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PORT NO. UMTA-MA-06-0026-79-3

PRT IMPACT STUDY
OPERATIONAL PHASE
Volume II: Data Collection Procedure and Coding Manual

Samy E.G. Elias
Richard E. Ward et al.

WEST VIRGINIA UNIVERSITY
Morgantown WV 26506



JULY 1979
FINAL REPORT

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VIRGINIA 22161

*Transportation
& Systems Center*

Prepared for
U.S. DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION
Office of Technology Development and Deployment
Washington DC 20590

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Technical Report Documentation Pa

1. Report No. UMTA-MA-06-0026-79-3		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle PRT IMPACT STUDY - OPERATIONAL PHASE Volume II: Data Collection Procedure and Coding Manual				5. Report Date July 1979	
				6. Performing Organization Code	
7. Author(s) Samy E.G. Elias, Richard E. Ward, Arup K. Mallik, Edward S. Neumann, James M. Rovelstad, John A. Pearie				8. Performing Organization Report No. DOT-TSC-UMTA-79-3	
9. Performing Organization Name and Address West Virginia University* Morgantown WV 26506				10. Work Unit No. (TRAIS) UM941/R9720	
				11. Contract or Grant No. DOT-TSC-1316	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Urban Mass Transportation Administration Office of Technology Development and Deployment Washington DC 20590				13. Type of Report and Period Covered Report of June 1978	
				14. Sponsoring Agency Code NOV 1 1979	
15. Supplementary Notes *Under Contract To: U.S. Department of Transportation Research and Special Programs Administration Transportation Systems Center Cambridge MA 02142				LIBRARY	
16. Abstract This is a study of the impact of the Phase I Morgantown PRT, the first fully automated, origin to destination, nonstop, demand activated, transportation system operational in a city environment. The study was designed to record the effect of the system operation on traffic and associated activities in the areas adjacent to the PRT. To achieve this objective a similar study was also conducted in 1975-76, prior to passenger service. The system served a large segment of the community reaching some 38% of the Morgantown residents. During the course of the study, it was concluded that the system was a major force in influencing travel habits within its service areas. It was further concluded that while auto traffic along the two main arterial thoroughfares experienced a large increase over the two year study period, residents of the service area used autos for their trips less often than they did prior to the PRT. Moreover, compared to the bus system, which it replaced, the PRT was carrying more than the bus's previous share of the total trips. The increase in transit travel is assumed to be, at least, partly due to favorable attitudes toward the PRT. The advantages to using the PRT within its service area included reduced travel time compared to the automobile and the bus. This study is reported in three reports: Volume I - Operational Phase Travel Analysis; Volume II - Operational Phase Data Collection Procedure and Coding Manual; and The Phase I PRT Impact on Morgantown Travel Traffic and Associated Activities. This report, Volume II, documents the procedures used in collecting data which describes transportation related conditions following the commencement of passenger service.					
17. Key Words PRT, Travel Surveys, Questionnaire, Transportation Cost			18. Distribution Statement DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161		
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages 124	22. Price

PREFACE

In October, 1975, Phase I of the Morgantown Personal Rapid Transit (PRT) System, a revolutionary new mode of public transportation, built as a research development and demonstration project by the Urban Mass Transportation Administration, commenced passenger service in Morgantown, West Virginia. Because the PRT is the first system of its kind ever operated in a city, it provides a unique opportunity to study the interaction between a new mode and its service area.

Although the present system installation in Morgantown represents only the first phase of a much larger system, it was believed that some measurable impacts could still be derived from its first few years of operation, prior to the initiation of the larger Phase II installation. Phase I consists of a three (3) station system connected by 2.2 miles of guideway and served by 45 vehicles. These vehicles operate at maximum speeds of 30 mph and minimum headway of 15 seconds. Phase II will expand this system to 5 stations, 3.4 miles of guideway, and 73 vehicles.

The PRT Impact Study was designed to record the effects of PRT system operation on traffic and associated activity in the area adjacent to the PRT Phase I. The intent of the study was to provide information which should be useful to other areas contemplating public transit, particularly those planning for Automated Guideway Transit (AGT) type installations. The Operational Phase was called Post-PRT Phase in earlier work and has been renamed due to development of Phase II PRT System and altering of the earlier Pre-Post design of the Impact Study. The Phase I study consists of two data collection stages; the Pre-PRT Stage, prior to passenger service on the Phase I installation, and the Operational Stage, following the commencement of revenue service on the Phase I installation.

The Pre-PRT Stage was completed in 1975 and is reported in three volumes:

- Volume I - Pre-PRT Phase Travel Analysis,
- Volume II - Pre-PRT Phase Data Collection Procedure and Coding Manual,
- Volume III - Pre-PRT Phase Frequency Tabulations from Four Transportation-Related Surveys.

This work was sponsored by the Transportation Systems Center (TSC), United States Department of Transportation, Cambridge, MA, under Contract Number DOT-TSC-985.

The Operational Stage, which was also sponsored by TSC, under Contract Number DOT-TSC-1316, was completed in 1977 and is reported in two volumes directly comparable to the Volumes I and II of Pre-PRT stage status reports. An additional summary report was also published, following the operational stage, which assesses the impact that the PRT had on travel in certain areas of Morgantown between 1975 and 1977. The three reports are:

- Volume I - Operational Phase Travel Analysis,
- Volume II - Operational Phase Data Collection Procedure and Coding Manual,
- The Phase I PRT Impact on Morgantown Travel Traffic and Associated Activities.

This report was made possible through the tremendous individual efforts of four Graduate Assistants at West Virginia University who assisted the principal investigators in practically every phase of the Impact Study. The principal Graduate Assistants, in alphabetical order, were:

Patricia Goeke
Ahmed Syed
Phaisal Vejpongsa
Kam-Luan Young.

Additional credit must also be given to three other student assistants who participated in certain aspects of the project:

James R. Penman
Amy L. Rovelstad
Jane A. Hiteshew.

Mrs. Janet Alderman was responsible for the typing and much of the administrative work.

Several agencies and other individuals cooperated in making the PRT Impact Study possible. They include Dr. Mary Stearns and Mr. K.H. Shaeffer of TSC, The City of Morgantown, and the Institutional Research Office of West Virginia University.

Special acknowledgment is also made of the significant contribution made by Mr. Govind K. Deshpande who left the project after the data collection phase of the study was completed.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures			Approximate Conversions from Metric Measures		
When You Know	Multiply by	To Find	When You Know	Multiply by	To Find
LENGTH					
inches	2.5	centimeters	millimeters	0.04	inches
feet	30	centimeters	centimeters	0.4	inches
yards	0.9	meters	meters	3.3	feet
miles	1.6	kilometers	kilometers	0.6	miles
AREA					
square inches	6.5	square centimeters	square centimeters	0.16	square inches
square feet	0.09	square meters	square meters	1.2	square yards
square yards	0.8	square meters	square kilometers	0.4	square miles
square miles	2.6	square kilometers	hectares (10,000 m ²)	2.5	acres
acres	0.4	hectares			
MASS (weight)					
ounces	28	grams	grams	0.035	ounces
pounds	0.45	kilograms	kilograms	2.2	pounds
Short tons (2000 lb)	0.9	tonnes	tonnes (1000 kg)	1.1	short tons
VOLUME					
teaspoons	5	milliliters	milliliters	0.03	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	quarts	1.06	gallons
cups	0.24	liters	liters	0.26	gallons
pints	0.47	liters	cubic meters	35	cubic feet
quarts	0.96	liters	cubic meters	1.3	cubic yards
gallons	3.8	liters			
cubic feet	0.03	cubic meters			
cubic yards	0.76	cubic meters			
TEMPERATURE (exact)					
Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature

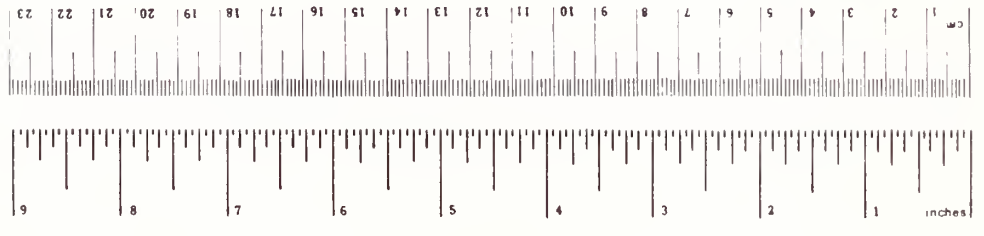


TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. INTRODUCTION	1
1.1 <u>Organization of the Report</u>	1
1.2 <u>Study Area</u>	1
2. TRAVEL SURVEYS	5
2.1 <u>Background to the On-Board and Telephone Interview Surveys.</u>	5
2.1.1 Drawing the Sample	6
2.1.2 Development of Questionnaires.	9
2.1.3 Questionnaire Pretests	9
2.1.4 Administering the Questionnaires	11
2.1.5 Data Collection	12
3. MODAL UTILIZATION.	15
3.1 <u>Automobile Utilization</u>	15
3.1.1 Traffic Counts	15
3.1.2 Roadside Auto Intercept Survey	15
3.1.3 Auto Speeds	21
3.2 <u>PRT Utilization.</u>	23
3.2.1 Actual Demand.	23
3.2.2 Maximum Potential Student Utilization.	24
3.3 <u>Bus Utilization.</u>	30
3.3.1 University Bus System.	30
3.3.2 Morgantown City Bus.	30
4. TRANSPORTATION COSTS	33
4.1 <u>Automobile Costs</u>	33
4.1.1 Cost and Availability of Gasoline	33
4.1.2 Automobile Operation and Maintenance Costs.	34
4.1.3 Parking Costs for Automobiles.	34
4.1.4 Automobile Accidents	39
4.2 <u>PRT System Operating Costs</u>	43
4.3 <u>University Bus System Costs.</u>	43
4.4 <u>City/County Bus System Costs</u>	43
5. ESTIMATION OF DISAGGREGATE ZONAL POPULATIONS.	51
5.1 <u>WVU Student Populations.</u>	51
5.2 <u>Faculty/Staff Population</u>	54
5.3 <u>Townspeople Population</u>	54
5.4 <u>Work Force Population.</u>	59

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
APPENDICES	
Appendix A - Forms Used in Travel Surveys . . .	A-1
Appendix B - Codebook for Data Files	B-1
B-1 Tape Format for Telephone Interview . . .	B-1
B-2 Tape Format for PRT On-Board Survey . . .	B-8
B-3 Tape Format for City Bus On-Board Survey.	B-11
B-4 Tape Format for Faculty/Staff 1977 Mailback Survey	B-16
B-5 Tape Format for Parking Survey.	B-19
B-6 Tape Format for City/County Ridership Survey.	B-20
B-7 Tape Format for Intercept Survey.	B-22
B-8 PRT Counts Data Tape Format	B-23
B-9 Tape Format for University Bus Ridership Survey.	B-25
B-10 Tape Format for PRT On-Board Survey with Follow-Up Survey Responses.	B-27

LIST OF ILLUSTRATIONS

<u>FIGURE</u>		<u>PAGE</u>
1	Primary Market Area and Corridor of the Morgantown PRT	3
2	Morgantown Urban Area	4
3	Bus Routes within or through the PRT Corridor.	7
4	Location of Intersections for Auto Intercept Survey and Automatic Traffic Counts	16
5	PRT Corridor Bus Schedules.	31
6	Study Area Boundaries for Accident Analysis.	40

LIST OF TABLES

<u>Table</u>		<u>Page</u>
2-1	Comparability of Questionnaire Items .	10
3-1	Automatic Traffic Counts	17
3-2	Auto Travel Time (Minutes) and Speeds in the PRT Corridor.	22
3-3	Estimated Potential Travel Demand for Student Travel on a Six Station PRT for Class-Related Purposes During a 13-Hour Day in 1977.	25
3-4	Estimated Hourly Potential Travel Demand for Student Travel on a Six Station PRT for Class-Related Purposes for Each Hour of a 13-Hour Day in 1977.	26
4-1	Price of Gasoline within the PRT Corridor	33
4-2	Cost of Standard-Size Car Operation (March, 1977).	35
4-3	Cost of Compact-Size Car Operation (March, 1977).	37
4-4	Parking Lot Capacities	41
4-5	Annual Cost for the PRT (June 1, 1976 to May 21, 1977)	44
4-6	Trends in M-PRT Operating Costs.	45
4-7	Cost Analysis-WVU Campus-Bus System (July, 1976 to June, 1977)	46
4-8	Cost Analysis-Morgantown City Transit (July, 1976 to June, 1977)	48
4-9	City/County Bus System Cost (July, 1976 to June, 1977)	49
5-1	Disaggregate Population Estimates of Primary Market Area.	52
5-2	Population Estimates of Morgantown	53

LIST OF TABLES (Continued)

<u>Table</u>		<u>Page</u>
5-3	Residence Locations of Nondormitory Students	55
5-4	Residence Location of WVU Employees from Phonebook Sample	56
5-5	Job Function of WVU Employees from Phonebook Sample	57
5-6	Work Location of WVU Employees from Phonebook Sample	57
5-7	Estimate of the Residence Location of WVU Employees.	58

1. INTRODUCTION

This report documents the procedures used by researchers at West Virginia University (WVU) in collecting data which describes transportation-related conditions in Morgantown, West Virginia following the commencement of passenger service on Phase I of the Morgantown Personal Rapid Transit (PRT) System. The record of data collection and data processing decisions given here provides essential documentation for researchers who may be performing subsequent analysis of the data.

1.1 Organization of the Report

The organization of this report is as follows:

The remainder of this chapter delineates the study area and defines some fundamental terminology related to the study area. Section 2 describes the various travel surveys which were conducted while Section 3 discusses both the vehicular traffic counts and the passenger ridership counts which were undertaken to describe the level of usage of the various transportation modes within the study area. The operational costs for the PRT, the Morgantown City Bus System, the University Bus System, as well as the cost of operating an automobile in the Morgantown area are all given in Section 4. Finally, Section 5 discusses the methods employed to estimate the size of the various disaggregate populations in Morgantown.

The report has two appendices. The forms used for the various surveys are presented in Appendix A. Appendix B details the format of the basic survey data which was made available on a nine track, 800 bytes per inch reel of magnetic tape to the United States Department of Transportation, Transportation Systems Center.

1.2 Study Area

Figure 1 illustrates the layout of both the existing, operational PRT route (Phase I), which is the subject of this study, as well as the extension to the route (Phase II) which got under construction after the data collection effort for this study was completed. It is anticipated that Phase II PRT will not be available to carry passengers until the fall of 1979.

The study area of the Phase I PRT is defined in terms of the PRT corridor and its Primary Market Area (PMA).

The broader, modal utilization impacts, following the commencement of Phase I PRT passenger service, were expected to occur along the PRT Corridor. For the purposes of this report, the corridor has been defined to include the following:

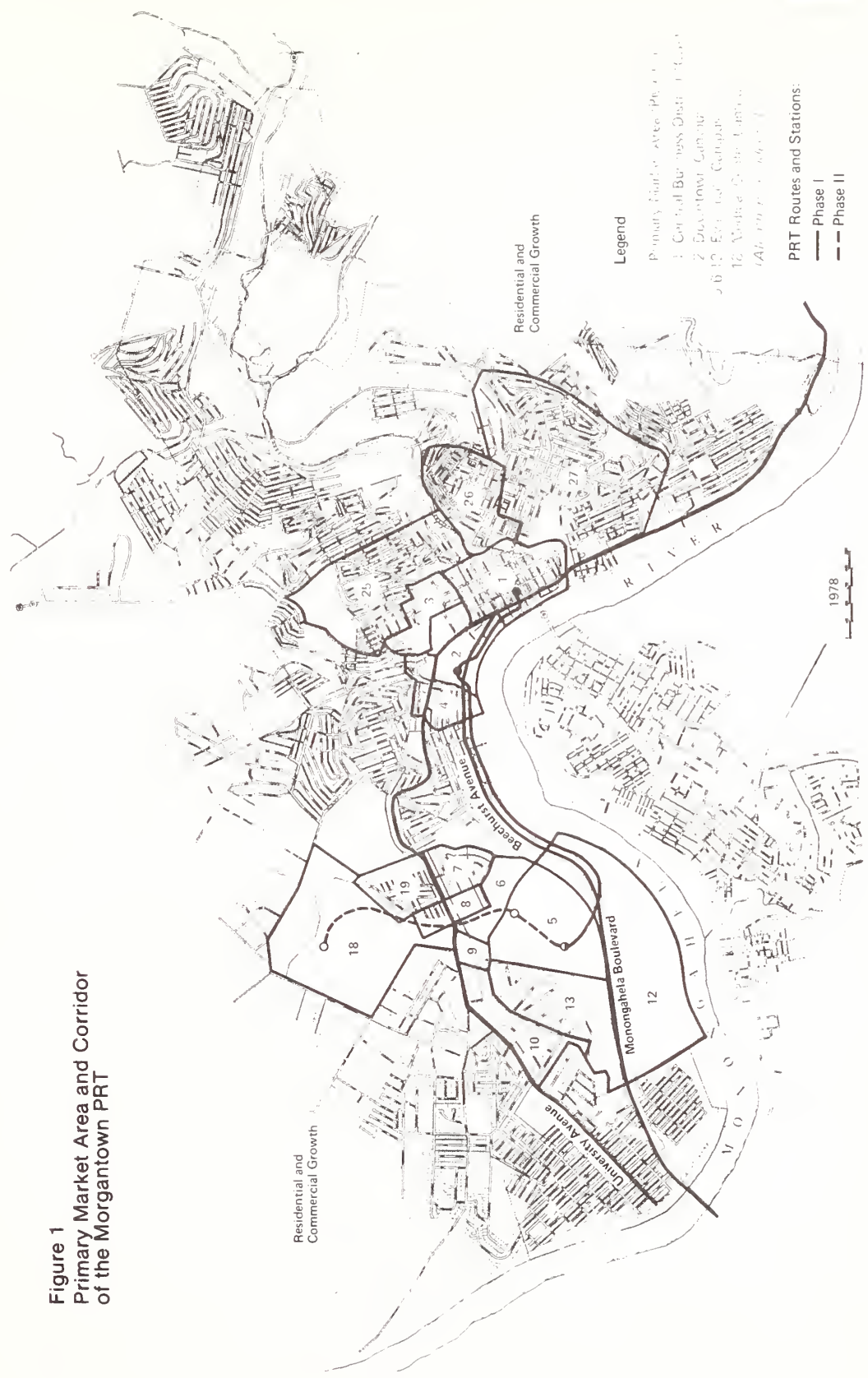
- a) The principal auto and bus route segments along Beechurst and University Avenues, both of which approximately parallel the PRT guideway alignment. These two routes are highlighted on Figure 1.
- b) Public Parking facilities within approximately a one-quarter mile radius of a PRT station.

The Primary Market Area (PMA) consists of 16 planning zones, representing a cross section of land uses, which surround the PRT stations. The purpose in identifying the PMA, in addition to the PRT corridor, is that it would permit the analysis of travel behavior in more detail, for those trip makers who are more likely to be influenced by the PRT, than could reasonably be accomplished by segregating trips along the corridor.

The PMA zones are a subset of a larger number of zones (46) into which the entire Morgantown Area had been divided. The zonal boundaries of all zones, including the PMA zones, were based on land use, topographic considerations and uniform socio-economic characteristics. The PMA zones, also illustrated on Figure 1, by definition, include those zones which are within approximately a ten-minute walking distance of a PRT station.

Figure 2 shows the location of the City of Morgantown with respect to its urbanized area.

