1976
ON BOARD SURVEY

SEPTEMBER 1977

prepared by

Northeast Ohio Areawide Coordinating Agency

in cooperation with

Greater Cleveland Regional Transit Authority

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SUMMARY OF RESULTS

In November 1976 NOACA and GCRTA conducted an on-board survey of GCRTA transit riders. All routes were surveyed in one direction except the downtown loops. The survey was a large scale effort requiring 264,000 survey forms, 130,000 pencils and 4,600 boxes of assorted sizes. Nearly 62,000 completed survey cards were obtained, coded, key punched and tabulated.

The intent of the survey was to gain current information about the existing transit ridership for NOACA's continuing planning program and, where possible, to compare that information with the results of a similar survey conducted in 1974. Changes in rider characteristics were anticipated because of major transit system improvements implemented by GCRTA during the 1974-1976 time period. Those improvements included:

- Creation of a common fare structure with free transfers.
- Reduction of fares from the 45 to 75 cent range (each independent system had a separate base fare) to 25 cents for local service and 35 cents for express.
- Addition of 20 percent more service.
- Implementation of a security program.
- Implementation of half fares during peak hours and free fares at other times for handicapped persons and senior citizens.
- Implementation of half fares for school trips.

Survey Results

Below are listed the questions as printed on the survey form (also shown on Figure 1) and the results. (NOTE: Questions one through three and fourteen are not included here).

4. How did you arrive at this bus/rapid?

. Walk 0-3 blocks	62%
. Walk 4 or more blocks	8%
. Driven to bus/rapid	6%
. Drove less than 5 miles	6%
. Drove more than 5 miles	3%
. Transferred	15%

5. Are you coming from:

. Work	18%
. Home	61%
. School	9%
. College	2%
. Shopping	2%
. Personal Business	3%
. Medical/Dental	2%
. Social/Recreational	1%
. Other	2%

6. Are you going to:

. Work	48%
. Home	19%
. School	9%
. College	5%
. Shopping	6%
. Personal Business	6%
. Medical/Dental	2%
. Social/Recreational	1%
. Other	4%

52%

7. Are you:

. Male	39%
. Female	61%

Age:

. Less than 18	14%
. 19-22	21%
. 23-35	27%
. 36-59	27%
. 60-64	5%
. 65 or Older	6%

8. Where do you live?

. Cleveland	55%
. Suburbs	45%

9. Why did you ride today?

. No cars available	35%
. No drivers license	9%
. More convenient	29%
. Save time	4%
. Less expensive	23%

10. How many times do you transfer during this trip?

. One	33%
. Two	13%
. Three	4%
. Four or more	1%
. None	49%

11. How many cars do you have in your family?

. One	40%
. Two	27%
. Three	7%
. Four or more	3%
. None	23%

12. What is your final destination?
(Including trip to home)

. Downtown Cleveland	52%
. Other parts of Cleveland	35%
. Suburb	13%

13. Will you transfer to complete this trip?

. No	58%
. Yes	42%

The highlights of the results are:

- The primary mode of access is walk;
- The home-work trip is by far the most common trip purpose;
- The ridership is primarily female;
- A significant percentage of the ridership is over 65 and less than 18;
- City of Cleveland residents outnumber suburban residents;
- The reasons riders choose transit are, in descending order, no alternative available, convenience/time saving and cost savings;

* is 20% significant? Given the survey [illegible] other [illegible]

- About half the riders transfer at least once;
- Most of the riders have a car in their household; and
- A majority of the surveyed riders are destined to the CBD.

1974-76 Comparison

The survey results, including a comparison with similar data of the 1974 survey, are discussed below. (Because the methodologies of the 1974 and 1976 surveys were different, these comparisons are approximate).

Mode of Access: Few riders (about 8 percent) walk 4 blocks or more to transit. A comparison with 1974 data shows that the aggressive GCRTA improvement program has not increased this percentage. In fact, a slight decrease is shown. Auto access ridership increased about 60 percent over 1974 levels and is now a greater proporiton of the GCRTA ridership than prior to the improvement program. The largest increase is among park and ride riders driving less than 5 miles.

Trip Purpose: There was a definite shift of trip purpose away from work to other types of trips. In 1976 non-work trips comprised 44 percent of all transit trips, which is approximately a 40 percent increase over non-work trips in 1974.

Age: Comparison of the two on-board survey results shows no significant increases in transit use by the very young (under age 18) or the elderly (age 65 or over). However, these two groups, because of physical and/or education limitations, are usually under represented in any self-selected survey sample. Therefore, no firm conclusion can be made, especially in light of the obvious observable increase in senior citizen riders.

Residence: A major goal of the creators and management of GCRTA was to provide a balanced improvement program relative to the City of Cleveland and the suburban areas. While City of Cleveland residents are a majority of GCRTA riders (55 percent), their proportion did not change between 1974 and 1976. This suggests that the improvement program is successfully meeting its goal of a balanced improvement program.

Reason for Riding: A major aspect of the GCRTA improvement program was the 25 cents fare (35 cents express). The impact of this fare reduction program is apparent in the results of the survey. There was nearly a twofold (to 23 percent in 1976) increase in the percent of the ridership choosing transit because of its lower cost. The percentage of riders choosing to ride because of transit's convenience or time savings remained constant from 1974 to 1976. There was a decrease in the percentage of riders who used transit because of the lack of an auto or driver's license.

Transfers: The number of transfers increased significantly between 1974 and 1976. The GCRTA fare structure includes free transfers, while in 1974 most transfers cost 5 cents, and transfers from one system to another cost the full fare of the second system used. The survey results show the number of riders transferring one or more times increased by 50 percent (this includes former riders who may be transferring more often and new riders who transfer). Nevertheless, in 1976 about half of all riders did not transfer at all.

The former Shaker Rapid is the service most affected by the free transfer between two systems. In 1974, prior to the GCRTA, a ride on the rapid cost 55 cents and a transfer to the CTS loop bus added 25 cents for a total

of 80 cents. In 1976 the cost for the same trip was 35 cents. In apparent response to that improvement, the percentage of riders on the former Shaker Rapid that transfer increased from 15 percent in 1974 to 34 percent in 1976.

Auto Ownership: Between 1974 and 1976 there was approximately a 25 percent increase in the proportion of transit riders having at least one auto in their households.

CBD Destinations: A comparison of 1974 and 1976 data for CBD destinations is not possible in that the question was not asked in 1974. An interesting and important statistic is that about 45 percent of all travel to the CBD was via transit in 1976.

estimations (pg 22)

Ridership Volume: While the surveys were not intended to determine actual ridership, they, plus GCRTA quarterly rider counts, provide sufficient data to make estimates of ridership. The total rides (including all boarding passengers) and first board passengers (which excludes those riders who board via a transfer) for Fall, 1974 and Fall, 1976 are shown below.

	1974	1976	% Increase
Rides	300,000	412,000	37
First Boards	210,000	270,000	29

Both of these increases point to the success of the GCRTA improvement package, and both totals have continued to increase since the 1976 survey. This ridership increase exceeds that of other large cities that have implemented programs similar to that of GCRTA, such as Los Angeles, Atlanta, and St. Louis.

according to GCRTA quarterly counts

Route by Route Analysis

An analysis of the results was made on a route by route basis, and also for riders of the bus system versus the two rapid transit systems. (Rapid transit riders as used herein exclude transferees from buses.) The two rapid transit systems (Heavy Rail and Light Rail) riders were found to have significantly different characteristics than bus riders, for example:

- Auto access accounts for a greater percentage of the ridership (37 and 46 percent Heavy and Light Rail respectively vs. 10 percent for the bus system).
- Trip purpose is more work trip oriented for rail riders (54 and 72 percent vs. 46 percent).
- About half of the rapid riders are males (52 and 52 percent vs. 39 percent).
- Fewer young people (under 18 years of age) use the rapids (7 and 8 percent vs. 15 percent).
- The residence of rapid riders is suburb oriented (56 and 75 percent vs. 44 percent).
- A far greater percentage of rapid riders choose transit for convenience and time savings (48 and 59 percent vs. 30 percent).
- Auto ownership is higher among rapid riders (50 and 51 percent vs. 34 percent have more than one auto in their household).
- The destination of rapid riders is more CBD oriented (69 and 84 percent vs. 49 percent).

A route by route analysis showed the following general conclusions:

- No route had more than 15 percent of its ridership walking 4 or more blocks to the service.
- Many of the long express routes serving the outlying sections of Cuyahoga County or the suburban counties had over 30 percent of their riders using auto access.
- Long express routes tend to be far more work trip oriented than local/crosstown routes.

- Few routes have less than 50 percent of their riders making work trips and none have less than 40 percent.
- Long express routes tend to have far higher percentages of males than local/crosstown routes, but no route has more than 60 percent male ridership.
- Long express routes have much higher percentages of their riders destined to the CBD than local and feeder routes, and many have over 80 percent destined to the CBD.

Full Report

The full report follows and includes two appendices. The reader is encouraged to review this additional information to gain a more complete insight to the data presented in this summary.

I. INTRODUCTION

This report documents and analyzes the 1976 on-board survey conducted jointly by the Northeast Ohio Areawide Coordinating Agency (NOACA) and the Greater Cleveland Regional Transit Authority (GCRTA). The 1976 on-board survey was a part of NOACA's continuing surveillance activity to maintain a current data bank relative to the transportation system in the 5-County NOACA area.

A similar survey was conducted in 1974 prior to the creation of the GCRTA. Since then, GCRTA has either absorbed or developed service agreements with all major mass transportation operators serving Cuyahoga County. In addition, GCRTA has implemented a wide range of service improvements including:

- Creation of a common fare structure with free transfers.
- Reduction of fares ranging from 45 to 75 cents (each independent system had a separate base fare) to 25 cents for local service and 35 cents for express.
- Addition of 20 percent more service.
- Implementation of a security program.
- Implementation of half fares during peak hours and free fares at other times for handicapped persons and senior citizens.
- Implementation of half fares for school trips.

Considering the magnitude of the service changes, NOACA and GCRTA determined that a second survey would be appropriate. The major purpose of the 1976 survey was to obtain a current transit ridership profile to document and evaluate the changes in rider characteristics, and to use as data for input to both short and long range transportation systems planning.

The survey methodology and question content was adapted from "Urban Mass Transportation Travel Surveys," August 1972. Based on prior experiences (the 1974 survey

and a test survey conducted in May 1976), improvements were made to the 1974 survey methodology in the distribution/collection of survey forms, and the tabulation of the results. Materials needed for the survey were provided by NOACA, and included: 264,000 forms, 130,000 pencils, 4,600 boxes, posters, box labels, masking tape, and rubber bands. As in 1974, the NOACA-designed distribution box was used. NOACA used GCRTA schedules and rider counts to prepare a packet of survey materials for each route and block assignment. GCRTA staff prepared driver instructions and distributed the packets to the appropriate vehicles.

The survey was conducted on all GCRTA routes (except Downtown Loops) in one direction. Radial routes were surveyed in an inbound (toward the Central Business District) direction and crosstown routes according to the flow of the majority of morning travel, primarily toward the rapid transit system. One exception was the Heavy Rail Rapid where all boarding passengers except at Terminal Tower, the major Central Business District (CBD) station, were surveyed. The survey was conducted during November 1976 on Tuesdays, Wednesdays and Thursdays, one operating station per day. Forms were distributed to the riders from 6:00 a.m. to 9:00 p.m.

The survey was self-administered, and was distributed by placing survey forms and pencils in distribution boxes attached to the fare box of buses and Light Rail Rapid cars. Drivers were asked to encourage riders to take a survey card. Collection boxes were placed at the front and (for local routes) rear doors. The Heavy Rail Rapid distribution was done by placing distribution boxes of survey forms at the entrances of each station, except Terminal Tower. Forms were collected from the buses and Light Rail Rapid at the end of each inbound trip by GCRTA personnel. A total of approximately 62,000 forms were collected

from among the approximately 205,000 inbound riders (including transfers).

NOACA coded and key punched the survey results. A general purpose tabulating program was used to prepare computer tabulations and cross-tabulations, for both individual routes and the total system.

The tabulations included a "factoring" process. For a number of reasons, a self-administered on-board survey will result in a varying percentage of returns for each bus trip and route surveyed. Past surveys have shown that center city local routes will usually have a far lower rate of return than suburban express routes. Therefore, NOACA built a factoring process into the 1976 survey.

Rider counts for each bus trip were made by GCRTA and the returns for each trip were assigned the weighting factor which, when applied, increased the returned survey data to the rider count total for that trip. (For example - if 25 returns were received and the rider count was 50, the factor was 2 and each of the returns were counted twice in the total results.)

A similar factoring process was used on a route and time period basis. The returns for each route and each time period (as shown on the survey form) were factored. The results used in this report are based on the results factored by route and time period.

The importance of the factoring process is that each route by time period is properly represented in the system-wide results. The usual under-representation of riders on center city local routes is eliminated. While the factoring process improves the reliability of the results, it can not insure that they are

statistically representative of the ridership.

Appendix A explains in more detail the mechanical procedures of the survey and Figure 1 shows the survey form used.

The remainder of this report details the data collected as part of the survey, but in no way does it represent the total data available. Additional cross-tabulations and stratifications were made but are not included herein. Those are available at NOACA. In addition, the coded data are stored in the permanent NOACA data bank and other tabulations, cross-tabulations and stratifications can be provided on request.

The report represents the data in four phases. First, a summary of the results of each question; second, an analysis of several relevant cross-tabulations; third, an analysis of the results by route; and fourth, a comparison of the results of each question with the results of the 1974 survey.

In the use and evaluation of the data, these calculations are appropriate:

- The survey was of inbound riders, except on the Heavy Rail Rapid where all boarding passengers, except at Terminal Tower, were surveyed.
- The useable surveys received were factored for each time period and route to represent the total riders.
- The very young, elderly and low income riders, because of educational and physical limitations, tend to be under represented in self administered surveys.
- All inbound riders, including transferees, were surveyed. However, question 4 of the survey identified transfers and their survey forms are not included in the tabulations, unless stated otherwise.
- Unless shown otherwise, the percentage results exclude those returns which did not answer the questions.

FIGURE 1

SURVEY FORM

TRANSIT RIDER SURVEY

NORTHEAST OHIO AREAWIDE COORDINATING AGENCY
GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY

No. 03051

– Please fill out this card and deposit it in one of the collection boxes provided. Thank you. –

1. At What Stop Did You Board This Bus/Rapid? _____
(Give names of nearest intersecting streets or rapid station)

2. At What Time Did You Board This Bus/Rapid? *(Please check one)*
(1) ☐ 5–7 am (2) ☐ 7–9 am (3) ☐ 9 am – 12 noon (4) ☐ 12–4 pm (5) ☐ 4–9 pm

3. At What Stop Will You Get Off This Bus/Rapid? _____
(Give names of nearest intersecting streets or rapid station)

4. How Did You Arrive At This Bus/Rapid?
(1) ☐ Walk 0–3 Blocks (2) ☐ Walk 4 Or More Blocks (3) ☐ Driven To Bus/Rapid
(4) ☐ Drove Less Than 5 Miles (5) ☐ Drove More Than 5 Miles
(6) ☐ Transferred – From Which Route Or Rapid? _____

IF YOU HAVE TRANSFERRED, YOU DO NOT HAVE TO COMPLETE THE REST OF THE SURVEY

5. Are You Coming From: (1) ☐ Work (2) ☐ Home (3) ☐ School (4) ☐ College
(5) ☐ Shopping (6) ☐ Personal Business (7) ☐ Medical/Dental (8) ☐ Social/Recreational
(9) ☐ Other

6. Are You Going To: (1) ☐ Work (2) ☐ Home (3) ☐ School (4) ☐ College
(5) ☐ Shopping (6) ☐ Personal Business (7) ☐ Medical/Dental (8) ☐ Social/Recreational
(9) ☐ Other

PLEASE COMPLETE THE REVERSE SIDE

DO NOT WRITE IN THIS SPACE

7. Are You: (1) ☐ Male (2) ☐ Female
Age: (1) ☐ Less Than 18 (2) ☐ 18–22 (3) ☐ 23–35 (4) ☐ 36–59
(5) ☐ 60–64 (6) ☐ 65 Or Older

8. Where Do You Live?
(1) ☐ Cleveland (2) ☐ Suburb _____
(Please specify)

9. Why Did You Ride Today? *(Please give only one reason)* (1) ☐ No Car Available (2) ☐ No Drivers License
(3) ☐ More Convenient (4) ☐ Save Time (5) ☐ Less Expensive

10. How Many Times Do You Transfer During This Trip?
(1) ☐ One (2) ☐ Two (3) ☐ Three (4) ☐ Four Or More (5) ☐ None

11. How Many Cars Do You Have In Your Family ?
(1) ☐ One (2) ☐ Two (3) ☐ Three (4) ☐ Four Or More (5) ☐ None

12. What Is Your Final Destination ?
(1) ☐ Downtown Cleveland (2) ☐ Other Parts Of Cleveland (3) ☐ Suburb _____
(Please specify)

13. Will You Transfer To Complete This Trip?
(1) ☐ No
(2) ☐ Yes – If Yes, To What Bus Route Or Rapid _____
(Please specify)

14. Please Select Your Family's Yearly Income:
(1) ☐ Less Than $5,000 (2) ☐ $5,000–$10,000 (3) ☐ $10,000–$17,000 (4) ☐ Over $17,000

PLEASE COMPLETE THE REVERSE SIDE

DO NOT WRITE IN THIS SPACE

- All percentages have been rounded and may not total to 100 percent. Also the results for any one question may differ a percentage point or two from one table to another.

- The results do not include the small number or riders who ride (inbound) between 9 p.m. and 6 a.m.

- The downtown loop system was not surveyed.

- It must be recognized that the survey was administered to a self-selected sample, i.e., those riders who chose to complete a survey form. How well those riders represent the total ridership cannot be known. Nevertheless, the survey results are useful for planning purposes.

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2. At What Time Did You Board This Bus/Rapid? *(Please check one)*
(1) ☐ 5–7 am (2) ☐ 7–9 am (3) ☐ 9 am – 12 noon (4) ☐ 12–4 pm (5) ☐ 4–6 pm

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(5) ☐ Shopping (6) ☐ Personal Business (7) ☐ Medical/Dental (8) ☐ Social/Recreational
(9) ☐ Other

6. Are You Going To: (1) ☐ Work (2) ☐ Home (3) ☐ School (4) ☐ College
(5) ☐ Shopping (6) ☐ Personal Business (7) ☐ Medical/Dental (8) ☐ Social/Recreational
(9) ☐ Other

PLEASE COMPLETE THE REVERSE SIDE

DO NOT WRITE IN THIS SPACE

7. Are You: (1) ☐ Male (2) ☐ Female
Age: (1) ☐ Less Than 18 (2) ☐ 18–22 (3) ☐ 23–35 (4) ☐ 36–59
(5) ☐ 60–64 (6) ☐ 65 Or Older

8. Where Do You Live?
(1) ☐ Cleveland (2) ☐ Suburb _____ *(Please specify)*

9. Why Did You Ride Today? *(Please give only one reason)* (1) ☐ No Car Available (2) ☐ No Drivers License
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DO NOT WRITE IN THIS SPACE

II. SYSTEM-WIDE PROFILE

Table 1 represents the total results for most survey questions. The data are presented under four headings: the system total; the bus system; the Heavy Rail Rapid; and, the Light Rail Rapid.

In reviewing and analyzing the data relative to the rapids, it should be noted that the results exclude riders who transferred to the rapids. (One exception is for the mode of access question, where those who transferred are included). In effect, the characteristics discussed below are those for only the riders who accessed the rapid by some means other than by bus.

Mode of Arrival

As can be expected, the large majority of all riders walk 3 or fewer blocks to transit. This is probably because high income persons who have a choice of modes, i.e. - their auto(s), will not walk long distances to transit. In lower income areas, where many persons do not have a choice of modes, the transit service coverage is usually very good and there is no need to walk more than three blocks. The survey did show a high percentage of GCRTA riders using auto access - 6 percent being driven to transit and 9 percent using park-and-ride access.

The Heavy Rail Rapid riders* are somewhat different from those on the total system, with fewer walk-on riders and more auto-access and transfer riders. The Light Rail Rapid has characteristics of its own, with nearly half of its riders being auto-access riders and few being transferees.

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*excluding transferees from buses

TABLE 1

TOTAL SYSTEM RESULTS
(In Percent)

	Total System	Bus System	Heavy* Rail System	Light* Rail System
MODE OF ACCESS				
Walk	70	79	31	43
Auto	15	10	37	46
Transfer	15	11	32	11
PURPOSE FROM				
Work	18	18	21	11
Home	61	59	63	80
School/College	11	12	9	5
Other	10	11	7	4
PURPOSE TO				
Work	48	46	54	72
Home	19	20	18	6
School/College	14	15	11	7
Other	19	19	17	15
SEX				
Male	39	36	52	52
Female	61	64	48	48
AGE				
Less Than 18	14	15	7	8
18 To 64	80	78	89	86
65 And Over	6	7	4	6
RESIDENCE				
Cleveland	55	56	44	25
Other	45	44	56	75
REASON FOR RIDING				
No Auto/License	44	49	24	16
Convenience/Time	33	30	48	59
Less Expensive	23	21	28	25
NUMBER OF TRANSFERS				
Zero	49	47	50	66
One	33	33	37	27
Two	13	15	10	5
Over Two	5	5	3	2
AUTOS IN HOUSEHOLD				
Zero	23	26	11	8
One	40	40	39	41
Over One	37	34	50	51
DESTINATION **				
CBD	60	49	69	84
Cleveland	31	37	24	11
Other	9	14	7	5

* Excluding transferees from buses except for mode of access.
** Excluding trips to home.

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The Heavy Rail Rapid riders* are somewhat different from those on the total system, with fewer walk-on riders and more auto-access and transfer riders. The Light Rail Rapid has characteristics of its own, with nearly half of its riders being auto-access riders and few being transferees.

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*excluding transferees from buses

Purpose From/Purpose To

Nearly two-thirds of all riders are coming to the transit service from home, and nearly 80 percent are coming from home or work. The Light Rail Rapid is much more home-oriented than the system total.

Nearly half of the system riders are traveling to work. The only other non-home trip purposes of note are school and college. The tendency toward work trips is even more pronounced on the two rapid systems, especially on the Light Rail System where nearly three-fourths of the riders are going to work.

The trip purpose characteristics show that transit service in Cuyahoga County is work trip oriented but also is a valuable element of the total transportation system for other types of trips. Indeed, the purpose of transit trips is not too different than the purpose of all trips, as shown below:

Trip Purpose	Approximate Percent of All Trips* by All Modes	Approximate Percent of Transit Trips**
Work	20%	33%
Home	40%	40%
School/College	5%	12%
Shop	15%	4%
Other	20%	11%

* Based on recent NOACA continuing process analyses.

** Includes inbound & outbound riders assuming the "outbound" riders have a trip purpose distribution equal to the "trip purpose from" characteristics of the inbound riders.

This comparison shows that transit in Cuyahoga County, perhaps in contrast to common belief, serves a wide variety of trip purposes.

Sex/Age

The two rapids* have slightly more male riders than females, but the total system is dominated by female riders (61 percent). Age characteristics tend to be similar among all systems.

Residence

A major item of interest is the residence of riders. Fifty-five (55) percent of all riders are City of Cleveland residents. The rapids* are oriented more towards suburban areas with slightly more than half of the Heavy Rail riders and about three-fourths of the Light Rail riders coming from the suburbs.

On a system-wide, county-wide basis, the fact that 55 percent of the ridership resides in Cleveland as compared to only 38 percent of the population is probably due to three causes. First, the service in Cleveland is better than in most suburban areas. The nature of any large urban area is a concentration of transit service to and from its core, which results in more service in those areas near the core. Second, since the residential and non-residential densities in Cleveland are greater than in the suburbs, they generate more ridership and require more service which then encourages more ridership. Third, the lower incomes of Cleveland residents result in more transit use because of the lack of alternative modes.

Reason for Riding

The total system has 44 percent of the riders riding transit because of the lack of a car or driver's license, 33 percent because of convenience or time savings,

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* excluding transferees from buses

and 23 percent because of cost savings. A large majority of the riders on the rapids* choose that mode because of convenience and time savings.

Number of Transfers/Daily Ridership

There are a large number of transfers on GCRTA services, but about half of the riders do not transfer. The Heavy Rail Rapid has similar characteristics. The Light Rail has fewer transfers, with two-thirds of the riders making no transfers. Knowing the percentage of riders making transfers, and the number of transfers they make it is possible to develop a conversion factor to compute daily first board ridership from total daily rides data. Total daily rides (i.e. - the total number of boarding passengers) including transfers are obtained by GCRTA once per quarter, usually in February, May, July, and October. First board ridership excludes transfering riders.

The factor for converting rides to first board riders is division of the number of rides by the number of first board riders (in percent) as developed below:

Percent of First Board Riders	Number of Transfers	Number of Rides Per First Board Rides	Total Rides Made By First Board Riders
48.8%	0	1	48.8
32.9%	1	2	65.8
13.3%	2	3	39.9
3.7%	3	4	14.8
1.3%	4	5	6.5
100.0%	NA	NA	175.8

The factor for rides per first board passenger is 1.8 and the factor for first board passengers per ride is (approx.) 0.6.

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* excluding transferees from buses

This factor applied to the October 1976 count of 412,000 rides shows that GCRTA carried about 250,000 first board riders on a typical weekday in Fall 1976. These data are not in total agreement with the factored results of the on-board survey results which show a total first board ridership of 312,000. Also, the survey showed 366,000 total rides. Adding the loops, which carried about 28,000 rides and were not surveyed, the total rides would be 394,000. A number of explanations for these differences are possible. Some are:

- Riders incorrectly completing the survey form, primarily over-estimating the number of transfers.
- Double counting riders who rode two vehicles with only one going in the survey direction.
- Double counting Heavy Rail riders boarding and deboarding at other than Terminal Tower.

The last possibility above was anticipated and accounts for the survey over-estimating first board riders by about 8,000.

Riders over-estimating the number of transfers they make is a second explanation. The survey also asked if a rider was going to transfer to complete his trip: of the first board riders, 42 percent said they would and 58 percent said they would not. However, only 80 percent of those who said they would not indicated "none" in the number of transfers question. On the other hand, 96 percent who said they would transfer indicated at least one transfer in the number of transfers question. This implies the factor for first board riders per ride is probably low.

A third, and probably most important explanation is that all routes were surveyed in a single direction. This means that a transfering rider riding two vehicles in a "normal" manner, i.e. - in the direction of the survey, are properly represented: they filled out a full survey card on their first ride and the initial part of the card on their second, and no cards on the return trip. However, those persons riding one vehicle in the reverse direction of the survey

would most likely have filled out 2 first board cards (one on each half of their round trip) and no "second" cards. The conclusion is that the survey methodology over-estimates the number of first board riders, and under-estimates the number of boarding transfer riders.

A fourth possible explanation is that a number of persons, after completing one card, would not have completed a second after a transfer. Therefore, it is probable that more "second" boarding cards should have been received.

A fifth explanation is that the ride count based on the tabulated survey is low due to a number of bus trips being excluded from the survey because of missing survey cards and ride counts.

The "explanations" above lead to a conclusion that the number of first boards should be less than the 304,000 figure shown by the survey, and the ride count should be somewhat higher than the 366,000 (excluding loops) shown by the survey. Nevertheless, the on-board survey does come close to matching known data, and is sufficiently accurate to make an estimate of actual ridership. For the remainder of this report a ride count of 412,000, a first board ridership total of 270,000 and a transfer factor of 0.65 has been used.

Auto Available

The transit dependency of many transit riders is apparent in the results of this question. About one quarter of the riders do not have an auto available in their household but 37 percent have more than one. The characteristics of rapid transit riders* are different: few rapid riders have no autos available and about half

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* excluding transferees from buses

have 2 or more.

Final Destination

About two thirds of riders system-wide and Heavy Rail Rapid* riders are destined to the Cleveland CBD (excluding trips to home). The Light Rail Rapid* is very CBD oriented, with over 80 percent of the riders destined to the CBD (also excluding trips to home).

The need for transit to serve the CBD is obvious. Recent NOACA estimates are that about 180,000 persons travel to the CBD every day. Of the approximately 135,000 persons using transit on the typical weekday, about 80,000 are destined to the CBD and account for about 44 percent of the persons destined there.

A negative aspect of the CBD orientation of existing transit trips is the relatively low number of persons using transit to other locations in Cleveland and Cuyahoga County. Approximately 700,000 trips by all modes have non-home destinations in Cleveland, and 1,300,000 have non-home destinations in the remainder of Cuyahoga County. These trip volumes are compared to approximate transit trip volumes below.

Non-Home Trip Destination	Via All Modes	Via Transit	% Via Transit
CBD of Cleveland	180,000	80,000	44
Remainder of Cleveland	700,000	42,000	6
Remainder of Cuyahoga Co.	1,300,000	12,000	1

On this type of comparison transit is very important to the CBD but does not compare well with the auto in the remainder Cleveland and is nearly an insignificant mode in travel to destinations in the remainder of Cuyahoga County.

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* excluding transferees from buses

SUMMARY

Overall, characteristics of GCRTA riders are typical of those in other large cities. They tend to be low income and female; work is the primary trip purpose and the majority of trips are made to the CBD. Perhaps the most interesting results of the survey are the relatively high auto access characteristics of the Light Rail Rapid users and also of all system users, the large percentage of total CBD trips via transit and the large percentage of riders who cite cost and convenience as motives for choosing transit.

III. CROSS-TABULATIONS

This chapter analyzes a selection of cross-tabulated on-board survey results. Those that are included represent some of the transit rider characteristics of importance to the transportation planning process.

Trip Purpose by Destination

Final destinations were cross-tabulated with purpose for the trip. Final destinations were adjusted to eliminate trips to home and stratified under three headings: Central Business District (CBD); the remainder of the City of Cleveland; the remainder of Cuyahoga County.

The results are shown in Tables 2 and 2a. The major share of transit work, college and shopping trips are made to the CBD. About two thirds of all trips destined to the remainder of Cleveland or the remainder of Cuyahoga County are for work or school. The only trip purpose where the CBD does not account for about half or more of those trips are school trips.

Transfers by Auto Ownership

The summary shown in Table 3 shows the number of transfers to be inversely related to auto ownership. These results support the following logic:

- If too many transfers are required, the use of public transportation becomes inconvenient and time-consuming; therefore, households will use private vehicles in proportion to the number owned.
- Households that possess one or more cars will use auto access to minimize the use of transfers.

TABLE 2

DESTINATION BY TRIP PURPOSE TO
(In Percent)

	Trip Purpose To					
Destination	Work	School	College	Shop	Other	Total
CBD	69	5	6	8	12	100
Remainder of Cleveland	44	20	8	5	23	100
Other	46	23	3	10	18	100
All Destinations	60	11	6	7	16	100

NOTE: Excluding Trips to Home

TABLE 2a

TRIP PURPOSE TO BY DESTINATION
(In Percent)

	Destination			
Trip Purpose To	CBD	Remainder Of Cleveland	Other	All Destinations
Work	73	21	6	100
School	30	51	19	100
College	61	34	5	100
Shop	70	19	11	100
Other	48	42	10	100
Total	60	31	9	100

NOTE: Excluding Trips to Home

TABLE 3

NUMBER OF TRANSFERS BY AUTO OWNERSHIP
(In Percent)

Number of Transfers	Number Of Autos In Household					
	0	1	2	3	4	Total
0	38	36	18	6	2	100
1	51	33	12	3	1	100
2	56	29	11	3	1	100
3 +	53	29	12	4	2	100
All Riders	49	33	13	4	1	100

Reason for Transit Use by Sex

A cross-tabulation of reason for transit use and sex provides the following information:

- 31% of the males surveyed found transit use convenient
  27% of the females surveyed found transit use convenient
- 29% of the males surveyed had no car available
  40% of the females surveyed had no car available
- 27% of the males surveyed found transit use less expensive
  20% of the females surveyed found transit use less expensive

Percentage responses for the categories of timesaving and no driver's license as reasons for transit use were equal for both sexes at approximately 9 and 4 percent respectively. The differences in the percentage responses for the car availability category could be caused by a variety of factors. For families having only one car available it is likely that the principal wage earner is the male member who uses the car. Also, the factors of users' personal income and proportion of female head of households using transit would contribute to the difference between the two sexes' selection of no car available. It has been documented that females' incomes are (in general) lower than males' incomes.

