
**SEPTA R3
MEDIA / ELWYN RAIL LINE
PARKING DEMAND STUDY**



DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
111 S. Independence Mall East
Philadelphia, PA 19106-2515

May 1999

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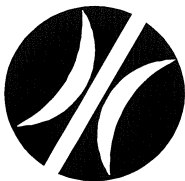


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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia in Pennsylvania and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. The Commission is an advisory agency which divides its planning and service functions between the Office of the Executive Director, the Office of Public Affairs, and three line Divisions: Transportation Planning, Regional Planning, and Administration. DVRPC's mission for the 1990s is to emphasize technical assistance and services and to conduct high priority studies for member state and local governments, while determining and meeting the needs of the private sector.



The DVRPC logo is adapted from the official seal of the Commission and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River flowing through it. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey. The logo combines these elements to depict the areas served by DVRPC.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

Title:	SEPTA R3 Media / Elwyn Rail Line Parking Demand Study	Date Published:	May 1999
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Geographic Area Covered: most of Delaware County (32 municipalities) and 14 municipalities in south central Chester County, Pennsylvania

Key Words: regional rail station, parking utilization, parking supply, rail ridership, commuter shed, rail capture ratio, journey-to-work, latent demand for station parking, Rail Station Activity Assignment Model

ABSTRACT

At the request of SEPTA, the DVRPC conducted detailed parking evaluations for 11 stations along the R3 Media / Elwyn Rail Line. DVRPC examined current parking conditions, and projected future parking conditions responding to latent demand and demographic growth within the rail line's commuter shed — for the Years 2005 and 2020. Projected parking levels were compared to planned parking expansions, proposed along the line by SEPTA and PennDOT for the year 2001, to assess the adequacy of the planned Parking Program.

The study incorporates findings from passenger surveys conducted at the Moylan-Rose Valley, Wallingford and Swarthmore stations. Additionally, the work estimates the effect of extending the R3 Line to a new terminal station at Wawa as an additional means in mitigating long term parking constraints projected for the line.

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TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	1
2	INTRODUCTION	5
3	EXISTING CONDITIONS	7
	Services, Ridership and Facilities	
	Study Area / Commuter Shed	
	Rail Capture Ratio	
4	FUTURE CONDITIONS	31
	Methodology	
	Base Conditions	
	Latent Demand for Station Parking	
	Future Growth	
5	ASSESSMENT OF FUTURE CONDITIONS	43
	Proposed Parking Expansion Program	
	Without Parking Expansion at Elwyn	
	Parking Expansion at Wallingford (Passenger Surveys)	
	Extension to Wawa	
6	CONCLUSIONS / RECOMMENDATIONS	49
	APPENDIX I RAIL STATION ACTIVITY ASSIGNMENT MODEL	51
	APPENDIX II Passenger Survey Effort	55

LIST OF FIGURES

1.	STUDY AREA	19
2.	GENERALIZED STATION SHED AREAS, for Stations within Fare Zone 3	21
3.	GENERALIZED STATION SHED AREAS, for Stations within Fare Zone 2	23
4.	SEPTA REGIONAL RAIL CAPTURE RATIO	29

LIST OF TABLES

1.	SELECTED SERVICE CHARACTERISTICS OF THE R3LINE, October 30, 1988	8
2.	SELECTED SERVICE CHARACTERISTICS OF THE R3LINE, April 1, 1990	9
3.	SELECTED SERVICE CHARACTERISTICS OF THE R3LINE, September 10, 1995	11
4.	HISTORICAL VIEW OF DAILY BOARDINGS ALONG THE R3LINE, for Selected Schedules between 1987 and 1996	12
5.	CURRENT STATION PARKING CHARACTERISTICS ALONG THE R3LINE	14
6.	HISTORICAL VIEW OF SEPTA PARKING UTILIZATION AND EXPANSION PROGRAMS ALONG THE R3LINE, 1990 to 1996	15
7.	DISTRIBUTION OF MATCHED RIDERS BY STATION AND MUNICIPALITY	17
8.	NUMBER OF MATCHED PASSENGER /LICENSE PLATE SURVEYS ALONG THE R3 LINE	18
9.	1990 RAIL CAPTURE RATIOS IN THE STUDY AREA	26
10.	MUNICIPAL LATENT DEMAND ESTIMATES WITHIN THE STUDY AREA.	34
11.	ASSIGNED STATION PARKING WITH PARKING EXPANSIONS AT ELWYN AND WALLINGFORD	35
12.	2005 ASSIGNED STATION PARKING	39
13.	2020 ASSIGNED STATION PARKING	41
14.	ESTIMATED PARKING UTILIZATION ALONG THE R3LINE -2005 AND 2020, Assuming Trend Growth, and Parking Expansions at Elwyn and Wallingford	43
15.	ESTIMATED PARKING UTILIZATION ALONG THE R3LINE -2005 AND 2020, Assuming Trend Growth, and Parking Expansion at Wallingford Only	44
16.	PARKING UTILIZATION ESTIMATES FROM PASSENGER SURVEY RESPONSES, Moylan-Rose Valley, Wallingford and Swarthmore Stations Only	45
17.	ESTIMATED PARKING UTILIZATION FOR SELECTED STATIONS -2020, Assuming R3 Line Extended to Wawa, and Proposed Parking Expansion Program	46

1 EXECUTIVE SUMMARY

The Southeastern Pennsylvania Transportation Authority (SEPTA) commissioned the Delaware Valley Regional Planning Commission (DVRPC) to examine parking conditions at 11 regional rail stations located along the Media / Elwyn (R3) Rail Line between and including the Lansdowne and Elwyn stations, in Delaware County, Pennsylvania.

The work involved:

- collecting data on station parking trends, station patronage and rail services;
- defining the commuter shed for the rail segment;
- determining the ridership capture ratio of the rail line;
- estimating latent demand and future growth components for the line for the purposes of projecting Year 2005 and Year 2020 parking conditions assuming SEPTA and PennDOT parking expansion plans for the line (hereinafter referred to as the Parking Program) assuming line's present alignment, and;
- projecting Year 2020 parking conditions assuming an extension of the R3 Line to a possible new terminal station located in Wawa, Delaware County.

In conjunction with the R3 Parking Demand Study, DVRPC also interviewed passengers currently using the Moylan-Rose Valley, Wallingford and Swarthmore stations. The reason for the passenger surveys was to determine existing parking preferences at the stations, and to quantify needs for a proposed parking lot expansion at the Wallingford Station. The findings of that effort are integrated into this report.

EXISTING CONDITIONS

From a practical standpoint, parking along the R3 line is fully utilized. According to the most recent SEPTA parking data, R3 Line parking lots were operating at 97 percent of capacity on a typical weekday (1,611 parking spaces were occupied compared to 1,660 spaces¹ available). The following tabulation details parking supply and utilization relationships for the line.

¹ Total existing public parking supply — includes SEPTA, municipal and private spaces.

EXISTING PARKING CONDITIONS

<u>FARE ZONE</u>	<u>LIMITS</u>	<u>SUPPLY</u>	<u>UTILIZATION</u>	<u>% UTILIZED</u>
3	Elwyn to Swarthmore	950	930	98%
2	Morton-Rutledge to Lansdowne	710	681	96%
Overall		1,660	1,611	97%

SEPTA and DVRPC conducted license plate and/or passenger surveys at all 11 stations along the line during 1995 and 1996. The primary commuter shed of the R3 Rail Line was identified from the survey results, and includes 32 municipalities in Delaware County and 14 municipalities in Chester County. Results of the survey also indicated the number of parkers from each municipality, at each station, along the line (i.e., the station sheds).

This latter information is fundamental in the study's procedure for estimating future parking conditions and ascertaining SEPTA regional rail's capture ratio of work trips to Center City Philadelphia. In the last matter, it was determined through this study that 19 percent of the study corridor's CBD-bound commuters use the regional rail system.

FUTURE CONDITIONS

In total, the Parking Program proposes an additional 228 parking spaces for the R3 Line by the year 2001 (Elwyn - 140 spaces, and Wallingford - 88 spaces). If parking demand were to remain at current levels, the proposed additional supply would result in an overall parking utilization of 79 percent within fare zone 3.

However, need for parking at the stations is expected to grow over time, and this study accounts for two components of future growth:

- Latent demand - existing parking demands manifested through station parking expansions — in this effort at Elwyn and Wallingford, and;
- Trend growth - parking needs emanating from increased residential development within the R3 Line's commuter shed, and increased Center City employment.

A near-term increase of 15 percent in daily parking demand is projected for the Elwyn Station upon provision of the additional parking spaces. Similarly, an increase of 30 percent is projected for the Wallingford Station as a result of latent parking demand. Taken together, these changes represent an increase of four percent over the line's existing parking utilization.

Two planning horizons (2005 and 2020) were used in estimating longer term parking utilization at the 11 rail stations. The basis for the trend estimates is DVRPC's municipal population and employment forecasts from the Year 2020 Plan². By 2005, overall parking utilization for the study segment of the R3 Rail Line is projected to increase by 12 percent. By 2020, parking demands are estimated to grow by approximately 19 percent versus base year levels.

Most of the study area's population growth is forecast for the western station sheds. Consequently, parking demand projections at stations in fare zone 3 exhibit higher rates of change than the stations located within the maturer eastern municipalities (fare zone 2).

FINDINGS

By the Year 2005, projected total utilization of parking at the 11 regional rail stations along the Media / Elwyn Rail Line will be at 94 percent of capacity (1,772 spaces occupied of 1,888 spaces supplied³. In comparison with the current situation, improved conditions are projected within fare zone 3 where the provision of additional parking at Elwyn and Wallingford will reduce parking utilization rates to 92 percent. Conditions at stations within fare zone 2 stay consistent with existing conditions (96% parking utilization).

By the Year 2020 projected total utilization of parking at the 11 regional rail stations along the rail line will be at 99 percent of capacity (1,871 spaces occupied versus 1,888 spaces available) — representing a slight worsening of conditions in both fare zones if compared with existing conditions.

² 2020 Zonal Population and Employment Forecasts, Report 25 - Direction 2020, DVRPC, April 1995.

