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RPC report

TRANSPORTATION TECHNICAL MEMORANDUM 51

BALTIMORE METRO IMPACT STUDY: DOCUMENTATION OF BASELINE CONDITIONS PRIOR TO OPERATION

Regional Planning Council
2225 N. Charles Street Baltimore, Maryland 21218

TECHNICAL MEMORANDUM 51

BALTIMORE METRO IMPACT STUDY:

DOCUMENTATION OF BASELINE CONDITIONS PRIOR TO OPERATION

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ACKNOWLEDGEMENTS

Many people have participated in the Metro Section A Impact Study and have made valuable contributions to it. The UMTA representatives, Richard Steinmann and John Caruolo, were instrumental in reviewing the work program outline and offering suggestions to improve the quality and scope of individual tasks. As major participants of the study and project leaders for their agencies, Carl Ruskin of the Baltimore City Department of Planning and Robert Mowry of the Mass Transit Administration supplied task reports and other information. Members of the Regional Planning Council Transportation Planning Division staff, too numerous to mention, were also invaluable in obtaining various traffic, socio-economic, and survey data.

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EXECUTIVE SUMMARY

This report desribes the transportation, demographic, environmental and land use conditions in the Northwest Corridor of Baltimore City and Baltimore County prior to the opening of Metro. These data were collected to represent the "before" conditions existing prior to startup of revenue service on November 21, 1983. This paper documents the work performed by the three major contributing agencies: the Regional Planning Council, Mass Transit Administration, and Baltimore City Department of Planning. All work was performed in accordance with an overall, multi-year work plan (Section A Metro Impact Study Work Program, August, 1982) which reflects work activities over the period spanning the "before" and "after" phases on Section A operation.

The Section A Metro rapid rail line serves the Northwest area of Baltimore City and is about 8 miles in length. The line serves a study impact corridor whose population density is 8,900 persons/sq. mile compared to the regional average of 975 persons/sq. mile. According to the 1980 Census, thirty-eight percent of the households in this area have no vehicles available; the regional average is 18%. In 1980, the median family income in the study area was $13,693 while the regional median was $21,826. The 1980 Census also indicates that 28% of the trips to work in the study area were by bus, while the regional total showed a 12% transit mode split.

Presented in this report are highway and transit travel data collected and tabulated for origin-destination pairs and station areas. Transit travel time contours were prepared as a means of portraying "before" levels of accessbility in the vicinity of major activity centers. Other travel characteristics tabulated and presented include traffic counts, auto occupancy counts, turning movement counts and peak hour level-of-service at major roadway intersections.

About 12,450 transit trips originate in the Northwest Study area between 6 and 9 a.m. with 28% of these destined for Metrocenter.

Residential land activity in the Study Area is portrayed in terms of average housing prices, rental rates, and measures of housing supply. This information is presented for each station area and for areas elsewhere in the region for comparison purposes.

Measures of commercial land activity presented include changes in sales and rentals of commercial properties near transit stations. Also reported are the results of special employee and shopper surveys conducted in selected station areas. An attempt is made to present a profile of the demographic and travel/access characteristics of these groups. Employees at Reisterstown Road Plaza generally travel to work by auto; 17% travel by bus. Of the shoppers at the Plaza, only 14% arrive by bus. More than half of the shoppers visit the Plaza at least once per week. At the Mondawmin complex, a more "in-town" location which contains both shopping and office space, 25% of the employees arrive by bus. Over 20% of the shopping or non-work trips were made by bus. Of the shopping trips, 29% come to Mondawmin several times per week. In surveying Metrocenter, it was found that 30% of the commutes to work were by bus. Fifty percent of the commuters were single car drivers and 17% were passengers in cars.

Noise levels were measured near the aerial Metro stations to determine the changes in LEQ (equivalent sound level). Data were collected ranging from 52 to 64 LEQ. These values will be compared with post-opening noise levels.

Energy consumed by buses in the study area was calculated. For the in-service buses during the 6-9 a.m. peak, approximately 40,700 BTUs per bus vehicle service mile was estimated. This translates into 8,900 BTUs per passenger trip - a value which will be compared with post-opening values.

A community attitude and perception survey was conducted in the study corridor, concentrating on residents living one quarter mile from the Metro alignment. The survey respondents (564 persons) generally had positive feelings about the Metro. For example, 70% of the respondents feel that building the Metro is a good idea; 71% feel that MTA should construct other Metro lines; 80% feel that construction of the Metro shows that the City is progressing; about 61% plan to use the Metro. It is also encouraging to note that nearly half of all the persons who plan to ride the Metro are currently not MTA bus riders. Again, these indications will be compared with post-opening responses, by the same resopndents, to comparable questions.

A final chapter summarizes the next steps associated with this study; this includes the planned post-opening data collection activities as well as the initial study impact assessment of the opening of Section B (extension of Metro to Owings Mills).

I. INTRODUCTION AND PURPOSE

A. THE PURPOSE OF THE IMPACT STUDY

The opening of the Section A Metro from Charles Center, in Baltimore's downtown central business district, to Reisterstown Road Plaza will affect travel and demographics in the Baltimore Region significantly. Understanding the impacts of operating Section A Metro will improve transportation planners' knowledge of user characteristics, thereby benefiting the continuing transit planning process in other corridors of the region. As in the cases of San Francisco,[1] Atlanta,[2] Washington, D.C.[3] and San Diego,[4] impact studies have served to better define the problems and benefits associated with the opening of a fixed-rail line. Through these studies, benefits have accrued to the ongoing operation of those lines as well as to the advance planning of future system expansion.

The transportation, socio-economic, environmental and economic information presented in this report will support the ongoing transportation planning activities of State and local government agencies of the Baltimore Region. Results of this study will provide useful empirical data which will enable the decision-makers to make more knowledgeable decisions for transportation development throughout the region. The data will also support decisions in developing the long-range plan for the Baltimore area.

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[1]Metropolitan Transportation Commission, BART in the San Francisco Bay Area--The Final Report of the BART Impact Program, U.S. DOT, Sept. 1979.

[2]Atlanta Regional Commission, 1982 Transit Impact Monitoring Program: Annual Report, March 1983.

[3]Metropolitan Washington Council of Governments, Trends Before Metrorail: A Metrorail Before-and-After Study Report, U.S. DOT, July 1982.

[4]San Diego Association of Governments, Trends Before the San Diego Trolley: A San Diego Trolley Guideway Implementation Monitoring Study Report, U.S. DOT, July 1982.

The result of these data collection activities is a "snapshot" of pre-opening Study Area conditions. This report documents the "before" data associated with these tasks. An additional technical report describing the "before" and "after" impact analysis of the Section A Metro will be prepared after the post-opening data have been collected, tabulated and analyzed. This report should be completed in about two years.

The general approach taken in this pre-opening phase of the study has been to present a profile of major travel, economic, environmental, etc. characteristics in the Study corridor. Where possible, comparisons are made against regional patterns and characteristics of other areas. In the post-opening phase, information will be assembled in an attempt to portray causal relationships, distinct from merely coincidental happenings due to implementation of rail service. Travel and land use impacts will be evaluated as they pertain to the study impact corridor. Surveys will be used predominantly to determine changes in trip making behavior.

The purpose of the Metro Impact Study is to measure, analyze and evaluate transportation, demographic, environmental, and land use impacts associated with the implementation of the rapid rail service in the Section A portion of the Northwest Corridor. General impacts to be measured include: transit system usage, highway system usage, the cost and efficiency of the transit system, and neighborhood impacts, including those related to housing, employment, commercial activity, and land development in the corridor.

The overall project design is embodied in a detailed work program, which provides for the cooperation of three principal agencies: Regional Planning Council, Baltimore City Department of Planning, and the Mass Transit Administration. Reference Material Appendix AA, "Section A Metro Impact Study Work Program," August 11, 1982 details these tasks. The tasks in the

work program are organized to obtain publishable results; these data are summarized in this report. The major tasks include:

- o On-Board Survey: Surveyors distribute questionnaires on buses. Results are evaluated by MTA and RPC.
- o Workplace Survey: Surveyors distribute questionnaires in a sample of workplaces located near transit stations to measure changes in mode of travel and work trip characteristics.
- o Station Area Studies: Observers collect data concerning use of on-street parking.
- o Traffic Volumes: Automatic counters are placed on arterials and freeways to obtain screenline counts, and observers measure average automobile occupancy and truck classifications at the screenlines. Turning movement and traffic accident data are collected at critical intersections.
- o Travel Time Survey: Observers compare actual travel time data for a selected set of trips by auto and by transit.
- o Environmental Analyses: Noise is monitored at various sites around the aerial alignment of Metro. Energy consumption by transit vehicles is evaluated.
- o Residential Land Activity Analysis: Secondary data sources are examined to compare housing prices, rental prices and housing supply changes near transit stations in control areas.
- o Commercial Land Activity Analysis: Secondary data sources are examined to monitor activity in sales and rentals of commercial properties near transit stations.
- o Shoppers Survey: Surveyors distribute questionnaires to a sample of shoppers at Reisterstown Plaza and Mondawmin Mall to measure changes in mode of travel and other characteristics.
- o Monitor TSADAS Plans Implementation: A comparison of actual land use development and public improvements expenditures is made with that shown in the Transit Station Area Development Studies (TSADAS).
- o Residential Attitude Survey: Household surveys are conducted to ascertain attitudes and perceptions of MTA construction and operation in neighborhoods.
- o Metrocenter Analysis: Person trips into Metrocenter are examined. Development near CBD transit stations is monitored.
- o Report Preparation: A "before" report summarizes conditions before the opening of Metro. A before and after report documents the impacts of Metro in the Northwest Corridor. Interim working papers detail methods and conclusions of specific tasks.

B. BACKGROUND

Significant transportation planning for a Baltimore rail system was begun in the early 1960's with an analysis of the long range and specific urban transportation requirements for the region. During the late 1960's and early 1970's, major transportation planning and design efforts continued through a series of studies and conceptual and preliminary engineering design projects, which resulted in the formulation of a Phase I Plan for rapid transit development as well as detailed preliminary engineering designs, cost estimates and implementation schedules for the Phase I rapid transit system. This long term planning and preliminary design process was accomplished between 1962 and the end of 1973, and was made possible by continuous leadership, encouragement, financing, and action by state, local and Federal governments and by public support through the public hearing process.

Beginning in 1967, conceptual and preliminary engineering work was begun on regional rapid transit development, with emphasis directed toward the proposed Phase I alignment from Randallstown in Baltimore County to Marley Station in Anne Arundel County. Work included studies on: vehicle and guideway systems, initial line structure and station concepts, patronage, and a broad and comprehensive operating plan.

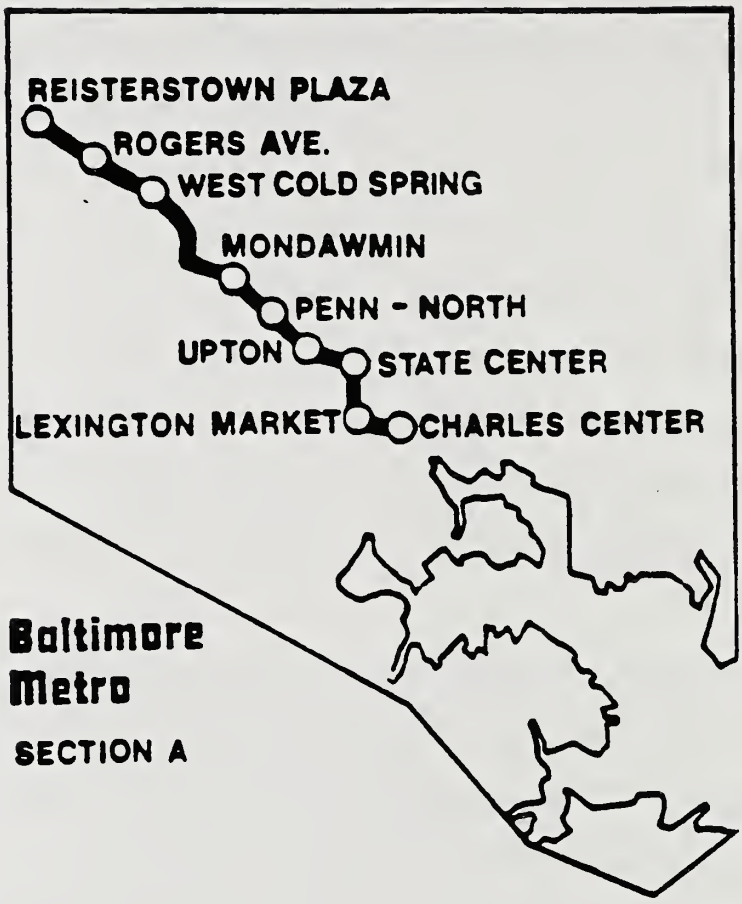
By 1971, it was determined that the Phase I alignment could be revised so that the Northwest and South lines could be studied as separate corridors. It was then decided to start with the Northwest corridor.

However, in the early 70's the Northwest corridor was divided into two projects: Section A, from Charles Center to Reisterstown Road Plaza and Section B, from Reisterstown Road Plaza to Owings Mills. In 1972, Section A

(shown in Figure I-1) was approved for funding and in 1974, ground was broken. Appendix A, "Planning for Rapid Transit in the Baltimore Region" provides a more complete summary of rapid rail study history.

Section A has been completed. Section B, extending six miles from Reisterstown Road Plaza, is presently under construction and planned to be open by 1987.

FIGURE I-1



Source: MTA

C. SECTION A METRO RAIL LINE DESCRIPTION

The Section A Metro rapid rail line serves the northwest area of Baltimore City and is about 8 miles in length. Its northwestern terminus is near Reisterstown Road Plaza, a 725,000 square foot enclosed mall, and extends to the rapidly expanding Baltimore City Central Business Ditrict (CBD) with stations at Lexington Market and Charles Center near Baltimore's renowned Harbor Place.

The dual rail line begins at the elevated Reisterstown Plaza Station, stops at two other elevated stations (Rogers Avenue and West Cold Spring), and then goes underground for the final 4-1/2 miles. Those stations classified as subway are Mondawmin, Penn-North, Upton, State Center, Lexington Market and Charles Center. See Figure I-2 for station alignment. Table I-1 lists the various stations by station-type and indicates the amount of parking spaces available at each.

The construction cost of "Section A" was $797 million. Initial ridership is expected to be around 25,000 riders per day and is expected to double within a year after "feeder" buses begin operation. Funding is 80 percent Federal, 20 percent state through the State of Maryland's Consolidated Transportation Trust Fund.

The Baltimore Metro recently began operation with 72 vehicles made by the Budd Co. of Philadelphia. The Metro trains are capable of speeds of up to 70 miles-per-hour; the average operating speed is 30 mph.

Cars are semi-permanently attached in "married pairs." Trains are to be composed of two-, four- or six-car groupings. Each car can carry 76 seated and 90 standing passengers; a six-car train will be able to carry 1,000 passengers.

Figure I-2
Section A
Metro Stations and Alignment

During rush hours trains arrive at 7-1/2 minute intervals. At other times of the day, headways are set at 10 minutes. Hours of operation are 5 a.m. to 8 p.m., Monday through Friday.

Initial fares at all stations are $.75, except for Reisterstown Plaza Station where $.85 is the fare. These fares are identical to the existing MTA bus fares for boardings in the Metro station areas.

Table I-1
Section A Metro Station Information

Station	Type of Station	Parking Spaces Available
Reisterstown Plaza	Aerial	1,200
Rogers Avenue	Aerial	350
West Cold Spring	Aerial	300
Mondawmin	Subway	150
Penn-North	Subway	0
Upton	Subway	0
State Center	Subway	0
Lexington Market	Subway	0
Charles Center	Subway	0
TOTAL		2,000

II. BALTIMORE REGION AND NORTHWEST CORRIDOR PERSPECTIVE

A. THE PROFILE OF THE BALTIMORE REGION AND NORTHWEST CORRIDOR IMPACT AREA

The Baltimore Region

The Baltimore Region is composed of six jurisdictions located in the central part of the State of Maryland. The Region is bounded by the Chesapeake Bay on the east, the State of Pennsylvania on the north and the Patuxent River for the most part on the west.

Those jurisdictions which constitute the Baltimore Region are Baltimore City and Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties. A map of the Baltimore Region is shown in Figure II-1.

The Northwest Corridor Impact Area

The Northwest Corridor for the Section A study area covers the northwest quadrant of Baltimore City stretching from the CBD to the Baltimore Beltway. This area encompasses approximately 38.7 square miles. Figure II-2 shows the study area and its major highway routes; these include Reisterstown Road, Park Heights Avenue, Northern Parkway, Liberty Heights Avenue, North Avenue and I-83.

A major freeway which borders the eastern part of the impact area is I-83. This freeway connects the Baltimore Beltway (I-695) on the north with the CBD of Baltimore City on the south and serves a segment of traffic generated within the Northwest corridor. The other main arterials carrying traffic in and out of the corridor include Park Heights Avenue, Liberty Heights Avenue and Reisterstown Road.

