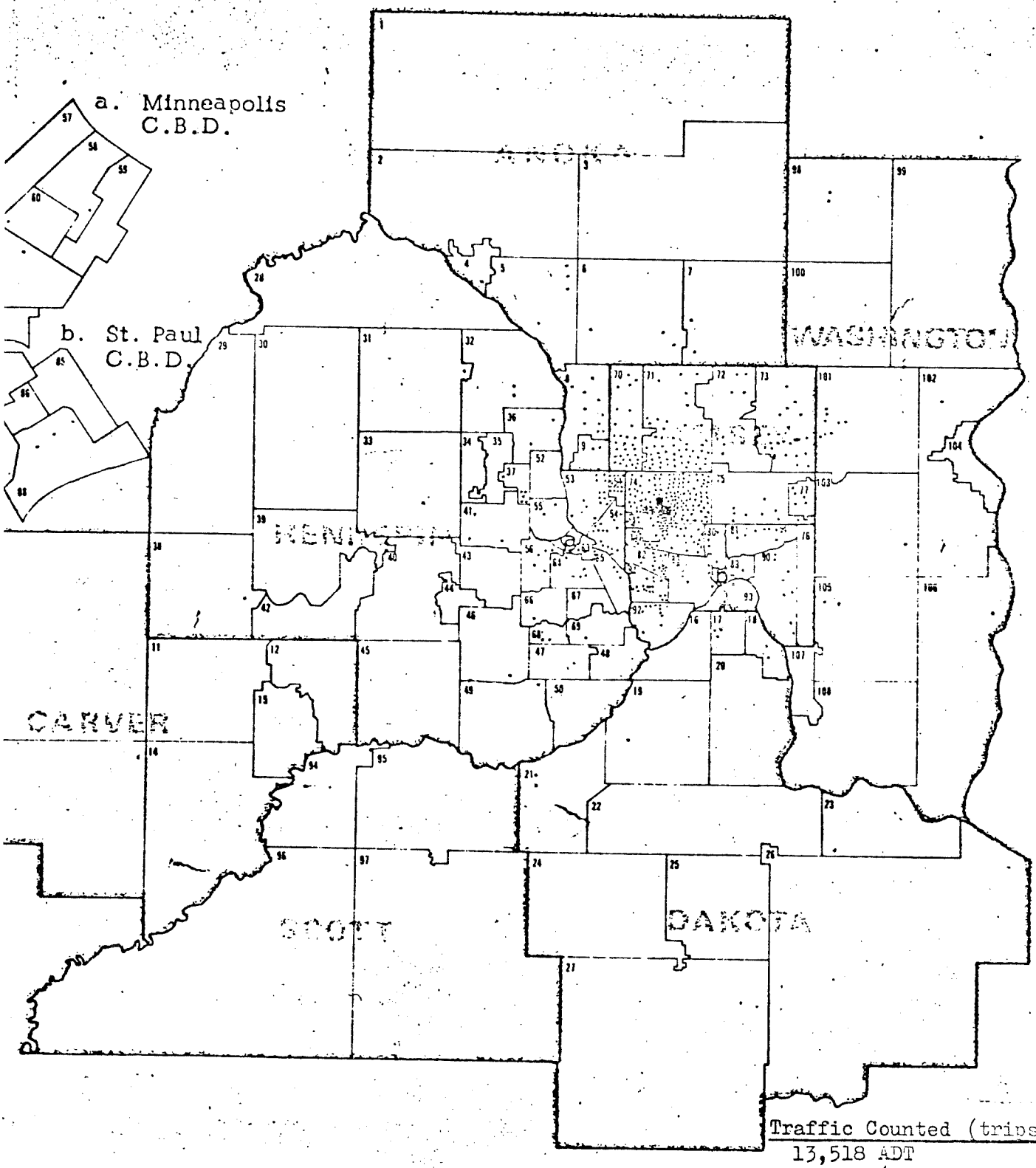
(therefore, 430 trips were not distributed)

51 trips were distributed outside the seven county area.

Exhibit A is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 11,411 trip ends that were distributed away from Rosedale between 9:00 a.m. - 9:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator, the trips represent home-shopping trips. Rosedale Shopping Center is located by a solid black square, which represents the other 11,411 trip ends.

Exhibit A
Trip Distribution for
Rosedale Shopping Center

■ locates special traffic generator
Each dot=20 distributed trip
ends between 9:00am-9:00pm



Traffic Counted (trips):
13,518 ADT
11,841 (9:00am-9:00pm)

Trips Distributed by Computer
11,411 (9:00am-9:00pm)
51 outside seven county area (9:00am-9:00pm)

0 5 10
Scale (miles)

Har Mar Shopping Center

Five information stations (01-05) were required to collect trip data at Har Mar. Traffic counts were made on 8/19/70 (Wednesday) and 8/20/70 (Thursday). Hourly manual traffic counts were taken between 8:30 a.m. - 9:30 p.m., and machine counts between 9:30 p.m. - 8:30 a.m. Interview post cards were handed out during the manual count hours, and the interview period was set at 9:00 a.m. - 9:00 p.m. This is required because partial hours cannot be accurately factored and expanded. The traffic counts were based on 48 hours, and yield:

19,365 trips ADT

17,126 trips (9:00 a.m. - 9:00 p.m.)

The expansion and distribution of the trips was made for the 12 hour interview period, and yield:

17,061 trips (9:00 a.m. - 9:00 p.m.)

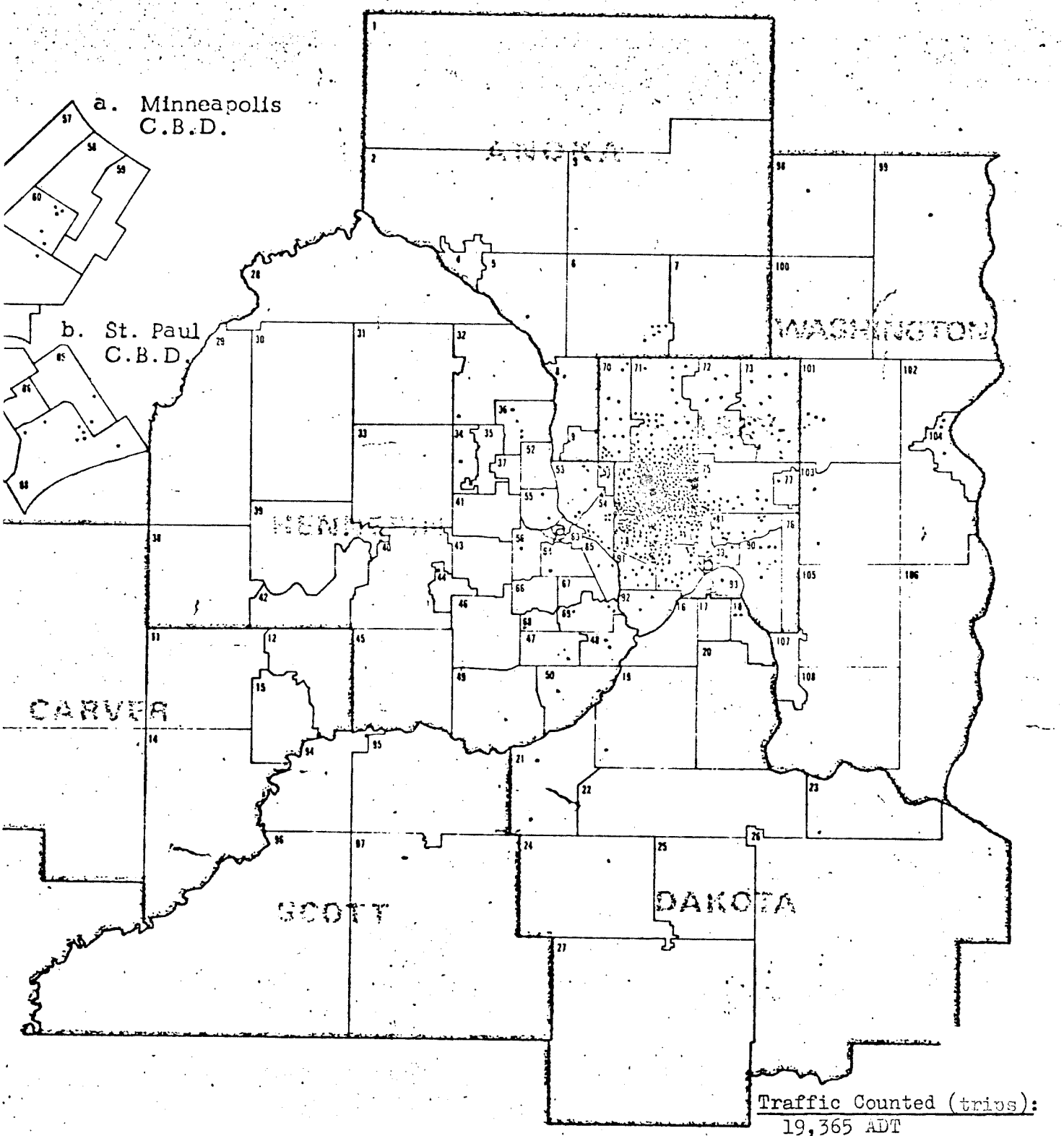
(therefore, 55 trips were not distributed)

109 trips were distributed outside the seven county area.

Exhibit B is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 17,061 trip ends that were distributed away from the Har Mar between 9:00 a.m. - 9:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator, the trips represent home-shopping trips. Har Mar Shopping Center is located by a solid black square, which represents the other 17,061 trip ends.

Exhibit B
Trip Distribution for
Har Mar Shopping Center

● locates special traffic generator
Each dot=20 distributed trip
ends between 9:00am-9:00pm



Traffic Counted (trips):
19,365 ADT
17,126 (9:00am-9:00pm)
Trips Distributed by Computer

17,061 (9:00am-9:00pm)
109 outside seven county area (9:00am-9:00pm)

0 5 10
Scale (miles)

Target Store (Roseville)

Five information stations (78-82) were required to collect trip data at Target. Traffic counts were made on 8/13/70 (Thursday) and 8/18/70 (Tuesday). Hourly manual traffic counts were taken between 8:30 a.m. - 10:30 p.m. No machine counts were taken because of the geometrics of the Entrance/Exit drives, and the majority of the traffic was counted manually. Interview post cards were handed out during the manual count hours, and the interview period was set at 9:00 a.m. - 10:00 p.m. This is required because partial hours cannot be accurately factored and expanded. The traffic counts were based on 48 hours, and yield:

unknown ADT

11,322 trips (9:00 a.m. - 10:00 p.m.)

The expansion and distribution of the trips was made for the 13 hour interview period, and yield:

10,749 trips (9:00 a.m. - 10:00 p.m.)

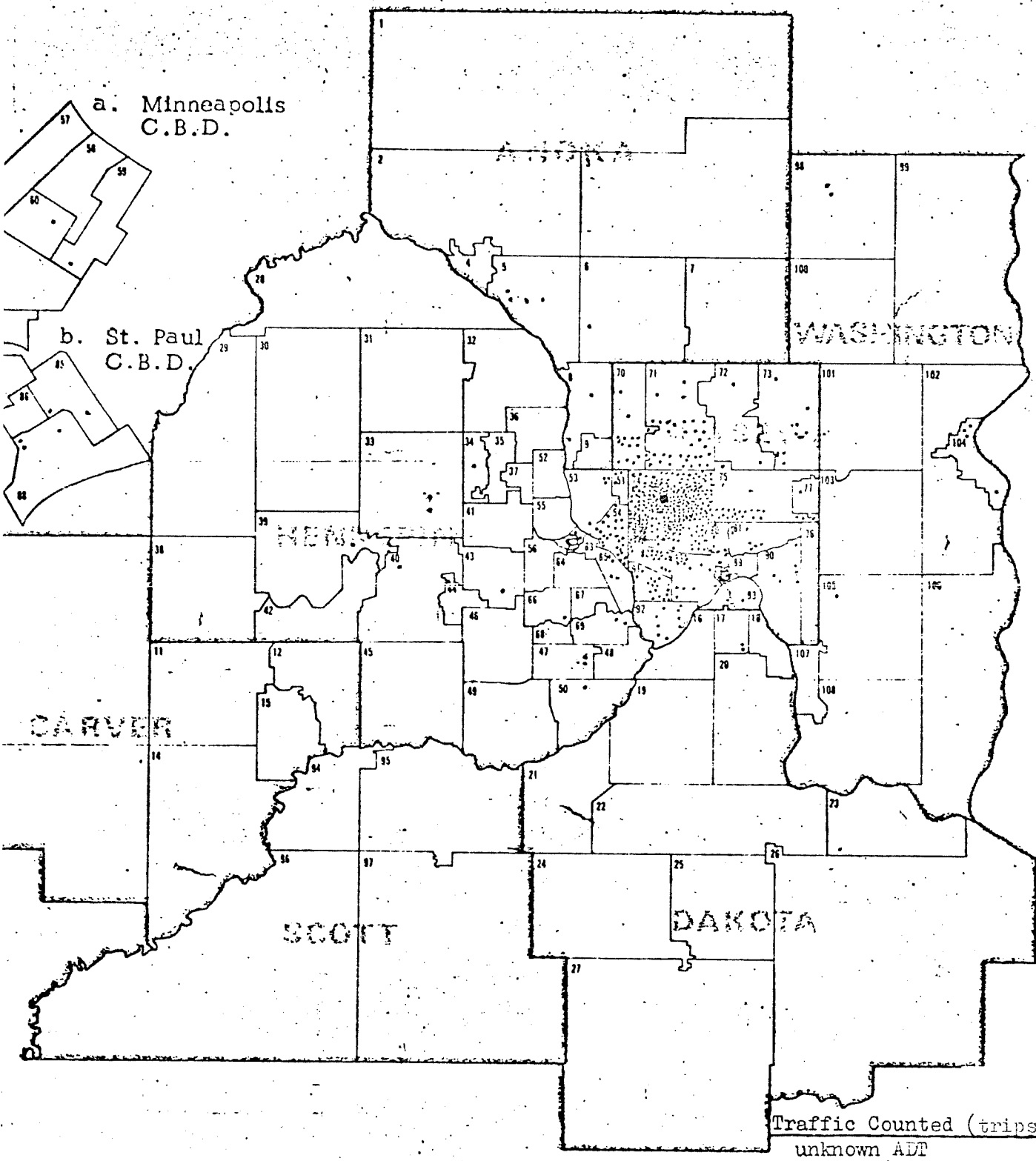
(therefore, 573 trips were not distributed)

306 trips were distributed outside the seven county area.

Exhibit C is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 10,749 trip ends that were distributed away from Target between 9:00 a.m. - 10:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator, the trips represent home-shopping trips. Target Store is located by a solid black square, which represents the other 10,749 trip ends.

Exhibit C
Trip Distribution for
Target Store (Roseville)

■ locates special traffic generator
Each dot=20 distributed
trip ends between 9:00am-10:00pm



Traffic Counted (trips):
unknown ADT
11,322 (9:00am-10:00pm)
Trips Distributed by Computer

10,749 (9:00am-10:00pm)
306 outside seven county area (9:00am-10:00pm)

0 5 10
Scale (miles)

Rosedale, Har Mar, Target (Roseville) Shopping Complex

Due to the close proximity of these three special traffic generators, they have been combined herein to be considered as one shopping complex for the purpose of trip distribution.

Distributed trips were totalled for the three generators as follows:

Rosedale	(9:00 a.m. - 9:00 p.m.)	= 11,411	51
Har Mar	(9:00 a.m. - 9:00 p.m.)	= 17,061	109
Target	(9:00 a.m. -10:00 p.m.)	= 10,749	306
Total plotted (Exhibit D)		= 39,221	
Total outside seven county area		=	466

Note that the time reference for Target is one hour longer than for the other two generators.

No ADT was counted for Target, so the following method was used to calculate that value. Factor= $\frac{\text{Interview Period Trips}}{\text{ADT Trips}}$

Rosedale: $\frac{11,841}{13,518} = 0.875$

Har Mar: $\frac{17,126}{19,365} = 0.885$

Target: $\frac{11,322}{\text{Factor}} = \text{ADT}$

It is estimated that Target's Factor is similar to that of Rosedale and Har Mar. Target is open one hour later than the other two, and its interview period is thus one hour longer. Therefore, an estimate of 0.895 for Target's Factor appears reasonable.

$$\text{ADT} = \frac{11,322}{0.895} = 12,650$$

ADT totals are then:

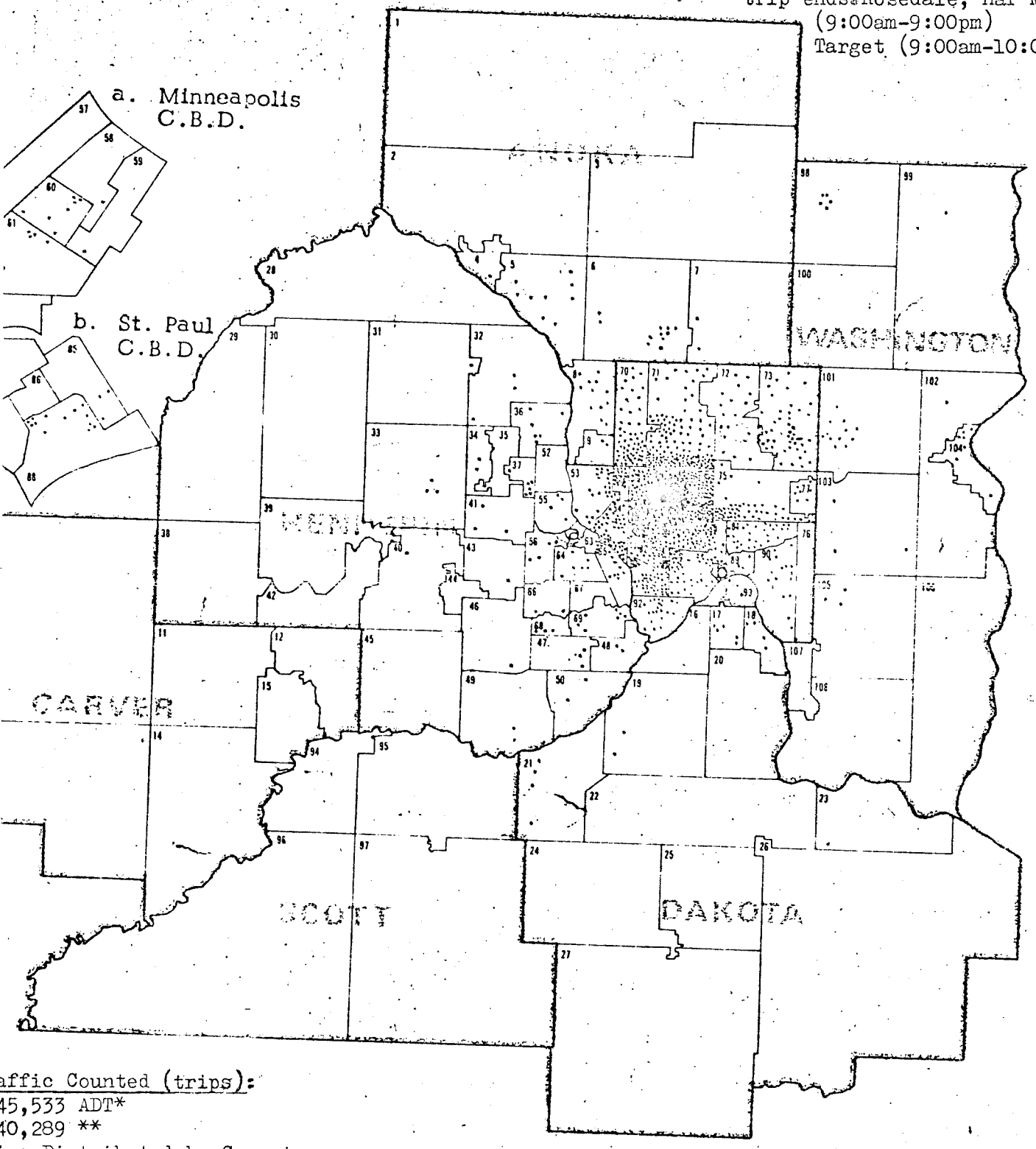
Rosedale	= 13,518
Har Mar	= 19,365
Target	= 12,650*
Total ADT	= 45,533 *

* Calculated, not counted.

Exhibit D is a map of the seven county area on which the total distributed trip ends for Rosedale, Har Mar, and Target are located. Each dot equals 20 trip ends out of the 39,221 trip ends that were distributed away from the shopping complex. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator complex, the trips represent home-shopping trips. The generator complex is located by a solid black square, which represents the other 39,221 trip ends.

Exhibit D
Trip Distribution for
Rosedale, Har Mar, Target (Roseville) Shopping Complex

■locates special traffic generator complex
Each dot=20 distributed trip ends: Rosedale, Har Mar (9:00am-9:00pm)
Target (9:00am-10:00pm)



affic Counted (trips):
45,533 ADT*
40,289 **

ips Distributed by Computer
39,211 **
466 outside seven county area**

See discussion for computation procedure.
Rosedale and Har Mar (9:00am-9:00pm) - Target (9:00am-10:00pm)

Apache Plaza Shopping Center

Five information stations (47-50,60) were required to collect trip data at Apache. Traffic counts were made on 8/11/70 (Tues.) and 8/12/70 (Wed.). Hourly manual traffic counts were taken between 8:30 a.m. - 10:00 p.m., and machine counts between 10:00 p.m. - 8:30 a.m. Interview post cards were handed out during the manual count hours, and the interview period was set at 9:00 a.m. - 10:00 p.m. This is required because partial hours cannot be accurately factored and expanded. The traffic counts were based on 48 hours, and yield:

20,850 trips ADT

19,507 trips (9:00 a.m. - 10:00 p.m.)

The expansion and distribution of the trips was made for the 13 hour interview period, and yield:

19,100 trips (9:00 a.m. - 10:00 p.m.)