Figure 1
Primary Market Area and Corridor
of the Morgantown PRT



Legend

- Priority District Area (Phase I)
- 1 General Business District (Phase I)
- 2 Downtown Corridor
- 3-6 12-19 Residential Corridors
- 10 Major District Station
- 14-19 Station Locations

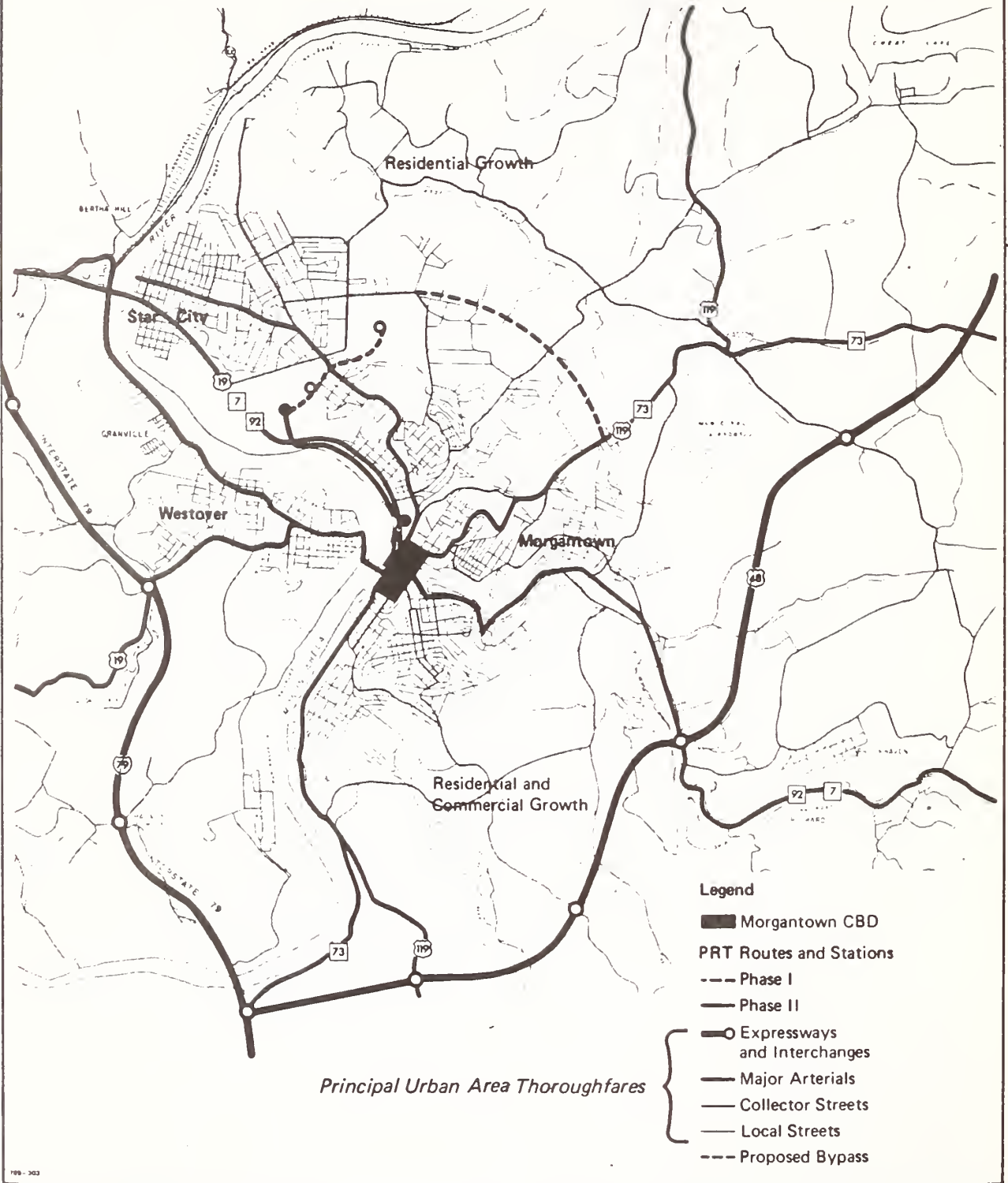
PRT Routes and Stations:

- Phase I
- - - Phase II

1978

Map used by permission of City of Morgantown

Figure 2
Morgantown Urban Area



199-303

2. TRAVEL SURVEYS

Travel along the PRT corridor and between PMA zones following the commencement of revenue operation of the Phase I PRT system basically involved the use of the automobile and the PRT. The city and county bus systems were also present, but were used by residents of the PMA to a much lesser degree. The University bus system, while it provided service between a small number of PMA zones, and was realigned from the Pre-PRT to act as a shuttle to the PRT, did not provide service along the PRT corridor. In order to collect information on the travel behavior of Morgantown residents with respect to the principal available modes, travel surveys were necessary. Each of the surveys sought information regarding the respondents' travel behavior, attitudes toward available transportation alternatives, and socio-economic characteristics. The surveys were targeted for specific segments of local travelers.

The automobile travel data was collected utilizing a telephone interview survey (PRT-1) which sampled residents of the PMA. While this survey was designed principally to obtain information on automobile travel, it was also used to obtain data on travel behavior with respect to the available bus systems as well as the PRT. On-Board Surveys were conducted on the PRT System (PRT-2) and the City Bus System (PRT-3).

Although there was some overlap between the telephone survey and the On-Board Surveys, the travel data for the PRT from the On-Board Survey was considered to be much more representative of actual conditions as it would include residents of Morgantown who were not necessarily residents of the PMA, whereas the telephone survey was limited to PMA residents.

Another survey which was utilized consisted of a mail back WVU faculty/staff travel survey. This survey was conducted primarily to gain insight into the travel behavior of this special group of potential PRT patrons.

2.1 Background to the On-Board and Telephone Interview Surveys

The objective of the Telephone Interview Survey (PRT-1) was to obtain travel behavior and socio-economic information about persons residing in the PMA. Specifically, the Telephone Interview Survey evolved from the desire to obtain trip length, trip purpose, trip origin and destination, age, sex, and occupation information from residents of the PMA who travel primarily by automobile. Several alternative methods

of obtaining information about auto occupants were considered but it was decided that the Telephone Interview Survey was the most promising approach when evaluated on the criteria of cost-effectiveness, response rate, bias, and capability to obtain socio-economic information such as income level. The sample form was limited to residents of the PMA on the assumption that the operation of the PRT would have a greater impact on their travel behavior than on people more distant from the PRT system.

The objective of the On-Board Surveys was to gather travel behavior and socio-economic information about persons riding the PRT and the bus route most impacted by the PRT. The On-Board PRT Survey was conducted in a two-part survey. The first part, in card form (PRT-2a), was completed during their trip, and collected upon leaving. Since a trip on the PRT would not allow sufficient time for completion of a detailed questionnaire, a Follow-Up PRT telephone interview survey (PRT-2b) was used to obtain, from a subsample of those respondents to the PRT On-Board Survey, the desired information regarding travel behavior and attitudes.

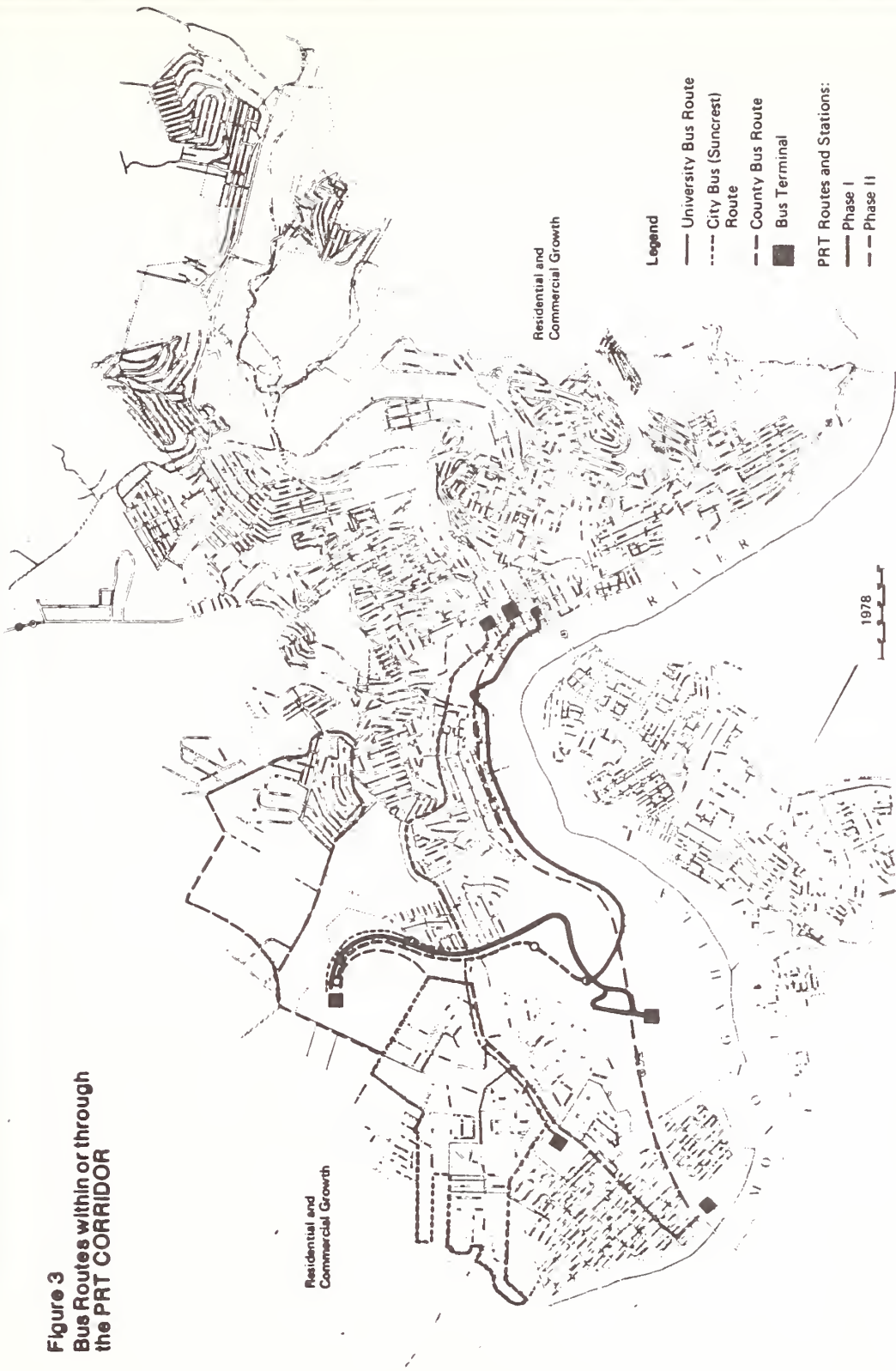
Three separate bus systems operate in the Morgantown area -- University, City and County. The On-Board Bus Survey (PRT-3) was limited to one City Bus Route because it was the only route which actually picked up any appreciable passengers in what was defined as the PRT corridor. The city and county bus routes are shown in Figure 3.

2.1.1 Drawing the Sample

A sample of approximately 2,000 PRT passengers was desired for the On-Board PRT Survey. The On-Board PRT sample was obtained by distributing a survey card to each passenger boarding the PRT during a given hour, up to the point where all cards allocated to that time period were distributed. Cards were distributed at each PRT station in proportion to the normal average ridership for that particular hour and day of the week as determined from previous PRT daily ridership counts. Approximately 2,800 On-Board PRT Survey cards were distributed during the week of March 28 through April 2, 1977. This yielded 2,160 respondents, or a 77% response rate.

From the On-Board PRT Survey cards collected during the day, all cards with non-University dormitory phone numbers were pulled each evening for the Follow-up PRT phone interview. (All University dormitories share the University phone exchange of 293 so that nondorm phones were readily identifiable.) Since WVU's dormitory students are predominantly University

Figure 3
Bus Routes within or through
the PRT CORRIDOR



Map used by permission of City of Morgantown

freshmen, a more representative sample for the follow-up calls could be obtained in this manner. The On-Board PRT Survey cards yielded 706 nondormitory respondents and of those, 390 were contacted and completed the Follow-Up PRT Survey.

The desired sample size of 200 for the On-Board Bus Survey was based on average daily ridership counts for the Suncrest City Bus, the bus route surveyed. Interviewers rode the bus through its entire route and distributed a survey to each person entering the bus. Each of the regularly scheduled daily bus trips was ridden once by an interviewer during the week of April 18 through April 23, 1977. Specific departure times were randomly assigned to a day of the week. This sample yielded 166 respondents.

A sample size of 1,300 was desired for the Telephone Interview Survey. All respondents were to live within walking distance of a PRT station, or, in other words, within the PMA. Previous experience with similar surveys in the Morgantown area indicated that a 65% completion rate could be expected from telephone surveys. An initial sample size of 2,000 would thus yield the desired 1,300 completed surveys. The sample was to be equally divided between WVU dormitory students and nondorm residents of the PMA.

A two-step sampling procedure for nondormitory PMA residents was used to obtain the desired sample of 1,000. First, a periodic random sample was drawn from the telephone directory. The second step was then to locate each address on a map of the zones.

This two-step sampling procedure was used to overcome problems associated with the mobility of the Morgantown population. A sampling by residents location only, as from the Polk Directory, would yield a high proportion of disconnected phones. A simple random sampling from the telephone directory would not exclude the residents outside of the PMA. The sample drawn with the two-step procedure provides a random sample from within the PMA with a minimal number of disconnected phones.

The size of the first-step sample drawn from the telephone book was determined as follows. To avoid double counting of WVU dormitory residents, the approximate number of dormitory students with phone numbers listed in the phone book was deducted from the estimated Morgantown area population. PMA population was estimated to be approximately 20% of that reduced estimate of the total Morgantown population, based on city population by ward residents. The required size of

the initial sample from the Morgantown Telephone Directory was therefore roughly 4,800. With non-PMA residents eliminated, this sampling procedure provided a final sample size of 1,090 PMA residents which yielded 470 completed interviews.

Another random sample of 1,081 West Virginia University dormitory residents telephone numbers was taken in the Spring of 1977 from the directory of the WVU Housing Office. This sample yielded 558 completed interviews, for a combined total of 1,028 respondents to the Telephone Interview Survey.

2.1.2 Development of Questionnaires

In the development of the questionnaires, care was taken to assure comparability of the questions asked of respondents to facilitate comparisons of data from the three questionnaires. As is shown in Table 2-1, the questionnaires were quite similar in items covered by each. For example, each of the questionnaires included identical questions regarding comparison of the three travel modes -- PRT, bus, and car -- on the seven attitudinal items regarding perceived safety, reliability, comfort, convenience, trip time, cost, and atmosphere.

2.1.3 Questionnaire Pretests

Both the On-Board Bus Survey and the Telephone Interview Survey were substantially the same as used in the 1975 Pre-PRT Phase of the PRT Impact Study. The major change was the addition of an attitude and comparison question.

The On-Board PRT Survey card was tested first for difficulties respondents might encounter in completing the forms while riding the PRT. In February and March, 1977, pretests were conducted at the Engineering and Beechurst Stations. In addition, that test was used to estimate the percentage of cards that would be completed and returned by the PRT riders. Approximately 68% were returned completed.

The cards were color coded as to station of origin so that this information would not have to be recorded in the field.

During the week of March 21-25, 1977, approximately 100 pretest interviews were conducted. Information gathered from this pretest was used to train interviewers further.

For the Telephone Interview Survey, the interviewers were instructed to probe for a complete and accurate account

TABLE 2-1

COMPARABILITY OF QUESTIONNAIRE ITEMS

Question Topic	On-Board PRT Survey & Follow-Up Question Item*	On-Board Bus Survey Question Item	Telephone Interview Question Item
Address	Z	2	A
Trips in last 24 hrs	5	--	B
Trip Origin	1	3	C
Bus Stop/PRT Station (Origin)	known	1	--
Trip time (start)	known	5	D
Destination	4	6	E
PRT Corridor	known	known	F
Trip Purpose	A	7	G
Travel mode to Bus stop/PRT station	2	4	--
Vehicular mode	known	known	H
Reason for mode	B	9	I
Waiting	D	10	--
Auto available for trip	--	8	J
Transportation Alternatives	C	8	K
Kind of parking space	--	--	L
Licensed driver	E	11	M
Autos owned	--	12	N
Auto generally available	--	--	O
Occupation	6	13	P
Employee of WVU	F	14	Q
Sex	G	15	R
Age	H	16	S
Marital Status	I	17	T
Family Income	--	--	CC
Family Income	--	--	DD
Student Income	--	--	EE
No. of trips on PRT	--	32	BB
Comparison of PRT, Bus and Auto	7-13	18-31	U-AA

*Those items designated by a letter were included on the On-Board PRT Survey card while those designated with a number were on the Follow-Up PRT Survey.

of all trips made on the previous day. Interviewers were also asked to encourage respondents to give an opinion on the seven attitudinal questions, even when not certain of factual information such as which vehicle has the best record for safety.

2.1.4 Administering the Questionnaires

The On-Board Bus Survey questionnaire and the On-Board PRT Survey card questionnaire were designed to be self-administered. Each of these forms could be completed by respondent (PRT or bus traveler) without assistance from an interviewer.

Prospective respondents entering the bus were asked to complete the form and return it to the interviewer as they left the bus. Respondents entering the PRT were handed the survey cards, asked to complete them during their trip, and to turn them in to the person collecting the cards at their destination station. Field personnel distributing and collecting the On-Board PRT Survey cards were identified with badges and were stationed at the entrance and exit gates of each PRT station.

The Telephone Interview Survey questionnaire and the On-Board PRT Follow-Up questionnaire were designed to guide the interviewer making the call. Space was left at the top of the Follow-Up PRT Questionnaire (Form PRT-2b) so that the On-Board PRT Survey card could be stapled to the form. The interviewer then had only to refer to the respondent's name and the time of the trip already on the survey card when reading the introduction.

Each of the questionnaires included seven attitudinal questions in which the respondent was asked to compare the PRT, bus, and car on such things as safety, reliability, comfort, etc. Interviewers were instructed to ask each of these questions in the following manner. First, respondents were asked, "Which of the three types of vehicle is most...?", and that response was recorded. Then the interviewer asked, "Which is least...?", and that response was recorded. The mode of transportation which was recorded as "second" was that mode not listed as either "most" or "least". The format of these comparison questions was altered for the On-Board Bus Survey in order to make it more readily understandable to a respondent reading the question. In this case, also, the respondent was asked to rate "most" and "least", and the "second" position was completed when the questionnaires were coded.

After reading the "Introduction" the interviewer verified the respondent's address. (If the address had changed the interview was terminated.) The interviewer then asked if a vehicle trip* had been made during the previous day. If no vehicular trip had been made, the interviewer skipped to nontrip related questions (M through EE).

If a trip had been made, the interviewer proceeded through questions C through L. These questions were repeated for each separate trip. After a study of all trips had been completed, the interviewer covered nontrip questions M through EE with the respondent. The last item, regarding household income, was written as three separate questions:

CC for all nonstudents
DD for all nonstudents, who would not answer CC
EE for all full-time students.

2.1.5 Data Collection

Both On-Board Surveys and the Telephone Interview Survey were implemented with a group of student interviewers, organized into five teams each comprised initially of five members and a team captain. The team captains were responsible for assigning and supervising day-to-day data collection activities, verifying completed Telephone Interview Surveys and On-Board PRT Follow-Up interviews, and coding, and collecting completed forms from their team members. One call in ten was verified by a call back from the captain.

The On-Board PRT Surveys were conducted during the time period March 28 through April 2, 1977, approximately five weeks before the end of the second academic semester at West Virginia University. All Follow-Up PRT interviews were completed during the evening of the day on which the On-Board PRT Survey card was completed. The number of cards distributed during each half hour segment was based on average ridership for that time and day of the week.

The Telephone Interview Survey was conducted during the time period April 13 through April 29, 1977. Initially

*For this research, a vehicular trip was defined as the movement of a respondent by a wheeled conveyance in order to engage in an activity, (e.g., shopping, recreation, eating, etc.).

each telephone number was assigned randomly to a one-hour time slot between 9 AM and 10 PM, Tuesday through Sunday, but no calls were scheduled for Saturday evenings or Sunday mornings. Interviewers were assigned one hour time slot between 9 AM/10 PM, Tuesday through Sunday, but no calls were scheduled for Saturday evenings or Sunday mornings. Interviewers were assigned one hour time blocks with a maximum of two consecutive time blocks assigned to one interviewer. When unseasonably warm weather or conditions which might have biased the results were encountered during the survey period, except for the exceptionally fine weather which drew people away from their homes, and necessitated a relatively high portion of callbacks.