FIGURE II-1

The Baltimore Region

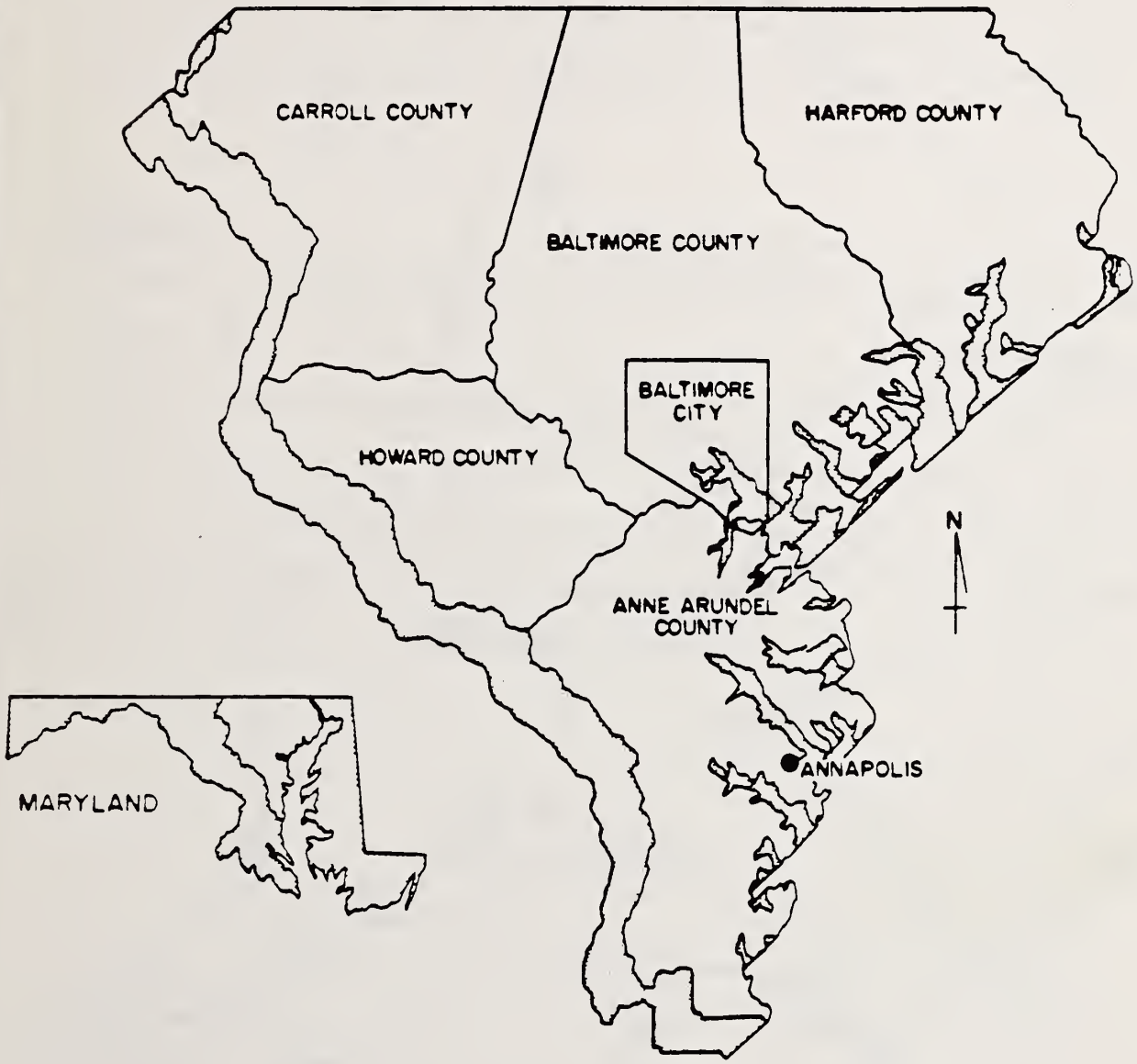
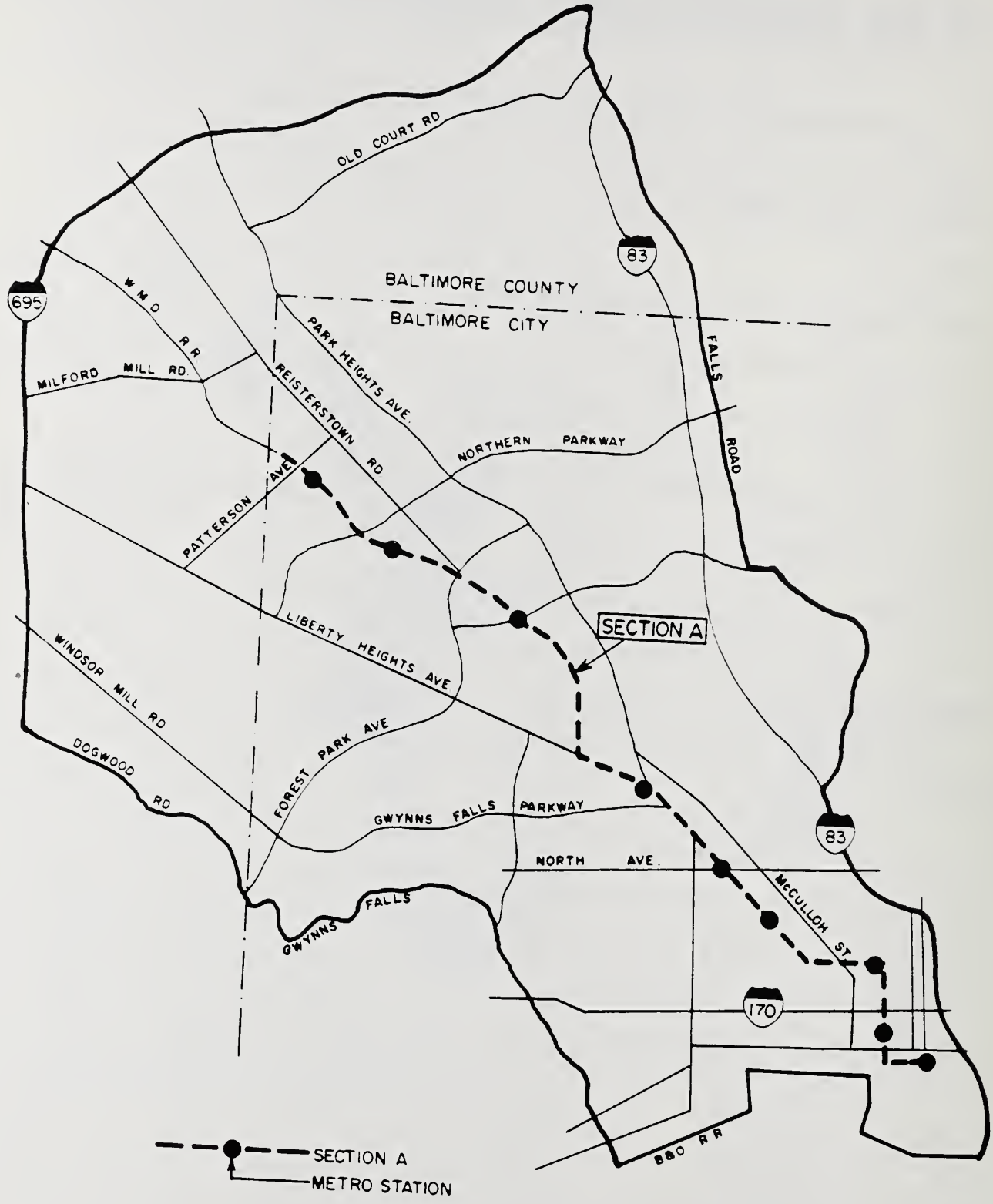


FIGURE II-2
SECTION A STUDY AREA



B. SOCIO-ECONOMIC CHARACTERISTICS FOR THE BALTIMORE REGION AND THE SECTION A STUDY AREA

For this section of the report, socio-economic data will be illustrated at various levels of geography: the Baltimore Region, the impact corridor study area, and a stratification within the Study Area. The Study Area has been divided into four sections: the Baltimore County portion, the Outer City, the Inner City, and the Metrocenter area (see Figure II-3).

Households

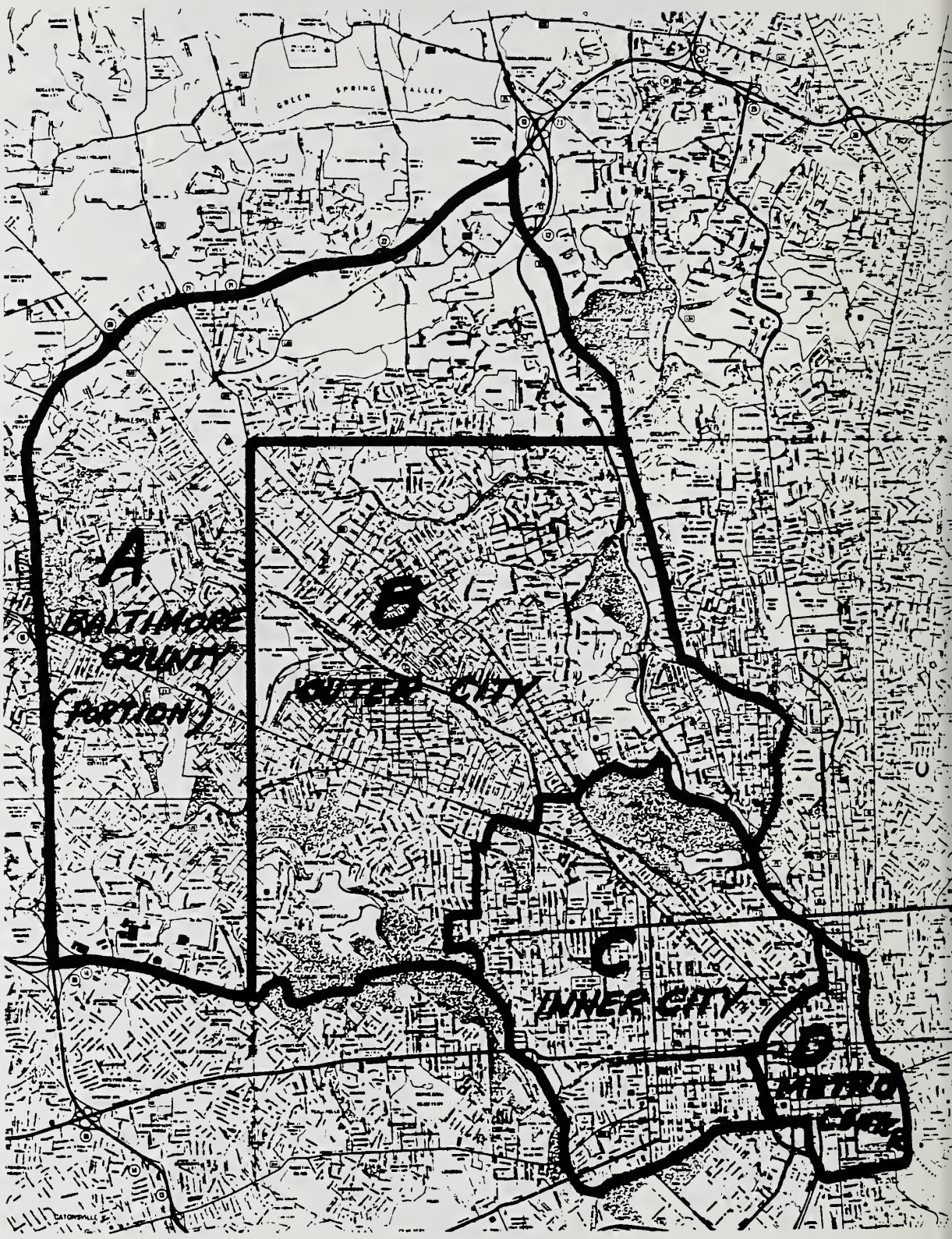
The number of households in the Baltimore Region increased 21.3% between 1970 and 1980. During this period, the Study Area showed an increase of 5.1% while Baltimore City experienced a 2.7% decline in the number of occupied housing units. Accordingly, the 1980 Census indicates that there are 124,675 households in the Section A Study Area. This is 16.5 percent of the regional total. Table II-1 shows the number of households by geographical area for 1970 and 1980.

Table II-1
Number of Households

	1970	1980	Percent Change
Baltimore Region	623,868	756,980	+21.3%
Study Area	118,549	124,675	+5.1%
A. Baltimore County Portion	15,799	18,852	+19.3%
B. Outer City	42,600	49,005	+15.0%
C. Inner City	52,350	48,781	-7.3%
D. Metro Center	7,800	8,037	+3.0%

Source: 1970 and 1980 Census

FIGURE II-3
SUB-SECTIONS OF STUDY AREA



Population

The population in the Baltimore Region increased 5.0% between 1970 and 1980 to 2,174,023 persons. For the same time period, the population of the Study Area decreased by 12.2% to 346,459. Population density, as another measure of population, was examined for 1980 by geographical area; there were 8,935 persons per square mile in the Study Area compared to 975 per square mile for the Baltimore Region average. Table II-2 presents the 1970 and 1980 population totals and 1980 population density by geographical area.

Table II-2
Population and Density

	1970	1980	% Change	Square Miles	Persons/ Square Mile
Baltimore Region	2,070,670	2,174,023	+5.0	2,229.4	975
Study Area	388,852	346,459	-12.2	38.8	8,900
A. Baltimore Co. Portion	50,586	49,576	-2.0	14.6	3,400
B. Outer City	149,473	140,369	-6.5	15.3	9,200
C. Inner City	172,294	141,106	-22.1	7.5	18,800
D. Metro Center	16,499	15,408	-7.1	1.4	11,000

Sources: 1970 Population - RPC TM #5-1970 Socio-Economic Data Summarized by Transportation Zone

1980 Population - RPC Round II Socio-Economic Data, 2/1/83

1980 Square Miles - RPC, TM #1, Baltimore Region Transportation Zones, (Revised 1981)

In order to better illustrate the changes in socio-economic data between 1970 and 1980 in the Region and in the Study Area, household and population figures were combined. It showed that in 1970 the average household size in the Baltimore Region was 3.23 persons. By 1980, this had been reduced to 2.80 persons per household. The Study Area displayed similar trends; in 1970, there were 3.28 persons per household while in 1980 there were 2.78. Table II-3 shows the persons per household for 1970 and 1980 for the geographical areas.

Table II-3
Persons per Household

	1970	1980
Baltimore Region	3.23	2.80
Study Area	3.28	2.78
A. Baltimore County Portion	3.20	2.63
B. Outer City	3.51	2.86
C. Inner City	3.29	2.89
D. Metro Center	2.12	1.92

Racial Composition

In the region, a total of 73 percent of the population is white and 27 percent is non-white. For the study area, 31 percent is white and 69 percent is non-white. Table II-4 indicates racial composition by geographical area.

Table II-4
Racial Composition

	White		Non-White	
	Persons	%	Persons	%
Baltimore Region	1,582,118	73	591,905	27
Study Area	107,397	31	239,057	69
A. Baltimore County	34,945	71	14,631	29
B. Outer City	44,739	32	95,625	58
C. Inner City	18,668	13	122,438	87
D. Metro Center	9,045	59	6,363	41

Source: Census 80, Population and Housing Characteristics, RPC, ERIS Publication 82.01, March 1982

Age Distribution

According to the 1980 Census, 63% of the region's population are between 18 and 64 years of age, while 27% are within the 0 to 17 age bracket. Those persons 65 and over make up 10% of the population.

The study area has the same age distribution as the region, with 60% of the population in the 18 to 64 age bracket, 27% in the 0-17 age group and 13% in the 65 and over classification. The age distribution percentages are shown in Table II-5 by geographical area.

Table II-5
Age Distribution

	Age 0 to 17		Age 18 to 64		Age 65+		Total
	Persons	%	Persons	%	Persons	%	Persons
Baltimore Region	588,001	27	1,366,555	63	219,467	10	2,174,023
Study Area	92,846	27	208,171	60	45,442	13	346,459
A. Baltimore County	11,266	23	31,982	64	6,328	13	49,576
B. Outer City	39,174	28	83,153	59	18,032	13	140,369
C. Inner City	40,447	29	82,313	58	18,346	13	141,106
D. Metro Center	1,962	12	10,709	70	2,737	18	15,408

Source: 1980 Census

Employment

Employment in the Baltimore Region increased by 17 percent between 1970 and 1980. For the same time period, employment in the Study Area increased by 13.5 percent. This change in employment, however, varied by geographic area within the Study corridor. Table II-6 indicates the 1970 and 1980 employment data by geographic area; also shown is 1980 employment as a percent of the Study Area.

Table II-6
Employment

	1970	1980	Percent Change	1980 Employment as a Percentage of Total Study Area
Baltimore Region	903,200	1,058,000	+17.1	-
Study Area	209,600	237,990	+13.5	100.0
A. Baltimore Co. Portion	11,170	19,350	+73.2	8.1
B. Outer City	37,300	42,390	+13.6	17.8
C. Inner City	42,780	42,290	-1.1	17.8
D. Metro Center	118,350	133,960	+13.2	56.3

Source: RPC Cooperative Forecast Round II Socio-Economic Data, 2/1/83.
RPC, TM #5, 1970 Socio-Economic Data Summarized by Transportation Zone.

Median Family Income

Median family income in the Baltimore metropolitan area was $21,826 at the time of the 1980 Census. This was almost double the median income reported in the 1970 Census. After adjusting for changes in the Consumer Price Index over that period, a real income gain of 4.4% was realized. The Study Area increased at about one-half the rate as that experienced by the

Region from an income of $9,677 in 1970 to one of $13,693 in 1980. Table II-7 shows the 1970 and 1980 median family income by geographical area.

Table II-7
Median Family Income

	1970	1980	Percent Change
Baltimore Region	$11,125	$21,826	+96.2
Study Area	$ 9,677	$13,693	+41.5
A. Baltimore County Portion	$16,948	$23,559	+39.0
B. Outer City	$10,686	$15,611	+46.0
C. Inner City	$ 6,406	$ 8,928	+39.4
D. Metro Center	$ 8,140	$ 9,924	+21.9

Source: 1970 - RPC Publication: TM #5, 1970 Socio-Economic Data Summarized by Transportation Zone

1980 - 1980 Census

Automobile Ownership

According to the 1980 Census, there were 47,994 households without a vehicle available out of the 124,675 households in the impact study corridor; this indicates that 38.5% of the households in the study area have no vehicle. Table II-8 indicates that 136,957 of the region's 756,980 households (18.1%) have no vehicle available.

Table II-8
Households with No Vehicle (1980)

	Households With No Vehicle	Households	Percent Households With No Vehicle
Baltimore Region	136,957	756,980	18.1
Study Area	47,994	124,675	38.5
A. Baltimore County Portion	1,325	18,852	7.0
B. Outer City	14,608	49,005	29.8
C. Inner City	27,020	48,781	55.4
D. Metrocenter	5,041	8,037	62.7

Source: 1980 Census Urban Transportation Planning Package, Section I.

III. TRAVEL CHARACTERISTICS

A. IMPACT CORRIDOR VS. BALTIMORE REGION

Trip Generation

In the Baltimore Region for 1980 there were approximately 5,221,600 total person trips per day; these account for the three main means of transportation: drive alone, carpool, and bus. Of this amount, approximately 14 percent were produced in the Section A study area. Journey-to-work trips for the region averaged about 877,000 per day. Of this amount, Baltimore City contributed about 259,500 or 29.6 percent to the regional total.

Means of Transportation to Work

The 1980 Census Journey-to-Work package contained data for the Baltimore Region and the impact area. Statistics were tabulated for the principal modes of commuter transportation: drive alone, carpool, and bus transit. For the Baltimore Region, it was found that about 65% of the commuters drive to work alone while for the impact area only 51% drive alone. While only 12% of the region's commuters travel by transit, 28% in the impact area use transit. Carpoolers account for 24% in the region and 21% in the impact area. Table III-1 shows the modal choice for trips to work as reported in the 1980 Census.

Table III-1
Percentage Share for Travel Modes
in Journey-to-Work

	Drive Alone	Carpool	Transit Bus	Total
Baltimore Region	65.1	24.3	11.6	100.0
Study Area	51.0	21.2	27.8	100.0
A. Baltimore Co. (Portion	71.6	22.5	5.9	100.0
B. Outer City	52.8	21.9	25.3	100.0
C. Inner City	37.0	19.8	43.2	100.0
D. Metro Center	38.2	17.7	44.1	100.0

Source: 1980 Census Urban Transportation Planning Package, Section I.

Vehicle Occupancy to Work

The 1980 Census Journey-to-Work data for the Baltimore Region and the impact study area were tabulated for work-purpose vehicle occupancy information. It was found that of the autos, trucks and vans (referred to as vehicles) travelling to work, about 73% carry no carpoolers while in the impact study area 68% carry no carpoolers. When 2-person vehicles (one driver plus one passenger) were examined, the Baltimore Region showed that 18% of vehicles travelling to work were in this category while the study area indicated 22%. In general, these data indicate that there is no significant difference between the region and study area statistics. Table III-2 illustrates the 1980 vehicle occupancy as it relates to the region and the impact corridor.

Table III-2
Vehicle Occupancy (1980) for Trips to Work
(in Percent)

	Driver Only	Driver Plus One Passenger	Driver Plus 2 or More Passengers	Total
Baltimore Region	72.9	17.8	9.3	100.0
Study Area	67.7	22.3	10.0	100.0
A. Baltimore Co. (Portion)	76.0	16.6	7.4	100.0
B. Outer City	70.7	19.0	10.3	100.0
C. Inner City	65.2	20.6	14.2	100.0
D. Metro Center	68.3	25.2	6.5	100.0

Source: 1980 Census Urban Transportation Planning Package, Section I.

B. EXISTING TRAVEL ORIENTATION OF NORTHWEST TRANSIT RIDERS

To compile information on the existing travel orientation of the Northwest transit riders, it was necessary to obtain the 1978 Feeder Bus data files and to extract from them pertinent data. The 1978 Feeder Bus Study data was factored to represent 1983 conditions.

Methodology

In general, the 1978 Feeder Bus Study provided an analysis of a survey of transit passengers in the Northwest Corridor. Data were collected, tabulated and published in report form. It was determined that, according to a 1982 recheck of the 1978 study, the major origin-destination patterns for the corridor had not changed, and therefore, the trip-orientation data for 1978 was usable. However, for the data to be usable in the Metro Impact Study, a correction factor for 1978 to 1983 changes in patronage was needed. To obtain that correction factor, bus patronage checking locations used in the 1978 survey were identified; passengers at those locations were then counted during the same month of 1983 as that of the 1978 survey. Data indicate that a 26% reduction in patronage had occurred in the Northwest corridor during that 5-year period; other MTA data sources indicated this same reduction was systemwide. Possible reasons for this reduction are raises in fares and decreases in the cost of gasoline.

Results of 1983 Update of Feeder Bus Analysis

Consequently, 1983 trip patterns for the Northwest transit riders were determined. Table III-3 shows the transit trip productions and attractions by RPD for the 6-9 a.m. peak period; also shown are those trips produced to RPD 118 (Metrocenter), and the percent oriented to Metrocenter. Of the

total transit trips produced in the Northwest corridor, 28% or about 3,500 are destined to Metrocenter during the morning peak period.

Table III-3
Transit Trips Produced from and Attracted to NW Corridor
1983
(6-9 a.m.)