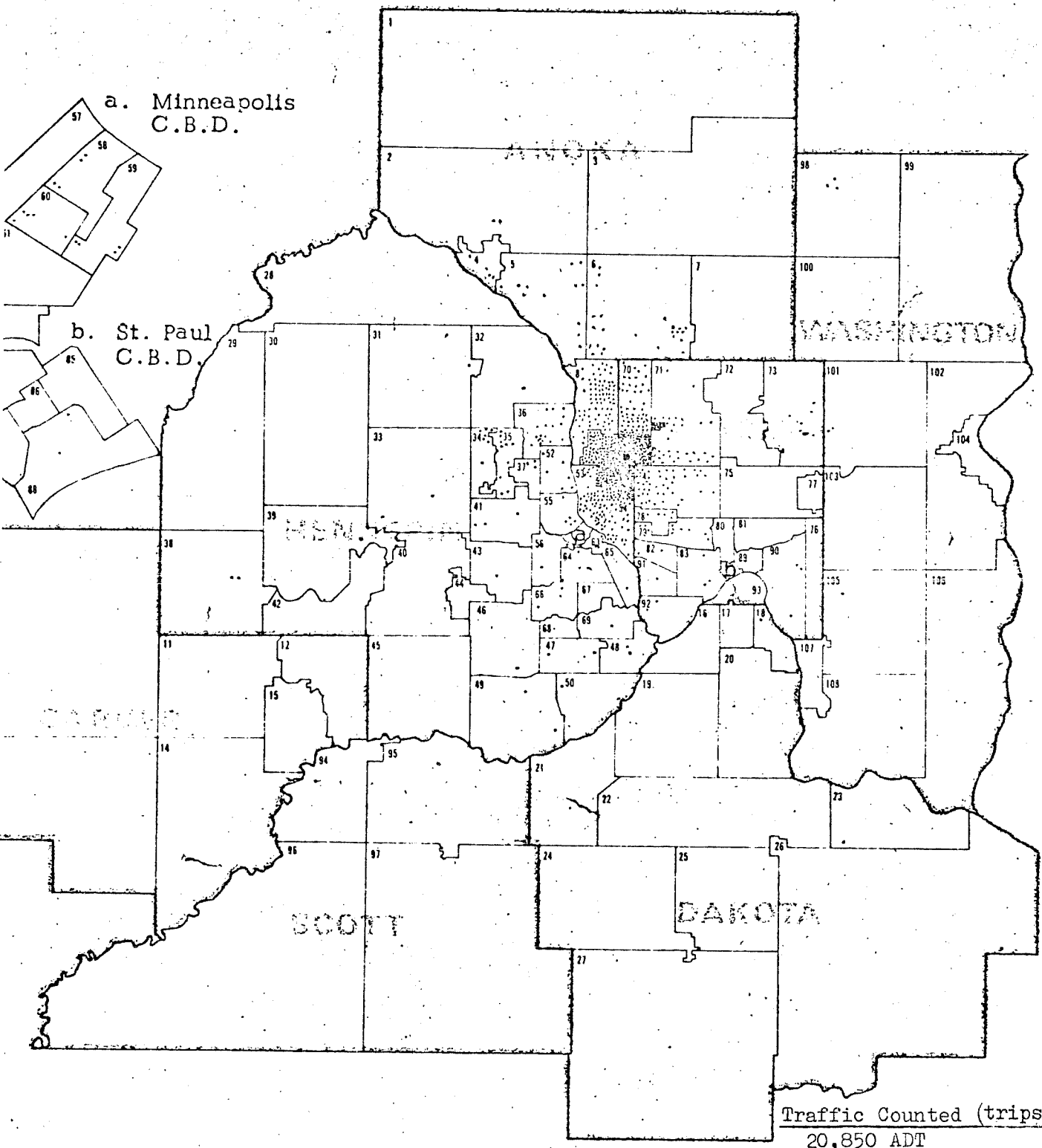
(Therefore, 407 trips were not distributed)

260 trips were distributed outside the seven county area.

Exhibit E is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 19,100 trip ends that were distributed away from Apache between 9:00 a.m. - 10:00 ;.m. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator, the trips represent home-shopping trips. Apache Plaza is located by a solid black square, which represents the other 19,100 trip ends.

Exhibit E
Trip Distribution for
Apache Plaza Shopping Center

■ locates special traffic generator
Each dot=20 distributed
trip ends between 9:00am-10:00pm.



Traffic Counted (trips):
20,850 ADT
19,507 (9:00am-10:00pm)
Trips Distributed by Computer

19,100 (9:00am-10:00pm)
260 outside seven county area (9:00am-10:00pm)

0 5 10
Scale (miles)

Brookdale Shopping Center

Four information stations (55-58) were required to collect trip data at Brookdale. Traffic counts were made on 7/28/70 (Tues.), 7/29/70 (Wed.), and 7/30/70 (Thurs.). Hourly manual traffic counts were taken between 8:30 a.m. - 9:30 p.m., and machine counts between 9:30 p.m. - 8:30 a.m. Interview post cards were handed out during the manual count hours, and the interview period was set at 9:00 a.m. - 9:00 p.m. This is required because partial hours cannot be accurately factored and expanded. The traffic counts were based on 48 hours, and yield:

26,994 trips ADT

23,632 trips (9:00 a.m. - 9:00 p.m.)

The expansion and distribution of the trips was made for the 12 hour interview period, and yield:

21,123 trips (9:00 a.m. - 9:00 p.m.)

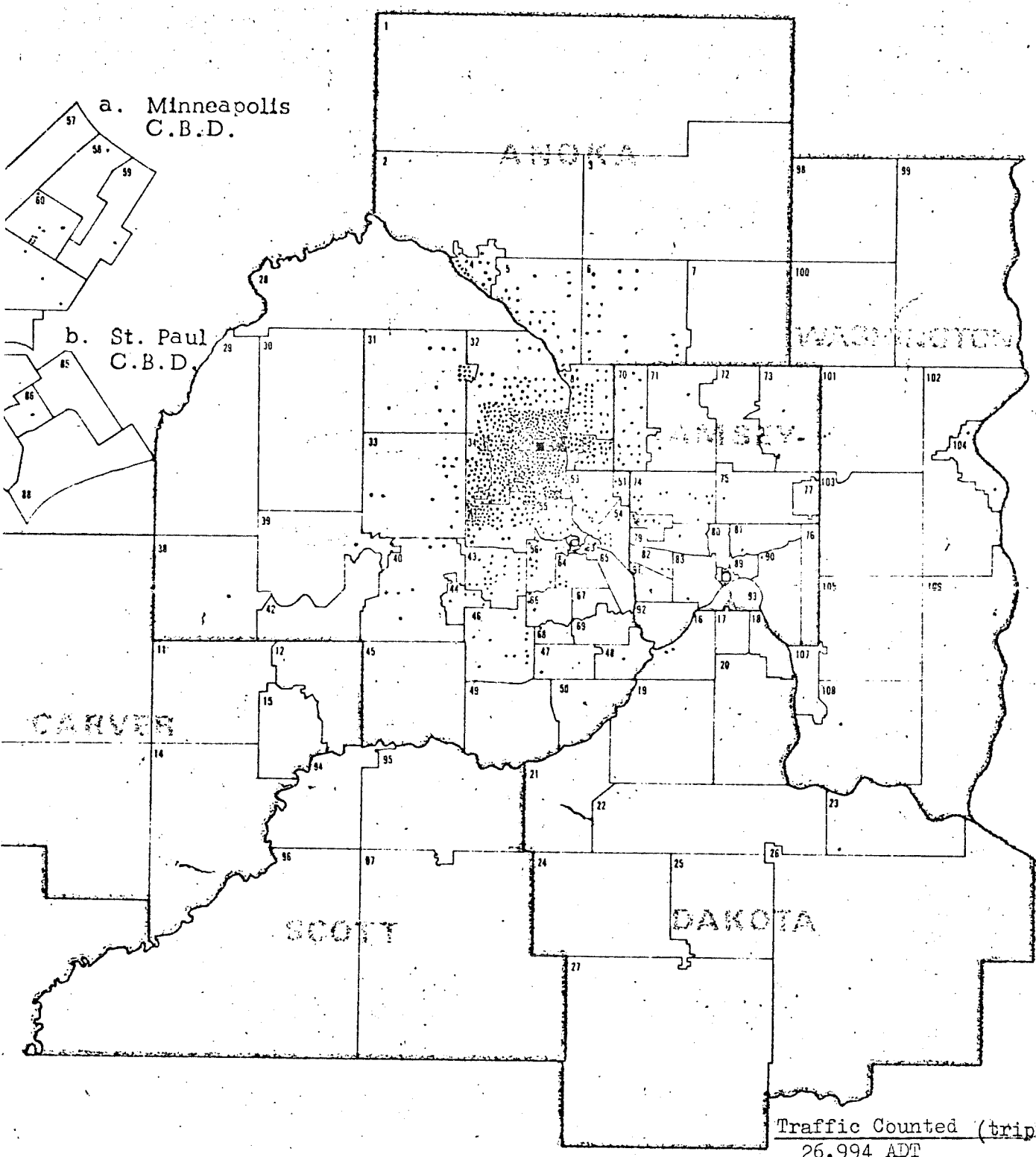
(Therefore, 2,509 trips were not distributed)

741 trips were distributed outside the seven county area.

Exhibit F is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 21,123 trip ends that were distributed away from Brookdale between 9:00 a.m. - 9:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator, the trips represent home-shopping trips. Brookdale is located by a solid black square, which represents the other 21,123 trip ends.

Exhibit F
Trip Distribution for
Brookdale Shopping Center

■ locates special traffic generator
Each dot=20 distributed
trip ends between 9:00am-9:00pm



Traffic Counted (trips):
26,994 ADT
23,632 (9:00am-9:00pm)
Trips Distributed by Computer
21,123 (9:00am-9:00pm)
741 outside seven county area (9:00am-9:00pm)

0 5 10
Scale (miles)

Minneapolis Industrial Park

Six information stations (84-89) were required to collect trip data at Minneapolis Industrial Park. Traffic counts were made on 8/28/70 (fri.) and 8/31/70 (Mon.). Hourly manual traffic counts were taken between 7:00 a.m. - 6:00 p.m., and machine counts between 6:00 p.m. - 7:00 a.m. Interview post cards were handed out during the manual count hours. Because few trips were counted between 5:00 p.m. - 6:00 p.m. and thus few post cards were handed out, the interview period was set at 7:00 a.m. - 5:00 p.m. The traffic counts were based on 48 hours, and yield:

11,755 trips ADT

7,214 trips (7:00 a.m. - 5:00 p.m.)

The expansion and distribution of the trips was made for the 10 hour interview period, and yield:

6,436 trips (7:00 a.m. - 5:00 p.m.)

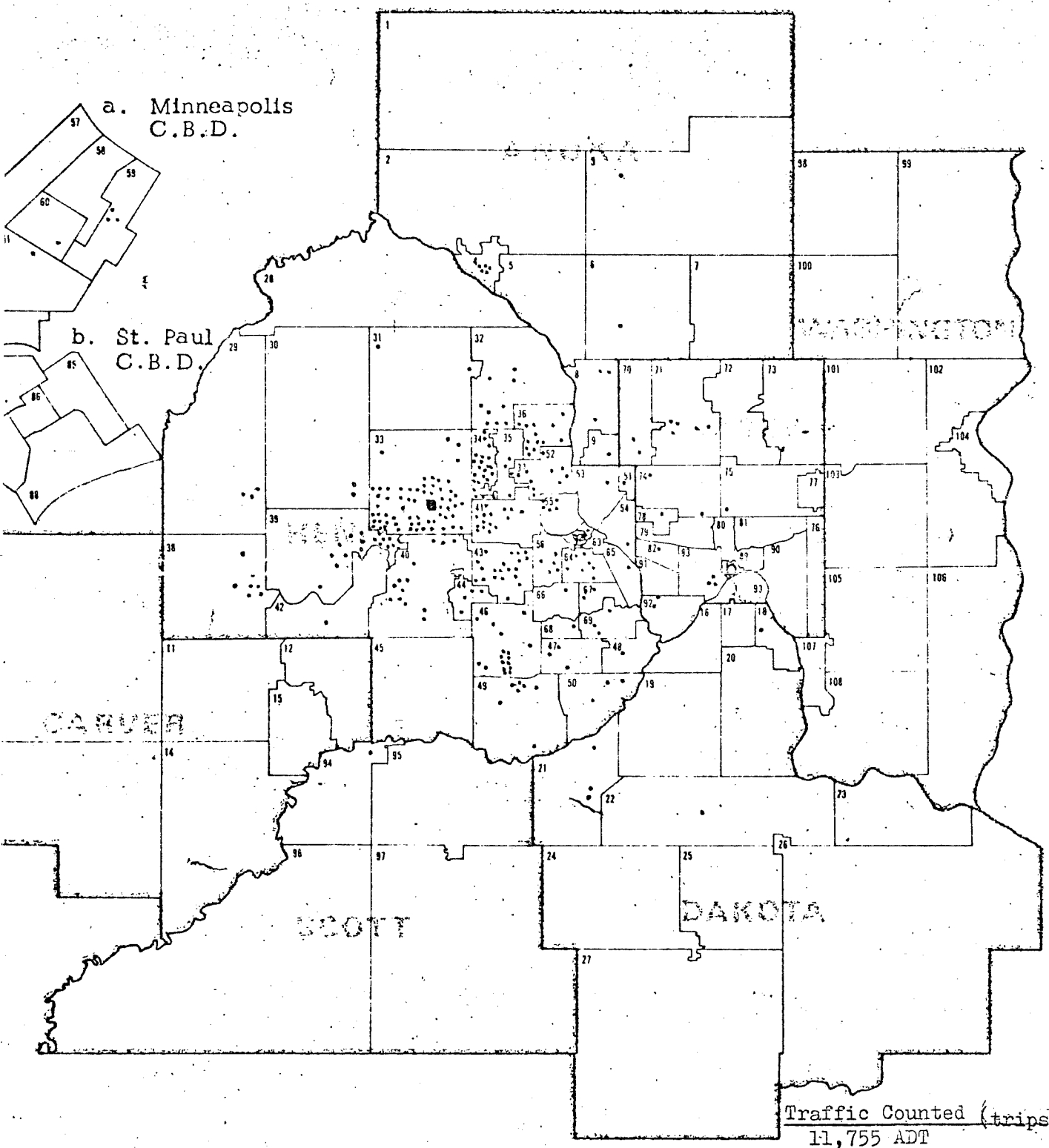
(Therefore, 778 trips were not distributed)

370 trips were distributed outside the seven county area.

Exhibit G is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 6,436 trip ends that were distributed away from the generator between 7:00 a.m. - 5:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the industrial nature of the special generator, the trips represent home-work trips. Minneapolis Industrial Park is located by a solid black square, which represents the other 6,436 trip ends.

Exhibit G
Trip Distribution for
Minneapolis Industrial Park

■ locates special traffic generator
Each dot=20 distributed
trip ends between 7:00a.m.-5:00pm



Traffic Counted (trips):
11,755 ADT
7,214 (7:00am-5:00pm)
Trips Distributed by Computer

6,436 (7:00am-5:00pm)
370 outside seven county area (7:00a.m.-5:00pm)

0 5 10
Scale (miles)

Prudential Insurance

One information station (97) was required to collect trip data at Prudential Insurance. Traffic counts were made on 9/8/70 (Tues.) and 9/10/70 (Thurs.). Hourly manual traffic counts were taken between 6:00 a.m. - 9:00 a.m., and machine counts between 9:00 a.m. - 6:00 a.m. Interview post cards were handed out during the manual count hours, and the interview period was set at 6:00 a.m. - 9:00 a.m. The traffic counts were based on 48 hours, and yield:

3,780 trips ADT

1,294 trips (6:00 a.m. - 9:00 a.m.)

Expansion factors were computed for both the interview period and for 24 hours. The data was then distributed using the 24-hour expansion factor. This in effect distributed trip patterns for a 3 hour period to a 24 hour period. This appears to be an erroneous assumption, and the expansion and distribution of trips should be limited and defined for only the hours between 6:00 a.m. - 9:00 a.m. These 3 hours yield:

1,280* trips (6:00 a.m. - 9:00 a.m.)

(Therefore, 14 trips were not distributed)

35* trips were distributed outside the seven county area.

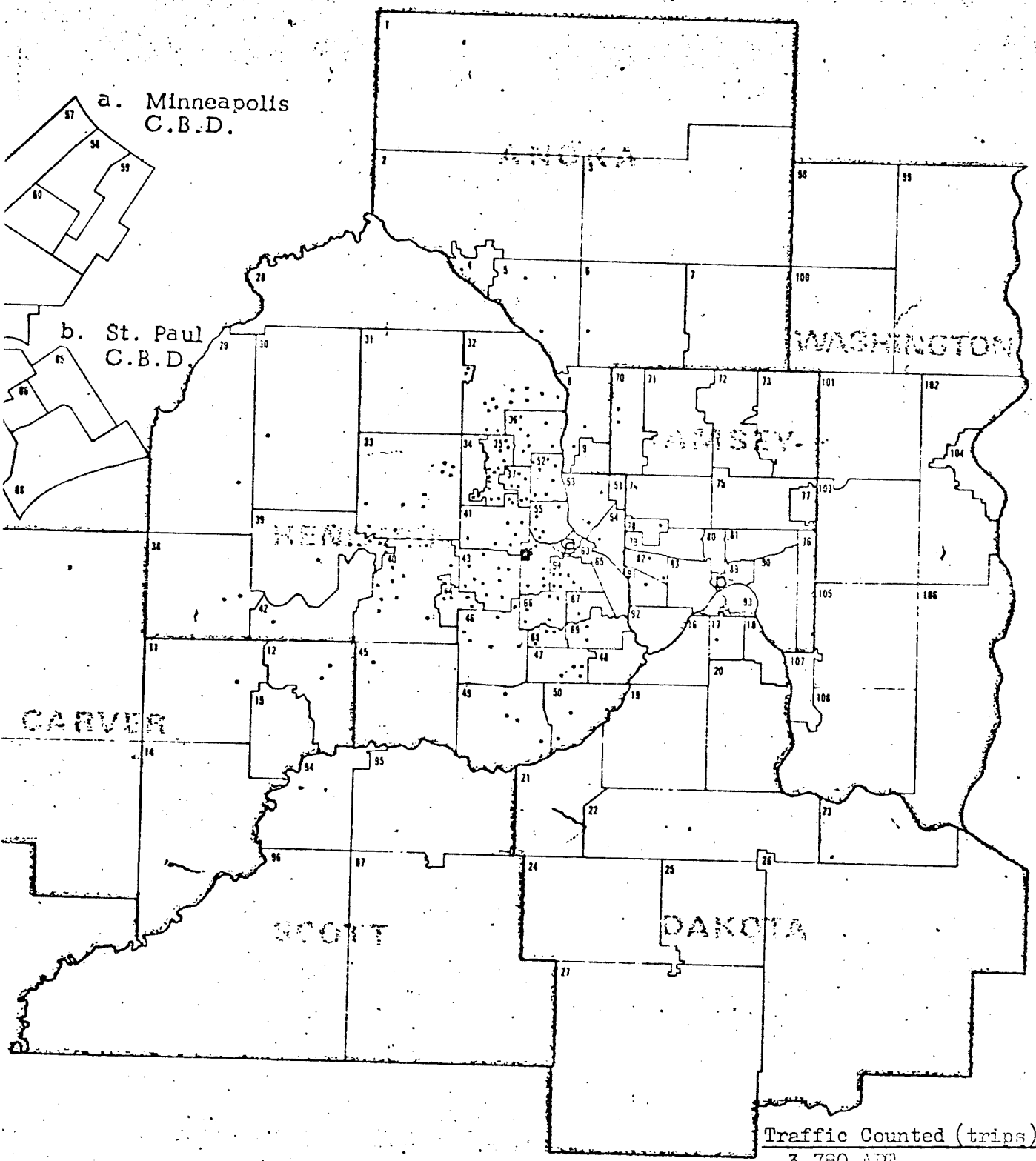
* These values were obtained by dividing the corresponding 24 hour values by 2.921, which is the ratio of the 24 hour machine count to the interview period machine count.

Exhibit H is a map of the seven county area on which the distributed trip ends are located. Each dot equals 7** trip ends out of the 1,280 trip ends that were distributed away from Prudential between 6:00 a.m.-9:00 a.m. These trip ends were plotted according to their respective data collection zone locations. Due to the office nature of the special generator, the trips represent home-work trips. Prudential Insurance is located by a solid black square, which represents the other 1,280 trip ends.

** $\frac{20}{2.921} = 6.85$ which is rounded to 7.

Exhibit H
Trip Distribution for
Prudential Insurance

■ locates special traffic generator
Each dot=7 distributed
trip ends between 6:00am-9:00am



0 5 10
Scale (miles)

Traffic Counted (trips):
3,780 ADT
1,294 (6:00am-9:00am)
Trips Distributed by Computer
1,230 (6:00am-9:00am)
35 outside seven county area (6:00am-9:00am)

Edina Interchange Industrial Park

Six information stations (91-96) were required to collect trip data at Edina Interchange Industrial Park. Traffic counts were taken on 8/26/70 (Wed.) and 8/27/70 (Thurs.). Hourly manual traffic counts were taken between 7:00 a.m. - 6:00 p.m., and machine counts between 6:00 p.m. - 7:00 a.m. Interview post cards were handed out during the manual count hours, which in this case is also the interview period. The traffic counts were based on 48 hours, and yield:

20,284 ADT trips

15,179 trips (7:00 a.m. - 6:00 p.m.)

The expansion and distribution of the trips was made for the 11 hour interview period, and yield:

14,627 trips (7:00 a.m. - 6:00 p.m.)

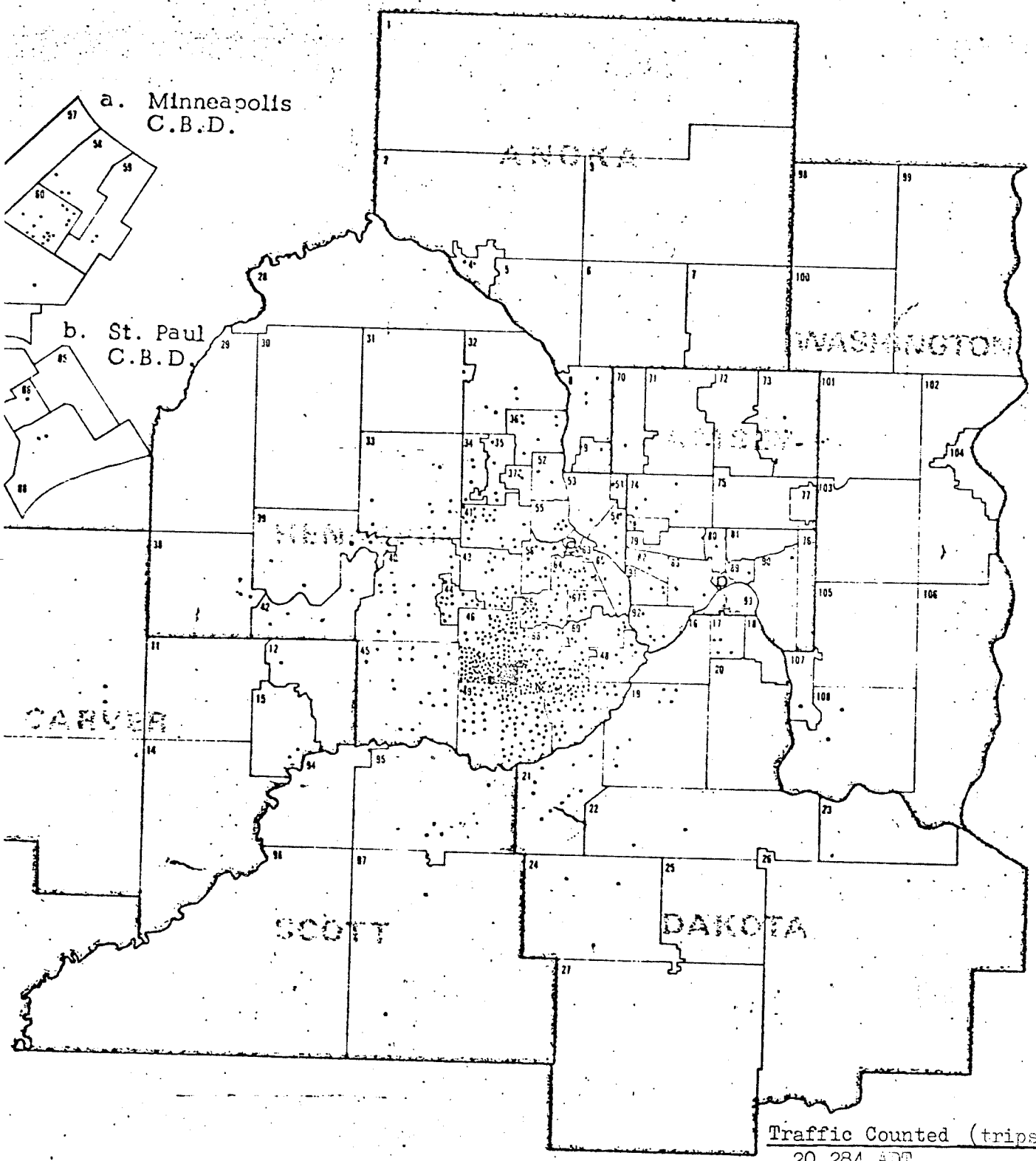
(Therefore, 552 trips were not distributed)

148 trips were distributed outside the seven county area.