³ Total planned supply of public parking spaces - includes SEPTA, PennDOT, municipal and private supplies.

The Year 2020 also represents a realistic horizon for extending the R3 Line from its current terminus at Elwyn to a new terminal station at Wawa. Based upon that scenario, a 414 space parking lot constructed at Wawa (as identified in SEPTA's engineering study of the project), would divert as many as 388 parkers using the Elwyn, Media and Moylan-Rose Valley stations — substantially freeing-up parking constraints projected at Elwyn, Media and Moylan-Rose Valley stations in fare zone 3.

CONCLUSIONS / RECOMMENDATIONS

The following conclusions and recommendations have been reached based upon the completed SEPTA R3 Media / Elwyn Rail Line Parking Demand Study.

1. From a practical viewpoint, the entire supply of parking spaces along the R3 Line is fully utilized (96% parking utilization rates in fare zone 2, and 98% in fare zone 3).
 2. The Parking Program, anticipated for operation in 2001, will add 140 parking spaces at Elwyn and 88 spaces at the Wallingford Station. Both stations are in fare zone 3. These expansions will provide sufficient additional supply to ease parking constraints encountered in fare zone 3 through the Year 2005. By the Year 2020, however, parking supply will be 100 percent utilized.
 3. If the Elwyn Station's parking lot is not expanded, full utilization of parking within fare zone 3 will occur before the Year 2005.
 4. The Parking Program does not adequately address parking needs within fare zone 2. On the other hand, SEPTA is actively exploring opportunities for additional surface parking lots in fare zone 2, notably in the vicinity of the Primos Station.
 5. By the Year 2020, even with the Parking Program in place, estimated parking utilization rates in fare zone 3 will be 100 percent. In order to effect a long term improvement within the fare zone, SEPTA should actively investigate additional opportunities for surface or structure parking at the existing stations or extend the line to a new terminal park-and-ride station located at Wawa. □
-

2 INTRODUCTION

At SEPTA's request, DVRPC conducted an examination of existing and future parking conditions at 11 regional rail stations located along the Media / Elwyn (R3) Rail Line in Delaware County, Pennsylvania. The studied rail segment is between the Lansdowne Station and the Elwyn Station.

The study's work program included:

- Collecting data on station parking trends, station patronage and rail services;
- Defining the commuter shed for the studied rail segment;
- Determining the ridership capture ratio within the study corridor;
- Estimating latent demand and future parking growth components for the line for the purposes of projecting Year 2005 and Year 2020 parking utilization along the existing R3 alignment, and;
- Projecting Year 2020 parking conditions assuming an extension of the R3 Line to a station located in Wawa.

In conjunction with the R3 Parking Demand Study, DVRPC also interviewed passengers using the Moylan-Rose Valley, Wallingford and Swarthmore stations. The reason for the passenger surveys was to determine existing parking preferences at the stations, and to quantify needs for a proposed parking lot expansion at the Wallingford Station. The findings of that effort are integrated into this report. □

3 EXISTING CONDITIONS

The baseline for the study's analysis is 1990 because of the availability of municipal demographic and journey to work information from the 1990 Census. Additional data used in describing the current situation included: SEPTA parking lot utilization data (1990 to 1998), SEPTA boarding count data (1990 to 1997), and R3 Line rider and license plate survey data (1995, 1996 and 1998). Where possible historical comparisons of the data are presented to illustrate recent trends.

SERVICES, RIDERSHIP AND FACILITIES

Table 1 summarizes selected service characteristics along the R3 Line according to the schedule in effect October 30, 1988. The service pattern included local service provided to the eastern stations (Primos, Clifton-Aldan, Gladstone and Lansdowne stations), and local and express services at the western end of the line (between Elwyn and Secane).

At the time, seven to ten trains operated in the predominant direction during the peak travel periods with 16 total trains during the midday. Average a.m. peak period inbound operating speed for local service was between 17 and 19 miles per hour.

Table 2 summarizes selected line service characteristics according to the R3 schedule effective April 1, 1990. This information is shown for its applicability to journey-to-work information from the 1990 Census. Compared to the service provided in 1988 (summarized in Table 1) overall service levels were reduced by one to two trains — during each the morning peak, midday and evening peak periods. On the other hand, the number of express trains serving stops between Secane and Elwyn, during the peak periods, were doubled (plus one to two trains).

Improved services offered in 1990 also included faster inbound a.m. peak period operating speeds for local and express train services. In 1990, local train service operated two miles per hour faster than 1988 operations. Express train operating speeds were between four and eight miles per hour faster in 1990 than in 1988.

TABLE 1: SELECTED SERVICE CHARACTERISTICS OF THE R3 LINE, October 30, 1988										
Station	Mi to C.C. ¹	Fare Zone	Service Type	AM Peak Period - Inbound Service			Trains per Midday (both directions)	PM Peak Period - Outbound Service		
				Trains	Travel Time (minutes)	Travel Speed (mph)		Trains	Travel Time (minutes)	Travel Speed (mph)
ELWYN	15.0	3	Local	8	48.4	18.6	16	7	49.4	18.2
			Express	2	46.0	19.6		1	39.0	23.1
MEDIA	14.0	3	Local	8	44.4	18.9	16	6	41.0	20.5
			Express	2	42.0	20.0		2	35.5	23.7
MOYLAN-ROSE VALLEY	13.2	3	Local	8	42.4	18.7	16	6	38.0	20.8
			Express	1	40.0	19.8		1	32.0	24.7
WALLINGFORD	12.3	3	Local	8	40.4	18.3	16	6	36.0	20.5
			Express	1	37.0	19.9		1	29.0	25.4
SWARTHMORE	11.2	3	Local	8	36.4	18.5	16	6	33.0	20.4
			Express	1	33.0	20.4		1	26.0	25.8
MORTON-RUTLEDGE	9.9	2	Local	8	33.4	17.8	16	6	30.0	19.8
			Express	1	30.0	19.8		1	23.0	25.8
SECANE	8.8	2	Local	9	30.2	17.5	16	7	27.0	19.6
			Express	1	26.0	20.3		1	20.0	26.4
PRIMOS	8.1	2	Local	9	28.2	17.2	16	7	25.0	19.4
CLIFTON-ALDAN	7.5	2	Local	9	26.2	17.2	16	7	23.0	19.6
GLADSTONE	6.9	2	Local	9	24.2	17.1	16	7	21.0	19.7
LANSDOWNE	6.3	2	Local	9	22.2	17.0	16	7	19.0	19.9

notes:
source:
1 - C.C. = Suburban Station in Center City Philadelphia
SEPTA R3 schedule, effective 10/30/1988

TABLE 2: SELECTED SERVICE CHARACTERISTICS OF THE R3 LINE, April 1, 1990

Station	Mi to C.C. ¹	Fare Zone	Service Type	AM Peak Period - Inbound Service			Trains per Midday (both directions)	PM Peak Period - Outbound Service		
				Trains	Travel Time (minutes)	Travel Speed (mph)		Trains	Travel Time (minutes)	Travel Speed (mph)
ELWYN	15.0	3	Local	5	45.0	20.0	15	3	42.0	21.4
			Express	4	39.0	23.1		3	35.3	25.5
MEDIA	14.0	3	Local	5	41.0	20.5	15	3	38.0	22.1
			Express	4	33.8	24.9		3	31.3	26.8
MOYLAN-ROSE VALLEY	13.2	3	Local	5	39.0	20.3	15	3	35.0	22.6
			Express	2	29.5	26.8		2	28.0	28.3
WALLINGFORD	12.3	3	Local	5	37.0	19.9	15	3	33.0	22.4
			Express	2	27.5	26.8		2	26.0	28.4
SWARTHMORE	11.2	3	Local	5	34.0	19.8	15	3	30.0	22.4
			Express	2	24.5	27.4		2	23.0	29.2
MORTON-RUTLEDGE	9.9	2	Local	5	31.0	19.2	15	3	27.0	22.0
			Express	2	21.5	27.6		2	20.0	29.7
SECANE	8.8	2	Local	8	28.0	18.9	15	5	24.0	22.0
			Express	2	18.5	28.5		2	17.0	31.1
PRIMOS	8.1	2	Local	8	26.0	18.7	15	5	22.0	22.1
CLIFTON-ALDAN	7.5	2	Local	8	24.0	18.8	15	5	20.0	22.5
GLADSTONE	6.9	2	Local	8	22.0	18.8	15	5	18.0	23.0
LANSDOWNE	6.3	2	Local	8	20.0	18.9	15	5	16.0	23.6

note: 1 - C.C. = Suburban Station in Center City Philadelphia
source: SEPTA R3 schedule, effective 4/1/1990 (service characteristics shown for their applicability to journey to work information from the 1990 Census)

Table 3 contains a summary of the R3 Line's service characteristics according to the schedule effective September 10, 1995. Very similar to the operating conditions in effect at the time of the Census, the later schedule does reflect an enhancement. Specifically, the extension of three inbound a.m. peak period local trains and one outbound p.m. peak period local train to the Morton-Rutledge Station (previously these trips ended at the Secane Station).

DVRPC also conducted auto travel time runs during the morning peak period in 1996, from selected locations within the corridor to 17th and Market Streets in Center City Philadelphia. The point of the exercise was to provide a comparison of the mobility offered by the two modes at selected points within the rail segment. The travel time survey data is summarized below:

AUTO TRAVEL TIME SURVEY RESULTS

<u>START LOCATION (NEAREST STATION)</u>	<u>VIA</u>	<u>DISTANCE (MILES)</u>	<u>TRAVEL TIME (MINUTES)</u>	<u>SPEED (MPH)</u>
PA 352 & US 1 (Elwyn)	US 1, Balto Pk, I-476, I-95, I-76	20.3	33.5	36.4
Providence Rd & Oak Ave (Primos)	Providence Rd, Baltimore Av, 38th & Market Sts	8.5	32.0	15.9

Travel times and travel speeds from the area surrounding the Elwyn Station are faster via automobile than the R3's express operation. From the Primos Station area, travel times and speeds are faster via the train.