RPD	Transit Trips Produced	Transit Trips to Metrocenter	Percent Transit Trips to Metrocenter	Transit Trips Attracted
101	572	354	62	370
102	120	72	60	348
107	2,436	679	28	808
108	2,483	659	27	821
109	944	256	27	1,073
110	390	207	53	348
116	1,655	408	25	673
117	2,831	559	20	1,406
118	464	44	9	3,892
NW CITY TOTAL	11,895	3,238	27	9,739
313(part)	198	114	58	385
319(part)	356	142	40	139
NW BALTO. CO. TOTAL	554	266	48	524
NW CORRIDOR TOTAL	12,449	3,504	28	10,263

C. TRAFFIC CHARACTERISTICS

Traffic data collected across screenlines in the Northwest Corridor and at various locations near Metro stations supply information to measure how auto traffic is affected by implementation of the Metro. These traffic data are reported in the following categories:

1. Traffic volume counts
2. Auto occupancy counts
3. Turning movement data
4. Peak-hour intersection level-of-service evaluation
5. Traffic accident data

Each are discussed below, along with a general methodology.

1. Traffic Volume Counts

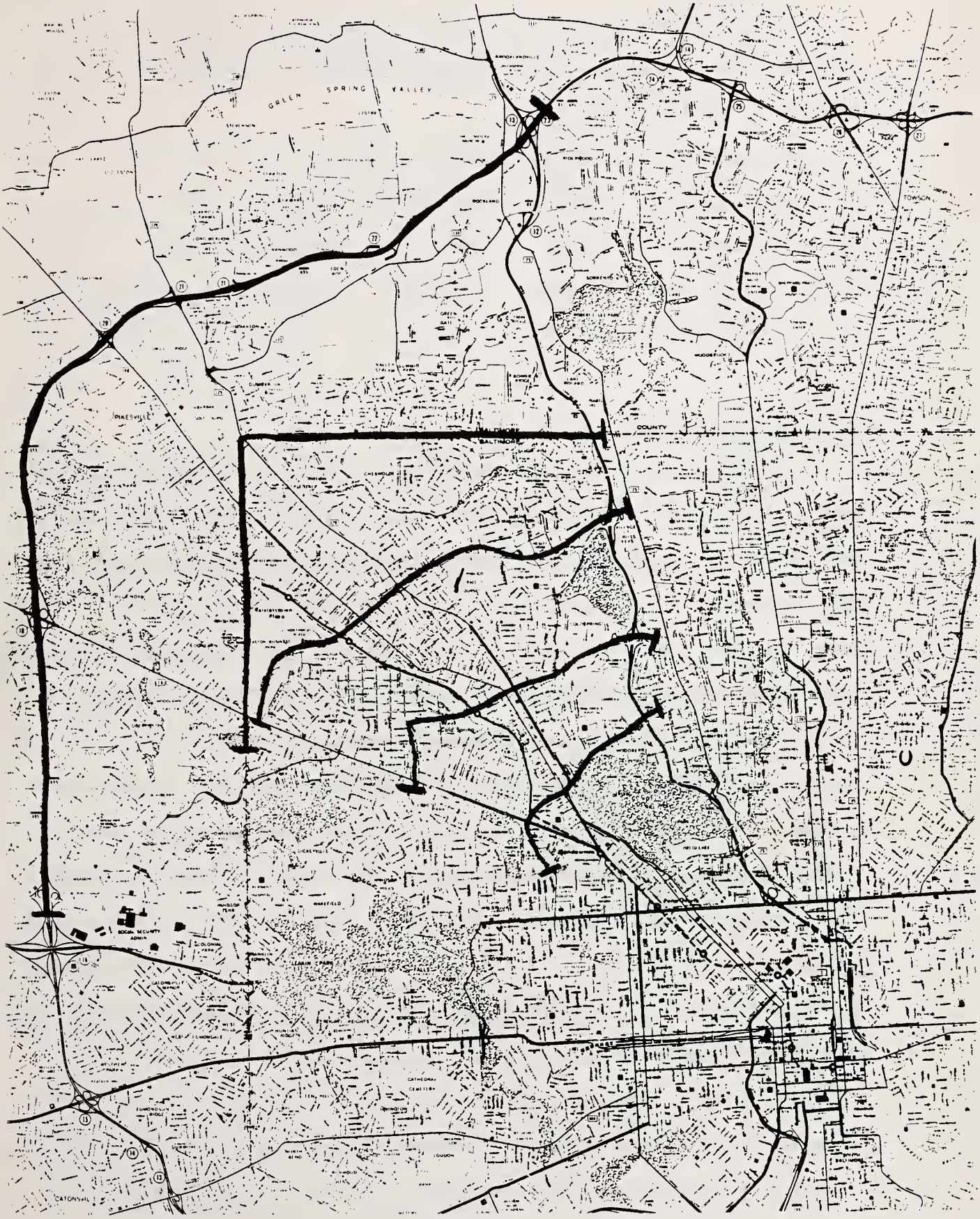
Screenlines were developed to count radial traffic in the Northwest Study Area so that corridor-level traffic changes could be monitored. Figure III-1 shows the five screenline locations where traffic counts were collected. The screenlines and weekday traffic count totals are shown in Table III-4.

Table III-4
Traffic Volume Counts by Screenline*

Screenline	24-Hour Traffic Count
I-695 (Windsor Mill Road to Jones Falls Expressway)	201,600
Northwest City Line (Liberty Road to Jones Falls Expressway)	186,400
Northern Parkway (Liberty Road to Jones Falls Expressway)	186,500
Cold Spring Lane (Liberty Road to Jones Falls Expressway)	174,200
Druid Park Drive (Gwynns Falls Parkway to Jones Falls Expressway)	196,400

*Data collected May-June, 1983.

FIGURE III-1
SECTION A METRO IMPACT STUDY
SCREENLINE LOCATIONS



Traffic volume counts were also tabulated by screenline, showing individual roadway counts with the date of collection. These data are shown in Appendix B, Traffic Count Data.

Other traffic counts on screenlines elsewhere in the Baltimore Region, outside the Northwest Corridor, were assembled as part of the RPC's ongoing travel monitoring activities. This information will be used as a control group, against which to compare Northwest Corridor growth. Similar data will be collected as part of the "after study."

2. Auto Occupancy Counts

Changes in auto occupancy summed across an entire screenline indicate increases or decreases in carpooling. These data were collected on weekdays and tabulated by direction for the 7-9 a.m. period. The auto occupancy data were collected on the same screenlines where the portable traffic counts were obtained. Auto occupancy data for the 7-9 a.m. peak period is shown, by inbound and outbound direction, in Table III-5. Little difference is in evidence between inbound and outbound. Between 75 and 85 percent of the automobile traffic corresponds to the "drive alone" or single occupant category while 13 to 22 percent of the autos carry one passenger. Only 2 to 5 percent carry two or more passengers. The tabulation of auto occupancy data by screenline is shown in Appendix C, Auto Occupancy Counts. Auto occupancy data were also collected on screenlines not in the Northwest Corridor for use as a control group; these data will be compared as part of the "after study."

Table III-5
Auto Occupancy Data at Screenlines (1983)
7-9 A.M. Peak

INBOUND

Screenline	% Drive Alone	% Driver Plus 1	% Driver Plus 2 or More	Number Autos Counted
I-695	81.3	14.9	3.8	10,873
NW City Line	84.7	13.1	2.2	13,659
Northern Parkway	81.6	16.3	2.1	5,510
Cold Spring	81.0	17.4	1.6	17,256
Druid Park Drive	78.7	17.9	3.4	14,645
OUTBOUND				
I-695	84.2	13.8	2.0	5,879
NW City Line	80.1	16.2	3.7	6.953
Northern Parkway	74.4	21.7	3.9	2,980
Cold Spring	74.9	19.7	5.4	6,630
Druid Park Drive	80.0	16.5	3.5	6,209

Source: State Highway Administration and Regional Planning Council.

3. Turning Movement Data

Turning movement data were collected at intersections near stations to determine traffic volume changes associated with the Metro opening. The turning movement data were collected at 25 locations between 7 a.m. and 7 p.m. These data were tabulated by individual location displaying a 12-hour count and the date of collection; Appendix D, Turning Movement Locations, shows these data.

4. Peak Hour Intersection Level-of-Service Evaluation

An intersection volume-to-capacity analysis was performed near Metro stations for the peak hours using the Critical Movement Summation (CMS) technique. It should be noted that this is just one method of evaluating intersection capacity. The technique does not actually calculate intersec-

tion capacity but, instead, calculates a critical implementation volume and compares that volume against a benchmark intersection capacity that is stratified by level of service. Table III-6 defines level of service categories as they apply to the capacity ranges of an intersection.

Table III-6
Intersection Capacity by Level of Service

Level of Service	Operating Conditions	Range of Capacity (vehicles per hour) LOW	HIGH
A	Free flow, low volume, high operating speed, high maneuverability	0	900
B	Stable flow, moderate volume; speed somewhat restricted by traffic conditions, high maneuverability	901	1,050
C	Stable flow, high volume; speed and maneuverability determined by traffic conditions	1,051	1,200
D	Unstable flow, high volumes, tolerable but fluctuating operating speed and maneuverability	1,201	1,350
E	Unstable flow, high volumes approaching roadway capacity, limited speed (30 mph), intermittent vehicle queuing	1,351	1,500
F	Forced flow, volumes lower than capacity due to very low speeds. Heavy queuing of vehicles, frequent stoppages	(special case)	1,500

The CMS technique was applied for the a.m. and p.m. peak hour at various intersections near Metro stations. Traffic volumes approaching the intersection and the number of approach lanes are the main variables in calculating the CMS. Also accounted for are: right turns, bus movements

and pedestrians. The technique is defined as "the volume of travel represented by the highest lane volumes of opposing travel (through and left turn) from both the north-south and east-west directions that occur during the peak hour."[1] The Baltimore City Department of Planning staff calculated on a microcomputer the level of service for the intersections near Metro stations using the CMS technique. The results of these data, summarized in Table III-7, show intersection level-of-service computations for the a.m. and p.m. peak hours; the data, listed by major arterial, show the critical summation and level-of-service (LOS). In general, during the a.m. peak most of the intersections indicate a relatively stable flow without incurring much congestion as calculated by LOS A, B and C. Few intersections show unstable flow during the a.m. peak (LOS, D, E and F). The data sheets to calculate the intersection level-of-service computations are available in Reference Material Appendix BB, "Intersection Level-of-Service computations (using Microcomputer), TASK 4.4."

5. Traffic Accident Data

The availability of accident data was researched. In general, data were available from the State Highway Administration's Bureau of Accident Studies, the Baltimore City Police Department, Maryland State Police and Interstate Division for Baltimore City (IDBC). Accident data for Baltimore City locations were available from the Baltimore City Police Department; IDBC used their data to tabulate collision diagrams throughout the City of Baltimore. The other two sources provided data for Baltimore County.

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[1]NCHRP Report 187, Quick-Response Urban Travel Estimation Techniques and Transferable Parameters, Users Guide, Transportation Research Board, 1978, p. 144.

Table III-7
Intersection Capacity Analysis
near Metro Section Areas
1983

	A.M. Peak		P.M. Peak	
	Crit Sum	LOS	Crit Sum	LOS
Liberty Road and				
Rogers Avenue	928	B	1,296	D
Northern Parkway	744	A	1,157	D+
Patterson Avenue	957	B	1,538	E-
Essex Road	1,215	D	1,111	C
St. Lukes Lane	1,246	D	1,278	D
Wabash Avenue and				
Cold Spring Lane	563	A	800	A
Garrison Boulevard	671	A	780	A
Belvedere Avenue	621	A	439	A
Rogers Avenue	667	A	907	B+
Northern Parkway	950	B	1,412	E
Patternson Avenue	908	B+	1,020	B-
Reisterstown Road and				
Gwynns Falls Parkway	854	A	947	B
Liberty Heights Avenue	1,151	D	1,394	E
Cold Spring Lane	805	A	1,125	C
Hayward Avenue	704	A	891	A-
Rogers Avenue	828	A	935	B
Northern Parkway	1,188	C-	1,561	E-
Patterson Avenue	608	A	821	A
Park Heights Avenue and				
Cold Spring Lane	1,237	D	1,210	D
Northern Parkway	1,592	E-	1,405	E
Gwynns Falls/Tioga Parkway	970	B	1,368	E+
Patterson/Alter Street	848	A	959	B
Campfield Road/Alter Street	582	A	418	A

For study purposes, twenty-two intersections near Metro stations in Baltimore City were identified for detailed accident reporting. For these locations, five collision diagrams were provided by the IDBC. These diagrams show types of collisions, date, time, and weather and road surface conditions for a given year; this graphical presentation of accident data could be diagramed for the remaining locations depending on "after" data comparisons.

At the present time, IDBC has an alphabetical listing of accidents by accident severity and functional controls for Baltimore City at selected locations. Accident severity is listed by the following categories: damage only, possible injury, non-incapacitating, incapacitating, fatal, first harmful event, and collision type. Functional controls are categorized by signal, sign, yield, channelization and other. These categories would require detailed explanation, and therefore will not be discussed at this time.

In summary, accident data was researched and shown to be available, however accident data by its very nature comes in many categories that make comparisons very difficult. Now that the "before" data format has been discovered, "after" data will be obtained so that the critical accident intersections can be analyzed.

D. AUTOMOBILE AND TRANSIT TRAVEL TIMES

The collection of auto and transit travel times for the Section A Metro "Before" Study provided data to determine changes in total travel time that will be compared to data collected in the "after" phase. Morning peak period highway travel time data and level of service estimates were compiled to measure changes in congestion levels while transit travel time data were gathered to provide a measure of improved or worsened level of transit service. All travel time data were collected for the AM peak period. This does not imply that PM peak travel conditions are similar to the AM peak, but that it would be more beneficial to the study to concentrate on a single peak period.

Travel time data were tabulated for:

1. origin-destination pairs (highway)
2. origin-destination pairs (transit)
3. highways paralleling the Metro line
4. roads leading to Metro stations
5. origin-destination pairs not in the Northwest corridor control group
6. the preparation of transit contour maps at selected station sites

These data, along with general methodology, are discussed below. Further documentation and descriptions are available in Reference Material Appendix CC, "Conduct Auto and Transit Travel Time Analyses: Before Report, TASK 5."

1. Auto Travel Times: Origin-Destination (O-D) Pairs

Travel times for the AM peak (7 to 9 AM) were determined for O-D pairs, mainly from major residential areas in the Northwest corridor to major em-

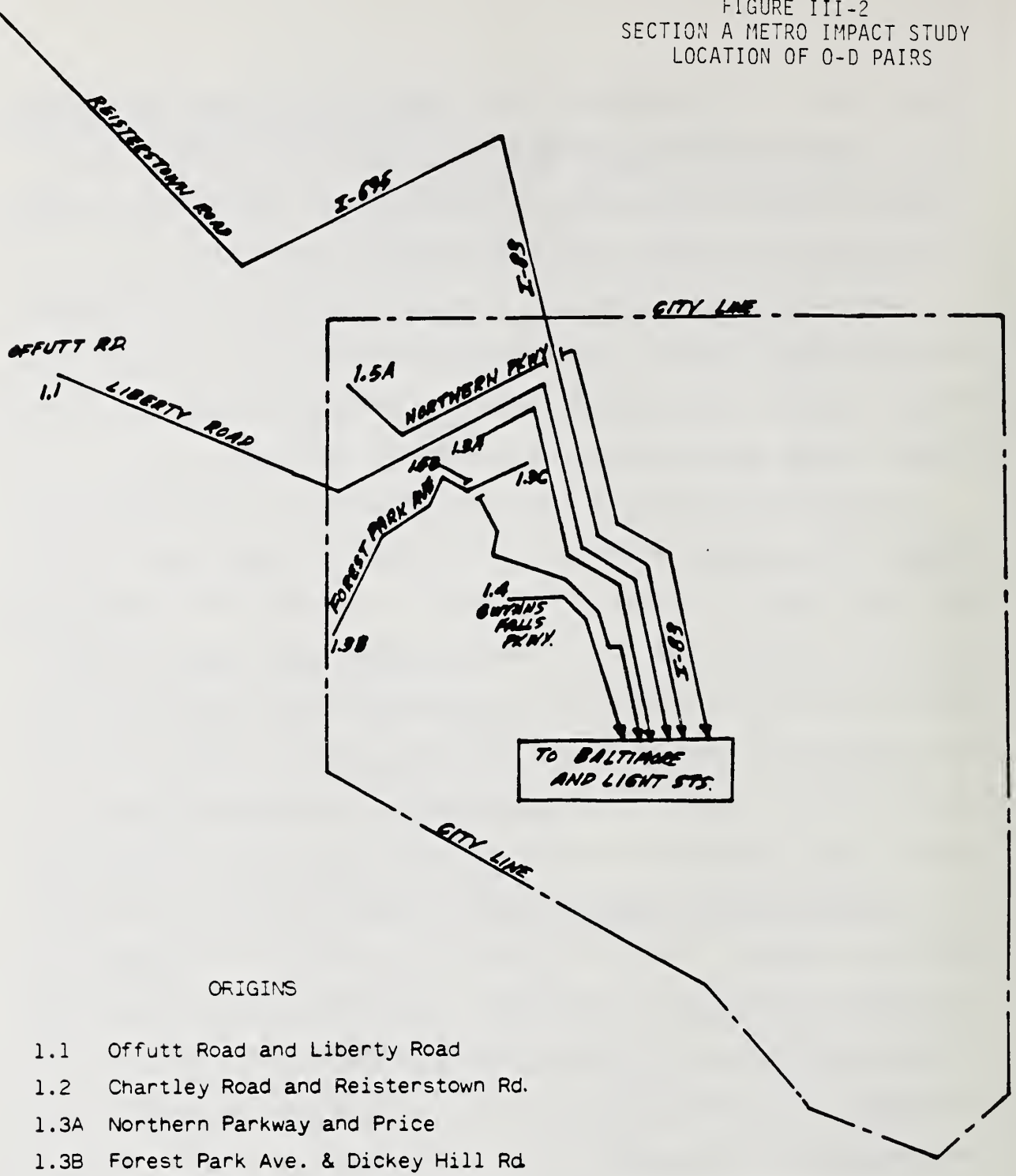
ployment sites. For the most part, auto travel times were determined by using a license plate number sampling technique that allows observers to consistently identify a large number of vehicles between several check points and consequently calculate a reliable estimation of travel time.

Under this method, an observer is placed at each of several locations along the O-D pair route. Each observer records the time and the license number of sampled vehicles as they pass the observation point. The license numbers are then matched and the travel times are determined.

For some sections of an O-D pair this technique was not utilized. In sections where numerous observation points would be needed, (e.g., in the CBD, where there was no one direct route to a destination), individuals drove these segments of an O-D pair numerous times. Auto times included the time to drive from an origin point to a destination point; time to park was not included due to the variations in personal judgment. However, it should be noted that in comparing transit and highway travel times from point to point, a major assumption of parking availability (primarily downtown) and the additionally incurred highway time calculated from this trip was not taken into account. This time to park the car and get to the destination point should be included in the overall highway time and will be addressed in the "after" phase of the study. Figure III-2 shows the location of the O-D highway travel routes. Table III-8 shows the origin, destination, route and travel times for O-D pairs.

A more comprehensive discussion of this technique is described in Reference Material Appendix DD, Staff Paper #30, A License Plate Technique to Collect Highway Travel Times.

FIGURE III-2
SECTION A METRO IMPACT STUDY
LOCATION OF O-D PAIRS



ORIGINS

1.1 Offutt Road and Liberty Road
1.2 Chartley Road and Reisterstown Rd.
1.3A Northern Parkway and Price
1.3B Forest Park Ave. & Dickey Hill Rd
1.3C Sinai Hospital
1.4 Gwynns Falls Parkway & Hilton St.
1.5A Reisterstown Rd. & Patterson Ave.
1.5B Wabash Ave. and Eldorado Ave.