Age by Trip Purpose To

Tables 4 and 5 show cross-tabulated survey results for trip purpose to and age. Table 4 shows that the "less than 18" age group makes mostly school trips; the "18-22" group makes more work trips than any other purpose but also a significant percentage of school and college trips; and the "23-35", "36-59" and "60-64" groups make few trips for purposes other than work. The elderly (65 and over) have a totally different pattern; they make no school or college trips, and about equally as many work, shopping and other trips. They are the only group making

TABLE 4

AGE BY TRIP PURPOSE TO
(In Percent)

	Trip Purpose To						
Age Group	Work	Home	School	College	Shop	Other	Total
Less than 18	8	39	37	1	3	12	100
18 - 22	39	19	11	15	4	12	100
23 - 34	60	16	3	5	4	12	100
35 - 59	67	15	1	1	5	11	100
60 - 64	62	11	-	-	10	17	100
65 +	23	15	-	-	28	34	100
All Riders	48	19	9	5	6	13	100

TABLE 5

TRIP PURPOSE BY AGE
(In Percent)

	Age Group						
Trip Purpose To	Less Than 18	18-22	23-34	35-59	60-64	65+	Total
Work	2	18	36	36	6	2	100
Home	28	22	23	20	3	4	100
School	60	28	10	2	-	-	100
College	3	69	25	3	-	-	100
Shop	9	14	20	25	7	25	100
Other	13	21	26	21	6	13	100
All Purposes	14	21	27	27	5	6	100

a significant percentage of their trips for shopping and other trip purposes.

Table 5 presents the data in a different manner. It shows that work trips are made primarily by persons between 18 and 64 years of age; and, school and college trips by persons under 35 years of age. Shopping and other trips are made by all age groups.

Time Period by Age

Cross-tabulation of age of respondents by time period of transit usage can be of assistance in determining what age groups are likely to ride during various hours throughout an average day. Table 6 presents a breakdown of the survey's findings as expressed in percentages. Note that these results are for inbound trips only.

The early morning period of 5 to 7 a.m. is dominated by persons twenty-three to fifty-nine years of age. In all probability these users are either traveling to or from work, since the majority of schools, shopping, and other purposes are not functioning at these early hours. Transit usage during the 7 to 9 a.m. (or a.m. peak period) shows a fairly large percentage of riders in the under eighteen and eighteen to twenty-two age groups. This is logical because of travel for school purposes. Persons 65 years of age or over do not account for a significant percentage of trips made during the a.m.-peak period. This may be because the free fare opportunity does not exist until 9 a.m. Finally, as expected, the 65 or over age group forms a significant proportion of users during the 9:00 to 12:00 noon period, probably because of the free fare travel incentive.

Free fare is also in the 12-4 pm period, those people because of most common time to start each trip, from the home, other than work.

Rail Rapid Ridership By Mode Arrival

Cross-tabulations of stop-on by mode of arrival for rapid transit lines demonstrates

TABLE 6

TIME PERIOD BY AGE
(In Percent)

	Age Group						
Time Period	Thru 17	18-22	23-34	35-59	60-64	65+	Total
5 - 7 AM	5	15	27	42	8	3	100
7 - 9 AM	12	21	31	28	4	4	100
9 - 12 Noon	7	23	24	24	7	15	100
12 - 4 PM	22	21	21	22	5	9	100
4 - 9 PM	18	21	28	24	5	4	100
5 AM - 9 PM	14	21	27	27	5	6	100

variances within segments of these facilities (See Table 7). There is notable difference in access mode between the east and west segments to the Heavy Rail Rapid. While 22 percent of users drive less than 5 miles to get to the west side segment of the rapid, only 8 percent do so to access the east side segment. On the other hand, 43 percent of east side users transfer to the Heavy Rail Rapid, while only 26 percent of west side riders do so. These differences in accessing the route can be accounted for by the fact that the west segment has five stations with 6000 park-and-ride spaces as opposed to two stations with 1000 spaces on the east segment.

The Light Rail Rapid was divided into three sections to observe the differences in access among the Green Road and the Van Aken branches and the combined portion from Shaker Square to the CBD. The largest proportion of the Green Road branch riders use auto access. The combined portion has primarily walk-on riders. It appears that the close proximity of the Van Aken branch to a high concentration of multiple dwelling units results in a greater ridership, thus accounting for the difference in the mode of arrival percentages, because the Van Aken branch has slightly more parking spaces than the Green Road branch.

SUMMARY

A large number of cross-tabulations are possible, and all can contribute to the knowledge of rider characteristics. Only a small number of the potential tabulations have been discussed in this chapter. They have shown that: trips to the CBD, Cleveland and suburban destinations tend

TABLE 7

RAPID TRANSIT RIDERS BY MODE OF ACCESS
(In Percent)

Rapid System Segment	Walk 0-3 Blocks	Walk 4+ Blocks	Driven To Stop	Park & Ride 0-5 Miles	Park & Ride 5+ Miles	Transfer	Total
Heavy Rail System							
East Side	24	9	14	8	2	43	100
West Side	20	9	11	22	12	26	100
Total	22	9	12	17	8	32	100
Light Rail System							
CUT-Shaker Square	48	9	13	14	2	14	100
Green Road Branch	20	4	11	30	30	5	100
Van Aken Branch	42	8	9	22	8	11	100
Total	36	7	10	23	13	11	100
Total Rail Riders	25	8	11	17	9	30	100

NOTE: Transferees are included

to have different purposes; the number of transfers decrease as auto availability increases; males tend to ride transit for cost and convenience reasons while females tend to ride transit for lack of auto; the age distribution of riders is related both to time of day and trip purpose; and, that the various segments of the rapid transit system have different mode of arrival characteristics.

IV. ROUTE BY ROUTE ANALYSIS

A total analysis of each individual route is not practical within the context of this document; however, a summary analysis of most questions for each route was made. This showed a pattern of rider characteristics which is summarized in this section. The methodology was to review the rider characteristics and highlight those routes which had characteristics distinctly different from the system average. The "different" routes then can be compared and conclusions made. It should be noted that this is not a rigorous statistical analysis, and only descriptive conclusions are appropriate. The rail rapid data in this section are for first board riders only (except for mode of access). Those routes for which fewer than 50 returns were received are not included in this analysis. Table 8 presents the results by route for each operating station, and Table 9 shows the rider counts and survey forms received. Appendix B includes a map of Cuyahoga County and a route map for each individual route.

Access Mode

A large majority of riders walk less than three blocks to the transit system, however, a number of routes show significant percentages of riders walking more than three blocks, being driven to the service, or using park-and-ride access. This is shown below.

Walk greater than three blocks: Eight routes have more than 12 percent of their riders walking more than three blocks. They are (Exp = Express, Fdr = Feeder, Fly = Flyer):

(Continued on page 45)

TABLE 8

INDIVIDUAL ROUTE RESULTS
(In Percent)

HAYDEN STATION

	Express Routes						Local Routes							
	9/9B Mayfield	28 Euclid	39/39B Lakeshore	39F Lakeshore	43 Willowick	49 Wickliffe	1 St. Clair	3 Superior	6/6A Euclid	30 Hayden	31 Avon Lake	36 Eddy	37 Taylor	41 Warrensville
MODE OF ACCESS														
Walk	76	77	75	33	49	75	85	87	66	85	63	89	83	47
Auto	18	12	14	56	51	24	3	3	7	5	9	1	5	4
Transfer	6	11	11	11	0	1	12	10	27	10	28	10	12	49
PURPOSE FROM														
Work	16	27	13	7	8	17	26	22	23	17	14	23	13	21
Home	67	65	69	90	88	83	45	55	36	62	63	63	45	55
School/College	5	4	12	1	1	0	16	9	24	9	18	9	32	13
Other	12	4	6	2	3	0	13	14	17	12	5	5	10	11
PURPOSE TO														
Work	54	60	58	78	70	83	35	35	24	39	46	51	31	38
Home	14	18	16	1	2	3	28	19	38	15	21	15	37	24
School/College	17	12	11	17	21	14	16	13	10	25	20	17	17	15
Other	15	10	15	4	7	0	21	33	28	21	13	17	15	23
SEX														
Male	40	38	31	43	37	41	35	30	38	26	32	26	41	38
Female	60	62	69	57	63	59	65	70	62	74	68	74	59	62
AGE														
Less Than 18	7	5	12	2	0	1	21	14	7	15	32	12	38	20
18 To 64	82	93	78	95	94	95	75	85	89	78	57	86	53	71
65 And Over	11	2	10	3	6	4	4	1	4	7	11	2	9	9
RESIDENCE														
Cleveland	15	48	73	12	1	3	92	93	70	78	35	86	56	30
Other	85	52	27	88	99	97	8	7	30	22	65	14	44	70
REASON FOR RIDING														
No Auto/License	39	51	38	16	31	29	58	55	53	65	57	58	57	67
Convenience/Time	33	25	38	32	49	49	24	27	29	9	29	31	28	23
Less Expensive	28	24	24	52	20	22	18	18	18	26	14	11	15	10
NUMBER OF TRANSFERS														
Zero	71	26	63	75	89	88	41	40	31	11	51	7	46	45
One	19	41	30	20	10	9	35	35	42	44	28	38	35	35
Two	6	22	6	5	0	3	18	18	20	32	16	35	15	13
Over Two	4	11	1	0	1	0	6	7	7	13	5	20	4	7
AUTOS IN HOUSEHOLD														
Zero	17	30	18	5	5	3	32	33	32	35	16	35	24	51
One	45	46	47	38	35	46	37	36	39	43	42	33	40	38
Over One	38	24	35	57	60	51	31	31	29	22	42	32	36	11
DESTINATION														
CBD	60	47	73	90	92	90	47	52	38	33	17	27	12	4
Cleveland	24	40	24	9	7	9	48	42	49	56	18	56	50	26
Other	16	13	3	1	1	1	5	6	13	11	65	17	38	70

NOTE: Destination data includes trips to home

TABLE 8 (Continued)

WOODHILL STATION

Local Routes

	2 East 79	4/38 Wade Park Hough	5 Chagrin Falls	8 Cedar	10 E 105	11 Scovill	12/13 Buckeye Woodland	14 Kinsman	15 Union	16/16A East 55	17 East 30	18 Harvard	19/19F Broadway Miles	24 Solon	33 Central	40 Lee Road	48 East 131	48A East 131	50 East 116
MODE OF ACCESS																			
Walk	74	88	58	82	77	87	92	86	90	51	15	82	79	89	87	65	51	47	61
Auto	5	4	41	6	4	5	2	6	4	7	7	3	8	10	7	8	8	7	10
Transfer	21	8	1	12	19	8	6	8	6	42	78	15	13	1	6	27	41	46	29
PURPOSE FROM																			
Work	14	30	13	20	20	14	18	18	18	31	52	17	15	17	23	22	33	50	27
Home	51	47	71	50	52	58	53	55	62	34	30	56	62	51	65	38	33	15	35
School/College	17	4	8	14	12	14	16	14	12	15	18	18	13	17	5	32	14	18	25
Other	18	19	8	16	16	14	13	13	8	20	0	9	10	15	7	8	20	17	13
PURPOSE TO																			
Work	32	36	60	49	31	28	25	32	47	30	0	41	39	30	39	26	20	11	21
Home	23	26	15	9	23	17	20	24	16	34	23	24	16	42	14	43	44	70	40
School/College	22	11	9	18	21	21	22	20	13	15	66	17	26	11	17	13	15	10	25
Other	23	27	16	24	25	34	33	24	24	21	11	18	19	17	30	18	21	9	14
SEX																			
Male	42	34	67	44	38	24	26	36	32	47	14	50	36	53	30	29	36	40	39
Female	58	66	33	56	62	76	74	64	68	53	86	50	64	47	70	71	64	60	61
AGE																			
Less Than 18	28	8	10	10	19	19	12	11	16	18	69	29	25	31	5	32	18	14	34
18 To 64	71	84	86	82	78	77	84	84	82	80	30	63	70	63	88	65	76	82	66
65 And Over	1	8	4	8	3	4	4	5	2	2	1	8	5	6	7	3	6	4	0
RESIDENCE																			
Cleveland	99	93	11	95	95	97	93	90	96	91	100	84	90	29	99	63	80	78	97
Other	1	7	89	5	5	3	7	10	4	9	0	16	10	71	1	37	20	22	3
REASON FOR RIDING																			
No Auto/License	64	46	24	49	61	62	59	60	52	59	76	53	54	54	47	63	61	55	68
Convenience/Time	22	25	38	34	23	24	25	26	26	27	10	35	28	29	33	27	25	23	18
Less Expensive	14	29	38	17	16	14	16	14	22	14	14	12	18	17	20	10	14	22	14
NUMBER OF TRANSFERS																			
Zero	17	39	19	36	23	47	48	39	40	17	7	25	34	29	53	27	40	39	32
One	45	38	37	34	41	30	33	39	42	41	81	45	43	37	30	43	33	37	39
Two	27	17	36	21	27	16	13	16	14	25	6	20	15	28	10	20	19	17	19
Over Two	11	6	8	9	9	7	6	6	4	17	6	10	8	6	7	10	8	7	10
AUTOS IN HOUSEHOLD																			
Zero	35	40	7	45	34	42	41	33	24	47	48	27	24	13	38	24	30	21	31
One	34	41	40	29	36	34	34	38	45	28	46	45	39	41	39	35	39	38	31
Over One	31	19	53	26	30	24	25	29	31	25	6	28	37	46	23	41	31	41	38
DESTINATION																			
CBD	21	54	54	57	26	55	50	47	52	17	6	11	47	20	63	14	6	7	14
Cleveland	73	40	21	40	68	41	45	46	43	74	92	79	50	36	31	46	65	68	80
Other	6	6	25	3	6	4	5	7	5	9	2	10	3	44	6	40	29	25	6

NOTE: Destination data includes trips to home

TABLE 8 (Continued)

WOODHILL STATION

Express Routes

	7/7A Monticello	15F Union	29 Garfield	32 Fairmount	32C Heights (Cedar)	32S Heights (Silsby)	32W Heights (Washington)	56 Harvard Exp.
MODE OF ACCESS								
Walk	82	92	86	89	86	81	94	91
Auto	12	5	8	6	8	10	4	5
Transfer	6	3	6	5	6	9	2	4
PURPOSE FROM								
Work	20	8	14	25	20	0	10	11
Home	65	88	71	47	52	86	60	64
School/College	5	2	5	22	23	3	26	17
Other	10	2	10	6	5	11	4	8
PURPOSE TO								
Work	51	61	66	38	41	63	40	46
Home	22	2	8	34	30	1	24	16
School/College	16	35	10	17	19	27	23	14
Other	11	2	16	11	10	9	13	24
SEX								
Male	49	26	33	36	42	58	46	27
Female	51	74	67	64	58	42	54	73
AGE								
Less Than 18	10	25	8	23	21	10	35	20
18 To 64	80	72	83	70	71	83	60	70
65 And Over	10	3	9	7	8	7	5	10
RESIDENCE								
Cleveland	18	96	47	33	19	4	13	71
Other	82	4	53	67	81	96	87	29
REASON FOR RIDING								
No Auto/License	46	44	39	50	52	42	42	56
Convenience/Time	32	35	37	33	30	30	41	27
Less Expensive	22	21	24	17	18	28	17	17
NUMBER OF TRANSFERS								
Zero	49	53	58	37	43	63	53	59
One	31	38	24	30	30	21	26	29
Two	14	8	9	19	17	11	13	9
Over Two	6	1	9	14	10	5	8	3
AUTOS IN HOUSEHOLD								
Zero	23	12	17	17	21	12	12	18
One	44	44	51	36	44	56	39	43
Over One	33	44	32	47	35	32	49	39
DESTINATION								
CBD	47	67	60	36	44	71	42	55
Cleveland	32	32	35	38	30	18	23	38
Other	21	1	5	26	26	11	35	7

NOTE: Destination data includes trips to home

TABLE 8 (Continued)

BROOKLYN STATION

	Express Routes		Local Routes										
	35 Broadview Exp.	51/51F Pearl	20 W 25-Broadview	20A/21 W 25-State	20B W 25-Pearl	45 W 65-Ridge	54 Pleasant Valley	68 Grantwood	72 Clark	79/79F Fulton-Ridge	81 Scranton	84 Fairfield	98 Brookpark
MODE OF ACCESS													
Walk	73	63	88	83	89	62	80	82	55	82	89	95	65
Auto	25	35	7	11	5	1	2	3	6	15	6	4	11
Transfer	2	2	5	6	6	37	18	15	39	3	5	1	24
PURPOSE FROM													
Work	15	12	17	13	15	23	11	7	46	13	26	14	40
Home	77	82	62	76	51	45	59	56	31	69	48	55	50
School/College	4	2	9	5	15	13	30	27	9	9	7	12	2
Other	4	4	12	6	19	19	0	10	14	9	19	19	8
PURPOSE TO													
Work	70	72	50	70	42	32	19	25	38	61	42	24	46
Home	9	6	18	7	27	28	30	29	46	13	23	19	29
School/College	14	14	9	10	9	13	46	25	5	11	11	22	5
Other	7	8	23	13	22	27	5	21	11	15	24	35	20
SEX													
Male	33	36	35	31	35	30	35	41	42	36	29	42	50
Female	67	64	65	69	65	70	65	59	58	64	71	58	50
AGE													
Less Than 18	7	5	13	8	18	20	35	39	8	8	16	25	2
18 To 64	88	91	77	86	70	69	60	52	92	84	76	71	91
65 And Over	5	4	10	6	12	11	5	9	0	8	8	4	7
RESIDENCE													
Cleveland	17	12	77	26	52	77	2	2	85	41	94	94	37
Other	83	88	23	74	48	23	98	98	15	59	6	6	63
REASON FOR RIDING													
No Auto/License	30	28	50	37	49	59	63	62	59	37	49	52	64
Convenience/Time	36	35	28	30	30	33	21	27	27	31	32	26	23
Less Expensive	34	37	22	33	21	8	16	11	14	32	19	22	13
NUMBER OF TRANSFERS													
Zero	77	72	50	54	51	59	34	71	32	59	41	18	21
One	17	17	38	37	35	25	41	18	34	33	38	54	43
Two	5	5	9	7	11	11	24	8	31	6	14	24	28
Over Two	1	6	3	2	3	5	1	3	3	2	7	4	3
AUTOS IN HOUSEHOLD													
Zero	10	8	24	14	27	40	1	12	37	15	36	51	36
One	41	41	44	44	41	37	45	36	41	44	42	32	39
Over One	49	51	32	42	32	23	54	52	22	41	22	17	25
DESTINATION													
CBD	72	76	53	69	47	7	28	4	0	68	51	40	21
Cleveland	17	16	41	23	38	76	5	6	77	23	43	50	46
Other	11	8	6	8	15	17	67	90	23	9	6	10	33

NOTE: Destination data includes trips to home

TABLE 8 (Continued)

TRISKETT STATION

Local Routes

	22 Lorain	23 Clark	25 Madison	26 Detroit	42 Dover	46 Westlake South Lakewood	69 Franklin	70 W 150-Bunts	71 Holland-Ford	78 W 98-Puritas	82 W 117-Memphis	83 West 130	86 Berea-Warren
MODE OF ACCESS													
Walk	82	95	95	93	96	93	94	63	99	91	59	90	68
Auto	7	3	2	4	2	6	0	5	1	5	6	7	9
Transfer	11	2	3	3	2	1	6	32	0	4	35	3	23
PURPOSE FROM													
Work	18	16	9	15	6	6	23	19	6	20	18	19	14
Home	52	70	80	64	94	92	64	40	91	71	38	55	43
School/College	14	6	5	9	0	0	7	35	3	4	20	10	33
Other	16	8	6	12	0	2	6	6	0	5	24	16	10
PURPOSE TO													
Work	36	64	52	51	20	85	58	33	76	45	27	46	29
Home	27	8	6	15	0	1	19	45	2	13	35	30	39
School/College	13	13	16	15	10	12	4	9	13	28	11	14	17
Other	24	15	26	19	70	2	19	13	9	14	27	10	15
SEX													
Male	40	33	35	39	14	42	24	42	43	37	38	38	37
Female	60	67	65	61	86	58	76	58	57	63	62	62	63
AGE													
Less Than 18	22	7	14	12	0	0	3	30	12	28	21	15	34
18 To 64	67	86	79	76	60	97	80	61	88	4	62	76	59
65 And Over	11	7	7	12	40	3	17	9	0	68	17	9	7
RESIDENCE													
Cleveland	87	53	27	38	0	31	97	63	2	95	69	59	61
Other	13	47	73	62	100	69	3	37	98	5	31	41	39
REASON FOR RIDING													
No Auto/License	51	43	45	44	84	32	38	61	33	54	63	57	57
Convenience/Time	33	30	32	33	16	33	38	22	39	27	22	26	30
Less Expensive	16	27	23	23	0	35	24	17	28	19	15	17	13
NUMBER OF TRANSFERS													
Zero	42	50	45	63	62	3	42	42	3	22	41	23	46
One	38	38	34	26	0	48	47	33	34	38	42	37	28
Two	15	8	17	7	38	38	3	19	45	30	15	29	22
Over Two	5	4	4	4	0	11	8	6	18	10	2	11	4
AUTOS IN HOUSEHOLD													
Zero	30	22	27	32	70	11	23	16	5	21	43	13	18
One	41	41	46	42	10	53	42	46	43	41	37	47	44
Over One	29	37	27	26	20	36	30	38	52	38	20	40	38
DESTINATION													
CBD	42	62	55	53	7	82	64	23	62	37	9	39	21
Cleveland	51	33	29	30	17	16	31	40	34	51	70	44	46
Other	7	5	16	17	76	2	5	37	4	12	21	17	33

NOTE: Destination data includes trips to home

TABLE 8 (Continued)

TRISKETT STATION

Express Routes

	31 Avon Lake	55 Clifton	55A Clifton	55C Clifton	55N Clifton	55S Clifton	65 Hilliard Franklin	85 Lorain	86F Berea
MODE OF ACCESS									
Walk	58	92	98	87	75	81	92	86	57
Auto	42	6	1	12	21	15	7	9	42
Transfer	0	2	1	1	4	4	1	5	1
PURPOSE FROM									
Work	7	8	11	9	11	14	11	7	8
Home	92	85	80	80	81	76	59	92	92
School/College	0	3	3	7	5	0	21	1	0
Other	1	4	6	4	3	10	9	0	0
PURPOSE TO									
Work	90	77	78	64	67	69	43	90	93
Home	0	6	4	8	8	12	24	1	1
School/College	9	7	2	13	12	9	20	7	6
Other	1	10	16	15	13	10	13	2	0
SEX									
Male	57	37	33	47	43	39	34	14	49
Female	43	63	67	53	57	61	66	86	51
AGE									
Less Than 18	0	4	4	9	6	3	33	1	2
18 To 64	93	88	75	84	84	86	60	98	98
65 And Over	7	8	21	7	10	11	7	1	0
RESIDENCE									
Cleveland	0	14	10	14	15	19	12	99	1
Other	100	86	90	86	85	81	88	1	99
REASON FOR RIDING									
No Auto/License	13	29	29	26	25	27	43	30	15
Convenience/Time	56	40	49	37	41	39	35	36	36
Less Expensive	31	31	22	37	34	34	22	34	49
NUMBER OF TRANSFERS									
Zero	96	81	80	77	78	75	50	82	84
One	2	15	15	13	16	14	32	16	13
Two	0	3	2	5	5	4	15	2	1
Over Two	2	1	3	5	1	7	3	0	2
AUTOS IN HOUSEHOLD									
Zero	2	21	28	10	15	17	13	16	2
One	45	52	54	45	49	51	38	52	45
Over One	53	27	18	45	36	32	49	32	53
DESTINATION									
CBD	95	84	82	81	80	78	40	84	89
Cleveland	5	11	15	9	10	11	19	16	9
Other	0	5	3	10	10	11	41	0	2

RAPID TRANSIT

	66 Heavy Rail	67 Light Rail
MODE OF ACCESS		
Walk	31	43
Auto	37	46
Transfer	32	11
PURPOSE FROM		
Work	21	11
Home	63	80
School/College	9	5
Other	7	4
PURPOSE TO		
Work	54	72
Home	18	6
School/College	11	7
Other	17	15
SEX		
Male	52	52
Female	48	48
AGE		
Less Than 18	7	8
18 To 64	89	86
65 And Over	4	6
RESIDENCE		
Cleveland	44	25
Other	56	75
REASON FOR RIDING		
No Auto/License	24	16
Convenience/Time	48	59
Less Expensive	28	25
NUMBER OF TRANSFERS		
Zero	50	66
One	37	27
Two	10	5
Over Two	3	2
AUTOS IN HOUSEHOLD		
Zero	11	8
One	39	41
Over One	50	51
DESTINATION		
CBD	59	81
Cleveland	27	12
Other	14	7

NOTE: Destination data includes trips to home

TABLE 8 (Continued)

	SUBURBAN STATIONS																		
	Express Routes									Local Routes									
	76 Turney	77 Brecksville	88 E 135	97 Oakwood	87 Westwood	75 North Olmsted	64 Olmsted Falls	96 Butternut	Maple Hts. Exp.	89 Olmsted Falls	53 Westgate	Dunham	Bedford Hts. Metro Estates	Lakeshore	Babbitt	Briardale	E 260	E 222	E 200
MODE OF ACCESS																			
Walk	85	37	91	76	94	72	89	90	76	89	92	88	60	91	74	76	85	66	55
Auto	12	63	7	21	5	26	11	10	12	0	8	4	7	5	2	12	5	5	0
Transfer	3	0	2	3	1	2	0	0	12	11	0	8	33	4	24	12	10	29	45
PURPOSE FROM																			
Work	11	14	8	15	13	10	5	13	14	25	51	12	22	14	14	10	11	19	27
Home	75	80	66	66	76	82	95	82	72	50	16	62	22	56	54	28	78	41	60
School/College	7	1	16	10	1	4	0	0	5	25	8	10	12	19	16	0	0	22	12
Other	7	5	10	9	10	4	0	5	9	25	25	16	44	11	16	62	11	18	1
PURPOSE TO																			
Work	59	77	50	47	70	71	88	74	55	38	73	40	7	47	54	7	32	44	34
Home	11	10	16	21	13	8	0	7	12	38	12	17	65	25	35	33	15	26	35
School/College	14	7	14	14	12	13	9	10	20	0	0	20	6	8	4	0	39	8	7
Other	16	6	20	18	5	8	3	9	13	24	15	23	22	20	7	60	14	22	24
SEX																			
Male	31	51	26	41	49	48	41	34	36	14	18	26	25	36	26	19	44	50	50
Female	69	49	74	59	51	52	59	66	64	86	82	74	75	64	74	81	56	50	50
AGE																			
Less Than 18	15	4	0	17	6	7	3	5	11	25	8	26	3	19	21	0	32	13	19
18 To 64	76	92	100	77	92	86	94	88	83	75	80	64	61	66	70	26	63	66	47
65 And Over	9	4	0	6	2	7	3	7	6	0	12	10	36	15	9	74	5	21	34
RESIDENCE																			
Cleveland	14	8	23	17	3	12	2	2	11	0	0	8	0	4	13	3	9	9	14
Other	86	92	77	83	97	88	98	98	89	100	100	92	100	96	87	97	91	91	86
REASON FOR RIDING																			
No Auto/License	41	15	42	40	30	33	29	28	36	100	79	58	77	56	67	37	57	62	74
Convenience/Time	36	41	37	36	30	43	44	36	36	0	12	25	18	26	26	50	31	17	25
Less Expensive	23	44	21	24	40	24	27	36	28	0	9	17	5	18	7	13	12	21	1
NUMBER OF TRANSFERS																			
Zero	75	79	77	67	78	79	88	76	75	74	82	61	81	32	61	50	50	54	64
One	19	17	17	22	13	13	9	16	17	13	18	27	13	47	24	21	20	29	31
Two	4	4	5	8	6	5	3	6	7	13	0	8	0	17	1	14	17	6	4
Over Two	2	0	1	3	3	3	0	2	1	0	0	4	6	4	14	15	13	11	1
AUTOS IN HOUSEHOLD																			
Zero	14	5	16	14	8	10	8	11	15	43	44	49	16	21	31	57	22	44	40
One	44	33	41	36	46	42	56	51	45	43	25	39	40	52	48	37	50	37	42
Over One	42	62	43	50	46	48	36	38	40	14	31	12	44	27	21	6	28	19	18
DESTINATION																			
CBD	65	86	58	53	74	75	84	67	63	0	0	26	0	42	18	7	21	10	2
Cleveland	18	9	20	22	13	17	12	14	19	0	0	15	0	14	18	28	18	32	38
Other	17	5	22	25	13	8	4	19	18	100	100	59	100	44	64	65	61	58	60

NOTE: Destination data includes trips to home

TABLE 9

SURVEY FORMS DISTRIBUTED AND RETURNED BY ROUTE

ROUTE	DRIVER COUNTS*	FORMS RETURNED**	PERCENT RESPONSES
1	6,964	1,329	19
2	1,615	404	25
3	6,231	1,537	25
4/38	2,482	720	29
5	395	195	49
6	11,012	2,279	21
7	1,264	802	63
8	1,799	353	20
9	2,843	2,402	84
10/29	7,844	1,537	20
11	1,699	604	36
12/13	2,694	975	36
14	5,822	1,127	19
15	3,220	776	24
16	2,201	464	21
17	256	30	12
18	561	279	50
19	2,768	989	36
20/21	6,608	2,615	40
22	3,300	995	30
23	1,256	374	30
24	287	134	47
25	1,759	337	19
26	4,261	945	22
28	2,179	906	42
30	1,274	491	39
31	152	130	86
32	3,029	1,374	45
33	716	164	23
34	264	210	80
35	1,924	1,064	55
36	606	146	24
37	1,223	297	24
39	2,493	1,442	58
40	2,415	544	23
41	1,106	583	53
42	27	16	59
43	538	395	73
45	301	172	57
46	290	149	51

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* Driver Count = Inbound count when forms were distributed.

** Forms Returned = Unedited aggregate total of completed forms.

TABLE 9 (Cont'd)

ROUTE	DRIVER COUNTS*	FORMS RETURNED**	PERCENT RESPONSES
48	2,267	710	31
49	70	54	77
50	1,739	270	16
51	1,739	1,002	58
53	190	20	11
54	196	129	66
55	6,037	3,179	53
56	2,008	684	34
64	161	128	80
65	636	276	43
66	24,085	10,185	42
67	9,415	4,085	43
68	370	187	51
69	115	44	38
70	880	172	20
71	96	55	57
72	132	52	39
75	2,294	1,065	46
76/88	2,931	1,511	52
77	906	425	47
78	1,065	275	26
79	3,653	1,782	49
81	2,167	685	32
82	1,287	228	18
83	954	348	36
84	813	181	22
85	296	157	53
86	1,546	666	43
89	12	7	58
96/87	640	412	64
97	584	411	70
98	205	113	55
Maple Hts. Exp.	1,004	209	21
Dunham	320	75	23
Bedford-Metro Est.	150	57	38
Lakeshore	215	128	60
Babbit	421	69	16
Briardale	432	69	16
E. 260	989	674	68
E. 222	808	448	55
E. 200	133	54	41
TOTAL	171,639	61,566	36

* Driver Count = Inbound count when forms were distributed.

** Forms Returned = Unedited aggregate total of completed forms.

Route		Rider Percentage
5	Chagrin Falls Fdr.	14%
20	W. 25	14%
31	Avon Lake Fly.	13%
32C	Heights Exp.	15%
32S	Heights Exp.	15%
37	Taylor	14%
51	Pearl Exp.	13%
68	Grantwood	13%
	System Average	8%

All of the above, except for Route 20, serve suburban areas. While a case could be made that the dense coverage in many parts of Cuyahoga County reduces the need to walk more than three blocks, the survey results show, even for routes serving areas where dense coverage does not exist, that a three block walk is an upper limit for most users.

Auto to Transit: A total of 13 routes had high percentages of riders either driven to the route (over 10%) or who used park-and-ride access (over 25%) and are shown below.

Route		Driven To	Park and Ride
5	Chagrin Falls Fdr.	15%	26%
31	Avon Lake Fly.	13%	29%
39F	Lakeshore Exp.	12%	44%
43	Willowick Fly.	11%	40%
49	Wickliffe Fly.	13%	11%
51	Pearl Exp.	15%	20%
66	Heavy Rail	12%	25%
67	Light Rail	10%	36%
77	Brecksville Fly.	10%	53%
86F	Berea Flyer	9%	33%
	Briardale	12%	0%
	System Average	6%	9%

Generally, most of the routes with high percentage of park and riders also have a high percentage of riders who were driven to the route. The percentages above show that being driven to transit is not a major access mode for any one route since no route has greater than 15 percent of its ridership using that mode. It also should be noted that all of the listed routes serve the fringe areas of

Cuyahoga and other counties. One potential reason for the high percentages of park-and-ride access to these routes is non-Cuyahoga County residents may cross into Cuyahoga County to use GCRTA services at a lower fare.