Table 4 presents an historical account of daily inbound boardings along the line. The columns are arranged according to the date of the schedule in effect when the boarding checks were performed.⁴ Examination of the data indicates that line ridership peaked on trains operating about ten years ago. In the intervening period to Fall 1994, ridership declined 17 percent. Separate analysis of fare increases on the regional rail system indicates that monthly ticket prices within fare zones 2 and 3 also increased an average of 17 percent over the same period.

⁴ As an example -- the boarding data shown on Table 4 identified as Fall 1994 is based upon passenger counts conducted during March 1995.

TABLE 3: SELECTED SERVICE CHARACTERISTICS OF THE R3 LINE, September 10, 1995										
Station	Mi to C.C. ¹	Fare Zone	Service Type	AM Peak Period - Inbound Service			Trains per Midday (both directions)	PM Peak Period - Outbound Service		
				Trains	Travel Time (minutes)	Travel Speed (mph)		Trains	Travel Time (minutes)	Travel Speed (mph)
ELWYN	15.0	3	Local	5	45.0	20.0	15	3	42.0	21.4
			Express	3	39.0	23.1		2	35.0	25.7
MEDIA	14.0	3	Local	5	41.0	20.5	15	3	38.0	22.1
			Express	5	34.8	24.1		3	31.7	26.5
MOYLAN-ROSE VALLEY	13.2	3	Local	5	39.0	20.3	15	3	35.0	22.6
			Express	2	29.5	26.8		2	28.0	28.3
WALLINGFORD	12.3	3	Local	5	37.0	19.9	15	3	33.0	22.4
			Express	2	27.5	26.8		2	26.0	28.4
SWARTHMORE	11.2	3	Local	5	34.0	19.8	15	3	30.0	22.4
			Express	2	24.5	27.4		2	23.0	29.2
MORTON-RUTLEDGE	9.9	2	Local	8	31.3	19.0	15	4	27.0	22.0
			Express	2	21.5	27.6		2	20.0	29.7
SECANE	8.8	2	Local	8	28.0	18.9	15	5	24.0	22.0
			Express	2	18.5	28.5		2	17.0	31.1
PRIMOS	8.1	2	Local	8	26.0	18.7	15	5	22.0	22.1
CLIFTON-ALDAN	7.5	2	Local	8	24.0	18.8	15	5	20.0	22.5
GLADSTONE	6.9	2	Local	8	22.0	18.8	15	5	18.0	23.0
LANSDOWNE	6.3	2	Local	8	20.0	18.9	15	5	16.0	23.6

notes: 1 - C.C. = Suburban Station in Center City Philadelphia
sources: SEPTA R3 schedule, effective 9/10/1995

**TABLE 4: HISTORICAL VIEW OF DAILY BOARDINGS ALONG THE R3 LINE,
for Selected Schedules in effect between 1987 and 1996**

Station	Fall '87	Fall '88	Fall '89	Fall '90	Fall '91	Fall '93'	Fall '94 ²	Fall '96	
	Inbnd	Inbnd	Inbnd	Inbnd	Inbnd	Inbnd	Inbnd	Inbnd	Outbnd
ELWYN	366	292	352	324	329	346	327	295	0
MEDIA	541	497	523	540	401	455	437	508	6
MOYLAN-ROSE VALLEY	195	204	195	210	229	214	208	239	0
WALLINGFORD	273	281	201	184	203	222	176	229	0
SWARTHMORE	509	571	378	423	550	534	640	605	8
<i>Subtotal Fare Zone 3</i>	<i>1,884</i>	<i>1,845</i>	<i>1,649</i>	<i>1,681</i>	<i>1,712</i>	<i>1,771</i>	<i>1,788</i>	<i>1,876</i>	<i>14</i>
MORTON-RUTLEDGE	575	523	415	493	402	431	380	471	20
SECANE	455	434	452	397	414	373	385	399	11
PRIMOS	361	434	315	271	305	226	188	268	19
CLIFTON-ALDAN	356	359	342	305	284	296	253	228	7
GLADSTONE	182	201	170	203	167	165	173	147	0
LANSDOWNE	361	369	349	388	424	361	286	341	18
<i>Subtotal Fare Zone 2</i>	<i>2,290</i>	<i>2,320</i>	<i>2,043</i>	<i>2,057</i>	<i>1,996</i>	<i>1,852</i>	<i>1,665</i>	<i>1,854</i>	<i>75</i>
TOTAL	4,174	4,165	3,692	3,738	3,708	3,623	3,453	3,730	89

notes: 1 - 1992 report not available due to RailWorks® construction project.
2 - The ridership checks were performed during March 1995.
source: SEPTA Regional Rail Ridership Census report, dated October 1997.

The most recent set of boarding data, however, shows signs that ridership is rebounding. For example, per SEPTA's most recent rail ridership census, Fall 1996 inbound boardings are about eight percent higher than the previous reporting period. Outbound station boardings are shown for the Fall 1996 service schedule only, and represent about two percent of the inbound volume.

Table 5 illustrates current supply and utilization relationships for public parking at the Media / Elwyn Rail Line's 11 stations. Municipal and privately owned parking lots complement the supply provided by SEPTA at the Swarthmore and Morton-Rutledge stations. Overall, 97 percent of the total parking supply along the line is utilized. Parking utilization within fare zone 3 averages 98 percent, while parking utilization within fare zone 2 averages 96 percent. Parking constraints are experienced at all the stations except Gladstone.

Table 6 presents an historical account of parking utilization at the R3 Line's stations between 1990 and 1996. The data is presented in comparison with parking expansions undertaken through SEPTA's parking expansion program during 1993, 1994 and 1995. As shown:

- An additional 21 spaces were added at the Moylan-Rose Valley Station after the 1993 parking utilization check;
- An additional 22 spaces were added at the Elwyn Station after the 1994 parking check, and;
- An additional 59 spaces were added at the Media Station after the 1995 check.

At each station there was a noticeable increase in parking utilization immediately following the expansions (Elwyn = +7.5%; Media = +17.4%; Moylan-Rose Valley = +21.1%) and a return to normalized conditions thereafter. The line as a whole displayed an increase in parking utilization of two percent between 1990 and 1995.

STUDY AREA / COMMUTER SHED

Several separate survey efforts were used to determine the extent of the R3 Line's commuter shed and hence the study area for the analyses of future conditions. In support of a separate study, SEPTA conducted passenger surveys at the Wallingford Station in May 1995 and a license plate survey at the Swarthmore Station in June 1995. License plate surveys within the SEPTA owned and operated parking lots at the nine remaining stations were conducted by SEPTA and DVRPC in January and February 1996 expressly for this study.

TABLE 5: CURRENT STATION PARKING CHARACTERISTICS ALONG THE R3 LINE

Station	Parking Fee	SEPTA Lots		Long-Term Municipal and Private Lots		Total Spaces Current % Utilized
		Current Number of Parking Spaces	Current Parking Spaces Utilized	Current Number of Parking Spaces	Current Parking Spaces Utilized	
ELWYN ¹	\$0.50/day	217	210	---	---	97%
MEDIA ¹	\$0.50/day, \$10/Monthly	269	263 ⁵	---	---	98%
MOYLAN-ROSE VALLEY ²	\$0.50/day	149	142	---	---	95%
WALLINGFORD ³	\$0.50/day	66	66	---	---	100%
SWARTHMORE ³	\$0.50/day	143	146	106	103	100%
<i>Subtotal Fare Zone 3</i>		<i>844</i>	<i>827</i>	<i>706</i>	<i>703</i>	<i>98%</i>
MORTON-RUTLEDGE ³	\$0.50/day, \$10/Monthly	83	82 ⁵	88	87	99%
SECANE ⁴	\$10/Monthly	40	40	---	---	100%
PRIMOS ⁴	\$0.50/day, \$10/Monthly	118	118 ⁵	---	---	100%
CLIFTON-ALDAN ⁴	\$0.50/day, \$10/Monthly	146	146 ⁵	---	---	100%
GLADSTONE ⁴	\$0.50/day	108	93	---	---	86%
LANSDOWNE ⁴	\$0.50/day, \$10/Monthly	127	115 ⁵	---	---	91%
<i>Subtotal Fare Zone 2</i>		<i>622</i>	<i>594</i>	<i>88</i>	<i>87</i>	<i>95%</i>
TOTAL		1,466	1,421	194	190	97%

notes:
 1 - September 1997 utilization checks performed by SEPTA.
 2 - February 1996 utilization checks performed by SEPTA.
 3 - March 1998 utilization checks performed by SEPTA.
 4 - September 1995 utilization checks performed by SEPTA.
 5 - Reflects 100% sales, and therefore utilization, in permit parking lots.

TABLE 6: HISTORICAL VIEW OF SEPTA PARKING UTILIZATION AND EXPANSION PROGRAMS ALONG THE R3 LINE, 1990 to 1996

Station	1990 Utilization	1993 ¹⁾ Utilization	Spaces Added	1994 Utilization	Spaces Added	1995 Utilization	Spaces Added	1996 ²⁾ Utilization
ELWYN	199	199		199	+22	214		211
MEDIA	184	203		210		207	+59	243
MOYLAM-ROSE VALLEY	123	123	+21	149		145		142
WALLINGFORD	62	62		63		66		-
SWARTHMORE	126	110		132		138		-
<i>Subtotal Fare Zone 3</i>	<i>694</i>	<i>697</i>		<i>753</i>		<i>770</i>		
MORTON-RUTLEDGE	82	82		81		82		-
SECANE	45	45		40		40		-
PRIMOS	117	117		103		118		-
CLIFTON-ALDAN	121	121		115		146		-
GLADSTONE	93	78		72		93		-
LANSDOWNE	115	115		115		115		-
<i>Subtotal Fare Zone 2</i>	<i>573</i>	<i>558</i>		<i>526</i>		<i>594</i>		
TOTAL	1,267	1,255		1,279		1,364		

notes:
1 - No Utilization Reports prepared in 1991 and 1992 due to ongoing RailWorks® reconstruction project.
2 - Special utilization check performed at these stations only in February, 1996.
sources:
Planning & Development, SEPTA

From the combined surveys, a total of 1,240 data records (license plate and/or passenger surveys) were collected, tabulated and analyzed⁵. Address matching was performed to define the station sheds on a municipal basis for each of the 11 stations. Quantifying the relationship between the municipality containing the customer's residence and the rail station patronized is critical in the methodology used for estimating future station parking activity. The Rail Station Activity Assignment Model (RSAAM) was used to estimate this information⁶.