3. MODAL UTILIZATION

The data collected in this category primarily reflects the traffic volumes corresponding to the three major modes - automobiles, PRT and University/city buses, in the PRT corridor. In certain cases additional data was collected such as automobile speeds, vehicle occupancy, and the level of service provided by the transit modes. Data collection procedures employed for the various modes are presented in the following sections.

3.1 Automobile Utilization

The major data for this mode includes traffic volumes, average auto occupancy and average auto speed between zones in the corridor.

3.1.1 Traffic Counts

University Avenue and Beechurst Avenue/Monongahela Boulevard are the two major North-South thoroughfares which are approximately parallel to the PRT alignment. A trip taken by auto in the PMA that could be taken by PRT will most probably utilize either University Avenue or Beechurst Avenue or a combination of both.

In order to determine the level of automobile use automatic traffic counters were installed by the State Highway Department during a one week period (April 19, 1977 - April 25, 1977) on both Beechurst Avenue and University Avenue as indicated in Figure 4.

The traffic counts were taken for both northbound and southbound traffic. One location was just south of eighth street on Beechurst Avenue and the other just north of Stewart Street on University Avenue.

The counts as provided by the West Virginia State Department of Highways are displayed in Table 3-1.

3.1.2 Roadside Auto Intercept Survey

This survey was intended primarily to obtain auto occupancy information and it was not envisaged as a cordon line survey. The occupancy data was collected by observers stationed at key intersections. Although the occupancy figures for auto traffic in the PRT corridor was the primary concern,

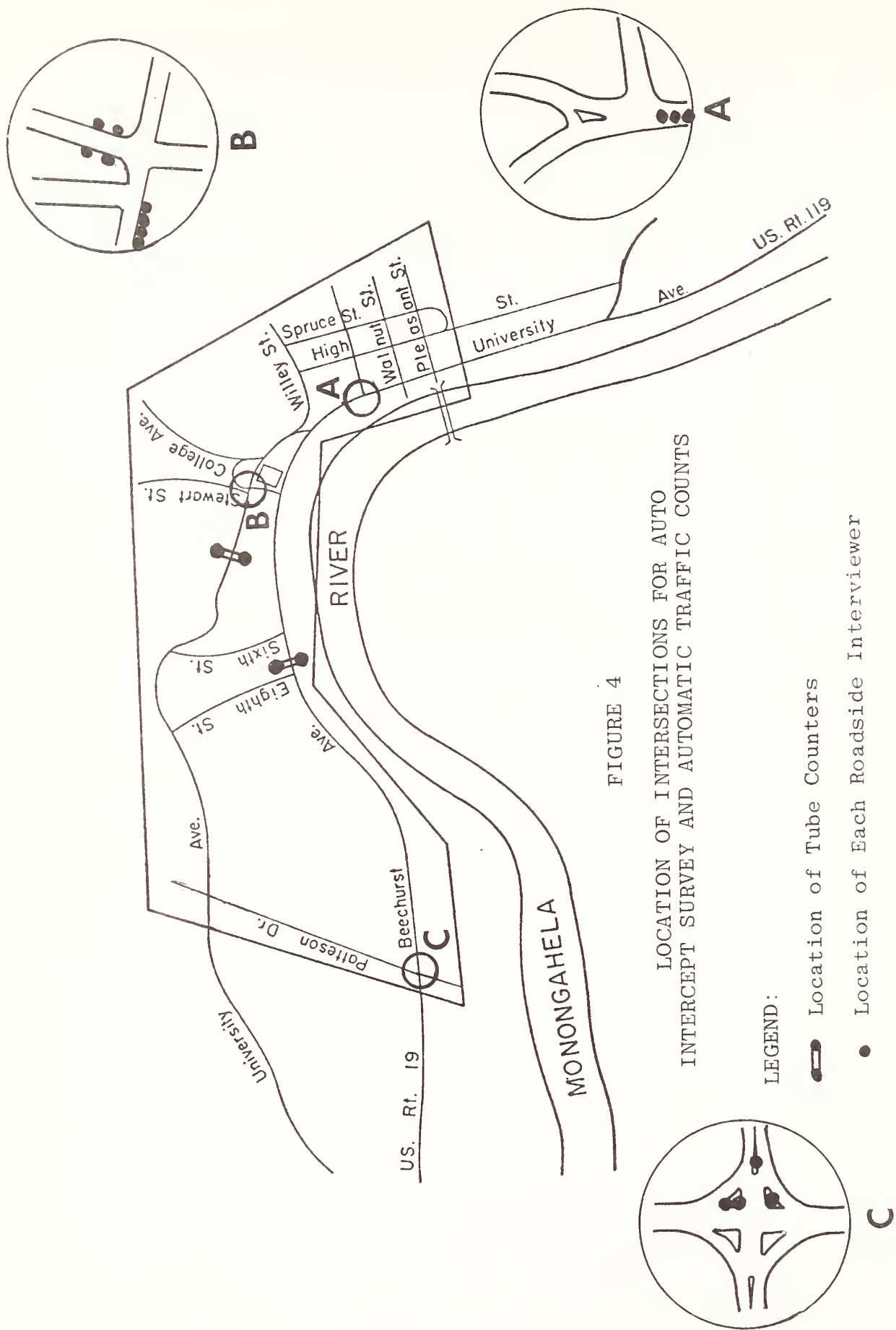


FIGURE 4
 LOCATION OF INTERSECTIONS FOR AUTO
 INTERCEPT SURVEY AND AUTOMATIC TRAFFIC COUNTS

TABLE 3-1
AUTOMATIC TRAFFIC COUNTS

SITE NAME: UNIVERSITY AVENUE
LOCATION: N OF STEWART ST.
DIRECTION: NORTHBOUND

SITE TYPE: PRT CORRIDOR
SITE NUMBER: 2

HOUR	MONDAY 04-18-77		TUESDAY 04-19-77		WEDNESDAY 04-20-77		THURSDAY 04-21-77		FRIDAY 04-22-77		SATURDAY 04-23-77		SUNDAY 04-24-77		AVERAGE OF WEEK	
	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
12-1	119	1.4	**		152	2.2	156	2.2	328	4.3	53	2.5	574	6.6	230	3.2
1-2	35	0.4	**		92	1.3	98	1.4	196	2.6	19	1.4	480	5.6	153	2.1
2-3	21	0.2	**		39	0.6	47	0.7	99	1.3	124	0.7	289	3.3	103	1.4
3-4	16	0.2	**		15	0.2	20	0.3	41	0.5	59	0.3	121	1.4	45	0.6
4-5	69	0.8	**		15	0.2	10	0.1	15	0.2	11	0.3	102	1.2	37	0.5
5-6	218	2.6	**		37	0.5	39	0.6	46	0.6	13	0.3	99	1.1	75	1.1
6-7	400	4.7	**		204	2.9	192	2.7	202	2.7	43	1.1	95	1.1	189	2.6
7-8	513	6.1	**		343	4.9	358	5.1	360	4.8	90	2.2	103	1.2	295	4.1
8-9	429	5.1	**		418	5.9	375	5.3	393	5.2	188	4.6	184	2.1	331	4.6
9-10	421	5.0	**		344	4.9	376	5.3	370	4.9	172	4.2	298	3.4	330	4.6
10-11	446	5.3	353	6.5	319	4.5	353	5.0	338	4.5	202	4.8	325	3.8	334	4.7
11-12	514	6.1	370	6.8	351	5.0	339	4.8	372	4.9	308	7.6	479	5.5	390	5.5
12-1	489	5.6	408	7.5	343	4.9	366	5.2	378	5.0	237	5.8	507	5.9	390	5.5
1-2	529	6.3	385	7.1	398	5.7	383	5.4	354	4.7	169	4.2	621	7.2	406	5.7
2-3	494	5.8	445	8.2	399	5.7	360	5.1	373	4.9	85	2.1	589	6.8	392	5.5
3-4	471	5.6	447	8.2	391	5.6	356	5.0	445	5.9	139	3.4	503	5.8	393	5.5
4-5	458	5.4	376	6.9	402	5.7	379	5.4	450	6.0	178	4.4	506	5.8	393	5.5
5-6	495	5.9	399	7.3	398	5.7	374	5.3	419	5.5	170	4.2	546	6.3	400	5.6
6-7	532	6.3	438	8.0	450	6.4	448	6.3	397	5.3	163	4.0	493	5.7	417	5.8
7-8	463	5.5	442	8.1	454	6.5	439	6.2	383	5.1	116	2.9	444	5.1	392	5.5
8-9	425	5.0	428	7.8	379	5.4	432	6.0	393	5.2	153	3.8	446	5.2	379	5.3
9-10	401	4.7	392	7.2	420	6.0	425	6.0	397	5.3	215	5.3	392	4.5	377	5.3
10-11	294	3.5	280	5.1	352	5.0	340	4.8	390	5.2	581	14.3	302	3.5	363	5.1
11-12	193	2.3	294	5.4	311	4.1	396	5.6	411	5.4	565	13.9	155	1.8	332	4.6
TOTAL	8445	99.8*	5457	100.1*	7026	100.1*	7061	99.8*	7550	100.0	4053	100.0	9452	99.9*	7146	99.9*

** data are missing

* percentages may not add to total because of rounding

TABLE 3-1 (Continued)

AUTOMATIC TRAFFIC COUNTS

HOUR	MONDAY 04-25-77		TUESDAY 04-19-77		WEDNESDAY 04-20-77		THURSDAY 04-21-77		FRIDAY 04-22-77		SATURDAY 04-23-77		SUNDAY 04-24-77		AVERAGE DAY OF WEEK	
	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
1-2-1	38	0.3	46	0.4	146	1.3	128	1.2	131	1.2	262	2.6	218	3.2	138	1.3
1-2	26	0.3	32	0.3	83	0.7	83	0.8	89	0.7	63	0.6	181	2.3	93	0.9
2-3	17	0.2	15	0.1	30	0.3	31	0.3	37	0.3	26	0.2	126	1.2	53	0.5
3-4	23	0.2	26	0.2	15	0.1	24	0.2	46	0.4	27	0.2	36	0.4	31	0.3
4-5	83	0.7	85	0.8	27	0.2	22	0.2	26	0.2	49	0.4	35	0.3	43	0.4
5-6	303	2.7	330	2.9	83	0.7	79	0.7	87	0.7	176	1.6	55	0.5	140	1.3
6-7	725	6.5	748	6.6	359	3.2	333	3.0	326	2.7	498	4.3	125	1.2	385	3.7
7-8	697	6.2	709	6.3	756	6.8	703	6.4	720	6.0	717	6.4	219	2.1	558	5.3
8-9	590	5.3	497	4.4	676	6.1	651	5.9	681	5.7	619	5.5	404	3.9	533	5.1
9-10	618	5.5	552	4.9	579	5.2	571	5.2	540	4.5	572	5.1	557	5.4	242	2.3
10-11	754	6.7	607	5.4	594	5.3	572	5.2	612	5.2	628	5.7	666	6.5	320	3.0
11-12	735	6.6	640	5.7	718	6.5	685	6.2	768	6.5	709	6.3	730	7.1	431	4.1
12-1	694	6.2	715	6.3	731	6.6	679	6.2	787	6.6	721	6.4	672	6.6	501	4.7
1-2	762	6.8	686	6.1	654	5.9	670	6.1	814	6.9	717	6.4	646	6.3	486	4.6
2-3	897	7.9	658	5.8	725	6.5	718	6.5	798	6.7	758	6.7	709	6.9	507	4.8
3-4	845	7.5	646	5.7	741	6.7	797	7.3	800	6.7	766	6.8	663	6.5	505	4.7
4-5	691	6.2	800	7.1	789	7.1	798	7.3	796	6.7	775	6.9	722	7.0	461	4.3
5-6	692	6.2	705	6.3	626	5.6	667	6.1	680	5.7	674	6.0	624	6.1	557	5.2
6-7	624	5.6	718	6.4	715	6.4	644	5.9	723	6.1	685	6.1	626	6.1	417	3.9
7-8	469	4.2	614	5.4	645	5.8	640	5.8	680	5.7	610	5.4	568	5.5	414	3.8
8-9	342	3.1	512	4.5	516	4.6	531	4.8	578	4.9	496	4.3	561	5.5	323	3.0
9-10	254	2.3	426	3.8	402	3.6	419	3.8	430	3.6	384	3.3	377	3.7	241	2.2
10-11	207	1.8	254	2.3	286	2.6	322	2.9	429	3.6	300	2.7	350	3.4	199	1.8
11-12	130	1.2	246	2.2	222	2.0	225	2.0	294	2.5	223	2.0	336	3.3	104	0.9
TOTAL	1211	100.2*	11267	99.9*	11118	99.8*	10992	100.0	11872	99.8*	11291	100.2*	10250	99.9*	6770	100.0
																10496
																100.1

* Percentage may not add to total because of rounding

TABLE 3-1 (Continued)
 AUTOMATIC TRAFFIC COUNTS

SITE NAME: BEECHURST AVENUE
 LOCATION: SOUTH OF 8TH STREET
 DIRECTION: NORTHBOUND

SITE TYPE: PRT CORRIDOR
 SITE NUMBER: 1

HOUR	MONDAY 04-25-77		TUESDAY 04-19-77		WEDNESDAY 04-20-77		THURSDAY 04-21-77		FRIDAY 04-22-77		SATURDAY 04-23-77		SUNDAY 04-24-77		AVERAGE DAY OF WEEK	
	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
12-1	65	0.3	79	0.4	171	0.8	202	1.1	213	1.1	483	2.9	385	3.1	228	1.3
1-2	35	0.2	34	0.2	122	0.6	101	0.5	136	0.7	350	2.1	303	2.4	154	0.9
2-3	26	0.1	26	0.1	53	0.3	53	0.3	59	0.3	220	1.3	210	1.7	92	0.5
3-4	45	0.2	29	0.2	30	0.1	29	0.2	50	0.3	100	0.6	109	0.9	56	0.3
4-5	95	0.5	124	0.7	28	0.1	23	0.1	49	0.3	58	0.3	66	0.5	63	0.3
5-6	538	2.9	573	3.0	153	0.7	123	0.6	104	0.5	84	0.5	135	1.1	245	1.4
6-7	1020	5.5	1000	5.3	670	3.2	526	2.8	508	2.6	218	1.3	109	0.9	579	3.2
7-8	1091	5.9	1078	5.7	1214	5.7	1030	5.4	1011	5.2	320	1.9	220	1.8	852	4.7
8-9	916	4.9	960	5.1	1583	7.5	1120	5.9	1151	5.9	519	3.1	363	2.9	945	5.2
9-10	1050	5.7	988	5.3	1516	7.2	1053	5.5	943	4.8	783	4.6	455	3.6	970	5.4
10-11	1086	5.8	1026	5.5	1415	6.7	978	5.1	1049	5.4	1111	5.7	540	4.3	1006	5.6
11-12	1303	7.0	906	4.8	1375	6.5	1041	5.5	1157	5.9	1156	6.0	879	7.0	1099	6.1
12-1	1153	6.2	1101	5.9	1340	6.3	1194	6.3	1312	6.7	1220	6.3	1272	7.5	1179	6.5
1-2	1331	7.2	1104	5.9	1200	5.7	1179	6.2	1241	6.3	1211	5.2	1225	7.3	1163	6.4
2-3	1304	7.0	1121	6.0	1290	6.1	1254	6.6	1356	6.9	1265	6.5	1138	6.8	1205	6.7
3-4	1310	7.1	1277	6.8	1489	7.0	1424	7.5	1387	7.1	1377	7.1	1067	6.3	1280	7.1
4-5	1380	7.4	1284	6.8	1340	6.3	1430	7.5	1471	7.5	1381	7.1	1027	6.1	1262	7.0
5-6	1160	6.2	1248	6.6	1388	6.6	1368	7.2	1308	6.8	1294	6.7	1117	6.6	1218	6.7
6-7	1046	5.6	1270	6.8	1200	5.7	1248	6.6	1080	5.5	1169	6.0	971	5.3	1104	6.1
7-8	891	4.8	1058	5.6	1242	5.9	1047	5.5	1010	5.2	1050	5.4	1035	6.1	700	5.6
8-9	723	3.9	844	4.5	748	3.5	909	4.8	891	4.6	823	4.2	895	5.3	592	4.7
9-10	514	2.8	688	3.7	754	3.6	808	4.2	931	4.8	739	3.8	818	4.9	513	4.1
10-11	338	1.8	553	2.9	472	2.2	497	2.6	605	3.1	491	2.5	603	3.6	345	2.4
11-12	152	0.8	435	2.3	349	1.7	393	2.1	560	2.9	375	1.9	564	3.3	116	0.9
TOTAL	18572	99.8*	18806	100.1*	21143	100.0	19017	100.1*	19582	100.4*	19397	99.8*	16850	99.9*	12518	100.0

* Percentage may not add to total because of rounding

TABLE 3-1 (Continued)
AUTOMATIC TRAFFIC COUNTS

HOUR	MONDAY 04-25-77		TUESDAY 04-19-77		WEDNESDAY 04-20-77		THURSDAY 04-21-77		FRIDAY 04-22-77		SATURDAY 04-23-77		SUNDAY 04-24-77		AVERAGE DAY OF WEEK	
	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
12-1	180	2.9	130	1.7	173	2.4	170	2.7	190	2.9	144	2.0	191	3.0	168	2.5
1-2	151	2.5	121	1.6	130	1.8	123	1.8	160	2.5	62	0.8	120	1.9	124	1.8
2-3	62	1.1	60	0.8	53	0.7	42	0.7	70	1.1	42	0.6	54	0.9	55	0.8
3-4	41	0.7	41	0.6	12	0.2	10	0.2	40	0.6	11	0.2	11	0.2	24	0.4
4-5	11	0.2	12	0.2	10	0.1	11	0.2	16	0.3	12	0.1	10	0.2	12	0.2
5-6	21	0.3	22	0.3	31	0.4	22	0.4	23	0.4	43	0.6	22	0.4	26	0.4
6-7	92	1.5	92	1.2	120	1.7	102	1.5	92	1.4	120	1.7	103	1.6	103	1.5
7-8	281	4.6	251	3.4	361	5.0	206	3.2	280	4.3	350	5.0	310	4.9	306	4.6
8-9	382	6.3	382	5.1	421	5.8	310	4.9	381	5.9	410	5.9	310	4.9	371	5.5
9-10	331	5.4	331	4.4	351	4.8	330	5.2	332	5.1	330	4.7	310	4.9	331	4.9
10-11	331	5.4	385	5.1	383	5.3	340	5.4	371	5.7	362	5.0	201	3.2	336	5.0
11-12	352	5.8	438	5.9	407	5.6	350	5.5	364	5.6	403	5.8	332	5.3	378	5.6
12-1	360	5.9	460	6.1	360	5.0	400	6.3	372	5.7	330	4.7	410	6.5	385	5.7
1-2	410	6.7	340	4.5	413	5.7	340	5.4	410	6.3	410	5.9	362	5.8	386	5.7
2-3	331	5.4	470	6.3	392	5.4	362	5.7	383	5.9	388	5.4	331	5.3	378	5.6
3-4	401	6.6	471	6.3	420	5.8	352	5.5	410	6.3	411	5.7	381	6.1	405	6.0
4-5	350	5.7	480	6.4	430	5.9	372	5.9	386	6.0	404	6.0	371	5.9	403	6.0
5-6	341	5.6	461	6.2	455	6.3	351	5.5	371	5.7	396	5.9	452	6.5	396	5.9
6-7	331	5.4	480	6.4	478	6.6	401	6.3	361	5.6	410	6.1	482	6.9	401	6.2
7-8	322	5.3	501	6.7	470	6.5	401	6.3	381	5.9	415	6.1	471	6.4	421	6.3
8-9	232	3.8	483	6.5	400	5.5	401	6.3	270	4.2	357	5.3	366	5.8	365	5.4
9-10	221	3.6	480	6.4	410	5.7	340	5.4	221	3.4	334	4.9	410	5.9	331	5.3
10-11	261	4.3	332	4.4	280	3.9	310	4.9	250	3.9	287	4.2	270	4.9	288	4.3
11-12	310	5.1	270	3.6	291	4.0	303	4.8	350	5.4	305	4.5	301	4.8	300	4.5
TOTAL	6105	100.1*	7493	100.1*	7250	100.1*	6349	100.0	6484	100.1*	6984	100.1*	6281	100.0	6725	99.9*

*Percentage may not add to total because of rounding

origin/destination information was also collected by drivers while they were stopped at the traffic signals during the red signal phase. In this way the traffic flow was undisturbed.