Trip Purpose

A number of routes have trip purposes that vary considerably from the system-wide average. The home-work trip is by far the single most common. Those routes with fewer than 50 percent of the trips from or to home plus work are shown below:

From Home and Work	
Briardale	38%
Bed. Hts. - Metro. Est	44%
System Average	79%

	To Home and Work	
11	Scovill	45%
12	Woodland	45%
54	Pleasant Valley	49%
84	Fairfield	43%
	Briardale	40%
	E. 260	47%
	System Average	67%

Those routes with more than 30 percent of their trips to school/college and more than 30 percent to all other purposes are:

	School/College	
15F	Union Fly.	35%
54	Pleasant Valley	46%
	E. 260	39%
	System Average	14%

	All Other Purposes	
3	Superior	38%
11	Scovill	34%
12	Woodland	33%
84	Fairfield	35%
	Briardale	60%
	System Average	19%

Also, those routes having more than 80 percent of their trips from home, or to work are:

From Home			To Work		
15F	Union Fly.	88%	31	Avon Lake Exp.	90%
31	Avon Lake Exp.	92%	46	Westlake-S. Lakewood Fdr.	85%
32S	Heights Exp.	86%	49	Wickliffe Fly.	83%
39F	Lakeshore Exp.	90%	64	Olmsted Falls Exp.	88%
43	Willowick Fly.	88%	85	Lorain Exp.	90%
46	Westlake-S. Lakewood Fdr.	92%	86F	Berea-Warren Fly.	93%
49	Wickliffe Fly.	83%		System Average	48%
51	Pearl Exp.	82%			
55	Clifton Exp.	85%			
55N	Clifton Exp.	81%			
64	Olmsted Falls Exp.	95%			
71	Holland-Ford	91%			
75N	North Olmsted Exp.	82%			
85	Lorain Exp.	92%			
86F	Berea-Warren Fly.	92%			
96	Butternut Exp.	81%			
	System Average	61%			

The first group above (low percentages of riders going to or from home plus work) are local, crosstown or shuttle routes, and apparently serve a large number of non-work trips. The second group includes those routes with large percentages of school trips. Cleveland State University and Cuyahoga Community College account for some of the trips, primary and secondary schools account for others. The third group above (over 30% for all purposes other than work, home, or school) consists primarily of local center city routes used for shopping, medical, and personal business purposes. The fourth group (home-work oriented) tends to be the peak hour commuter oriented express services. Generally, local, crosstown and suburban shuttle routes tend to serve the non-work trip market and peak hour express routes serve the work trip market.

Sex

The system average shows that 61 percent of the ridership consists of females.

Those routes with more than 70 percent female riders are:

11	Scovill	76%	56	Harvard Exp.	73%
12	Woodland	74%	81	Scranton	71%
15F	Union	74%	85	Lorain Exp.	86%
30	Hayden	74%	88	E. 135	74%
36	Eddy	74%		Babbit	74%
40	Lee	71%		Briardale	81%
	Dunham	74%		Bedford-Hts.-Metro. Est.	75%
				System Average	61%

These routes tend to be either central city local/feeder routes or crosstown routes. Those routes which carry high percentages of females are also those routes which are used more for non-work purposes.

The routes with more than 50 percent male ridership are:

5	Chagrin Falls Fdr.	67%	66	Heavy Rail*	52%
24	Solon Fdr.	53%	67	Light Rail*	52%
31	Avon Lake Fly.	57%	77	Brecksville Fly.	51%
32S	Heights Exp.	58%		System Average	39%

These routes tend to be peak-hour commuter oriented. It should be noted that most of the above routes are rapids, rapid feeders or express routes.

Age

Those routes with a percentage greater than 10 percent of riders over age 64 are:

9	Mayfield Exp.	11%	82	W. 117-Memphis	17%
20B	W. 25	12%		Lakeshore Blvd.	15%
22	Lorain	11%		Brairdale	74%
26	Detroit	12%		E. 222	21%
34	Green	11%		E. 200	34%
45	W. 65-Ridge Fdr.	11%		Bedford Hts.-Metro. Est.	36%
55A	Clifton Exp.	22%		System Average	6%
55S	Clifton Exp.	11%			

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* Excluding transferees from buses

In general, the above routes serve the central city and older suburbs adjacent to Cleveland which have higher percentages of elderly populations than the remainder of Cuyahoga County. The routes include express, local, and crosstowns.

Those routes carrying more than 30 percent persons under age 18 are:

24	Solon Fdr.	31%	54	Pleasant Valley	35%
32W	Heights Exp.	35%	65	Hilliard-Franklin	33%
34	Green	32%	68	Grantwood	39%
37	Taylor	38%	86	Berea-Warren Fdr.	34%
40	Lee Road	32%		E. 260	32%
50	E. 116	34%		System Average	14%

Each of the above routes serve a major high school.

Residence Beyond Cuyahoga County

There are a large number of GCRTA riders who live beyond Cuyahoga County. The routes with more than 5 percent of their riders from beyond Cuyahoga are:

5	Chagrin Falls Fdr.	16%	75	North Olmsted Exp.	9%
31	Avon Lake Fly.	66%	77	Brecksville Fly.	28%
39F	Lakeshore Exp.	6%	86F	Berea-Warren Fly.	8%
43	Willowick Fly.	94%	97	Oakwood Exp.	7%
49	Wickliffe Fly.	89%		Lakeshore Blvd.	10%
				System Average	2%

Routes 43 and 49 serve Lake County exclusively, which explains the very high percentages of non-Cuyahoga County residents using them. Route 39F serves the eastern fringe of Cuyahoga County and is obviously being used by Lake County residents driving to the service. Those routes which serve other fringe areas are: Route 5, which serves Chagrin Falls and draws riders from Geauga County; Route 31, which serves Avon Lake in Lorain County; Route 77, which serves Brecksville to the south and draws riders from Summit County; Route 97, which serves Oakwood and draws riders from Summit County; and, Routes 75 and 86F, which serve North Olmsted and Berea and draw riders from Lorain County.

Reason for Transit Use

The survey form asked why the rider chose to ride transit. There were 5 choices in three groups: first, the rider had no auto or driver's license; second, the rider felt transit was more convenient or saved time; and third, the rider felt transit saved money. The routes with high percentages of riders in each of these groups are shown on the following page:

NO AUTO/DRIVER'S LICENSE

Greater Than 60%

2	E. 79	64%
10	E. 105	61%
11	Scovill	62%
30	Hayden	65%
40	Lee Road	63%
41	Warrensville	67%
48	Shaker E. 131	61%
50	E. 116	68%
54	Pleasant Valley	63%
68	Grantwood	62%
70	W. 150-Bunts	61%
82	W. 117-Memphis	63%
98	Brookpark	64%
	Babbitt	67%
	E. 222	62%
	E. 200	74%
	Bed. Hts.-Metro. Est.	77%
	System Average	44%

Less Than 20%

31	Avon Lake Fly.	13%
39F	Lakeshore Fly.	16%
67	Light Rail*	16%
77	Brecksville	15%
86F	Berea-Warren Fly.	15%
	System Average	44%

CONVENIENT/TIME SAVING

Greater Than 40%

31	Avon Lake Fly.	56%
32W	Heights Exp.	41%
43	Willowick Fly.	49%
49	Wickliffe Fly.	49%
55A	Clifton Exp.	49%
	Briardale	50%
55N	Clifton Exp.	41%
64	Olmsted Falls Exp.	44%
66	Heavy Rail*	48%
67	Light Rail*	59%
75	N. Olmsted Exp.	43%
77	Brecksville Fly.	41%
	System Average	33%

INEXPENSIVE

Greater Than 30%

5	Chagrin Falls Fdr.	38%
20A	W. 25-State	33%
31	Avon Lake Fly.	31%
35	Broadview Exp.	34%
39F	Lakeshore Exp.	52%
46	Westlake-S. Lakewood Fdr.	35%
51	Pearl Exp.	37%
55	Clifton Exp.	31%
	System Average	23%
55C	Clifton Exp.	37%
55N	Clifton Exp.	34%
55S	Clifton Exp.	34%
77	Brecksville Fly.	44%
79	Fulton	32%
85	Lorain Exp.	34%
86F	Berea-Warren Fly.	49%
87	Westwood Exp.	40%
96	Butternut Exp.	36%

* excluding transferees from buses

The results of this analysis show that those routes carrying high percentages of transit dependent persons are primarily crosstown routes, and those with very low percentages are suburban express routes. Suburban express routes have large percentages of riders who chose transit because of cost savings, even though they carry the 35 cent fare and not the lower 25 cent local fare. The routes with high percentages of riders choosing transit because of convenience include the two rapids, a number of routes which use freeways for the most part of their trip, and the routes using Clifton Boulevard/Lakeshore Freeway. Only Routes 32W, 64 and Briardale are an exception.

Destination

The major transit rider destination is the Cleveland CBD, accounting for about 52 percent of all riders (including trips to home). A number of routes have over 75 percent of their riders destined to the CBD. They are:

31	Avon Lake Fly.	95%	55C	Clifton Exp.	81%
39F	Lakeshore Exp.	90%	55N	Clifton Exp.	80%
43	Willowick Fly.	92%	55S	Clifton Exp.	78%
46	Westlake-S. Lakewood Fdr.	82%	64	Olmsted Falls Exp.	84%
49	Wickliffe Fly.	90%	67	Light Rail*	81%
51	Pearl Exp.	76%	77	Brecksville Fly.	86%
55	Clifton Exp.	84%	85	Lorain Exp.	84%
55A	Clifton Exp.	82%	86F	Berea-Warren Fly.	89%
				System Average	52%

All of these routes are suburban express routes, and most of them are peak-hour commuter oriented.

* excluding transferees from buses

NO AUTO/DRIVER'S LICENSE

Greater Than 60%

2	E. 79	64%
10	E. 105	61%
11	Scovill	62%
30	Hayden	65%
40	Lee Road	63%
41	Warrensville	67%
48	Shaker E. 131	61%
50	E. 116	68%
54	Pleasant Valley	63%
68	Grantwood	62%
70	W. 150-Bunts	61%
82	W. 117-Memphis	63%
98	Brookpark	64%
	Babbitt	67%
	E. 222	62%
	E. 200	74%
	Bed. Hts.-Metro. Est.	77%
	System Average	44%

Less Than 20%

31	Avon Lake Fly.	13%
39F	Lakeshore Fly.	16%
67	Light Rail*	16%
77	Brecksville	15%
86F	Berea-Warren Fly.	15%
	System Average	44%

CONVENIENT/TIME SAVING

Greater Than 40%

31	Avon Lake Fly.	56%
32W	Heights Exp.	41%
43	Willowick Fly.	49%
49	Wickliffe Fly.	49%
55A	Clifton Exp.	49%
	Briardale	50%
55N	Clifton Exp.	41%
64	Olmsted Falls Exp.	44%
66	Heavy Rail*	48%
67	Light Rail*	59%
75	N. Olmsted Exp.	43%
77	Brecksville Fly.	41%
	System Average	33%

INEXPENSIVE

Greater Than 30%

5	Chagrin Falls Fdr.	38%
20A	W. 25-State	33%
31	Avon Lake Fly.	31%
35	Broadview Exp.	34%
39F	Lakeshore Exp.	52%
46	Westlake-S. Lakewood Fdr.	35%
51	Pearl Exp.	37%
55	Clifton Exp.	31%
	System Average	23%
55C	Clifton Exp.	37%
55N	Clifton Exp.	34%
55S	Clifton Exp.	34%
77	Brecksville Fly.	44%
79	Fulton	32%
85	Lorain Exp.	34%
86F	Berea-Warren Fly.	49%
87	Westwood Exp.	40%
96	Butternut Exp.	36%

* excluding transferees from buses

Those routes having a high percentage (over 40%) of riders with destinations in the suburbs and outside Cuyahoga County (including trips to home) are:

24	Solon Fdr.	44%		Babbitt	64%
34	E. 200	65%		Briardale	65%
41	Warrensville	70%		E. 260	61%
54	Pleasant Valley	67%		E. 222	58%
65	Hilliard Franklin	41%		E. 200	60%
68	Grantwood	90%		Dunham	59%
	Lakeshore Blvd.	44%		Bedford Hts.-Metro. Est.	100%
				System Average	13%

Nearly all of the above routes are suburban crosstown routes.

Transfers

Total system averages indicate that about half of all first board riders do not transfer, while 33 percent transfer once. The remaining 18 percent transfer twice or more. Those routes having a high percentage (more than 30 percent) of riders transferring more than once are:

2	E. 79	38%	36	Eddy	55%
5	Chagrin Falls Fdr.	44%	46	Westlake-S. Lakewood Fdr.	49%
10	E. 105	36%	71	Holland-Ford	63%
16	E. 55	42%	72	Clark	34%
24	Solon Fdr.	34%	78	W. 98-Puritas Fdr.	40%
28	Euclid Exp.	33%	83	W. 130 Fdr.	40%
30	Hayden	45%	98	Brookpark	36%
32	Fairmount Exp.	33%		System Average	18%

Those routes having a high percentage (over 80 percent) of no transfers are:

31	Avon Lake Fly.	96%	64	Olmsted Falls Exp.	88%
43	Willowick Fly.	89%	85	Lorain Exp.	82%
49	Wickliffe Fly.	88%	86F	Berea-Warren Fly.	84%
55	Clifton Exp.	81%		Bedford Hts.-Metro. Est.	81%
				System Average	49%

Those routes which have a high percentage of riders transferring more than once are crosstowns or feeders to the heavy and light rail lines. Those routes which

have a high percentage of no transfers are express radials and flyers. These (except Bedford Heights-Metro Estates) routes are downtown oriented and appear to adequately distribute riders into the downtown area.

Auto Ownership

About 40% of total system riders own one automobile. Those routes whose riders significantly vary from this response are:

Own No Car (Over 40%)			Own 2 or More (Over 50%)		
8	Cedar	45%	5	Chagrin Falls Fdr.	53%
11	Scovill	42%	31	Avon Lake Fly.	53%
12	Woodland	41%	39F	Lakeshore Exp.	57%
16	E. 55	47%	43	Willowick Fly.	60%
41	Warrensville	51%	49	Wickliffe Fly.	51%
82	W. 117-Memphis	43%	51	Pearl Exp.	51%
84	Fairfield	51%	54	Pleasant Valley	54%
	Briardale	57%	67	Light Rail*	51%
	E. 222	44%	68	Grantwood	52%
	Dunham	49%	71	Holland-Ford	52%
			77	Brecksville Fly.	62%
	System Average	23%	86F	Berea-Warren Fly.	53%
				System Average	37%

The majority of routes with a high percentage of no car responses service the near east and west sides of Cleveland, typically areas with low income populations, or are suburban local routes.

The routes showing a large percentage of riders with two or more cars are, with some exceptions, feeder, express and flyer routes which service the newer far suburbs. The other routes (68, 54, and 71) are suburban cross-towns.

*excluding transferees from buses

Conclusions

A methodology has been used which highlights those routes having characteristics distinctly different from the system average. The differences in rider characteristics among routes are related to area served and type of service (express, local, and rail). Variations between those factors influence what type of riders are attracted to the system. For example, suburban express routes with downtown destinations attract riders whose characteristics differ from those riders who use a center-city crosstown route.

There were five routes eliminated from the above discussion because of a very small number of returns. These were:

- 17 E. 30 (30 returns, 256 counted riders)
- 42 Dover (16 returns, 59 counted riders)
- 53 Westgate (20 returns, 190 counted riders)
- 69 Franklin (44 returns, 115 counted riders)
- 89 Olmsted Falls (7 returns, 58 counted riders)

Route 17 is a short center-city shuttle serving the East 34th rapid station, Cuyahoga Community College, Jane Addams High School, and also a major public housing area. It carries a high percentage of school and college trips, females, persons under age 18, and persons without an auto or driver's license. Route 69 is a center-city local route and, except for a high percentage of females, it is similar to the system average.

Routes 42 Dover, 53 Westgate and 89 Olmsted Falls are typical of the type of suburban crosstown routes GCRTA was asked to implement. Route 53 was in operation prior to GCRTA but the other two are new routes. All three appear to serve non-work trips made by elderly females without a car or driver's license. They do not appear to act as feeders to main line bus routes.

V. COMPARISON OF 1974 AND 1976 SURVEYS

In 1974 NOACA, in cooperation with the Cleveland Transit System, the Shaker Rapid Transit, and suburban bus operators, conducted a total system survey. In 1976 NOACA and GCRTA conducted a similar survey of the total system operating in Cuyahoga County. This chapter deals with rider characteristic changes between 1974 and 1976. The system improvements influencing those changes are:

- Creation of a common fare structure with free transfers.
- Reduction of fares ranging from 45 to 75 cents (each independent system had a separate base fare) to 25 cents for local service and 35 cents for express.
- Addition of 20 percent more service.
- Implementation of a security program.
- Implementation of half fares during peak hours and free fares at other times for handicapped persons and senior citizens.

When reviewing data contained in this section, it should be noted that the 1974 survey was conducted in both directions of travel, but the survey was designed to solicit a response for only the first transit trip of the day. The 1976 results as used herein also represent only first boarding passengers; however, responses were solicited only on "inbound" trips.

A primary difference in the 1974 and 1976 surveys was the factoring process included in the 1976 tabulation. This factoring eliminates, to some degree, the bias created by differing rates of return among, in general, routes serving low income center-city areas, and high income suburban areas. While it is not possible to say that the factored results are completely repre-

sentative of all riders, they do insure that the responses for each route and time period are proportionately represented. Table 10 includes a comparison of the 1976 unfactored and factored results. As expected, the unfactored results reflect the higher rates of returns from routes serving suburban areas. The characteristics associated with those routes (higher incomes, auto ownership, more males, fewer transfers, etc.) are more dominant in the unfactored results. Table 10 also presents the 1974 (unfactored) results which are discussed in the following sections. For consistency, all 1974-1976 comparisons are based on the unfactored 1976 survey results.

Reasons for Using Transit

The results show, as expected based on a large fare decrease, a major shift to "less expensive" as a reason for using transit. The "convenient/time" response rate increased slightly, and "no auto/license" decreased significantly.

Arrival Mode To Bus/Rapid

There were six possible answers to the arrival mode question. These six choices could then be categorized into three general modes; walk, auto, and transfer. The results show a relative increase in auto access ridership and a relative decrease in walk access. Not shown in Table 10 is that the percentage (8%) of those who walked 4 or more blocks did not increase between 1974 and 1976, reinforcing the theory that the majority of transit riders take transit only because of its proximity to their residence.

TABLE 10

1974-1976 TOTAL SYSTEM RESULTS
(In Percent)

	1976 Survey Factored	1976 Survey Unfactored	1974 Survey Unfactored
MODE OF ACCESS			
Walk	70	68	72
Auto	15	19	15
Transfer	15	13	13
TRIP PURPOSE*			
Work	56	64	69
School/College	21	19	16
Shop	7	5	4
Other Purposes	16	12	11
SEX			
Male	39	40	37
Female	61	60	63
AGE			
Less Than 18	14	11	12
18 To 64	80	83	82
65 And Over	6	6	6
RESIDENCE			
Cleveland	55	46	45
Other	45	54	55
REASON FOR RIDING			
No Auto/License	44	39	53
Convenience/Time	33	36	33
Less Expensive	23	25	14
NUMBER OF TRANSFERS			
Zero	49	55	63
One	33	30	29
Two	13	11	7
Over Two	5	4	1
AUTOS IN HOUSEHOLD			
Zero	23	19	23
One	40	42	45
Over One	37	39	32
DESTINATION**			
CBD	60	65	NA
Cleveland	31	26	NA
Other	9	9	NA

* Adjusted - See Text
** Excluding Trips to Home

Sex/Age

No significant change in the male-female distribution occurred between 1974 and 1976. However, the age distribution appears to have changed somewhat, as shown below:

Age Group	1974 Results	1976 Results (Unfactored)
0-17	12%	11%
18-22	18%	20%
23-34	24%	28%
35-64	40%	35%
65 +	6%	6%

Trip Purpose

The purpose of trip at the origin and destination ends were included in the 1976 on-board survey as two separate questions. "Home" was included as a category so that trips that neither began nor ended at home could be determined.

The trip purpose of the 1974 on-board survey used only a single question to determine trip purpose and did not attempt to elicit information on the origin and destination of trips. The 1974 survey question read as follows: What is the main purpose of this trip? ( ) work, ( ) school, ( ) shop, ( ) pers/bus., ( ) medical/dental, ( ) soc/rec., ( ) other. Because there is no "home" response, a transit rider returning from work to home in 1974 would say that "work" was the main purpose of the trip. However, a rider surveyed in 1976, making the same trip, would say his trip purpose was "home".

To compare the two surveys, the "to" trips of the 1976 survey were adjusted in the following manner: all trips to home were converted to trips "to" the purpose they were "from", thus making trip purposes of the 1976 survey compatible with those of the 1974 survey.

The results of Table 10 show a shift toward trip purposes other than work. It appears that a significant portion of the GCRTA increased ridership is making a non-work trip.

Number of Transfers

Transfer information relates to the opportunity for widespread transit usage over an expanded area and indicates the efficiency of the overall route structure: is it necessary to transfer a certain number of times to reach a certain destination or is it possible to make the trip without having to transfer at all? The creation of a coordinated county-wide transit operation (GCRTA) providing a common fare structure with free transfer opportunities makes a review of changes in transfer ridership important. Since the 1974 survey findings were based on autonomous operations, each with its own fare structure, percentage changes in favor of more transfers should have taken place.

The percentage change for riders who do <u>not</u> transfer (63% in 1974 versus 55% (unfactored) in 1976) represents an increase in the number of persons who now use the free transfer. There is a significant percentage increase in the number of persons who are taking advantage of extended transfer opportunities.

It should be noted that multiple transfers (two and three times) also increased. No increase between 1974 and 1976 was noted for four or more transfers.

An additional use of the transfer information can be an attempt to determine the increase of first board ridership between Fall 1974 and Fall 1976. The total number of rides increased from about 300,000 to about 412,000, a 37% increase. However, because the number of transfers has increased, not all of the new rides are first board passengers.

Because the 1974 transfer data were not factored, only an estimate can be made of the transfer factor. Using the unfactored data, the results are:

Percent of First Board Riders	Number of Transfers	Number of Rides Per First Board Riders	Total Rides Made by First Board Riders
63	0	1	63
29	1	2	58
7	2	3	21
1	3	4	4
-	4	5	-
100	NA	NA	146

This results in a factor of 0.7 and indicates the 1974 first board ridership was 210,000. The increase in first board ridership (1974-1976) was 60,000 (29%).

Number of Autos In Family

A question concerning the number of autos in a family is included in surveys of transit usage to establish a relationship between travel and household characteristics. Responses to this question are a means of determining what

proportion of transit users are dependent riders. Percentage responses of the 1974 and 1976 results for this question are provided in Table 10. The difference between the two surveys is relatively small. The percentage of those riders who have no or one auto in their family decreased slightly. There has been an increase in the percentage of persons having more than one auto. The data appears to show that the increase in GCRTA ridership came from all auto ownership groups.

Light Rail Rapid Characteristics

The Light Rail Rapid is of special interest. It is one of the few in the nation, the only suburban system to be absorbed by the GCRTA, and serves a major corridor having no freeway alternative. Also, the plans for upgrading the system are quite extensive.

One characteristic which changed dramatically was the percentage of Light Rail Rapid riders transferring. In 1974 it was 15 percent. In 1976 this percentage increased to 34 percent.

A second change was the reason for riding, which is shown below (unfactored).

Reason	1974	1976
No auto/license	17%	16%
Convenience/time	64%	59%
Less expensive	19%	25%

This shows a shift toward cost savings as the reason for use and indicates, to some degree, that cost is a major factor in mode choice even for high income areas (given that the rapid serves a high income area).

A third change is mode of access (unfactored).

Mode of Access	1974	1976
Walk 0-3 blocks	38%	36%
Walk 4 + blocks	8%	7%
Driven to stop	12%	10%
Park & Ride - 0-5 miles	20%	24%
Park & Ride - 5 + miles	16%	13%
Transfer	6%	10%

The above data show increases in percentages of both transfer and park-and-ride access (0-5 miles).

Conclusions

In 1974, a group of independent operators of mass transportation provided service to transit users. The operators consisted of the Cleveland Transit System (CTS - bus and heavy rail), the Shaker Rapid (light rail), and seven suburban operators who provided bus service only. Fares were high, transfers between systems were available only at full fare (5 cents between CTS routes), and service was at a low ebb due to high operating costs and the smaller market being served.

In contrast, the GCRTA, made up of the CTS and Shaker Rapid and contract agreements with suburban bus operators, has developed a unified transportation system. The system offers low fares (reduced approximately 40 percent), free transfers and increased service, which includes more routes, greater frequency of operation, and increased hours of operation.

With this background, the following conclusions drawn from the comparison of the two on-board surveys can be made:

- The number of riders transferring increased.
- The reasons for using transit shifted somewhat from transit dependency to cost savings.
- The purposes for using mass transportation has changed with trip purposes such as shopping, and personal business having increased as a percentage of the total ridership.
- A greater percentage of riders are using auto access to transit services.
- More males are using the service.
- More riders with auto(s) in their household are using the service.
- The total ridership increased.

Characteristics which did not change are:

- The proportion of riders who are City of Cleveland residents.
- The proportion of riders walking more than 4 blocks.
- The proportion of riders transferring 4 times or more.

The 1974-1976 comparisons were not expected to show major changes. The GCRTA improvement program was designed to provide improved service to all user groups with a balance between the suburbs and the City of Cleveland. The comparative results show that those goals are being met.

As future improvements are implemented, NOACA and GCRTA plan to conduct similar but smaller scale surveys to monitor the impacts of those improvements on the ridership characteristics. The experience and data gained from the 1974 and 1976 full system surveys will be a starting point for such efforts.

appendices

APPENDIX A

SURVEY METHODOLOGY

INTRODUCTION

This appendix documents the methodology used to prepare, conduct and tabulate the 1976 on-board survey. Much of the methodology, as well as the analysis, presented in this report is based on the 1974 on-board survey.

The 1974 survey was conducted for seven separate operators: Cleveland Transit System, Shaker Heights Rapid Transit System, Euclid Municipal Transit System, Maple Heights Transit System, Garfield Heights Coach Line, North Olmsted Municipal Bus Line, and Cleveland-Lorain Highway Coach Line. With the exception of the latter, all other systems now are part of the Greater Cleveland Regional Transit Authority*. The condition of fares and areas serviced for the concerned operators has changed drastically from 1974 to 1976 since the creation of RTA (the specific changes have been noted in numerous sections of the report). A detailed description of the procedures and findings of the 74 survey was produced in the form of a technical memorandum which is available for review at NOACA for those persons interested in such information.

This appendix is divided into 5 sections as follows:

- I Meetings with Operator(s)
- II Material Acquisition
- III Material Distribution
- IV Actual Survey
- V Processing of Data

*The RTA purchased the Cleveland-Lorain Highway Coach Lines operating rights within Cuyahoga County and provides replacement service in western Cuyahoga County.

I. MEETINGS WITH OPERATOR(S)

A. Setting Scope and Time/Days of Survey

The survey was conducted on all Greater Cleveland Regional Transit Authority (RTA) vehicles which account for nearly all of the transit service in the Cleveland urbanized area.

As part of the first step in conducting the 1976 on-board survey, a series of meetings took place between NOACA and the RTA during the month of September. Agreements were reached as to the following; the entire RTA system would be surveyed during the month of November 1976 on succeeding Tuesdays, Wednesdays, and Thursdays in a one-way direction by individual storage and dispatching stations;the survey would be conducted between the hours of 5:00 am and 9:00 pm; radial routes would be surveyed in an inbound direction and crosstown routes in the direction of heaviest (AM) usage as determined by RTA; attempts would be made to obtain information on a route/block/trip basis; and the survey would be self-administered.

B. Designing Questionnaire

The RTA had input and approval of the questions to be asked on the survey form. RTA was primarily interested in the following questions:

1. Stop On - At what stop did you board this bus/rapid?
2. Time - At what time did you board this bus/rapid?
3. Stop Off - At what stop did you get off this bus/rapid?
4. Arrival Mode - How did you arrive at the bus/rapid?

RTA's interest in the above questions was based on its desire to derive information that could be used to improve scheduling, as well as gain information about riders' transferring activity. Therefore, riders were asked to fill out the first four questions of the survey each time they used transit during the surveyed period. In other words, unlike the 1974 survey, the respondent was instructed to complete more than one survey card but only for certain questions. A transfer control statement was included. It instructed all riders to fill out a questionnaire for each trip made in a valid direction (inbound for radial routes, crosstown, and/or rail feeder routes). The effect of the transfer control was to obtain responses for all trip and socioeconomic questions on the first vehicle boarded, and only origin/destination and mode of arrival for subsequent transfers made to complete a one-way trip.

The remaining questions of purpose, age, sex, residence, reasons for use, etc., were included by NOACA in accordance with its data requirements. In most cases the remaining questions and their possible categorial response selections were identical to the 1974 survey to facilitate comparisons of the data and note general changes in user characteristics. Figures A-1 and A-2 show the 1974 and 1976 survey forms.

C. Defining RTA and NOACA Responsibilities

A scope of services (Figure A-3) was devised which specified the responsibilities of the Regional Transit Authority in the on-board survey. The major work elements included survey design, premarketing campaign, distribution and collection, and passenger count totals.

Figure A-1. Survey Form, 1974

TRANSIT RIDER SURVEY

NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

439 The Arcade, Cleveland, Ohio 44114

Help NOACA improve future area transit service. Please fill out and deposit this card in the collection boxes at the front or rear door as you leave. Thank You!