The address matching component resulted in precisely locating 956 of the survey records (77% of the total collected). Fewer surveys were "matchable" than were collected for a variety of reasons.

- Some Pennsylvania vehicle registrations were not known to PennDOT, perhaps as a result of recording / key coding a "0" in place of an "O" or vice versa and/or an "l" versus a "1", etc..
- Some registrations were from out of state and/or from distant communities, not typically associated with the region, and therefore were not traceable (or considered).
- In some cases the addresses associated with the vehicle registration included only a post office box number — so the specific residence couldn't be located or its municipality determined with certainty.
- Some addresses reflect the newest subdivisions which are not yet included in DVRPC's base mapping or published maps, and as a result were not able to be located.

Table 7 summarizes the results of the address matching ("ad-match") activity. Each station's shed is defined and quantified on a municipal basis in the table. All station sheds taken together define the commuter shed or the detailed study area for the R3 Line. The contents of Table 7 serve as the baseline condition for the modeling component of this study. The study area consists of 32 municipalities in Delaware County and 14 municipalities in Chester County. The R3 Line's assigned parking activity is 956 "parkers" for the 1995 base year condition.

⁵ License plate surveys reflect riders who are using the regional rail line for all trip purposes and all destinations served by the line.

⁶ RSAAM is more fully explained in chapter 4 — FUTURE CONDITIONS, and in APPENDIX I.

**TABLE 7: DISTRIBUTION OF MATCHED RIDERS BY STATION AND MUNICIPALITY,
License Plate Survey / Address Matching Results**

Municipality	Elwyn	Media	Moylan-Rose Valley	(a) Wallingford	Swarthmore	Morton	Secane	Primos	Clifton-Aldan	Gladstone	Lansdowne	Total
Birmingham (Chester Co.)	4 2.4%	3 1.8%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	7
East Bradford	0 0.0%	2 1.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2
East Goshen	2 1.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2
East Marlborough	3 1.8%	2 1.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	5
Kennett Square Borough	0 0.0%	1 0.6%	1 0.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2
Kennett Township	2 1.2%	4 2.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	6
New Garden	1 0.6%	1 0.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2
Pennsbury	3 1.8%	4 2.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	7
Pocopson	1 0.6%	1 0.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2
Thorbury (Chester Co.)	1 0.6%	2 1.2%	1 0.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4
West Chester	3 1.8%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	3
West Goshen	4 2.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4
Westtown	17 10.0%	10 5.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	27
Willistown	3 1.8%	2 1.2%	0 0.0%	0 0.0%	1 1.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	6
Aldan	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	10 11.8%	0 0.0%	0 0.0%	14
Aston	22 12.9%	6 3.6%	21 17.9%	1 1.9%	3 3.2%	1 2.0%	0 0.0%	3 4.1%	0 0.0%	0 0.0%	1 1.8%	55
Bethel	2 1.2%	1 0.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.4%	0 0.0%	0 0.0%	0 0.0%	4
Chadds Ford	6 3.5%	5 3.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	11
Brookhaven	11 6.5%	4 2.4%	19 16.2%	11 20.4%	3 3.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	48
Chester Heights Borough	8 4.7%	10 5.9%	1 0.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	19
Clifton Heights	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	6 8.1%	15 17.6%	0 0.0%	0 0.0%	21
Collingdale	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4 5.4%	14 16.5%	1 1.7%	0 0.0%	20
Concord	4 2.4%	21 12.4%	3 2.6%	0 0.0%	1 1.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	29
Darby Borough	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	9
Darby Township	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.2%	0 0.0%	8 14.0%	9
East Lansdowne	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4 14.8%	18 24.3%	5 5.9%	0 0.0%	2 3.5%	29
Edgmont	4 2.4%	7 4.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	3 5.3%	3
Glendolen	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 7.4%	1 1.4%	1 1.2%	0 0.0%	0 0.0%	11
Haverford	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.4%	1 1.2%	0 0.0%	0 0.0%	4
Lansdowne	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 2.4%	4 6.9%	0 0.0%	6
Marple	0 0.0%	7 4.1%	0 0.0%	0 0.0%	5 5.3%	7 13.7%	0 0.0%	0 0.0%	0 0.0%	17 29.3%	17 29.8%	36
Media	51 30.0%	28 16.6%	29 24.8%	3 5.6%	1 1.1%	2 3.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	21
Middletown	0 0.0%	0 0.0%	0 0.0%	3 5.6%	1 1.1%	1 2.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	22
Morton	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 3.7%	1 1.4%	0 0.0%	0 0.0%	0 0.0%	113
Nether Providence	0 0.0%	0 0.0%	13 11.1%	27 50.0%	41 43.6%	6 11.8%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2
Newtown	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	87
Ridley Township	0 0.0%	1 0.6%	0 0.0%	0 0.0%	5 5.3%	11 21.6%	4 14.8%	2 2.7%	0 0.0%	0 0.0%	0 0.0%	1
Rose Valley	0 0.0%	0 0.0%	10 8.5%	5 9.3%	2 2.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 3.4%	0 0.0%	25
Rutledge	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 2.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	17
Springfield	0 0.0%	1 0.6%	0 0.0%	0 0.0%	8 8.5%	17 33.3%	11 40.7%	9 12.2%	11 12.9%	0 0.0%	0 0.0%	1
Swarthmore	0 0.0%	0 0.0%	0 0.0%	0 0.0%	20 21.3%	3 5.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.8%	58
Thorbury (Delaware Co.)	11 6.5%	2 1.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	23
Upper Chichester Township	5 2.9%	3 1.8%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	13
Upper Darby Township	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	8
Upper Providence	2 1.2%	28 16.6%	15 12.8%	4 7.4%	3 3.2%	2 3.9%	5 18.5%	27 36.5%	23 27.1%	34 58.6%	19 33.3%	108
Yeadon	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	54
Total	170	169	117	54	94	51	27	74	85	58	57	956

note:
(a) Wallingford Station data obtained from a May 24, 1995 passenger survey conducted by SEPTA. Values shown represent only the drivers responding to the questionnaire [i.e., excluded from the Wallingford Station totals are the number of walkers (39), those dropped off at the station (35), those who rode a bike to the station (3) and those who carpool (0)].

A further review of Table 7 reveals that two dissimilar Delaware County municipalities each contribute over 100 parkers — Middletown and Upper Darby townships. Other municipalities which contribute significantly to the R3 line's parking demands are: Aston, Nether Providence, Springfield and Upper Providence townships and Brookhaven Borough.

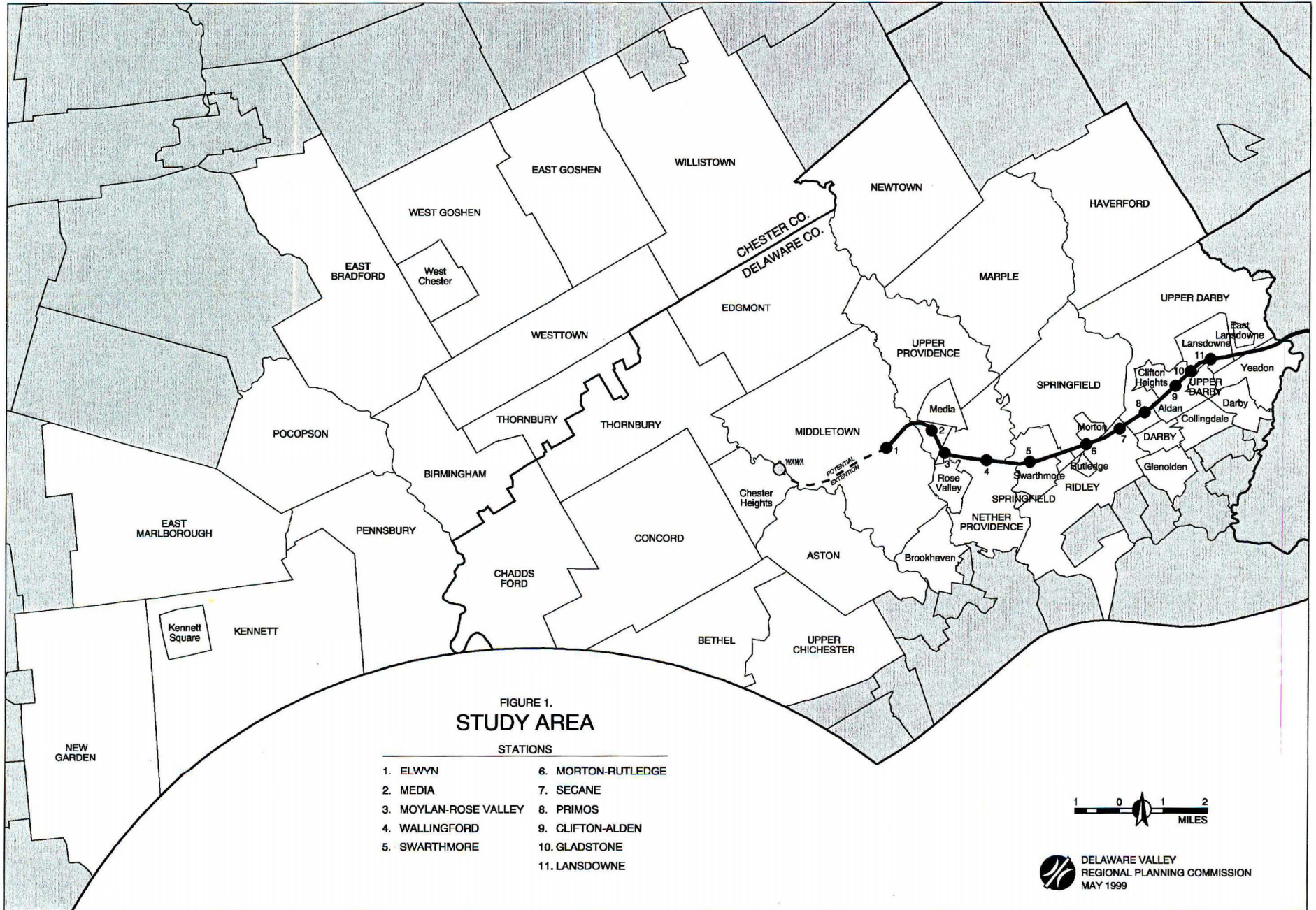
Figure 1 displays the study area for the R3 Media / Elwyn Rail Line Parking Demand Study determined as a result of the ad-match component. Graphical representations of the R3 Line's station sheds are illustrated on Figure 2 - for fare zone 3 (the westernmost segment of the line), and Figure 3 - for fare zone 2 (containing the six eastern stations within the studied rail segment).