The intersection involved and the location of the surveyors is illustrated in Figure 4. A more specific description of the surveyor stations is given below:

- a) Beechurst Avenue - University Avenue: Northbound Traffic.
- b) Monongahela Boulevard - Patteson Drive: Southbound Traffic.
- c) University Avenue - Campus Drive: Northbound Traffic
- d) University Avenue - Stewart Street: Southbound Traffic.
- e) Beechurst Avenue - Hough Street: Northbound Traffic.

This survey was conducted for two week days; Wednesday, April 13, 1977, from 8 AM to 5 PM, and Friday, April 15, 1977, from 8 AM to 5 PM.

In most intersections several observers were assigned so that most of the cars could be intercepted without disturbing the natural flow of traffic. In Appendix A, a sample form is displayed which was used in collecting the auto intercept data.

3.1.3 Auto Speeds

Auto speeds were computed based on a travel time study. The data collected for this study is summarized in Table 3-2.

The travel time study was conducted over segments of the two thoroughfares which are approximately parallel to the PRT alignment. One route studied was along University Avenue between the Towers Dormitory, on the Evansdale Campus, and the Mountainlair, on the main campus, a distance of about 1.5 miles. The other study was conducted along Beechurst Avenue between the Walnut Street PRT station, in the CBD, and the University Coliseum, on the Evansdale Campus, a distance of about 2.1 miles.

Trips were made at various times of a day, driven normally without exceeding the posted speed limits, and the data collected includes the delays occurring at various signals and stop signs along the routes.

TABLE 3-2
 AUTO TRAVEL TIME (MINUTES) AND
 SPEEDS IN THE PRT CORRIDOR

ROUTE	UNIVERSITY AVENUE		BEECHURST AVENUE	
	Main Campus NORTHBOUND	Towers - Towers SOUTHBOUND	Main Campus NORTHBOUND	Coliseum-Walnut SOUTHBOUND
8:00 AM	5.33	6.33	6.10	6.40
9:00 AM	5.20	--	5.50	6.00
10:00 AM	6.90	10.00	--	6.20
11:00 AM	9.70*	--	5.30	6.30
12:00 AM	6.50	15.1*	10.00*	8.00
1:00 PM	--	--	6.6	8.00
2:00 PM	8.60	9.02	6.00	7.00
3:00 PM	9.00	9.30	5.10	15.50
4:00 PM	5.80	9.80	7.50	16.00
5:00 PM	7.10	--	--	18.05*
AVERAGE TIME	7.13	9.93	6.51	9.75
DISTANCE MILES	1.5	1.5	2.1	2.1
AVERAGE SPEED MPH	12.62	9.06	19.35	12.92
MINIMUM SPEED MPH	9.28	5.96	12.6	6.98

* Travel Time For Slowest Trip

3.2 PRT Utilization

This section of the report details the methods utilized to obtain two totally different and independent estimates of PRT utilization. The first estimate reflects actual demand for PRT System service. The second estimate is based on a method developed during the planning stages for the PRT and it is intended to reflect the maximum potential demand for service by the WVU student population.

The estimates of the actual demand for PRT system service, along with the results obtained from the PRT On-Board Follow-Up survey (re. Section 2.1) were the basis for the PMA PRT trip tables which eventually were used for the analysis presented in Volume II.

During the period of time when the PRT data was collected, the system was scheduled for operation 13 $\frac{1}{4}$ hours per day. The system operated entirely in the scheduled mode with a low of 18 vehicles and a high of 21 vehicles at any one time. Scheduled headways were often as low as 15 seconds, the minimum permitted. However, for the most part, because of the fact that the engineering station was partially completed (Phase I), headways of 15 seconds could not be sustained for very long because of the station through-put problem. On the average, headways were limited to 2 out of every 3 dispatch slots at 15 second intervals.

3.2.1 Actual Demand

One of the characteristics of PRT, and indeed the Morgantown PRT, is that it features a demand responsive service option, in addition to scheduled service. This is achieved in the M-PRT by integrating a destination selection unit (DSU) with each fare collection gate (FC). The Scenario for every passenger passing through the FC/DSU system is as follows:

- Prior to making a trip, each trip maker has acquired a magnetically encoded fare card, which may be valid either for a single trip, or any number of trips up to a pre-encoded expiration data.
- The trip maker must then insert the fare card into the FC gate. If it is valid he must then select a desired destination, and is so instructed by a lighted display on the gate.

- The destination is selected by depressing a button on the DSU which corresponds to the desired destination.
- The FC gate and DSU are interlocked so that - a) a destination must be selected in order to gain entry, and b) only the first destination is recorded.

The FC/DSU system interfaces with the central controlling computer so that a permanent record of every origin and destination is made throughout the day as a function of time. These permanent records were available to the research team for a one-week period during the study periods.

The average ridership for Monday (4/4/77), Tuesday (4/5/77) and Wednesday (4/6/77) was used to expand the PRT on-board follow-up surveys (re. Section 2.1) to the daily PMA PRT trip table presented in Volume II. The average total daily ridership for the 3 days was 10,294.

3.2.2 Maximum Potential Student Utilization

Estimates of the maximum potential demand for PRT service by WVU students are summarized in Tables 3-3 and 3-4. These estimates are based on the methodology and computer programs which were originally presented in a thesis by Iskander*. During the Pre-PRT Phase of this impact evaluation, Singalavanija made minor changes to the program, the details of which were presented in a separate report**.

The data input consisted of two magnetic tapes controlled by the West Virginia University Office of Admissions and Records. The tapes generally reflect enrollment statistics for the Spring Semester, 1977. One tape details student class schedules, while the other tape stores personal data about each student, including such information as the students major and rank.

* W. H. Iskander, "Development and Solution of a Model for Classification of Students' Trips Between Campuses", unpublished MSIE thesis, West Virginia University, 1971.

** Singalavanija Rachada, "Data Processing for Classification of Students' Trips Between Campuses", unpublished M.S.E. problem report, West Virginia University, 1975.

TABLE 3-3

ESTIMATED POTENTIAL TRAVEL DEMAND
 FOR STUDENT TRAVEL ON A 6 STATION PRT
 FOR CLASS-RELATED PURPOSES DURING A 13-HOUR DAY IN 1977

ORIGINS	DESTINATIONS					
	CBD	MAIN CAMPUS	COLISEUM	CAC, ENGINEERING	TOWERS & FORESTRY	MEDICAL CENTER
CBD	0	2429	192	36	262	37
MAIN CAMPUS	898	0	1814	633	5936	907
COLISEUM	111	1966	0	24	743	64
CAC, ENGINEERING	30	616	19	0	271	34
TOWERS & FORESTRY	265	6085	731	273	0	393
MEDICAL CENTER	31	1029	55	23	252	0

Total of all numbers = 26,154 trips

TABLE 3-4

ESTIMATED HOURLY POTENTIAL TRAVEL DEMAND
FOR STUDENT TRAVEL ON A 6 STATION PRT
FOR CLASS-RELATED PURPOSES FOR EACH HOUR OF A 13-HOUR DAY IN 1977

	CBD	MAIN CAMPUS	COLISEUM	CAC, ENGINEERING	TOWERS & FORESTRY	MEDICAL CENTER
7:00 - 8:00 AM						
CBD	0	213	19	8	50	0
MAIN CAMPUS	0	0	232	96	292	1
COLISEUM	0	22	0	1	5	0
CAC, ENGINEERING	0	0	0	0	0	0
TOWERS & FORESTRY	0	783	145	67	0	1
MEDICAL CENTER	0	127	11	4	28	0
	0	437	29	11	78	15
	8	0	420	146	511	180
8:00 - 9:00 AM	0	128	0	4	24	2
	0	32	5	0	8	0
	1	1630	216	59	0	110
	0	243	16	6	44	0
	0	150	10	4	35	5
	38	0	319	105	527	52
9:00 - 10:00 AM	2	187	0	3	26	3
	2	69	4	0	28	2
	12	702	102	38	0	55
	4	122	5	2	44	0
	0	86	6	3	20	3
	88	0	249	113	608	69
10:00 - 11:00 AM	11	238	0	3	76	6
	4	121	3	0	44	2
	35	713	63	35	0	39
	3	83	3	1	42	0
	0	36	6	2	6	3
	146	0	206	65	593	113
11:00 - 12:00 PM	30	423	0	2	109	18
	5	121	5	0	43	6
	75	765	60	22	0	63
	2	37	3	4	16	0

TABLE 3-4 (Con't)
 HOURLY TRIP ESTIMATES

	CBD	MAIN CAMPUS	COLISEUM	CAC, ENGINEERING	TOWERS & FORESTRY	MEDICAL CENTER
	0	136	32	7	62	8
	132	0	332	89	1541	190
12:00 - 1:00 PM	20	320	0	11	175	12
	7	101	2	0	53	4
	21	724	131	34	0	50
	11	213	17	4	113	0
	0	13	0	1	2	2
	341	0	36	5	1300	211
1:00 - 2:00 PM	33	441	0	0	256	19
	6	98	0	0	58	17
	75	173	7	10	0	42
	9	146	0	1	98	0
	0	8	0	0	7	1
	124	0	19	14	490	79
2:00 - 3:00 PM	6	81	0	0	49	3
	4	50	0	0	23	2
	20	438	5	8	0	19
	0	29	0	1	20	0
	0	0	0	0	2	0
	21	0	1	0	74	12
3:00 - 4:00 PM	3	37	0	0	23	1
	2	24	0	0	14	1
	26	157	2	0	0	14
	2	29	0	0	18	0
	0	0	0	0	0	0
	54	0	5	0	226	30
4:00 - 5:00 PM	1	4	0	0	1	0
	0	4	0	0	2	0
	3	17	0	0	0	1
	0	2	0	0	6	0

TABLE 3-4 (Cont'd)
 HOURLY TRIP ESTIMATES

	CBD	MAIN CAMPUS	COLISEUM	CAC, ENGINEERING	TOWERS & FORESTRY	MEDICAL CENTER
	0	0	0	0	0	0
	28	0	3	0	104	20
5:00 - 6:00 PM	1	8	0	0	0	0
	0	0	0	0	0	0
	4	23	0	0	0	0
	0	0	0	0	0	0

There are approximately 16 steps involved in the processing of the data, including task specific FORTRAN and PL/1 programs and certain IBM/360 utility programs such as IEBGENER and SORT/MERGE. The processing result in origin/destination tables for potential trips between 6 zones for every 5-minute interval between 7 AM and 6 PM on a Wednesday. The 6 zones which were established were based on their proximity to the 6 PRT stations originally proposed for the PRT system; however, 3 of the zones correspond to the area surrounding the 3 stations in Phase-I of the PRT as it now exists.

The type of student trips included in the results are:

- a) Trips from home to the first class.
- b) Trips between classes.
- c) Trips from class to lunch.
- d) Trips from lunch to class.
- e) Trips from the last class to home.

Time between consecutive classes is ten (10) minutes. Wednesday data was originally chosen for processing because there were more classes scheduled on that day than any other day of the week, and therefore maximum peak demands, by students for PRT service were expected to occur on Wednesday as well. Each student is assumed to ride the PRT from home to his first class and from his last class to home. In this regard it was reasoned that a prudent parking control policy by the University could easily affect the assumed behavior. It was further assumed that if a student finishes a class before noon, and his next class does not begin until the afternoon, then a lunch trip would be generated, to and from the students' residence, using the PRT.

Intraclass trips are handled in the following manner: If a student finishes a class at 0850 on the main campus, as an example, and his next class starts at 1100 in the Engineering Building on the Evansdale Campus, the model assumes that the PRT is used to travel between these classes, with the time of the trip being determined according to a specified probability distribution. Two of the six zones, Main Campus and Towers Dormitory, were classified as major activity centers. A different probability distribution is used to determine the temporal distribution of interzone trips: major activity center to major activity center; major to minor; minor to major; and minor to minor. A major zone was defined as an area where a student would assumably prefer to spend as much time as possible, because of the larger variety and availability of facilities and activities; while a minor zone constituted an area where a student would prefer to spend as little time as possible, for just the opposite reasons. For example, if a student finished a class on the

Main Campus and his next class is at the Engineering Building, he or she will linger as long as possible at the Main Campus (major zone) before going to the Engineering Building (in a minor zone).

3.3 Bus Utilization

Bus ridership counts were taken on two different bus systems: The University Bus, which acted as a feeder to the PRT, and the Morgantown City Bus. The procedures followed in each case were different, which was due mainly to the type of service being offered by the respective systems and the difference in the known magnitude of trips being taken. Figure 3 illustrated the various bus routes operating through the PRT Corridor. Figure 5 displays their respective schedules.

3.3.1 University Bus System

Bus ridership was counted for the University buses by positioning observers at all the stops being served. Following the commencement of revenue service on the PRT, the University operated essentially one route, which ran from the Medical Center to the University Coliseum with intermediate stops at the "Towers" Dormitory Complex, the Forestry Building, the Engineering PRT Station, and the Creative Arts Center. Service along the entire length of this route was scheduled on 15 minute headways. However, a much higher level of service was in fact operated as a short-run route within the longer route. This latter service operated between the "Towers" and Engineering PRT Station stops on a scheduled headway of 5 minutes. The primary purposes of the University bus service was to provide shuttle service within the Evansdale Campus, and to provide an interface with the PRT station for those travelers who were enroute to or from the Main Campus or the CBD of Morgantown.

The data was collected by the stationed observers between the hours of 8:00 AM and 5:00 PM for the week beginning Sunday, March 27, 1977. The data collected for each bus stopping included the number getting on the bus, the number getting off the bus and the number standing. The survey form which was used is reproduced in Appendix A. One data record was established for each stop that each bus made.

3.3.2 Morgantown City Bus

Earlier in this report it was pointed out that only one of the city bus routes in fact operates within the PRT Corridor. This route is known as the Suncrest route. It starts at downtown Morgantown (CBD) and runs along University

UNIVERSITY BUS SCHEDULE

MEDICAL CENTER SHUTTLE BUS

Shuttle service is provided between Coliseum, Towers, and Medical Center every 15 minutes from 8:00 AM until 5:00 PM -- Monday through Friday - except from noon until 12:15 and from 12:45 to 1:00 PM - when service is provided every 5 minutes.

EVENING INTERCAMPUS BUS SCHEDULE

Leave Mountainlair at:

9:00 PM	11:15 PM
9:45 PM	Midnight (Friday only)
10:30 PM	12:30 AM (Friday only)

MORGANTOWN TRANSIT SCHEDULE

MONONGALIA COUNTY TRANSIT SCHEDULE

STAR CITY ROUTE

SUNCREST ROUTE

7:40 a.m. - Lv. Morgantown for Star City, Suncrest, University and Monongalia General Hospitals, Chestnut Ridge Road, Point Marion Road, Canyon to Tyrone Road, Dellslow, Richard and Brookhaven. Return to Morgantown
9:00 a.m., 10:00 a.m., 11:00 a.m., 12:00 noon, 1:00 p.m., 2:00 p.m., 3:00 p.m., 4:00 p.m. - Lv. Morgantown. Arr. Hills 5 min. after the hour and University Hospital 15 min. after the hour (10:00 a.m., 12:00 noon and 2:00 p.m. buses continue to Chestnut Ridge Road to Stewart Street. Lv. Stewart Street 20 min. after the hour. Return via Stewart Street, Willowdale Road, University Hospital) (Lv. University Hospital 9:30 a.m., 10:30 a.m., 11:30 a.m., 12:30 p.m., 2:30 p.m., 3:30 p.m., and 4:30 p.m. Arr. Star City Town Hall 25 till the hour. Arr. Hills 20 till the hour. Travel via Monongahela Blvd. and Beechurst Avenue to Morgantown)
5:10 p.m. - Lv. Morgantown for Hills, Star City, Suncrest, University and Monongalia General Hospitals, Chestnut Ridge Road, Point Marion Road, Canyon to Tyrone Road, and Cheat Road. Return Cheat Road via Mileground to Morgantown.

Board at Fayette Street (10 min. after and on half hour)
 Board at Court House (10 min. till the hour)

Lv. Town: 10 min. after the hour, on the half hour, and 10 min. till the hour, until 5:20 p.m.

STREETS: Fayette-Spruce-Willey-University-WVU Medical Center-General Hospital-VanVoorhis-University-Dairy Mart-(Turn around)-University-Junior-Western-Lawnwood-Collins Ferry-Greendale-Woodland-Eastern-Aspen-Dogwood-Anderson-Colonial-Killarney-Van Voorhis-General Hospital-WVU Medical Center-University-Willey-High-Fayette.

WVU Hospital - 10 min. after leaving town
 Dairy Mart - 20 min. after leaving town
 WVU Hospital - 35 min. after leaving town
 8th Street - 49 min. after leaving town

FIGURE 5

PRT Corridor Bus Schedules

Avenue to the Suncrest Area, at the political boundary between Morgantown and Star City.

The ridership counts were made by observers who actually boarded the buses and rode the entire length of the route. The data at each stop included the number on, the number off, the ratio of standees to riders, and the arrival and departure times. The forms used for this purpose are also reproduced in Appendix A. One data record was established for each stop that each bus made.

4. TRANSPORTATION COSTS

4.1 Automobile Costs

The cost of using an automobile in Morgantown was estimated on the basis of operating costs, maintenance costs and parking costs. Operating costs were estimated by considering the cost of gasoline, depreciation of an automobile, insurance costs and the maintenance costs.

The data collected on automobile costs, which are present in the following sections, were based on prevailing costs in Morgantown during April, 1977. A parking survey was conducted to determine the cost to park a car in the CBD and in public lots within the downtown (main) campus of WVU.

4.1.1 Cost and Availability of Gasoline

In general, gasoline was observed to be available in adequate quantities during the study period. However, the retail prices of gasoline exhibited some variability within the PRT corridor. In order to determine the average price, a gasoline price survey was conducted. Six stations within the PRT corridor were visited by members of the study team and prices for 3 types of gasoline - Regular, Hi-Test and Unleaded gasolines were noted. The results of this survey are presented in Table 4-1. An additional service station used in the base line survey in 1975 was not in operation in 1977

TABLE 4-1
PRICE OF GASOLINE WITHIN THE PRT CORRIDOR

Price per gallon in cents				
Gas	Station	Regular	Hi-Test	Unleaded
1.	A	65.9	--	70.9
2.	B	56.9	--	59.9
3.	C	57.9	65.9	61.9
4.	D	65.9	67.9	66.9
5.	E	57.9	67.9	63.9
6.	F	63.9	67.9	64.9

4.1.2 Automobile Operation and Maintenance Costs

It should be expected that operating costs per mile will vary considerably depending on certain conditions. The variables affecting this cost can be identified mainly as the size of the car and the total miles driven annually. Other factors influencing this cost are the way an individual drives, the breakdown of city and highway mileage driven, and the weight of the total load. Depreciation cost, constituting a significant proportion of automobile operating cost is influenced largely by the age of the automobile.

To simplify the procedure which is needed to determine the automobile operating cost, several assumptions were made. They are as follows:

- a) Typical 1977 models using unleaded gasoline were chosen in the category of standard and compact cars to determine operating costs for automobiles.
- b) An average of 10,000 miles of driving is assumed with 60% highway driving.
- c) MPG was assumed to be 10% lower than EPA figures for 1977 automobiles.
- d) The average price of gasoline at six service stations during April 1977 was assumed to be the price of gasoline.
- e) The time value of money was assumed to be nine percent which is a weighted average of two-thirds capital at 12% rate and one-third equity.
- f) A car was assumed to have a life of 10 years.
- g) The insurance rates for Morgantown, considerably lower than metropolitan areas, were used in the analysis.
- h) The parking charges are also those for the Morgantown area, and are also lower than other areas.
- i) The repair and maintenance costs are based on typical automotive shops in the Morgantown area.
- j) Driving in Morgantown requires the use of snow tires for at least 4 months out of a year.