PLEASE FILL OUT ONLY ONE CARD DURING THIS SURVEY

DO NOT WRITE IN THIS SPACE

№ 104140

1. At What Time Did You Board This Bus/Rapid? *(please check one)*

(1) ☐ 5:00 to 6:59 am (3) ☐ 9:00 to 11:59 am (5) ☐ 4:00 to 5:59 pm (7) ☐ 9:00 to 11:59 pm
(2) ☐ 7:00 to 8:59 am (4) ☐ 12:00 to 3:59 pm (6) ☐ 6:00 to 8:59 pm (8) ☐ Midnight to 4:59 am

2. At What Stop Did You Board This Bus/Rapid? _____
(Give names of nearest intersecting streets or rapid station)

3. How Did You Arrive At The Bus/Rapid Stop? *(please check one)*

(1) ☐ Walked less than one block
(2) ☐ Walked 1-3 blocks
(3) ☐ Walked 4 blocks or more
(4) ☐ Was driven to stop
(5) ☐ Drove to stop less than 5 miles and parked
(6) ☐ Drove to stop 5 miles or more and parked
(7) ☐ Transfered from CTS bus/rapid Route.No. _____
(8) ☐ Transfered from other transit system Route name _____

4. At What Stop Will You Get Off This Bus/Rapid? _____
(Give names of nearest intersecting streets or rapid station)

5. What Is The Main Purpose Of This Trip? *(please check one)* (1) ☐ Work (2) ☐ Shopping (3) ☐ School
(4) ☐ Personal business (5) ☐ Medical/Dental (6) ☐ Social-Recreation (7) ☐ Other

6. Age: (1) ☐ Under 18 (2) ☐ 18–22 (3) ☐ 23–35 (4) ☐ 36–64 (5) ☐ 65 or over

7. Sex: (1) ☐ Male (2) ☐ Female *PLEASE COMPLETE THE REVERSE SIDE*

DO NOT WRITE IN THIS SPACE

8. Where Do You Live? (1) ☐ City of Cleveland (2) ☐ Suburb *(Please specify)* _____

9. Why Do You Ride The Bus/Rapid? *(please check one)*
(1) ☐ No car available (3) ☐ Less expensive (5) ☐ More convenient
(2) ☐ No driver's license (4) ☐ Saves time

10. Will You Transfer To Another Bus Or Rapid When You Leave This Bus/Rapid? *(please check one)*
(1) ☐ YES (go on to next question) (2) ☐ NO (go to question 14)

11. How Many Times Will You Transfer? *(please check one)* (1) ☐ Once (2) ☐ Twice (3) ☐ Three times (4) ☐ More than three times

12. When You Transfer Will You Transfer To: *(please check one)* (1) ☐ CTS bus (2) ☐ CTS rapid (3) ☐ Other bus (4) ☐ Shaker Hts. rapid

13. What Stop (After Transferring) Will You Leave Public Transportation?
(Give names of nearest intersecting streets or rapid station) _____

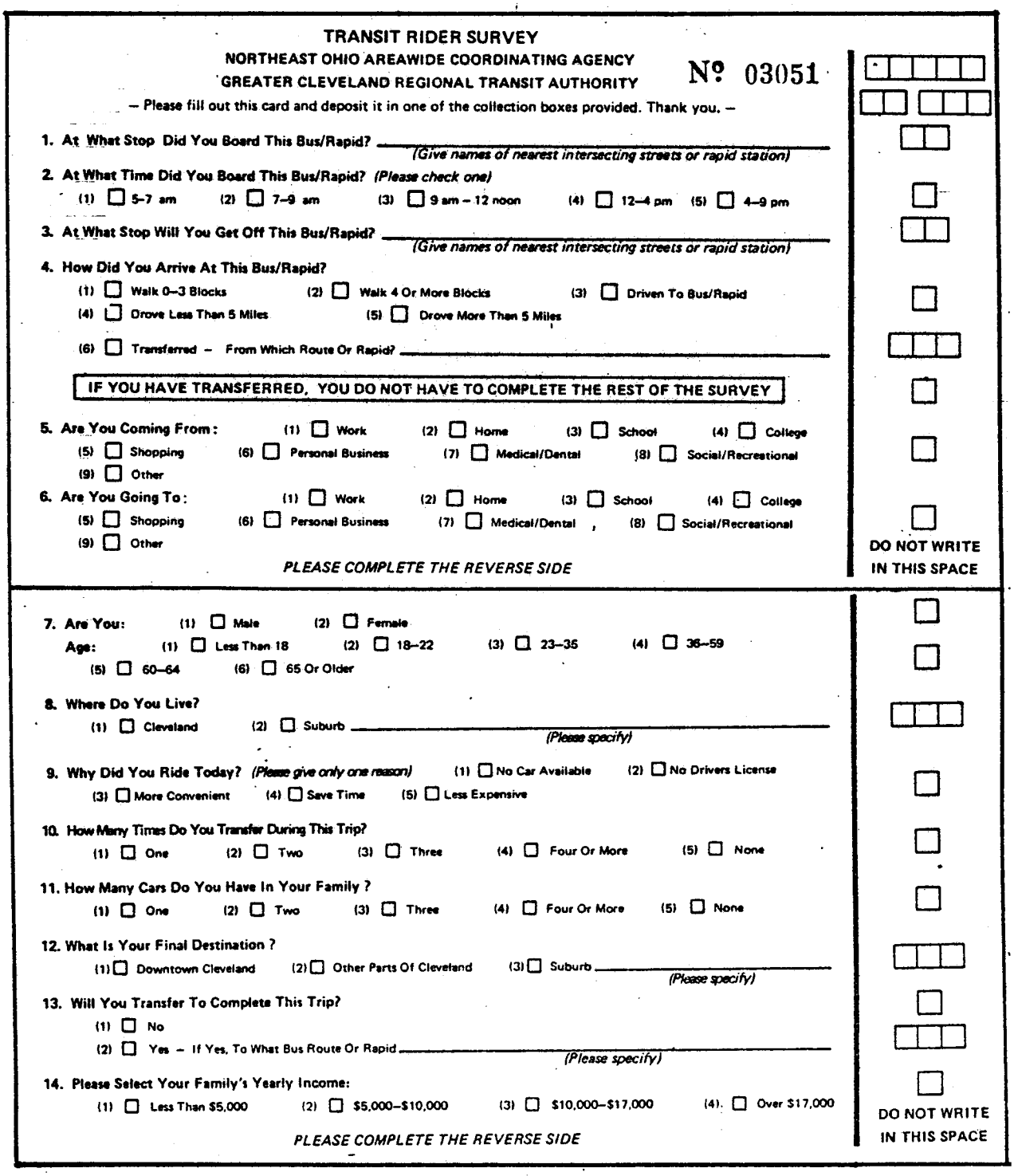
14. How Many Cars Do You Have In Your Family? _____

15. What Is Your Yearly Family Income? *(please check one)*
(1) ☐ Less than $4,000 (3) ☐ $8,000 to $12,000 (5) ☐ $14,000 to $17,000
(2) ☐ $4,000 to $8,000 (4) ☐ $12,000 to $14,000 (6) ☐ Over $17,000

WE WELCOME YOUR COMMENTS OR SUGGESTIONS..... _____

Preparation of this survey form was financed, in part, through a contract from the U.S. Department of Transportation, Urban Mass Transportation Administration.

Figure A-2. Survey Form, 1976



TRANSIT RIDER SURVEY

NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY

Nº 03051

– Please fill out this card and deposit it in one of the collection boxes provided. Thank you. –

1. At What Stop Did You Board This Bus/Rapid? _____ *(Give names of nearest intersecting streets or rapid station)*

2. At What Time Did You Board This Bus/Rapid? *(Please check one)*
   (1) ☐ 5–7 am (2) ☐ 7–9 am (3) ☐ 9 am – 12 noon (4) ☐ 12–4 pm (5) ☐ 4–9 pm

3. At What Stop Will You Get Off This Bus/Rapid? _____ *(Give names of nearest intersecting streets or rapid station)*

4. How Did You Arrive At This Bus/Rapid?
   (1) ☐ Walk 0–3 Blocks (2) ☐ Walk 4 Or More Blocks (3) ☐ Driven To Bus/Rapid
   (4) ☐ Drove Less Than 5 Miles (5) ☐ Drove More Than 5 Miles
   (6) ☐ Transferred – From Which Route Or Rapid? _____

IF YOU HAVE TRANSFERRED, YOU DO NOT HAVE TO COMPLETE THE REST OF THE SURVEY

5. Are You Coming From: (1) ☐ Work (2) ☐ Home (3) ☐ School (4) ☐ College
   (5) ☐ Shopping (6) ☐ Personal Business (7) ☐ Medical/Dental (8) ☐ Social/Recreational
   (9) ☐ Other

6. Are You Going To: (1) ☐ Work (2) ☐ Home (3) ☐ School (4) ☐ College
   (5) ☐ Shopping (6) ☐ Personal Business (7) ☐ Medical/Dental (8) ☐ Social/Recreational
   (9) ☐ Other

PLEASE COMPLETE THE REVERSE SIDE

DO NOT WRITE IN THIS SPACE

7. Are You: (1) ☐ Male (2) ☐ Female
   Age: (1) ☐ Less Than 18 (2) ☐ 18–22 (3) ☐ 23–35 (4) ☐ 36–59
   (5) ☐ 60–64 (6) ☐ 65 Or Older

8. Where Do You Live?
   (1) ☐ Cleveland (2) ☐ Suburb _____ *(Please specify)*

9. Why Did You Ride Today? *(Please give only one reason)* (1) ☐ No Car Available (2) ☐ No Drivers License
   (3) ☐ More Convenient (4) ☐ Save Time (5) ☐ Less Expensive

10. How Many Times Do You Transfer During This Trip?
    (1) ☐ One (2) ☐ Two (3) ☐ Three (4) ☐ Four Or More (5) ☐ None

11. How Many Cars Do You Have In Your Family ?
    (1) ☐ One (2) ☐ Two (3) ☐ Three (4) ☐ Four Or More (5) ☐ None

12. What Is Your Final Destination ?
    (1) ☐ Downtown Cleveland (2) ☐ Other Parts Of Cleveland (3) ☐ Suburb _____ *(Please specify)*

13. Will You Transfer To Complete This Trip?
    (1) ☐ No
    (2) ☐ Yes – If Yes, To What Bus Route Or Rapid _____ *(Please specify)*

14. Please Select Your Family's Yearly Income:
    (1) ☐ Less Than $5,000 (2) ☐ $5,000–$10,000 (3) ☐ $10,000–$17,000 (4) ☐ Over $17,000

PLEASE COMPLETE THE REVERSE SIDE

DO NOT WRITE IN THIS SPACE

Figure A-3. Scope of Services

TPG
NOACA

EXHIBIT A - SCOPE OF SERVICES

The work element of the Transit On-Board Survey includes: (a) Survey Design, (b) Premarketing Campaign, (c) On-Board Survey, (d) Passenger Count Totals, and (e) Post Survey Analysis. The overall objective of the project is to conduct a transit survey on all transit vehicles November 4 through November 17, 1976, along with total passenger count by scheduled route, for all scheduled routes in operation by GCRTA in NOACA's study area.

A. Survey Design: Assist in the formulation of survey procedures.

Objective: Design a procedure which will produce usable results without causing undue disruption of normal transit operations.

Work Description

1. Meetings and reviews with NOACA personnel to determine goals and objectives of the "On-Board Survey"; finalize the format of the questionnaire and survey result records; and finalize survey procedures, including design of questionnaire distribution equipment as they relate to GCRTA.

2. An inventory of transit equipment to determine location of questionnaire distribution and collection equipment.

Output: A workable survey procedure.

Time: From September 27, 1976 through November 2, 1976

B. Premarketing Campaign: Promotion work done before the survey to notify the passengers of the On-Board Survey.

Objective: To notify the transit users of the dates of the survey, justification of the need, and request for cooperation.

Work Description:

1. Printing and posting of promotion material on transit vehicles so as to ensure the maximum possible contact with the transit users, where feasible.

2. A Public Service Campaign involving the media (including newspapers, radio and television) should be developed as a joint effort of the GCRTA and NOACA.

Output: Insuring transit users' interest and cooperation to take part in the On-Board Survey by filling out a survey card.

Time: Posting to be on transit vehicles prior to days of survey.

C. On-Board Survey: Conduct a survey on all GCRTA system routes from November 4 through November 17, 1976. The technique involves the collection of data describing transit rider characteristics by handing out a Transit Rider Survey card on the transit vehicles and having riders complete the survey cards during their trip.

Objective: To collect transit ridership data for the ongoing surveillance program in the NOACA study area.

Work Description:

1. Survey Form Distribution On-Board Survey

   a. Bundling: NOACA will bundle the forms by block, route, rapid station, or system, as appropriate (as decided in coordination with the GCRTA). The GCRTA shall collect the bundles at the Arcade and arrange for distribution to the appropriate operating centers.

   b. The GCRTA shall provide ridership data to NOACA based on recent counts for each block, route, rapid station, or system, as appropriate.

   c. GCRTA management will notify Union officials and request their members' full cooperation.

   d. Assigned GCRTA personnel will set up and dismantle on-board survey equipment as required.

   e. Drivers are required to take those steps necessary to assure the integrity of the survey, such as:

      - Distributing the proper number of forms and recording the start and end sequence numbers for each trip, block, route, etc.
      - Encouraging riders to take a form
      - For runs serving two different routes, the drivers shall have two bundles and shall assure the proper forms are distributed
      - Passing out forms only in the specified direction (inbound)
      - Where necessary (in Public Square and other major route terminal points), assigned GCRTA personnel will handle the collection of forms as agreed upon

f. The GCRTA shall arrange for distribution of cards at the heavy-rail rapid. Such form distribution and collection shall be by persons stationed at the turnstiles.

2. Form Collection

a. All collected forms shall be bundled by GCRTA personnel by block, route, or system insofar as practical (it is anticipated that the large majority of forms will be returned to NOACA in bundles similar to those provided to the GCRTA).

b. Collection boxes shall be provided on each bus at the front door and also at the rear door for "local" routes. Collection boxes shall be provided at the front door of rolling stock and at the Terminal Tower for the Shaker Rapid. Collection boxes shall be provided at each heavy-rail rapid transit station at the turnstiles. Personnel shall be provided at the heavy-rail and light-rail Terminal Tower stations to assist in collecting the forms.

Output: Transit Rider Survey cards which were collected and identified by route, block, and/or line during the survey.

Time: November 4 through November 17, 1976.

D. Passenger Count: A total passenger count of all persons boarding the transit vehicles the day of the On-Board Survey shall be based upon the counts taken by the drivers.

Objective: To count all persons boarding the transit vehicle by trip, block, route, or time of day as discussed in Task A above.

Work Description: Boarding motor coach and rapid passenger counts will be maintained during the survey period. The counts shall be recorded by trip, time of day, block, or route. Standard turnstile counts will be provided for those days the survey is conducted on the rapids.

Output: Count sheets showing survey card sequence numbers and boarding by time of day, trip, block, or route for all services.

Time: Same day as On-Board Survey

E. Post Survey Analysis: Raw data review.

Objective: Insure correct interpretation of raw data to be processed.

Work Description: Meetings and reviews with NOACA personnel to determine completeness of survey, correct interpretation of data related GCRTA vehicle usage, and documentation of survey procedures.

Output: Raw data file.

Time: As required.

RTA's premarketing campaign consisted of posting notices (Figure A-4) in their vehicles approximately three weeks in advance of the first survey day which informed the riders that a survey was to be taken. Bulletins (Figure A-5) instructing vehicle operators of their survey duties were also provided to the stations prior to the survey days. All media public service announcements were handled by NOACA (Figure A-6).

The RTA handled the distribution and collection of the survey forms on all operating vehicles during the survey period. It was agreed that each two or three bus stations (i.e. garages) and/or rail divisions (heavy and light rail) would be surveyed on different days (see Figure A-7) so that RTA office personnel, by controlling material distribution and collection, could protect the integrity of the survey returns. The presence of RTA office personnel at strategic locations (see Figure A-8) proved invaluable for the collection of completed survey forms bundled according to vehicle route, block, and trip.

The last important work element involved taking a total count of all boarding passengers by routes, block, and trip on the days the survey took place. RTA's operators handed out the survey cards where possible, as well as providing the counts, which were returned to NOACA with the completed survey forms for each surveyed half-trip. The vehicle operator's contribution varied since it was extremely difficult for them to actively participate in this type of survey, especially during rush-hour periods when the traffic and large numbers of passengers adversely affect their ability to perform additional tasks.

Figure A-4. Signs posted in transit vehicles.

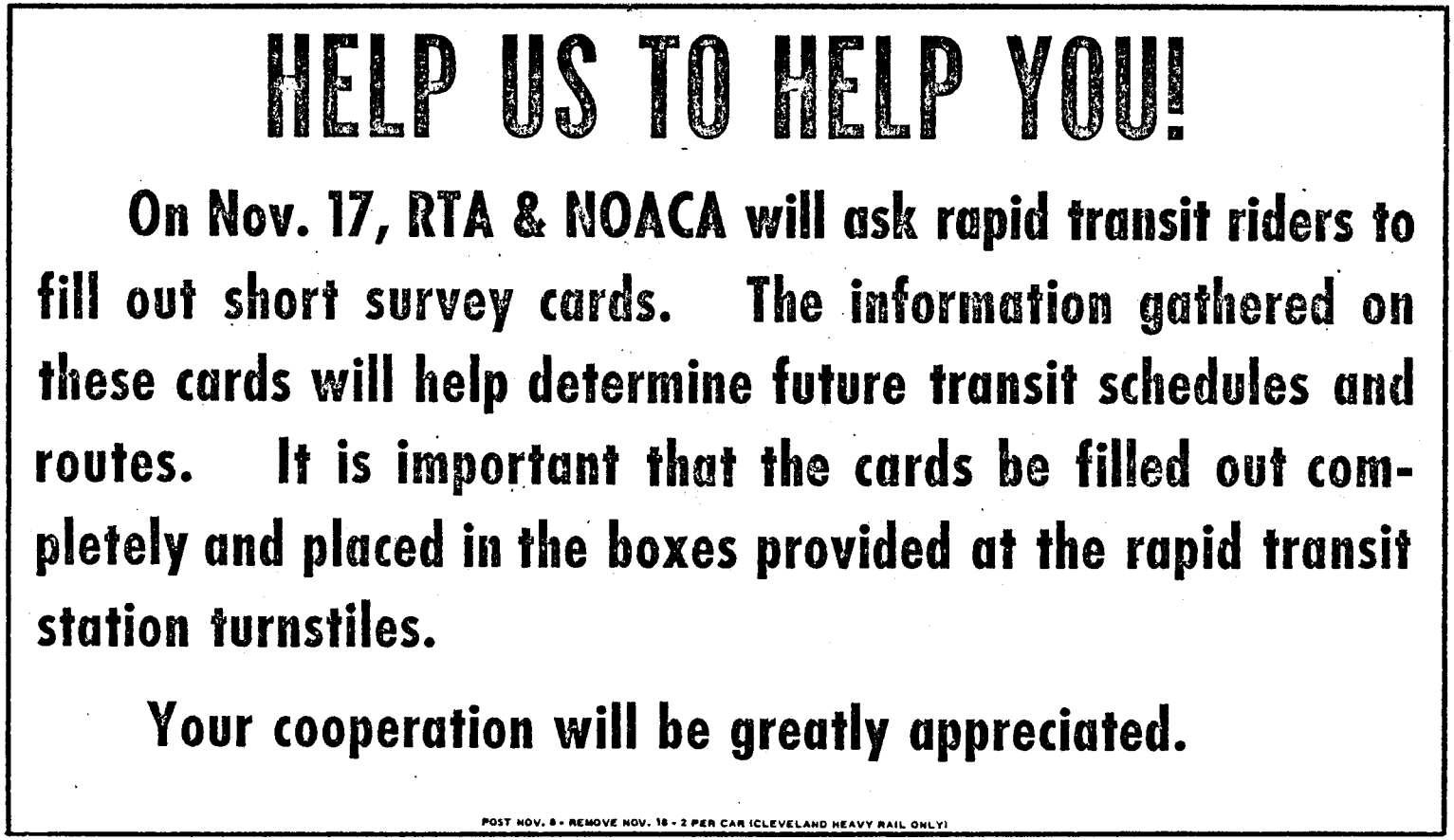


Figure A-5. Instructions for GCRTA operators.

Rev. 10/6/76

RTA Bulletin

On Board Survey Instructions

Triskett Station - November 11, 1976

SUBJECT: INSTRUCTIONS FOR RADIAL (TRUNK) MOTOR COACH LINES' DISTRIBUTION AND COLLECTION OF SURVEY MATERIALS

TO: ALL SUPERVISORS
ALL OPERATORS

The survey will begin with the first trip of the schedule on the morning of the survey, (except for owl runs, which will begin the survey at 4:30 A.M.). The survey will end for all half-trips ending after 7:00 P.M.

All coaches will be fitted with a survey card distribution box on the farebox, a survey card collection box on the dashboard and another survey collection box attached to the "Take One" box by the rear door.

WHEN EACH OPERATOR REPORTS TO THE STATION STARTER THE OPERATOR WILL BE GIVEN SURVEY CARDS TO SUPPLY THE COACH FOR THE ENTIRE BLOCK AND PINK CARD, FORM 976A. (Excess survey cards can be kept on the coach behind the farebox).

THIS SURVEY IS TO BE TAKEN ON INBOUND HALF-TRIPS ONLY. Inbound is defined as half-trips that end in downtown Cleveland. At the start of each inbound half-trip operators will stock the survey distribution box mounted on the farebox with survey cards. OPERATORS WILL, THEN TAKE A COUNT OF ALL BOARDING PASSENGERS, USING THE DENOMINATORS MOUNTED ON THE DASHBOARD OF ALL COACHES. As the supply of survey cards is used up operators should restock the distribution box.

AT THE LAST STOP OF EACH INBOUND HALF-TRIP OPERATORS WILL RECORD THE NUMBER OF BOARDING PASSENGERS ON PINK CARD, FORM 976A. Operators will then collect the survey cards from the two collection boxes and any left on the seats. Operators will put a rubber band around these and the pink card, Form 976A. RTA employees from the Main Office will be stationed at these endpoints to pick up these survey card packets for each trip. The attached sheet lists the assigned endpoints for each radial line.

THIS SURVEY IS NOT TO BE TAKEN IN THE OUTBOUND DIRECTION. Operators will remove survey cards from the distribution box for trips in the outbound direction. If any card packets have accidentally been left on coaches, operators pulling in the coach should return them to the station dispatcher, should also remove any leftover survey pencils from the distribution box.

SPECIAL NOTE

YOU CAN HELP BY ASKING ALL CUSTOMERS TO "PLEASE TAKE A SURVEY CARD". FURTHERMORE, WHENEVER POSSIBLE, PLEASE HAND THE TOP SURVEY CARD TO THE FIRST BOARDING PATRON AT EACH STOP. This will encourage the other patrons to take a survey card.

Your cooperation is most necessary and much appreciated.

Joseph D. Jaros

Joseph D. Jaros,
Superintendent of Bus Operations

Date: October 26, 1976

No.: 76-120 P.C. 1

REV. 10-16-75

RTA Bulletin

On Board Survey Instructions

Triskett Station - November 11, 1976

SUBJECT: PROCEDURES FOR CROSSTOWN/FEEDER MOTOR COACH LINES' DISTRIBUTION AND COLLECTION OF SURVEY MATERIALS

TO ALL SUPERVISORS
ALL OPERATORS

The survey will begin with the first trip of the schedule on the morning of the survey, (except for owl runs, which will begin the survey at 4:30 A.M.). The survey will end for all half-trips ending after 7:00 P.M.

All coaches will be fitted with a survey card distribution box on the farebox, a survey card collection box on the dashboard and another survey collection box attached to the "Take One" box by the rear door.

WHEN EACH OPERATOR REPORTS TO THE STATION STARTER THE OPERATOR WILL BE GIVEN SURVEY CARDS TO SUPPLY THE COACH FOR THE ENTIRE BLOCK AND PINK CARD, FORM 976A. (Excess survey cards can be kept on the coach behind the farebox).

THE SURVEY IS TO BE TAKEN IN ONE DIRECTION ONLY. Those routes that terminate at a rapid transit station will conduct the survey on the half-trip traveling to the station. Those routes that do not terminate at a rapid transit station will conduct the survey in the southbound direction or westbound direction, whichever is appropriate. The attached sheet lists the assigned endpoints and direction to be surveyed for each route.

At the start of each half-trip to be surveyed operators will stock the survey distribution box mounted on the farebox with survey cards. OPERATORS WILL THEN TAKE A COUNT OF ALL BOARDING PASSENGERS, USING THE DENOMINATORS MOUNTED ON THE DASHBOARD OF ALL COACHES. As the supply of survey cards is used up operators should restock the distribution box.

AT THE END OF EACH SURVEYED HALF-TRIP OPERATORS WILL RECORD THE NUMBER OF BOARDING PASSENGERS ON PINK CARD, FORM 976A. Operators will then collect survey cards from the two collection boxes and any cards left on the seats, put a rubber band around them and the pink card, Form 976A for THAT trip, and store the packet behind the farebox. Operators will remove survey cards from the distribution box for those half-trips not being surveyed. The operator pulling in the coach will be responsible for turning in the survey card packets to the station dispatcher, and removing left-over pencils from the distribution box.

SPECIAL NOTE

YOU CAN HELP BY ASKING ALL CUSTOMERS TO "PLEASE TAKE A SURVEY CARD". FURTHERMORE, WHENEVER POSSIBLE, PLEASE HAND THE TOP SURVEY CARD TO THE FIRST BOARDING PATRON AT EACH STOP. This will encourage the other patrons to take a survey card.

Your cooperation is most necessary and much appreciated.

Joseph D. Jaros

Joseph D. Jaros,
Superintendent of Bus Operations

Date: October 26, 1976

No.: 76-121 P.C. 2

Figure A-6. Public service announcements sent to all media.

NOACA
Northeast Ohio Areawide Coordinating Agency

JAMES F. PATTERSON
President
FREDERICK E. J. PIZZEDAZ
Executive Director

FOR FURTHER INFORMATION CONTACT:
LOIS EPSTEIN, 241-2414, EXT. 37

NOACA AND RTA TO CONDUCT TRANSIT RIDER SURVEY

FOR RELEASE: IMMEDIATELY (10/27/76)

A transit rider survey will be conducted by the Northeast Ohio Areawide Coordinating Agency (NOACA) and the Greater Cleveland Regional Transit Authority beginning on November 4.

Riders will be requested to check a multiple choice questionaire dealing with such information as destination, transfers, purpose of trip and number of cars in the family.

NOACA's transit planners will analyze the travel characteristics obtained through the survey. The results will enable the agency to develop data to use in both short and long-range transportation planning studies.

The information will also enable RTA to determine future transit routes and schedules.

On November 4, the survey will be conducted on the following bus routes: 1--St. Clair; 3--Superior; 6--Euclid; 9--Mayfield Express; 9B--Mayfield Express; 28--Euclid Express; 30--Hayden; 34--Green; 36--Eddy; 37--Taylor; 39-39B-F--Lakeshore Express; 41--Warrensville; 43--Willowick Freeway Flyer; 49--Wickliffe Flyer; and the following City of Euclid lines: Lake Shore Blvd., Babbitt, Briardale, East 260th, East 222nd, East 200th.

(MORE)

400 The Arcade • Cleveland, Ohio 44114 • (216) 241-2414

noaca and rta to conduct transit rider survey(add 1)

November 9: 20--West 25th (via Broadview); 20A-21-- West 25th State Express; 20B--West 25th (via Pearl); 35--Broadview Express; 45--West 65th-Ridge; 51--Pearl Expres; 54--Pleasant Valley; 68--Grantwood; 72--Clark Bridge; 79-79F--Fulton; 81--Scranton; 84--Fairfield; 98--Brookpark; Brecksville Road Transit; and the following Garfield Coach Lines: 76--Turney Express; 88--E. 135th Express; 97--Oakwood Express.

November 10: 2--East 79th; 4--Wade Park; 5--Chagrin Falls; 7-7A--Monticello Express; 8--Cedar; 10--East 105th; 11--Scovill; 12-13--Woodland/Buckeye; 14--Kinsman; 15-15F--Union; 16-16A--East 55th; 17--East 30th; 18--Harvard-Denison; 19-19F-- Broadway Miles; 24--Solon; 29--Garfield Expres; 32--Fairmount; 32C,S,W --Heights Express and the following City of Maple Heights lines: Maple Heights Express; Dunham; Bedford Heights-Metro Estates.

~~November 11~~ November 18: 22--Lorain; 23--Clark; 25--Madison; 26--Detroit; 31--Avon Lake; 42--Dover; 46 Westlake-S. Lakewood; 55--Clifton Express; 65--Hilliard-Granklin; 69--Franklin; 70--West 150th-Bunts; 71--Holland-Ford; 78 West 98th-Puritas; 82--West 117th-Memphis; 83--West 130th; 85--Lorain Express; 86-86F--Berea-Warren, and the following North Olmsted Municipal bus line routes: 53--Westgate Local; 64--Olmsted Falls Express; 75--North Olmsted Express; 87--Westwood Express; 89--Olmsted Falls Shopper; 96--Butternut Express.

Shaker rapid riders will be surveyed on November 16; Cleveland rapid--November 17.

Figure A-7. Survey Schedules.

DATE	STATION/DIVISION
Thursday Nov. 4th	Hayden Station Euclid Station
Tuesday Nov. 9th	Brooklyn Station Brecksville Station Garfield Heights Station
Wednesday Nov 10th	Woodhill Station Maple Heights Station
Tuesday Nov 16th	Light Rail Division
Wednesday Nov. 17th	Heavy Rail Division
Thursday Nov. 18th	Triskett Station North Olmstead Station

Figure A-8. Survey pickup instructions - Triskett Station.

ON-BOARD SURVEY
DESIGNATED END POINTS - TRISKETT STATION

RADIAL TRIPS (Trips that end in downtown Cleveland) SURVEY CARD PICK-UP POINTS

#22 LORAIN - Terminal Loop

#23 CLARK - Terminal Loop

#25 MADISON - Terminal Loop

#26 DETROIT - E. 22/CSU
Public Square Trips - Terminal Loop

#31 AVON LAKE - E. 17th

#55 CLIFTON - E. 18th
Public Square Trips - Ontario at Superior

#65 HILLIARD - E. 17th

#69 FRANKLIN - W. Roadway

#85 LORAIN - E. 22/CSU

#86 BEREA - E. 17th

CROSSTOWNS (Trips that terminate at a rapid transit station, or crosstown trips)

#42 DOVER - Southbound trips

#46 WESTLAKE - Trips to Triskett Rapid Station

#70 WEST 150 - Southbound Trips

#71 HOLLAND-FORD - Trips to Brookpark Rapid Station

#78 WEST 98 - Trips to W. 98th-Detroit Rapid Station

#82 WEST 117 - Southbound trips

#83 WEST 130 - Trips to Triskett Rapid Station

#86 BEREA - Southbound trips

NOACA's involvement in transit on-board surveys stems from its responsibility to obtain current travel data of all modes of transportation throughout its cordon area. Such information is used by NOACA for long- and short-range transportation planning and is necessary for periodical review of past origin and destination travel studies. Questions pertaining to socioeconomic characteristics of transit users are included in accordance with UMTA guidelines and are incorporated into NOACA's data base file for further transportation and comprehensive planning purpose; i.e., land use, model simulations, network updates, and review of proposals for obtaining federal funds. The on-board survey's socioeconomic questions are designed to be similar to the U.S. Bureau of the Census, Work Trip Purpose statistical information.

NOACA staff met with responsibile RTA staff and designed the On-Board Survey questionnaire. Together, NOACA and RTA agreed upon methods of material distribution and collection which were included in the scope of services section of the contractual agreement between the two parties. The purchase of survey materials, their batching by route and block, data processing and analysis of the questionniare results, all were NOACA's responsibilities in the effort (see Figure A-3).

A final draft copy of the survey questionnaire was sent to UMTA for its review.

II. MATERIAL ACQUISITION

A. Based on Sample Size

Estimates of quantity materials needed were based in general on the experience gained in the 1974 on-board survey. First, the total number of vehicles remained roughly the same as were surveyed in 1974 (900 to 1000 vehicles). Secondly, RTA had reported that the current daily ridership was approximately 400,000. It was assumed that the sample (inbound riders) would consist of at least half of the total ridership; i.e., 200,000.

The following table presents a listing of material and quantity purchased.

Survey cards	264,000
Survey boxes	4,600
Pencils	130,000
Labels	3,300
Posters	50
Tape (rolls)	50
Rubber bands	15,000

The above figures include allowances made for reserves in case they were needed. The total cost of the materials was about $6,000.

B. Request for Bids from Vendors

Bids were solicited in accordance with agency procedures. At least three bids were received for each item listed above.

C. Selection of Vendors

The selection of vendors was based on two factors, lowest cost and acceptable delivery date.

D. Delivery According to Predetermined Time Schedule

A reasonable delivery date was crucial since all materials had to be assigned by station/route/block/trip. The "batching" of materials took two weeks to complete (prior to survey days). Delays in the delivery of material thus would have upset the entire survey schedule.

III. MATERIAL DISTRIBUTION

A. Allocation by Station/Route/Block/Trip

Because it was desired to eventually tabulate all survey results by route, block and/or trip, procedures were developed to distribute and receive the survey cards by route, block, and trip. RTA schedules were used to define each bus (and light rail) vehicle trip. The RTA schedules are typical of most large transit systems with the service on each route being broken down into blocks. A "block" is a description, by time of day and location, of the movement of the bus or rapid car from the time it leaves the operating station until it returns. Typically, the transit vehicle makes a number of round trips on the route. Each of these trips is not formally assigned a number by RTA, however, NOACA assigned a trip number to be used in bundling, collecting and tabulating the on-board survey. Because the survey was accomplished in one direction only, the first halftrip (i.e. movement from one route terminal to the other) in the direction of the survey was numbered "1", the second "2", etc.

The RTA blocks are numbered using 3-digit numbers with the first digit defining the station. Because the survey tabulations would include the route

number and no route operates out of more than one station, the first digit of the block number was ignored in the on-board survey.

Prior rider counts were used to estimate the number of riders for each trip. The survey cards were then allocated to each trip based on ridership. The packages of cards for each trip were bundled by block and route and the routes then boxed for each operating station. As additional safeguards, the survey cards were printed in 6 different colors and a single color assigned to each station. Also, each survey card was uniquely numbered, in sequence, and each set of cards for each trip, block, and route was recorded by the sequence numbers involved. For the heavy rail rapid, the bundles were developed on a station basis in lieu of trip.

B. Contingency Plan to Supply Reserves

In every instance, extra materials were provided for all stations surveyed. Additional form sequence numbers were documented and, if used, were cross-correlated to a particular route/block/trip. Surplus boxes, pencils, and tape were transported to other stations yet to be surveyed from those stations where the survey had been completed.