Exhibit I is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 14,627 trip ends that were distributed away from the generator between 7:00 a.m. - 6:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the industrial nature of the special generator, the trips represent home-work trips. Edina Interchange Park is located by a solid black square, which represents the other 14,627 trip ends.

Exhibit I
Trip Distribution for
Edina Interchange Industrial Park

■ locates special traffic generator
Each dot=20 distributed trip ends between 7:00a.m.-6:00p.m.



0 5 10
Scale (miles)

Traffic Counted (trips):
20,284 ADT
15,179 (7:00a.m.-6:00p.m.)
Trips Distributed by Computer

14,627 (7:00a.m.-6:00p.m.)
148 outside seven county area (7:00a.m.-6:00p.m.)

Pentagon Park Office Complex

Four information stations (11-14) were required to collect trip data at Pentagon Park. Traffic counts were taken on 8/25/70 (Tues.) and 8/26/70 (Wed.). Hourly manual traffic counts were taken between 7:00 a.m. - 6:00 p.m., and machine counts between 6:00 p.m. - 7:00 a.m. Interview post cards were handed out during the manual count hours, which in this case is also the interview period. The traffic counts were based on 48 hours, and yield:

25,005 trips ADT

20,317 trips (7:00 a.m. - 6:00 p.m.)

The expansion and distribution of the trips was made for the 11 hour interview period, and yield:

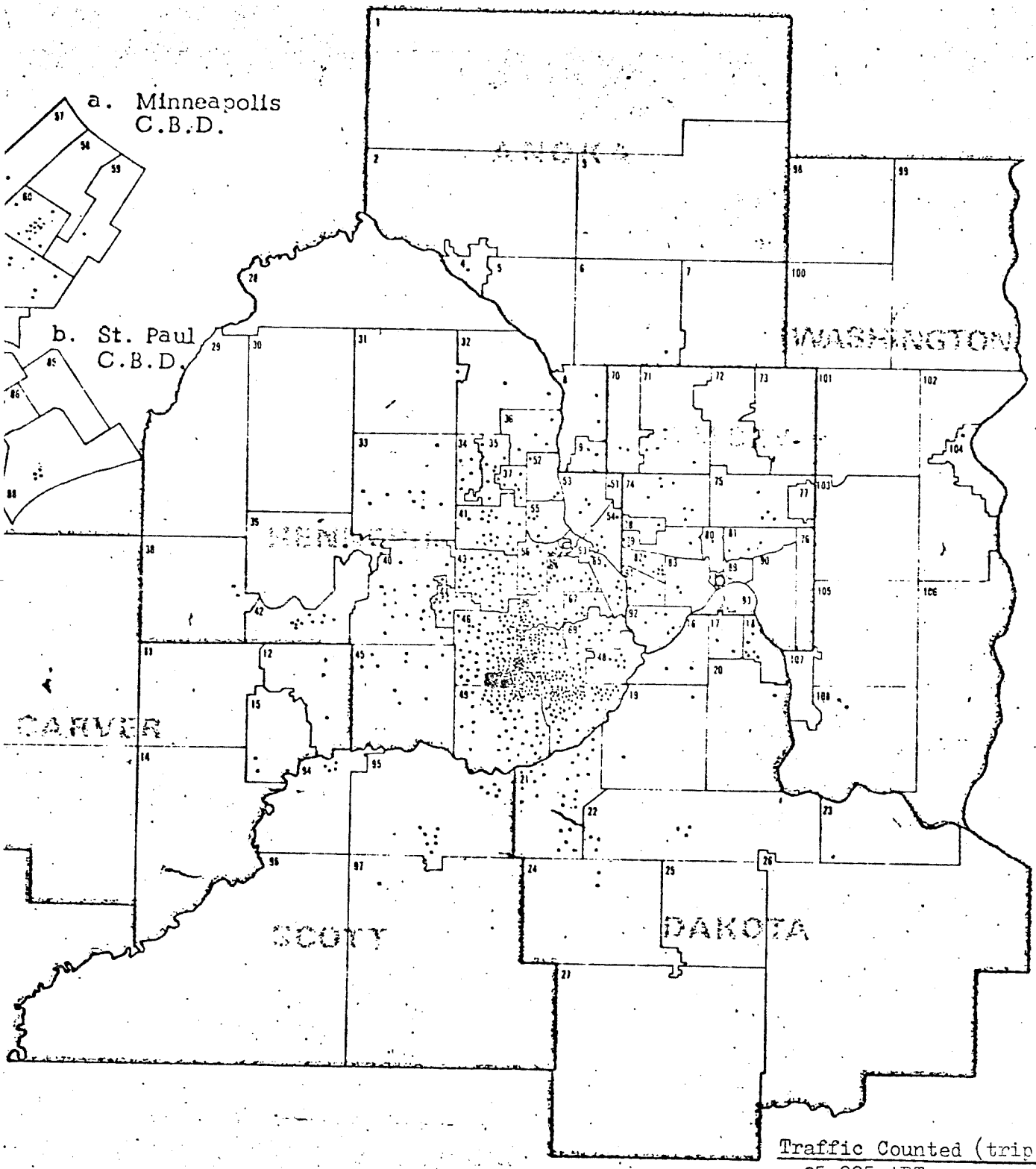
16,961 trips (7:00 a.m. - 6:00 p.m.)
(therefore, 3,356 trips were not distributed)

303 trips were distributed outside the seven county area.

Exhibit J is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 16,961 trip ends that were distributed away from the generator between 7:00 a.m.-6:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the office nature of the special generator, the trips represent home-work trips. Pentagon Park is located by a solid black square, which represents the other 16,961 trip ends.

Exhibit J
Trip Distribution for
Pentagon Park Office Complex

■ locates special traffic generator
Each dot=20 distributed trip ends between 7:00 a.m. - 6:00 p.m.



0 5 10
Scale (miles)

Traffic Counted (trips):
25,005 ADT
20,317 (7:00a.m.-6:00p.m.)
Trips Distributed by Computer

16,961 (7:00a.m.-6:00p.m.)
303 outside seven county area (7:00a.m.-6:00p.m.)

Southdale Shopping Center

Eight entrance information stations (61, 63, 65, 68, 70, 72, 74, 76) and eight exit information stations (62, 64, 67, 69, 71, 73, 75, 77) were required to collect trip data at Southdale. Traffic counts were taken on 8/4/70 (Tues.), 8/5/70 (Wed.), and 8/6/70 (Thurs.). Hourly manual traffic counts were taken between 8:30 a.m. - 10:00 p.m., and machine counts between 10:00 p.m. - 8:30 a.m.

Interview post cards were handed out during manual count hours, and the interview period was set at 9:00 a.m. - 10:00 p.m. This is required because partial hours cannot be accurately factored and expanded. The traffic counts were based on 48 hours, and yield:

33,701 trips

32,313 trips (9:00 a.m. - 10:00 p.m.)

The expansion and distribution of the trips was made for the 13 hour interview period, and yield:

31,877 trips (9:00 a.m. - 10:00 p.m.)

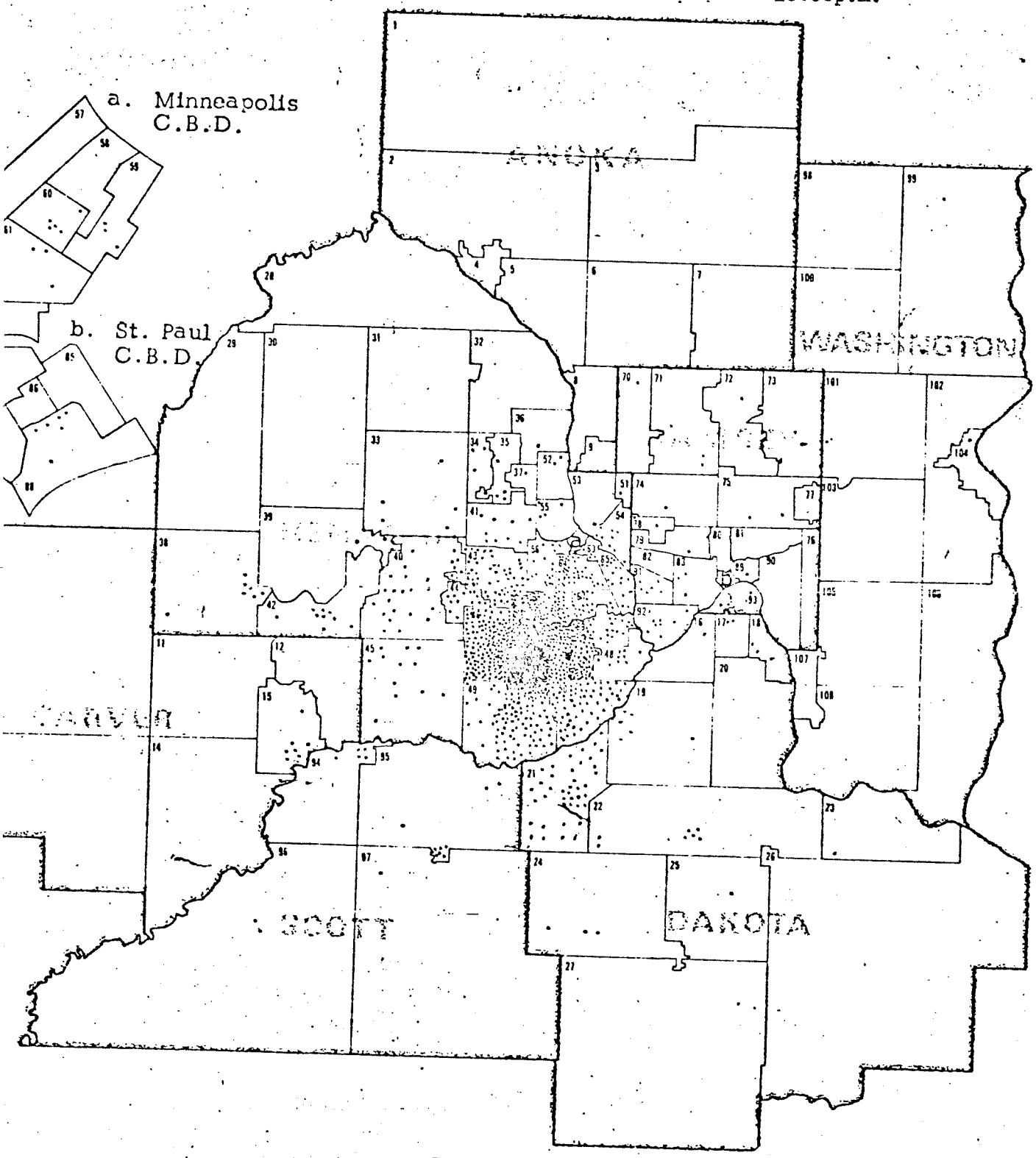
(therefore, 436 trips were not distributed)

708 trips were distributed outside the seven county area.

Exhibit K is a map of the seven county area on which the distributed trip ends are located. Each dot equals 20 trip ends out of the 31,877 trip ends that were distributed away from Southdale between 9:00 a.m.-10:00 p.m. These trip ends were plotted according to their respective data collection zone locations. Due to the retail nature of the special generator, the trips represent home-shopping trips. Southdale is located by a solid black square, which represents the other 31,877 trip ends.

Exhibit K
Trip Distribution for
Southdale Shopping Center

■ locates special traffic generator
Each dot=20 distributed trip ends between 9:00a.m. - 10:00p.m.



0 5 10
Scale (miles)

Traffic Counted (trips):
33,701 ADT
32,313 (9:00a.m.-10:00p.m.)

Trips Distributed by Computer
31,877 (9:00a.m.-10:00p.m.)
708 outside seven county area (9:00a.m.-10:00p.m.)

Trip Ends by Mile Rings

Exhibits L through V show rings from one to five miles centered on each special traffic generator. The percentage of trip ends (excluding those at the generator itself) within the five-mile ring is labeled. For the regional shopping centers, a breakdown for all rings is given. No percentages are given for Rosedale, Har Mar, and Target individually.

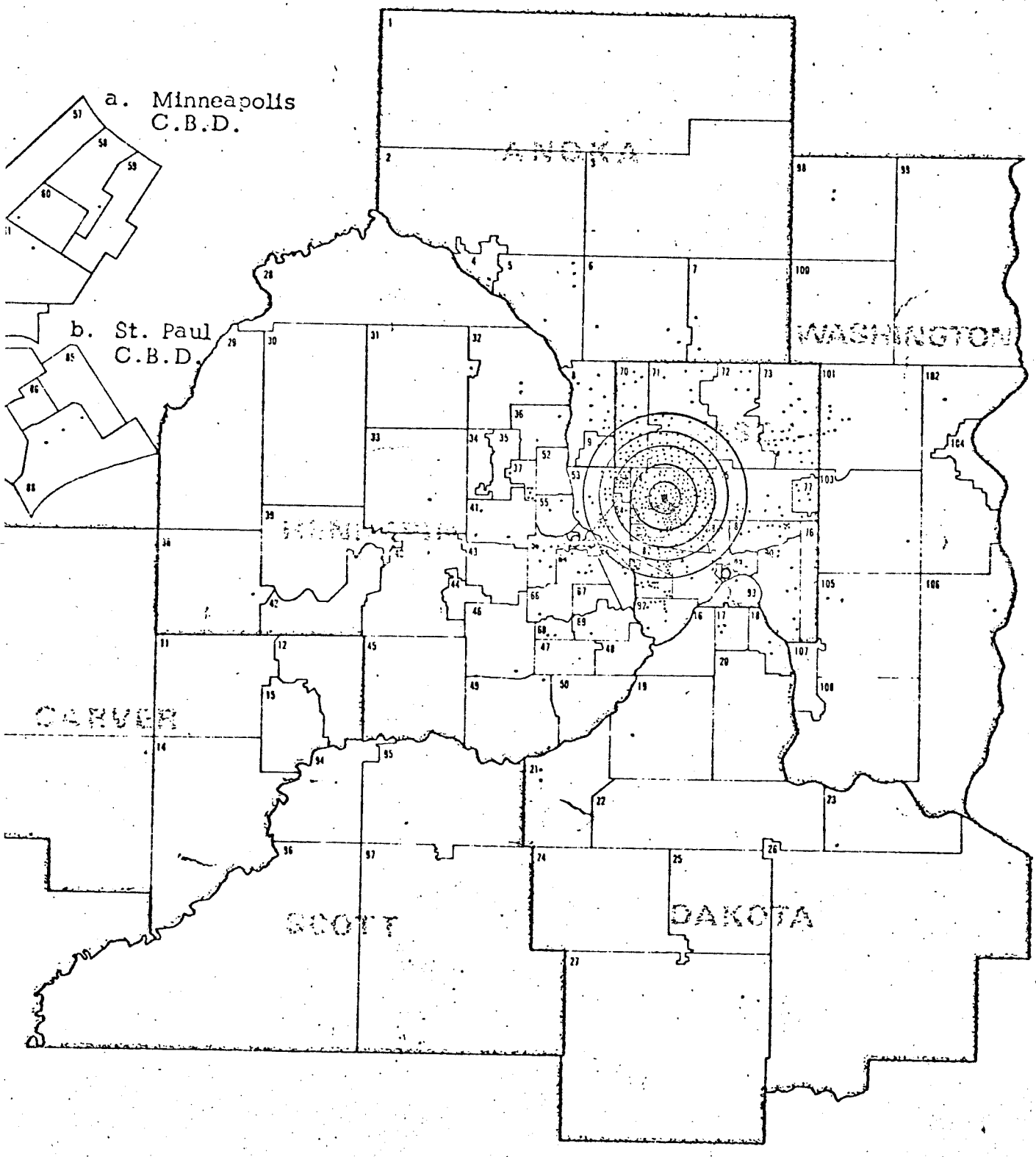
All trips are home based, and it is seen that home-work trips are generally longer than home-shopping trips.

The following table summaries the results of Exhibits L through V.

Percentage of Trip Ends Within a Five Mile Ring

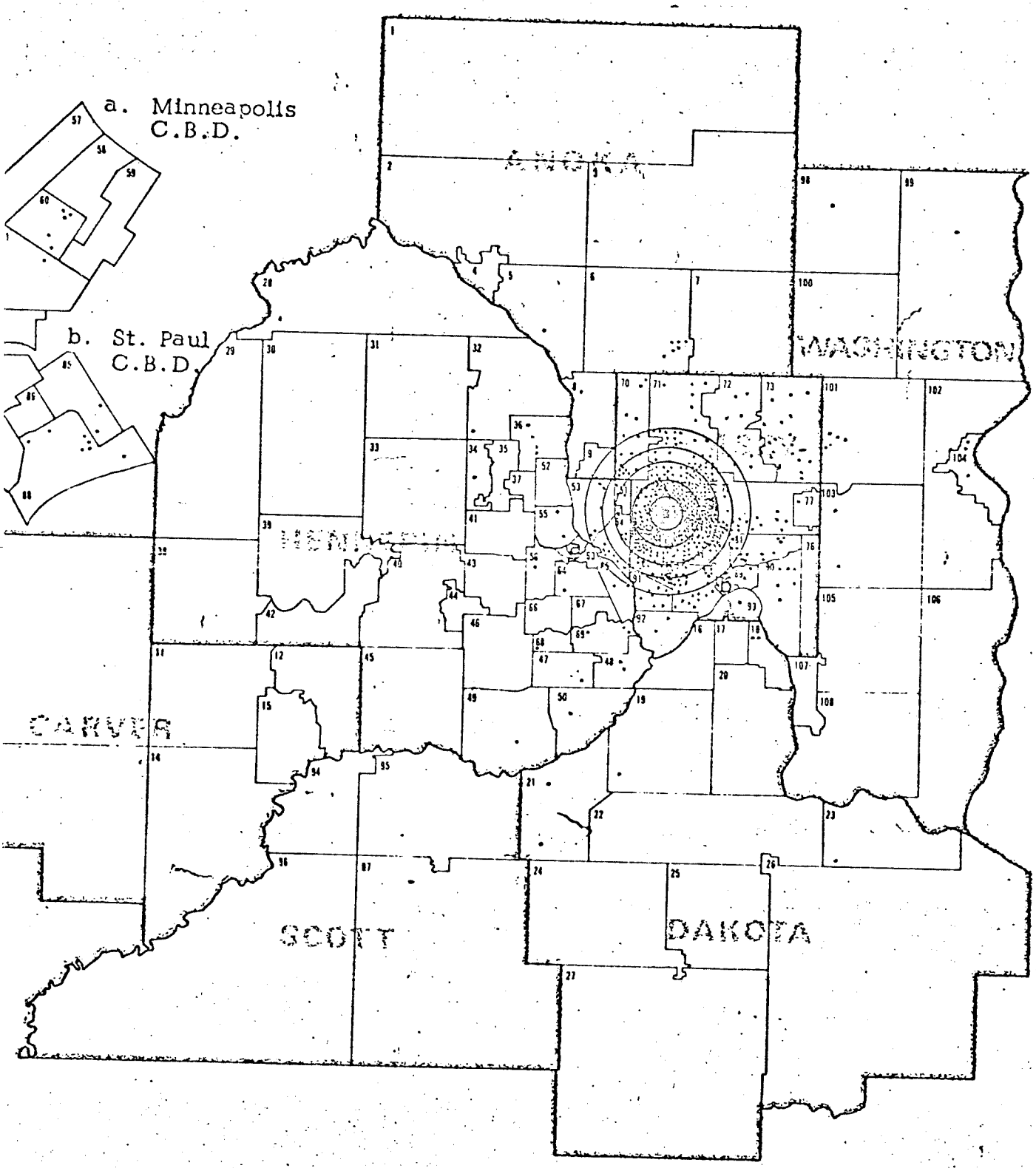
Special Generator	% of Trips Within Five Mile Ring
1. Rosedale, Har Mar, Target	71
2. Apache Plaza	81
3. Brookdale	72
4. Minneapolis Industrial Park	36
5. Prudential Insurance	41
6. Edina Interchange Park	60
7. Pentagon Office Park	48
8. Southdale	81