Table 8 compares the number of matched surveys to the most recent boarding data and parking utilization counts at each station. The amount of matched surveys represent between 50 percent and 80 percent of the utilized parking spaces within the SEPTA lots at any given station.

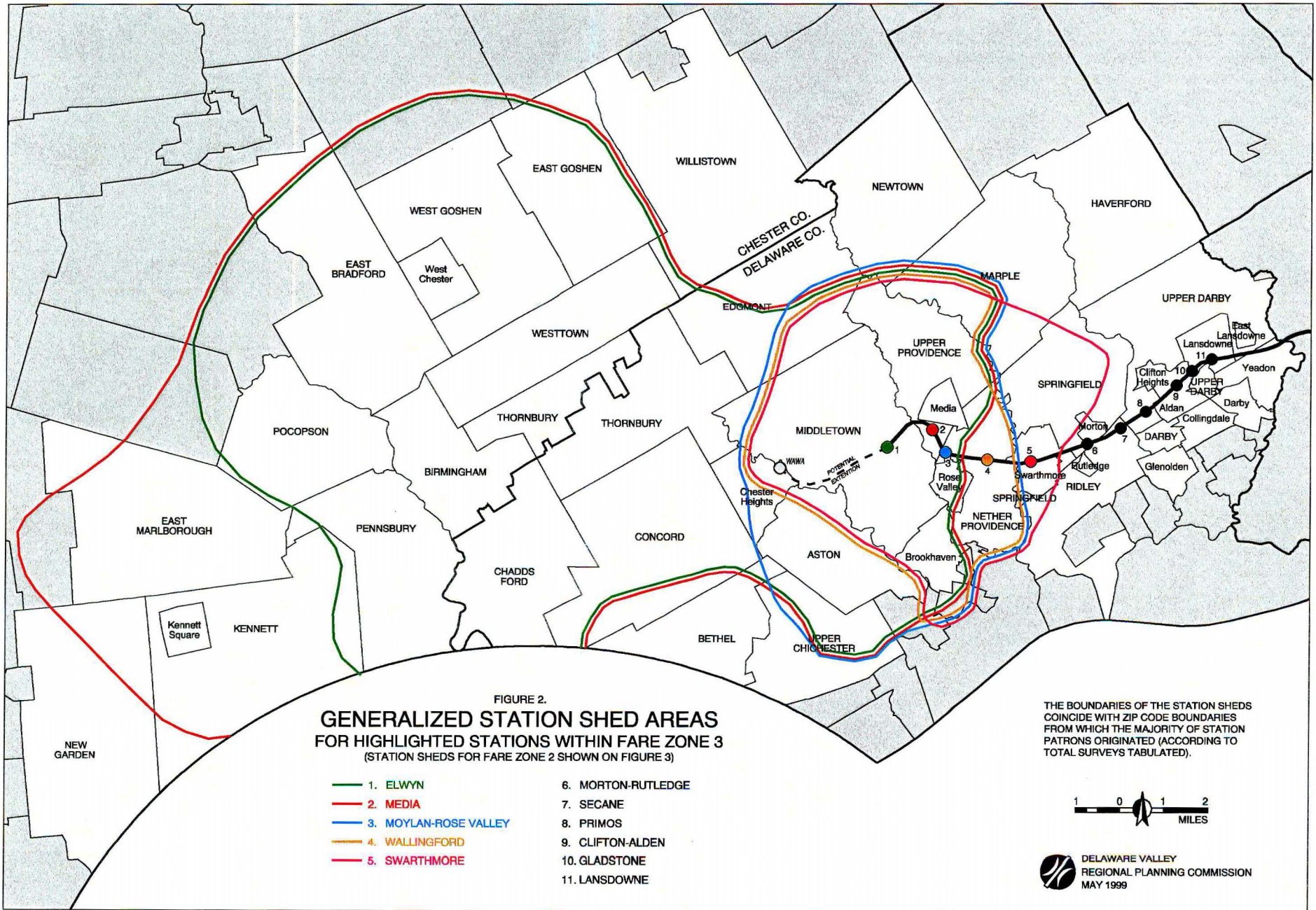
Station	Customer Surveys Matched	Daily Boardings Fall 1996			SEPTA Spaces Utilized
		Inbound	Outbound	Total	
ELWYN	170 ¹	295	0	295	210
MEDIA	169 ¹	508	6	514	263
MOYLAN-ROSE VALLEY	117 ¹	239	0	239	142
WALLINGFORD	54 ²	229	0	229	66
SWARTHMORE	94 ³	605	8	613	146
MORTON-RUTLEDGE	51 ¹	471	20	491	82
SECANE	27 ⁴	399	11	410	40
PRIMOS	74 ⁴	268	19	287	118
CLIFTON-ALDAN	85 ⁴	228	7	235	146
GLADSTONE	58 ⁴	147	0	147	93
LANSDOWNE	57 ⁴	341	18	359	115
TOTAL	956	3,730	89	3,819	1,421

- notes: 1 - License plate survey conducted by SEPTA in January 1996.
 2 - Wallingford data was determined from a passenger survey conducted by SEPTA on May 24, 1995. The data shown represents only the responses from those who drove to the station (excluded from the tabulations are the responses of those who walked, bicycled, or were dropped-off at the station).
 3 - License plate survey conducted by SEPTA in June 1995.
 4 - License plate survey conducted by DVRPC in February 1996.

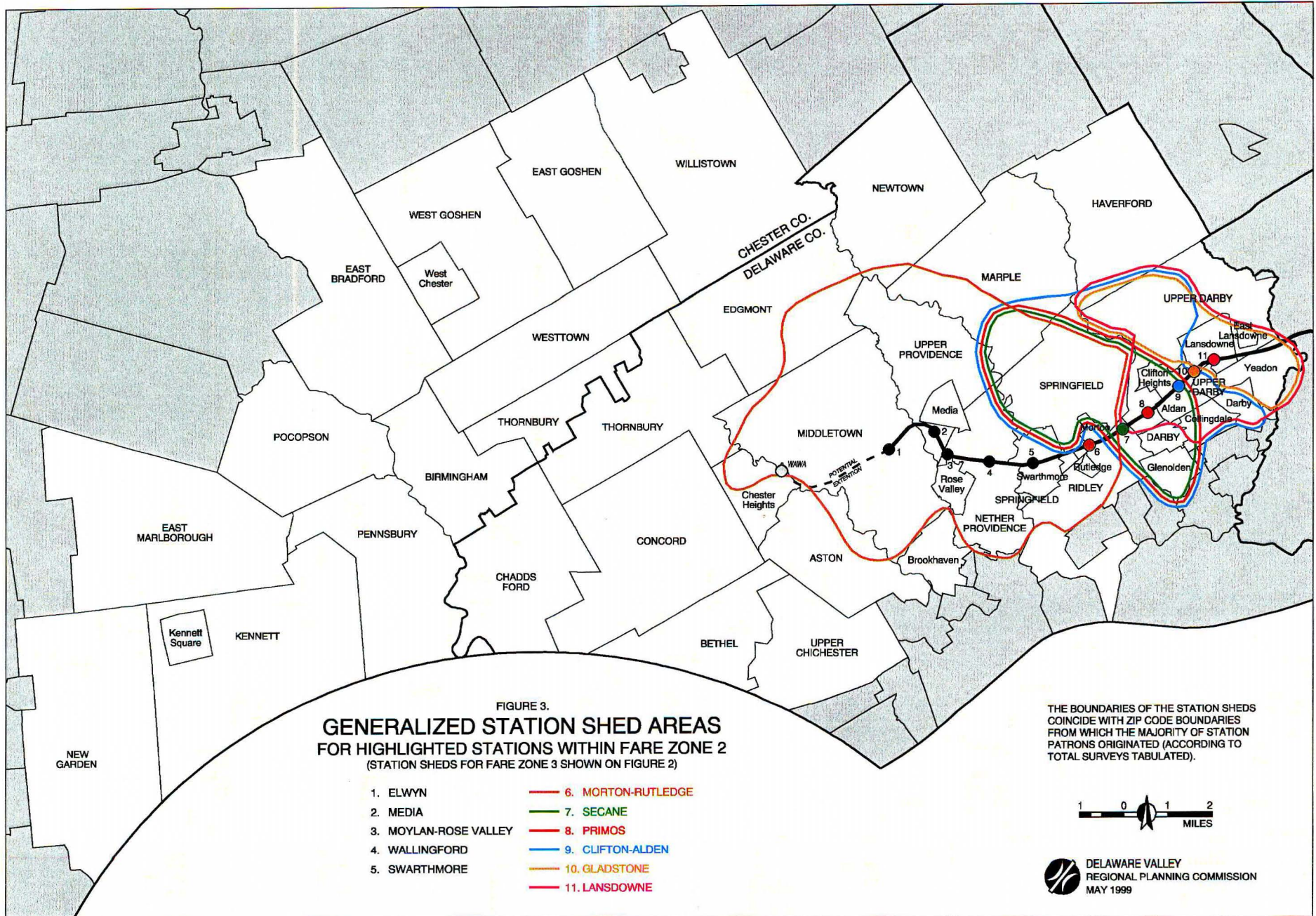
SEPTA R-3 MEDIA / ELWYN RAIL LINE PARKING DEMAND STUDY



SEPTA R-3 MEDIA / ELWYN RAIL LINE PARKING DEMAND STUDY



SEPTA R-3 MEDIA / ELWYN RAIL LINE PARKING DEMAND STUDY



RAIL CAPTURE RATIO

Capture ratio is defined as the share of all work trips originating in the study area which are destined to Center City Philadelphia and which use SEPTA regional rail. Center City was selected as the focus of the analysis since travel to the downtown area represents the vast majority of the commuter rail market. The source of the data is 1990 Census Journey-to-Work data.