IV. ACTUAL SURVEY

A. Methods of Distribution

For the buses and light rail cars, drivers received the marked bundles (by route/block/trip) of survey cards, count slips, and pencils as they reported to, or departed from their stations. In the cases where a driver changed routes, but not vehicles, he was instructed to use the proper forms (as identified by route/block/trip). Other driver duties included loading of the specially designed distribution boxes (attached to fare box) with proper sequenced cards and pencils while traveling in the surveyed direction, and encouraging riders to complete a form during their trip. Passengers were surveyed in an in-bound direction only.

The distribution of forms on the heavy rail consisted of riders taking a card as they paid their fare and passed through the turnstile. All heavy rail stations except the terminal had distribution boxes. The Cleveland Union terminal was omitted because its primary use is for return trips and this would add greatly to the problem of double counting.

B. Methods of Collection

There were basically two methods of collection. The first involved respondent riders simply dropping their forms in deposit boxes located in the front and rear of the buses and light rail cars. A second collection method involved heavy rail (and some light rail) users depositing their completed forms in large containers located at all heavy rail and certain light rail stations (C.U.T. and Shaker Square). The vehicle operator was involved in this process since he/she was responsible for collecting the completed forms at the end of the surveyed portion of a trip and banding the returns along with the

rider count. As noted earlier RTA provided additional manpower at strategic locations (i.e., Public Square for radial routes) to remove the completed forms plus counts from the vehicles. This latter procedure assisted in maintaining an orderly collection per trip and relieved the drivers of additional work. Collections were made at rapid stations throughout the survey day by an additional crew. Again, an orderly collection was achieved which assisted in the reconstruction of completed survey forms according to the categories in which they were originally assigned for distribution.

C. Transport of Returns to NOACA

RTA staff returned the completed forms to the NOACA Survey Office the same day for the most part, which they were obtained. This activity was important since a quick return guaranteed that different station's results would not be mixed together. Another benefit of this procedure was that as a certain station's route response was returned, a measure of excess materials could be determined and allocated to a station yet to be surveyed. Finally, the reconstruction of repsonses per route/block/trip assignment was able to be done immediately, and thus expedite the data processing work.

V. PROCESSING OF DATA

A. Reconstruction of Returns by Originally Assigned Categories

As noted earlier, an attempt was made to obtain information down to the trip level. In order to achieve this goal, it was necessary to assign forms to the route/block/trip level before distribution and then assign the returned forms exactly after they had been returned.

An expansion factor by trip was calculated to represent the activity on a given trip (for each route and block); unfortunately the number of returns versus the riders counted proved to be inadequate on most trips resulting in unacceptably high trip factors (i.e., greater than about 2.0). Nevertheless most returns were coded with trip factors.

B. Coding

The majority of the coding work involved simple transferring of a selected response number to the proper boxes located on the card. Detailed codes and rationale are noted in the following instructions.

Survey Form Color (card column 1) - Six colors were used to identify the four major bus stations and the two rail divisions. The coders simply placed a numerical code (from 1 to 6) in the first card column to match the corresponding color.

1= Green - Hayden and Euclid stations
2= Blue - Brooklyn and Brecksville
3= White - Woodhill and Maple Heights
4= Pink - Triskett and Garfield Heights
5= Yellow - Light Rail
6= Tan - Heavy Rail

Sequence Numbers (card colums 2 through 6) - A five-digit number identifying each survey card as a unique record (including card color) representing a specific route and block had been preprinted on each form. No coding was needed since the keypunchers automatically transferred this information to an IBM card (see Figure A-9 for sequence number to route and block correspondence).

Figure A-9. Sequence of survey cards by dispatching station.

WOODHILL STATION

RT No	ROUTE	COLOR CODE	SEQUENCE No. FROM	TO
2	East 79th	3	00001	02370
4-38	Wade Park-Hough	3	48501	52595
5	Chagrin Falls	3	02371	02995
7-7A	Monticello Exp.	3	02996	04760
8	Cedar	3	17641	21185
10-29	East 105th-Gar.Exp.	3	04761	17640
11	Scovill	3	21186	23905
13	Woodland/Buckeye	3	23906	27920
14	Kinsman	3	27921	38385
15-15F	Union	3	43056	47355
16-16A	East 55th	3	55001	60240
17	East 30th	3	62041	60390
18	Harvard-Denison	3	60391	61645
19-19F	Broadway-Miles	3	38386	43055
24	Solon	3	61646	62110
32	Fairmount	3	65946	66795
32 CSW	Heights Exp	3	62111	65945
33	Central	3	47356	48500
40	Lee Road	3	66796	70945
48-48A	Shaker-East 131st	3	70946	75595
50	East 116th	3	75596	78000
56	Harvard Express	3	52596	55000

BROOKLYN STATION

20	W.25th-via Broadview	2	00001	11620
20A-21	W.25th-State Exp.	2	00001	11620
20B	W.25th(via Pearl)	2	00001	11620
35	Broadview Express	2	11621	14495
45	West 65th-Ridge	2	17266	17960
51	Pearl Express	2	14496	17265
54	Pleasant Valley	2	17961	18340
68	Grantwood	2	18341	19095
72	Clark Bridge	2	25356	25715
79-79F	Fulton	2	19096	25355
81	Scranton	2	26181	29510
84	Fairfield	2	29511	31000
98	Brookpark	2	25716	26180

TRISKETT STATION

RT No	ROUTE	COLOR CODE	SEQUENCE No. FROM	TO
22	Lorain	4	00001	07980
23	Clark	4	08321	10200
25	Madison	4	10201	13425
26	Detroit	4	20201	26060
31	Avon Lake	4	26061	26305
42	Dover	4	13856	13935
46	Westlake-S.Lakewood	4	13426	13855
55-55A	Clifton Express	4	26306	37140
55C	Clifton Express	4	26306	37140
55N-S	Clifton Express	4	26306	37140
65	Hilliard-Franklin	4	37141	37800
69	Franklin	4	37801	37980
70	West 150th-Bunts	4	13936	15030
71	Holland-Ford	4	15031	15345
78	West 98th-Puritas	4	15346	16845
82	West 117th-Memphis	4	16846	18880
83	West 130th	4	18881	20200
85	Lorain Express	4	07981	08320
86-86F	Berea-Warren	4	37981	39700

HAYDEN STATION

1	St. Clair	1	00001	09645
3	Superior	1	09646	19475
6	Euclid	1	19476	38435
9	Mayfield Express	1	38436	42450
9B	Mayfield Express	1	38436	42450
28	Euclid Express	1	42451	45140
30	Hayden	1	48796	50855
34	Green	1	50856	51205
36	Eddy	1	51206	51920
37	Taylor	1	51921	53755
39-39B-F	Lakeshore Exp.	1	45141	48165
41	Warrensville	1	53756	56000
43	Willowick Freeway Fly.	1	48166	48715
49	Wickliffe Flyer	1	48716	48795

SUBURBAN

RT No	ROUTE	COLOR CODE	SEQUENCE No. FROM	TO
76-88	Turney Exp.-E135-Ex.	4	40001	42960
77	Brecksville	2	32501	34000
97	Oakwood Express	4	42961	43600
89	Olmsted Falls Shop.	4	45866	45910
53	Westgate Local	4	46816	47000
87-96	Westwood Express - Butternut Exp.	4	45911	46660
75	N. Olmsted Express	4	43601	45865
64	Olmsted Falls Express	4	46661	46815
997	Maple Heights Exp.	3	78901	80460
998	Dunham	3	80461	81630
999	Bedford Hgt.Metro Ex.	3	81631	82000
991	Lakeshore Blvd.	1	57001	58350
992	Babbitt	1	58351	58650
993	Briardale	1	58651	59000
994	East 260th	1	59001	59300
995	East 222nd	1	59301	59700
996	East 200th	1	59701	60000

RAPID TRANSIT

66	Cleveland	6	00001	27000
67-67A	Shaker	5	00001	14000

Route Number (card columns 7 and 8) - In most instances, the coders simply transferred the information from the driver's passenger-count slips which were screened by NOACA supervisory personnel relative to proper sequence number assignment, as well as route, block, and trip numbers.

Route Subscript (card column 9) - Many of RTA's routes are subdivided into various "branches" of a main trunkline or have no assigned numerical designations. The coders noted deviations from two-digit route numbers at legitimate routes where their existence could be verified. Where route numbers had to be created, the route subscript became essential for identification (see Figure A-10).

Block Numbers (card columns 10 and 11) - The last two digits of the block-number series were coded to further assist in the identification of survey responses by tracing them back to the route where they were originally distributed.

Trip Numbers (card columns 12 and 13) - This last form of specific identification was coded from the driver count slips to be joined with the appropriate route and block numbers for analysis on a trip-by-trip basis.

Trip Factor (card columns 14,15, and 16) - The trip factor (manually calculated by the coders) consisted of dividing the total number of riders by the total number of cards returned per trip. An implied decimal exists between card columns 15 and 16. (See Figure A-11 which shows the work flow chart for calculating both the trip and time factors.)

Figure A-10. Computer code designation for survey routes.

	R.T.A. #	OBS* CODE	
WOODHILL	2	020	EAST 79
	4	040	WADE PARK
	5	050	CHAGRIN FALLS
	7	070	MONTICELLO EXP. (sev.)
	7A	071	MONTICELLO EXP. (HOSP.)
	8	080	CEDAR
	10	100	EAST 105
	11	110	SCOVILL
	12	120	WOODLAND
	13	130	BUCKEYE
	14	140	KINSMAN
	15	150	UNION
	15F	151	UNION
	16	160	EAST 55 (COV. HTS. CITY HALL)
	16A	161	EAST 55 (C.C. LOOP)
	17	170	EAST 30
	18	180	HARVARD
	19	190	BROADWAY - MILES(LOC.)
	19F	191	BROADWAY - MILES(RY.)
	24	240	SOLON
	29	290	GARFIELD EXP.

* ON-BOARD SURVEY

	32	320	FAIRMOUNT
	32C	321	HEIGHTS EXP. (CEDAR)
	32S	322	HEIGHTS EXP. (SILSBY)
	32W	323	HEIGHTS EXP. (WASH.)
	33	330	CENTRAL
	38	380	HOUGH
	40	400	LEE RD.
	48	480	SHAKER - E. 131 (MARYMNT. HOSP.)
	48A	481	SHAKER - E. 131 (MILES)
	50	500	EAST 116
	56	560	HARVARD EXP.
HAYDEN	1	010	ST. CLAIR
	3	030	SUPERIOR
	6	060	EUCLID (WIND.)
	6A	061	EUCLID (UNIV. CIRCLE)
	9	090	MAYFIELD EXP. (HILL. HOSP.)
	9B	091	MAYFIELD EXP. (RICH. MALL)
	28	280	EUCLID EXP.
	30	300	HAYDEN
	34	340	GREEN
	36	360	EDDY

	37	370	TAYLOR
	39	390	LAKESHORE EXP. (E.185)
	39B	391	LAKESHORE EXP.(BRATNL)
	39F	392	LAKESHORE EXP.(FLYER)
	41	410	WARRENSVILLE
	43	430	WILLOWICK FLYER
	49	490	WICKLIFFE FLYER
TRISKETT	22	220	LORAIN
	23	230	CLARK
	25	260	MADISON
	26	260	DETROIT
	31	310	AVON LAKE
	42	420	DOVER
	46	460	WESTLAKE-S. LAKEWOOD
	55	550	CLIFTON EXP.(R.R. LOOP)
	55A	551	CLIFTON EXP.(COVE AVE.)
	55C	552	CLIFTON EXP.(BAY VILL.)
	55N	553	CLIFTON EXP.(W. GATE NORTH)
	55S	554	CLIFTON EXP.(W. GATE SOUTH)
	65	650	HILLIARD-FRANKLIN
	69	690	FRANKLIN

	70	700	W. 150 - BUNTS
	71	710	HOLLAND - FORD
	78	780	W. 98 - PURITAS
	82	820	W. 117 - MEMPHIS
	83	830	WEST 130
	85	850	LORAIN EXP.
	86	860	BEREA - WARREN
	86F	861	BEREA - WARREN (I-71)
BROOKLYN	20	200	W. 25 (VIA BROADVIEW)
	20A	201	W. 25 - STATE (LOCAL)
	21	210	W. 25 - STATE EXP.
	20B	202	W. 25 (VIA PEARL)
	35	350	BROADVIEW EXP.
	45	450	W. 65 - RIDGE
	51	510	PEARL EXP.
	51F	511	PEARL EXP.
	54	540	PLEASANT VALLEY
	68	680	GRANTWOOD
	72	720	CLARK BRIDGE
	79	790	FULTON
	79F	791	FULTON
	81	810	SCRANTON
	84	840	FAIRFIELD
	98	980	BROOKPARK

RAPID TRANSIT	66	660	CLEVELAND (HEAVY RAIL)
	67	670	SHAKER (VAN AKEN)
	67A	671	SHAKER
SUBURBAN	76	760	TURNEY EXP.
	77	770	BRECKSVILLE
	88	880	E. 135 EXP.
	97	970	OAKWOOD EXP.
	89	890	OLMSTED FALLS SHOP.
	53	530	WESTGATE LOCAL
	87	870	WESTWOOD EXP.
	75	750	N. OLMSTED EXP.
	64	640	OLMSTED FALLS EXP.
	96	960	BUTTERNUT EXP.
		997	MAPLE HTS. EXP.
		998	DUNHAM
		999	BEDFORD HTS.-METRO EST.
		991	LAKESHORE BLVD.
		992	BABBITT
		993	BRIARDALE
		994	EAST 260
		995	EAST 222
		996	EAST 200

Figure A-11. Preparation of survey cards for keypunching.

FACTOR CALCULATION FLOW CHART

1. For each trip the survey cards were counted. The rider count ticket was placed on top of the bundle of survey cards for the trip.

2. The factor was computed (number of riders from the rider count ticket divided by the number of cards to one decimal).

3. The time factor was placed on the rider count on the ticket.

4. The trip factor was placed on rider count ticket.*

5. The route, block trip number and time period was placed on the ticket. The coded time period (of boarding-question 2) was based on the half-trip start time.

6. All trip bundles were divided in time periods (1-5 as in question 2 of the survey).

7. All "loose" survey cards were divided into time periods based on the response to question 2-time of boarding. (If the time was blank, the card was not used). Loose survey cards were those not traceable back to a certain trip.

8. The factor by time period was computed (riders/cards) per time period to one decimal. (If a rider-count ticket was not available, it was estimated based on previous ride counts or similar trips.)

*Keypunchers duplicated these data for the entire trip bundle from the rider-count ticket.

Question 1 - Boarding Stop (card columns 17,18, and 19) - Coders were instructed to use the public timetable for routes which included zones and major street intersections. Each bus route would have a maximum of 19 zones, the rail divisions stations from 20 through 66. Card columns 17 and 18 specified a given zone; column 19 was limited to a "0" or "1" number only, the "0" referring to any place within the zone other than the boundary intersection which was designated by a "1" (see Figures A-12 and A-13 and Appendix B).

Question 2 - Board Time (card column 20) - Five time periods were provided and the coders simply tranferred the corresponding number into the appropriate coding space.

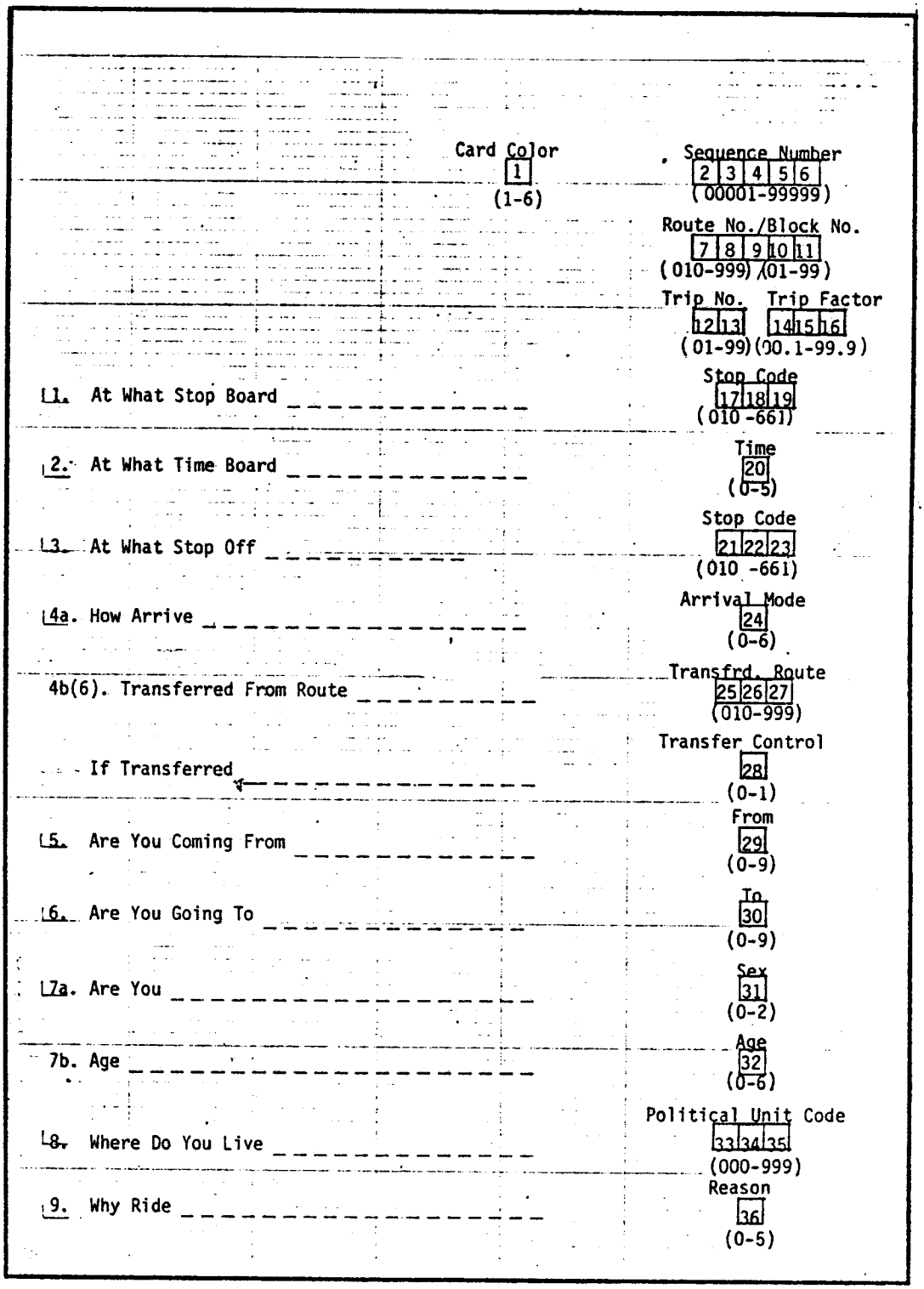
1= 5-7am
2= 7-9am
3= 9am-12 noon
4= 12-4pm
5= 4-9pm

Question 3 - Alighting Stop (card columns 21,22, and 23) - (See Question 1 above for the coding procedure for this question). At those stations where a bus route connected with a rail route, the rail station's stop designation took precedence (see Figure A-13).

Question 4 - Arrival Mode to Boarding Stop (card columns 24,25,26,and 27) - The question was coded in two separate parts. First, card column 24 was coded according to the appropriate box number selection. Second, card columns 25,26, and 27 were coded with appropriate route designations only if a number "6" was placed in column 24; this number represented a transfer from another transit vehicle.

1= Walk 0-3 blocks
2= Walk 4 or more blocks
3= Driven to bus/rapid
4= Drove less than 5 miles
5= Drove more than 5 miles
6= Transferred - from which route or rapid

Figure A-12. Survey coding instructions.



10. How Many Times Transfer _____ Future Transfers [37] (0-5)

11. How Many Cars in Family _____ Number Cars [38] (0-5)

12. What is Your Final Destination _____ Political Unit Code [39][40][41] (000-999)

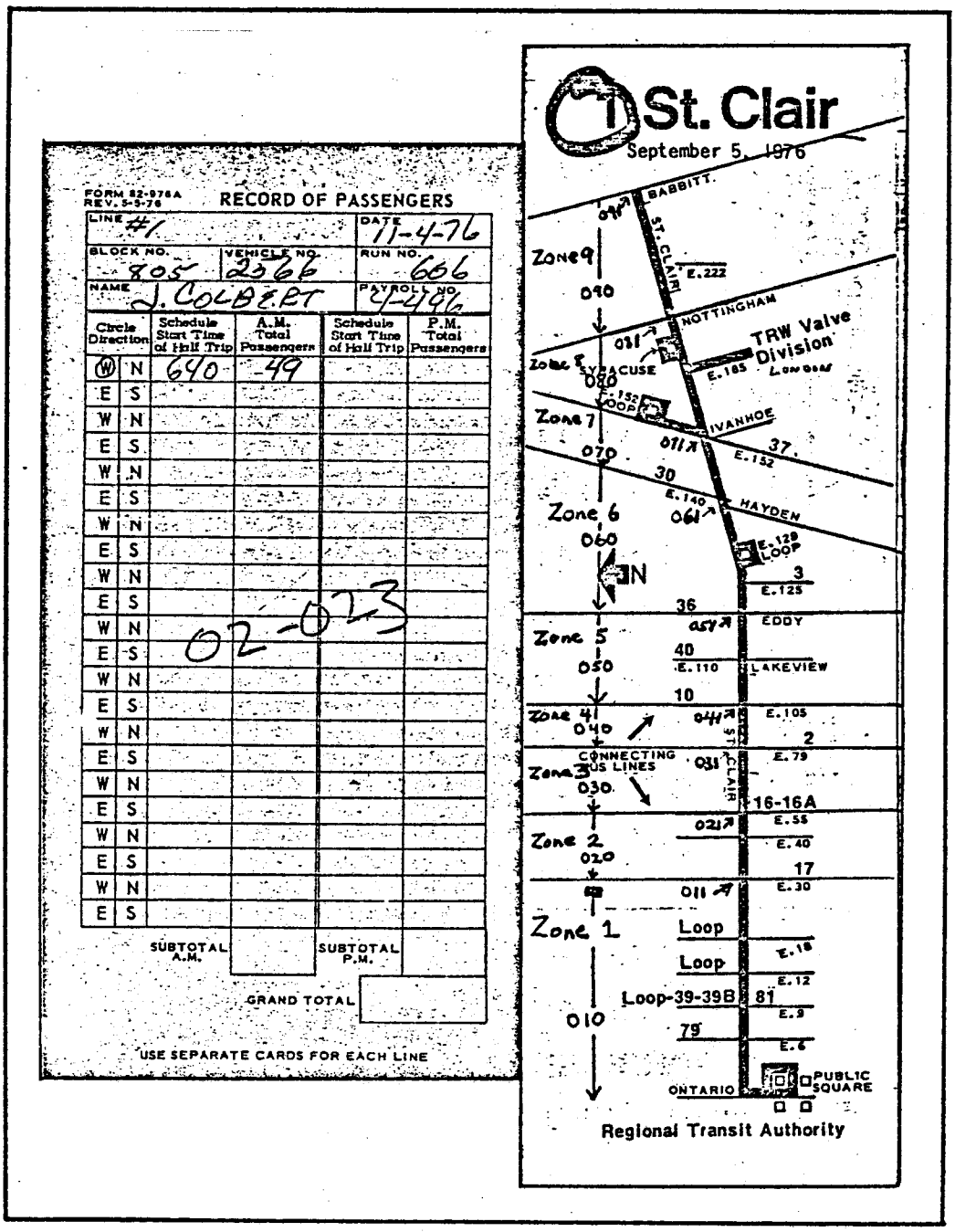
13a. Will You Transfer _____ Will Transfer [42] (0-2)

13b. If Transfer, What Route _____ Transfer Route [43][44][45] (010-999)

14. Family's Income _____ Income [46] (0-4)

[47][48][49] (00.1-99.9)

Figure A-13. Passenger count and zone demarcation.



Transfer Control Statement (card column 28) - This statement instructed the respondent that, if he/she were traveling on the first boarded vehicle, he/she should complete the entire questionnaire. The coders would then mark "0" in column 28 and continue to code the entire form. If a rider had transferred prior to receiving a survey form (as noted by a "6" in column 24), he/she was not to complete the remaining questions (5 through 14). In this case the correct code for one transferring would be a "1" in column 28. This signaled the coder to stop coding the remainder of the questions. A "1" in card column 28 also signaled the keypuncher to zero fill the remainder of the card columns for question responses (see Figure A-12).

Questions 5,6, and 7 - Purpose From/Purpose To of Trip/and Sex and Age of Respondents (card columns 29,30,31, and 32) - Coding of the repsonses for the above questions simply involved the transfer of the box checked to the appropriate card column (see Figure 12).

Purpose From:

1= Work
2= Home
3= School
4= College
5= Shopping
6= Personal Business
7= Medical/Dental
8= Social/Recreational
9= Other

Purpose To:

1= Work
2= Home
3= School
4= College
5= Shopping
6= Personal Business
7= Medical/Dental
8= Social/Recreational
9= Other

Sex:

1= Male
2= Female

Age:

1= Less than 18
2= 18-22
3= 23-35
4= 36-59
5= 60-64
6= 65 or over

Question 8 - Political Unit of Residence (card columns 33,34, and 35) - The coders were provided a political unit codelist, (see Figure A-14). Every municipality in the five-county area was represented and their appropriate numeric designations were recorded.

Questions 9/10/11 - Reasons for Riding/Number of Times Transferred/Number of Autos per Family (card columns 36,37, and 38) - Again coding of these question responses simply involved the transfer of the box selection checked to the appropriate card columns. The nature of these questions was to obtain an indication of transit user motives for selecting this mode of travel, whether by some attraction or by necessity.

Reasons for Riding:

1= No car available
2= No drivers license
3= More convenient
4= Save time
5= Less expensive

Number of Times Transferred:

1= One
2= Two
3= Three
4= Four or more
5= None

Number of Autos per Family:

1= One
2= Two
3= Three
4= Four or more
5= None

Question 12 - Final Destination (card columns 39,40, and 41) - Coding of the responses for this question was similar to the instructions outlined in Question 8 above with the addition of a separate numeric code for the Cleveland CBD. (See Figure A-13).

Figure A-14. NOACA city code correspondence tables.

Clev CBD	100
Akron	536
Amherst	001
Amherst Township (T)	002
Aquilla V	301
Atwater T	601
Auburn	302
Aurora	602
Avon	003
Avon Lake	004
Bainbridge T	303
Barberton	534
Bath T	514
Bay Village	102
Beachwood	103
Bedford	104
Bedford Heights	105
Bentleyville Village V	106
Berea	108
Boston Heights V	501
Boston T	502
Brady Lake V	623
Bratenahl V	107
Brecksville	109
Briarwood Beach V	401
Brighton T	005
Brimfield T	621
Broadview Heights	110
Brook Park	113
Brooklyn	111
Brooklyn Heights V	112
Brownhelm T	006
Brunswick	403
Brunswick Hills T	402
Burton T	304
Burton V	305
Camden T	007
Carlisle T	008
Chardon T	306
Chardon V	307
Charlestown	603
Chatham T	404
Chester T	308
Chippewa-on-the-Lake	405
Clairdon T	309
Cleveland	101
Cleveland Heights	116
Chagrin Falls T	114
Chagrin Falls V	115
Clinton V	531
Columbia T	009
Concord T	225
Copley T	520
Coventry T	526
Cuyahoga Falls	518
Cuyahoga Heights V	117
Deerfield T	604
East Cleveland	118
Eastlake	201
Eaton Estates	035
Eaton T	010
Edinburg T	605
Elyria	011
Elyria T	012
Euclid	119
Fairlawn	521
Fairport Harbor V	222
Fairview Park	120
Franklin T	538
Franklin T	620
Freedom T	606
Garfield Heights	121
Garrettsville V	607
Gates Mills V	122
Glenwillow V	123
Gloria Glens V	406
Grafton T	014
Grafton Village V	013
Grand River V	223
Granger T	407
Green T	532
Greensburg	539
Guilford T	408
Hambden T	310
Harrisville T	409
Henrietta T	015
Hinckley T	410
Highland Heights	124
Hiram T	608
Hiram V	609
Homer T	411
Hudson T	503
Hudson V	504
Huntington T	016
Hunting Valley V	125
Hunting Valley V (Part)	323
Huntsburg T	311
Independence	126
Kent	622
Kipton V	017
Kirtland	238
Kirtland T	213
Kirtland Hills V	214
Lafayette T	412
Lagrange T	019
Lagrange V	018
Lakeline V	202
Lakemore V	533
Lakewood	127
Leroy T	226
Linndale V	128
Litchfield T	414
Liverpool T	415
Lodi V	416
Lorain	020
Lyndhurst	129
Macedonia	505
Madison North	236
Madison T	234

Madison V	235
Mantua T	610
Mantua V	611
Maple Heights	130
Mayfield Heights	132
Mayfield V	131
Medina	417
Medina T	418
Mentor	211
Mentor-on-the-Lake	212
Mentor T	239
Middleburg Heights	133
Middlefield T	313
Middlefield V	314
Mogadore V	529
Mogadore V	630
Montville T	315
Montville T	419
Moreland Hills V	134
Munroe Falls V	519
Munson T	316
Nelson T	612
Newburg Heights V	135
Newbury T	317
North Olmsted	136
North Perry V	232
North Randall V	137
North Ridgeville	021
North Royalton	138
Northampton T	515
Northfield Center T	506
Northfield V	507
Norton	524
Oakwood V	139
Oberlin	022
Olmsted Falls V	141
Olmsted T	140
Orange V	142
Painesville	224
Painesville T	221
Painesville Southwest	237
Palmyra	613
Paris T	614
Parkman T	318
Parma	144
Parma Heights	145
Penfield T	023
Peninsula V	508
Pepper Pike	146
Perry T	231
Perry V	233
Pittsfield T	024
Randolph T	626
Ravenna	627
Ravenna T	628
Randallsville T	50
Richfield	537
Richfield T	510
Richmond Heights	147
Rittman V	428
Riveredge	148
Rochester T	026
Rochester V	025
Rocky River	149
Rootstown T	625
Russell T	319
Russia T	027
Sagamore Hills T	511
Seven Hills	150
Seville V	420
Shaker Heights	151
Shalersville T	615
Sharon T	421
Sheffield Lake	029
Sheffield T	030
Sheffield V	028
Silver Lake V	517
Solon	152
South Amherst V	031
South Euclid	153
South Russell V	300
Spencer T	422
Spencer V	423
Springfield T	527
Stow	516
Streetsboro T	629
Streetsboro V	616
Strongsville	154
Suffield T	624
Sugar Bush Knolls V	619
Tallmadge	523
Thompson T	321
Timberlake	203
Troy T	322
Twinsburg T	512
Twinsburg V	513
University Heights	155
Valley View V	156
Vermilion	032
Wadsworth	424
Wadsworth T	425
Waite Hill V	215
Walton Hills V	157
Warrensville Heights	159
Warrensville T	158
Wellington T	034
Wellington V	033
Westfield Center V	413
Westfield T	426
Westlake	160
Westview V	161
Wickliffe	204
Willoughby	205
Willoughby Hills V	206
Willowick	220
Windham T	617
Windham V	618
Woodmere V	162
York T	427
OUTSIDE 7 CO AREA	999

Question 13 - Future Transfer to Complete Trip (card columns 42,43, and 44)- The coding procedures for this question are similar to those for Question 4. Card column 42 was coded either with "0" meaning no transfer, or "1" meaning yes. If a respondent indicated that he/she did transfer, the number of the route transferred to was coded into card columns 43,44, and 45. (See Figure A-12)

1= No
2= Yes - If Yes, To What bus Route Or Rapid

Question 14 - Yearly Family Income (card column 46) - The number of the box checked was transferred to the appropriate card column. (See Figure A-12)

1= Less than $5,000
2= $5,000-10,000
3= $10,000-17,000
4= Over $17,000

Time Factor (card columns 47,48, and 49) - The time factor (calculated by the coders) consisted of dividing the total number of riders by the total number of cards returned per time period for a given route (see Figure A-11.)

Coders were instructed to check the origin and destination of a respondent if the coder noted that the rider transferred from or to another route. The latter verification of route intersection with stop-on was important, since all other information after the control statement would not be coded if a transfer took place (refer to instructions Card Column 28).

Finally, a decision was made to restrict coding to the survey form that had at least one side completely filled out (where no transfer was indicated). A total of 61,566 cards were coded over twelve-week periods by eleven full- and part-time temporarily employed persons at NOACA.