Trip Ends by Mile Rings
for Rosedale Shopping Center

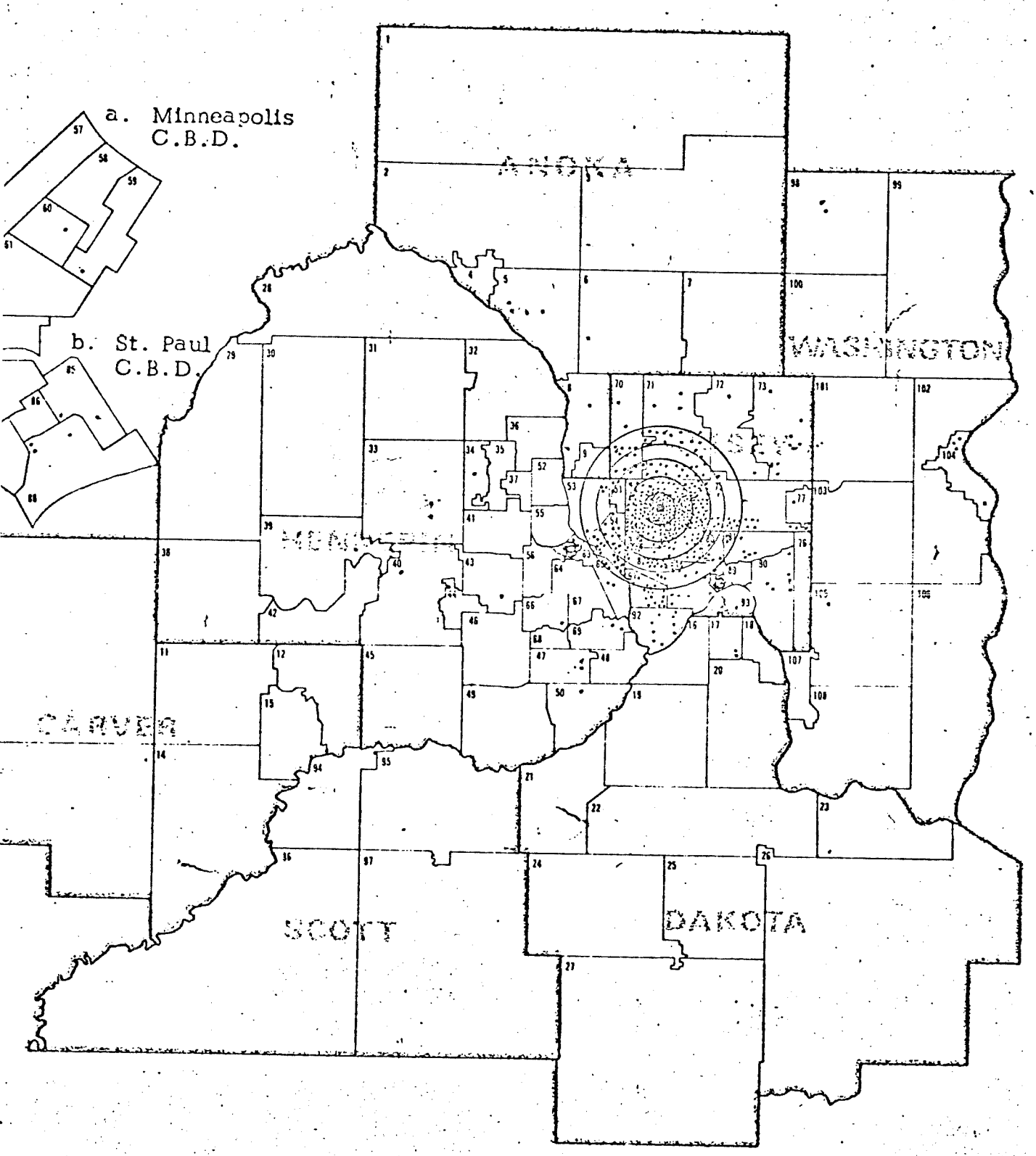


Trip Ends by Mile Rings

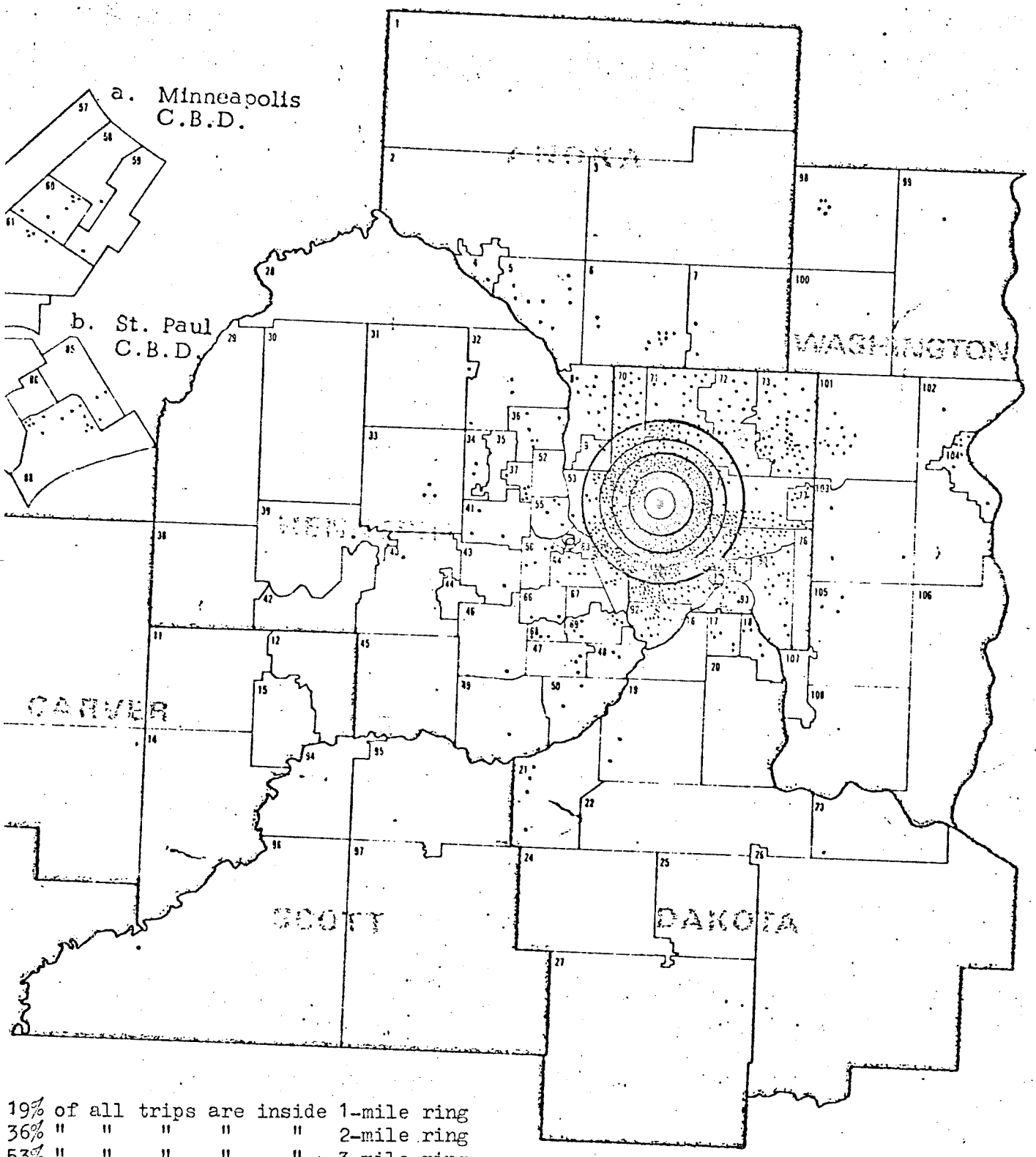
for Har Mar Shopping Center



Trip Ends by Mile Rings
for Target Store (Roseville)

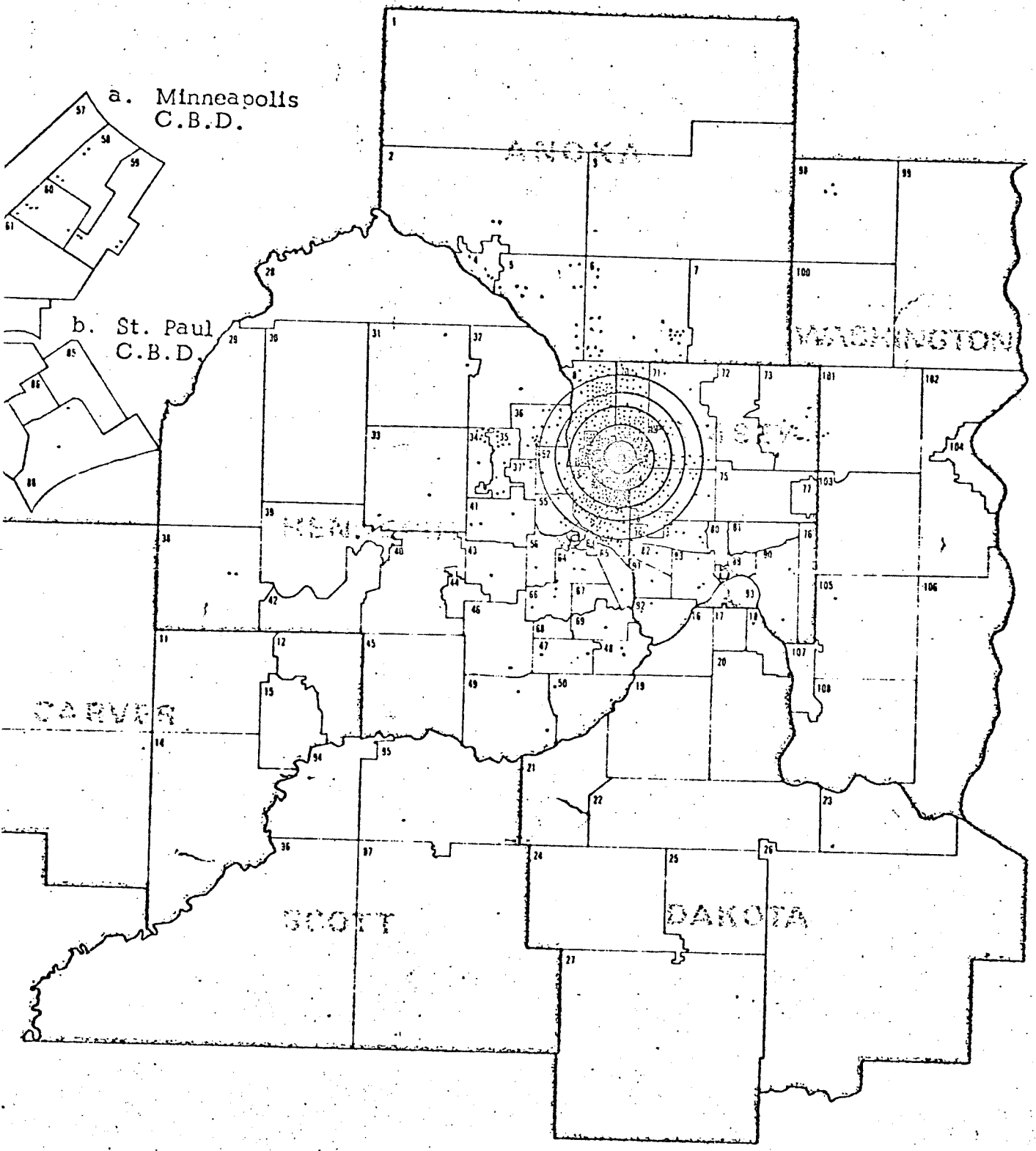


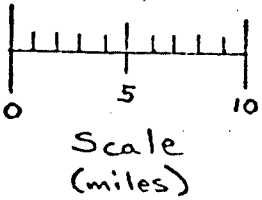
Trip Ends by Mile Rings
for Rosedale, Har Mar, and Target
Shopping Complex



19% of all trips are inside 1-mile ring
36% " " " " " 2-mile ring
53% " " " " " 3-mile ring
63% " " " " " 4-mile ring
71% " " " " " 5-mile ring

Trip Ends by Mile Rings
for Apache Plaza Shopping Center

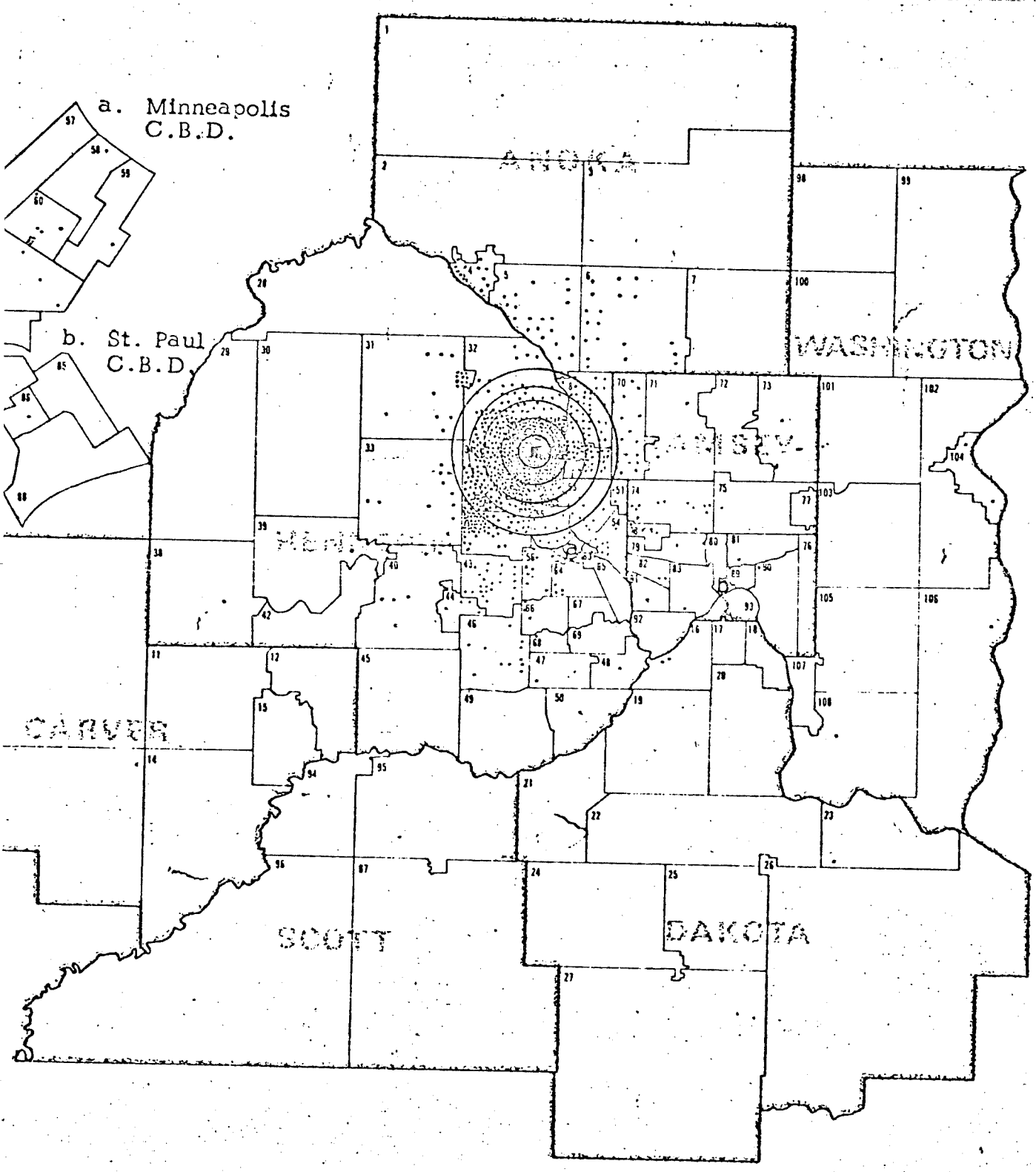




23% of all trips are inside 1-mile ring
44% of all trips are inside 2-mile ring
60% of all trips are inside 3-mile ring
68% of all trips are inside 4-mile ring
81% of all trips are inside 5-mile ring

Trip Ends by Mile Rings

for Brookdale Shopping Center



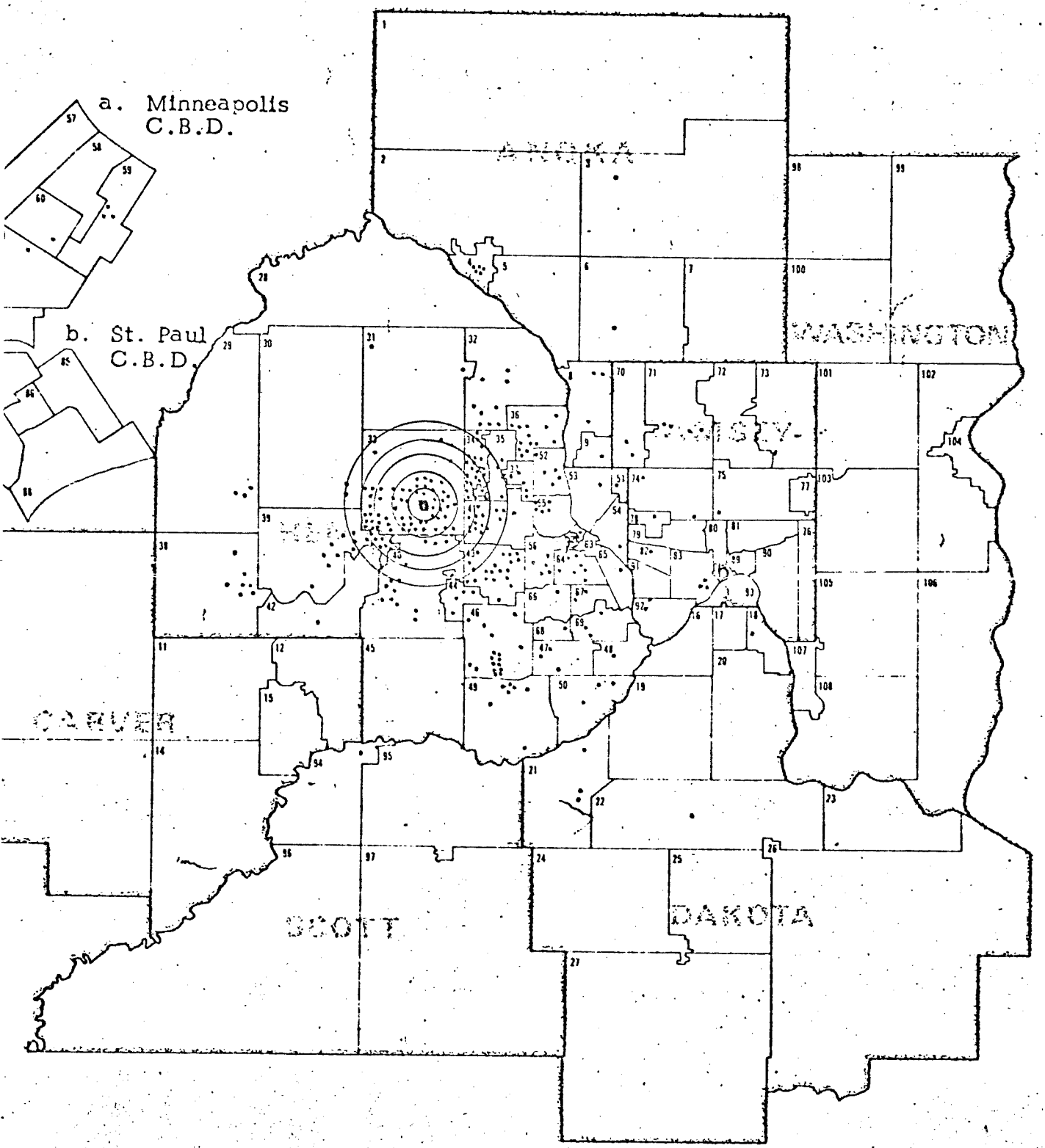
0 5 10

Scale (miles)

13% of all trips are inside 1-mile ring
35% of all trips are inside 2-mile ring
45% of all trips are inside 3-mile ring
64% of all trips are inside 4-mile ring
72% of all trips are inside 5-mile ring