TABLE III-8

Auto Travel Times for O-D Pairs

ROUTE	ORIGIN	DESTINATION	ROUTE	AM PEAK TRAVEL TIME (MIN.)
1.1	Randallstown (Offutt & Liberty)	Baltimore & Light	Liberty, Northern P., JFX	33.2
1.2	Chartley Rd. & MD 140	Baltimore & Light	MD 140, I-695, JFX	38.6
1.3A	Northern Pky. & Price	Baltimore & Light	Northern Pkwy, JFX	17.3
1.3B	Dickeyville	Sinai	Hillsdale, Wabash, Belvedere	12.4
1.3C	Sinai	Dickeyville	Belvedere, Eldorado	14.7
1.4	Hilton & Gwynns Falls	Baltimore & Light	Gwynns Falls, Druid Hill, Centre,St. Paul	18.9
1.5A	Reisterstown & Patterson	Baltimore & Light	Reisterstown, Northern Pkwy., JFX	19.0
1.5B	Wabash & Eldorado	Baltimore & Light	Wabash, Liberty, Druid Hill, Centre, St. Paul	19.9

2. Transit Travel Times: Origin-Destination Pairs

Transit travel times were also calculated for the AM peak (7 to 9 AM) for identical O-D pairs; that is, the time incurred by using transit for the exact same points as those used in collecting auto times were chosen. Additional pairs were chosen for the tabulation of transit travel times between major transit dependent routes.

Transit travel times were calculated by using Spring, 1983 bus schedules. The quickest bus route to complete an O-D pair was determined. Transit times include the wait and transfer times, as well as the transit in-vehicle time for each origin to destination. Table III-9 shows the transit travel times for the O-D pairs.

TABLE III-9

Transit Travel Times for O-D Pairs
(A.M. Peak)

ROUTE	ORIGIN	DESTINATION	TRAVEL TIMES (Minutes) WALK	WAIT	TRANSIT IN-VEHICLE	TOTAL
.1	Randallstown (Offutt & Liberty)	Baltimore & Light	1	7.0	47.0	55.0
.2	Chartley Rd. & MD 140	Baltimore & Light	-	6.0	52.5	58.5
.3A	Northern Pky. & Price	Baltimore & Light	1	13.2	27.0	41.2
.3B	Dickeyville (Dickeyville Rd. & Forest Pk.)	Sinai	1	15.8	34.6	51.4
.4	Hilton & Gwynns Falls	Baltimore & Light	2	12.6	28.4	43.0
.5A	Reisterstown & Patterson	Baltimore & Light	-	6.4	28.0	34.4
.5B	Wabash & Eldorado	Baltimore & Light	4	6.4	23.0	33.4
.5C	Park Hgts. & Olympia	Baltimore & Light	-	5.0	34.7	39.7
.5D	Reservoir Hill (McCulloh & Cloverdale)	Social Security	-	7.6	37.5	45.1
.5E	Sudbrook (Milford Mill & MD 140)	Baltimore & Light	-	6.4	32.0	38.4
.5F	West Arlington (Liberty & Rogers)	Mondawmin Mall	2	7.6	14.2	23.8

A comparison of the auto and transit travel times for identical O-D pairs is shown in Table III-10.

TABLE III-10

Comparison of Auto & Transit Travel Times (AM Peak)
(Minutes)

ROUTE	ORIGIN	DESTINATION	AUTO	TRANSIT	TRANSIT -AUTO	DIFF.
1.1	Randallstown	Baltimore & Light	33.2	55.0	21.8	65.7%
1.2	Chartley Rd. & MD 140	Baltimore & Light	38.6	58.5	19.9	51.6%
1.3A	Northern Pky. & Price	Baltimore & Light	17.3	41.2	23.9	138.2%
1.3B	Dickeyville	Sinai	12.4	51.4	39.0	314.5%
1.4	Hilton & Gwynns Falls	Baltimore & Light	18.9	43.0	24.1	127.5%
1.5 A	Reisterstown & Patterson	Baltimore & Light	19.0	34.4	15.4	81.1%
1.5B	Wabash & Eldorado	Baltimore & Light	19.9	33.4	13.5	67.8%

3. Auto Travel Times: Highway Paralleling the Metro Line

Auto travel times for the AM peak (7 to 9 AM) were determined for the routes paralleling the Metro line. Segments were identified to measure changes in travel times due to congestion, etc. Data were collected using the license plate method previously described. For each of the parallel routes, auto travel times, distance and speed is shown in Table III-11. Figure III-3 shows the parallel routes with segments. These data will be compared with times sampled after start up of operations to identify any alleviation in highway congestion within the corridor.

4. Auto Travel Times: Roads Leading to Metro Stations

Auto travel times and delays to station areas were determined by examining specific "station access" routes. Each of these routes were driven between 5 and 8 times to minimize bias. Since these data are intended to show changes in delay, only AM peak times were collected; changes in delay in the off-peak were assumed to be insignificant for measurement. Staff indicated time delays due to congestion, accidents, travel signals, etc. as encountered on their predetermined route. Upon returning to the office, the data were compiled so that auto travel times, distances, and speeds could be calculated between critical locations on the way to the station. Table III-12 shows the list of station access routes as well as the times, distances and speeds of the segments along the routes; Figure III-4 shows the station access routes under study. These data will be compared with times sampled after start up of operations to identify any Metro related access congestion.

TABLE III-11

Auto Travel Times Along Routes Paralleling the Metro Line

Route	Major Arterial(s) Surveyed	FROM	TO	Avg. Peak Travel Time	DISTANCE (MILES)	SPEED MPH
2.1	Liberty Road/ Liberty Heights	Liberty (S. of Offutt)	Liberty (S. of Washington Ave.)	8.4 min.	2.90	20.7
		Liberty (S. of Washington Ave.)	Liberty (N. of N. Parkway)	4.4 min.	2.38	32.5
		Liberty Hgts. (S. of N. Parkway)	Liberty Hgts. (S. of Eldorado)	2.3 min.	0.79	20.6
		Liberty Hgts. (S. of Eldorado)	Liberty Hgts. (S. of Wabash)	3.1 min.	1.40	27.1
		Liberty Hgts. (S. of Wabash)	Liberty Hgts. (S. of Tioga)	1.6 min.	0.64	24.0
2.2	Reisterstown Rd.	MD 140 (at Chartley Rd.)	MD 140 (at Enchanted Hill Rd.)	4.3 min.	2.50	34.9
		MD 140 (at Enchanted Hill Rd.)	MD 140 (S. of I-695 ramps)	12.5 min.	4.20	20.2
		MD 140 (S. of I-695 ramps)	MD 140 (S. of Milford Mill)	3.5 min.	1.65	28.3
		MD 140 (S. of Milford Mill Rd.)	MD 140 (S. of Patterson)	2.4 min.	0.83	20.8
		MD 140 (S. of Patterson Ave.)	MD 140 (S. of N. Parkway)	1.7 min.	0.78	27.5
		MD 140 (S. of N. Parkway)	MD 140 (S. of Garrison)	1.5 min.	0.66	26.4
		MD 140 (S. of Garrison)	MD 140 (S. of Cold Spring)	2.0 min.	0.83	24.9
		MD 140 (S. of Cold Spring)	MD 140 (N. of Druid Park Drive)	2.2 min.	1.06	28.9
		MD 140 (N. of Druid Park Drive)	Auchentoroly (S. of Gwynns Falls)	2.4 min.	0.78	19.5
2.3	Park Heights Ave.	Park Hgts. (S. of Old Court Rd.)	Park Hgts. (S. of Clarks Lane)	3.4 min.	1.52	26.8
		Park Hgts. (S. of Clark Lane)	Park Hgts. (S. of Hayward)	3.7 min.	1.43	23.2
		Park Hgts. (S. of Hayward)	Park Hgts. (S. of Cold Spring)	3.0 min.	1.02	20.4

Route	Major Arterial(s) Surveyed	FROM	TO	Avg. Peak Travel Time	(MILES) DIST	MPH
2.4	Pennsylvania, Greene	Reisterstown Rd. (at Park Circle	Reisterstown (at Liberty Hgts.)	1.7 min.	0.55	18.5
		Reisterstown Rd. (at Liberty Hgts.)	Pennsylvania (at North Ave.)	2.2 min.	0.76	17.4
		Pennsylvania (at North Ave.)	Greene (at Baltimore St.)	7.8 min.	1.82	25.7
2.5	Wabash Ave.	Wabash Ave. (S. of Patterson)	Wabash Ave. (N. of Eldorado)	2.4 min.	1.23	30.8
		Wabash Ave. (N. of Eldorado)	Wabash Ave. (S. of Cold Spring)	2.6 min.	0.95	21.9
		Wabash Ave. (S. of Cold Spring)	Liberty Rd. (S. of Wabash Ave.)	3.6 min.	1.23	20.5

FIGURE III-3
SECTION A METRO IMPACT STUDY
PARALLEL ROUTES TO METRO BY SEGMENT

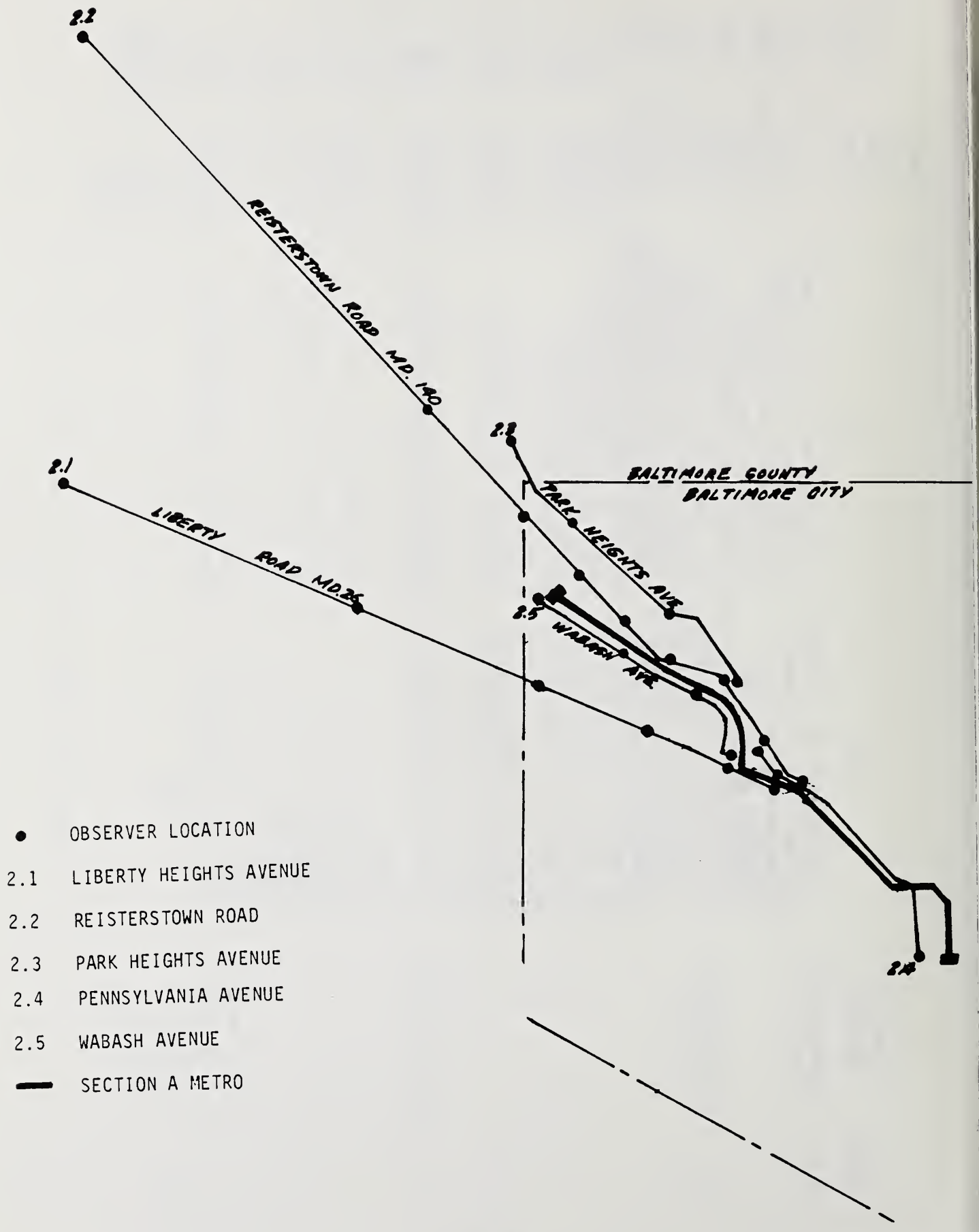


TABLE III-12

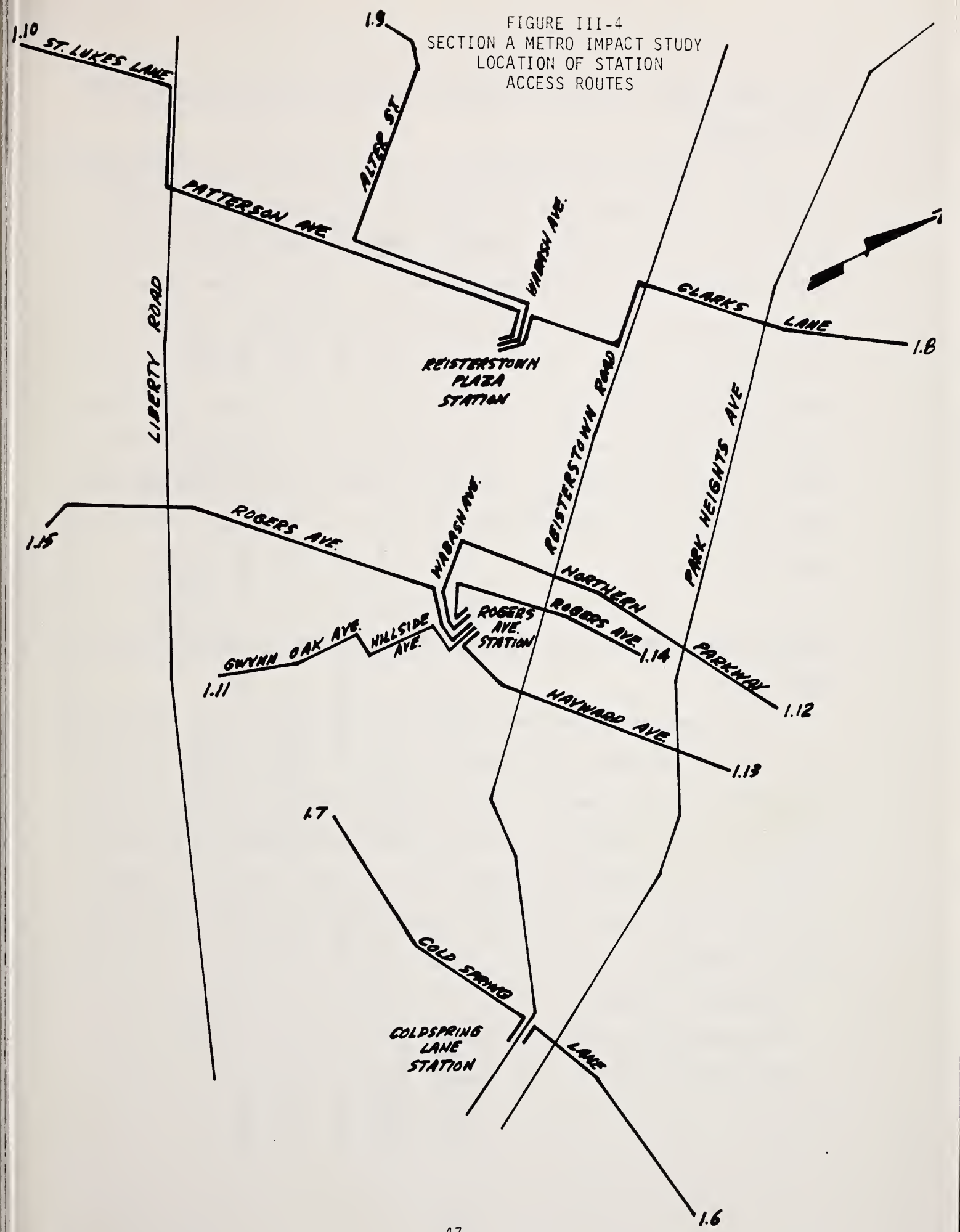
Auto Travel Times to Metro Station Areas

			Avg. Time (Min.)	DIST.	Speed (MPH)
Springarden Dr. & Cold Spring	TO	Cold Spring Sta.	5.9	1.38	14.0
Springarden & Cold Spring	TO	Cold Spring & Pk. Hgts	3.0	.85	17.0
Cold Spring & Pk. Hgts.	TO	Cold Spring Station	2.9	.53	10.9
Cold Spring & Garrison	TO	Cold Spring Station	2.3	.64	16.7
Cold Spring & Garrison	TO	Cold Spring & Dolfield	1.4	.49	21.0
Cold Spring & Dolfield	TO	Cold Spring Station	0.9	.15	10.0
Clarks & Fallstaff	TO	Reisterstown Plaza Sta.	6.4	1.64	15.4
Clarks & Fallstaff	TO	Clarks & MD 140	4.3	1.00	14.0
Clarks & MD 140	TO	MD 140 & Patterson	.8	.19	14.3
MD 140 & Patterson	TO	R. Rd. Plaza Sta.	1.3	.45	20.8
Essex & Campfield	TO	Reisterstown Plaza Sta.	3.3	1.49	27.1
Essex & Campfield	TO	Alter & Patterson	1.9	.81	25.6
Alter & Patterson	TO	Patterson & Sta. Lot Entrance	.9	.53	35.3
Patterson & Sta. Lot Entrance	TO	R. Rd. Plaza Sta. Ent.	.5	.15	18.0
St. Lukes & Townbrook	TO	Reisterstown Plaza Sta.	4.6	2.11	27.5
St. Lukes & Townbrook	TO	St. Lukes & MD 26	1.3	.52	24.0
St. Lukes & MD 26	TO	Patterson & MD 26	.7	.32	27.4
Patterson & MD 26	TO	Patterson & Alter	1.9	.59	18.6
Patterson & Alter	TO	Patterson & St. Ent.	.8	.53	39.8
Patterson/St. Ent.	TO	R. Rd. Plaza Sta.	.5	.15	18.0
Haddon Ave. & Gwynn Oak	TO	Rogers Ave. Sta.	3.2	.93	17.4
Northern Pkwy. & Winner	TO	Rogers Ave. Sta.	5.7	1.64	17.3
N. Pky. & Winner	TO	N. Pky. & MD 140	1.6	.77	28.9
N. Pky. & MD 140	TO	Wabash & Rogers	3.0	.55	11.0
Wabash & Rogers	TO	Rogers Sta.	1.1	.32	17.5

TABLE III-12 (Cont.)

Route				Avg. Time (Min.)	DIST.	Speed (MPH)
1.13	Hayward & Maple	TO	Rogers Ave. Sta.	3.2	.87	22.1
	Hayward & Maple	TO	Hayward & Reister-town	2.4	.64	22.5
	Hayward & Reisterstown	TO	Rogers Ave. Sta.	0.8	.23	20.9
1.14	Rogers & Jonquil	TO	Rogers Ave. Sta.	3.4	.93	21.9
	Rogers & Jonquil	TO	Rogers & Reisterstown	1.1	.25	26.4
	Rogers & Reisterstown	TO	Rogers Ave. Sta.	2.3	.68	26.3
1.15	Gwynn Oak & Rogers	TO	Rogers Ave. Sta.	4.4	1.62	16.3
	Rogers & Gwynn Oak	TO	Rogers & MD 26	1.3	.45	17.3
	MD 26 & Rogers	TO	Rogers Ave. Sta.	3.1	1.17	15.9

FIGURE III-4
SECTION A METRO IMPACT STUDY
LOCATION OF STATION
ACCESS ROUTES



5. Auto Travel Times: Origin-Destination Pairs not in the Northwest Corridor (Control Group)

Travel times were also examined for a control group of origin-destination pairs. These data could be compared to an "after" phase to measure changes in travel time due to background regional travel growth not necessarily associated with the Northwest corridor. Highway travel times from various locations in the Baltimore Region were collected. For the five routes studied, each was sampled between 5 and 8 times to minimize bias. These data were collected on random weekdays in May and June, 1983 before school ended for the semester. One route was also collected in October, 1983 for comparison purposes. Table III-13 shows the control group travel times, distances and average speeds. Figure III-5 shows the location of these control routes.