The area encompassing Center City, usually defined as the area from Vine Street to South Street and between the Delaware and Schuylkill Rivers, has been broadened for this study. University City / 30th Street and the area between Vine Street and Spring Garden Street from Broad Street to the Schuylkill River were added to account for the relatively large number of commercial and institutional employers located on the fringes of the traditional CBD.

Table 9 lists 1990 rail capture ratios within the study area municipalities. The information is presented to provide an order of magnitude perspective on rail utilization throughout the study area as it presently exists and its potential for growth. In Table 9, the use of SEPTA regional rail is not restricted to the R3 Line. For example, along the study corridor's fringes, some municipalities are also conveniently served by parallel regional rail lines (e.g., the R2 Wilmington and R5 Downingtown lines). As a consequence, rail commuters from certain municipalities may not exclusively be using the Media / Elwyn Rail Line.

Of special note in the table are the county totals. A total of 608 CBD commuters from the study corridor's Chester County municipalities rely on SEPTA commuter rail, representing a capture ratio of 33 percent. Delaware County's portion of the study corridor contains 4,186 CBD-bound rail commuters — representing a capture ratio of just 18 percent. The dichotomy in county-wide rail capture ratios is attributable to available alternates to regional rail in the eastern limits of the corridor (e.g., bus, trolley and elevated railway are more abundant in Delaware County).

When all public transportation modes are accounted for, transit's total share of CBD-bound journey-to-work trips is approximately equal within each county of the study corridor (Chester County = 40% transit of 1,868 total Center City bound work trips; Delaware County = 43% transit of 23,899 total Center City bound work trips). From this data it may be inferred that the potential for CBD-bound work trip travel, by transit within the corridor, is twice the present demand.

Figure 4 illustrates the computed rail capture ratios within the study area. □

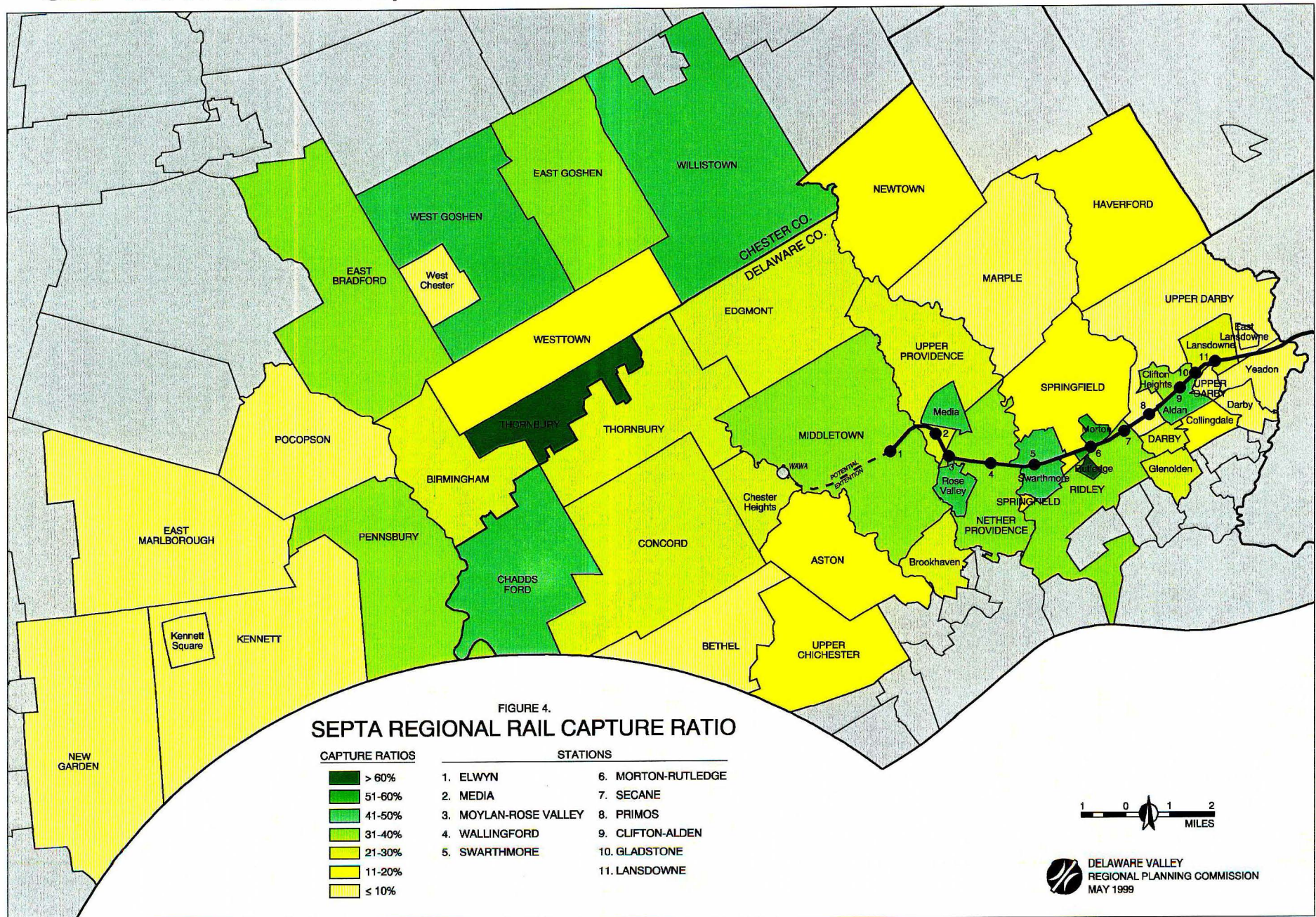
TABLE 9: 1990 RAIL CAPTURE RATIOS IN STUDY AREA, Work Trips to Center City Philadelphia						
Municipality	(a) Total Population ¹	(b) Employed Residents ¹	(c) Persons Working in CBD ¹	(d) Persons Working in CBD (%) (c/b)*100	(e) Persons Using Rail to CBD ¹	(f) SEPTA's Rail Capture Ratio (%) (e/c)*100
BIRMINGHAM TOWNSHIP	2,636	1,289	40	3.1%	9	23%
EAST BRADFORD TOWNSHIP	6,440	3,432	133	3.9%	47	35%
EAST GOSHEN TOWNSHIP	15,138	8,408	441	5.2%	169	38%
EAST MARLBOROUGH TOWNSHIP	4,781	2,591	37	1.4%	0	0%
KENNETT SQUARE BOROUGH	5,218	2,868	13	0.5%	0	0%
KENNETT TOWNSHIP	4,624	2,323	22	0.9%	0	0%
NEW GARDEN TOWNSHIP	5,430	3,225	5	0.2%	0	0%
PENNSBURY TOWNSHIP	3,326	1,540	24	1.6%	8	33%
POCOPSON TOWNSHIP	3,266	1,293	10	0.8%	0	0%
THORNBURY TOWNSHIP	1,131	567	18	3.2%	11	61%
WEST CHESTER BOROUGH	18,041	10,188	187	1.8%	18	10%
WEST GOSHEN TOWNSHIP	18,082	10,203	385	3.8%	161	42%
WESTTOWN TOWNSHIP	9,937	5,131	224	4.4%	31	14%
WILLISTOWN TOWNSHIP	9,380	4,898	329	6.7%	154	47%
CHESTER COUNTY TOTALS	107,430	57,956	1,868	3.2%	608	33%

TABLE 9: 1990 RAIL CAPTURE RATIOS IN STUDY AREA, Work Trips to Center City Philadelphia						
Municipality	(a) Total Population ¹	(b) Employed Residents ¹	(c) Persons Working in CBD ¹	(d) Persons Working in CBD (%) (c/b)*100	(e) Persons Using Rail to CBD ¹	(f) SEPTA's Rail Capture Ratio (%) (e/c)*100
ALDAN BOROUGH	4,549	2,318	327	14.1%	137	42%
ASTON TOWNSHIP	15,080	8,023	501	6.2%	96	19%
BETHEL TOWNSHIP	3,330	1,803	76	4.2%	6	8%
CHADDS FORD TOWNSHIP	3,118	1,803	119	6.6%	53	45%
BROOKHAVEN BOROUGH	8,567	4,929	294	6.0%	82	28%
CHESTER HEIGHTS BOROUGH	2,273	1,440	91	6.3%	21	23%
CLIFTON HEIGHTS BOROUGH	7,111	3,352	394	11.8%	131	33%
COLLINGDALE BOROUGH	9,175	4,268	345	8.1%	56	16%
CONCORD TOWNSHIP	6,933	3,647	282	7.7%	60	21%
DARBY BOROUGH	11,140	4,533	656	14.5%	51	8%
DARBY TOWNSHIP	10,955	5,108	588	11.5%	152	26%
EAST LANSDOWNE BOROUGH	2,691	1,331	107	8.0%	9	8%
EDGMONT TOWNSHIP	2,735	1,247	91	7.3%	25	27%
GLENOLDEN BOROUGH	7,260	3,723	394	10.6%	85	22%
HAVERFORD TOWNSHIP	49,848	25,368	3,167	12.5%	461	15%
LANSDOWNE BOROUGH	11,712	6,343	991	15.6%	270	27%