Qualification of all the variables which were considered and the calculation of the average cost per mile are presented in Tables 4-2 and 4-3.

4.1.3 Parking Costs for Automobiles

Automobile parking on a limited basis is available at various WVU campuses. The Evansdale Campus has parking lots which serve both the students and faculty of WVU based on permits issued by WVU on a first come first served basis. However, very limited faculty/staff permits are issued for the Downtown Campus. The Downtown Campus has two public lots behind the Mountainlair (Student Union). A free lot is avail-

COST OF STANDARD-SIZE CAR OPERATION
(March 1977)

Initial Cost:

Considering 1977 PLY-Fury with V-8 engine, automatic trans., power steering, power brakes, air conditioning, tinted glass, radio, clock, whitewall tires, including destination charge, and all taxes: \$5,514.00

Equivalent annual cost @ 8% cost of money = 5,514 (A/P, 8%, 10) = \$821.59

Repairs & Maintenance

a.	Need 15 additional tires including snow tires @ \$46 each = \$690 in 10 years i.e. annual average tire cost =	\$69.00	
b.	Oil, lubrication, oil filter 3 times per year @ 14.75 =	\$44.25	
c.	Tune-up, 2 @ \$40.45 filter once a year =	\$85.90	
d.	State Inspection =	\$3.59	
e.	Muffler & tail pipe once in 2 years =	\$22.00	
f.	Brakes, shocks, wiper, hoses, fan belts, ball joints: annual cost =	\$41.25	
g.	Front end alignment, wheel balancing & mounting and tire changes in winter and summer =	\$33.00	
h.	Carburetor - average annual cost =	\$11.00	
i.	Antifreeze & car wash =	\$35.75	
j.	Catalytic converter - annual cost =	\$82.50	
k.	Miscellaneous parts and labor: including freon in air conditioner, brake fluid, power steering fluid, transmission fluid =	\$22.00	
	Subtotal	\$450.24	\$450.24

Gasoline

6,000 miles @ 18 miles/gallon = 333 gallons
4,000 miles @ 13 miles/gallon = 308 gallons
total = 641 gallons

add 10% on EPA ratings 64 gallons
total = 705 gallons

Unleaded gasoline @ 64.73
cents/gallon for 705 gallons per year = \$456.35
(Average gasoline price in March, 1977)

TABLE 4-2 (Continued)

Insurance

Average estimated annual premium = \$192.50
 (A large student population of age less than 25)

Parking, Garaging, Tools, etc. = \$110.00

Registration & Property Taxes = \$ 43.00

Total = \$2073.68

Average 10,000 miles per year driving

Average cost per mile = \$2073.68/10,000 miles = 20.74 cents/mile

Summary

	Cost/Year \$	Cost/Mile ¢	% of Total Cost
1. Capital recovery	821.59	8.216	39.62
2. Repairs & Maintenance	450.24	4.502	21.71
3. Gasoline as of March, 1977	456.35	4.564	22.01
4. Insurance, parking, registration, property tax etc.	345.50	3.455	16.66
TOTAL	2,073.68	20.737	100

NOTES:

1. It must be realized that the cost of operating any car per mile does not remain constant over its 10 years operating life. As a car gets old, annual capital recovery cost (item 1) and insurance, property tax (item 4) will reduce and repair and maintenance (item 2) will increase. In the first year, capital recovery is much higher than the average estimated and repair costs are very low because normally parts are guaranteed during the first year.

2. It is expected that operating costs will increase due to upward pressure on gasoline price in years to come. Gasoline prices in the PRT Corridor during the month of April 1977 at six stations were as follows. (item IV of 1A).

Station 1 70.9¢ per 1 gallon
 Station 2 59.9¢ per 1 gallon
 Station 3 61.8¢ per 1 gallon
 Station 4 66.9¢ per 1 gallon
 Station 5 63.9¢ per 1 gallon
 Station 6 64.9¢ per 1 gallon

COST OF COMPACT-SIZE CAR OPERATION
(March 1977)

Initial Cost:

Considering 1977 PLY-Volare with 6-cylinder, automatic transmission, A.M. radio body side molding, white wall tires, power steering, dealer preparation charge, destination charge, and all taxes: \$4,406.00

Equivalent Annual Cost @ 8% cost of money = 4,406.00 (A/P, 8%, 10) = \$656.49

Repairs & Maintenance:

a.	15 tires Including snowtires, @ 46.00 each = \$690.00 in 10 years, yearly average time cost	=	.....	\$69.00	
b.	Oil, oilfilter, and lubrication 3 times per year	=	.....	\$44.25	
c.	Tune-up twice a year @ 32.45 plus air filter once a year	=	.....	\$69.90	
d.	State inspection	=	.....	\$ 3.59	
e.	Yearly cost of biannual muffler and tailpipe replacement	=	.....	\$22.00	
f.	Brakes, shocks, wiper, hoses, fan belts, ball joints, etc.	=	.....	\$41.25	
g.	Front end alignment, wheel balancing, mounting, and tire changing in winter and summer	=	.....	\$33.00	
h.	Carburetor - average annual cost	=	.....	\$11.00	
i.	Antifreeze and car wash	=	.....	\$35.75	
j.	Catalytic converter biannual @ 150.00	=	.....	\$82.50	
k.	Miscellaneous parts and labor: (i.e. brake fluid, power steering fluid, transmission fluid, etc.)	=	.....	\$22.00	
	Sub total			\$434.24	\$434.24

Gasoline

6000 miles highway driving @21 miles/gallon	=	286 gallons
4000 miles city driving @16 miles/gallon	=	<u>250 gallons</u>
Sub-total	=	536 gallons
10% under rating of EPA ratings		<u>54 gallons</u>
Total	=	<u>590 gallons</u>

TABLE 4-3 (Continued)

Gasoline (continued)

Unleaded gasoline @ 64.73 cents/gal.
 for 590 gallons (Average gasoline price of
 6 stations surveyed in March, 1977)
 included taxes = \$381.91

Insurance

Average estimated annual premium = \$192.50

Parking, Garaging, Tolls, etc. = \$110.00

Registration and Property = \$ 41.00

Total = \$1,816.14

Average 10,000 miles per year driving cost \$1,816.14

Average cost per mile = 1672/10,000 = 18.16 cents/mile

Summary

	Cost/Year \$	Cost/Mile ¢	% of Total Cost
1. Capital recovery	656.49	6.565	36.15
2. Repairs and Maintenance	434.24	4.342	23.91
3. Gasoline as of March	381.91	3.819	21.03
4. Insurance, parking registration, property tax, etc.	343.50	3.435	18.91
TOTAL	\$1,816.14	18.16¢	100

able at the Towers, the Coliseum and at the Medical Center on the Evansdale Campus.

Parking within the CBD of Morgantown is provided by the Morgantown Parking Authority. An inventory of parking spaces in Morgantown was conducted by field inspection. The data on WVU Parking Lots was collected from the WVU Parking Control Office. Table 4-4 describes the capacities of the various lots which were investigated.

A parking survey was also conducted to determine the average time required to find an available space, and then to park.

The survey was conducted during the weekdays of April 4, 1977 through April 8, 1977. Data was collected for 8 hours from 8:00 AM to 4:00 PM. Three days were used to collect data on the CBD lots and two days for the University lots.

The survey form utilized for this study is presented in Appendix A. Staffing requirements consisted of one interviewer at the University Lot and 2 at the CBD lots. The interviewers moved from lot to lot in the CBD area on a random basis.

Parking fees charged by WVU for permit holders is \$3.00 per month. The public lots on the Downtown Campus cost \$0.35 for each parking opportunity.

The city lots charge \$0.10 for 20 minutes and multiples thereof.

4.1.4 Automobile Accidents

The records of accidents involving automobiles are recorded by the Morgantown City Police Department. Accidents from these records were separated by the study team to reflect accidents occurring within the PRT corridor. Figure 6 describes the area which was studied.

The time period considered for collection of data related to automobile accidents was from January 1976 through April 1977. The data collected for each accident included the following:

- a) Location of accident (Zone No.)
- b) Type of injury, if any.
- c) Damage to automobiles and property, if any, in dollars.

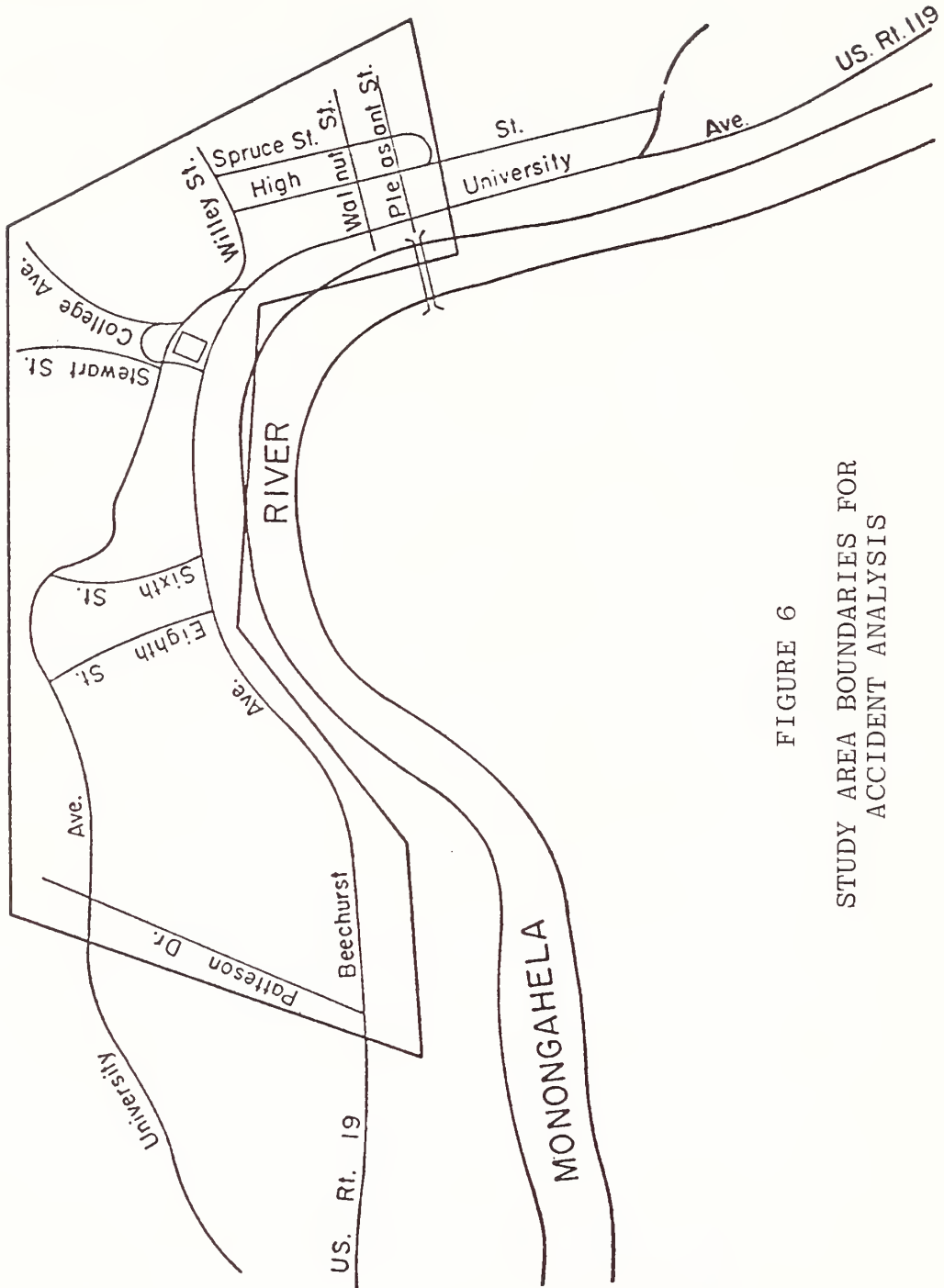


FIGURE 6
 STUDY AREA BOUNDARIES FOR
 ACCIDENT ANALYSIS

TABLE 4-4

PARKING LOT CAPACITIESMorgantown Parking Authority Lots:

<u>Parking Lot No.</u>	<u>Name</u>	<u>No. of Spaces</u>
1	Beside Massulo's	87
2	Fayette - Chestnut	82
3	Ruff Stone - Chestnut	22
4	University - Wall Street (R.S.)	71
5	Chestnut - Pleasant	67
6	Pleasant - Spruce	67
7	Wall - Spruce	25
8	Spruce Street South	74
9	Spruce Street North	71
10	Willey Street	43
11	North High	87
12	Parking Garage (University, Walnut, & Chestnut)	421

MAIN CAMPUS PARKING

1	Appalachian	30
2	Woodburn Hall	22
3	Science Hall	20
4	Personnel	20
5	Falling Run	75
6	Maiden Lane	58
7	Tennis Courts	24
8	Beechurst	12
9	Old Forestry	15
10	Stadium Outside	25
11	I. A. B.	50
12	Oglebay Hall	18
13	Spruce Street	10
14	Armstrong Hall	2
15	Music School	6
16	Health Service	7
17	College Avenue	10
18	Old Bookstore	3
19	Bookstore	4
20	M. I. Building	4
21	Speech and Hearing	10
22	Old Mountainlair	18
23	Administration Building	16
24	Woman's Hall	8
25	Mountainlair	18
26	Stadium Inside	15
27	Glasscock House	2
28	New Computer Center	35
29	Beechurst Avenue	10

TABLE 4.4 (Continued)

UNIVERSITY LOTS FOR PUBLIC

<u>Parking Lot No.</u>	<u>Name</u>	<u>No. of Spaces</u>
	Mountainlair Upper	250
	Mountainlair Lower	250
EVANSDALE CAMPUS		
40	Engineering Faculty	141
41	Engineering Rear	45
43	Agriculture Science Side	219
44	Agriculture Science Front	35
45	Creative Arts Center	185
46	Forestry	119
47	Engineering Student Lot	220
48	Twin Towers	78
49	Communications	38
50	Forestry Tower	161
MEDICAL CENTER		
60	Lot A	65
61	Lot B	59
62	Lot C	13
63	Lot F	222
64	Lot D	12
65	Lot E	342
66	Lot G	10
	Law School	169
FREE PARKING LOTS		
	Towers	250
	Coliseum	1200
	CAC	100
	Medical Center	700
	Natatorium	400

4.2 PRT System Operating Costs

The operating costs for the PRT were obtained from the University office directly responsible for operating the system. The figures which are summarized in Table 4-5 were drawn from the PRT's operating budget for the 12 month period 6-1-76 through 5-31-77. This period corresponds to the period used for the Pre-PRT study. Table 4-6 displays a more complete picture of PRT operating costs by showing the trends over the first 2½ years of operation.

Because the PRT, in its present form (Phase I) is an incomplete system (Phase II currently under construction), fares have not been set in order to offset operating costs. Students pay a flat transportation fee, for each semester's use, which is assessed during semester registration. The fee for the spring semester, 1977, was \$10.00, which also meant that they could use the University feeder bus system. Faculty/Staff and Townspeople have the option of purchasing a similar "semester-pass" at the same price that the students pay. On the average, the semester flat fare corresponds roughly to 10¢/day - "ride as often as you wish." Faculty/Staff or Townspeople, who do not anticipate frequent use of the system, may purchase "single trip" passes every time they enter a station at a cost of 25¢. Ultimately, when Phase II is completed, a new fare policy may be established. Each fare card (pass) can be magnetically encoded with an expiration date so that a great deal of flexibility is available in setting up single or multiple period fares.

4.3 University Bus System Costs

The flat, semester transportation fee, which each student pays, entitles the student to use the feeder bus service, which consists of 7 state owned University buses, as well as the PRT. On those few occasions when the PRT experiences a failure which is expected to take more than 15 minutes to recover from, the feeder bus system is rerouted to carry intercampus trips until the PRT service is reinstated.

Operating cost data for the bus system was made available from the WVU bus operator and is presented in Table 4-7. .

4.4 City/County Bus System Costs

Operating costs for the City Bus System were collected directly from the City Manager's Office. The data which were acquired is displayed in Table 4-8 and corresponds to operation for the fiscal year, July 1976 - June, 1977. Fares for the City Bus are \$.40 per ride. However, bulk tickets can be bought at a discount price of 3 for \$1.00.

TABLE 4-5
 ANNUAL COSTS FOR THE PRT
 (for the year June 1, 1976 to May 21, 1977)

OPERATING EXPENSES:

Labor	= \$	542,754.00
Unclassified (Benefits, insurance, etc.)	= \$	85,840.64
Energy		
Electricity	= \$	100,552.00
Natural Gas (for guideway heating)	= \$	100,619.00
Materials, Supplies, Equipment, Maintenance, Contracts, etc.	= \$	<u>466,412.00</u>
 TOTAL OPERATING COST	=	 \$1,297,177.64

Operating Days	=	329
Average System Cost Per Day	=	\$3,942.79
Total Revenue Miles	=	594,000
Average Cost Per Mile	=	\$2.19
Total Passengers	=	1,856,861
Average Cost Per Passenger Trip	=	\$.70

TABLE 4-6
TRENDS IN M-PRT OPERATING COSTS

	<u>Oct-75</u> <u>June-76</u>	<u>July-76</u> <u>June-77</u>	<u>July-77</u> <u>June-78</u>
Total Annual O&M Cost	\$3,166,066	\$1,297,178	\$1,257,397
Total Vehicle Miles	401,542	626,157	595,732
Average Cost Per Vehicle Mile	\$7.88	\$2.06	\$2.37
Total Passenger Trips	607,452	1,856,694	2,011,488
Average Cost Per Passenger Trip	\$5.21	\$.70	\$.62
Average Cost Per Capacity Passenger-Trip	\$.59	\$.16	\$.18
Average Cost Per Capacity Passenger-Mile		\$.10	\$.11

TABLE 4-7
 COST ANALYSIS--WVU CAMPUS-BUS SYSTEM
 July, 1976 - June, 1977

Operating Expenses

7 buses @ \$25,000	= \$175,000
Estimated Life	= 10 years
Estimated Salvage Value at the end of 10 years @ \$2,000	= \$14,000
Assuming 7% cost on Capital Investment, annualized Capital Cost	
= 151,000 (A/P, 7%, 10) + .07(14,000)	= \$23,903

Operating Expenses (Annual)

Total Labor:	\$ 86,306.00	
Fuel Parts, etc.:	\$ 82,706.00	
Unclassified (Benefits, insurance, etc.):	<u>\$ 13,161.66</u>	
Total	\$182,173.66	= \$182,173.66
Number of Operating days/year		= 302
Average System cost/day		= \$603.22
Total Estimated Platform hours/day		= 65.37
(19,742 hours/year) Average cost per platform hour		= \$9.23
Number of Miles driven/year		= 140,781
Average System cost/mile		= \$1.29

The yearly bus ridership figure is not kept by WVU. The Pre-PRT average weekday survey of 10,252 was factored up to a yearly estimated number of 1,663,272 passenger trips.

The cost figures presented in Table 4-8 are total annual costs for all the routes operated by the city. Moreover, because only one of its routes runs within the PRT corridor, any comparisons to the PRT other than fares would be misleading. Data was not available from the city to permit an allocation of its total costs to the PRT corridor route.

Operational costs for the County Bus System was collected directly from the county transportation office. The data is displayed in Table 4-9, and corresponds to operations for the fiscal year July, 1976-June, 1977.