6. Transit Travel Times: The Preparation of Contour Maps at Selected Station Sites

Travel time contour maps were prepared for two locations in the Northwest corridor, Mondawmin and Reisterstown Road Plaza, as well as the CBD (Baltimore and Light Streets). These maps, which display travel times from each of the three locations to various points, were prepared to provide an indication of an improved or worsened level of transit service for comparison to the "after" phase of the study. Three different transit time contour maps were prepared:

Mondawmin - AM peak

Reisterstown Road Plaza - Off-Peak

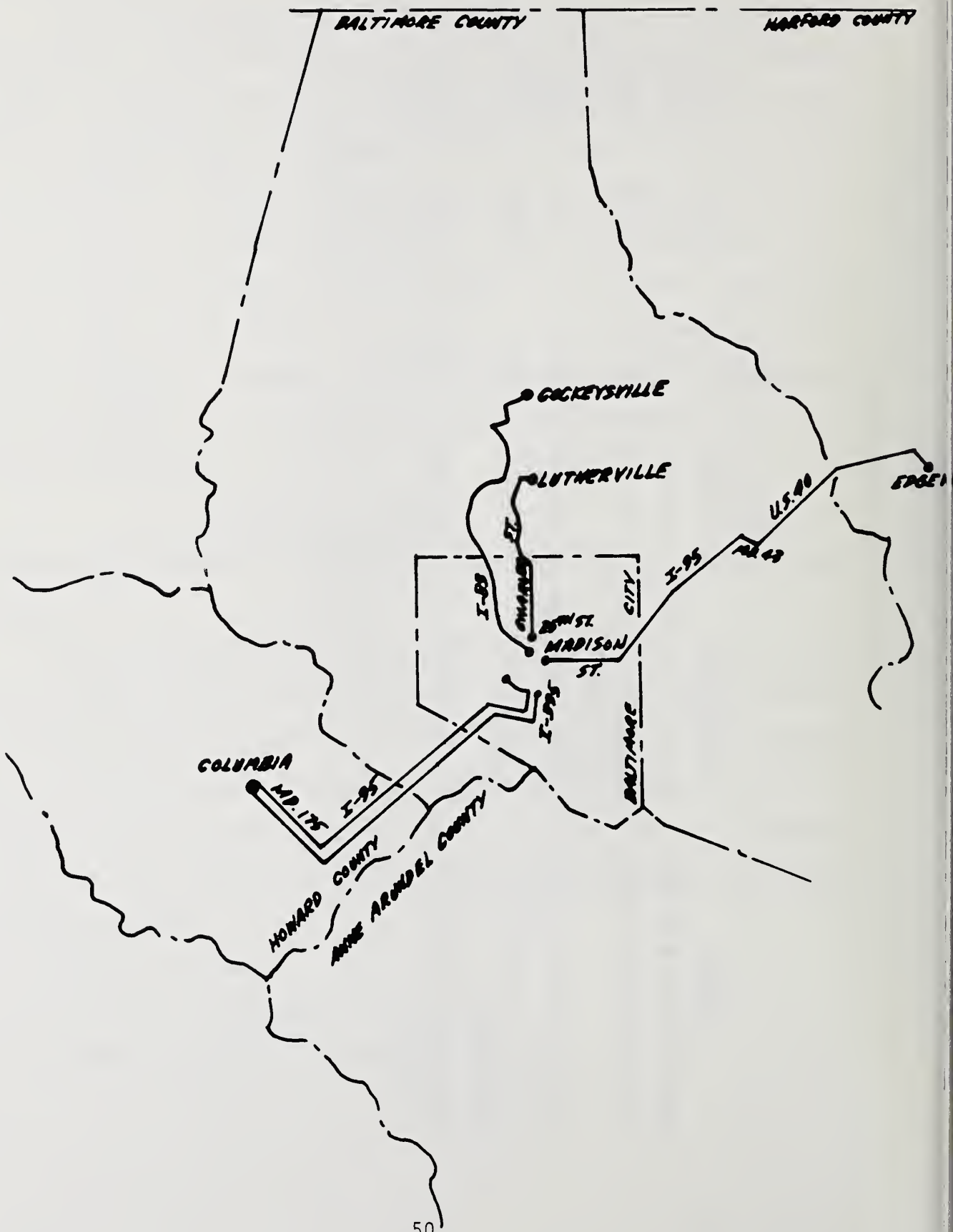
Baltimore and Light - AM Peak

TABLE III-13

Control Group Travel Times

ORIGIN	DESTINATION	Data for Month of Year	Avg. Time (Tenths of Min.)	DIST.	MPH
Edgewood (US 40 & MD 755)	Madison & St. Paul	May-June	29.5	18.3	37.2
Columbia (MD 175 & Tamar)	Martin Luther King Blvd. & Balto.	May-June	21.0	17.1	48.9
Columbia (MD 175 & Tamar)	Calvert & Baltimore	May-June	23.3	16.9	43.5
Cockeysville (Cranbrook & Pepperwood)	Maryland Ave. & Oliver	May-June	24.6	15.6	38.0
Lutherville (York Rd. & Ridgefield)	St. Paul & 25th Sts.	May-June	21.6	8.5	23.6
		Oct.	24.3	8.5	21.0

FIGURE III-5
SECTION A METRO IMPACT STUDY
CONTROL GROUP ROUTES



Transit contours for the A.M. peak period were prepared for Mondawmin and downtown (Baltimore and Light) due to the predominance of work trips to those locations during the peak. Contours for the off-peak were prepared for Reisterstown Road Plaza due to the large number of shopping trips oriented to the shopping center during the off-peak hours. Contours are shown in 10 minute intervals. Time included the walk, wait and transfer time as well as the in-vehicle run time.

In general, bus schedules were used. The time period (either AM peak or off-peak) was chosen and a chart was prepared showing each bus lines' wait time. Wait time was calculated by the formula: 1/2 headway (1 thru 12 min.) + 1/5 Headway (13 to 32 min.). Transfer times were calculated using the wait time formula. A walk time was assumed to the shopping centers. Before contours could be drawn, each bus line was examined to see if a transfer to another line would alter its contour lines. Usually, a transfer to another bus added a wait time that would prohibit its use. Consequently, the final maps show that the radial movements were traveled faster than crosstown movements. Figure III-6 shows the transit travel time contours to Mondawmin in the AM peak. Figure III-7 shows transit times to Reisterstown Road Plaza in the off-peak. Most of the time accumulated for these contours is the initial wait time; after the bus has arrived, the run time is not as significant. Figure III-8 shows the transit travel time contours to Baltimore and Light Streets for the AM peak. Due to express service from the suburbs, some pockets are formed where it is quicker for outer areas to get to the CBD.


FIGURE III-6
TRANSIT TRAVEL TIME
CONTOURS (IN MINUTES)
TO MONDAWMIN
A.M. PEAK-1983
MOUNT WASHINGTON
VILLAGE OF CROSS KEYS
PIMLICO RACE COURSE
COLDSPRING
ARLINGTON
West Cold Spring
LANDFILL
WOODBERRY
DRUID
FOREST PARK
WINDSOR HILLS
WAKEFIELD
WALBROOK
GWYNNS FALLS PARK
ROSEMONT
SANDTOWN
EDMONDSON VILLAGE
CATHEDRAL CEMETERY
52

FIGURE III-7
TRANSIT TRAVEL TIME
CONTOURS (IN MINUTES)
TO REISTERSTOWN ROAD PLAZA
OFF PEAK-1983

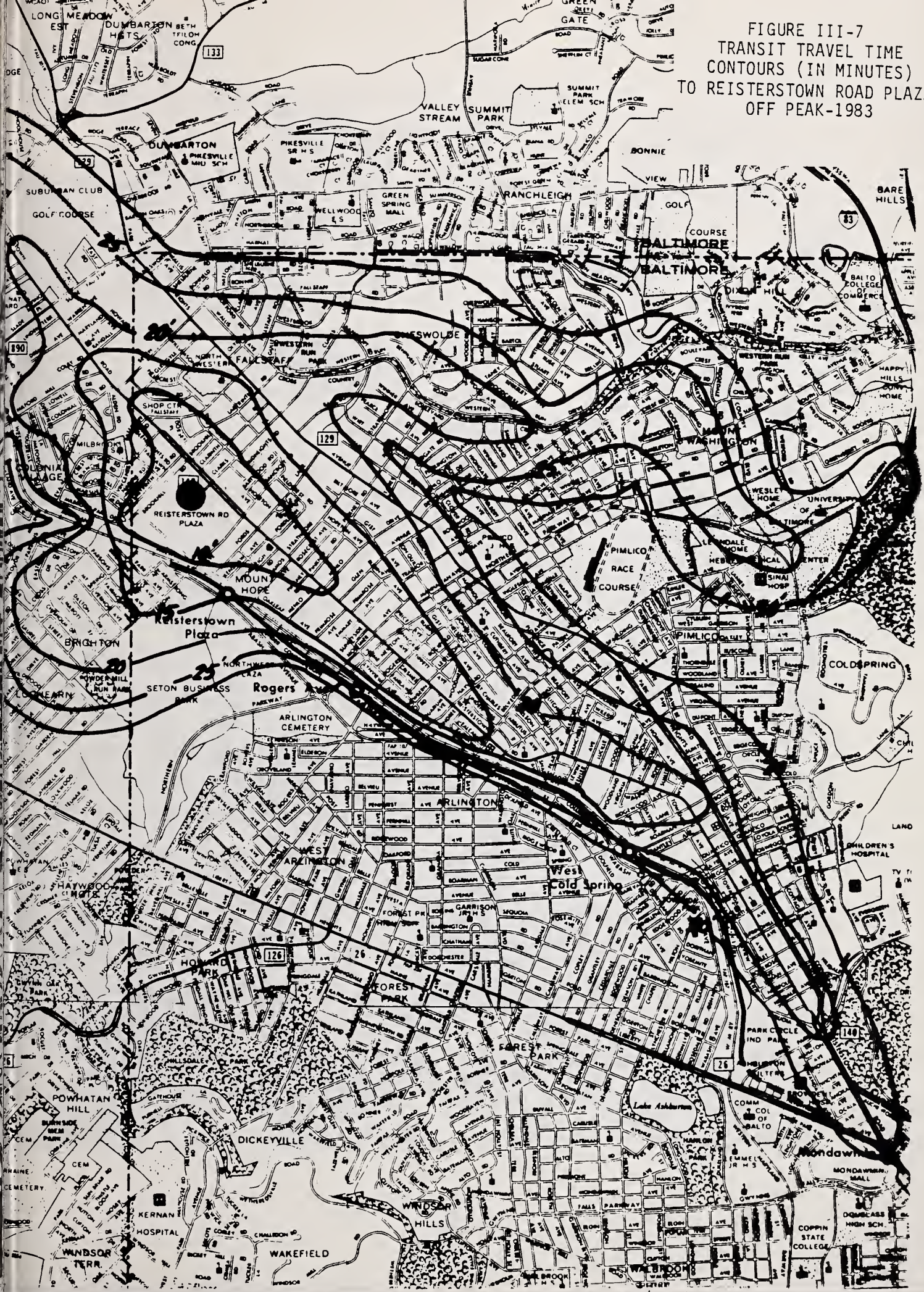
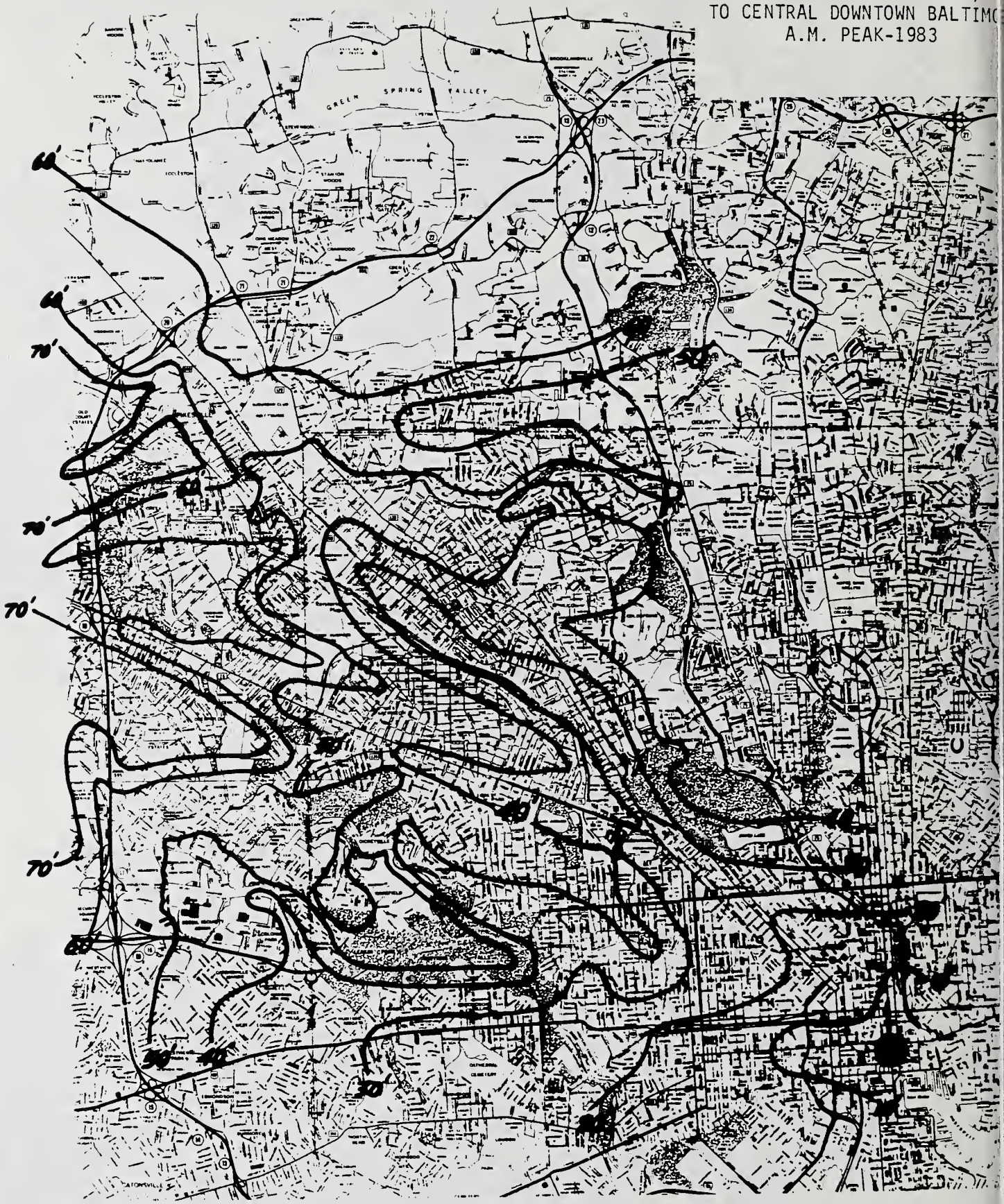


FIGURE III-8
TRANSIT TRAVEL TIME
CONTOURS (IN MINUTES)
TO CENTRAL DOWNTOWN BALTIMO
A.M. PEAK-1983



E. PERSON TRIPS INTO METROCENTER

Person trip data, consisting of traffic counts, auto occupancy counts, and the number of transit trips at the CBD cordon line, provides information from which to determine changes in person travel into the CBD.

Data collected with a concentration on the Northwest corridor could show changes in mode choice. Therefore, data was collected to reflect travel during the morning weekday 6-9 a.m. peak period. The three major modes examined were:

1. auto driver
2. auto passenger (carpoolers)
3. transit rider

Data collection activities for each of these modes are discussed below. Further documentation and descriptions are available in Reference Material, Appendix EE, "Measure Changes in Person Trips Into the CBD," TASK 12.4.

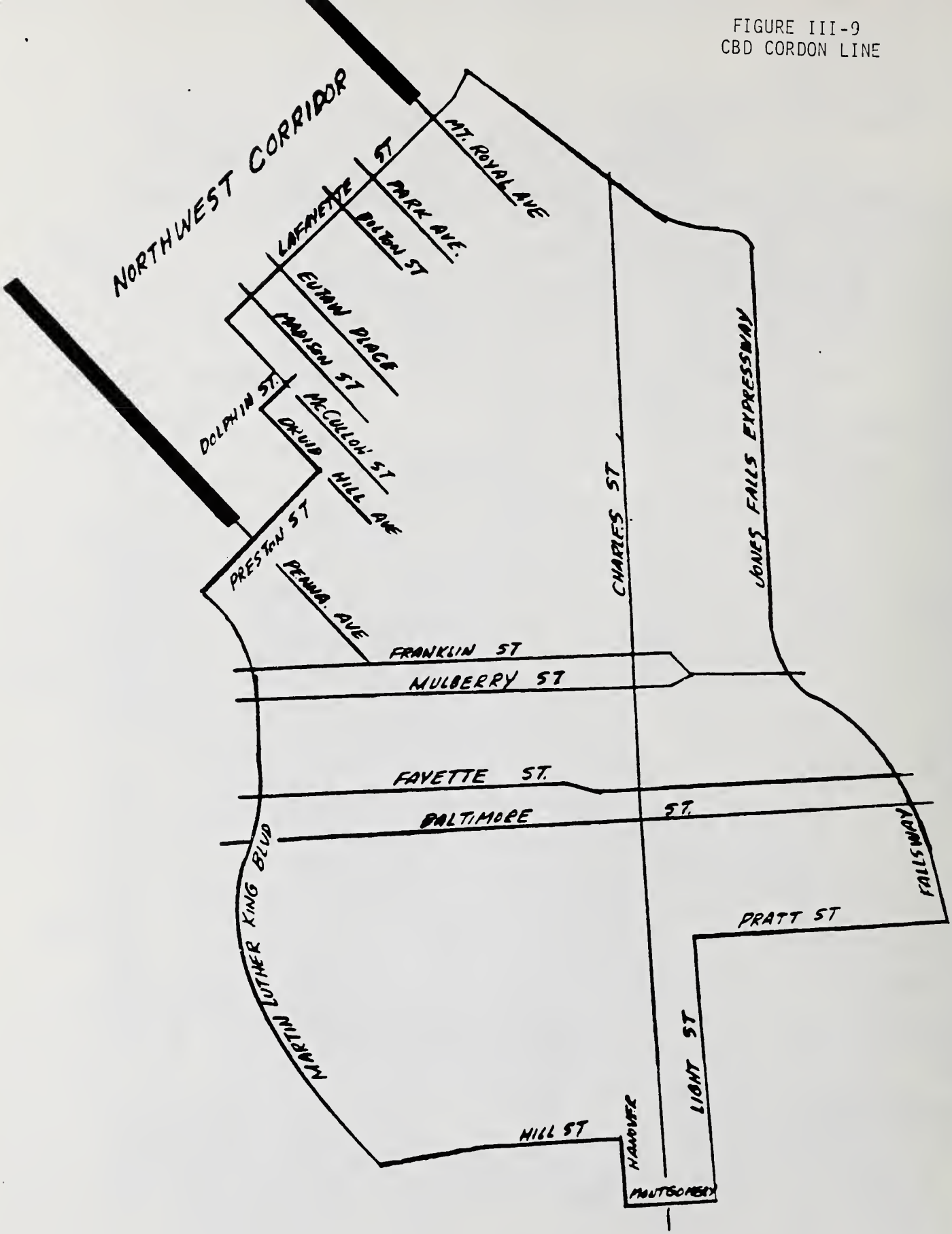
1. Auto Driver

Traffic volume counts on the CBD cordon line were available for the year 1981 at 49 locations. Figure III-9 shows the CBD cordon line cutting across the major arterials. For each of these locations, traffic count data were examined by direction for the 6 a.m. to 9 a.m. time period. For this analysis, traffic counts for the streets carrying traffic in and out of the Northwest corridor were distinguished from the total cordon line.

2. Auto Passenger (Carpooler)

For the same locations on the CBD cordon, auto occupancy data for 1981 were collected by direction for the 7 a.m. to 9 a.m. time frame. From these

FIGURE III-9
CBD CORDON LINE



data, an auto passenger count was obtained using the traffic count data.

3. Transit Ridership

Transit patronage at the CBD cordon line was identified for the 6-9 a.m. peak period. Weekday data for 1980 and 1982 was obtained from the Mass Transit Administration (MTA). A tabulation of ridership data representing 1981 AM peak ridership was compiled for both the Northwest and the entire cordon line.

By combining these data, a resulting measurement of person trips in and out of the CBD at the cordon line was established. Table III-14 shows the number of vehicles, carpoolers, and transit riders entering and leaving the CBD at the cordon line for a typical 1981 weekday peak period (6 a.m. to 9 a.m.). Note that no estimate of those trips that pass through the CBD have been determined.