TABLE 9: 1990 RAIL CAPTURE RATIOS IN STUDY AREA, Work Trips to Center City Philadelphia						
Municipality	(a) Total Population ¹	(b) Employed Residents ¹	(c) Persons Working in CBD ¹	(d) Persons Working in CBD (%) (c/b)*100	(e) Persons Using Rail to CBD ¹	(f) SEPTA's Rail Capture Ratio (%) (e/c)*100
MARPLE TOWNSHIP	23,123	11,791	968	8.2%	77	8%
MEDIA BOROUGH	5,957	3,243	196	6.0%	83	42%
MIDDLETOWN TOWNSHIP	14,130	5,961	485	8.1%	162	33%
MORTON BOROUGH	2,851	1,461	180	12.3%	91	51%
NETHER PROVIDENCE TOWNSHIP	13,229	6,550	778	11.9%	277	36%
NEWTOWN TOWNSHIP	11,566	5,437	530	9.7%	105	20%
RIDLEY TOWNSHIP	31,169	15,329	1,351	8.8%	490	36%
ROSE VALLEY BOROUGH	982	465	66	14.2%	29	44%
RUTLEDGE BOROUGH	843	419	42	10.0%	27	64%
SPRINGFIELD TOWNSHIP	24,160	11,637	1,458	12.5%	273	19%
SWARTHMORE BOROUGH	6,157	3,290	424	12.9%	194	46%
THORNBURY TOWNSHIP	5,056	1,801	125	6.9%	26	21%
UPPER CHICHESTER TOWNSHIP	15,004	7,923	410	5.2%	53	13%
UPPER DARBY TOWNSHIP	81,177	40,646	6,419	15.8%	385	6%
UPPER PROVIDENCE TOWNSHIP	9,727	5,183	477	9.2%	129	27%
YEADON BOROUGH	11,980	6,129	1,567	25.6%	90	6%
DELAWARE COUNTY TOTALS	413,388	206,501	23,899	11.6%	4,186	18%
STUDY AREA TOTALS	520,818	264,457	25,767	9.7%	4,794	19%

1 source: US Census

SEPTA R-3 MEDIA / ELWYN RAIL LINE PARKING DEMAND STUDY



4 FUTURE CONDITIONS

Analyses were undertaken to determine future levels of parking activity for the R3 Media / Elwyn Rail Line. The specific analysis considered station parking expansions proposed as part of the line's Parking Program which are anticipated for implementation by the year 2001. Additionally, short term future (Year 2005) and long range future (Year 2020) analyses were undertaken to examine parking activity changes which respond to changes in forecasted population demographics in the R3 line's commuter shed, and employment in Center City Philadelphia.

The Rail Station Activity Assignment Model (RSAAM), a special planning tool developed to provide quick, reasonable and consistent estimates of rail station activity levels, was employed for estimating future parking demand and utilization⁷.

METHODOLOGY

RSAAM's foundation is the relationship established between the municipality in which the rail user lives and the rail station patronized. The base year condition for this relationship is contained in the matched riders matrix (Table 7). Quantifying the connection between residence municipality and rail station patronized allows the propensity to use rail within the municipality(ies) to be "linked" in proportion to forecasted demographics within the study corridor.

The methodology of the RSAAM uses the matched station license plate survey response data as surrogates for current rail station parking activity. These values are the base assigned inputs for the model. Estimated growth due to latent demand, manifested at the municipal level in response to SEPTA's station parking expansion program, is then added to the station's base parking assignments to yield station activity changes due to the Parking Program (i.e., anticipated by 2001). Next, station parking growth, responding to forecasted changes in municipal population and employment within the station shed, is projected and summed with year 2001 activity levels to estimate assigned station parking levels for the Years 2005 and 2020.

⁷ The rail station activity assignment model developed for and used under the auspices of this study is not intended to supplant the regional travel forecasting model which is maintained by DVRPC. Rather, it provides sketch planning, best "guesstimate" responses to sensitivity analysis questions, taking current regional rail service levels and ridership characteristics, and forecasted demographics into account. The DVRPC regional travel forecasting model, when applied in a focused fashion, is more capable of estimating ridership levels in response to service changes, and many more external variables.

The percent changes (increases or decreases) in assigned station parking activity levels are then applied to actual current year parking levels at the station(s) to yield future year parking utilization estimates. Assessments of parking utilization and needs are provided on a fare zone basis.

More information on the RSAAM, and its application within this study, is provided in APPENDIX I.

BASE CONDITIONS

Base conditions within the procedure are analogous to the customer survey / address match component (i.e., the information contained in Table 7).

LATENT DEMAND FOR STATION PARKING

The underlying theory of latent demand is that new customers will be attracted to the R3 line's stations given readily available supplies of parking. Latent demand is expected to be most significant within municipalities surrounding stations with highly constrained parking lots — that are also without readily available transportation alternatives.

The basis for the latent demand estimates are observations of actual parking supply and demand changes which took place after physical expansion of parking lots were implemented at the Moylan-Rose Valley Station (+21 spaces in 1993), the Elwyn Station (+22 spaces in 1994) and the Media Station (+59 spaces in 1995). The RSAAM was subsequently calibrated for these three stations.

Computations at the Media Station were key in this exercise, for the reasons listed below.

1. Parking utilization rates at the Media Station remained the lowest after the expansion was implemented, indicating that parking capacity was not constraining growth in demand.
 2. Twenty municipalities are common between the Elwyn station shed (23 municipalities total) and the Media station shed (26 municipalities total), suggesting that latent demand attributes at the two stations would be similar without constraints imposed by a lack of available parking.
 3. The majority of the municipalities which comprise the Moylan-Rose Valley station shed (9 of 11 total municipalities) are also included in the Media station shed, again suggesting that latent demand attributes of the municipalities feeding the two stations should be similar.
-

The results of the calibration for parking demand changes due to latent demand are tabulated below.

<u>STATION</u>	<u>LATENT DEMAND FACTOR</u>	
	<u>ACTUAL</u>	<u>CALIBRATED</u>
Elwyn	+ 7.5%	+ 15.3%
Media	+ 17.4%	+ 17.8%
Moylan-Rose Valley	+ 21.1%	+ 21.4%

Municipal latent demand increments for the study area municipalities, which were not addressed in the calibration step, were estimated using the following guidelines:

1. Municipalities surrounding the stations with presently fully utilized parking lots have typically higher latent demand percentages than those which don't.
2. Municipalities along the rail line which are closer to the CBD or are closer to a parallel rail line, typically have lower latent demand percentages.
3. Municipalities which are closer to the rail line generally have higher latent demand percentages.

Table 10 displays the final municipal latent demand factors for the study area municipalities. Table 11 shows the results of applying the parking expansion / latent demand estimating procedure, within the RSAAM, to the Elwyn and Wallingford stations assuming the Parking Program is implemented (Elwyn = +140 spaces to be added in 1999, and Wallingford = +88 spaces to be added in 2000). The resultant changes in activity at the stations proposed for parking expansion, versus base year activity, are summarized below.

1. Elwyn + 26 "parkers" (+ 15.3% in assigned station parking);
2. Wallingford + 16 "parkers" (+ 29.6% in assigned station parking).

The 42 additional "parkers" projected for the line after the expansions at Elwyn and Wallingford represents a 4.4 percent increase above the line's current activity level (956 "parkers").

TABLE 10: MUNICIPAL LATENT DEMAND ESTIMATES WITHIN THE STUDY AREA			
Chester County Municipalities	Latent Demand %	Delaware County Municipalities (continued)	Latent Demand %
BIRMINGHAM TOWNSHIP	13%	CONCORD TOWNSHIP	19%
EAST BRADFORD TOWNSHIP	13%	DARBY BOROUGH	0%
EAST GOSHEN TOWNSHIP	8%	DARBY TOWNSHIP	0%
EAST MARLBOROUGH TOWNSHIP	12%	EAST LANSDOWNE BOROUGH	0%
KENNETT SQUARE BOROUGH	19%	EDGMONT TOWNSHIP	15%
KENNETT TOWNSHIP	13%	GLENOLDEN BOROUGH	0%
NEW GARDEN TOWNSHIP	13%	HAVERFORD TOWNSHIP	0%
PENNSBURY TOWNSHIP	13%	LANSDOWNE BOROUGH	0%
POCOPSON TOWNSHIP	13%	MARPLE TOWNSHIP	19%
THORNBURY TOWNSHIP	13%	MEDIA BOROUGH	26%
WEST CHESTER BOROUGH	8%	MIDDLETOWN TOWNSHIP	19%
WEST GOSHEN TOWNSHIP	8%	MORTON BOROUGH	0%
WESTTOWN TOWNSHIP	13%	NETHER PROVIDENCE TOWNSHIP	33%
WILLISTOWN TOWNSHIP	10%	NEWTOWN TOWNSHIP	13%
		RIDLEY TOWNSHIP	19%
Delaware County Municipalities		ROSE VALLEY BOROUGH	33%
ALDAN BOROUGH	0%	RUTLEDGE BOROUGH	0%
ASTON TOWNSHIP	17%	SPRINGFIELD TOWNSHIP	19%
BETHEL TOWNSHIP	19%	SWARTHMORE BOROUGH	0%
CHADDS FORD TOWNSHIP	13%	THORNBURY TOWNSHIP	13%
BROOKHAVEN BOROUGH	17%	UPPER CHICHESTER TOWNSHIP	13%
CHESTER HEIGHTS BOROUGH	18%	UPPER DARBY TOWNSHIP	0%
CLIFTON HEIGHTS BOROUGH	0%	UPPER PROVIDENCE TOWNSHIP	19%
COLLINGDALE BOROUGH	0%	YEADON BOROUGH	0%