TABLE 4-8

COST ANALYSIS-MORGANTOWN CITY TRANSIT
July, 1976 - June, 1977

OPERATING EXPENSES: (Annual)		
6 Buses operating Labor:	= \$106,391	
Fuel, Parts, etc.:	= \$ 25,973	
Unclassified, (Benefits, Insurance, etc.)	= <u>\$ 33,947</u>	
Total	\$166,311	= \$166,311
Total Annualized Operating Cost		= \$166,311
Number of Operating days/year		= 308 days
Average System cost/day		= \$539.97
Number of Platform hours/day		= 80
Average System cost/platform hour		= \$6.75
Number of Miles driven/year		= 223,300
Average System cost/mile		= \$.74
304,304 Passengers/year		
Average Cost per Passenger per Trip		= \$.53
Average Revenue per Passenger per Trip		= \$.39

TABLE 4-9

CITY/COUNTY BUS SYSTEM COST
July, 1976 - June, 1977

	<u>City</u>	<u>County</u>
Operating Costs	\$166,311	\$135,560
Number of Vehicles	8	9
Number of Operating days/year	308	306
Number of Platform hours/day	80	52.5
Annual Revenue Mileage	233,300	188,948
Operating Cost/Platform Hour	\$6.75	\$8.43
Operating Cost/Revenue Mile	\$.74	\$.72

5. ESTIMATION OF DISAGGREGATE ZONAL POPULATIONS

Each of the Primary Market Area (PMA) zones can be described by five (5) population parameters: The number of WVU students who reside in dormitories (Dorm Students); the number of WVU students who reside in private accommodations (Nondorm Students); the number of WVU faculty and staff residing in each zone; the number of people residing in each zone who are in no way related to WVU (Townspeople); and lastly, the number of people who work within each zone (Work Force Population).

The disaggregate population estimates are used in two ways. The first was that it would enable an assessment of the representativeness of the residential patterns of respondents to the various travel surveys which were being planned. The second use was that it would make it possible to consider demand models which could distinguish between travel as a function of the various disaggregate populations.

This section of the report discusses the methods used to derive estimates for the above referenced disaggregate populations for each of the PMA zones. Table 5-1 tabulates the population estimates for the PMA zones which were obtained from each of the following procedures. Table 5-2 estimates the total population for all of Morgantown.

5.1 WVU Student Populations

Fortunately, the residences of all Dorm Students, who are mainly Freshmen, was well documented by the West Virginia University Housing Office. The location of each dormitory, with respect to the PMA zones, was easily determined, and therefore, the task of estimating the Dorm Student populations for each of the PMA zones was clearly a relatively straightforward matter. With this estimate made, only the residential distribution of Nondorm Students remained to be determined.

With regard to the Nondorm Students, the West Virginia University Office of Admissions and Records furnished a magnetic tape to the research team which contained the Morgantown addresses of the 17,020 students enrolled in the University as of the Spring semester of 1977. The address for every tenth student whose housing code indicated that he did not live in a University dormitory was printed out, and the zone of residence for each student in the sample was tabulated manually. It is important to note that only those students who lived in University dormitories were excluded

TABLE 5-1

DISAGGREGATE POPULATION ESTIMATES OF
PRIMARY MARKET AREA

<u>Zone</u>	<u>Dorm Student</u>	<u>Non-Dorm Student</u>	<u>Fac/Staff</u>	<u>Residents</u>	<u>Total</u>	<u>Estimates of Working Population</u>
1	0	513	27	860	1400	1261
3	1630	478	27	160	2295	75
4	734	489	53	430	1706	41
7	0	58	69	80	207	56
8	1860	0	5	0	1865	232
9	0	0	0	130	130	235
10	0	93	53	120	266	26
11	0	12	0	0	12	9
13	0	70	21	55	146	--
18	0	42	48	220	310	1554
19	0	634	27	20	681	25
25	0	932	133	2547	3612	--
26	0	396	74	1253	1723	67
27	0	746	329	2005	3080	17
Total	4224	4463	866	7880	17433	3598
				(17433) PMA Resident Population		

TABLE 5-2
POPULATION ESTIMATES OF MORGANTOWN

<u>Zone</u>	<u>Population</u>	<u>Zone</u>	<u>Population</u>
1*	1400	27*	3080
2*	Campus	28	201
3*	2295	29	1713
4*	1706	30	Outside City Limits
5	Campus	31	313
6	Campus	32	2106
7*	207	33	194
8*	1865	34	162
9	130	35	190
10	266	36	Outside City Limits
11	12	37	Outside City Limits
12	Campus	38	Outside City Limits
13*	146	39	454
14	1419 (Star City)	40	135
15	3252	41	311
16	538	42	5501
17	541	43	Outside City Limits
18*	310	44	Outside City Limits
19*	681	45	Star City
20	209	46	Star City
21	2230		
22	Campus		
23	1196	Total	33,243
24	1065		
25*	3612		(Does not include
26*	1723		Westover and Star
			City)

- NOTE: 1. Zones marked with * are PMA Zones
2. All other zones are external zones (outside the PMA) and were not included in any analysis.

from the sample. Students living in privately operated boarding houses were included in the sample. A total of 1161 students were included in the sample.

The estimate of the relative frequency of zonal occupancy from the sample, along with an estimate of the total Nondorm Student population permitted the population estimate to be made, which is tabulated in Table 5-2.

Approximately 38% of the total Non-Dorm Student population lives within the PMA, while 100% of the Dorm Student population lives within the PMA.

5.2 Faculty/Staff Population

A sample was taken of very fifth entry in the 1976-77 West Virginia University telephone directory. However, employees listed as working outside the greater Morgantown area, such as extension agents or those at a branch Campus, were excluded from the sample. Also included were persons who were obviously not active employees, such as retired academic personnel or Medical Doctors who were clinical professors. The total sample consisted of 862 employees. Based on information in the telephone directory, the employees in the sample were classified according to job function, work location, and residence location. The secondary results of this study are tabulated in Tables 5-3, 5-4, and 5-5. Table 5-6 includes the estimates of the total Faculty/Staff population of which resides in each of the PMA zones.

5.3 Townspeople Population

Townspeople were defined in the introduction to this section as those residents of the PMA who are in no way related to WVU, either as a student or as a member of the faculty or staff. At the time that the Pre-PRT Phase of the Impact Study was being conducted, the total aggregate population for each of the PMA zones was derived from the 1970 census results. Independent estimates of student and faculty/staff populations similar to those discussed above in sections 5.1 and 5.2, were also made during the Pre-PRT study. Therefore, the distribution of the residences of Townspeople, within the PMA, was determined by subtracting the respective known population, for each zone, from the total aggregate population.

For the purpose of this report, representing the Operational Phase of the PRT Impact Study, it was assumed that the Townspeople population within the PMA zones would remain essentially the same as was reported for the Pre-PRT

TABLE 5-3

RESIDENCE LOCATIONS OF NONDORMITORY STUDENTS
(From Admissions and Records Tape)

<u>ZONE</u>	<u>FREQUENCY</u>	<u>PERCENT</u>	<u>ZONE</u>	<u>FREQUENCY</u>	<u>PERCENT</u>	<u>ZONE</u>	<u>FREQUENCY</u>	<u>PERCENT</u>
1*	44	3.79	46	12	1.03	121	4	0.34
3*	41	3.53	51	7	0.60	122	1	0.09
4*	105	9.04	52	2	0.17	123	21	1.81
7*	5	0.43	54	2	0.17	125	3	0.25
10	8	0.69	55	2	0.17	126	2	0.17
11	1	0.09	56	28	2.41	128	2	0.17
13*	6	0.52	57	3	0.25	129	1	0.09
14	33	2.84	60	1	0.09	131	1	0.09
15	84	7.24	61	1	0.09	133	1	0.09
16	2	0.17	64	7	0.60	134	3	0.25
17	1	0.09	65	1	0.09	137	5	0.43
18*	50	4.31	66	1	0.09	139	1	0.09
19*	8	0.69	67	3	0.25	150	1	0.09
20	6	0.52	72	4	0.34	Unknown	15	1.29
21	76	6.55	73	1	0.09			
23	40	3.45	74	1	0.09			
24	23	1.98	77	6	0.52			
25*	80	6.89	81	3	0.25			
26*	34	2.93	82	4	0.34			
27*	64	5.51	83	1	0.09			
28	3	0.25	91	2	0.17			
29	13	1.12	93	2	0.17			
30	2	0.17	100	1	0.09			
31	2	0.17	101	1	0.09			
32	26	2.24	102	1	0.09			
33	31	2.67	104	4	0.34			
34	14	1.21	106	12	1.03			
35	16	1.38	107	13	1.12			
36	12	1.03	109	6	0.52			
37	32	2.76	110	5	0.43			
38	19	1.64	112	1	0.09			
39	2	0.17	113	1	0.09			
40	1	0.09	114	15	1.29			
41	2	0.17	115	5	0.43			
42	41	3.53	116	2	0.17			
43	1	0.09	117	2	0.17			
44	7	0.60	120	2	0.17			

- NOTE: 1. Zones marked with * are PMA Zones
 2. All other zones are external zones (outside the PMA) and were not included in any analysis.

TABLE 5-4

RESIDENCE LOCATION OF WVU EMPLOYEES
FROM PHONEBOOK SAMPLE

<u>ZONE</u>	<u>FREQUENCY</u>	<u>ZONE</u>	<u>FREQUENCY</u>	<u>ZONE</u>	<u>FREQUENCY</u>
1*	5	42	66	87	4
3*	5	44	30	90	1
4*	10	46	27	91	4
7*	13	50	1	93	5
8	1	52	1	94	4
10	10	53	1	100	1
13*	4	54	3	106	11
14	21	55	6	107	3
15	105	56	11	110	1
16	4	57	3	139	1
17	3	58	5	Unknown	28
18*	9	59	5		
19*	5	60	6		
21	19	61	1	TOTAL	862
23	21	62	3		
24	11	63	2		
25*	25	64	3		
26*	14	66	2		
27*	62	67	3		
29	29	69	2		
30	2	70	1		
31	11	71	4		
32	34	72	3		
33	21	73	4		
34	6	74	1		
35	5	77	2		
36	32	80	2		
37	12	81	3		
38	68	82	11		
39	2	83	7		
40	4	85	1		
41	4	86	2		

- NOTE: 1. Zones marked with * are PMA Zones
2. All other zones are external zones (outside the PMA) and were not included in any analysis.

TABLE 5-5

JOB FUNCTION OF WVU EMPLOYEES FROM PHONEBOOK SAMPLE

<u>JOB FUNCTION</u>	<u>FREQUENCY</u>	<u>%</u>
Administration	117	13.573
Teaching and/or research	246	28.538
Research only	23	2.668
Medical	79	9.164
Secretarial, clerical	143	16.589
Maintenance	99	11.484
Other (including food service workers, office assistance, librarians, securities, bus drivers, WVU-TV)	155	17.981
TOTAL	862	99.997

TABLE 5-6

WORK LOCATION OF WVU EMPLOYEES FROM PHONEBOOK SAMPLE

<u>WORK LOCATION</u>	<u>FREQUENCY</u>	<u>%</u>
CBD*	34	3.944
Main Campus	276	32.018
Engineering	33	3.828
Coliseum & Natatorium	25	2.900
Towers, Forestry	53	6.148
Medical Center	267	30.974
Agriculture	47	5.452
C.A.C.	19	2.204
Other (Law Centers, PRT Maintenance, Communications Center, etc.)	108	12.529
TOTAL	862	99.997

* Predominantly WVU-TV and persons in Office of Personnel.

TABLE 5-7

ESTIMATE OF THE RESIDENCE LOCATION OF WVU EMPLOYEES

<u>ZONE</u>	<u>NUMBER</u>	<u>ZONE</u>	<u>NUMBER</u>
1 *	27	29	154
3 *	27	30	11
4 *	53	31	58
7 *	69	32	180
8 *	5	33	111
10	53	34	32
13 *	21	35	27
14	111	36	170
15	557	37	64
16	21	38	361
17	16	39	11
18 *	48	40	21
19 *	27	41	21
21	101	42	350
23	111	44	159
24	58	46	143
25 *	133	Unknown	149
26 *	74	99	711
27 *	329		

- NOTE: 1. Zones marked with * are PMA Zones
2. All other zones are external zones (outside the PMA) and were not included in any analysis.

study. Because new estimates or actual measurements based on student directory and WVU phonebook of the Dorm and Nondorm Students and Faculty/Staff populations were made, the total, aggregate population for each zone would not be the same as the figures which were originally derived from the 1970 census data. In fact, the total population for all PMA zones during this study was estimated to be 863 (5%) higher than the 1970 census figures.

The estimated change in the Morgantown population since 1975 was based on data supplied by the Morgantown Area Chamber of Commerce, and over all represents a 4.02% increase. It is believed, however, that the percentage increase for the entire urban area is significantly greater. However, data was not available to confirm this opinion.

5.4 Work Force Population

At the onset of this study, it was assumed that the work force in the appropriate PMA zones, which included persons not necessarily residing in the respective zones, remained constant during the two years since the Pre-PRT study had been conducted. The assumption was based largely on the research team's general awareness of trends and changes pertaining to business, commerce and industry within the PMA.

The original estimates of the work force population was made for the Pre-PRT study and was based on data, some of which was made available by WVU, with the balance being extracted from sources within the West Virginia Department of Employment Security. During the period when data was being collected for the Operational Study, a considerable amount of time was spent in canvassing local businesses and in researching additional data provided by the Morgantown City Clerk's office. The purpose was to identify all new businesses in the PMA since the 1975 study, as well as to identify all business which in fact moved location or otherwise ceased to operate. In general, the findings were that where one business was lost an equivalent one was gained, at least in terms of number of employees. Moreover, the conclusion reached was that there was no reason to suspect that the original assumption was incorrect. Therefore, the figures reported in Table 5-1 are the same as those which were reported earlier.

I. What was your main reason for choosing a (Kind of vehicle) to make this trip?

Trip 1 _____
 Trip 2 _____
 Trip 3 _____
 Trip 4 _____
 Trip 5 _____
 Trip 6 _____

- 1. convenience
- 2. low cost
- 3. speed
- 4. no other transportation available
- 5. safety
- 6. I do not drive
- 7. other; specify:

	30
	31
	32
	33
	34
	35

J. (If not obvious) Was a car of yours available for your use during the time you took this trip?

- 1. YES
- 2. NO

Trip 1 _____
 Trip 2 _____
 Trip 3 _____
 Trip 4 _____
 Trip 5 _____
 Trip 6 _____

	36
	37
	38
	39
	40
	41

K. What other kinds of transportation were available to you for this trip? (Record 2 alternatives-Do not prompt)

Trip 1 _____
 Trip 2 _____
 Trip 3 _____
 Trip 4 _____
 Trip 5 _____
 Trip 6 _____

- 1. auto-driver
- 2. auto-passenger
- 3. bus-county
- 4. bus-city
- 5. bus-university
- 6. taxi
- 7. hitchhike
- 8. motorcycle
- 9. bicycle
- 10. PRT

	42-43
	44-45
	46-47
	48-49
	50-51
	52-53

Card No. HH No.

1	2	3	4	5	

L. (If the respondent was an auto driver) What kind of parking space did you use?

Trip 1 _____
 Trip 2 _____
 Trip 3 _____
 Trip 4 _____
 Trip 5 _____
 Trip 6 _____

- 1. at residence
- 2. university lot
- 3. on-street metered
- 4. on-street non-metered
- 5. private paid lot
- 6. off-street metered city lot
- 7. off-street non-metered lot
- 8. other; please specify

	6
	7
	8
	9
	10
	11

Did you make any other trips within the city of Morgantown yesterday? (If yes go to question C; if no, go to question M. But be sure to probe to get all trips, including those while at work.)

In order to complete our survey, I would like to get a little information about you.

M. (If not obvious) Are you a licensed driver?

1. YES
2. NO

12

N. How many automobiles do you and your spouse own?

1. 0
2. 1
3. 2
4. 3
5. 4 or more

13

O. How many automobiles do you have available for your personal use here in Morgantown?

1. 0
2. 1
3. 2
4. 3
5. 4 or more

14

P. Would you please tell me your occupation?

1. housewife
2. student
3. miner
4. professional (teacher, doctor, engineer, nurse, etc.)
5. proprietor, manager
6. sales
7. clerical
8. skilled, semi-skilled worker (secretary, mechanic, factory worker, waitress, etc.)
9. farmer, farm worker
10. not employed
11. other; please specify: _____

15-16

Q. Are you an employee of West Virginia University?

1. YES
2. NO

17

R. (If not obvious) What is your sex?

1. Female
2. Male

18

S. What is your age:

1. 14 years or under
2. 15-19
3. 20-24
4. 25-34
5. 35-44
6. 45-54
7. 55-64
8. 65 or older

19

T. What is your marital status?

1. married
2. single
3. widowed
4. separated
5. divorced

20

DD. Was your total (family) income for the past twelve (12) months:

1. more than \$15,000/yr.
2. more than \$10,000/yr.
3. more than \$5,000/yr.
4. below \$5,000

--	--

45-46

EE. (For full-time students)

May I ask how much rent you pay?
(check here if this includes meals:) _____ per _____

Approximately how much do you (your spouse and dependents) spend on food? (If not included in rent) _____ per _____

Approximately how much do you (your spouse and dependents) spend each month on all other purchases? (including transportation, recreation, clothes, books, records--but not tuition). _____ per month.

(Interviewer: Calculate the respondent's average expenses and expenditures for 4 months (one semester) and record the total in the box below).

--

47

\$ _____ /4 months

(Use the following code to reflect the amount in the box.)

1. \$250 - \$499
2. \$500 - \$749
3. \$750 - \$999
4. \$1000 - \$1249
5. \$1250 - \$1499
6. \$1500 - \$1749
7. \$1750 - \$1999
8. \$2000 - \$2249
9. over \$2250

That completes my list of questions. Thank you very much for your time and cooperation.

OPERATIONAL PRT IMPACT STUDY
ON-BOARD RIDERSHIP QUESTIONNAIRE

PRT Ridership Questionnaire

Please place a check mark (✓) on the line next to the appropriate answer for each question. Your responses will help us to improve the PRT Service. Thank you.

- A. What is the primary purpose of this trip? ___(1) returning home, ___(2) school related, ___(3) shopping, ___(4) social/recreational, ___(5) other.
- B. What was your main reason for choosing the PRT to make this trip? (Check only one.) ___(1) convenience, ___(2) low cost, ___(3) speed, ___(4) safety, ___(5) no other transportation available, ___(6) I do not drive, ___(7) other.
- C. What other kinds of vehicular transportation were available to you for this trip? (Check as many as necessary.) ___(1) auto: as driver, ___(2) auto: as passenger, ___(3) hitchhike, ___(4) taxi, ___(5) county bus, ___(6) city bus, ___(7) motorcycle, ___(8) bicycle, ___(9) none.
- D. How many minutes did you wait for this PRT car? ___(1) 0-2, ___(2) 3-5, ___(3) 6-10, ___(4) 11 or longer.
- E. Are you a licensed driver? ___(1) yes, ___(2) no.
- F. Which of the following applies to you? ___(1) non-university, ___(2) WVU faculty, ___(3) WVU staff, ___(4) part-time WVU student, ___(5) full-time WVU freshman, ___(6) full-time WVU sophomore, ___(7) full-time WVU junior, ___(8) full-time WVU senior, ___(9) WVU graduate student.
- G. What is your sex? ___(1) female, ___(2) male.
- H. What is your age? ___(1) 14 or under, ___(2) 15-19, ___(3) 20-24, ___(4) 25 or older.
- I. What is your marital status? ___(1) married, ___(2) single, ___(3) other.

So that we may call you to learn more about your use and opinions of the PRT, please place your name, phone number, and address on the lines below.

Name: _____ Phone: _____
Address: _____

DO NOT WRITE IN THIS COLUMN	#
_____	da
_____	on
_____	off
_____	a hr
_____	A
_____	B
1	2
3	4
5	6
7	8
9	
_____	D
_____	E
_____	F
_____	G
_____	H
_____	I
_____	N
_____	P
_____	Z
_____	call

757 30/01

PRT ON-BOARD
SUPPLEMENTAL TELEPHONE QUESTIONNAIRE

(Introduction) Hello, May I please speak to _____ (Name) _____?
Mr./Ms. _____ (Name) _____ I am calling with regard to
the PRT Ridership Questionnaire you completed earlier
today. We would like to know about your use and opinions
of the PRT.

First, would you please answer a few questions about the
PRT trip you took at _____ (Time) _____ o'clock today.

-
1. Where were you coming from when you got on the PRT?
(Write in address or establishment name.)