C. Keypunching of Coded Data

The keypunching portion of the coded data was accomplished (as was the coding) by NOACA staff. Coding instructions as well as the list of route codes were provided to each keypuncher. This process was designed to maximize usage of duplication for returned cards belonging to appropriate categories of route and time period. Special instructions were given concerning the response to card column 28 since if a "1" appeared all other question/coding were ignored. Returns from each route were submitted for keypunching separately. Certain information such as station color code and time factor were duplicated for defined subsections (within a route) based on information contained on the first card in a section, which were completed by supervisory staff based on the rider-count ticket.

D. Test Runs of Data Through Use of Tabulating Program

As the information per route was keypunched it was then transferred to disk and later tapes as part of the total file of records (see Figure A-15 and A-16 for data layout and flowchart). The Alan M. Voorhees General Purpose Summary Program (GPSP) was used to tabulate the results. GPSP was selected primarily for its capacity to produce cross-tabulations of three questions; e.g., stop-on by stop-off by time periods. Such desired information could be derived at the system route, block, and trip level.

Multiple combinations of questions were tested at all levels (system, route, and trip). It became apparent that an insufficient number of trips had a sufficient return rate to warrant further consideration. Therefore, it was decided that all tables would contain information at the system and route level.

E. Edit Procedures to Identify and Correct Errors

The editing process began as a result of discovering erroneous information. A procedure was established that would identify errors in certain critical fields. Correct ranges were provided for the following:

Card columns:		
	1	Colors 1-6
	2-6	Sequence Nos. 00001-99999
	7-9	Route No. - See approved list
	10-11	Block No.
	12-13	Trip No.
	14-16	Trip Factor
	20	Time 0-5
	28	Transfer Control 0-1
	47-49	Time Factor

The edit program would indicate all errors in any (or all) of the card columns per record. While using this first edit program it was noted that some records were being displayed in duplicate, but only appeared because the first record had an error. Subsequently, a duplicate check was added to the edit program which solved this problem. The net result of the edit procedure was a total data file containing 60,925 clean records (clean in terms of correct responses for critical items) of the 61,566 records coded.

F. Production of Final Tables

The final tables produced for the total system and individual routes are as follows:

1. Stop-On by Mode of Arrival
2. Purpose-To by Purpose-From by Time Period
3. Reason for Transit Use by Sex
4. Stop-On by Stop-Off (Summary)
5. Income by Residence
6. Destination by Purpose-To
7. Number of Transfers by Number of Family Autos
8. Age by Purpose-To by Time Periods

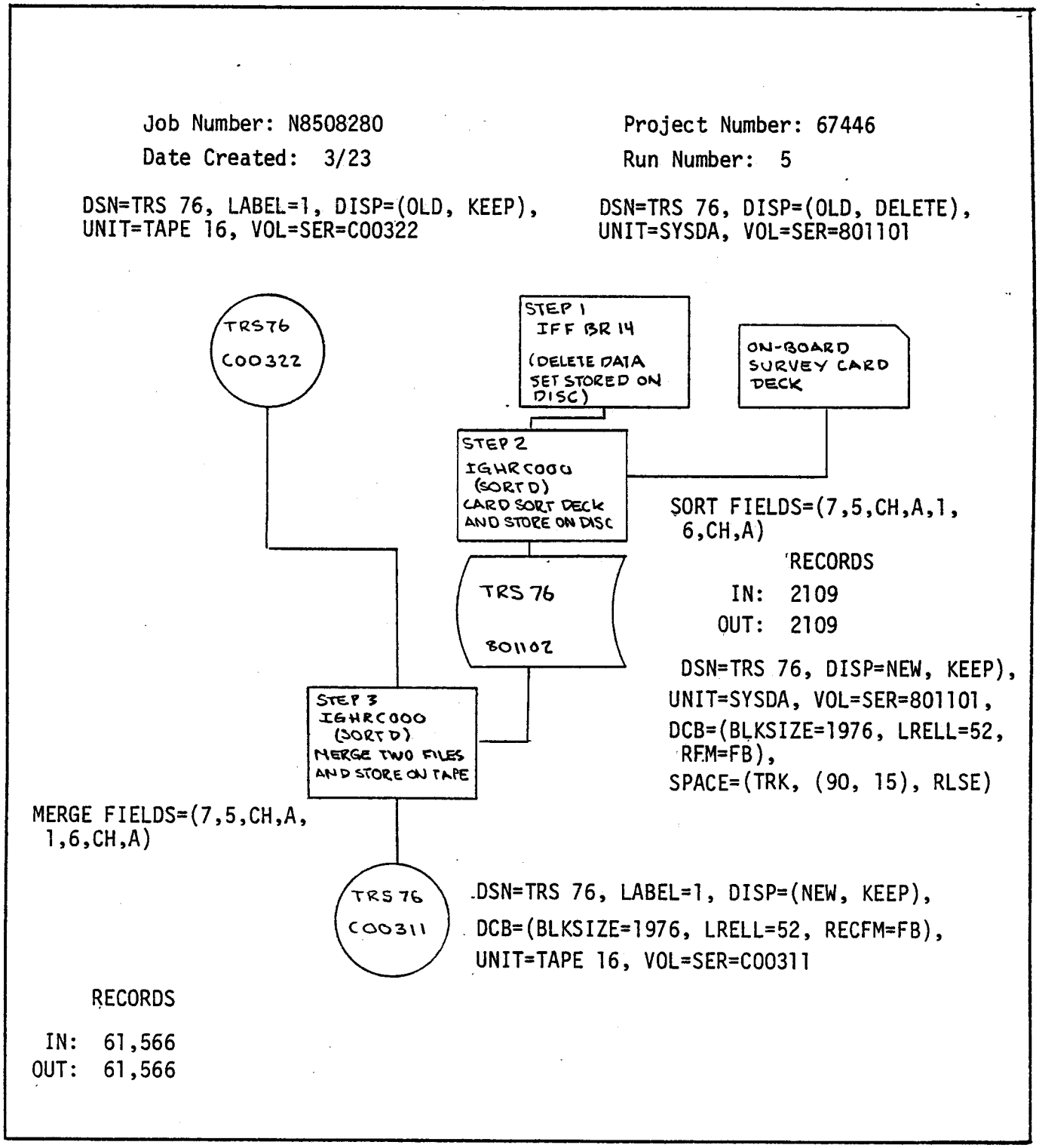
Other tables can be produced as required. It was felt that the above tables would provide an adequate amount of information concerning the general rider characteristics and travel patterns of transit users for the purpose of this report.

Figure A-15. Data Layout

File Format No. _____ Major File Name TRS 76 Page 1 of ____
File Title: DSN=TRS 76, LABEL=1, DISP=(NEW, KEEP) Date 6/7/77
UNIT=TAPE 16, VOL=SER=C00322
Characters/rec. DCB=(BLKSIZE=1976, LRELL=52, RECFM=FB)/60,925

	DESCRIPTION
01	Station Code by Color (1-6)
02	
03	
04	Sequence Number (00001-99999)
05	
06	
07	
08	Route Number (010 - 999)
09	
10	
11	Block Number (Last Two Digits)
12	
13	Trip Number
14	
15	Trip Factor (No. Riders/No. Cards = --.-)
16	
17	
18	Stop On (Zones 01 - 66)
19	
20	Boarding Time (0-5)
21	
22	Stop Off (Zones 01-66)
23	
24	Arrival Mode (0-6)
25	Arrival Mode - Transfer
26	Route Number (010 - 999)
27	
28	Transfer Control (IFCC 24= 0-5= All IFCC 24= 6 Stop)
29	Purpose From (0 - 9)
30	Purpose To (0 - 9)
31	Sex (0 - 2)
32	Age (0 - 6
33	
34	Residence (NOACA Political Unit Codes)
35	(001 - 999)
36	Reason for Use (0 - 5)
37	Number of Transfers (0 - 5)
38	Number of Autos (0 - 5)
39	
40	Destination (CBD=100, All others Polit Unit Code)
41	
42	Transfer to Complete Trip (0 - 2)
43	If Transfer to Complete Trip,
44	Route Number (010 - 999)
45	
46	Income (0 - 4)
47	
48	Time Factor (Riders/cards for route by
49	Time Period = --.-)

Figure A-16. Data Flow Chart



APPENDIX B

STOP ON AND STOP OFF

CODING RATIONALE

INTRODUCTION

Coding of information concerning a transit rider's location of boarding and alighting is a complicated process in on-board surveys. In 1974, the methodology consisted of the assignment of numbers to every bus stop along a route/line as well as coding the nearest street address to the relevant vehicle stop. The results obtained by using these two procedures, in terms of the amount of time it took to code versus the quality of information obtained, were not cost effective. In fact, the use of street addresses was so difficult that the information was not coded for all the routes surveyed in 1974. In light of these obvious shortcomings a new approach was implemented for the 1976 on-board survey. Its purpose intended to derive useful information and at the same time simplify the work task so that inexperienced coders could complete the task within a reasonable time frame.

METHODOLOGY

Based on parameter limitations of the tabulating program, each bus route and rail division was allocated a certain number of zones which were used to denote key subareas of boarding and alighting activity. Each bus route could have a maximum of nineteen zones. In all cases for radial routes, the first zone contained the Central Business District (CBD) (as defined by the boundaries of the CBD cordon area; E.30 to the east, I-71/Carnegie to the south, the Cuyahoga river to the west, and Lake Erie to the north).

Radiating from the CBD zones, numbers were assigned according to where arterials used by crosstown routes and/or significant load point intersections existed, relative to the total length of a given route. The size of the zones for local as opposed to express routes using the same street may be quite different since the latter may extend to the far reaches of Cuyahoga County. The numbering of zones varied among routes. Also, if a route had numerous "branches" (e.g., Routes 55,55A,55C,55N, and 55S-Clifton Express) the zone structure was defined to enable each branch to be identified separately.

Crosstown routes' zone designations began from a north to south (or west to

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Crosstown routes' zone designations began from a north to south (or west to

east) direction starting with zone two and continuing up to zone nineteen. Zone one was not used because of its association to the CBD. Intersecting routes and significant load intersections were used to establish zone boundaries.

For all bus routes the zone definition included a third digit (zones 1 through 9 are prefaced with a "0" e.g., 01,02,03 etc.) to denote whether the boarding or deboarding point was within a given zone or at the interface of two zones.

The following examples denotes the methodology used for coding loading points.

- 02 - Zone two
- 021 - Third digit is "0" boarding/deboarding at interface of Zones 2 and 3
- 020 - Third digit is "1" boarding/deboarding within Zone 2

Both rail divisions (66 heavy rail and 67 light rail)were numbered by station/stop. The heavy rail was numbered from 20 through 37 beginning with the airport and ending at Windermere station. Zone numbers for the light rail started with 38 at the Cleveland Union Terminal through 55 for the Green Road branch (67A), and from 56 at Drexmore through 66 for the Van Aken branch (67). The coding was accomplished by reviewing the respondents

response for questions 1 and 3 on the survey card in conjunction with street maps and route maps to identify the appropriate zone for "stop-on" and "stop-off" respectively. In all cases where a bus line intersected a rail station (and direct transfer was available) the rail station's zone number was used as the "stop-off".

A comprehensive set of figures follows which denotes zone enumeration of all RTA routes, presented by station and type of route.

In summary, the zonal designations for stop-on and stop-off are artifically-assigned numbers used to breakdown a route into a series of activity subareas. Efforts were made to highlight intersecting routes and major load points intersecting arterials. The zonal data should be reviewed only on a route basis since such groupings vary according to each route (and sometimes within a route where "branches" exist). Although this method of coding stop-on and stop-off information has limitations, it makes available a wide range of data which can be provided by NOACA upon request.

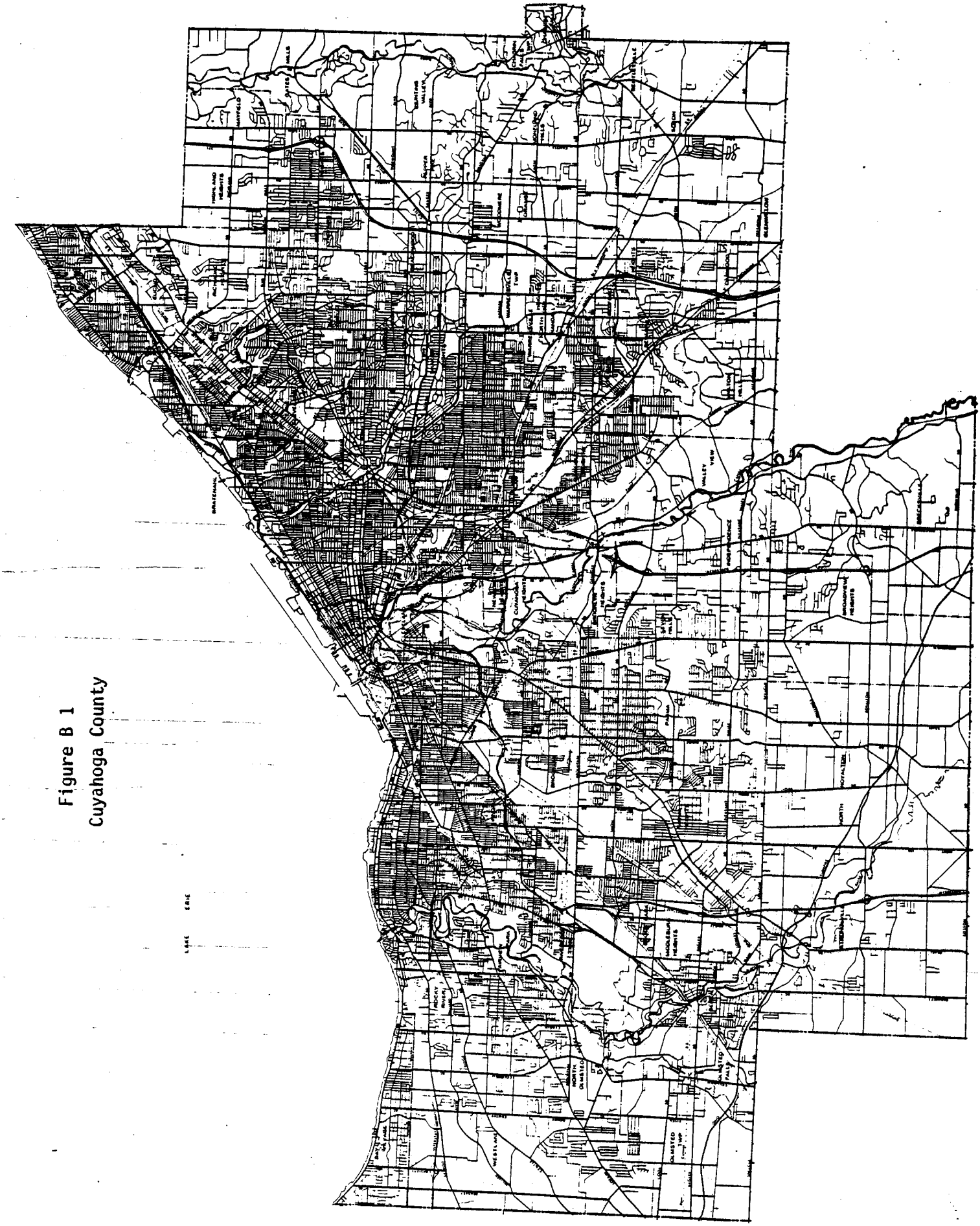
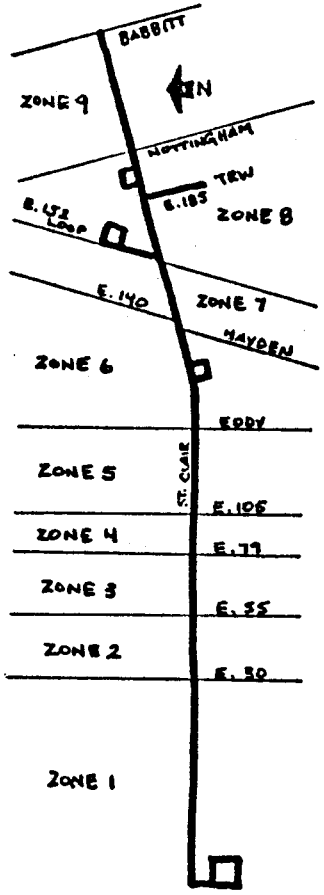


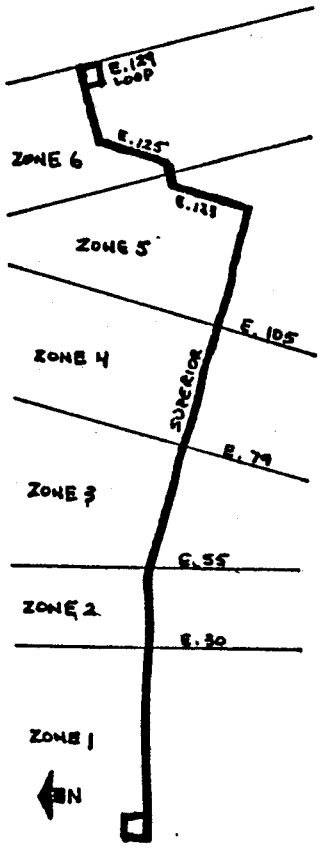
Figure B 1
Cuyahoga County

HAYDEN RADIAL

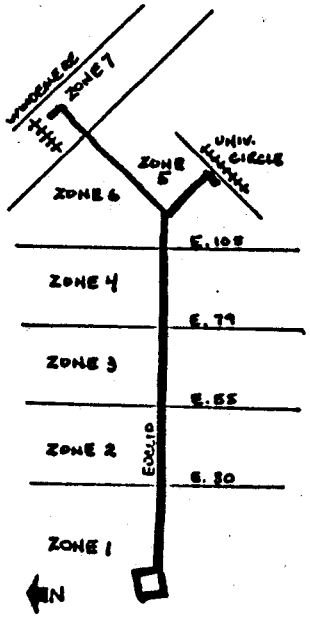
1 St. Clair



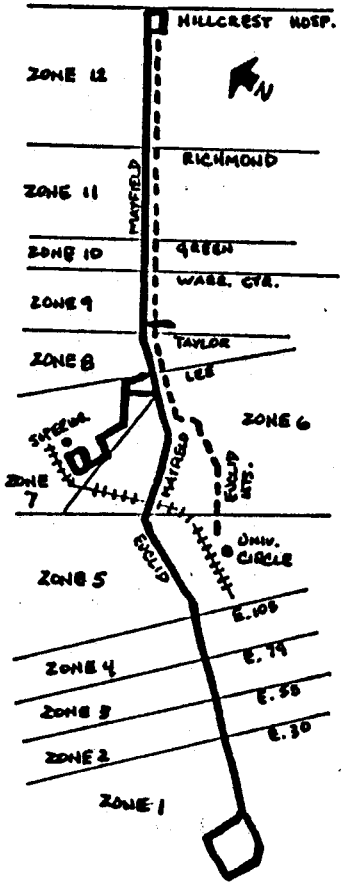
3 Superior



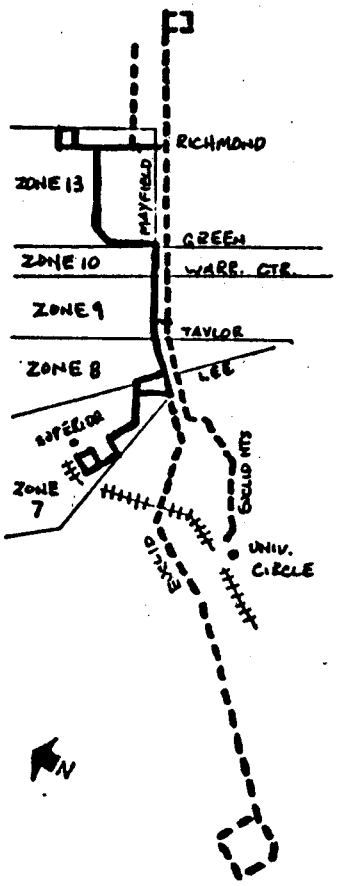
6·6A·Euclid



9 Mayfield Exp.

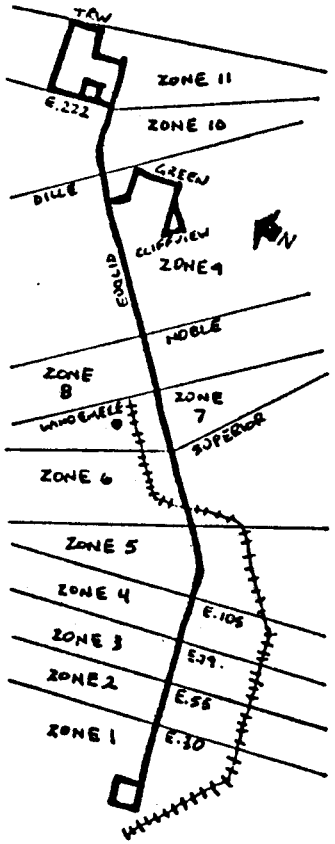


9B Mayfield Exp.

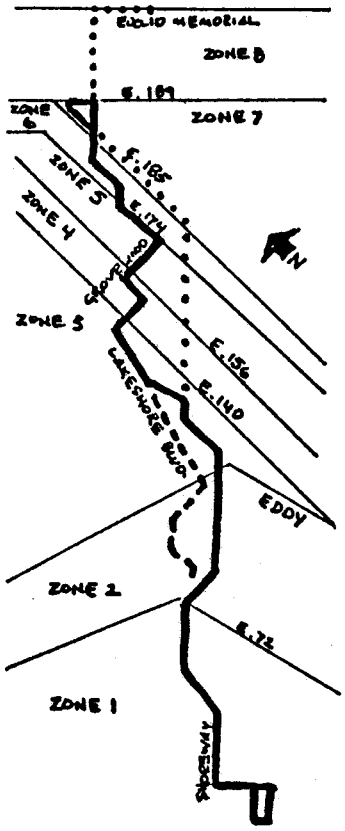


HAYDEN RADIAL

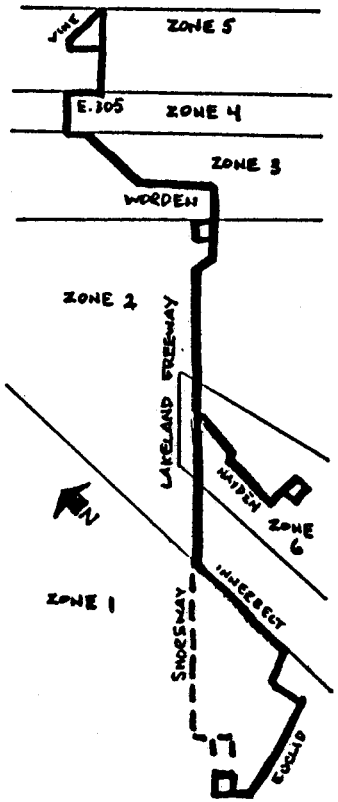
28 Euclid Express



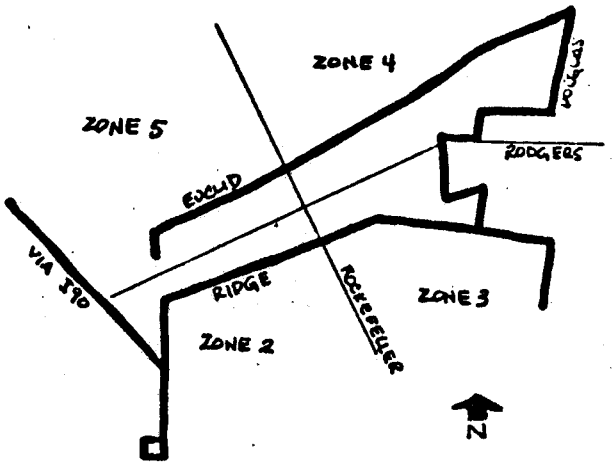
39·39B·39F Lakeshore Exp.



43 Willowick Freeway Flyer

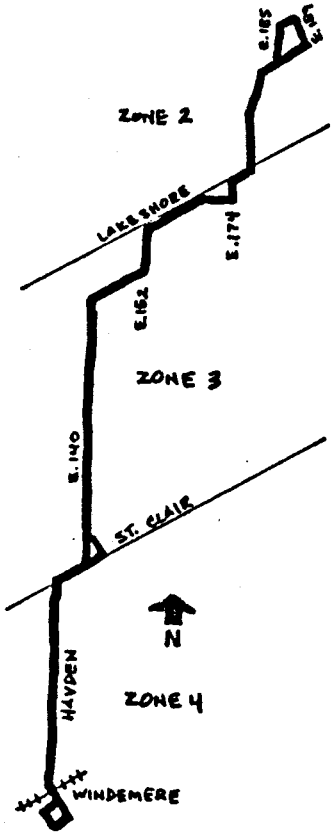


Route 49 WICKLIFFE FLYER

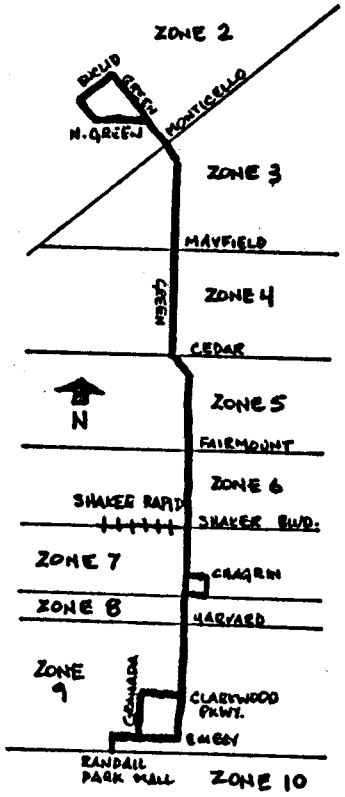


HAYDEN CROSSTOWN

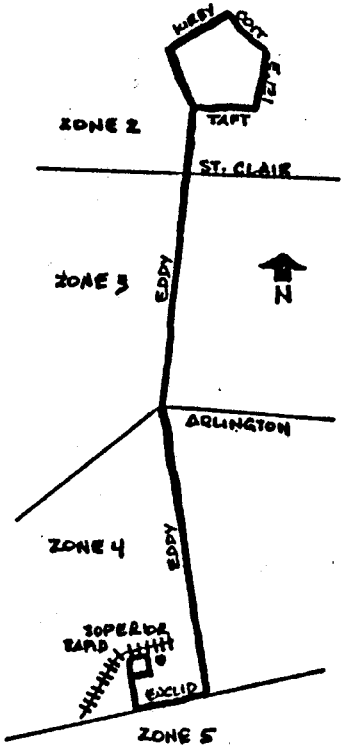
30 Hayden



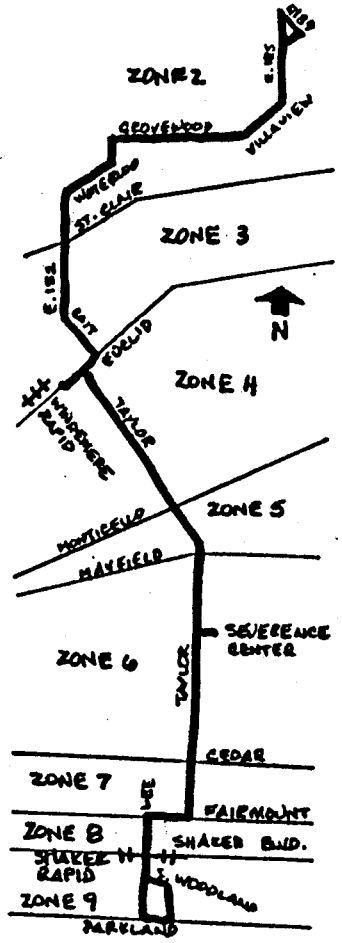
34 Green



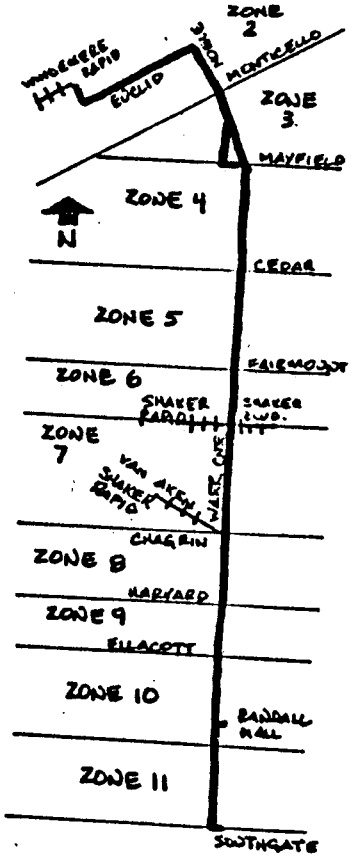
36 Eddy



37 Taylor

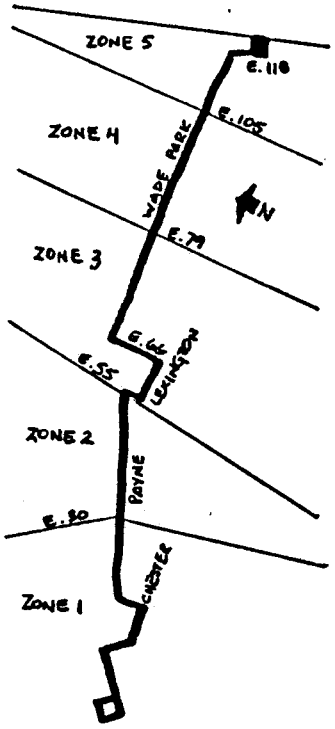


41 Warrensville

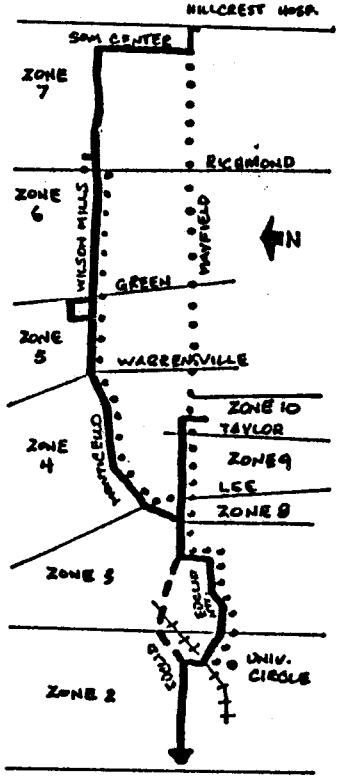


WOODHILL RADIAL

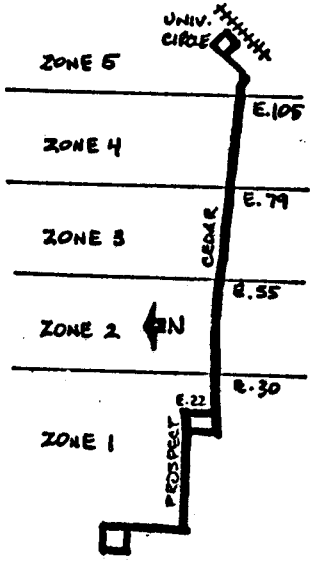
4 Wade Park



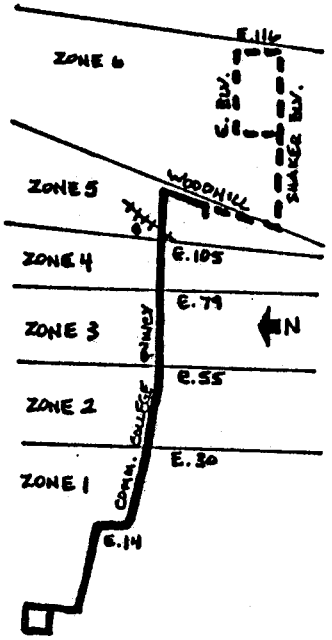
7-7A Monticello Exp.