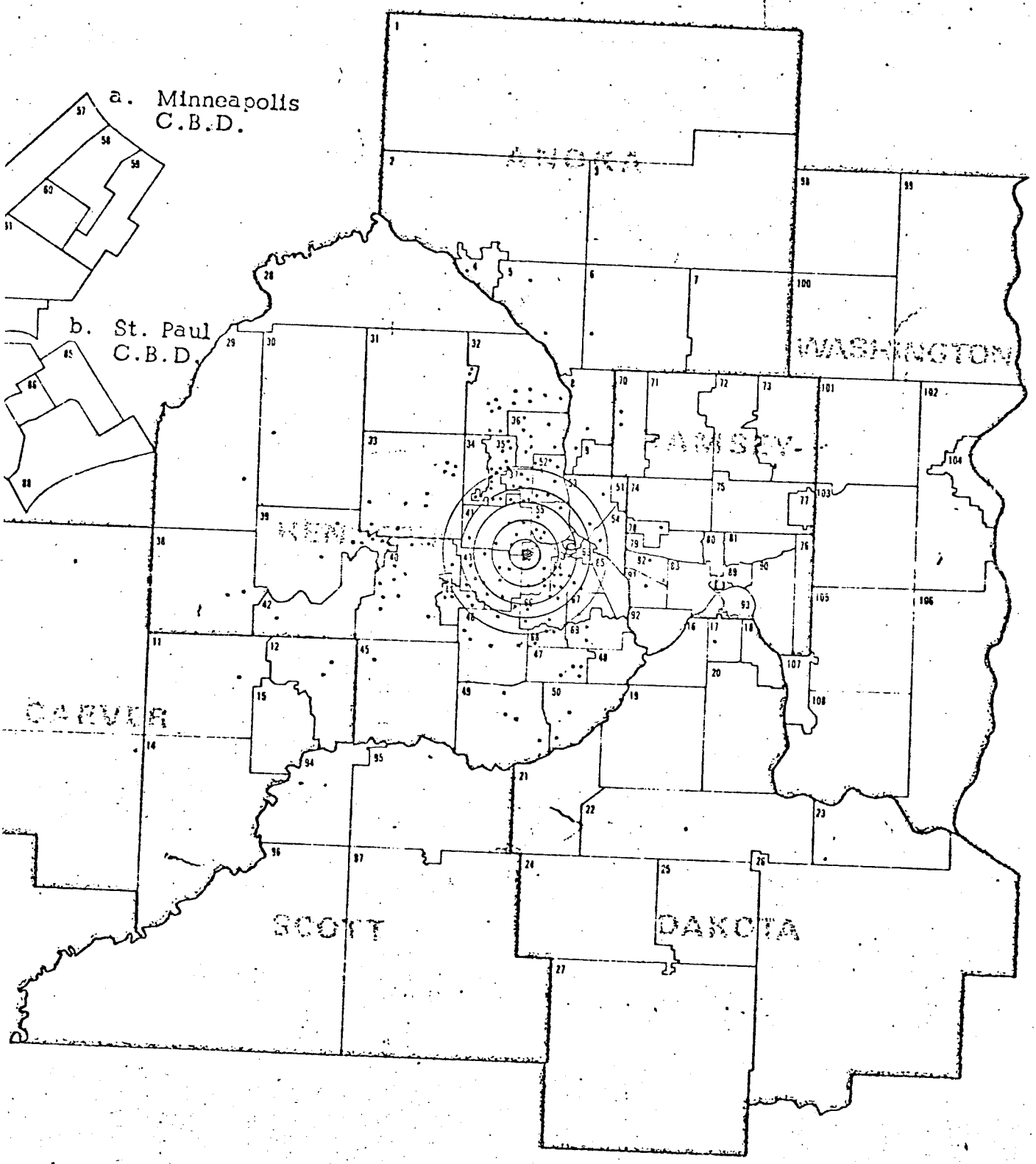
Trip Ends by Mile Rings

for Minneapolis Industrial Park



36% of all trips are inside 5-mile ring

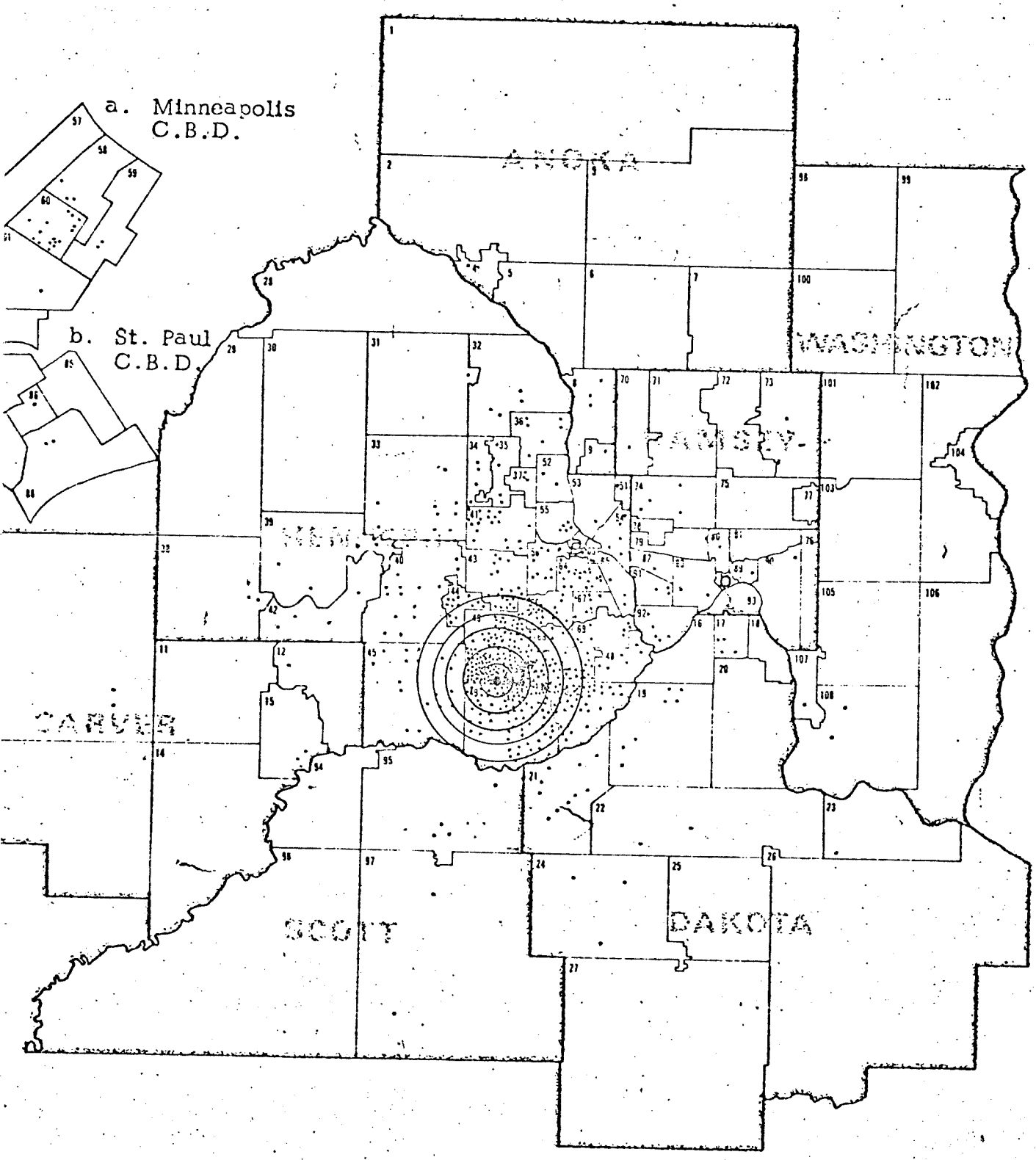
Trip Ends by Mile Rings
for Prudential Insurance



41% of all trips are inside 5-mile ring

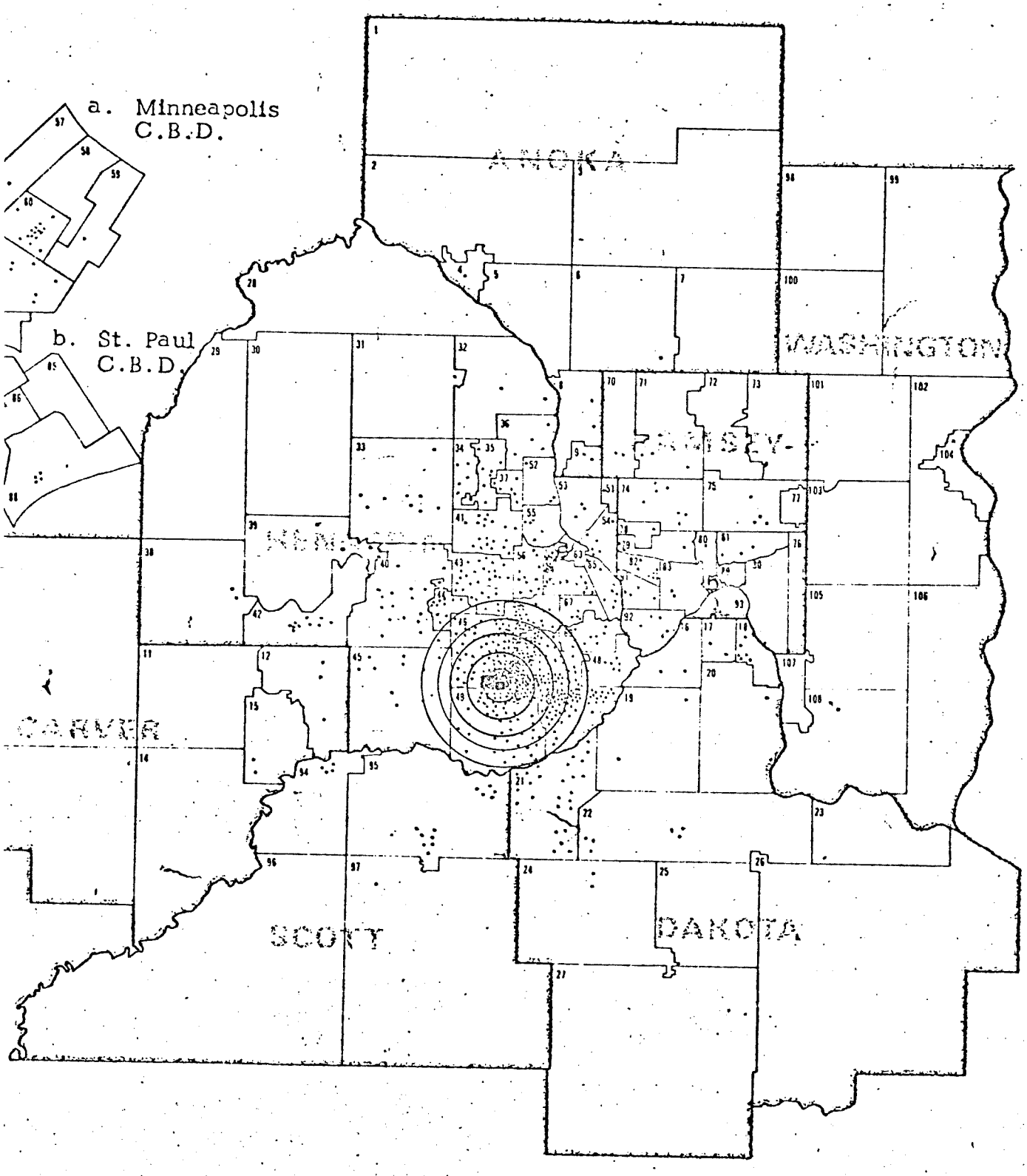
Trip Ends by Mile Rings

for Edina Interchange Park



60% of all trips are inside 5-mile ring

Trip Ends by Mile Rings
for Pentagon Office Park

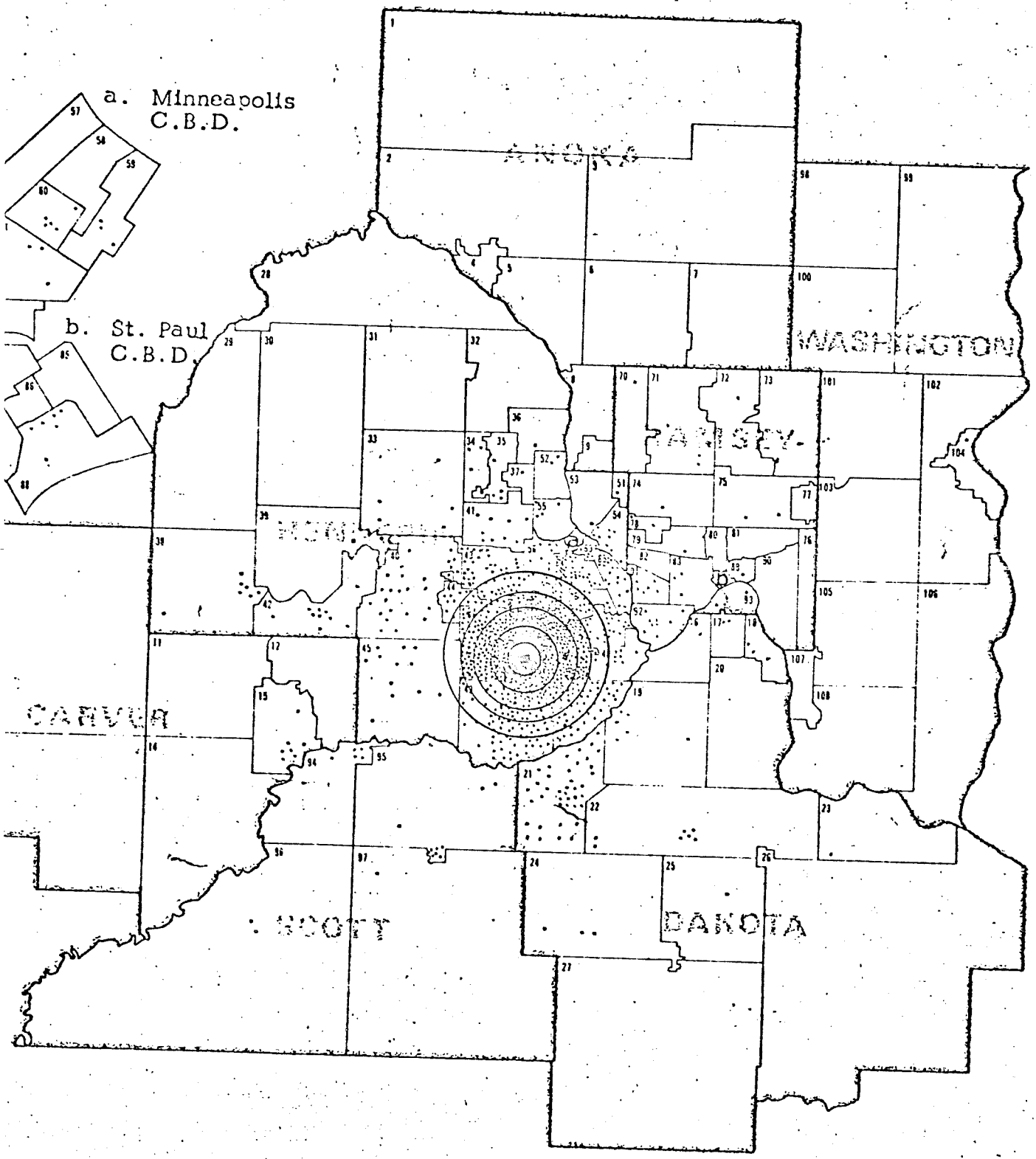


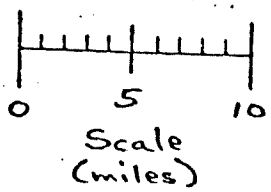
48% of all trips are inside 5-mile ring

0 5 10
Scale (miles)

Trip Ends by Mile Rings

for Southdale Shopping Center





18% of all trips are inside 1-mile ring.
42% of all trips are inside 2-mile ring
60% of all trips are inside 3-mile ring
73% of all trips are inside 4-mile ring
81% of all trips are inside 5-mile ring

Shopping Center Data

Data Tables 1-4 present information on the four regional shopping centers included in the special generator study. (Note that Target is excluded from Rosedale and Har Mar.) Data presented for each shopping center are acres, retail space, employment, and daily trips generated. Percentage of trip ends by mile rings, employment (jobs), dwelling units, and population for a five mile ring around each center are also included.

From the data presented, various relationships were determined and included in the Tables. These relationships are: trips per main center employees, trips per 1,000 sq. ft. of retail space, trips per 1,000 residents (5-mile ring), trips per 100 dwelling units (5-mile area), trips per 1,000 employees (jobs) (5 mile area), retail employees per 1,000 sq. ft. of retail space, satelite area to main center area, and major department stores in each center.

Data Table 5 is a summary of Data Tables 1-4, and shows a comparison of the four shopping centers. Because Target is excluded from the Rosedale-Har Mar shopping complex, the relationships shown for the five mile area do not reflect the true trips generated by the existing shopping complex of Rosedale, Har Mar, and Target. ADT for the three center complex is 45,533, compared to 32,883 for Rosedale and Har Mar alone. This amounts to a 38% increase in trips generated by the "real world" complex. This increase could then be applied to the five mile area relationships shown for the Rosedale-Har Mar complex, thereby yielding:

5 Mile Area:		Rosedale, Har Mar, Target
Trips / 1,000 Residents	=	88
Trips / 100 Dwelling Units	=	26
Trips / 1,000 Employees (jobs)	=	160

At present, Tables 1-5 reflect 1970 base relationships, and should be updated periodically to establish travel trends at each shopping center.

DATA TABLE 1

SOUTHDALE SHOPPING CENTER

	Area (acres)	Square Feet	Employment
Main Center - Retail	N/A	940,000	3,783
- Services + Other	N/A	360,000	27
Sub-Total	82.9	1,300,000	3,810
Satelites* - Retail	N/A	444,250	434
- Services + Other	N/A	129,500	203
Sub-Total	63.4	573,750	637
TOTAL	146.3	1,873,750	4,447

* Satelites refer to business enterprises very close to the main shopping center, but not a part of the center.

- Data Assignments to Area within a Five Mile Radius of Southdale

Year	Employment	Dwelling Units	Population
1960	125,297	147,452	457,487
1970	199,112	155,588	475,307
1980	250,442	170,148	517,698
1990	276,281	195,242	587,988
2000	323,468	217,021	661,396

-Trip Ends by One Mile Rings from Southdale

Mile Radius	% of Total Trip Ends Within 5 Mi. Radius	% of All Total Trip Ends	% of All Total Trip Ends - Cumulative
0-1	21.6	17.5	17.5
1-2	30.5	24.7	42.2
2-3	22.0	17.9	60.1
3-4	15.6	12.7	72.8
4-5	10.3	8.4	81.2
TOTAL	100.0	81.2	

DATA TABLE 1 (Continued) SOUTHDALE SHOPPING CENTER

-Relationships

Trips per day to main center = 33,701

$$\frac{\text{Trips}}{\text{Main Center Employees}} = \frac{33,701}{3,810} = 8.8$$

$$\frac{\text{Trips}}{\text{1,000 Sq. Ft. Retail}} = \frac{33,701}{940} = 35.9$$

Five Mile Area:

$$\frac{\text{Trips}}{\text{1,000 Residents}} = \frac{33,701}{475.307} = 70.9$$

$$\frac{\text{Trips}}{\text{100 Dwelling Units}} = \frac{33,701}{1,555.88} = 21.7$$

$$\frac{\text{Trips}}{\text{1,000 Employees (jobs)}} = \frac{33,701}{199.112} = 169$$

$$\frac{\text{Retail Employees}}{\text{1,000 Sq. Ft. Retail}} = 4.0$$

$$\frac{\text{Satelite Area}}{\text{Main Center Area}} = 0.44$$

Major Department Stores: Dayton's, Donadlsons

DATA TABLE 2

BROOKDALE SHOPPING CENTER

		Area (acres)	Square Feet	Employment
Main Center	- Retail	N/A	1,000,000	2,681
	- Services + Other	N/A	100,000	186
Sub-Total		87	1,100,000	2,857
Satelites*	- Retail	N/A	N/A	259
	- Services + Other	N/A	N/A	18
Sub-Total		30	160,400	287
TOTAL		117	1,260,400	3,144

* Satelites refer to business enterprises very close to the main shopping center, but not a part of the center.

- Data Assignments to Area within a Five Mile Radius of Brookdale

Year	Employment	Dwelling Units	Population
1960	90,361	89,254	320,437
1970	140,630	134,022	444,330
1980	193,120	151,301	482,990
1990	241,059	175,628	517,894
2000	292,008	192,725	557,435

-Trip Ends by One Mile Rings from Brookdale

Mile Radius	% of Total Trip Ends Within 5 Mi. Radius	% of All Total Trip Ends	% of All Total Trip Ends - Cumulative
0-1	18.3	13.2	13.2
1-2	30.3	21.8	35.0
2-3	14.4	10.4	45.4
3-4	25.8	18.6	64.0
4-5	11.2	8.0	72.0
TOTAL	100.0	72.0	

-Relationships

Trips per day to main center = 26,994

$$\frac{\text{Trips}}{\text{Main Center Employees}} = \frac{26,994}{2,857} = 9.4$$

$$\frac{\text{Trips}}{\text{1,000 Sq. Ft. Retail}} = \frac{26,994}{1,000} = 27.0$$

Five Mile Area:

$$\frac{\text{Trips}}{\text{1,000 Residents}} = \frac{26,994}{444.33} = 60.8$$

$$\frac{\text{Trips}}{\text{100 Dwelling Units}} = \frac{26,994}{1,340.22} = 20.1$$

$$\frac{\text{Trips}}{\text{1,000 Employees (jobs)}} = \frac{26,994}{140.63} = 192$$

$$\frac{\text{Retail Employees}}{\text{1,000 Sq. Ft. Retail}} = 2.7$$

$$\frac{\text{Satelite Area}}{\text{Main Center Area}} = 0.15$$

Major Department Stores: Dayton's, Donaldsons, Penny's, Sears

DATA TABLE 3

APACHE PLAZA SHOPPING CENTER

	Area (acres)	Square Feet	Employment
Main Center - Retail	N/A	650,000	700
- Services + Other	N/A		330
Sub-Total	42.7	650,000	1,030
Satelites* - Retail	N/A	50,000	280
- Services + Other	N/A	30,000	450
Sub-Total	35.6	80,000	730
TOTAL	78.3	730,000	1,760

* Satelites refer to business enterprises very close to the main shopping center, but not a part of the center.

- Data Assignments to Area within a Five Mile Radius of Apache Plaza

Year	Employment	Dwelling Units	Population
1960	247,550	120,055	402,694
1970	308,753	168,295	501,612
1980	386,983	179,241	531,806
1990	419,322	191,343	535,876
2000	440,783	188,249	549,581

-Trip Ends by One Mile Rings from Apache Plaza

Mile Radius	% of Total Trip Ends Within 5 Mi. Radius	% of All Total Trip Ends	% of All Total Trip Ends - Cumulative
0-1	28.5	23.0	23.0
1-2	26.0	21.1	44.1
2-3	19.6	15.8	59.9
3-4	9.8	7.9	67.8
4-5	16.1	13.0	80.8
TOTAL	100.0	80.8	

DATA TABLE 3 (Continued) APACHE PLAZA SHOPPING CENTER

-Relationships

Trips per day to main center = 20,850

$$\frac{\text{Trips}}{\text{Main Center Employees}} = \frac{20,850}{1,030} = 20.2$$

$$\frac{\text{Trips}}{\text{1,000 Sq. Ft. Retail}} = \frac{20,850}{650} = 32.1$$

Five Mile Area:

$$\frac{\text{Trips}}{\text{1,000 Residents}} = \frac{20,850}{501.612} = 41.6$$

$$\frac{\text{Trips}}{\text{100 Dwelling Units}} = \frac{20,850}{1,682.95} = 12.4$$

$$\frac{\text{Trips}}{\text{1,000 Employees (jobs)}} = \frac{20,850}{308.753} = 68$$

$$\frac{\text{Retail Employees}}{\text{1,000 Sq. Ft. Retail}} = 1.1$$

$$\frac{\text{Satelite Area}}{\text{Main Center Area}} = 0.12$$

Major Department Stores: Wards, Penny's

DATA TABLE 4

ROSEDALE - HAR MAR SHOPPING COMPLEX

	Area (acres)	Square Feet	Employment
Main Center - Retail	N/A	1,138,400	1,949
- Services + Other	N/A		299
Sub-Total	91.4	1,138,400	2,248
Satelites* - Retail	N/A	N/A	584
- Services + Other	N/A	N/A	917
Sub-Total	39.8	267,100	1,501
TOTAL	131.2	1,405,500	3,749

* Satelites refer to business enterprises very close to the main shopping center, but not a part of the center.