2. How did you travel from that location to the PRT station?

1. walk
 2. auto (as the driver)
 3. auto (as the passenger)
 4. county bus
 5. city bus
 6. university bus
 7. taxi
 8. hitchhike
 9. motorcycle
 10. bicycle
 11. other, please specify: _____

INTERVIEWER:

--	--

33 34

--	--

35 36

3. When you got off the PRT, what type of transportation did you use to complete your trip?

- 1. walk
- 2. auto (as the driver)
- 3. Auto (as the passenger)
- 4. county bus
- 5. city bus
- 6. university bus
- 7. taxi
- 8. hitchhike
- 9. motorcycle
- 10. bicycle
- 11. other, please specify: _____

--	--

37 38

4. What was your primary destination for this trip?
(Write in address or establishment name.)

--	--

39 40

5. How many one-way trips have you made on the PRT today?

- 1. one
- 2. two
- 3. three
- 4. four
- 5. five
- 6. six
- 7. seven
- 8. eight
- 9. nine or more

--

41

6. What is your occupation?

- 1. housewife
- 2. student
- 3. miner
- 4. professional (teacher, doctor, engineer, nurse, etc.)
- 5. proprietor, manager
- 6. sales
- 7. clerical
- 8. skilled, semi-skilled worker (mechanic, waitress, factory worker, etc.)
- 9. farmer, farm-worker
- 10. not employed
- 11. other, please specify: _____

--	--

42 43

CITY BUS SYSTEM QUESTIONNAIRE

The few minutes you will spend in completing this questionnaire will help to provide answers that are very important in a study on the means of transportation available in the city of Morgantown. Your completed form will be collected as you leave the bus. Thank you for your assistance.

Unless otherwise instructed, please place a check mark () on the line next to the appropriate answer for each question.

- 1. On the lines below, please place the names of streets or roads of the intersection nearest the location where you entered this bus.

--	--

1-2 RT

- 2. Is the location above your approximate home address?

- 1. YES
- 2. NO, please place your address on the lines below:

--

3 Day

M Date

--	--

4-6

--	--

7-8 ZONE

--	--

9-10 ZONE

- 3. Where were you coming from when you got on this bus?

- 1. Home
- 2. Morgantown downtown shopping area
- 3. West Virginia University (downtown campus)
- 4. Evansdale Campus
- 5. University Medical Center
- 6. Suncrest area
- 7. Star City---downtown area
- 8. Star City---Hill's Plaza location
- 9. Other, please specify the location (address if possible) on the lines below:

--	--

11-12

- 4. How did you travel from the location listed above (in question 3) to the location where you got on the bus?

- 1. Walk
- 2. Auto: as the driver
- 3. Auto: as a passenger
- 4. County bus
- 5. City bus
- 6. PRT (Personal Rapid Transit)
- 7. Taxi
- 8. Hitchhike
- 9. Motorcycle
- 10. Bicycle
- 11. Other, please specify: _____

--	--

13-14

9. What was your main reason for choosing this city or county bus to make this trip? (Check only one)
- 1. Convenience
 - 2. Low cost
 - 3. Speed
 - 4. Safety
 - 5. No other vehicle transportation available
 - 6. I do not drive
 - 7. Other; specify: _____
10. Approximately how many minutes did you have to wait at the bus stop for this bus?
- 1. 0-5
 - 2. 6-10
 - 3. 11-15
 - 4. 16-20
 - 5. 21-25
 - 6. 26-30
 - 7. Longer than 30 minutes
11. Are you a licensed driver?
- 1. Yes
 - 2. No
12. How many automobiles do you (and your spouse) own?
- 1. 0
 - 2. 1
 - 3. 2
 - 4. 3
 - 5. 4 or more
13. What is your occupation?
- 1. housewife
 - 2. student
 - 3. miner
 - 4. professional (teacher, doctor, engineer, etc.)
 - 5. proprietor, manager
 - 6. sales
 - 7. clerical
 - 8. skilled, semi-skilled worker (mechanic, waitress, factory worker, etc.)
 - 9. farmer, farm-worker
 - 10. not employed
 - 11. other, please specify: _____
14. Are you a full-time University employee?
- 1. Yes
 - 2. No
15. What is your sex?
- 1. female
 - 2. male

34

35

36

37

38-39

40

41

16. What is your age?
- 1. 14 years or younger
 - 2. 15-19
 - 3. 20-24
 - 4. 25-34
 - 5. 35-44
 - 6. 45-54
 - 7. 55-64
 - 8. 65 or older

 42

17. What is your marital status?
- 1. married
 - 2. single
 - 3. widowed
 - 4. separated
 - 5. divorced

 43

The next several questions ask you for your preferences among a bus, a car, or the PRT (Personal Rapid Transit). Please check () one answer to each question.

18. Which is most safe?
- 1. bus
 - 2. car
 - 3. PRT

 44

19. Which is least safe?
- 1. bus
 - 2. car
 - 3. PRT

 45
 46

20. Which is most reliable?
- 1. bus
 - 2. car
 - 3. PRT

 47

21. Which is least reliable?
- 1. bus
 - 2. car
 - 3. PRT

 48
 49

22. Which gives you the most comfortable ride?
- 1. bus
 - 2. car
 - 3. PRT

 50

23. Which gives you the least comfortable ride?
- 1. bus
 - 2. car
 - 3. PRT

 51

 52

24. Which is most convenient?
- 1. bus
 - 2. car
 - 3. PRT

 53

- | | | |
|--|--|----|
| 25. Which is least convenient? | | |
| <input type="checkbox"/> 1. bus | | 54 |
| <input type="checkbox"/> 2. car | | 55 |
| <input type="checkbox"/> 3. PRT | | |
| 26. Which type of vehicle takes you from the beginning to the end of your trip in the most amount of time? | | |
| <input type="checkbox"/> 1. bus | | |
| <input type="checkbox"/> 2. car | | |
| <input type="checkbox"/> 3. PRT | | 56 |
| 27. Which takes you from the beginning to the end of your trip in the least amount of time? | | |
| <input type="checkbox"/> 1. bus | | |
| <input type="checkbox"/> 2. car | | 57 |
| <input type="checkbox"/> 3. PRT | | 58 |
| 28. Which is most costly for you? | | |
| <input type="checkbox"/> 1. bus | | |
| <input type="checkbox"/> 2. car | | |
| <input type="checkbox"/> 3. PRT | | 59 |
| 29. Which is least costly for you? | | |
| <input type="checkbox"/> 1. bus | | |
| <input type="checkbox"/> 2. car | | 60 |
| <input type="checkbox"/> 3. PRT | | 61 |
| 30. Which offers the most pleasant atmosphere for traveling? | | |
| <input type="checkbox"/> 1. bus | | |
| <input type="checkbox"/> 2. car | | |
| <input type="checkbox"/> 3. PRT | | 62 |
| 31. Which offers the least pleasant atmosphere for traveling? | | |
| <input type="checkbox"/> 1. bus | | |
| <input type="checkbox"/> 2. car | | 63 |
| <input type="checkbox"/> 3. PRT | | 64 |
| 32. Approximately how many times have you ridden the PRT? | | |
| <input type="checkbox"/> 1. never | | |
| <input type="checkbox"/> 2. 1 - 10 | | |
| <input type="checkbox"/> 3. 11 - 25 | | |
| <input type="checkbox"/> 4. 26 - 50 | | |
| <input type="checkbox"/> 5. 51 - 75 | | |
| <input type="checkbox"/> 6. 76 - 100 | | |
| <input type="checkbox"/> 7. more than 100 | | 65 |

THANK YOU

OPERATIONAL PRT IMPACT STUDY
FACULTY/STAFF NONHOME-BASED TRAVEL SURVEY

I. Which of the following best describes your primary job function?
(Circle one only)

- | | | | | | | |
|----------------|------------------------------|------------------|---------|-------------------------|-------------|-------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Administrative | Teaching and/
or Research | Research
Only | Medical | Secretarial
Clerical | Maintenance | Other |

II. What is your home address? _____

III. Circle the campus or general area which is nearest to or is your principal place of work (Circle one only)

- | | |
|---|--------------------|
| 0 Home | 4 Coliseum |
| 1 Morgantown Central Business District | 5 Towers, Forestry |
| 2 Main University Campus | 6 Medical Center |
| 3 Engineering, Agriculture, Creative Arts | 7 Other _____ |

IV. As accurately as possible, record all of the trips, in order of occurrence, which you made on April 28, 1977 between any of the areas listed under Item III above. With the exception of time, record your trips using the code numbers. To record your trips, follow the example given below.

	FROM	TO	PURPOSE OF TRIP	APPROX. TIME TRIP STARTED	MODE OF TRAVEL	IF YOU USED AUTO WHERE DID YOU PARK?	IF YOU DID NOT USE AUTO, WAS AUTO AVAILABLE FOR THIS TRIP?
TRIP NUMBER			1. Returning home 2. Work related 3. Shopping 4. Eat Meal 5. Personal Business 6. Medical/Dental 7. Social Recreational 8. Other		1. Auto-Driver 2. Auto-Pass. 3. PRT 4. Bus County, City 5. Bus-Univ. 6. Taxi 7. Motor-cycle 8. Bicycle	1. University Lot 2. On Street-metered 3. On Street non-metered 4. Private Paid Lot 5. Off Street Metered-lot 6. Other (Specify)	1. Yes 2. No 3. Not Applicable
EXAMPLE	0	3	2	8:30 AM	1	1	3
1							
2							
3							
4							
5							

CODEBOOK FOR DATA FILES

APPENDIX B-1

TAPE FORMAT FOR TELEPHONE INTERVIEW

File 1 of Tape Number 000584. DSNAM=POSTMPTCT.TELINT.
 RECFM = FB, LRECL = 240, BLKSIZE = 4800.

BYTE NUMBER	DESCRIPTION	EXPLANATION	LOCATION ON QUESTIONNAIRE
1-5	Card number and control number	Household - peculiar	1st page
6-7	Zone in which household located	From map of zones	1st page
8	Dorm code	1=lives in dorm 2=does not live in dorm	1st page
9-11	Time code		1st page
12	Month	4=April	
13-14	Day on which phone interview was completed	01=Monday 05=Friday 02=Tuesday 06=Saturday 03=Wednesday 07=Sunday 04=Thursday	
15	Does respondent still live at the given address?	1=yes 2=no	A
16	Did respondent make any vehicular trip today?	1=yes 2=no	B
17-18	Zone of origin of 1st trip		
19-20	Zone of origin of 2nd trip		
21-22	Zone of origin of 3rd trip		
23-24	Zone of origin of 4th trip		
25-26	Zone of origin of 5th trip		
27-28	Zone of origin of 6th trip	From map of zones	C

APPENDIX B-1 (continued)

29-33	Time of start of 1st trip	Each time is in form of	D
34-38	Time of start of 2nd trip	HHMM, where HH=hour in	
39-43	Time of start of 3rd trip	conventional American form,	
44-48	Time of start of 4th trip	MM=minutes, and C=code for	
49-53	Time of start of 5th trip	AM or PM (1=AM, 2=PM thus,	
54-58	Time of start of 6th trip	10312=10:31 PM)	
59-60	Zone of destination of 1st trip	From map of zones	E
61-62	Zone of destination of 2nd trip		
63-64	Zone of destination of 3rd trip		
65-66	Zone of destination of 4th trip		
67-68	Zone of destination of 5th trip		
69-70	Zone of destination of 6th trip		
71	Route of 1st trip	1=University Avenue	
72	Route of 2nd trip	2=Beechurst-Monongahela	
73	Route of 3rd trip	3=Willowdale and Stewart Street	
74	Route of 4th trip		
75	Route of 5th trip		
76	Route of 6th trip		
77-80	Blank		
81-85	Card #, Respondent #		G
86-87	Purpose of 1st trip	1=Returning home	
88-89	Purpose of 2nd trip	2=School related	
90-91	Purpose of 3rd trip	3=Work related	
92-93	Purpose of 4th trip	4=Social/Recreational	
94-95	Purpose of 5th trip	5=Transfer to other means of travel	
96-97	Purpose of 6th trip	6=Medical/Dental	
		7=Eat meal	
		8=Personal business	
		9=To transport another person	
		10=Other	

APPENDIX B-1 (continued)

H

98-99 Mode of transportation for 1st trip 1=Auto/driver
 100-101 Mode of transportation for 2nd trip 2=Auto/passenger
 102-103 Mode of transportation for 3rd trip 3=Bus/County
 104-105 Mode of transportation for 4th trip 4=Bus/City
 106-107 Mode of transportation for 5th trip 5=Bus/University
 108-109 Mode of transportation for 6th trip 6=Taxi
 7=Hitchhike
 8=Motorcycle
 9=Bicycle
 10=PRT

I

110 Main reason for choice of mode for 1st trip 1=Convenience
 111 Main reason for choice of mode for 2nd trip 2=Low cost
 112 Main reason for choice of mode for 3rd trip 3=Speed
 113 Main reason for choice of mode for 4th trip 4=No other mode available
 114 Main reason for choice of mode for 5th trip 5=Safety
 115 Main reason for choice of mode for 6th trip 6=I do not drive
 7=Other

J

116 Car available for 1st trip 1=yes
 117 Car available for 2nd trip 2=no
 118 Car available for 3rd trip
 119 Car available for 4th trip
 120 Car available for 5th trip
 121 Car available for 6th trip

K

122-123 Alternative modes perceived for 1st trip 1=Auto/driver
 124-125 Alternative modes perceived for 2nd trip 2=Auto/passenger
 126-127 Alternative modes perceived for 3rd trip 3=Bus/County
 128-129 Alternative modes perceived for 4th trip 4=Bus/City
 130-131 Alternative modes perceived for 5th trip 5=Bus/University
 132-133 Alternative modes perceived for 6th trip 6=Taxi
 7=Hitchhike
 8=Motorcycle
 9=Bicycle
 10=PRT

APPENDIX B-1 (continued)

134-160	Blank		
161-165	Card #, Respondent Information		
166	Parking space for 1st trip	1=At residence	L
167	Parking space for 2nd trip	2=University lot	
168	Parking space for 3rd trip	3=On-street metered	
169	Parking space for 4th trip	4=On-street non-metered	
170	Parking space for 5th trip	5=Private lot paid	
171	Parking space for 6th trip	6=Off-street metered city lot	
		7=Off-street non-metered lot	
		8=Other	
172	Is respondent a licensed driver?	1=yes	M
		2=no	
173	Number of auto owned by respondent and spouse	1=0 autos	N
		2=1 auto	
		3=2 autos	
		4=3 autos	
		5=4 or more autos	
174	Number of autos available for personal use of respondent in Morgantown	1=0 autos	O
		2=1 auto	
		3=2 autos	
		4=3 autos	
		5=4 or more autos	
175-176	Respondent occupation	1=Housewife	P
		2=Student	
		3=Miner	
		4=Professional	
		5=Proprietor, manager	
		6=Sales	
		7=Clerical	
		8=Skilled	
		9=Farmer, farm worker	
		10=Not employed, retired	
		11=Other	

APPENDIX B-1 (continued)

177	Is respondent an employee of West Virginia University?	1=yes 2=no	Q
178	Respondent sex	1=Female 2=Male	R
179	Respondent age	1=14 years or under 2=15-19 3=20-24 4=25-34 5=35-44 6=45-54 7=55-64 8=65 or older	S
180	Respondent marital status	1=Married 2=Single 3=Widowed 4=Separated 5=Divorced	T
181	Which vehicle is most safe?	1=PRT	U
182	Which vehicle is 2nd most safe?	2=Car	
183	Which vehicle is least safe?	3=Bus	
184	Which vehicle is most reliable?	1=PRT	V
185	Which vehicle is 2nd most reliable?	2=Car	
186	Which vehicle is least reliable?	3=Bus	
187	Which vehicle gives most comfortable ride?	1=PRT	W
188	Which vehicle gives 2nd most comfortable ride?	2=Car	
189	Which vehicle gives least comfortable ride?	3=Bus	
190	Which type vehicle is most convenient?	1=PRT	X
191	Which type vehicle is 2nd most convenient?	2=Car	
192	Which type vehicle is least convenient?	3=Bus	

APPENDIX B-1 (continued)

193	Which vehicle takes least time?	1=PRT	Y
194	Which vehicle takes 2nd least time?	2=Car	
195	Which vehicle takes most time?	3=Bus	
196	Which vehicle is least expensive?	1=PRT	Z
197	Which vehicle is 2nd least expensive?	2=Car	
198	Which vehicle is most expensive?	3=Bus	
199	Which vehicle offers most pleasant atmosphere?	1=PRT	AA
200	Which vehicle offers 2nd most pleasant atmosphere?	2=Car	
201	Which vehicle offers least pleasant atmosphere?	3=Bus	
202	Number of times respondent took the PRT	1=Never 2=1-10 3=11-25 4=26-50 5=51-75 6=76-100 7=More than 100	BB
203-204	Annual salary of respondent (non-student)	1=Under \$3000 2=\$3000-\$3999 3=\$4000-\$4999 4=\$5000-\$5999 5=\$6000-\$6999 6=\$7000-\$7999 7=\$8000-\$8999 8=\$9000-\$9999 9=\$10,000-\$12,499 10=\$12,500-\$14,999 11=\$15,000-\$24,000 12=Over \$25,000	CC
205-206	Annual salary of respondent family (non-student)	(Ignore all others - coding error) 1=more than \$15,000/yr 2=more than \$10,000/yr 3=more than \$5,000/yr 4=below \$5,000/yr	DD

APPENDIX B-1 (continued)

207	Student respondent average expenses per year	EE
		1=\$250-\$499
		2=\$500-\$749
		3=\$750-\$999
		4=\$1000-\$1249
		5=\$1250-\$1499
		6=\$1500-\$1749
		7=\$1750-\$1999
		8=\$2000-\$2249
		9=Over \$2250

208-240 Blank

APPENDIX B-2

TAPE FORMAT FOR PRT ON-BOARD SURVEY

File 2 of Tape Number 00584. DSNNAME=POSTMPCT.PRTON
 RECFM = FB, LRECL = 32, BLKSIZE = 3200

BYTE NUMBERS	QUESTION	DESCRIPTION	EXPLANATION
1-3	-		
4	-	Day questionnaire filled out	1=Monday 6=Saturday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday
5	-	Location respondent entered PRT	1=Engineering 2=Beechurst-Engineering 3=Walnut 4=Beechurst-Walnut
6	-	Location respondent left PRT	Same code as location respondent entered PRT
7-10	-	Time respondent was making the trip	HHMC; HH is the hour; M is minutes; C = Code for AM and PM 1031 = 10:00 1032 = 10:30 PM 1 = AM 2 = PM
11	A	Primary purpose of the trip	1=Returning home 2=School related 3=Shopping 4=Social/recreational 5=Other

APPENDIX B-2 (continued)

12	B	Why respondent chose PRT	1=Convenience 2=Low cost 3=Speed 4=Safety 5=No other mode available 6=Do not drive 7=Other
13	C	Was auto (as driver) available as alternative mode?	0 or Blank = No 1 = Yes
14		Was auto (as passenger) available as alternative mode?	0 or Blank = No 1 = Yes
15		Was hitchhike available as alternative mode?	0 or Blank = No 1 = Yes
16		Was taxi available as alternative mode?	0 or Blank = No 1 = Yes
17		Was county bus available as alternative mode?	0 or Blank = No 1 = Yes
18		Was city bus available as alternative mode?	0 or Blank = No 1 = Yes
19		Was motorcycle available as alternative mode?	0 or Blank = No 1 = Yes
20		Was bicycle available as alternative mode?	0 or Blank = No 1 = Yes
21		Was no alternative mode available?	0 or Blank = No 1 = Yes
22	D	Minutes respondent waited for PRT car	1=0-2 min. 2=3-5 min. 3=6-10 min. 4=11 or longer

APPENDIX B-2 (continued)