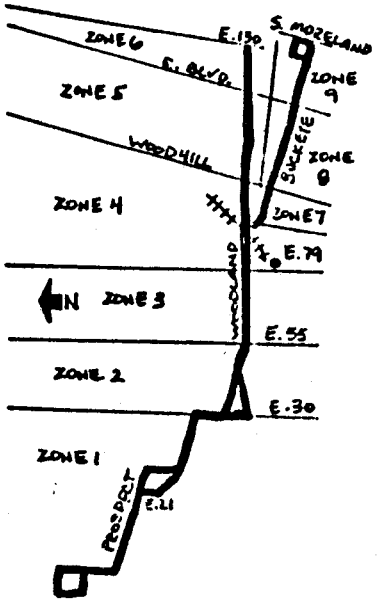
8 Cedar



11 Scovill

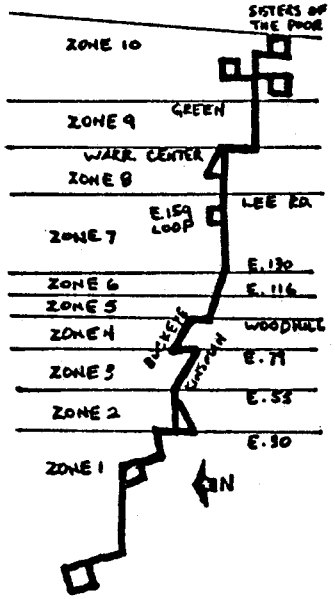


12 Woodland 13 Buckeye

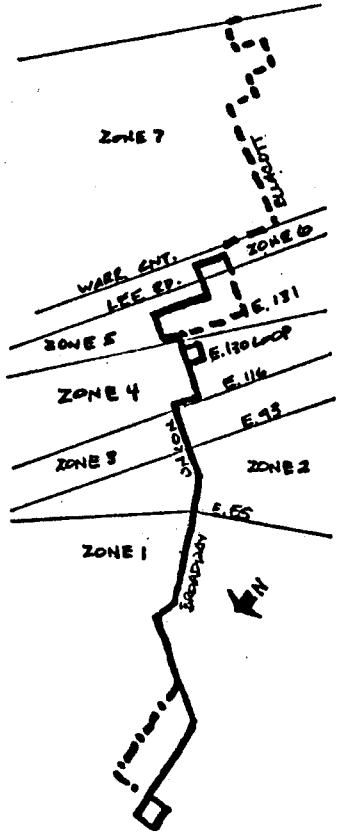


WOODHILL RADIAL

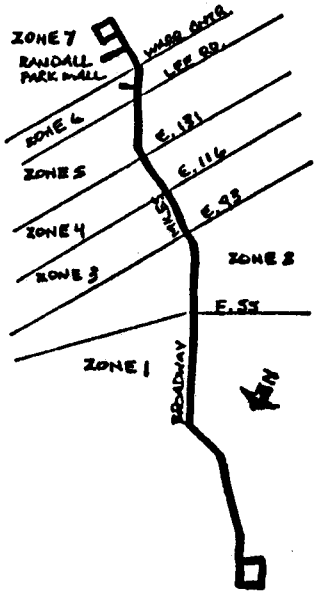
14 Kinsman



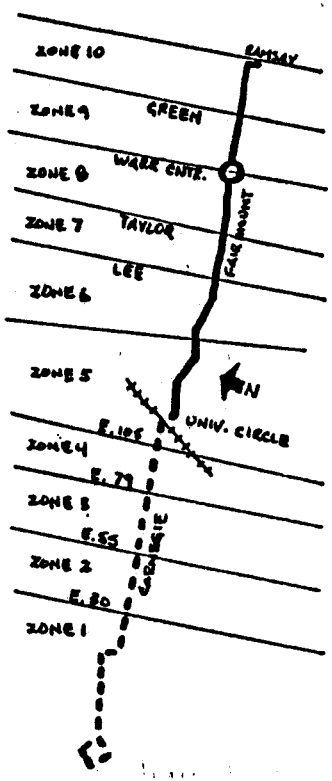
15·15F Union



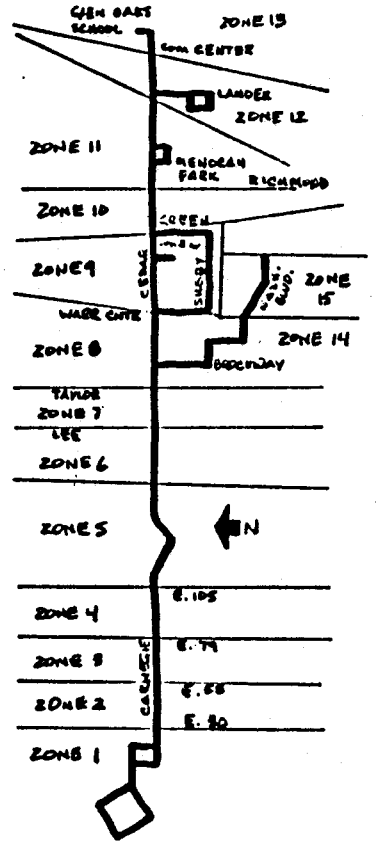
19-19F Broadway Miles



32 Fairmount

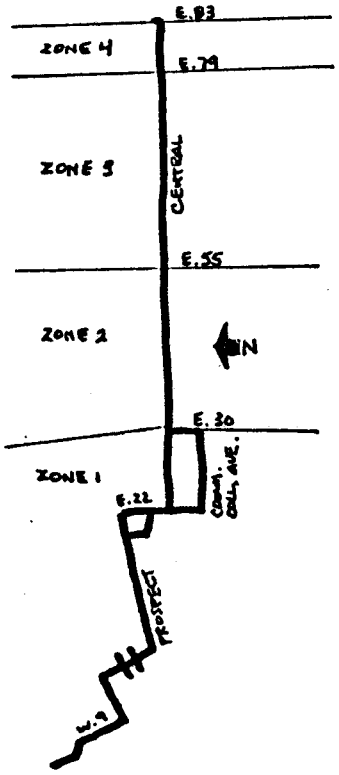


32C·32S·32W Heights Exp.

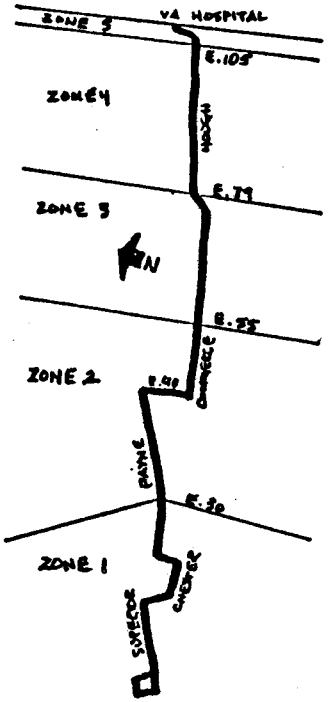


WOODHILL RADIAL

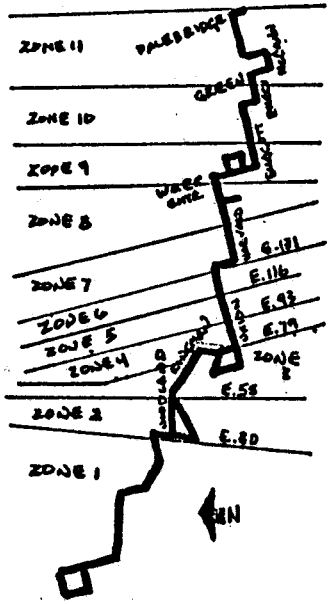
33 Central



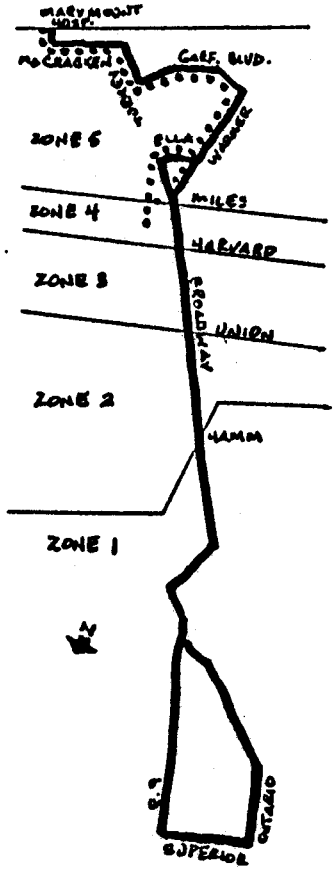
38 Hough



56 Harvard Express

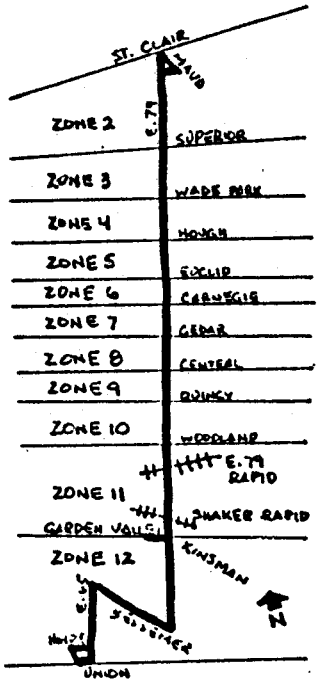


29 Garfield Express

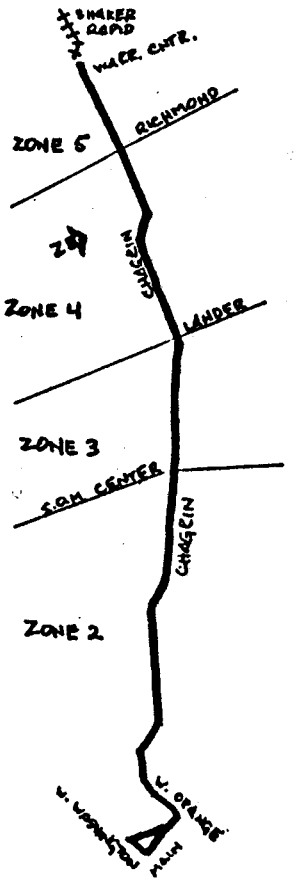


WOODHILL CROSSTOWN

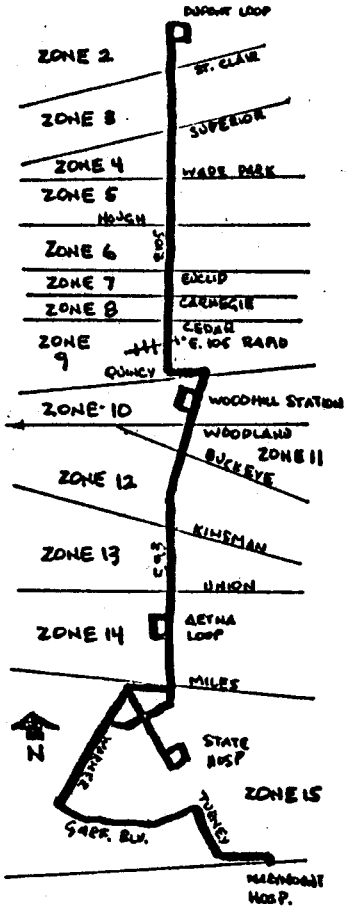
2 East 79



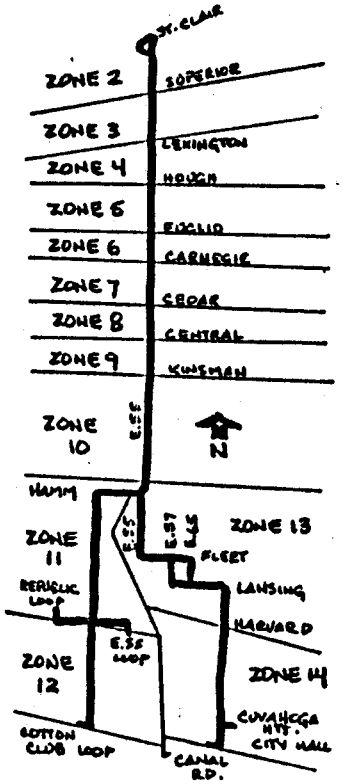
5 Chagrin Falls



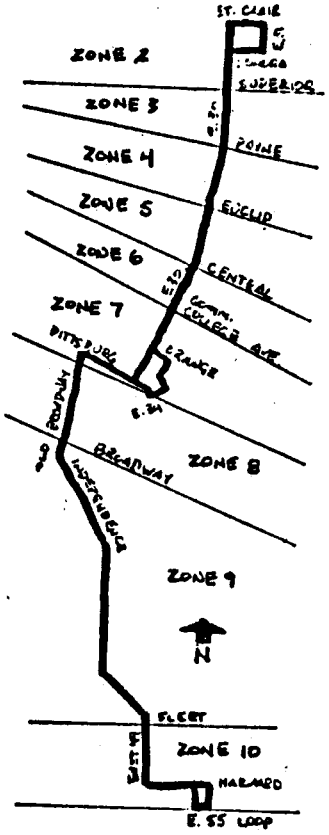
10-East 105



16-16A East 55

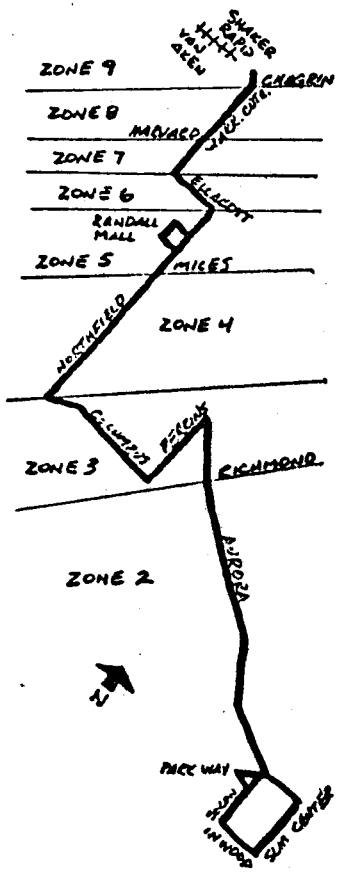


17 East 30

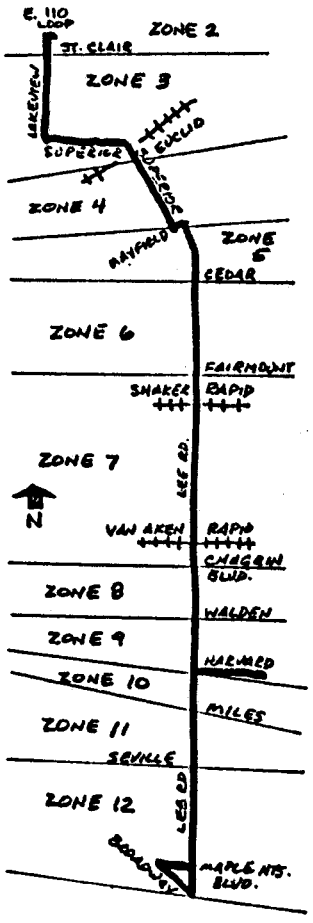


WOODHILL CROSSTOWN

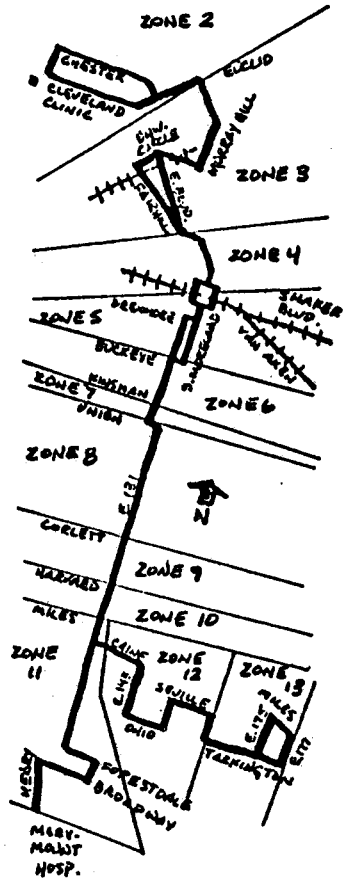
24 Solon



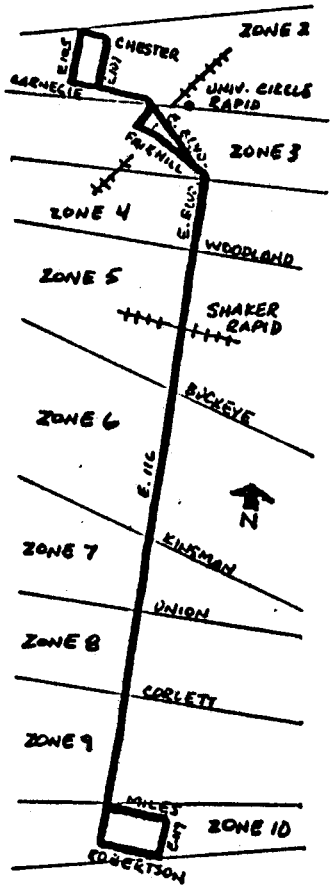
40 Lee Rd.



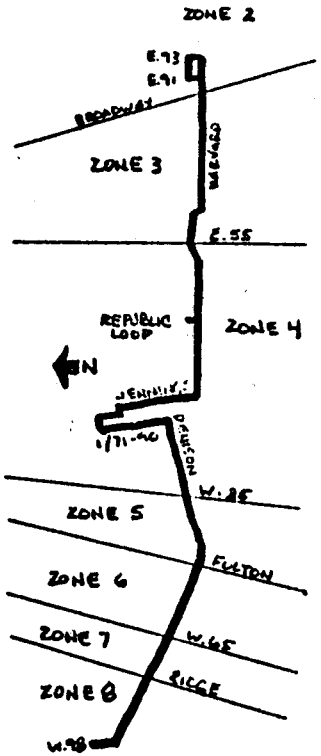
48-48A Shaker -East 131



50 East 116

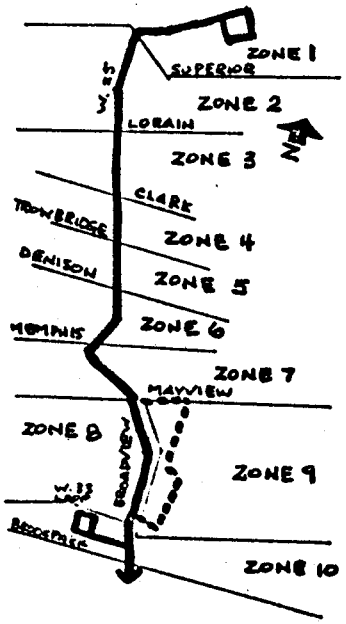


18 Harvard-Denison

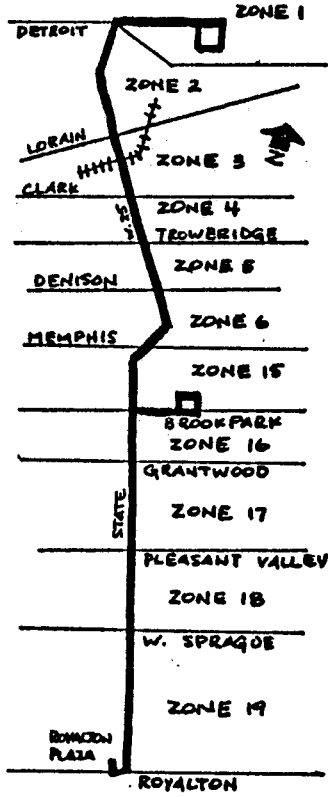


BROOKLYN RADIAL

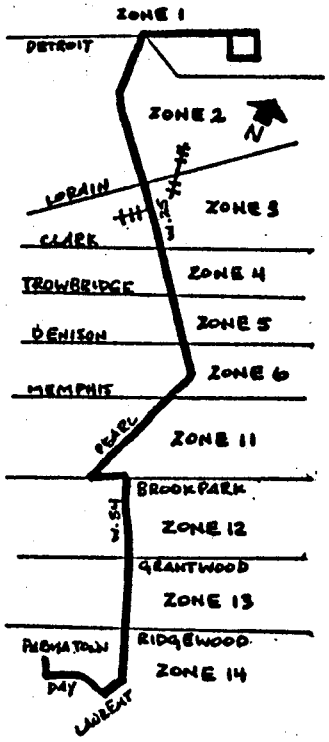
20-West 25



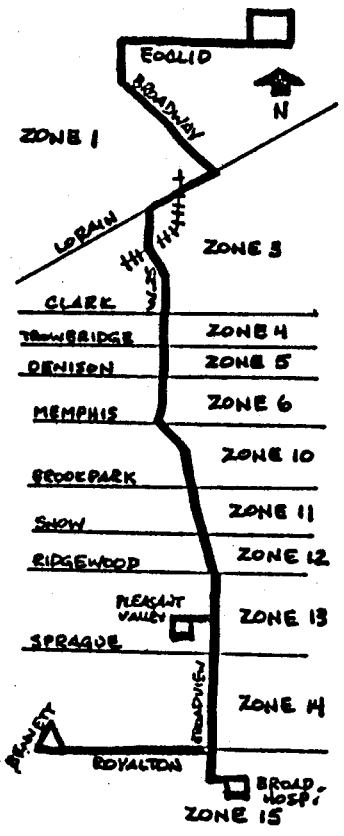
20A-21 West 25 State Express



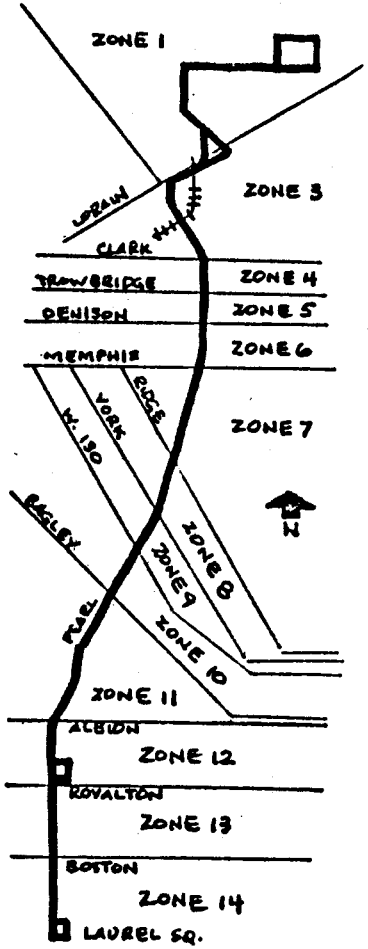
20B West 25 (Via Pearl)