- Data Assignments to Area within a Five Mile Radius of Rosedale Har-Mar

Year	Employment	Dwelling Units	Population
1960	188,619	132,706	439,785
1970	282,287	174,874	517,963
1980	327,958	180,551	536,142
1990	348,854	191,585	550,625
2000	358,174	184,097	480,089

-Trip Ends by One Mile Rings from Rosedale Har-Mar

Mile Radius	% of Total Trip Ends Within 5 Mi. Radius	% of All Total Trip Ends	% of All Total Trip Ends - Cumulative
0-1	22.4	17.4	17.4
1-2	28.3	22.0	39.4
2-3	20.4	15.8	55.2
3-4	17.1	13.3	68.5
4-5	11.8	9.1	77.6
TOTAL	100.0	77.6	

DATA TABLE 4 (Continued) ROSEDALE - HAR MAR SHOPPING CENTER

-Relationships

Trips per day to main center = 32,883

$$\frac{\text{Trips}}{\text{Main Center Employees}} = \frac{32,883}{2,248} = 14.6$$

$$\frac{\text{Trips}}{\text{1,000 Sq. Ft. Retail}} = \frac{32,883}{1,138.4} = 28.9$$

Five Mile Area:

$$\frac{\text{Trips}}{\text{1,000 Residents}} = \frac{32,883}{517.963} = 63.5$$

$$\frac{\text{Trips}}{\text{100 Dwelling Units}} = \frac{32,883}{1,748.74} = 18.8$$

$$\frac{\text{Trips}}{\text{1,000 Employees (jobs)}} = \frac{32,883}{282.287} = 116$$

$$\frac{\text{Retail Employees}}{\text{1,000 Sq. Ft. Retail}} = 1.7$$

$$\frac{\text{Satelite Area}}{\text{Main Center Area}} = 0.23$$

Major Department Stores: Dayton's, Donaldsons, Penny's, Sears

DATA TABLE 5

Regional Shopping Centers	Southdale	Brookdale	Apache Plaza	Rosedale-Har-Mar
Total Trips	33,701	26,994	20,850	32,883
Trips / Main Center Employees	8.8	9.4	20.2	14.6
Trips / 1,000 Sq.Ft. Retail	35.9	27.0	32.1	28.9
Retail Employees / 1,000 Sq. Ft. Retail	4.0	2.7	1.1	1.7
Satelite Area / Main Center Area	0.44	0.15	0.12	0.23
5 Mile Area: Trips / 1,000 Residents	70.9	60.8	41.6	63.5
Trips / 100 Dwelling Units	21.7	20.1	12.4	18.8
Trips / 1,000 Employees (jobs)	169	192	68	116
Major Department Stores	2	4	2	4

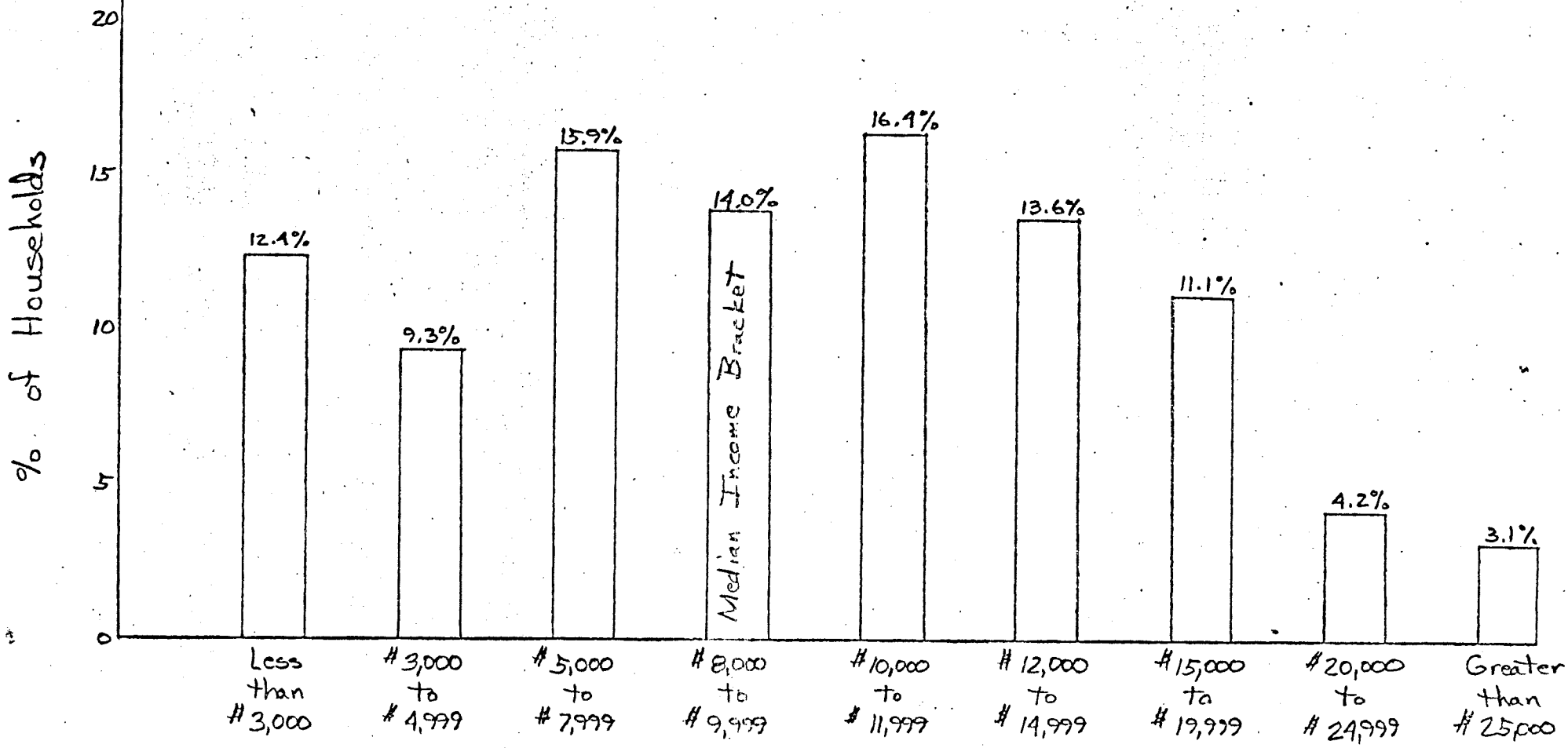
Income Within Five Mile Ring Around Regional Shopping Centers

Four bar charts are included herein indicating household income inside a five mile ring around the four regional shopping centers. The median income bracket (50% above, 50% below) for each area is indicated on each chart.

The area around Southdale Shopping Center is a higher income area than the other three shopping center areas. The income levels around the other three centers is comparable, and no significant differences are apparent.

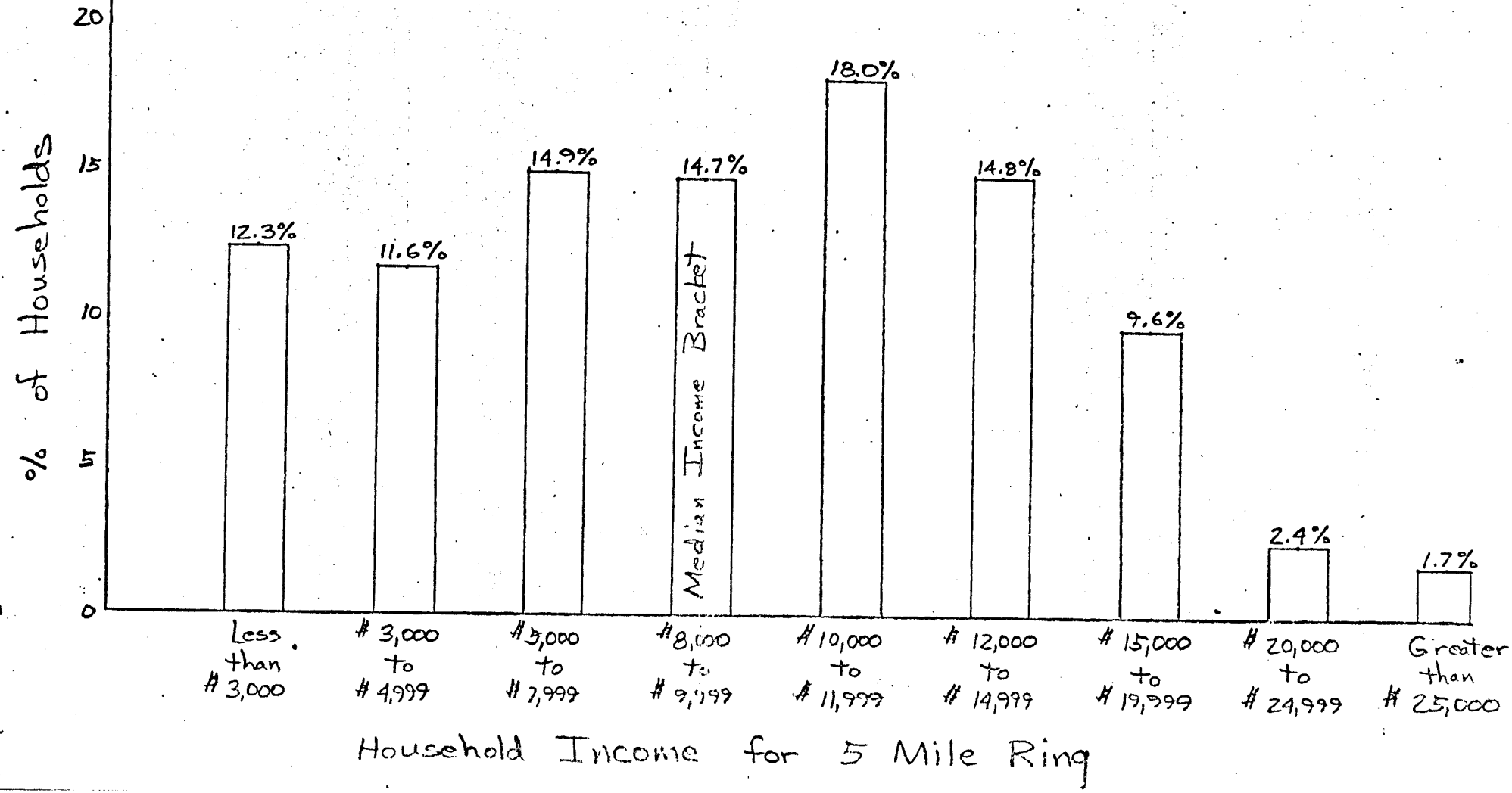
Household Income in 5 Mile Ring Around Rosedale - Har Mar Shopping Centers

NOTE:
Data from System 70 Data Collection Districts 51, 53, 54, 71, 74, 78, 79, 80, 82, 83, 91.



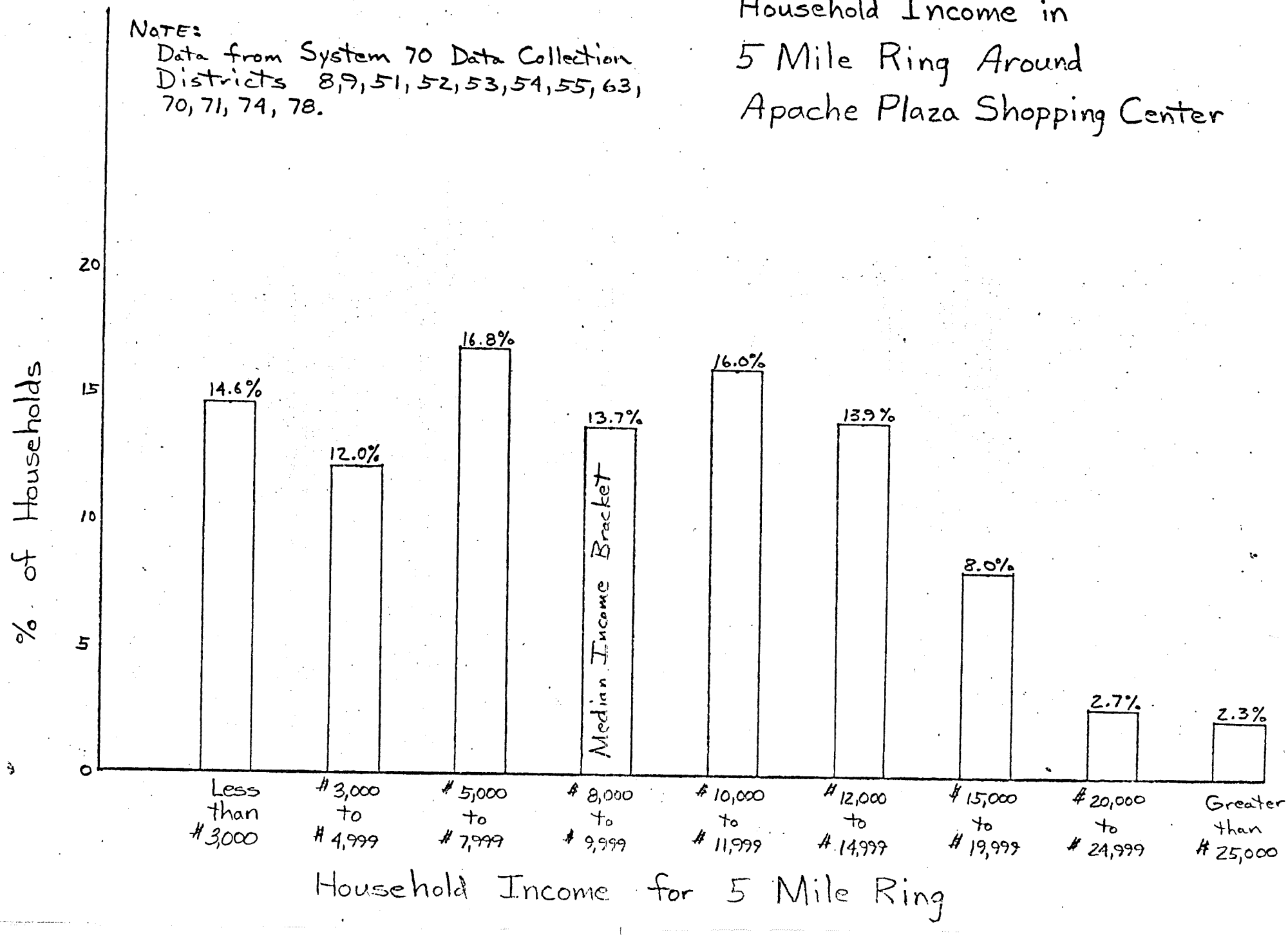
Household Income in 5 Mile Ring Around Brookdale Shopping Center

NOTE:
Data from System 70 Data Collection Districts 8, 9, 32, 34, 35, 36, 37, 41, 52, 53, 55.



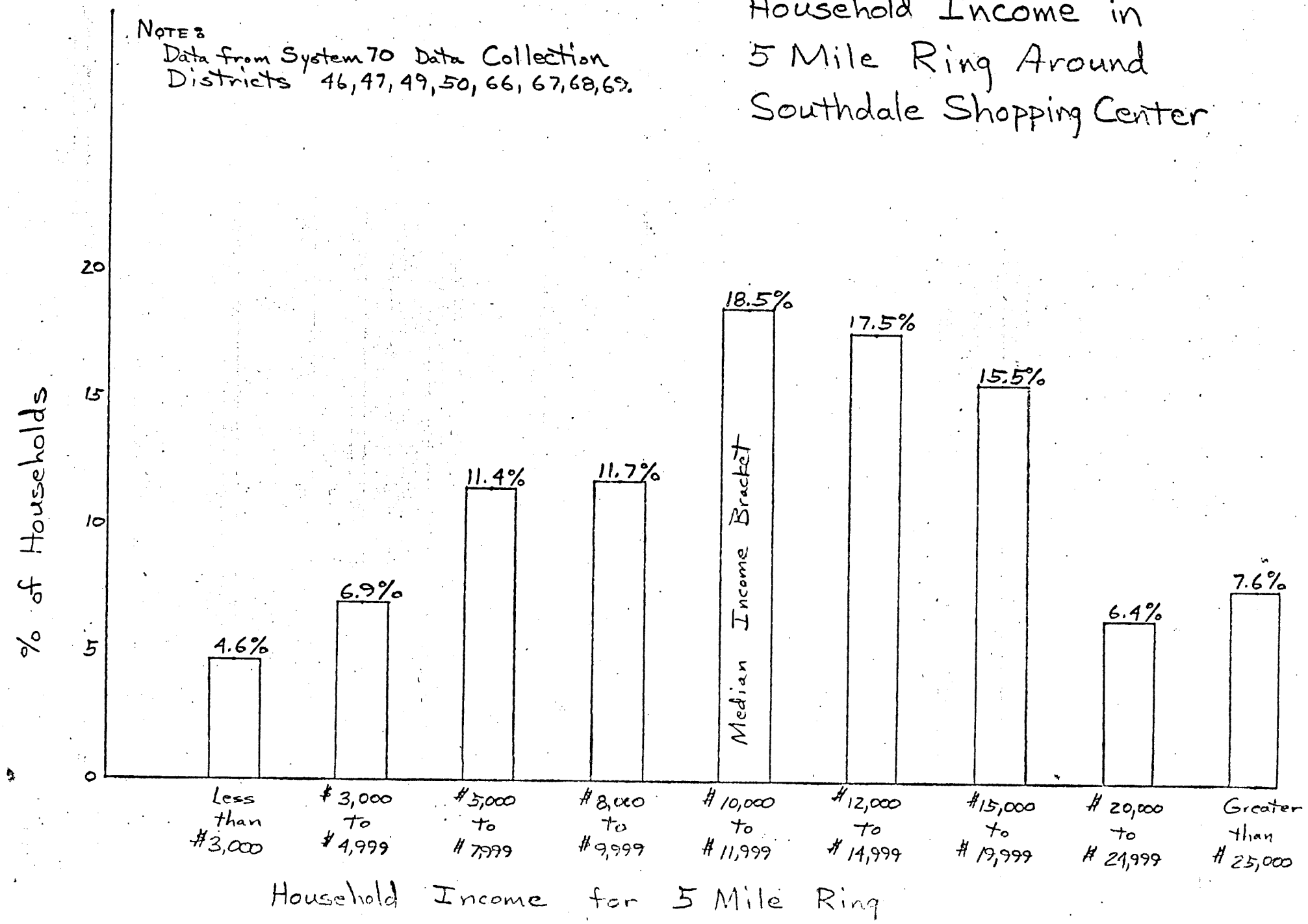
NOTE:
Data from System 70 Data Collection Districts 8,9,51,52,53,54,55,63, 70,71,74,78.

Household Income in 5 Mile Ring Around Apache Plaza Shopping Center



Household Income in 5 Mile Ring Around Southdale Shopping Center

NOTE:
Data from System 70 Data Collection Districts 46, 47, 49, 50, 66, 67, 68, 69.



Frequency Distribution of Travel Times

Frequency distribution of travel times graphs, based upon trips distributed for each special generator, were made. These graphs indicate the percentages of trips made for various categories of trip times. Terminal time* is included at both trip ends in the trip time for all graphs.

Home-shopping trips are generally of shorter duration than home-work trips. Less than 10% of home-shopping trips last longer than twenty minutes, while considerably higher percentages of home-work trips are longer than twenty minutes.

Two computer print-outs were used to obtain trip length frequency distribution information. The first was 1970 District Skimtrees with Intra Zonal Travel Times. The second was Trip Length Distribution by Purpose Number.

The Skimtree print-out shows trip times from each district (UPMD) to all districts. It is essentially a 117 x 117 matrix. Districts 109-117 are external to the seven county area, and for the purpose of this report, are ignored. The times in the skimtrees are produced from the following two formulas.

1. Time (A to A) = $2\ (Ter_A) + Intra_A$
2. Time (A to B) = $Ter_A + Inter_{A \text{ to } B} + Ter_B$

Where: $Time_{A \text{ to } A}$ = Skimtree time for intra-district trip

$Time_{A \text{ to } B}$ = Skimtree time from District A to District B

Ter_A = Terminal time assigned to District A by the Metro Council

$Intra_A$ = Intra-District time assigned to District A by the Metro Council

$Inter_{A \text{ to } B}$ = Intra-District time for travel from District A centroid to District B centroid; developed from the road network.

Ter_B = Terminal time assigned to District B by the Metro Council

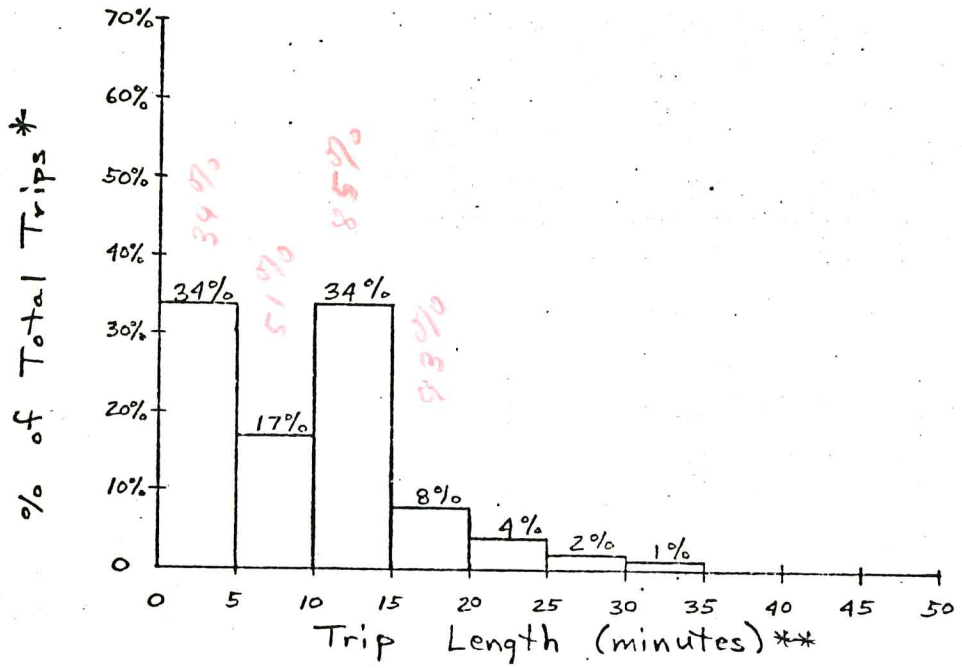
The skimtree data is then combined with the trip table data, and for each special generator, a trip length frequency distribution is printed by the computer.

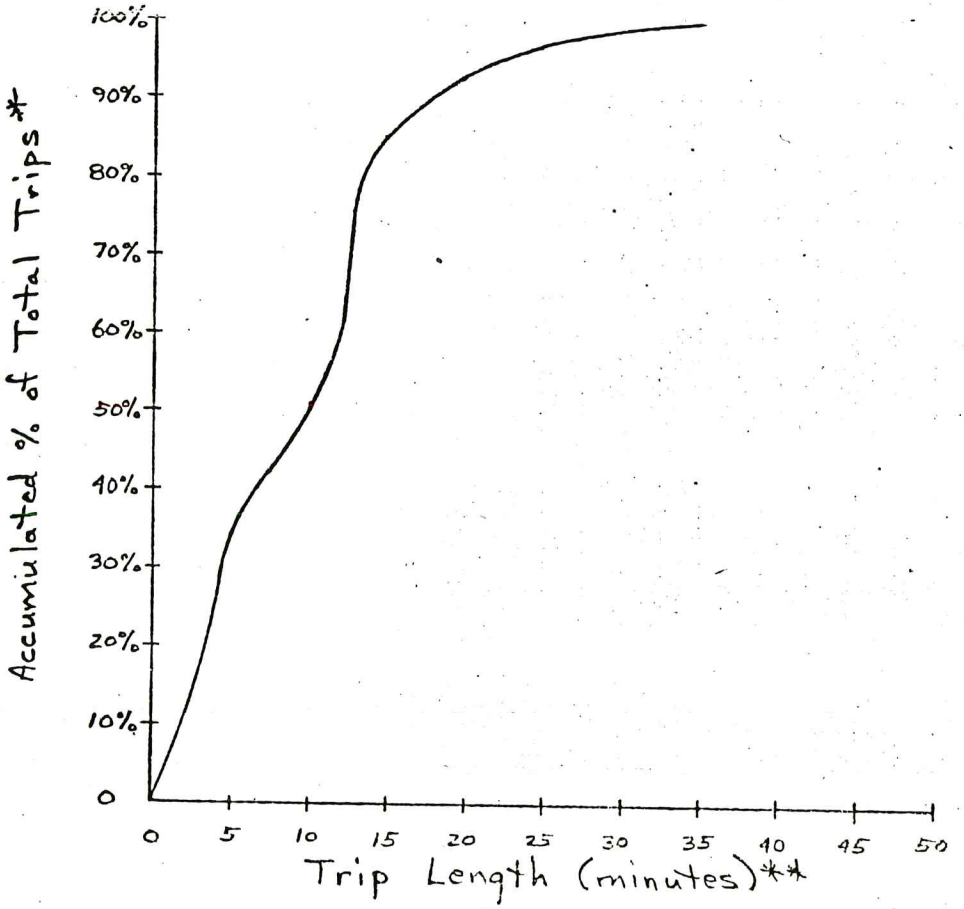
The following graphs were prepared from this computer print-out.