TABLE III-14
Number of Vehicles, Carpoolers, and Transit Riders
Entering and Leaving at the CBD Cordon Line
1981 Weekday
6 a.m. to 9 a.m.

	INBOUND		OUTBOUND	
	CBD Cordon	NW Corridor	CBD Cordon	NW Corridor
Number of vehicles	72,744	9,019	40,605	3,747
Number of carpoolers	28,986	3,795	11,341	923
Number of transit riders	29,540	6,017	18,389	3,454
TOTAL	131,270	18,831	70,335	8,124
% vehicles	55	48	58	46
% carpoolers	22	20	16	11
% transit riders	23	32	26	43
TOTAL	100	100	100	100

F. PARKING DATA AT METRO STATION AREAS

A parking study was conducted in the Fall of 1982 and the Spring of 1983 for six of the nine Metro Station areas in the Section A corridor. The survey, prepared by the Baltimore City Planning Department, was conducted between 2 and 3 p.m. to give a better indication of the usage of those parking spaces available. Residential usage as well as non-residential usage was ascertained.

There were 4,000 legal curb spaces available around the six station sites. A utilization rate of 35 percent was observed at the time of this on-street survey. The Penn-North Station area had the highest utilization rate at 75 percent. Reisterstown Plaza had the highest percentage of non-resident usage with 33 percent. Table III-15 indicates parking utilization at the six stations. Appendix E contains the methodology employed in the parking studies as well as the utilization and observed parking demand at the station areas.

Table III-15
"Before" parking Survey at Metro Station Areas
(Taken Between 2 and 3 p.m. - Weekdays)
(1982 and 1983)

Transit Station	Legal Curb Spaces	Observed Parked Cars
Reisterstown Plaza	500	94
Rogers Avenue	600	290
West Cold Spring	700	211
Mondawmin	700	252
Penn-North	600	450
Upton	900	384

IV. LAND DEVELOPMENT CHARACTERISTICS OF THE IMPACT CORRIDOR

A. RESIDENTIAL LAND ACTIVITY

Residential land activity around the Metro stations provides information for determining the effects of Metro on residential property values over time. Data collected for this study includes:

1. housing price data,
2. rental price data, and
3. housing supply data.

Methodology

Before collecting these residential land data, control areas were designated in the portions of Baltimore City which would not be affected by the Metro line. Control areas, similar to the station areas in social and economic background (as defined by Census tract and block data), were identified so that future comparisons, not biased by regional growth, could be measured. Figure IV-1 shows the control and station areas chosen for the residential comparisons.

1. Housing Price Data

Housing price data was obtained from LUSK Reports for the years 1970, 1975 and 1980. The mean values of housing prices for those years for the station and control areas are shown in Table IV-1. The increase in the mean house value over time in the corridor varied by station area. The ten year increase, for example, at the Reisterstown Plaza Station, was over 200%, from $12,800 in 1970 to $40,700 in 1980, while in the Penn-North Station area, housing values increased by 80% from $3,803 in 1970 to $6,878 in 1980.

FIGURE IV-1
TRANSIT STATION PLANNING
STUDY AREAS AND CONTROL AREAS

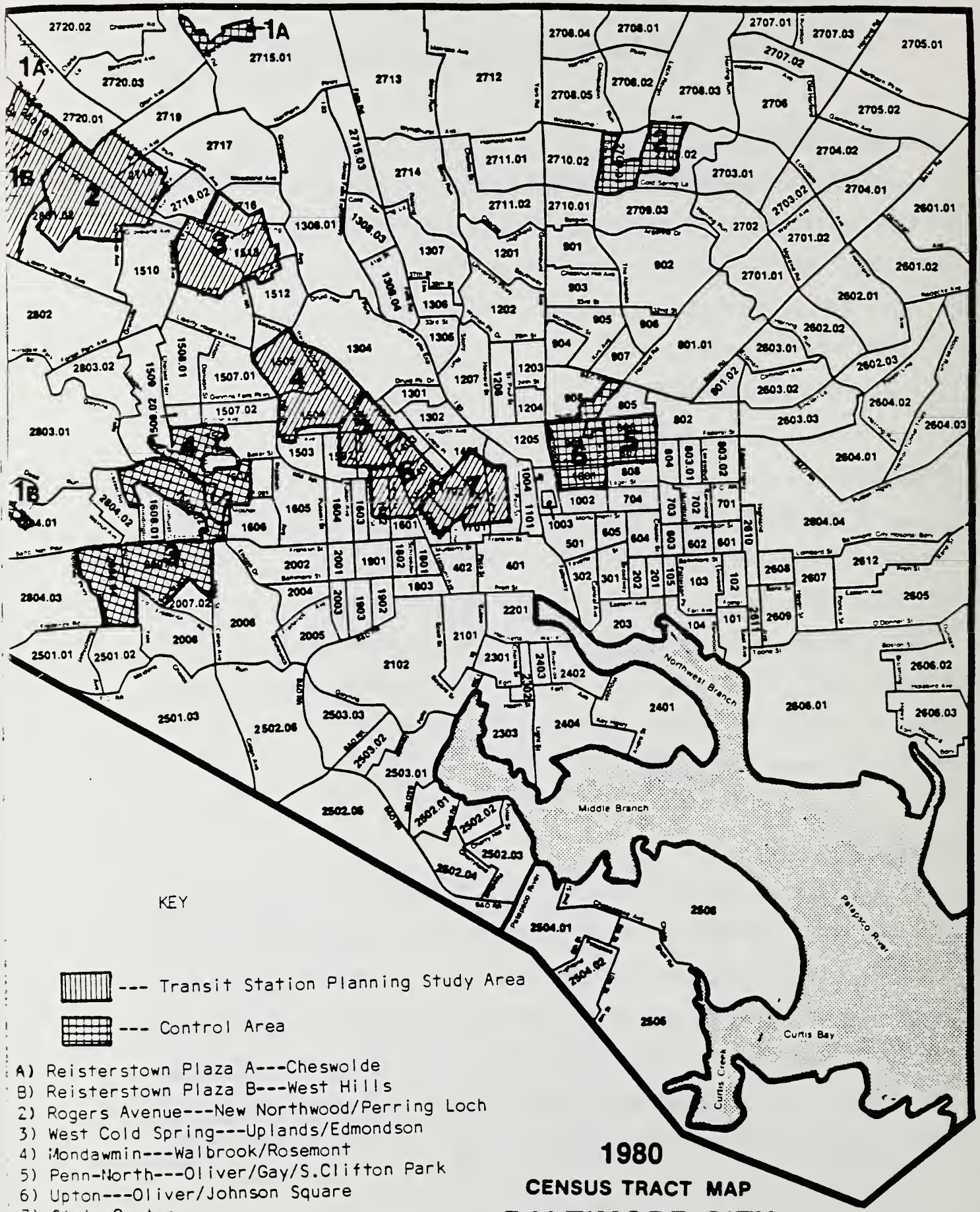


Table IV-1
Housing Price Mean Value by
Metro Station and Control Areas
1970, 1975 and 1980

Station Area	Control Area	Mean Value 1970	1975	1980
Reisterstown Plaza A		NA	NA	NA
	Cheswolde A	NA	NA	NA
Reisterstown Plaza B		12,800	22,208	40,700
	West Hills B	9,136	19,850	26,031
Rogers Ave.		10,702	17,674	30,325
	New Northwood/Perring Loch	11,374	20,802	32,958
W. Cold Spring		7,869	9,407	15,640
	Uplands/Edmondson	7,315	13,627	21,097
Mondawmin		8,553	6,572	17,455
	Walbrook/Rosemont	5,994	10,486	19,400
Penn North		3,803	3,059	6,878
	Oliver/Gay/S. Clifton Pk.	2,802	3,762	8,278
Upton		3,065	3,648	9,632
	Oliver/Johnson Square	2,492	3,607	6,258
State Center		24,513	46,369	59,482
	None	NA	NA	NA

A comparison of the mean house values for all station areas (not including State Center) shows a 1980 mean house value of $15,400 for the corridor, and $15,147 for the control areas. Appendix F shows the housing price data by station and control areas for 1970, 1975 and 1980; also included are the number of transactions, total sales and mean value.

2. Rental Price Data

Rental price data was collected through three sources. Rent data for 1983, collected during the month of April, were obtained by utilizing the Baltimore City Department of Housing and Community Development Rent Survey. This is an annual survey in which rent information is collected for a one month period in April of each year. In addition, information was obtained through direct contact with apartment buildings and complexes in October, 1983. The third source of data was the 1980 Census. Table IV-2 shows 1983 mean rents by Metro station and control areas. For comparison purposes, the 1980 Census mean rent data are also shown. Appendix G shows details on the 1983 mean rent and 1980 Census data for the station and control areas for various apartment sizes.

Table IV-2
Rental Price - Mean Rent by Metro Station and Control Areas
1980 and 1983 Census

Station Area	Control Area	1980 Mean Rent	1983 Census Mean Rent
Reisterstown Plaza A		$252	$386
	Cheswolde A	252	305
Reisterstown Plaza B		224	386
	West Hills B	202	305
Rogers Ave.		187	296
	New Northwood/Perring Loch	207	355
W. Cold Spring		172	282
	Uplands/Edmondson	155	306
Mondawmin		154	206
	Walbrook/Rosemont	152	308
Penn North		118	170
	Oliver/Gay/S. Clifton Pk.	124	169
Upton		122	184
	Oliver/Johnson Square	104	177
State Center		157	305
	None	NA	NA

3. Housing Supply Data

General housing supply data was collected for the Metro station and control areas. For each area, the number of households, whether renter or home-owner-occupied, were identified (See Table IV-3). Appendix H provides a more detailed description of the station and control areas including population, race, renters, home-owners, income, mean house value and mean rent.

Table IV-3
Number of Households-Rentals vs Owner-Occupied
1980 Census

Station Area	Control Areas	# of Households	PERCENT Renters	PERCENT Home-Owners
Reisterstown Plaza A		487	100	0
	Cheswolde A	440	96	4
Reisterstown Plaza B		156	17	83
	West Hills B	93	14	86
Rogers Ave.		2,167	26	74
	New Northwood/Perring Loch	2,115	28	72
W. Cold Spring		3,629	60	40
	Uplands/Edmondson	4,010	54	46
Mondawmin		2,178	61	39
	Walbrook/Rosemont	1,350	55	45
Penn North		3,421	78	22
	Oliver/Gay/S. Clifton Pk.	3,150	68	32
Upton		3,133	83	17
	Oliver/Johnson Square	2,894	82	18
State Center		3,895	90	10

B. COMMERCIAL LAND ACTIVITY

Commercial land activity data provides information for determining what effect the initiation of Metro service has on commercial development and associated retail activity. Data obtained for this study included:

1. retail sales activity;
2. commercial office space inventory; and
3. commercial/retail employment data.

These data, along with a general methodology, are discussed below. Further documentation and descriptions are available in Reference Material Appendix FF, "Conduct Commercial Land Activity," TASK 8.

1. Retail Sales Activity

A description of available data sources and a proposed methodology are outlined in Reference Material Appendix GG, Retail Sales Activity-Research. The work to date has indicated that retail sales data are not easily obtainable and that substantial resources are required to complete the investigation.

2. Commercial Office Space

Commercial office space data were researched and found to be subcategorized into three sections: commercial office space inventory, rental rates, and property values. A general methodology for developing these data, followed by data results for each section, is shown.

Methodology

Office space supply for the station impact areas in 1980 was determined from a variety of sources, including Black's Office Guide for Maryland, the

Directory of Major Office Buildings, published in 1976 by the then Chamber of Commerce of Metropolitan Baltimore, and a survey by a local realty company, W.C. Pinkard and Company, Inc. entitled, "Existing Primary Office Space." An attempt was made to try and distinguish between total square footage and that portion of each building dedicated to commercial office use. Where the sources reported different square footage measurements for the same building, local realtors were questioned to resolve the discrepancies.

Rental rates for 1980 were also obtained from the above sources, although Black's Guide was the source most heavily relied upon.

Property values were proxied by the "full cash value" figures obtained from the Department of Assessments and Taxation's assessment files. These values were accessed by using the block and lot number for each property. The block and lot numbers (along with the ward and section numbers) were obtained by looking up the addresses of each commercial property in the Real Estate Tax Assessments book for Baltimore, which is published every two years by The Mayor and City Council of Baltimore and the Greater Baltimore Board of Realtors.

Results

Commercial Office Space Inventory

Only four station areas were found to have major commercial office space in their impact areas: Charles Center, Lexington Market, State Center, and Reisterstown Road Plaza. The total square footage and square footaged dedicated to commercial use are shown for these areas in Table IV-4. In addition, Appendix I, Commercial Office Space Inventory, lists

individual buildings in these areas, including their address, market tier ("A" being the highest quality), height, size in square footage (both total and office portions), date of construction and 1980 rental rates.

Table IV-4
Commercial Office Space Inventory Summary
by Metro Station Area (1980)

Station Area	Total Sq. Ft.	Office Sq. Ft.
Charles Center	8,641,300	8,181,700
Lexington Market	431,100	415,600
State Center	423,300	406,300
Reisterstown Plaza	40,000	40,000

The Charles Center Station impact area had the most commercial office structures (70), of course, since it is in the heart of the Central Business District. These buildings combined contain more than eight million square feet of commercial office space, of which 3.8 million had an "A" market tier rating.

The Lexington Market Station impact area, located on the fringes of the Central Business District, had over 400,000 square feet of commercial office space among its six buildings, none of which were rated higher than "B".

The State Center Station impact area also showed five major commercial office structures which totaled just over 406,000 square feet. Although this area includes the mammoth state office complex, these buildings were not included since they are dedicated to governmental use. It should be noted, however, that the state owned 850,000 square feet of office space in 1980 and leased another 24,200 square feet in the State Center Station impact area.[1]

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[1]Maryland Government Services Administration.

Only one relatively small office building was found in the Reisterstown Road Station impact area.

Rental Rates

In general, rental information was obtained for only one-half of the commercial office structures. The rental rates per square foot should only be used as a general indication of lease rates, since there can be many differences in what additional services are covered by the rent (e.g., janitorial, insurance, utilities, landscaping, etc.). For the Charles Center Station area, the range of rates varied from $6.75 to $13.00 a square foot. The "A" properties averaged to $11.50 a square foot, while the "B" class went for an average of $8.15 a square foot and the "C's" for approximately $7.40 a square foot. For the few properties for which rental rates were available, the Lexington Market Station area averaged $6.70 per square foot and the State Center Station area $7.25.

Property Values

Maryland's assessing system--usually called triennial assessments--is based on a three-year cycle in which one-third of all taxable real estate is reviewed and valued every year. Assessments are based upon estimates of the market value of property, which according to Maryland Law is known as "full cash value." These full cash value figures are used as proxies for property values and are shown in Appendix J by Station area. Note that the "current" and "base" full cash values for the individual commercial properties represent different years according to which "assessment group" the property belongs in. As a result of these differences, "before" and "after" evaluations of property value changes will have to be done on a station-by-station basis.

Although little can be concluded from this "before" data at the present, the information obtainable on the "current" values of commercial property did yield the following "average" building values: $5.3 million for the Charles Center Station; $2.2 million for Lexington Market and $2.4 million for the State Center area.[2]

3. Commercial/Retail Employment Data

Methodology and Results

Employment data (1970, 1975, and 1980) were tabulated for the "impact areas" surrounding the nine station stops along the Metro Section A corridor. These impact areas are essentially 2,000 foot radii around the center of each station (except for Lexington Market and Charles Center where the impact areas were derived by taking 1,000 foot radii from each of the two ends of the individual stations) and are delineated by transportation zones (TZs), the smallest geographical area for which employment data is available. In several cases, individual transportation zones were in more than one station impact area. When this occurred, the TZ was assigned to only one impact area, based on the proportion of the total TZ in each impact area.

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[2]A data file has recently been supplied to the RPC from the Department of Assessments and Taxation (processed by the Baltimore City Department of Planning) which contains full cash value data for every structure in the station impact areas. Data for each lot is grouped by ward, section and block. In the future, the commercial structures can be extracted from this file to get a more complete accounting of the commercial value in each impact area.

The employment numbers at the TZ level are based on the Regional Planning Council's Master Establishment File (MEF) which details wage and salary employment by individual establishment. MEF employment numbers are adjusted to regional, jurisdictional and two-digit SIC controls as determined by Maryland State Employment Security Administration Data, in-house RPC employment estimates and local jurisdictional employment surveys.[3]

Employment information, shown in Table IV-5, includes data for retail, service and office employment in each station area, as these categories are seen as being potentially the most affected by the operation of the Section A Metro Line. (Appendix K details the employment data by Station and TZ, and lists the Standard Industrial Classification Codes (SICs) associated with the retail, service and office employment categories.)

Table IV-5 also indicates that total employment in the city declined about six percent between the 1970 and 1975 period but increased by about nine percent between 1975 and 1980. Overall, for the entire decade, total city employment increased about 2.5 percent, or at an average annual rate of 0.2 percent. The growth pattern of total city employment was not typical of all of the metro impact employment categories. For instance, retail employment declined steadily over the ten-year period a total of 21 percent. While the other two categories, service and office employment, both showed increases of approximately 23 percent over the entire decade. Service

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[3]For a more complete explanation of the methodology involved in estimating employment, see Technical Memorandum Number 5, "1970 Socio-Economic Data Summarized by Transportation Zones," RPC, October 1973; and Technical Memorandum Number 36, "Procedure for Generating 1975 Socio-Economic Data by Transportation Zones," RPC, February 1978; and Technical Memorandum Number 50, "Round II Cooperative Forecasts Methodologies," RPC, July, 1984.

Table IV-5
Metro Station Area "Before" Employment

STATION AREA	1970 TOTAL EMP	1970 RET EMP	1970 SERV EMP	1970 OFF EMP	1975 TOTAL EMP	1975 RET EMP	1975 SERV EMP	1975 OFF EMP	1980 TOTAL EMP	1980 RET EMP	1980 SERV EMP	1980 OFF EMP
Reisterstown Road	3,987	2,234	302	82	5,875	2,700	1,230	145	5,320	2,930	1,170	130
Rogers Avenue	5,601	1,668	996	212	4,665	1,130	825	210	6,770	1,080	2,490	110
West Cold Spring	3,657	1,131	416	134	3,015	895	210	65	3,678	1,230	310	30
Mondawmin	4,585	1,909	78	112	5,068	655	110	55	5,620	560	298	190
Penn North	6,582	922	908	183	6,000	730	755	165	6,298	650	580	80
Upton	4,204	614	980	60	3,450	590	240	70	2,360	260	180	30
State Center	14,662	1,141	2,497	555	17,685	1,430	2,565	1,535	29,010	960	2,160	1,970
Lexington Market	13,154	3,179	1,628	2,306	15,800	1,730	2,625	1,840	11,840	1,210	650	1,210
Charles Center	52,043	2,376	7,216	12,027	47,050	1,870	5,945	13,090	54,978	1,970	7,598	16,878
Baltimore City	447,303	67,841	47,269	29,685	420,780	60,735	41,140	30,150	458,600	53,800	58,300	36,600

employment declined sharply in the 1970 and 1975 period (-13 percent) but then rose even more sharply in the 1975 to 1980 time span (+42 percent). Office employment increased marginally over the first part of the decade (+2 percent) and much more strongly during the last five years (+21 percent).

Comparing the combined employment in all of the station impact areas with total city employment, station impact area employment increased from 24 percent to 27 percent of total City employment. However, retail employment in the station area declined from 22 to 20 percent of total City retail employment. Likewise, service employment declined from 32 to 26 percent of total city-wide service employment. The proportion of office employment, however, increased from 53 to 56 percent of City office employment, a not very surprising trend considering that the Baltimore Metrocenter is included in the impact area. Individual station impact areas, of course, show deviations from these average trends. Discussed in Appendix L are the employment changes surrounding each station area.

C. TSADAS PLANS

Plans prepared by the Transit Station Area Development and Access Study (TSADAS) provide data to compare actual land development in station areas with the proposed plans. A listing of TSADAS plans for each station is listed in Appendix M. An analysis of these plans is scheduled in the "after" phase of this task.