23	E	Is respondent licensed driver?	1=Yes 2=NO
24	F	Respondent Status	1=Nonuniversity 2=WVU faculty 3=WVU staff 4=Part-time WVU student 5=Full-time WVU Freshman 6=Full-time WVU Sophomore 7=Full-time WVU Junior 8=Full-time WVU Senior 9=WVU graduate student
25	G	Respondent sex	1=Female 2=Male
26	H	Respondent's age	1=14 or under 2=15-19 3=20-24 4=25 or older
27	I	Marital Status	1=Married 2=Single 3=Other
28	-	Name	1=Given 2=Not given
29	-	Telephone	1=Given 2=Not given
30-31	-	Address zone	See Zone from Map
32	-	Was the questionnaire completed by the respondent on the phone?	1=Questionnaire follow-up completed 2=Questionnaire follow-up not attempted 3=Questionnaire follow-up unsuccessful

TAPE FORMAT FOR CITY BUS ON-BOARD SURVEY

File 3 of Tape Number 00584. DSNAME = POSTMPCT. CCBSOBD
 RECFM=FB, LRECL=65, BLSIZE=1300

BYTE NUMBER	QUESTION	DESCRIPTION	EXPLANATION
1-2	-	Time Code.	01=7-7:50 AM 10=4-4:50 PM 02=8-8:50 AM 11=5-5:50 PM 03=9-9:50 AM 12=6-6:50 PM 04=10-10:50 AM 13=7-7:50 PM 05=11-11:50 PM 14=8-8:50 PM 06=12-12:50 PM 15=9-9:50 PM 07=1-1:50 PM 08=2-2:50 PM 09=3-3:50 PM
3	-	Day questionnaire filled out.	1=Monday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday 6=Saturday
4-6	-	Date questionnaire filled out.	422 = April 22, 1977
7-8			
9-10	2	Location of respondent residence.	91=If respondent reside zone is the same as for question 1. 92=Does not reside in zone where entered bus but approximate address not given
11-12	3	Where respondent was coming from when he got in bus.	91=Home 96=Suncrest Area 92=Downtown 97=Star City Downtown 93=Main Campus 98=Star City Hills Plaza 94=Evansdale 95=Med-Center

APPENDIX B-3 (continued)

13-14	4	Mode of travel used by respondent to get from location in question 3 to location where he got on bus.	<ul style="list-style-type: none"> 1=Walk 2=Auto (as driver) 3=Auto (as passenger) 4=County bus 5=City bus 6=PRT 7=Taxi 8=Hitchhike 9=Motorcycle 10=Bicycle 11=Other
15-19	5	Time this trip started.	<ul style="list-style-type: none"> Hours (2 bytes), minutes (2 bytes) A.M./P.M. Code (1 byte)--1=A.M, 2=P.M.
20-21	6	Where respondent will leave this bus.	<ul style="list-style-type: none"> 91=Home 92=Downtown 93=Main Campus 94=Evansdale 95=Med Center 96=Suncrest Area 97=Star City downtown 98=Star City Hills Plaza
22-23	7	Trip Purpose.	<ul style="list-style-type: none"> 1=Returning home 2=School Related 3=Work related 4=Shopping 5=Social-Recreational 6=To get to another means of transportation 7=Medical-Dental 8=Eat meal 9=Personal business 10=To transport another person 11=Other

APPENDIX B-3 (continued)

24	8	Was auto (as driver) available as alternative mode?	0 or Blank = No 1 = Yes
25		Was auto (as passenger) available as alternative mode?	
26		Was Hitchhike available as alternative mode?	
27		Was Taxi available as alternative mode?	
28		Was Bus-County available as alternative mode?	
29		Was Bus-City available as alternative mode?	
30		Was Motorcycle available as alternative mode?	
31		Was bicycle available as alternative mode?	
32		Was PRT available as alternative mode?	
33		Was no other alternative mode available?	
34	9	Main reason for choosing this bus to make this trip.	1=Convenience 2=Low cost 3=Speed 4=Safety 5=No other vehicle transportation available 6=Respondent does not drive 7=Other
35	10	Minutes respondent waited at bus stop for bus.	1=0-5 minutes 2=6-10 minutes 3=11-15 minutes 4=16-20 minutes 5=21-25 minutes 6=26-30 minutes 7=Longer than 30 minutes
36	11	Is respondent licensed driver?	1=Yes 2=NO

APPENDIX B-3(continued)

37	12	Number of autos owned by respondent and spouse.	1=0 autos 2=1 auto 3=2 autos 4=3 autos 5=4 or more autos
38-39	13	Respondent occupation.	1=Housewife 2=Student 3=Miner 4=Professional 5=Proprietor, Manager 6=Sales 7=Clerical 8=Skilled, semi-skilled worker 9=Farmer, farm worker 10=Not employed, retired 11=Other
40	14	Is respondent full time University employee?	1=Yes 2=No
41	15	Respondent sex.	1=Female 2=male
42	16	Age of respondent.	1=14 years or younger 2=15-19 years 3=20-24 years 4=25-34 years 5=35-44 years 6=45-54 years 7=55-64 years 8=65 years or older
43	17	Respondent's marital status.	1=Married 2=Single 3=Widowed 4=Separated 5=divorced

APPENDIX B-3 (continued)

44	18	Which vehicle is most safe?	1=Bus
45	-	Which vehicle is 2nd most safe?	2=Car
46	19	Which vehicle is least safe?	3=PRT
47	20	Which vehicle is most reliable?	1=Bus
48	-	Which vehicle is 2nd most reliable?	2=Car
49	21	Which vehicle is least reliable?	3=PRT
50	22	Which vehicle gives most comfortable ride?	1=Bus
51	-	Which vehicle gives 2nd most comfortable ride?	2=Car
52	23	Which vehicle gives least comfortable ride?	3=PRT
53	24	Which vehicle is most convenient?	1=Bus
54	-	Which vehicle is 2nd most convenient?	2=Car
55	25	Which vehicle is least convenient?	3=PRT
56	26	Which vehicle takes most time?	1=Bus
57	-	Which vehicle takes 2nd most time?	2=Car
58	27	Which vehicle takes least time?	3=PRT
59	28	Which vehicle is most expensive?	1=Bus
60	-	Which vehicle is 2nd most expensive?	2=Car
61	29	Which vehicle is least expensive?	3=PRT
62	30	Which vehicle offers most pleasant atmosphere?	1=Bus
63	-	Which vehicle offers 2nd most pleasant atmosphere?	2=Car
64	31	Which vehicle offers least pleasant atmosphere?	3=PRT
65	32	How many times did the respondent ride the PRT?	1=Never 2=1-10 times 3=11-25 times 4=26-50 times 5=51-75 times 6=76-100 times 7=More than 100 times

APPENDIX B-4

TAPE FORMAT FOR FACULTY/STAFF 1977 MAILBACK SURVEY

File 4 of Tape Number 000817. DSNAME = POSTMPCT.FS77.
 RECFM = FB, LRECL = 80, BLKSIZE = 640

BYTE NUMBER	DESCRIPTION	EXPLANATION
1-4	Blank.	
5-6	Date.	Day of the month in which completed questionnaire was received by Dept. of Industrial Engineering.
7	Primary job function of respondent.	1=Administrative 2=Teaching and/or research 3=Research only 4=Medical 5=Secretarial, clerical 6=Maintenance 7 - 9=Other
8-9	Zone in which respondent resides.	See map of zones.
10	Respondent principle place of work.	0=Home 1=CBD 2=Main University Campus 3=Engineering, Agr; C.A.C. 4=Coliseum 5=Towers and Forestry 6=Medical Center 7=Other
11	Number of trips reported by respondent.	
12	Trip #1 trip number.	Always 1.
13	Origin of trip #1.	Coded same as byte 10

APPENDIX B-4 (continued)

14	Destination of trip #1.	Coded same as byte 10
15	Purpose of trip #1.	<ul style="list-style-type: none"> 1=Returning home 2=Work related 3=Shopping 4=Eat Meal 5=Personal Business 6=Medical/Dental 7=Social/Recreational 8=Other
16-20	Time trip #1 started.	<p>Hours (2 bytes), minutes (2 bytes), AM/PM Code (1 byte)-- 1=A.M., 2= P.M. Example: 08301 = 8:30 A.M.</p>
21	Mode of travel for trip #1.	<ul style="list-style-type: none"> 1=Auto-driver 2=Auto-passenger 3=PRT 4=City or County bus 5=University bus 6=Taxi 7=Motorcycle 8=Bicycle 9=Walk
22	If auto used for trip #1 where respondent parked.	<ul style="list-style-type: none"> 1=University Lot 2=On-street metered 3=On-street non-metered 4=Private paid lot 5=Off-street metered lot 6=Other
23	If auto not used for trip #1 was auto available?	<ul style="list-style-type: none"> 1=Yes 2=No 3=Not applicable
24	Trip #2 number.	Always 2
25	Origin of trip #2.	Coded same as byte 10

APPENDIX B-4 (continued)

26	Destination of trip #2.	Coded same as byte 10
27	Purpose of trip #2.	Coded same as byte 15
28-32	Time trip #2 started.	Coded same as byte 16-20
33	Mode of travel for trip #2.	Coded same as byte 21
34	If auto used for trip #2, where respondent parked.	Coded same as byte 22
35	If auto was not used for trip #2, was auto available?	Coded same as byte 23
36-47	Information for trip #3	Coded same as for trip #1
48-59	Information for trip #4	Coded same as for trip #1
60-71	Information for trip #5	Coded same as for trip #1

APPENDIX B-5

TAPE FORMAT FOR PARKING SURVEY

File 8 on Tape Number 000594, DSNAM = POSTMPT. PARK.
 RECFM = FB, LRECL = 14, BLKSIZE = 4200.

BYTE NUMBERS	DESCRIPTION	EXPLANATION
1	Day of week.	1=Monday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday
2-5	Time.	Hours (2 bytes), Minutes (2 bytes)
6-7	Lot number.	Coded as shown at top of Survey form PRT-8
8	Blank.	
9	Blank.	
10-11	Time required to find a parking place.	In minutes

APPENDIX B-6

TAPE FORMAT FOR CITY/COUNTY RIDERSHIP SURVEY

File 9 of Tape Number 000584., DSN = POSTMPCT.CTYBS.
 RECFM = FB, LRECL = 28, BLKSIZE = 5600.

BYTE NUMBER	DESCRIPTION	EXPLANATION
1	Bus type.	1=City 2=County
2-5	Record Identifier.	
6	Run Number.	1=Suncrest 2=Star City
7	Day of week.	1=Monday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday
8-9	Month.	e.g. 04 = April and 11 = November
10-11	Day of Month.	Chronological Day Date
12-13	Stop number.	A running count of the number of stops made by bus.
14-17	Time of this stop.	Hours (2 bytes), minutes (2 bytes) (7 am to 5 pm; 0900 = 9 am)
18-19	Number of passengers boarding bus at this stop.	
20-21	Number of passengers leaving bus at this stop.	

- 22 Number of standees.
- 23-24 Zone number of this stop. See map of zones
- 25-28 Time at which bus scheduled to start its run from CBD terminal. Hours (2 bytes), minutes (2 bytes) (7 am to 5 pm; 0900 = 9 am)

APPENDIX B-7

TAPE FORMAT FOR INTERCEPT SURVEY

File 7 or Tape Number 000584. DSNNAME = POSTMPCT.ODINT.
 RECFM = FB, LRECL = 15, BLKSIZE = 3000

BYTE NUMBERS	DESCRIPTION	EXPLANATION
1-4	Control number.	
5-6	Zone of origin of trip.	See map of zones.
7-8	Zone of destination of trip.	See map of zones
9	Number of occupants.	
10-13	Time.	Hour (2 bytes), minutes (2 bytes). (7 am to 5 pm; 0900 = 9 am)
14	Code for Location.	1= University Avenue - North 2= University Avenue - South 3= Beechurst Avenue - North 4= Beechurst Avenue - South (at Coliseum)
15	Code for Day.	3=Wednesday 5=Friday

APPENDIX B-9

PRT COUNTS DATA TAPE FORMAT

File 10 on Tape Number 000584. DSNAME = POSTMPT. PASSDATA
 RECFM = FB, LRECL = 34, BLKSIZE = 3400

BYTE NUMBER	CONTENTS	DESCRIPTION & VALUE DEFINITION
1-2	Month.	1 = January, 2 = February, 12 = December
3-9	Day.	1 = First day of month, 2 = second day of month, 31 = thirty-first day of month
5-6	Start Hour.	Ø = 12 Midnight, 1 = 1 AM, 2 = 2 AM, 12 = 12 Noon, 13 = 1 PM, 14 = 2 PM, 23 = 11 PM
7-8	End Hour.	Same as start hour
9-10	Number of Entries.	The number of five minute intervals for which data was recorded during the hour.
11-12	Wal to Bee Passenger Count	The number of passenger requests between which data was recorded during the hour.
13-14	Wal to Eng Passenger Count	
15-16	Bee to Wal Passenger Count	
17-18	Bee to Eng Passenger Count	
19-20	Eng to Wal Passenger Count	



APPENDIX B-8 (continued)

21-22	Eng to Bee Passenger Count	The number of passenger requests between the specified stations during the hour
23-24	Wal to Bee Occupied Dispatches	The number of vehicles statused as occupied from an origin station to a destination station.
25-26	Wal to Eng Occupied Dispatches	
27-28	Bee to Wal Occupied Dispatches	
29-30	Bee to Eng Occupied Dispatches	
31-32	Eng to Wal Occupied Dispatches	
33-34	Eng to Bee Occupied Dispatches	



APPENDIX B-9

TAPE FORMAT FOR UNIVERSITY BUS RIDERSHIP SURVEY

File 11 on Tape Number 000584. DSNAM=POSTMPCCT.UBUS.
 RECFM = FB, LRECL = 26, BLKSIZE = 5200

BYTE NUMBER	DESCRIPTION	EXPLANATION
1-2	Date	
3	Dash	(-)
4	Month	4
5	Dash	(-)
6-7	Year	77
8	Location	1=Med Center 2=Pierpont 3=Towers 4=Ag Science 5=Engineering 6=CAC 7=Coliseum 8=Mt.Lair 9=On Bus
9	Route	1=Med Center-Coliseum 2=Coliseum-Med Center 3=Towers-Engineering 4=Engineering-Towers 5=Med Center-Mt. Lair 6=Mt. Lair-Med Center

APPENDIX B-9 (continued)

10	Stop	1=Med Center 2=Pierpont 3=Towers 4=Ag Science 5=Engineering 6=CAC 7=Coliseum 8=Mt. Lair
11-12	Bus Number	1-6 for route 3, 4 10-20 for route 1, 2, 5, 6
13-16	Arrival Time	HHMM, HH=hours; MM=minutes
17-18	Number of passengers on bus	
19-20	Number of passengers off bus	
21-22	Number of passengers standing	
23-26	Departure time	Same as arrival

APPENDIX B-10

TAPE FORMAT FOR PRT ON-BOARD SURVEY
WITH FOLLOW-UP SURVEY RESPONSES

File 12 of Tape Number 000584. DSN=POSTMPCT. PRTOBF
RECFM = FB, LRECL = 64, BLKSIZE = 640

BYTE NUMBERS	QUESTION	DESCRIPTION	EXPLANATION
1-3	-		
4	-	Day questionnaire filled out.	1=Monday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday
5	-	Location respondent entered PRT.	1=Eng. 2=Beechurst-N 3=Walnut 4=Beechurst-S
6	-	Location Respondent Left PRT	Same code as location respondent entered PRT.
7-10	-	Time.	HHMC; HH is the hour; M = minutes; C = Code for AM and PM 1031 = 10:00 1032 = 10:30 PM 1 = AM 2 = PM

APPENDIX B-10 (continued)

11	A	Primary purpose of the trip.	1=Returning home 2=School related 3=Shopping 4=Social/recreational 5=Other
12	B	Why respondent chose PRT.	1=Convenience 2=Low cost 3=Speed 4=Safety 5=No other mode available 6=Do not drive 7=Other
13	C	Was auto (as driver) available as alternative mode?	0 or Blank=No 1=Yes
14		Was auto (as passenger) available as alternative mode?	0 or Blank=No 1=Yes
15		Was hitchhike available as alternative mode?	0 or Blank=No 1=Yes
16		Was taxi available as alternative mode?	0 or Blank=No 1=Yes
17		Was County bus available as alternative mode?	0 or Blank=No 1=Yes
18		Was City bus available as alternative mode?	0 or Blank=No 1=Yes
19		Was motorcycle available as alternative mode?	0 or Blank=No 1=Yes
20		Was bicycle available as alternative mode?	0 or Blank=No 1=Yes
21		Was no alternative mode available?	0 or Blank=No 1=Yes

APPENDIX B-10 (continued)

22	D	Minutes respondent waited for PRT car.	1=0-2 min. 2=3-5 " 3=6-10 " 4=11 or longer
23	E	Is respondent licensed driver?	1=Yes 2=No
24	F	Respondent Status.	1=Non-University 2=W.V.U. Faculty 3=W.V.U. Staff 4=Part-time WVU Student 5=Full-time WVU Freshman 6=Full-time WVU Sophomore 7=Full-time WVU Junior 8=Full-time WVU Senior 9=WVU graduate student
25	G	Respondent's sex.	1=Female 2=Male
26	H	Respondent's age.	1=14 or under 2=15-19 3=20-24 4=25 or older
27	I	Marital Status.	1=Married 2=Single 3=Other
28	-	Name.	1=given 2=not given
29	-	Telephone.	1=given 1=not given
30-31	-	Address Zone.	See Zone from map

APPENDIX B-10 (continued)

32	-	Was the questionnaire completed by the respondent on the phone?	1=Questionnaire follow-up completed 2=Questionnaire follow-up not attempted 3=Questionnaire follow-up unsuccessful
33-34	1	Location from where respondent was coming.	See map of zones
35-36	2	How did respondent get to the PRT station?	1=Walk 2=Auto (as driver) 3=Auto (as passenger) 4=County Bus 5=City Bus 6=University Bus 7=Taxi 8=Hitchhike 9=Motorcycle 10=Bicycle 11=Other
37-38	3	What other transportation did respondent use to complete his trip?	Same as above
39-40	4	Respondent destination.	See zone map
41	5	Respondents one-way trips on PRT.	1=one 2=two 3=three 4=four 5=five 6=six 7=seven 8=eight 9=nine or more

APPENDIX B-10(continued)

- | | | | |
|-------|----|---|--|
| 42-43 | 6 | Respondent's occupation. | 1=Housewife
2=Student
3=Miner
4=Professional
5=Proprietor, manager
6=Sales
7=Clerical
8=Skilled or Semi-skilled person
9=Farmer or farm worker
10=Not employed, retired
11=Other |
| 44 | 7 | Which of the vehicles is most safe? | 1=PRT |
| 45 | | Which of the vehicles is 2nd most safe? | 2=Car |
| 46 | | Which of the vehicles is least safe? | 3=Bus |
| 47 | 8 | Which of the vehicles is most reliable? | 1=PRT |
| 48 | | Which of the vehicles is 2nd most reliable | 2=Car |
| 49 | | Which of the vehicles is least reliable? | 3=Bus |
| 50 | 9 | Which of the vehicles is most comfortable to ride? | 1=PRT |
| 51 | | Which of the vehicles is 2nd most comfortable? | 2=Car |
| 52 | | Which of the vehicles is least comfortable to ride? | 3=Bus |
| 53 | 10 | Which of the vehicles is most convenient? | 1=PRT |
| 54 | | Which of the vehicles is 2nd most convenient? | 2=Car |
| 55 | | Which of the vehicles is least convenient? | 3=Bus |
| 56 | 11 | Which vehicle takes least amount of time? | 1=PRT |
| 57 | | Which vehicle takes 2nd least amount of time? | 2=Car |
| 58 | | Which vehicle takes most amount of time? | 3=Bus |

APPENDIX B-10 (continued)

- | | | | |
|----|----|---------------------------------------|-------|
| 59 | 12 | Which vehicle is least expensive? | 1=PRT |
| 60 | | Which vehicle is 2nd least expensive? | 2=Car |
| 61 | | Which vehicle is most expensive | 3=Bus |
| 62 | 13 | Which vehicle is most pleasant? | 1=PRT |
| 63 | | Which vehicle is 2nd most pleasant? | 2=Car |
| 64 | | Which vehicle is least pleasant? | 3=Bus |

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