* Terminal time includes such items as time for walking to the car and driving out of the parking lot onto the road network system.

Frequency Distribution of Travel Times

Rosedale Shopping Center

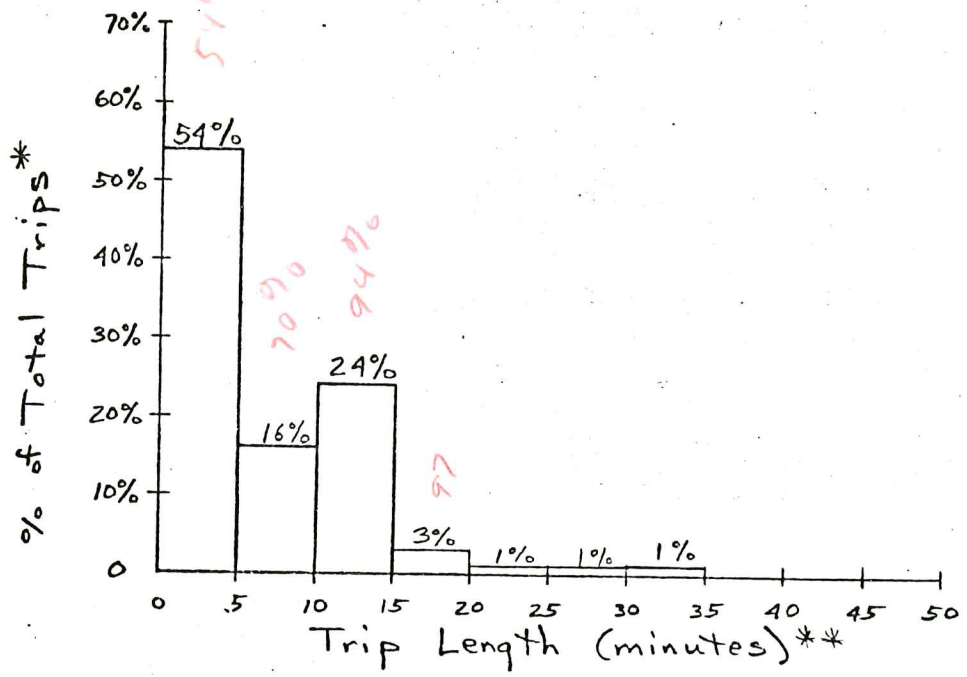


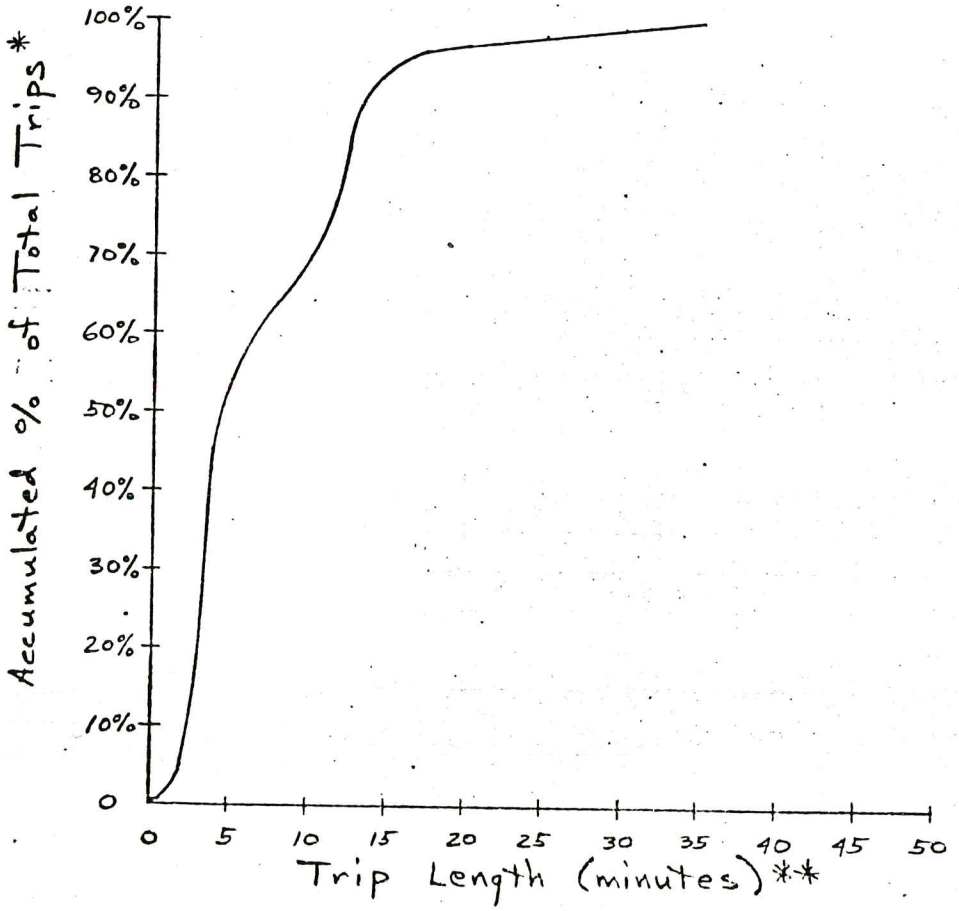


* Total Trips = 11,359 (excludes 51 trips outside seven-county area)
** Includes terminal times

Frequency Distribution of Travel Times

Har-Mar Shopping Center

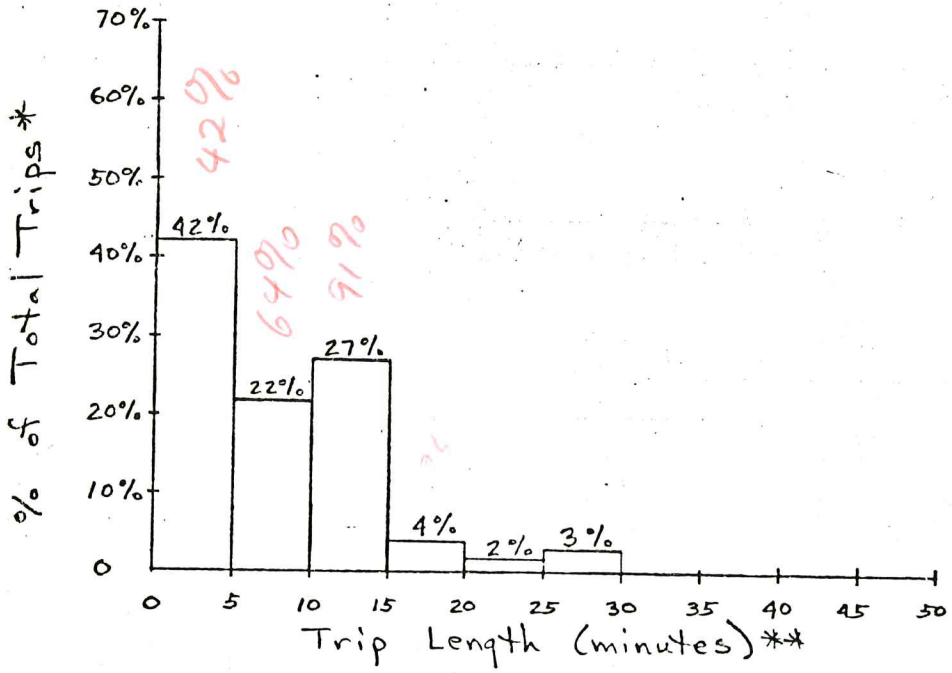


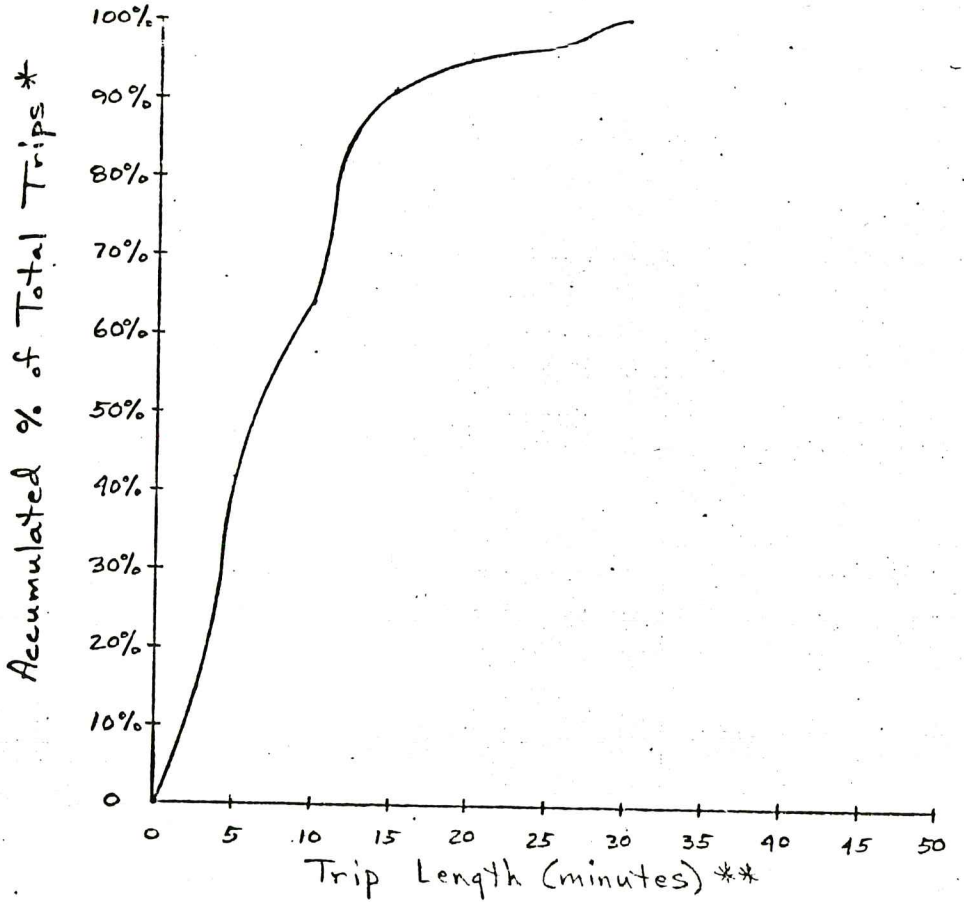


* Total Trips = 16,949 (excludes 109 trips outside seven-county area)
** Includes terminal times

Frequency Distribution of Travel Times

Target Store - Roseville

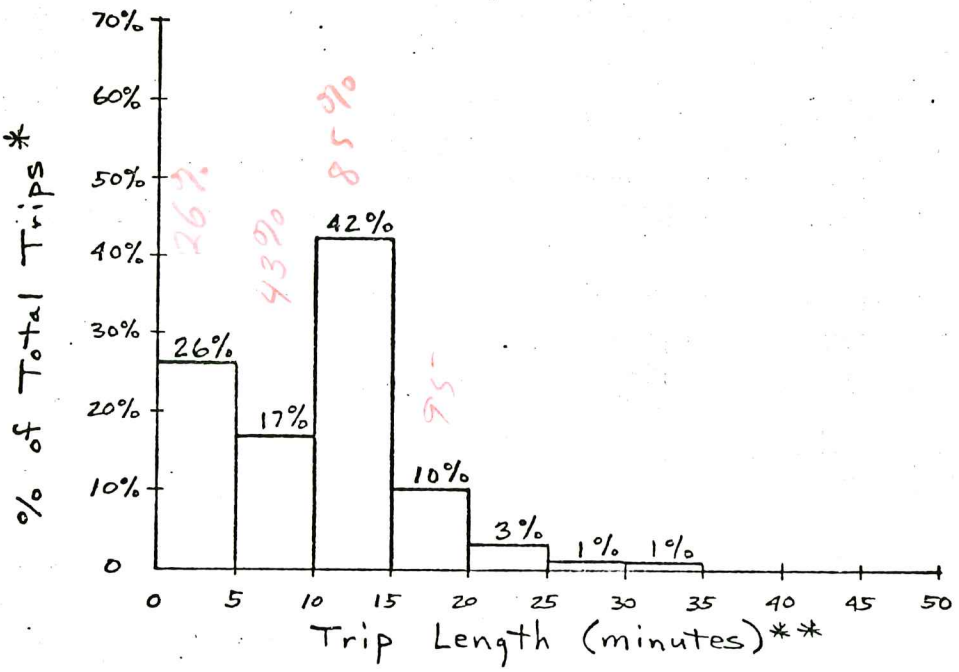


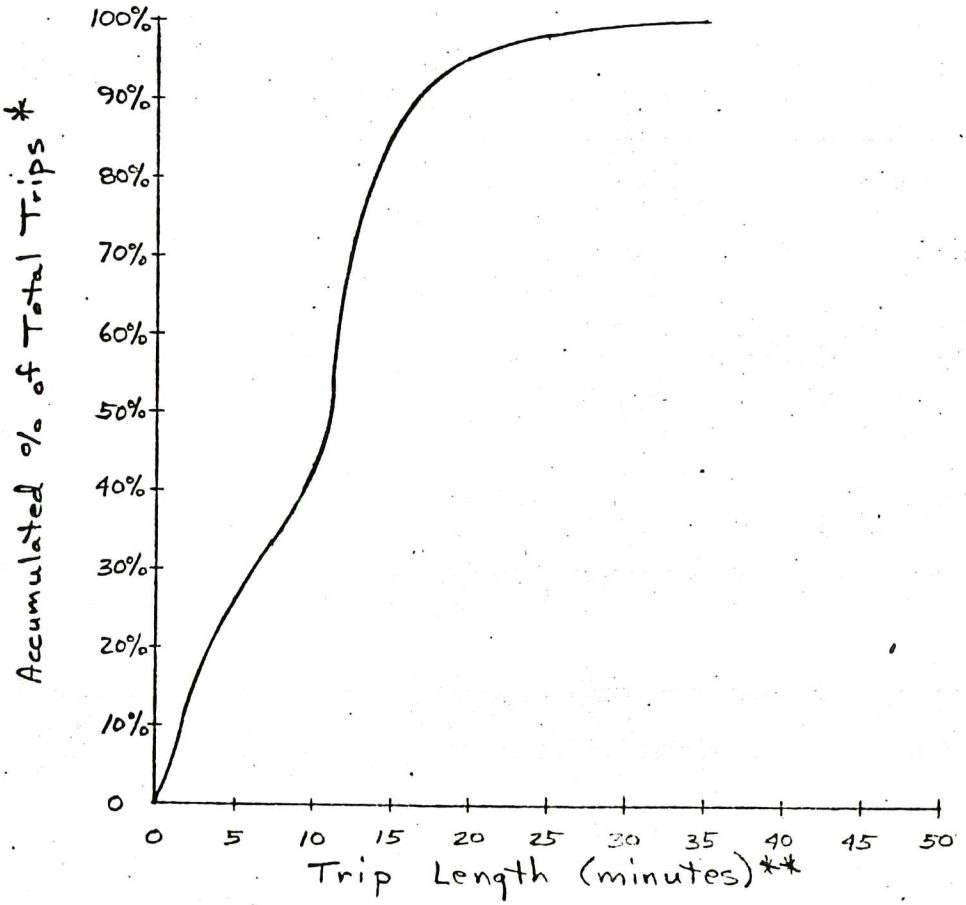


* Total Trips = 10,447 (excludes 306 trips outside seven-county area)
** Includes terminal times

Frequency Distribution of Travel Times

Apache Plaza



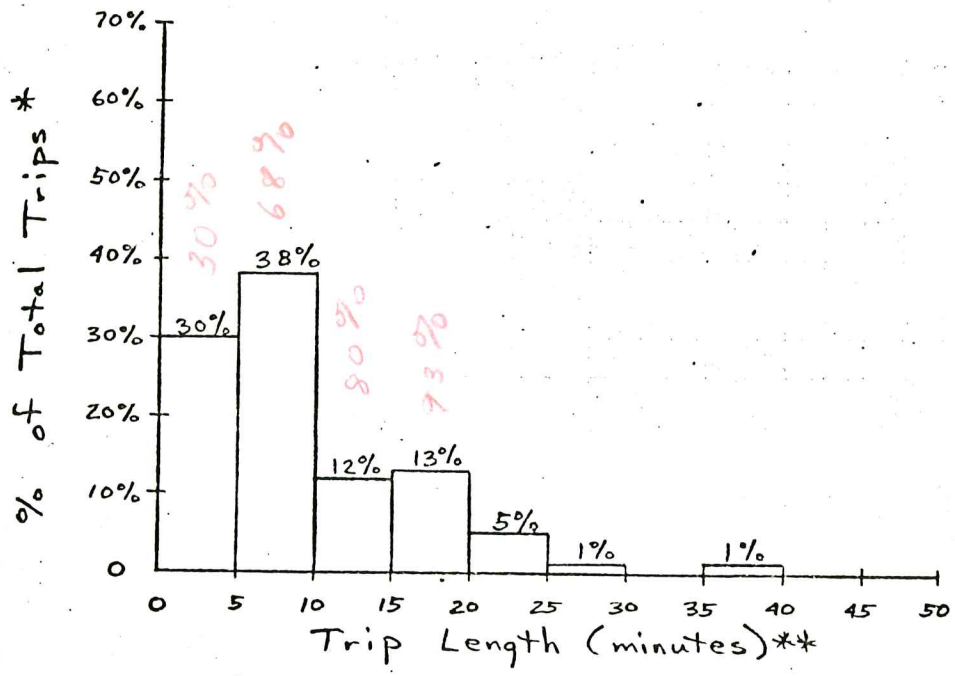


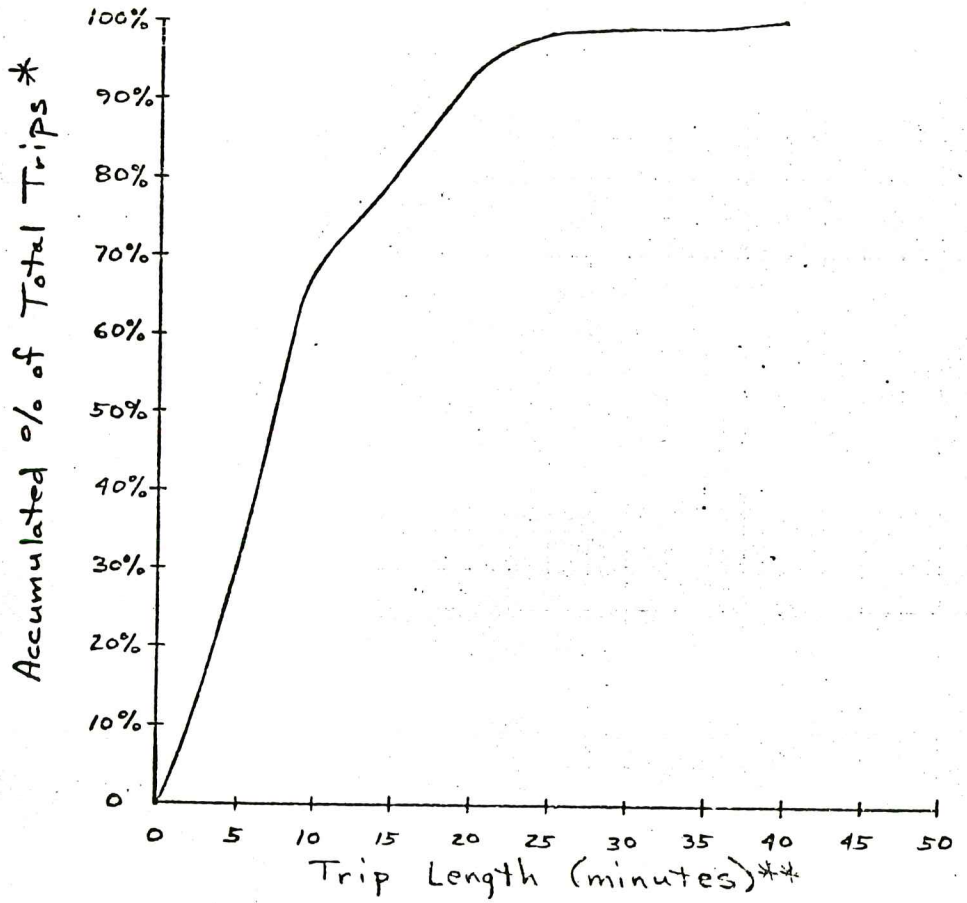
* Total Trips = 18,843 (excludes 260 trips outside seven-county area)