V. STATION AREA PROFILES

This chapter contains information on the principal station areas surrounding the Metro line where surveys have been administered to measure changes in transit travel. These areas included: A) Reisterstown Plaza, B) Mondawmin, and C) Metrocenter with stations at State Center, Lexington Market and Charles Center. For each of these station areas, the physical setting is decribed along with information resulting from surveys administered in the immediate vicinity. Survey data were collected from employees, shoppers, and management of retail and office establishments located near the station sites. For the most part, these surveys were conducted by the Baltimore City Planning Department. The employees survey administered at the Reisterstown Road Plaza and Mondawmin Shopping Center as well as survey tabulations, are shown in Appendix N; the shoppers survey and resulting tabulations, also given out at these same locations, are shown in Appendix O.

A. REISTERSTOWN PLAZA STATION

Physical Setting

The immediate station area contains a full scale regional complex, Reisterstown Road Plaza, and a large undeveloped tract, i.e., Seton (approx. 200 acres). Industrial users are located adjacent to the station along the Western Maryland Railroad tracks, with the largest concentration located within the Menlo Industrial Park. Residential areas are primarily due east and, to a lesser degree, northwest of the station site. Prior to the operation of Metro, the area was serviced by one radial bus line, the No. 7, and one crosstown line, No. 44.

Results of Employer-Based Survey

The Baltimore City Planning Department undertook an employer-based survey in May of 1983 through a distribution to each of the employers at the Reisterstown Road Plaza shopping center. Employers identified the number of workers at their location. At the Reisterstown Road Plaza, 347 returns were received from the 968 employees for a sample rate of just under 36%. The findings or key factors from the survey are presented below; more detail is provided in Appendix N.

- The primary occupation at the Reisterstown Road Plaza was sales (56%), with an additional 225 employees working in a managerial capacity. Ten percent identified themselves as clerical workers.
- Almost 48% of the employees live in zipcodes adjacent to the "Plaza." Over 40% live in zipcodes south and southeast of the "Plaza."
- Approximately 72% of the employees travel to work by auto while only 17% commute by bus.
- Drivers account for 63% of employee commuters; 8% travel to work as passengers in cars, however, 13% are passengers for the trip from work to home; 8% walk to work and only 4% walk from work to home.
- Of those workers who used the bus, over 43% indicated that they lived in or near adjacent zipcodes. About 60% of all employees who commuted to work by bus lived in areas south and southeast of the "Plaza."
- Persons who did not use the bus or walk were asked for specific reasons why they chose not to travel by bus. First responses were given in the following proportions:

    a. Route was too far from their home (44%)
    b. Service was unreliable (20%)
    c. Buses overcrowded (12%)
    d. Trip took too long including wait time (11%)
    e. Other reasons (13%)

- o Household incomes of respondents were relatively low. Almost one-third (31%) indicated an annual household income of less than $10,000. Only 40% had household incomes greater than $20,000 per year.

- o Automobile usage is generally proportional to household income. Those workers surveyed whose household income is over $30,000/year and travel by car equaled 88%, while 64% of those workers with a household income of less than $10,000 use an auto. About 18.5% of those with over $30,000 annual household income travel as passengers in cars.

- o Work travel times are relatively short with almost 30% being less than 10 minutes. Only about 10% of the employees surveyed have a trip greater than 40 minutes. Over 60% of the employees travel less than 20 minutes to work.

- o Twenty-six percent of those workers with less than $10,000/year household income commute by bus compared to only 9% of those indicating $30,000/year or more.

- o For those workers traveling to work, 15% use bus transit between 8 and 10:00 a.m., while 25% use transit to work between 4 and 6 p.m. For trips from work, 19% take the bus between 4 and 6 p.m., while only 15% of the workers use the bus past 8 p.m.

Results of Shopper's Survey

The shopper's survey was conducted at Reisterstown Road Plaza and Mondawmin Shopping Center by the Baltimore City Planning Department on Thursday, June 2nd and Saturday, June 4th, 1983. Interviews were conducted from 10 a.m. to 8 p.m. on Thursday and from 12:00 p.m. to 5 p.m. on Saturday. The interviews were confrontational in nature in that interviewers, located stategically at various entrances to the shopping centers, confronted shoppers as they entered the facility. After screening out employees of the centers, interviewees were asked questions relating to home zip code, trip origin, trip purpose, employment, frequency, mode of transportation to and from the center, extent of and experience with public transit, automobile availability, transit lines utilized (if any), age, and income. (Inter-

viewer observed race and sex.) At the Reisterstown Road Plaza, 395 interviews were conducted, 280 on Thursday and 115 on Saturday. The key facts are presented below; more detail is provided in Appendix O. (Results for the Mondawmin portion of the survey are reported in Section B of this chapter.)

- Over 60% of the respondents live in zipcoded areas (21207, 21208, 21215) adjacent to the Plaza. The zipcode area surrounding the Plaza accounts for 45% of all non-workers.

- More than 65% of all shopper trips (i.e., non-work) to the Plaza originate in the three adjacent zipcodes with #21215 accounting for 48% of the trips.

- Only 2% of shopper trips originated in the downtown zipcodes of 21201-21202.

- Almost 3/4 of all non-work trips to the Plaza (73%) were by automobile, compared to only 14% by bus. Over 9% were walking trips. Equal numbers of auto users drive alone as drive with at least one passenger (34%).

- On trips from the Plaza, walking decreases slightly to 7% and bus use increases slightly to 16%. Of those who did not take a bus on the survey data, 13% indicated that they have previously taken transit to the Plaza.

- Trip frequency to the Plaza is high, with more than half of the surveyed shoppers (52%) visiting at least once per week and 35% several times per week. Three quarters (75%) frequent the Plaza at least 2-3 times each month. Over 60% of those most frequent trips (at least once per week) are made by residents in the surrounding zipcode (21215).

- The predominant non-work trip purposes were shopping (77%) and banking (5%), while 7% visited solely as a means of recreation. Other trip purposes were company business, dining and driving a friend or relative home.

- When asked for a specific reason why they chose not to travel by bus, non-bus riders and those who did not walk indicated as a first response that:

    a. The trip was too slow (36%)
    b. The route was too far from their house (22%)
    c. There was no direct service (16%)
    d. Service reliability was a factor (12%)

- o Household incomes were moderate. Twenty percent of the annual household incomes were less than $10,000, 47% were greater than $20,000 per year, and almost 28% were greater than $30,000 per year.

- o Racial composition was 58% black and 41% white.

Management Study of Reisterstown Road Plaza

The Baltimore City Planning Department conducted a management study at the Reisterstown Road Plaza. The generalized results follow.

Parking Management -	There are no definitive changes planned. Parking will be monitored and, if a problem occurs, it will be remedied. There is excess parking capacity in the lot closest to the station.
Capital Improvements/Orientation -	There are none specifically planned directly related to the station. The Reisterstown Road site has recently been expanded an additional 80,000 square feet.
Other Development Plans -	The parking lot closest to the station is being studied as to a possible development site, but there are no serious plans for development.
Promotion -	An aggressive promotion effort has been undertaken in conjunction with the opening of the Metro. A possibility of providing bus service between the station and the Plaza entrance is being explored. Park-and-ride efforts are being considered.

B. MONDAWMIN STATION

Physical Setting

The immediate station vicinity is dominated by the Mondawmin Shopping Mall which now serves as a community shopping center and a focal point for many community activities. The mall and immediate station vicinity is ringed by several major institutional uses which include: (1) the Provident Hospital and the Community College of Baltimore to the north; (2) Coppin State College to the southeast; (3) three secondary schools to the south; and (4) Druid Hill Park to the east. Higher density residential development is located along Reisterstown Road and to the southeast of the station. Primarily the residential communities surrounding the station are rowhouses of medium density nature. Prior to Metro operation, Mondawmin was well served by three radial bus routes (Nos. 5, 7, 28) and three crosstown lines (Nos. 1, 22, 51).

Results of Employer-Based Survey

An employer-based survey was administered by the Baltimore City Planning Department in 1983 at the Mondawmin Shopping Center. Of the estimated 1,200 employees, 471 responses were received, for a sample of just under 40%. Key facts from that survey are presented below; more detail is presented in Appendix N.

- Equal numbers of employees at the Mondawmin complex worked in sales and professional categories (24% and 23% respectively) with 18% in managerial positions. Sixteen percent identified their occupation as clerical worker.
- Approximately 40% of the employees live in three contiguous zipcode areas. Another 25% reside in the next adjacent zipcode areas.

- Over 60% of the employees travel to work by automobile, while 25% use the bus.

- Drivers account for 56% of employee commuters; 7% travel as passengers in cars to work; 8% walk to work. Nine percent are passengers in cars from work and only 5% walk from work.

- Of those workers who used the bus, 47% indicated that they lived in zipcodes adjacent to Mondawmin.

- Those persons who did not use the bus or did not walk, when asked for a specific reason why they chose not to travel by bus indicated as their first response:

    a. Route was too far from their residence (39%)
    b. Bus was too crowded (19%)
    c. Service was unreliable (17%)
    d. Trip took too long including wait time (12%)

- Household incomes are moderate. Twenty-seven percent of the employees indicated annual household incomes of under $10,000; 43% had household incomes of over $20,000/year; and 21% had over $30,000 annual household income.

- Automobile usage has a dramatic relationship to household income: 90% of workers with household incomes over $30,000/year travel by car, while only 33% of those workers with a household income of less than $10,000 use an automobile. Over three-quarters (78%) of those with over $30,000/year household income drive to work alone. Forty-five percent of those with less than $10,000/year in household income and 6% with those indicating $30,000/year or more commute by bus. Thirteen percent of those in the lowest income category walk to work.

- Travel times from work are relatively short, with over 30% of the trips taking less than 10 minutes. Only about 10% are greater than 40 minutes. About 60% are under 20 minutes. The average bus trip is 24.1 minutes, while the average automobile trip is 19.8 minutes.

- Almost half the employees (47%) at the complex begin work between 8 and 9 a.m.. Thirty-five percent start work between 8:30 and 9:00 a.m. and 70% between 8:00 and 10:00 a.m. Half leave work between 4:00 and 5:00 p.m., with 44% departing in the 4:30-5 p.m. period. One-quarter (24%) leave after 8:00 p.m.

- Bus utilization increases during the course of the day for employees travelling to work--from 20% between 8:00 and 9:00 a.m. to 34% between 3:00 and 5:00 p.m. For the trip from work, 18% of the employees take the bus in the 4:00 to 5:00 p.m. period, while 26% travel by bus from work after 8:00 p.m.

Results of Shoppers Survey

A shopper's survey was conducted simultaneously at Reisterstown Road Plaza and at Mondawmin on a Thursday and Saturday in June, 1983. At Mondawmin, 438 interviews were administered--284 on Thursday and 154 on Saturday. Key facts are outlined below; more detail is provided in Appendix O.

- Over 60% of the respondents interviewed live in the contiguous zipcodes (21215, 21216, 21217). An additional 19% reside in 7 adjacent zipcodes.
- Just under 60% of all shoppers' (i.e., non-work) trips to Mondawmin originate in the three zipcodes named above. Zipcode 21215 accounts for 26% of those trips.
- Only 6% of the shopping trips originated from Metro Center zipcodes 21201 and 21202.
- Over 60% of all non-work trips to Mondawmin were by automobile, with over 20% by transit. Over 14% of the trips were by walking.
- Drivers account for 51% of the non-work trips, while passengers in cars make up 10% of the non-work trips.
- Trip frequency to Mondawmin is high with half of the shoppers visiting Mondawmin at least once per week and 29% making several trips per week. Over 70% frequent the shopping center at least 2-3 times per month.
- The predominant non-work trip purpose was shopping at 64%. Personal business accounted for 21% of non-work trips. Five percent of the trips were identified as having recreational purposes.
- When asked for a specific reason why they chose not to travel by bus, non-bus riders and non-walkers indicated as a first response:
    a. Trip was too slow (48%)
    b. Crowded buses (14%)
    c. Fares too high (11%)
    d. Routes were too far from homes or no direct service (10%)
- Household incomes were low, with 40% reporting under $10,000. Only 30% had incomes greater than $20,000 per year.
- Respondents were predominantly black (96%).

Management Study of Mondawmin Shopping Center

The Baltimore City Planning Department conducted a management survey at Mondawmin Mall. These were the generalized results.

Parking Management -	One acre of ground was leased to MTA for a park-and-ride lot. Station construction removed approximately one-third of available parking in front of the office of the Motor Vehicle Administration.
Capital Improvements/Orientation -	The facia on the north side of the Shopping Center is being replaced and modernized. The Motor Vehicle Administration offices are being relocated to the opposite quadrant of the parking lot. The present space will be converted to additional retail stores.
Other Development Plans -	Joint development between the station and the mall could be done, but the mall owner is not seriously exploring this at the present time.
Promotion -	Advertising of the Metro is being done.

C. METROCENTER - STATE CENTER, LEXINGTON MARKET AND CHARLES CENTER STATIONS

Physical Setting

This area encompasses the greater downtown area from the State Office Complex on the North and the Lexington Market/retail area on the West to the office buildings in the center and to the East of the Central Business District. Also included and within walking distance of the Charles Center Station is the renowned "Harbor Place," the Convention and Civic Centers, the National Aquarium and the financial district.

In order to assess the travel habits and patterns of workers in the downtown area who would be affected by the implementation of Section A of Metro, data was extracted from the City of Baltimore's Downtown Transportation Study. A survey was administered in the summer of 1982 to a sample of 142,000 downtown emplyees at their work sites. The sample was draft from 787 firms located within Metrocenter and the neighboring transportation zones and was selected to represent firms and public agencies of different sizes, types, and geographic location. Of the 40,000 surveys distributed approximately 25,000 completed forms were returned.

Responses of workers who resided within the defined Northwest transit corridor (as previously determined) were isolated from the file by controlling for appropriate zip codes. This was accomplished by comparing zip code and TZ boundaries for the NW corridor. Since all zip code boundaries did not necessarily conform to the Northwest Corridor catchment area, responses had to be adjusted by utilizing resident labor force as a factor. By using transportation zones, we were able to determine the proportion of all workers residing within each zip code and within the northwest transit corridor. For example, in zip code 21207, 73% of the resident labor force of the en-

tire zip code lived in TZ's that fell within the boundaries of the northwest corridor. We then factored all responses of Metrocenter workers identifying 21207 as their home zip code by 73%.

Travel Charcteristics of Downtown Employees Living in the Northwest Transit Corridor: Key Facts

- One-fifth (21.3%) of respondents originated from zip cde 21207, while slightly less than one-quarter (23.4%) lived in 21215. About equal numbers of workers identified 21216 and 21217 as their home zip codes (13.6%, 13.1% respectively).

- Of NW commuters to Metrocenter, 30% traveled to work by bus and 67% by automobile. Drivers accounted for 50% of all NW commuters to Metro Center; 17% traveled as passengers in cars. These rates were essentially the same as those for the overall downtown work force.

- The average commuting distance was 6.5 miles, the median distance was 7 miles. Approximately 78% of downtown employees residing in the NW sector of the Baltimore Region originated their trip within the Beltway.

- Automobile usage was proportional to family income and, for the most part, to distance travelled: 80% of workers with family incomes over $30,000 traveled by car, while only 38% of workers with less than $10,000/year family income commuted by automobile; 77% of those workers travelling in excess of 17 miles to their job use an automobile, while 43% living within 2 miles commute by car. Auto usage dropped from 85% at 12 miles to 77% at 17 miles - and transit use increased from 13% to 18% respectively for those distances. This increase was most likely due to superior service provided by the Glyndon Park and Ride.

- Work departure time was highly peaked, with 44% leaving in the brief 4:45 to 5:00 p.m. period.

- Bus users identified 33 bus lines that were used for the home-to-downtown commute. One-fifth (19%) utilized the #28 (Liberty Road/Liberty Heights Avenue). Approximately equal numbers rode the #7, #19, #5, and #15 (13%, 13%, 12%, 11%). Eight percent used the #47; 7% utilized the #24.

- Family incomes were relatively high. Almost 60% had incomes over $20,000/year; 22% had family incomes over $35,000/year.

- Automobile commuters to Metrocenter from the NW corridor enjoyed a large supply of cheap, convenient parking. More than two-thirds (67.7%) of commuters parked free of charge either because parking was provided by employer (40%) or because they found free curbside parking or lot space. Of those who paid for parking, almost half (46%) paid less than $2.50/day. Only 15% said they paid more than $4.00/day.

- Walking distances for both transit patrons and auto users were relatively short. The average transit user walked just under 2 blocks from the bus stop to the job site and the average automobile driver walked only 1.5 blocks.

Additional travel characteristics of CBD workers residing in the Northwest corridor are described in Appendix P.

VI. ENVIRONMENTAL CONSIDERATIONS

A. NOISE MEASUREMENT

Noise data can provide information on the level of noise and its effects on the neighboring environment. "Before" data was collected at locations near Metro stations and nearby residential areas. Biases such as heavy construction work described as nearby temporary disturbances were not included; however, normal truck traffic, the sound of vehicle horns, dogs barking, etc. were included.

Data Collection

Six locations were identified along the Metro line. Distances from the line were not greater than 1/4 mile. Measurements of noise were collected with an audiometer. All of the locations were along the aerial portion of the Metro line. Figure VI-1 shows the general location of these six sites. For each location, noise data were collected in decibels at about 5-second intervals for about 250 seconds or 50 times. An Equivalent Sound Level or LEQ[1] was computed for each location. The calculated LEQ is a logarithmic average. For some locations, data were collected more than once. Table VI-1 summarizes the noise data.

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[1]The LEQ is a single value of sound level for any desired duration, which includes all of the time varying sound energy in the measurement period. For example, an LEQ of 56 is generally low for an urban area near a major arterial highway; to obtain this figure over 50 observations were tabulated - many registered low (somewhere between 50 and 57 decibels); only a few were high (i.e., occasional dump truck roaring by on Wabash Avenue at 72 decibels.)

FIGURE VI-1
NOISE LOCATION SI

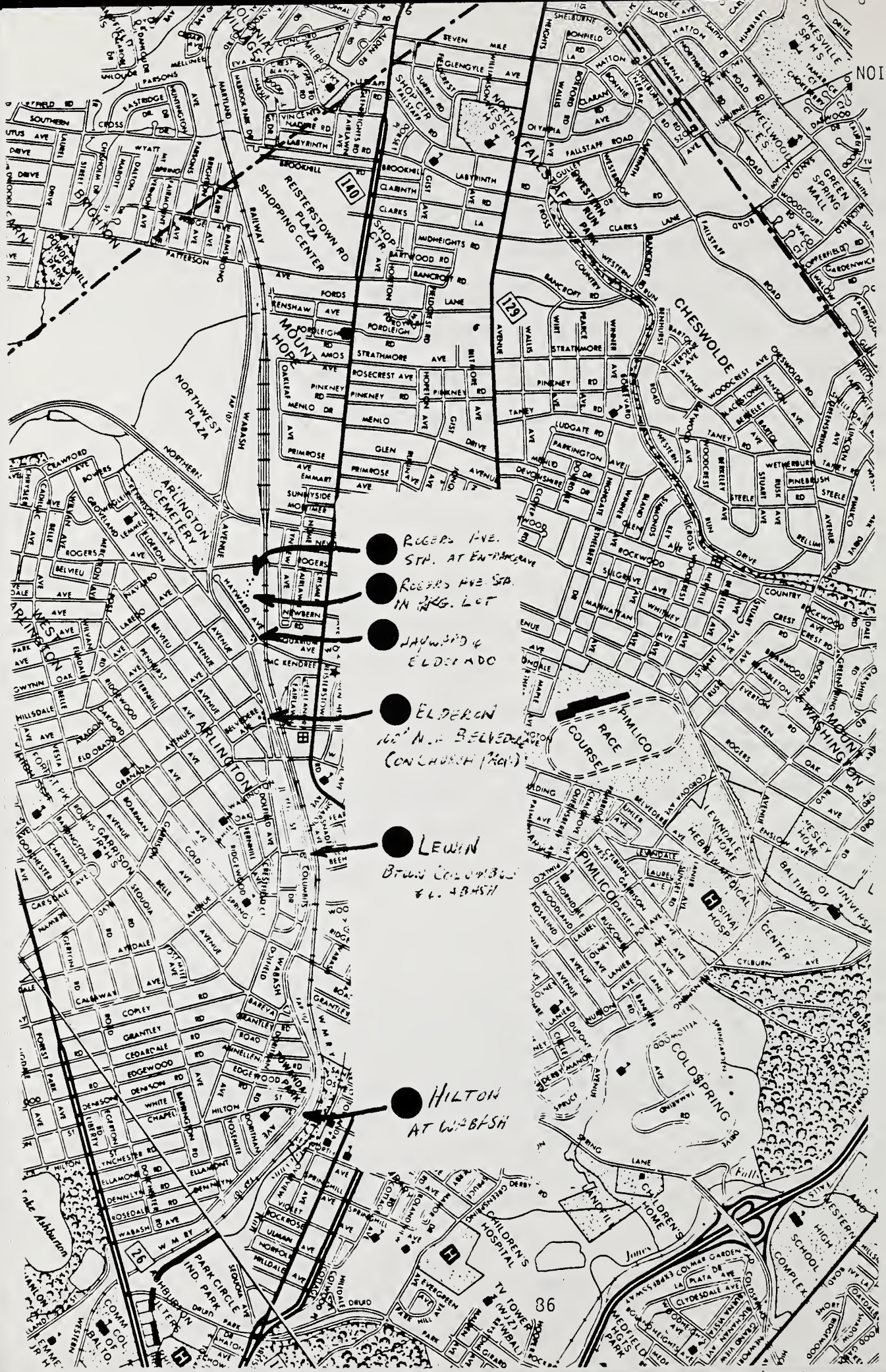

Table VI-1
Noise Measurement

Site No.	Location	Date	Begin. Time	LEQ
1	Rogers Ave. Station (75' from entrance)	Fri. 5/27/83	9:00 am	56
2	Rogers Ave. Station (near motorcycle rack)	Fri. 5/27/83	9:12 am	52
3	Hayward and Eldorado (sw corner)	Fri. 5/27/83	9:31 am	60
		Tue. 6/7/83	8:19 am	60
4	Elderon (100' N. of Belvedere)	Fri. 5/27/83	9:49 am	64
		Tue. 6/7/83	8:32 am	63
5	Lewin (between Columbus & Wabash)	Tue. 6/7/83	8:45 am	63
6	Hilton (at Wabash)	Fri. 5/27/83	10:15 am	58

The data show that in tree lined areas, i.e., site #2, the LEQ is low while along more active areas, i.e., along Wabash Avenue, the LEQ is high.