35 Broadview Express

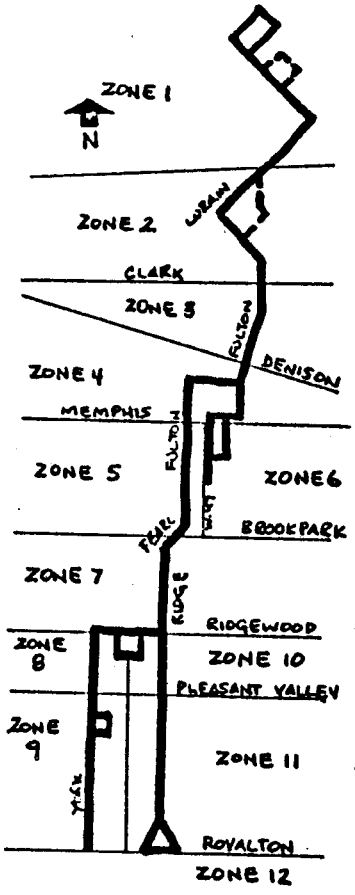


51 Pearl Express

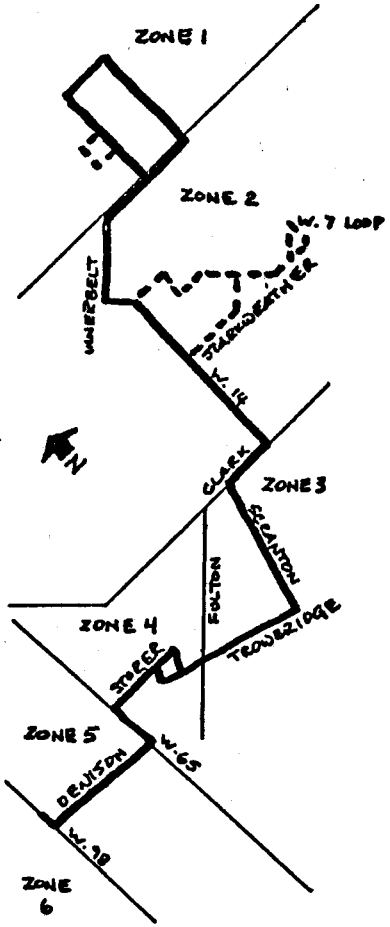


BROOKLYN RADIAL

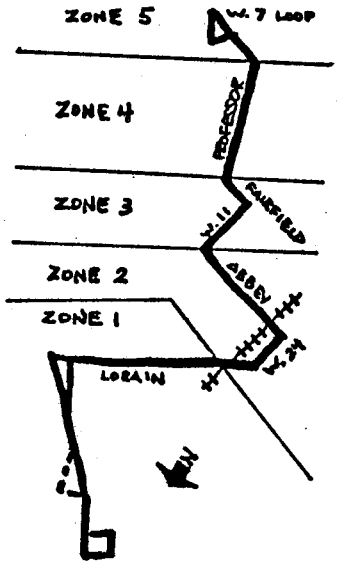
79·79F Fulton



81 Scranton

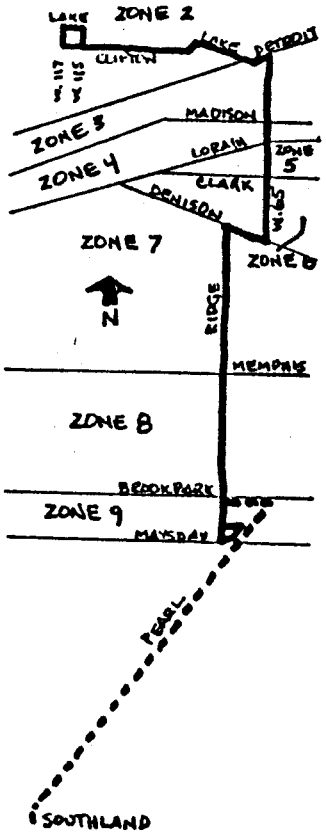


84 Fairfield

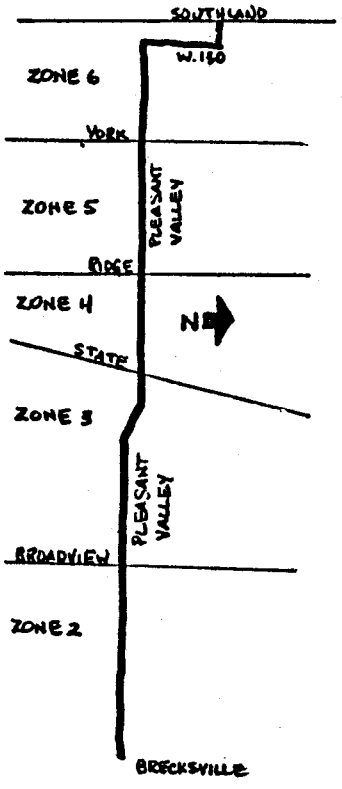


BROOKLYN CROSSTOWN

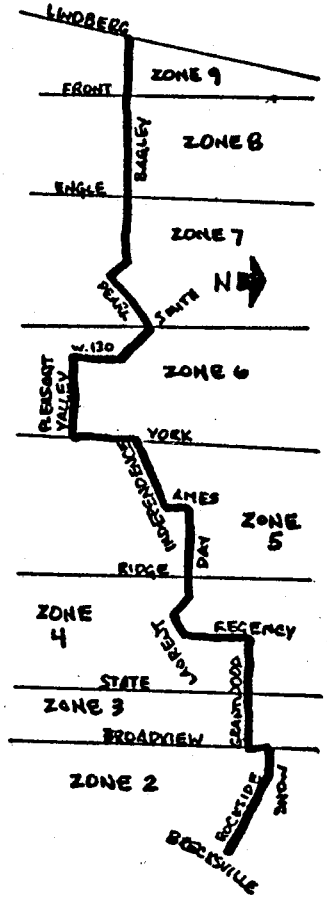
45 West 65-Ridge



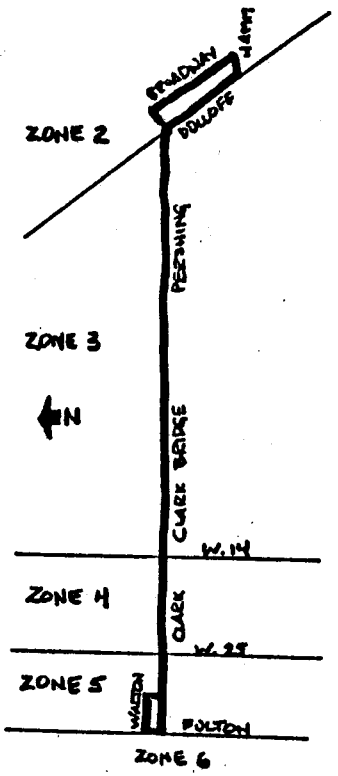
54 Pleasant Valley



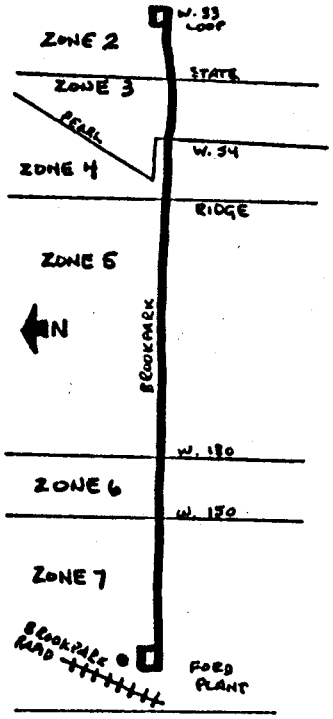
68 Grantwood



72 Clark Bridge

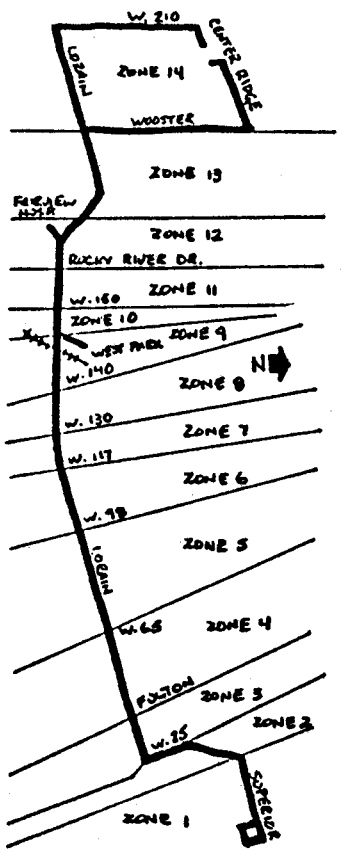


98 Brookpark

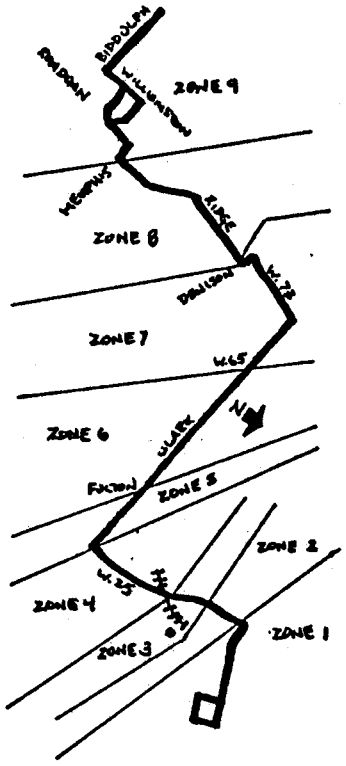


TRISKETT RADIAL

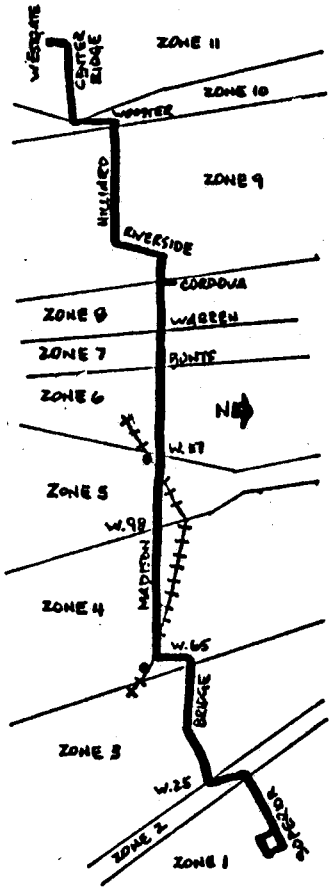
22 Lorain



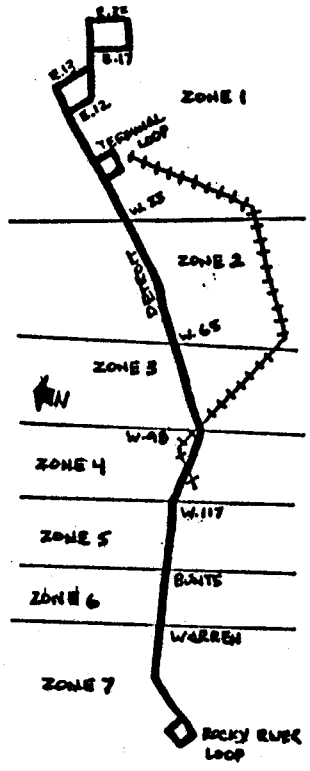
23 Clark



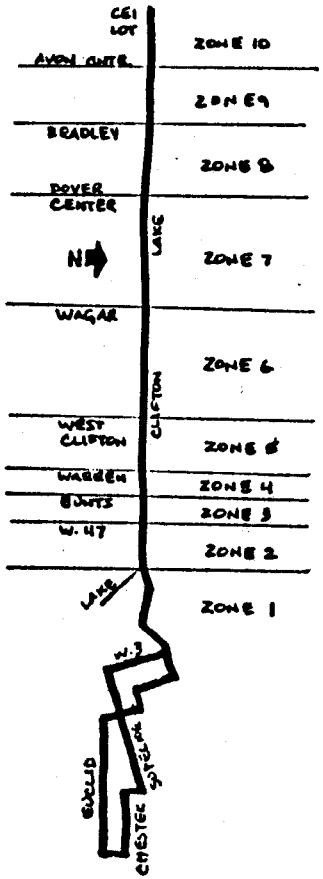
25 Madison



26 Detroit

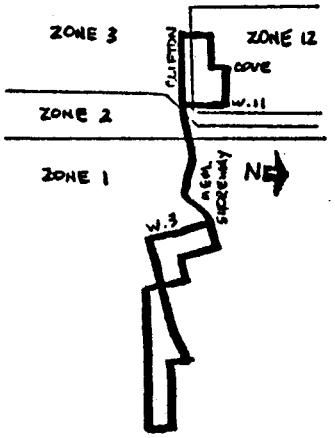


31 Avon Lake

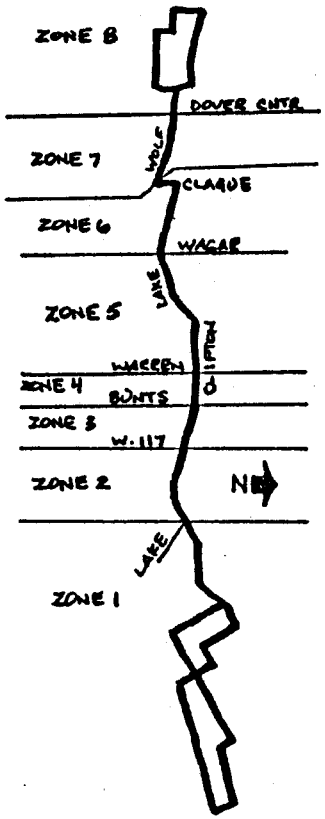


TRISKETT RADIAL

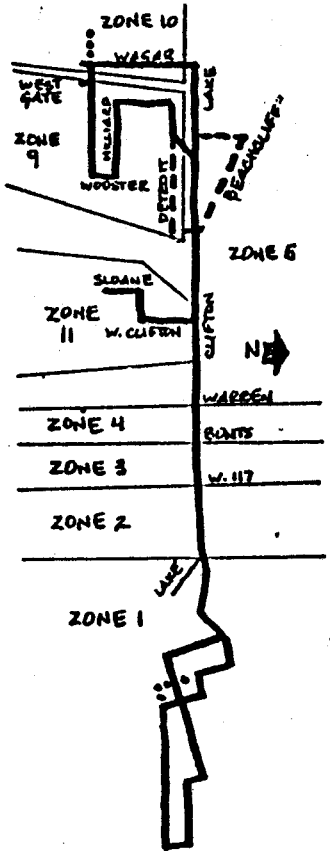
55A Clifton Express



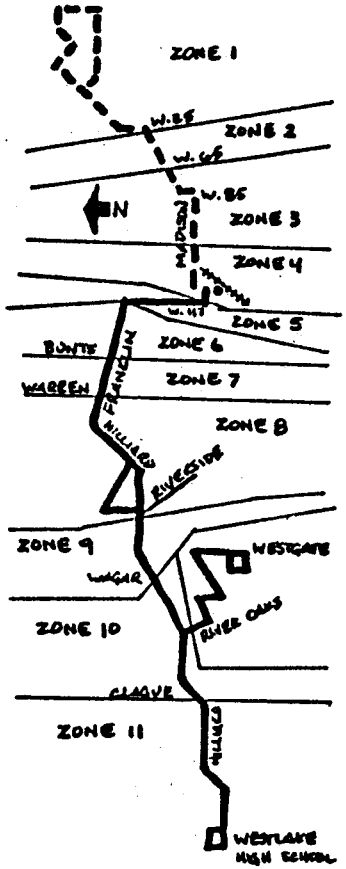
55C Clifton Exp.



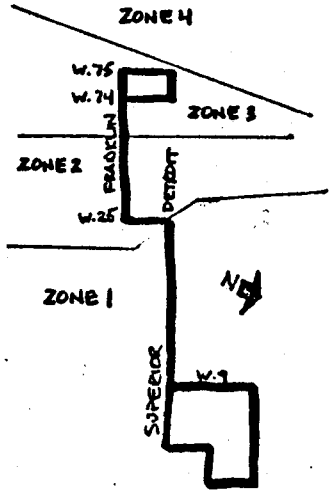
55N-S Clifton Express



65 Hilliard-Franklin

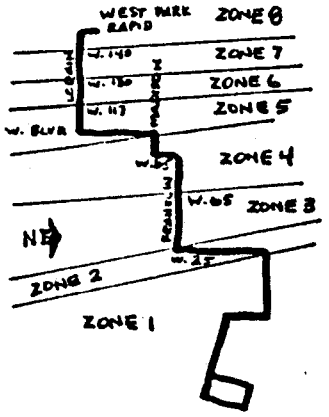


69 Franklin

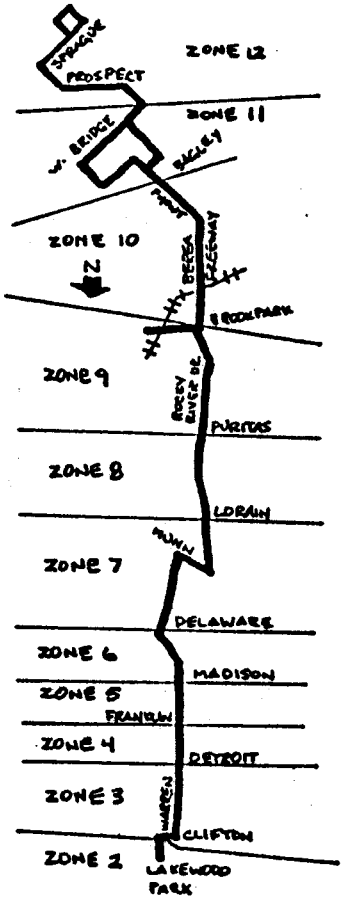


TRISKETT RADIAL

85 Lorain Express

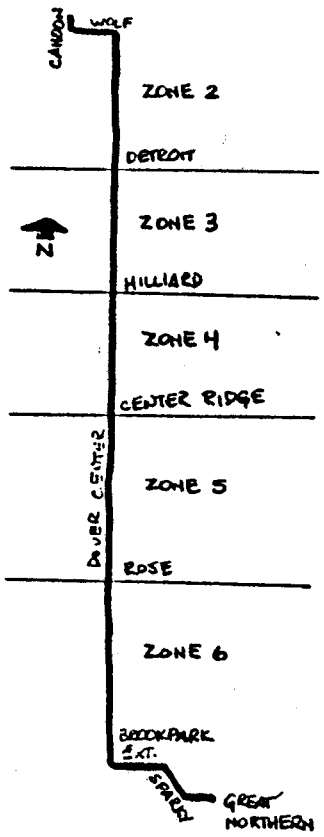


86 Berea-Warren

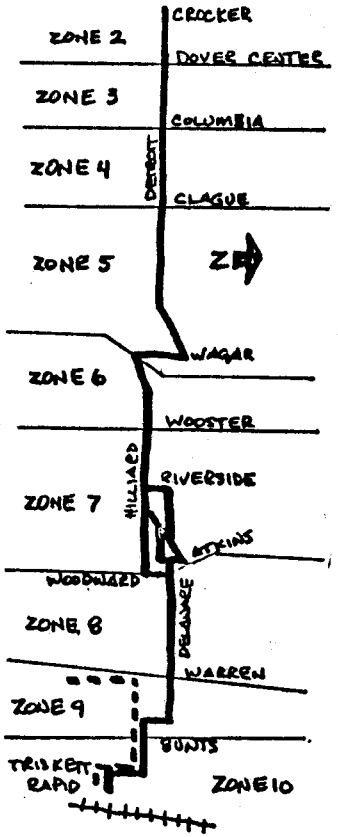


TRISKETT CROSSTOWN

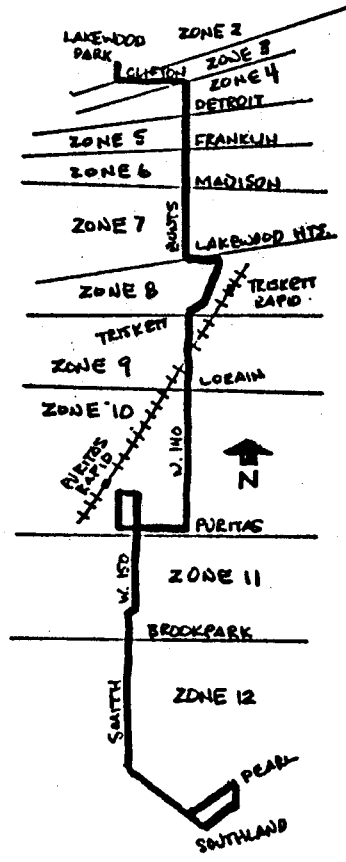
42 Dover



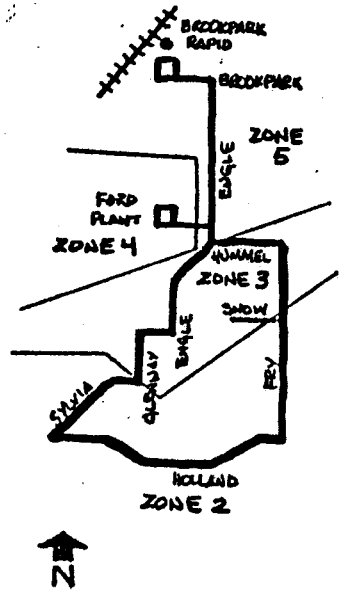
46 Westlake-S. Lakewood



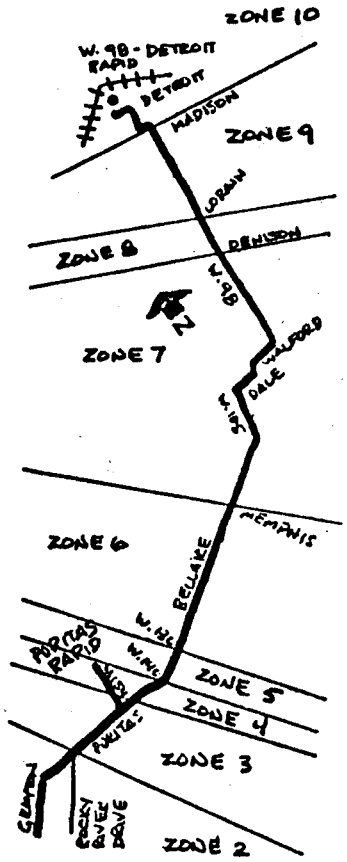
70 West 150-Bunts



71 Holland-Ford



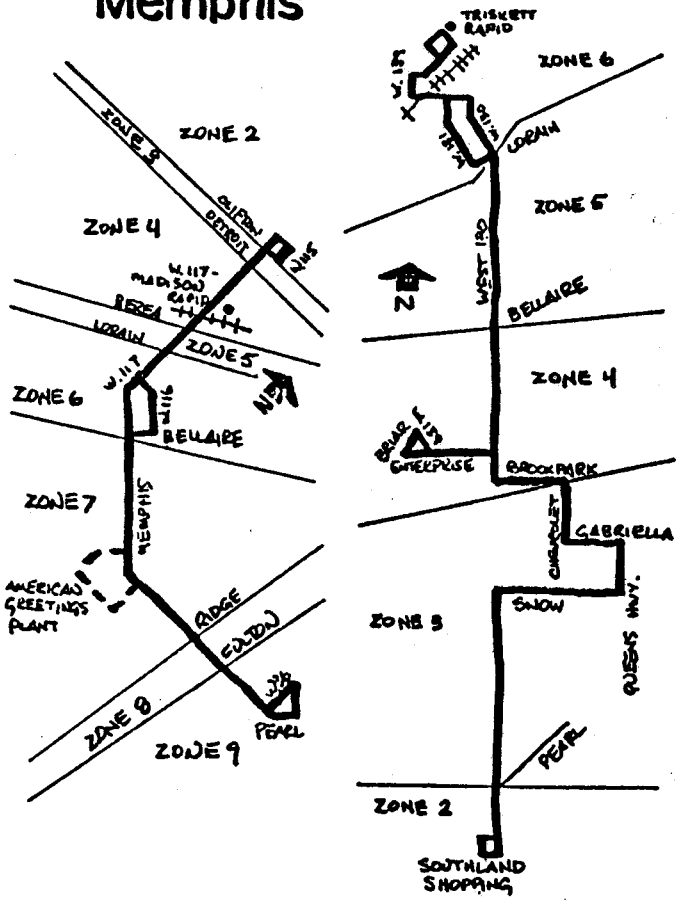
78 West 98 Puritas



TRISKETT CROSSTOWN

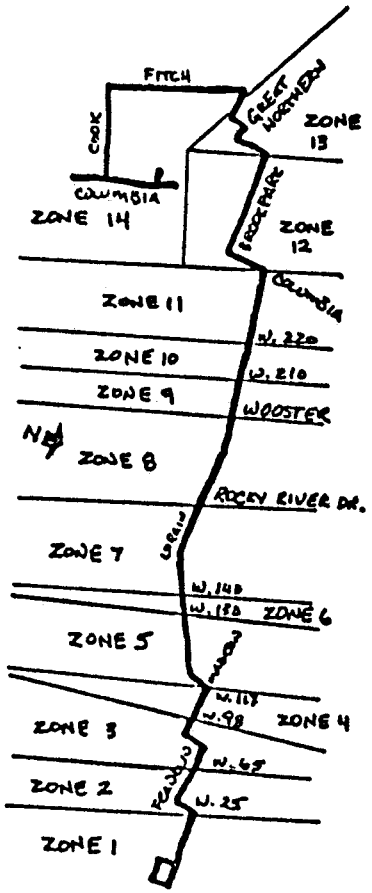
82 West 117· Memphis

83 West 130

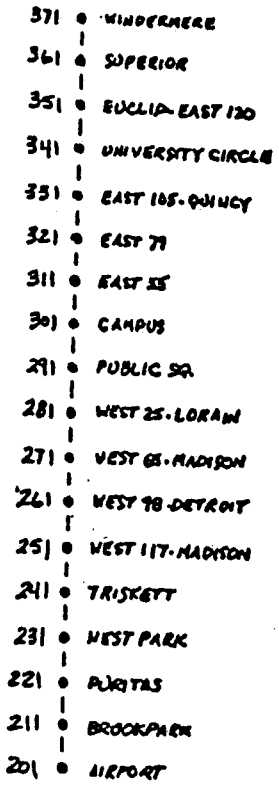


SUBURBAN RADIAL / RAPID TRANSIT

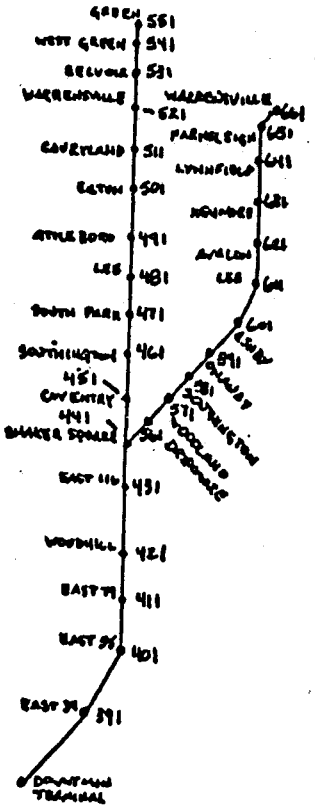
64 Olmsted Falls Express



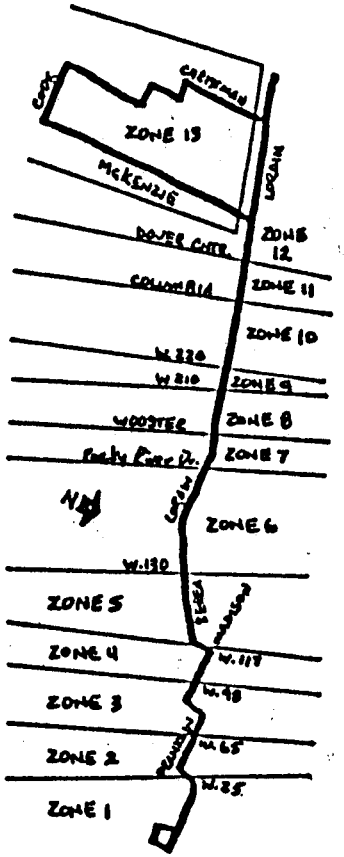
Route 66 RTA RAPID TRANSIT



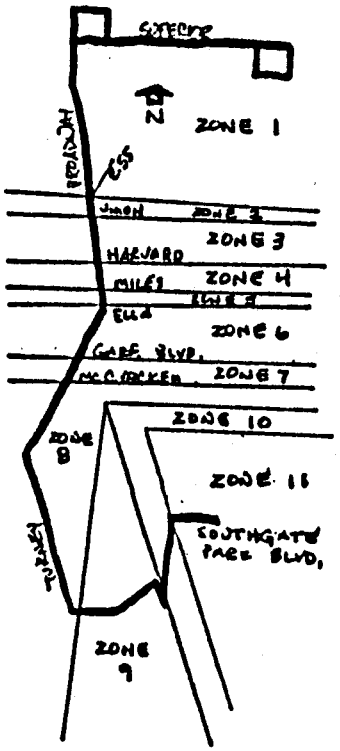
67 Van Aken 67A Shaker Rapid Transit



75 North Olmsted Express

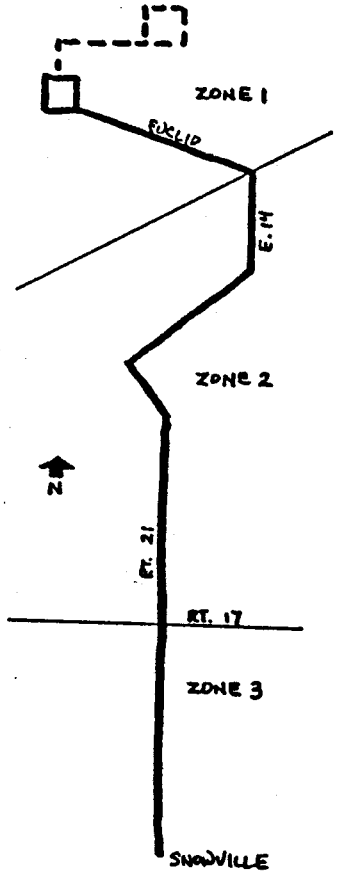


76 Turney Express

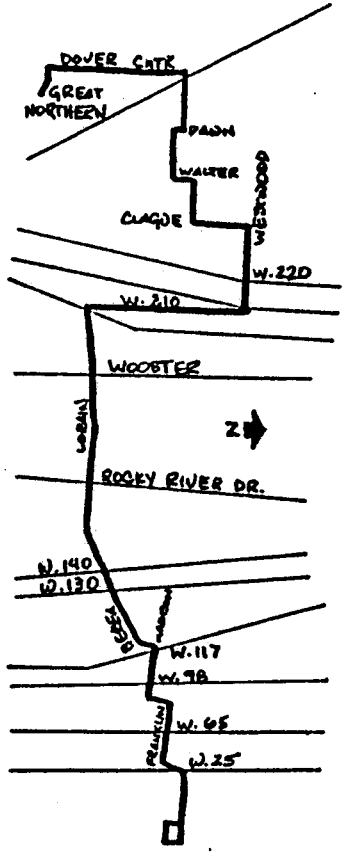


SUBURBAN RADIAL

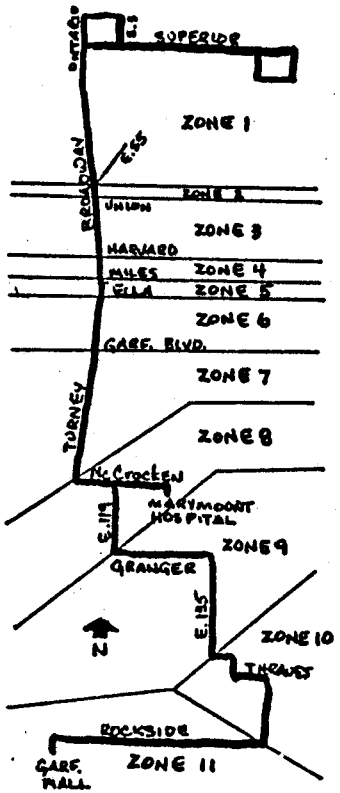
77 Brecksville



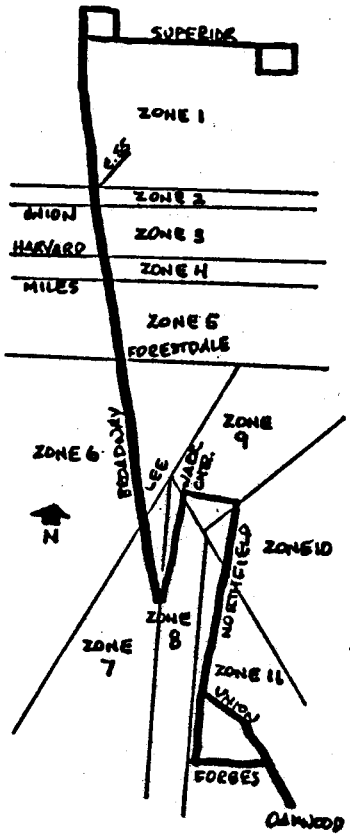
87 Westwood Express



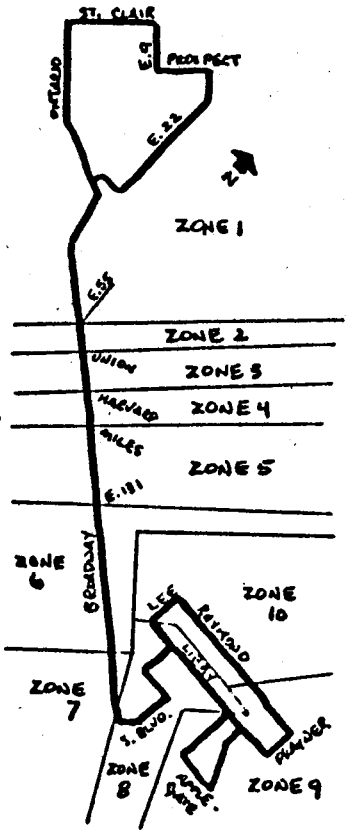
88 East 135 Express



97 Oakwood Express

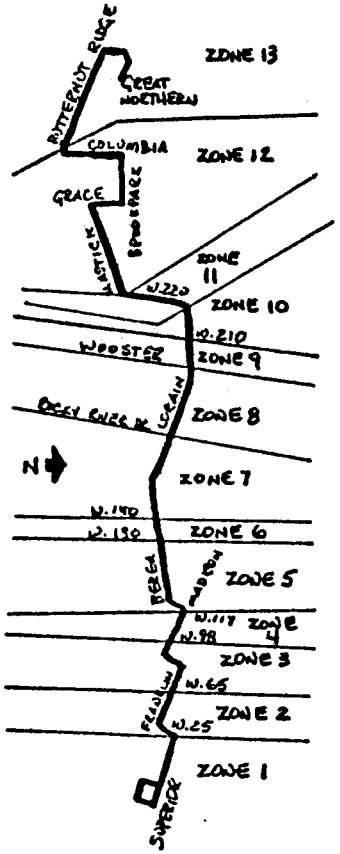


Maple Hts. Express



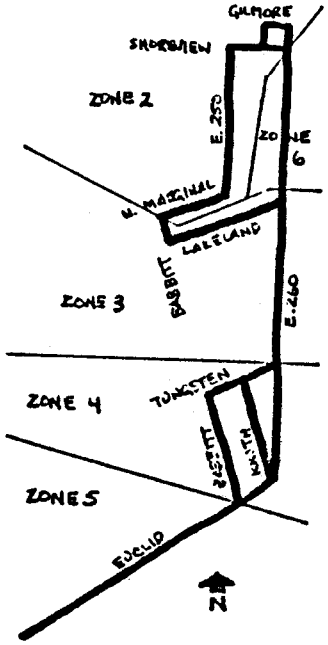
SUBURBAN RADIAL

96 Butternut Express

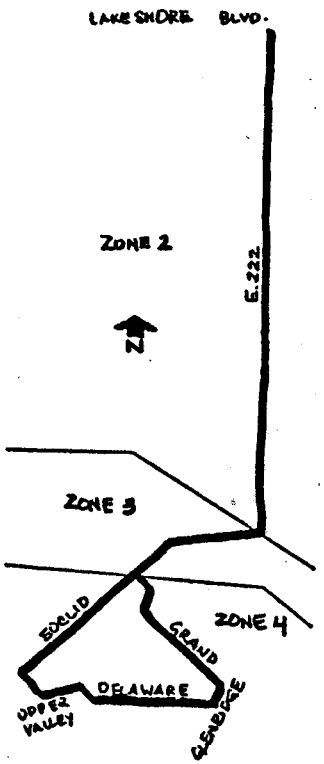


SUBURBAN CROSSTOWN

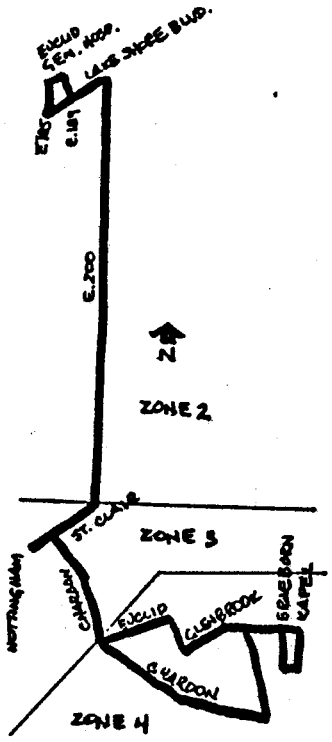
East 260



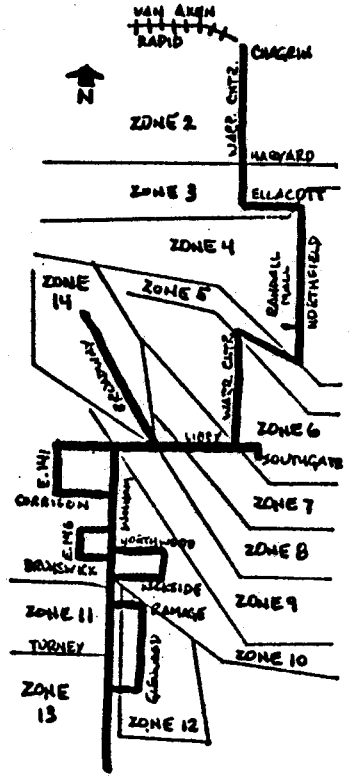
East 222



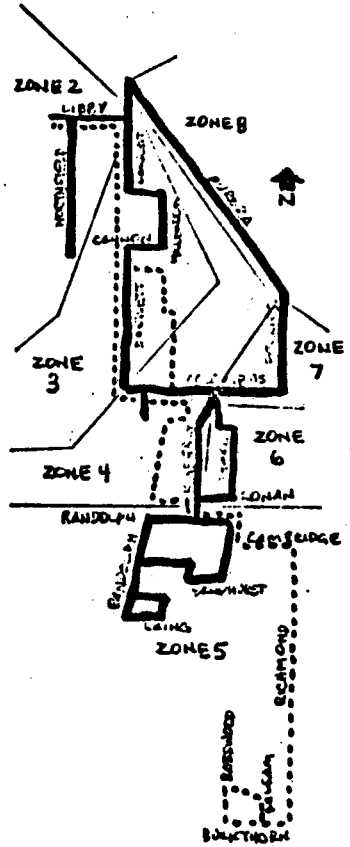
East 200



Dunham

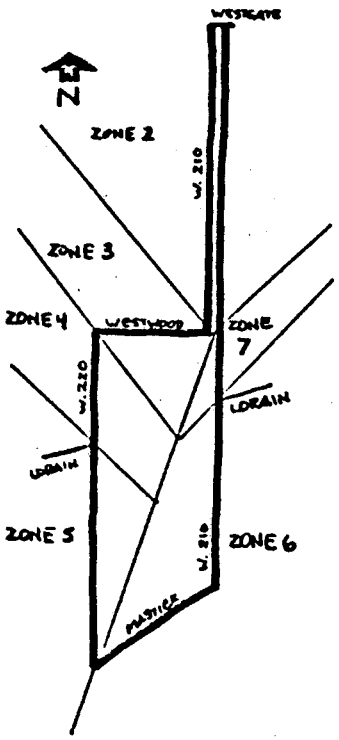


Bedford Hts. Metro Estates

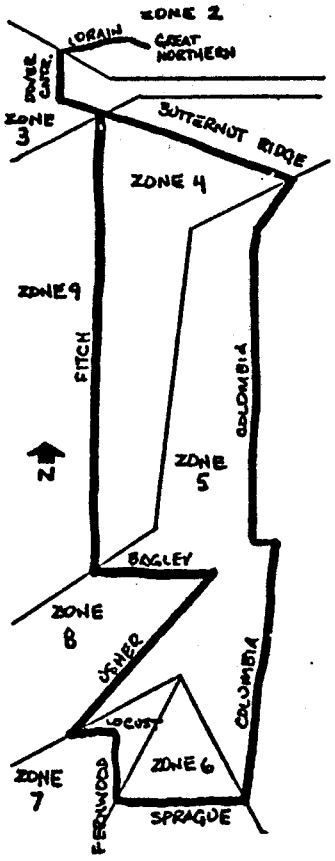


SUBURBAN CROSSTOWN

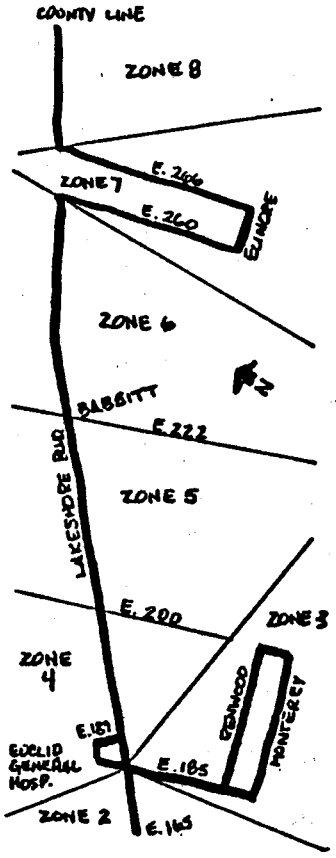
53 Westgate Local



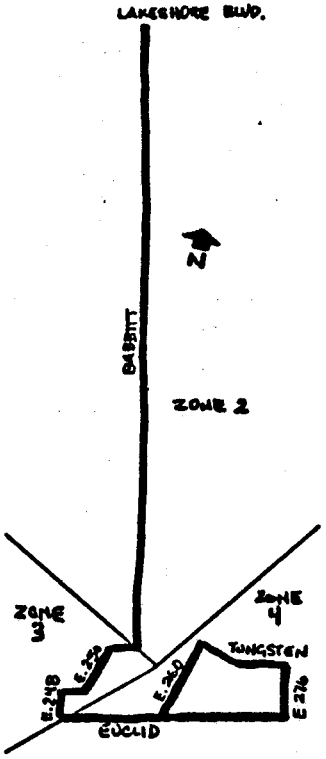
89 Olmsted Falls Shopper



Lake Shore Blvd.



Babbitt



Briardale