** Includes terminal times

Frequency Distribution of Travel Times

Brookdale Shopping Center

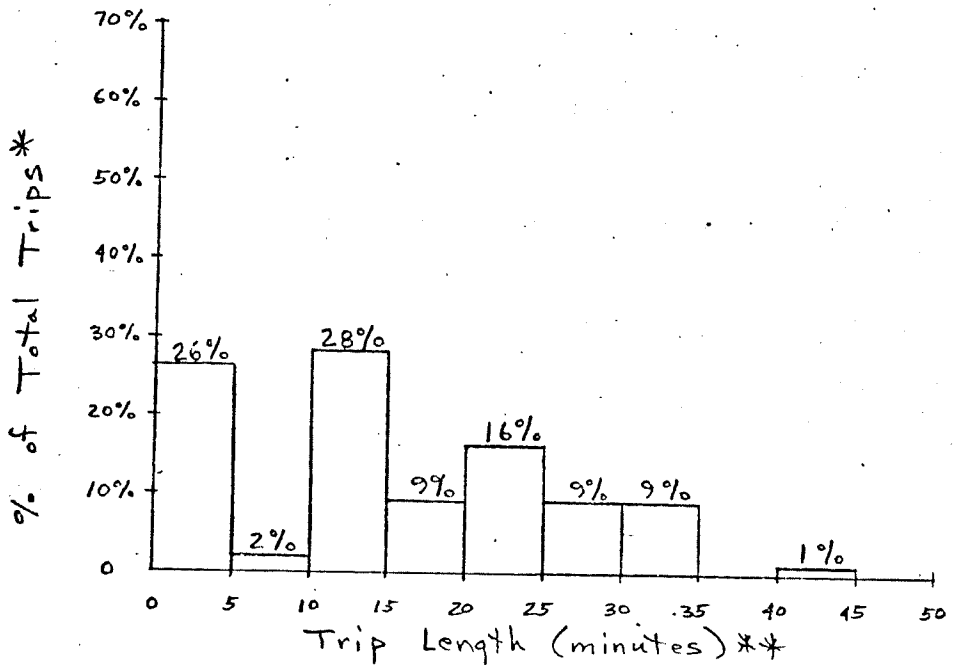


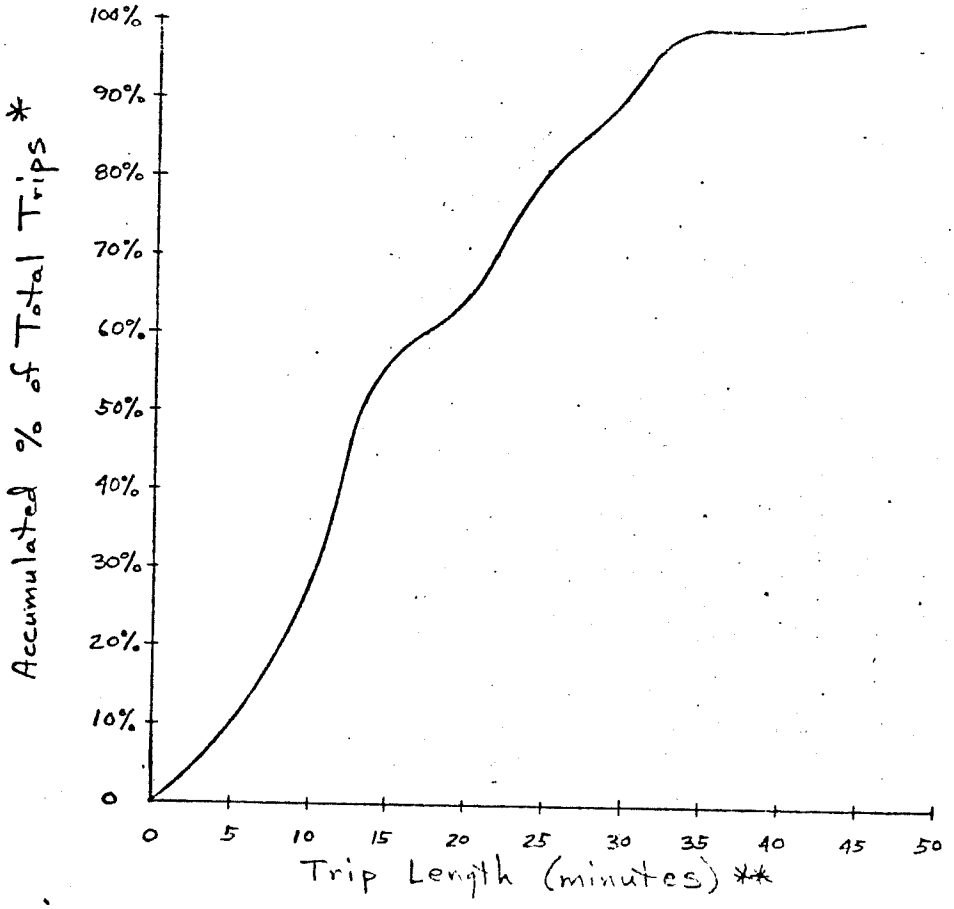


* Total Trips = 20,385 (excludes 741 trips outside seven-county area)
** Includes terminal times

Frequency Distribution of Travel Times

Minneapolis Industrial Park



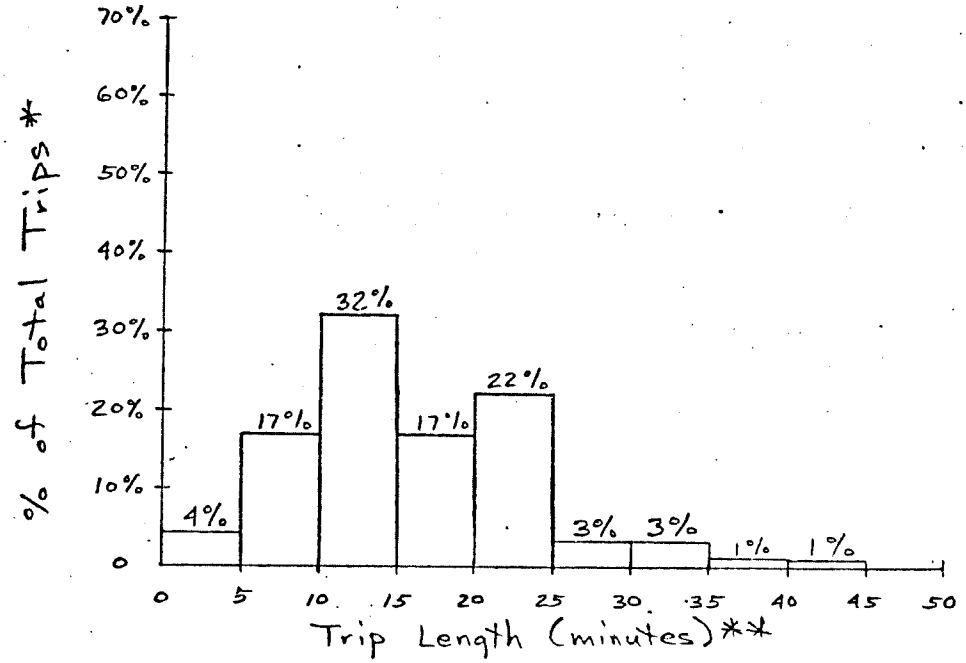


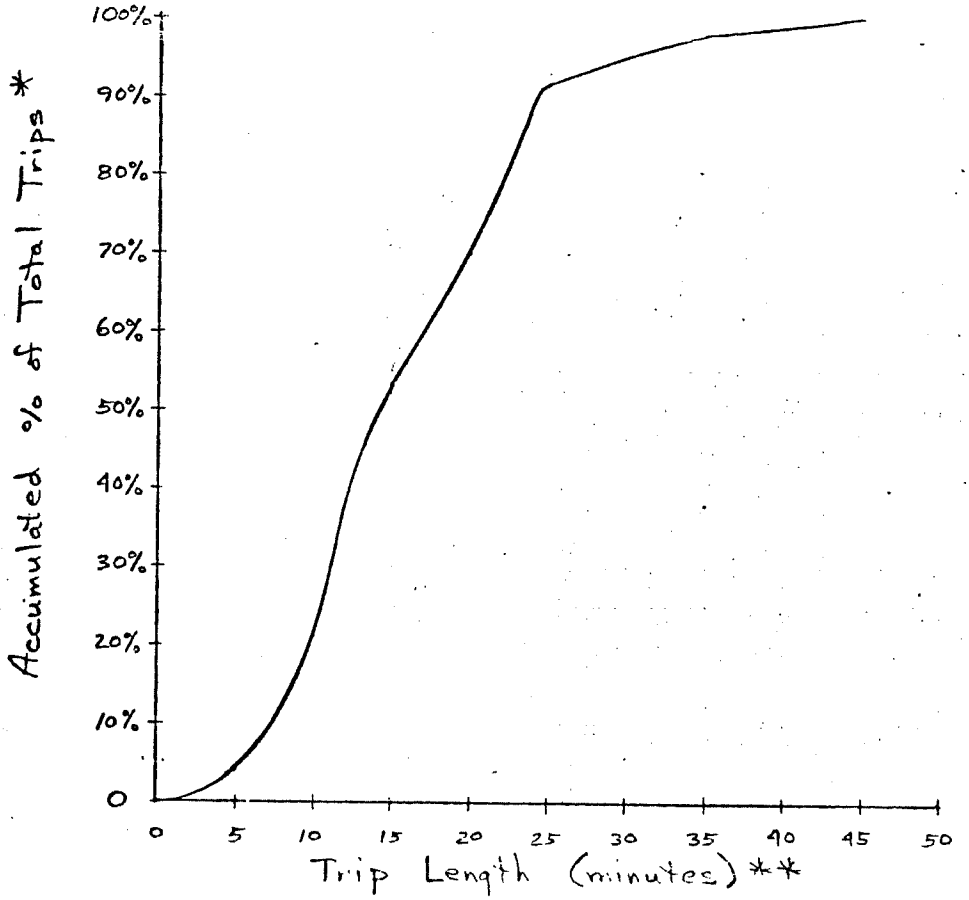
* Total Trips = 6,093 (excludes 370 trips outside seven-county area)

** Includes terminal times

Frequency Distribution of Travel Times

Prudential Insurance

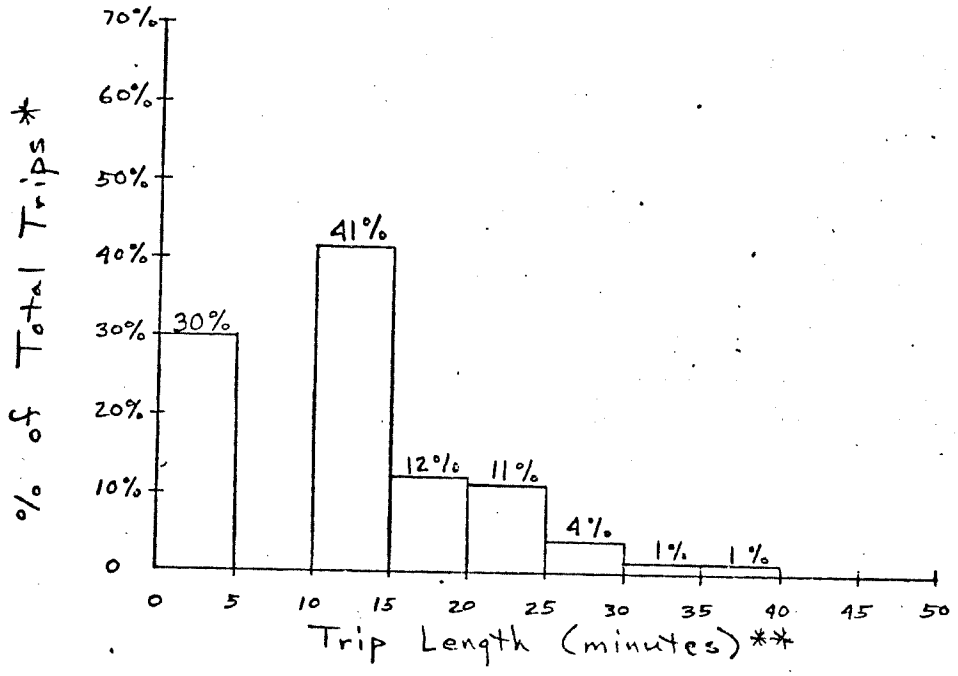


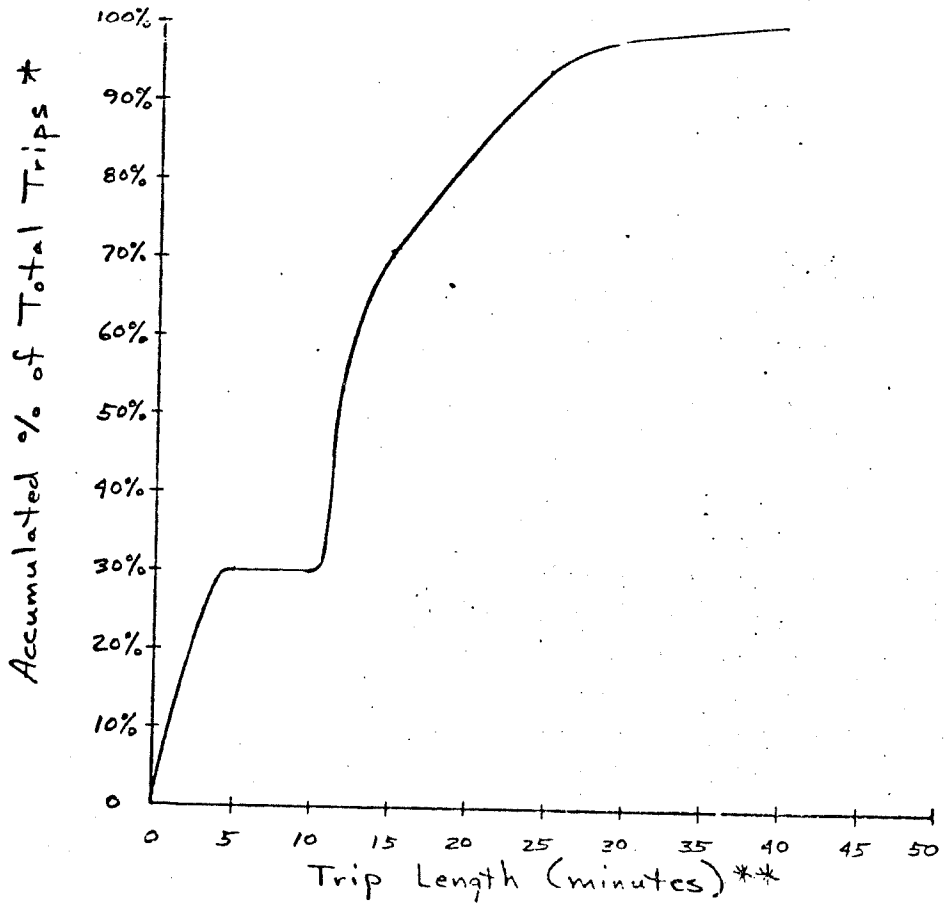


* Total Trips = 3,672 (excludes 101 trips outside seven-county area)
** Includes terminal times

Frequency Distribution of Travel Times

Edina Interchange Industrial Park

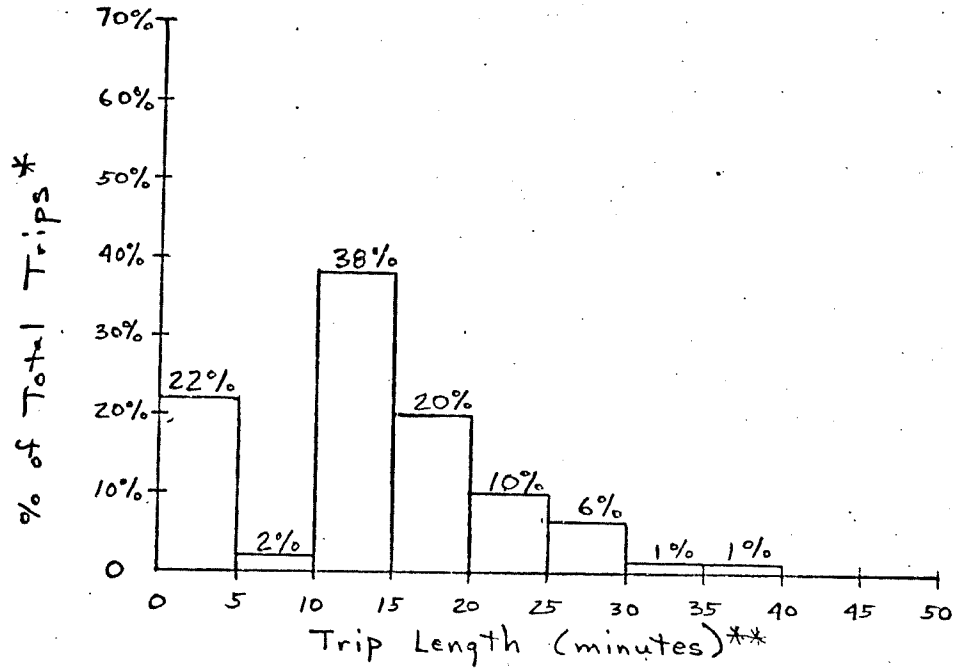


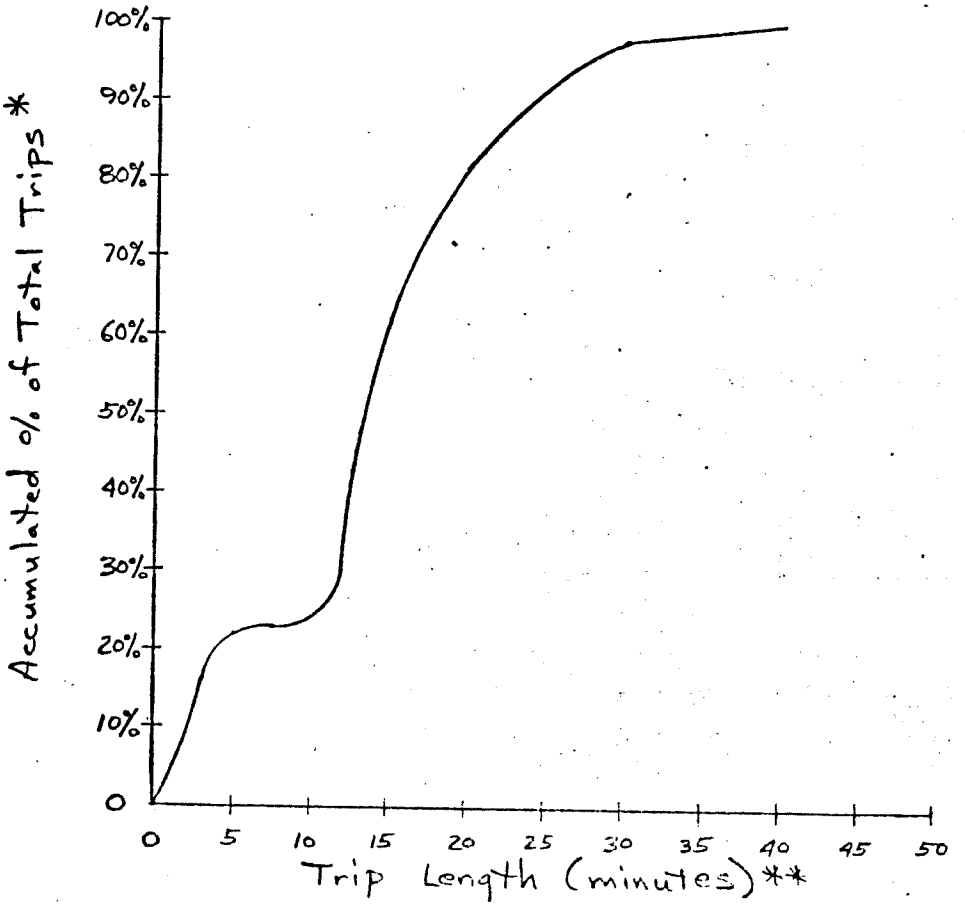


* Total Trips = 14,465 (excludes 148 trips outside seven-county area)
** Includes terminal times

Frequency Distribution of Travel Times

Pentagon Office Park



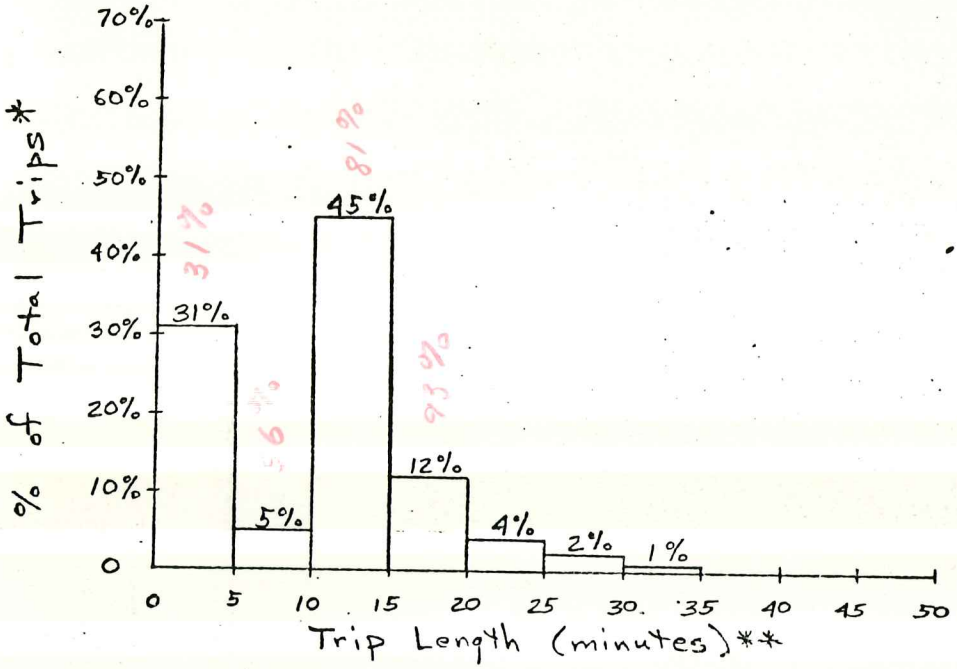


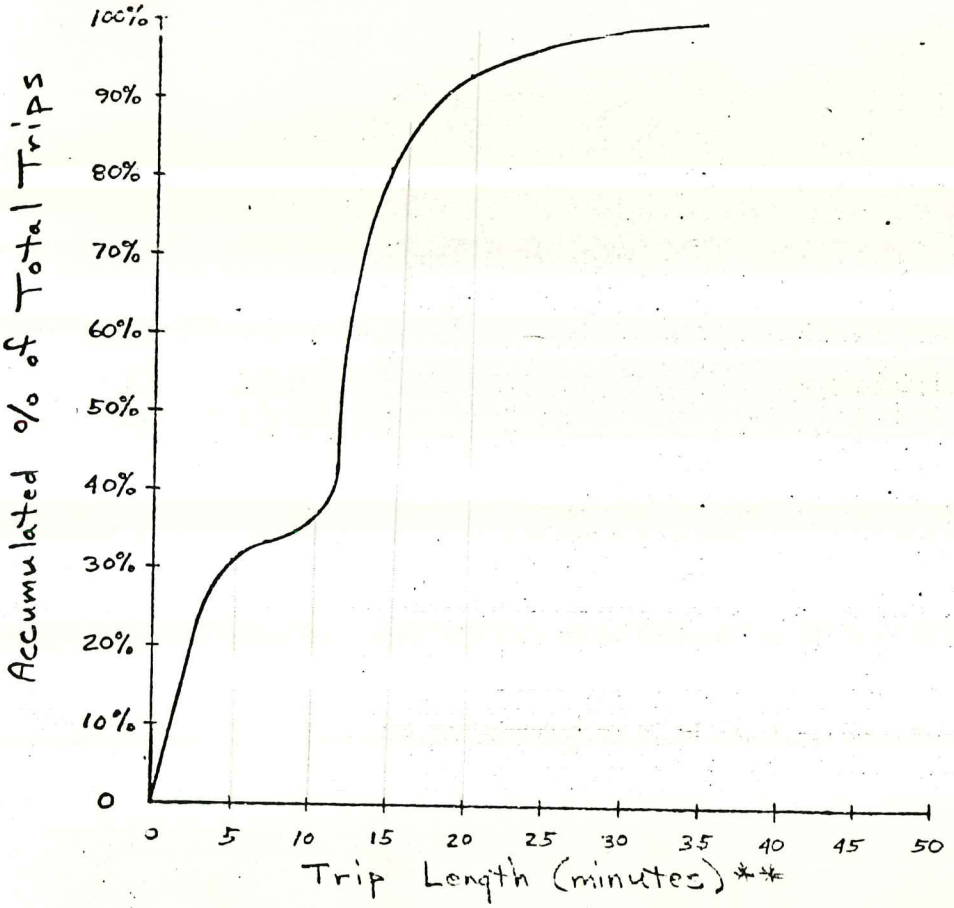
* Total Trips = 16,675 (excludes 303 trips outside seven-county area)

** Includes terminal times

Frequency Distribution of Travel Times

Southdale Shopping Center





* Total Trips = 31,173 (excludes 708 trips outside seven-county area)
** Includes terminal times