B. ENERGY CONSUMPTION

A determination of the amount of energy used by transit buses during the morning peak period (6-9 a.m.) of an average weekday was made. An MTA bus schedule book was obtained to determine the number of buses travelling through the corridor, for inclusion in the "energy audit." Data were collected on: the vehicle-miles-travelled while in service, systemwide fuel usage per bus vehicle, and type of fuel used. Reference Material Appendix HH details the assumptions used to calculate the energy expenditure.

Data Collection

In order to determine the amount of energy consumed by buses in the Northwest corridor, bus mileage was calculated for all buses travelling in the study area that began their trip at an origin of a bus line, not at the division, between 6:00 a.m. and 8:59 a.m. Deadhead time, even though a part of energy expenditure, was not calculated due to the extended amount of effort needed to complete this task.

After the number of buses was determined, mileage by line was calculated. The UTPS Program UNET was useful in providing these data.

Data Analysis

After the mileage was tabulated by bus line segment and the number of trips per segment calculated, VMT were determined. Table VI-2 shows a summary of VMT calculations for each bus line. The VMT represents bus in-service vehicular travel within the Northwest study area for the 6-9 a.m. peak period.

TABLE VI-2
Bus VMT By Line (Spring, 1983)
6-9 a.m.

Bus Line	Bus Vehicle-Miles-of-Travel
1	76.7
5	679.3
7	586.8
13	216.4
15	384.6
19	364.0
21	48.3
22	147.1
24	88.7
27	359.6
28	629.7
30	50.4
33	86.1
44	220.8
47	211.2
51	190.5
77	73.0
86	123.2
TOTAL	4,536.4

The next step in the analysis was to determine, based on mileage data, the energy expenditure. Therefore, BTU measurement was calculated. The following formula for estimating the number of BTUs was applied to the data gathered.

Formula for Energy Expenditure

$$E = \frac{M}{A} \times B$$

Where: E = Energy (# of BTUs) used
M = Bus VMT in NW corridor
A = Average number of M.P.G. per bus for FY 1983*
B = Number of BTUs/gallon for #1 diesel fuel (based on 41.5 typical American Petroleum Institute specific gravity)** = 134,900 BTUs/gallon

*Source: MTA
**Source: Exxon Company - Marketing Technical Services

$$E = \frac{4536.4}{3.35} \times 134,900$$

$$E = 1,354.15 \times 134.900$$

$$E = 182,674,734 \text{ BTUs}$$

Therefore, 182,674,734 BTUs were expended by in-service transit vehicles in the morning peak period (6-9 a.m.) in the study area for 1983.

Additional measures were also calculated. The number of BTUs per in service vehicle mile was 40,300.

The number of BTUs per passenger trip was also tabulated. For 1983, estimates of the number of trips produced and attracted to and from the study area were determined. MTA patronage data for the 6-9 a.m. peak from the 1978 Feeder Bus Study was factored to represent the 1983 "before" conditions. The number of trips produced was 12,450 while the number attracted were 10,250; the total number of trips was 22,700 in the study area. This translated into 8,050 BTUs per trip. Identical data will be calculated for the "after" study.

VII. COMMUNITY PERCEPTIONS AND ATTITUDES TOWARD METRO

A residential attitude survey was developed to measure community perceptions toward Metro; the survey was administered in June, 1983. This chapter presents the methodology and results of the survey. More specific details on the results of the attitude survey are included in Staff Paper #31, Reference Material Appendix II, "Residential Attitude Survey."

Methodology

The survey instrument was designed primarily by the Regional Planning Council's transportation division staff in consultation with the MTA, Northwest Baltimore Corporation (NWBC), Park Heights Community Corporation (PHCC), and Maryland Technical Advisory Service (MTAS)/University of Maryland. Before developing the survey instrument, RPC staff went to NWBC and PHCC meetings to inform community residents of the impending survey and to identify neighborhood concerns and attitudes for incorporation into the survey. The key issues raised at these meetings concerned crime, traffic and parking, and the timing of the survey (i.e., it should have been administered before construction of the Metro). Residents also expressed the opinion that the Metro was designated not to serve people who live along the Metro corridor, but rather to serve suburban commuters. These concerns and issues were subsequently incorporated within the survey. The MTAS reviewed the survey methodology, and MTA reviewed and assisted in finalizing the survey instrument.

Both the design and administration of the "before" residential attitude survey was limited by constrained financial resources. While it would have been preferable to conduct either personal or telephone interviews, limited financial resourced dictated the use of a mail-out survey. It is expected, however, that

the "after" survey will be a telephone interview and that the design of the "after" survey effort will include some additional validity checks of the "before" survey population.

An initial examination of the Section A Metro corridor indicated that residents most likely to be affected by the Metro lived between the State Center and Reisterstown Road Station and within one quarter mile, or approximately three city blocks, of the Metro line. This area was subsequently refined to conform to the existing street system and patterns of development. The Stewart Criss-Cross Directory was used to identify all streets and block numbers contained within the study area. A total of 460 blocks were identified.

The sample design was based upon random selection of blocks within the survey area. A total of 171 blocks (or 2,798 residential telephone listings) were identified for the sample.

Using the formula[1]

$$n = \left[\frac{z\sqrt{p^* \ (1-p^*)}}{p-p^*} \right]^2$$

where

n = sample size

z = 1.96 (equals confidence level of 95 percent)

p* = .5 (equals highest possible standard error)

p-p* = .05 (equals sampling error of plus or minus five percent)

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[1]Silvers, Arthur L., Urban Planning Analysis: Methods and Models, John Wiley and Sons, New York, 1974.

It was found that 273 responses would produce survey results that could be accepted with 90 percent confidence that the sample error would be five percent. It was anticipated that the survey response rate would be about 10 percent, hence the need to mail nearly 3,000 survey forms.

Personalized letters were sent from the RPC's executive director to the survey participants. These letters were mailed over a three week period and gave the sample population ten days to respond. Nearly 21% (564) persons who received questionnaires returned them. The remaining surveys or the non-response surveys were not investigated due to the level of funding for this effort. Nevertheless, some methodology for addressing the non-response rate will be dealt with in the "after" stage of the study.

Summary of Data Items

Answers to questions 1-24 of the residential attitude survey are contained in Appendix Q. The following paragraphs summarize some of the survey's pertinent findings.

Generally, the survey respondents had positive feelings about the Metro. For example, 70% of the respondents feel that building the Metro is a good idea; 71% feel that MTA should construct other Metro lines; 80% feel that construction of the Metro shows that the City is progressing; and about 61% (345 respondents) plan to use the Metro. It is encouraging to note that nearly half of all the persons who plan to ride the Metro are currently not MTA bus riders. Forty-seven percent of the respondents either never ride the bus or ride it very infrequently. About 21% of those persons who plan to use the Metro currently ride MTA buses nearly every day; 9% currently ride MTA buses about 3 or 4 days a week; 13% currently ride about 1 or 2 days a week. The concern for safety is not a prime consideration for those persons who do not plan to use the Metro.

Only 10% said they would not ride the Metro due to safety considerations, while 40% said they had no plans to ride the Metro because it does not go where they want to go.

Approximately 60% of the respondents feel that their neighborhood is provided with good bus service. When these responses are categorized by current transit usage we find that 63% of the people who ride the MTA nearly every day agree that their neighborhood has good bus service. This compares with 61% who ride three or four times a week; 65% for those who ride once or twice a week, and 67% for those who use the MTA once or twice a month. Fifty-five percent of the people who never use the MTA feel that their neighborhood has good bus service compared to 58% of those who use MTA a few days a year. Clearly, the perception of residents in the Section A corridor is that they currently have good bus service.

Those persons who feel that their neighborhoods do not have good bus service are more anxious to ride the Metro that those persons who feel that their neighborhood has good bus service. Seventy-three percent of these respondents intend to ride the Metro when it opens as opposed to only 58% who strongly agree that their neighborhood has good bus service.

Nearly half of the respondents feel that crime will increase some in neighborhoods near the Metro Station. About 1/3 of the respondents feel that opening the Metro will make no difference in the crime rate in the neighborhoods. Respondents who live near the Rogers Avenue Station have the greatest fear that there will be a large increase in crime, while persons living around the Reisterstown Road Station are most optimistic and have the highest percent response to the statement that crime will decrease greatly as a result of the Metro.

The following are key characteristics of the survey resondents: 59% of the respondents are home owners; 51% are female, 71% are black, 22% of the respondents are between 55 and 64 years of age; 14% of the respondents have lived in their neighborhood between 16 and 20 years; 22% have lived in their neighborhood between 2 and 5 years; 24% are in the 6 to 15 year range; and only 3% have lived in the neighborhood less than 1 year. Approximately 1/4 of the respondents are high school graduates and 1/4 of the respondents have had some college. Nearly 30% are college graduates. Nineteen percent of the respondents stated that their estimated family income is greater than $35,000; 15% fall within the $15-$19,000 range; and 14% are in the $10-$14,000 range.

One third of the respondents agree with the statement that Metro was designed primarily to serve suburban commuters. Interestingly, the number of people who agree with this statment increased the closer one lives to the county. For instance, only 27 percent of the respondents who live near the State Center Station felt that Metro was designed primarily to serve suburban commuters. On the other hand, nearly 43 percent of the respondents who live near the Reisterstown Road Station agree with the statement.

The respondents seemed to understand the survey questions. The non-response rate for most of the questions was approximately 3%. Notable exceptions were questions 15, 16A, 16C, and 25. These questions had non-response rates of 11.6, 7, 8.6, and 15.4 percent, respectively.

VIII. SUMMARY OF FINDINGS AND NEXT STEPS

A. PRE-OPENING CHARACTERISTICS

The preceding chapters were intended to develop a comprehensive profile of Northwest Corridor demographic, travel, economic and environmental characteristics associated with pre-service operation along the Section A rail transit alignment. Substantial staff effort was expended by the three principal governmental agencies involved (the Regional Planning Council, the Baltimore City Department of Planning, and the Mass Transit Administration) to collect, assemble, and evaluate information related to these various evaluation parameters. The collective result of these activities is a "snapshot" of pre-opening Study Area conditions.

The Section A corridor is more densely developed than the region as a whole and is home to a resident population that generally relies more on public transit to satisfy their mobility needs than residents of other parts of the region. Much of the vehicular traffic traversing Study Area roadways would appear to be locally generated. Long-distance commuter travel is generally served by major freeway routes bounding the area on its east and north sides.

While housing purchase and rental prices have risen dramatically in the area in recent years, the level of real estate speculation there to date is difficult to ascertain. Results are mixed when one attempts to compare recent rises in property values in the area against those for comparable areas located in other corridors.

B. POST-OPENING DATA COLLECTION

Although startup of revenue service on Section A took place in November 1983, the implementation of coordinated feeder bus support service did not follow until June, 1984. In order to allow adequate time for ridership patterns to "settle" and reach a state of equilibrium, most data collection activities for the post-opening phase of the Metro Impact Study were delayed until Spring 1985.

Planned for March/April/May 1985 were most of the same data collection activities as reported earlier in this report under the pre-opening assessment. These data include employee/shopper access surveys in station area commercial centers, parking supply utilization rates, traveltime studies in the corridor, highway congestion analyses, etc. Table VIII-1 presents a general listing of post-opening data collection activities. A more detailed task/subtask delineation of project responsibilities by study participant, as well as a proposed budget, is presented in Appendix R.

A major post-opening study component was performed by the Mass Transit Administration in November 1984 under the auspices of a broader, operations-oriented analysis agency. This effort termed Comprehensive Operational Analysis (COA) involved a 100 percent sample origin/destination-type survey of riders for a time period of 5 a.m. to 2 p.m., two directions, on all MTA buses and rail cars.

The Fall 1984 COA constituted the first systemwide survey of riders ever conducted by MTA. The primary purpose was to develop an origin/destination database associated with individual transit service routes and stops along each route.

As shown in Appendix S, the COA survey form solicited indications from Metro train riders of their mode of travel prior to implementation of Section A rail service. Space limitations on the survey instrument precluded

the inclusion of detailed questions on ridership demographics. In Spring 1985, RPC is planning to conduct a special more detailed survey of Metro rail riders. Of particular interest on the COA survey questionnaire will be responses to the question asking for the "prior mode" of Metro riders, that is prior to startup of Section A service.

C. INCREMENTAL ASSESSMENT OF SECTION B IMPACT

As shown in Table VIII-1, the final phase of F.Y. 1985 activities involves the development of a detailed work plan for extending the Metro Impact Study coverage area and technical scope to include Section B. As shown in Figure VIII-1, Section B of the Northwest Line will continue northwest from the Section A terminus (Reisterstown Road Plaza) for a distance of six miles to the planned Owings Mills suburban town center. With this penetration of the suburban, northwest commuter shed, the character of ridership patterns and demographics can, once again, be expected to change. Furthermore, the unique placement of the Section B rail line in the median of the Northwest Expressway (presently under construction) will enable a direct auto vs. rail usage comparison to be performed.

The purpose of the Metro Impact Study - Section B will be to trace modal shifts over time, throughout the Northwest Corridor. With startup of revenue service along Section B scheduled for 1987, efforts should soon get underway to identify preopening data collection requirements.

Table VIII-1
Metro Section A Impact Study
Proposed F.Y. 1985 Activities

	Principal Agency
Transit Origin/Destination Survey	Regional Planning Council
Employer-Based CBD Access Survey	Baltimore City Department of Planning
Employer-Based Reisterstown Road Plaza and Mondawmin Access Survey	Baltimore City Department of Planning
Parking Studies in Station Areas	Baltimore City Department of Planning
Transit Energy Consumption Analysis	Mass Transit Administration/ Regional Planning Council
Traffic Volumes and Occupancy Counts	Regional Planning Council
Travel Time/Access Studies	Regional Planning Council
Environmental Impact Studies	Regional Planning Council
Residential Land Activity	Baltimore City Department of Planning
Commercial Land Activity	Regional Planning Council
Major Activity Centers' Analysis	Baltimore City Department of Planning
Station-Area Development Plans/ Implementation	Baltimore City Department of Planning
Attitudes and Perceptions Resurvey	Regional Planning Council
Plan for Metro Section B Impact Analysis	Regional Planning Council

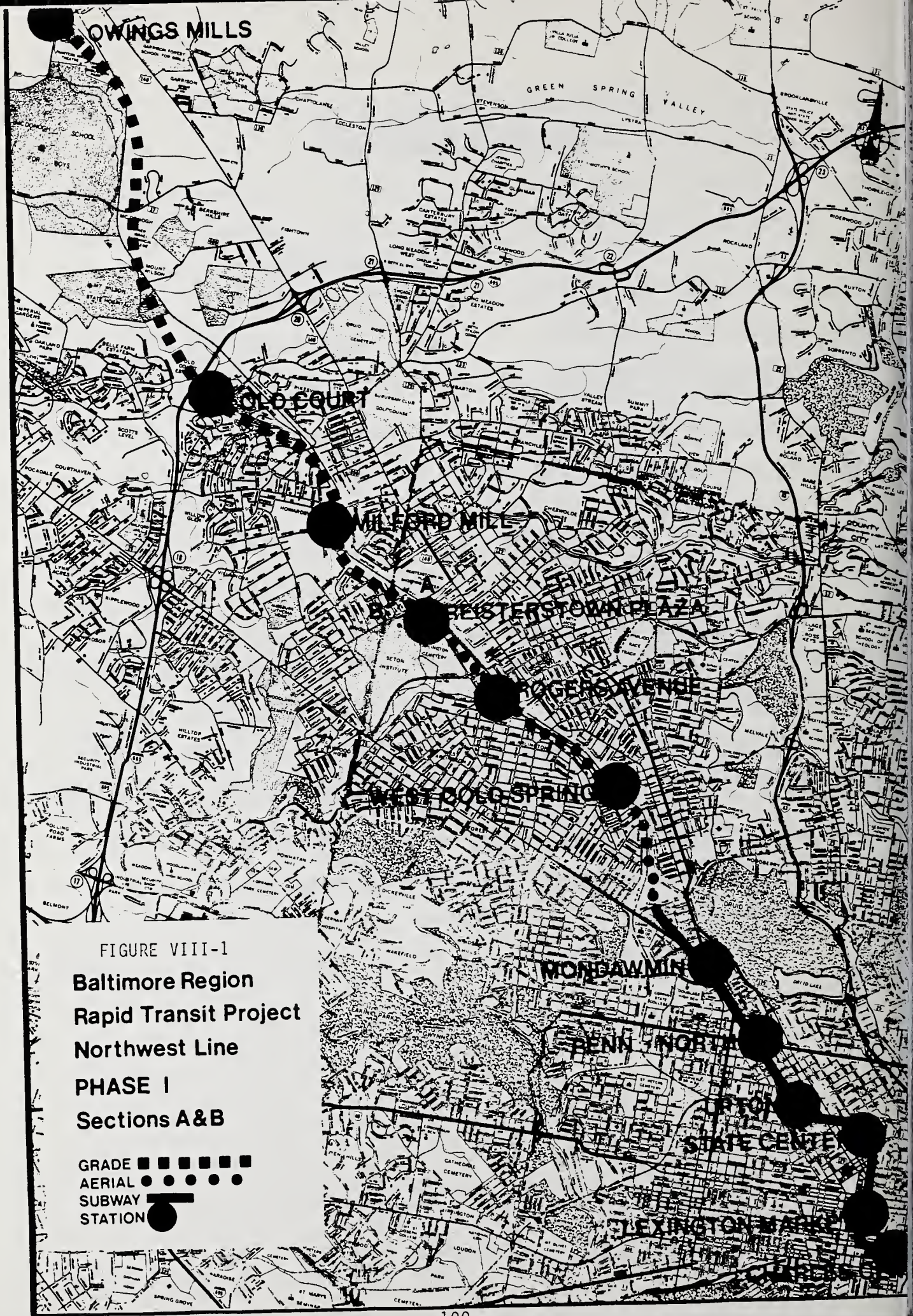

FIGURE VIII-1

Baltimore Region
Rapid Transit Project
Northwest Line
PHASE I
Sections A&B