**TABLE 11: ASSIGNED STATION PARKING,
With Parking Expansions at Elwyn & Wallingford**

Station	Municipality	Current Assigned Station Parking (1)	Latent Demand (Parkers)	Assigned Station Parking With Latent Demand At Elwyn & Wallingford
Elwyn *	Birmingham (ChesCo)	4	1	5
	East Goshen	2	0	2
	East Marlborough	3	0	3
	Kennett Township	2	0	2
	New Garden	1	0	1
	Pennsbury	3	0	3
	Pocopson	1	0	1
	Thornbury (ChesCo)	1	0	1
	West Chester	3	0	3
	West Goshen	4	0	4
	Westtown	17	2	19
	Willistown	3	0	3
	Aston	22	4	26
	Bethel	2	0	2
	Chadds Ford	6	1	7
	Brookhaven	11	2	13
	Chester Heights Borough	8	1	9
	Concord	4	1	5
	Edgmont	4	1	5
	Middletown	51	11	62
	Thornbury (DelCo)	11	1	12
	Upper Chichester Township	5	1	6
Upper Providence	2	0	2	
TOTALS	170	26	196	
Media	Birmingham (ChesCo)	3		3
	East Bradford	2		2
	East Marlborough	2		2
	Kennett Square Borough	1		1
	Kennett Township	4		4
	New Garden	1		1
	Pennsbury	4		4
	Pocopson	1		1
	Thornbury (ChesCo)	2		2
	Westtown	10		10
	Willistown	2		2
	Aston	6		6
	Bethel	1		1
	Chadds Ford	5		5
	Brookhaven	4		4
	Chester Heights Borough	10		10
	Concord	21		21
	Edgmont	7		7
	Marple	7		7
	Media	13		13
	Middletown	28		28
	Ridley Township	1		1
Springfield	1		1	
Thornbury (DelCo)	2		2	
Upper Chichester Township	3		3	
Upper Providence	28		28	
TOTALS	169		169	
Moylan-Rose Valley	Kennett Square Borough	1		1
	Thornbury (ChesCo)	1		1
	Aston	21		21
	Brookhaven	19		19
	Chester Heights Borough	1		1
	Concord	3		3
	Media	4		4
	Middletown	29		29
	Nether Providence	13		13
	Rose Valley	10		10
	Upper Providence	15		15
TOTALS	117		117	
Wallingford *	Aston	1	0	1
	Brookhaven	11	2	13
	Media	3	1	4
	Middletown	3	1	4
	Nether Providence	27	9	36
	Rose Valley	5	2	7
	Upper Providence	4	1	5
	TOTALS	64	16	80
Swarthmore	Willistown	1		1
	Aston	3		3
	Brookhaven	3		3
	Concord	1		1
	Marple	5		5
	Middletown	1		1
	Nether Providence	41		41
	Newtown	1		1
	Ridley Township	5		5
	Rose Valley	2		2
	Springfield	8		8
	Swarthmore	20		20
	Upper Providence	3		3
	TOTALS	94		94
Morton	Aston	1		1
	Marple	7		7
	Media	2		2
	Middletown	1		1
	Nether Providence	6		6
	Ridley Township	11		11
	Rutledge	1		1
	Springfield	17		17
	Swarthmore	3		3
Upper Providence	2		2	
TOTALS	51		51	
Secane	Darby Township	4		4
	Glenolden	2		2
	Morton	1		1
	Ridley Township	4		4
	Springfield	11		11
	Upper Darby Township	5		5
TOTALS	27		27	
Primos	Aldan	3		3
	Aston	1		1
	Bethel	1		1
	Clifton Heights	6		6
	Collingdale	4		4
	Darby Township	18		18
	Glenolden	1		1
	Haverford	1		1
	Morton	1		1
	Ridley Township	2		2
	Springfield	9		9
	Upper Darby Township	27		27
	TOTALS	74		74
Clifton-Aldan	Aldan	10		10
	Clifton Heights	15		15
	Collingdale	14		14
	Darby Borough	1		1
	Darby Township	5		5
	Glenolden	1		1
	Haverford	1		1
	Lansdowne	2		2
	Marple	2		2
	Springfield	11		11
Upper Darby Township	23		23	
TOTALS	85		85	
Gladstone	Collingdale	1		1
	Haverford	4		4
	Lansdowne	17		17
	Ridley Township	2		2
	Upper Darby Township	34		34
TOTALS	58		58	
Lansdowne	Aldan	1		1
	Collingdale	1		1
	Darby Borough	8		8
	Darby Township	2		2
	East Lansdowne	3		3
	Lansdowne	17		17
	Springfield	1		1
	Upper Darby Township	19		19
	Yeadon	5		5
	TOTALS	57		57
	GRAND TOTALS		956	42

* PARKING EXPANSION ASSUMED

1) NUMBER OF ADDRESSES MATCHED PER LICENSE PLATE SURVEY -- SORTED BY STATION (SEE TABLE 7)

FUTURE GROWTH

Estimates of future station utilization should also consider ridership changes which occur as a consequence of ongoing population growth within the study area and employment growth in Center City Philadelphia. Normal growth for regional rail parking facilities were estimated for 2005 and 2020 based upon municipal growth trends exhibited in forecasted demographic data contained in *2020 Zonal Population and Employment Forecasts, Report 25 - Direction 2020* (DVRPC, April 1995), and in travel simulations for the years 1990 and 2020 per DVRPC's regional travel forecasting model.

Selected findings from the analysis of those data items are enumerated below.

1. Study area population is forecasted to rise four percent between 1990 and 2005, and six percent between 1990 and 2020.
2. Study area employed residents are forecasted to rise six percent between 1990 and 2005, and 13 percent between 1990 and 2020.
3. Employment within Philadelphia's CBD is forecasted to rise ten percent between 1990 and 2005, and 21 percent between 1990 and 2020.
4. Home based work transit person trips between the study area and the Philadelphia CBD are projected to rise 17 percent between 1990 and 2020.

Estimated municipal rail ridership growth rates, for the period 1990 to 2005 and between 1990 and 2020, were derived by considering forecasted changes in the number of employed residents within the study area (item 2 above), changes in employment within the CBD (item 3 above) and changes to transit ridership forecasted by the regional model (item 4 above) at the municipal level. The combination of indicators for the study area as a whole suggests that station activity increases on the order of eight percent are possible between 1990 and 2005 as a consequence of forecasted demographic changes within the study corridor. By the Year 2020, an increase of 17 percent above 1990 levels can be expected.

Table 12 illustrates the application of the Year 2005 municipal growth rates to the base year assigned station activity levels — after the parking expansions at Elwyn and Wallingford have been implemented (i.e., the values shown in the last column of Table 11). The resultant change in assigned study area rail station parking activity reveals an increase of 12.2 percent compared to 1990 base conditions (1,073 "parkers" by 2005 versus 956 baseline "parkers"). The vast majority of the change is projected to occur at stations in fare zone 3 (+ 19.2%). Very little change takes place in fare zone 2 (+ 0.3%).

Table 13 illustrates the application of the Year 2020 municipal growth rates to the base year assigned parking activity levels, again assuming that the parking expansions at Elwyn and Wallingford have been completed. The resultant change in assigned Year 2020 study area station parking use reveals an increase of 19.4 percent compared to base year conditions (1,141 "parkers" by 2020 versus 956 "parkers" in the baseline). Once again, the vast majority of the change is projected to occur at stations in fare zone 3 (+ 30.1%), with minimal change projected in fare zone 2 (+ 0.9%). □

TABLE 12: 2005 ASSIGNED STATION PARKING

Station	Municipality	Assigned Station Parking With Latent Demand At Elwyn & Wallingford	Incremental Trend Growth (Parkers)	Trend Growth 2005 Assigned Station Parking Demand (Parkers)
Elwyn	Birmingham (ChesCo)	5	1	6
	East Goshen	2	0	2
	East Marlborough	3	1	4
	Kennett Township	2	0	2
	New Garden	1	0	1
	Pennsbury	3	1	4
	Pocopson	1	0	1
	Thornbury (ChesCo)	1	0	1
	West Chester	3	1	4
	West Goshen	4	1	5
	Westtown	19	4	23
	Willistown	3	0	3
	Aston	26	2	28
	Bethel	2	0	2
	Chadds Ford	7	2	9
	Brookhaven	13	2	15
	Chester Heights Borough	9	3	12
	Concord	5	1	6
	Edgmont	5	1	6
	Middletown	62	4	66
	Thornbury (DelCo)	12	2	14
	Upper Chichester Township	6	1	7
Upper Providence	2	0	2	
TOTALS	196	27	223	
Media	Birmingham (ChesCo)	3	1	4
	East Bradford	2	1	3
	East Marlborough	2	1	3
	Kennett Square Borough	1	0	1
	Kennett Township	4	1	5
	New Garden	1	0	1
	Pennsbury	4	1	5
	Pocopson	1	0	1
	Thornbury (ChesCo)	2	1	3
	Westtown	10	2	12
	Willistown	2	0	2
	Aston	6	0	6
	Bethel	1	0	1
	Chadds Ford	5	2	7
	Brookhaven	4	1	5
	Chester Heights Borough	10	3	13
	Concord	21	4	25
	Edgmont	7	1	8
	Marple	7	0	7
	Media	13	0	13
	Middletown	28	2	30
	Ridley Township	1	0	1
Springfield	1	0	1	
Thornbury (DelCo)	2	0	2	
Upper Chichester Township	3	0	3	
Upper Providence	28	1	29	
TOTALS	169	22	191	
Moylan-Rose Valley	Kennett Square Borough	1	0	1
	Thornbury (ChesCo)	1	0	1
	Aston	21	1	22
	Brookhaven	19	3	22
	Chester Heights Borough	1	0	1
	Concord	3	1	4
	Media	4	0	4
	Middletown	29	2	31
	Nether Providence	13	2	15
	Rose Valley	10	1	11
	Upper Providence	15	1	16
TOTALS	117	11	128	
Wallingford	Aston	1	0	1
	Brookhaven	13	2	15
	Media	4	0	4
	Middletown	4	0	4
	Nether Providence	36	5	41
	Rose Valley	7	1	8
	Upper Providence	5	0	5
TOTALS	70	8	78	
Swarthmore	Willistown	1	0	1
	Aston	3	0	3
	Brookhaven	3	0	3
	Concord	1	0	1
	Marple	5	0	5
	Middletown	1	0	1
	Nether Providence	41	5	46
	Newtown	1	0	1
	Ridley Township	5	0	5
	Rose Valley	2	0	2
	Springfield	8	0	8
	Swarthmore	20	1	21
	Upper Providence	3	0	3
TOTALS	94	6	100	
Morton	Aston	1	0	1
	Marple	7	0	7
	Media	2	0	2
	Middletown	1	0	1
	Nether Providence	6	1	7
	Ridley Township	11	0	11
	Rutledge	1	0	1
	Springfield	17	0	17
	Swarthmore	3	0	3
Upper Providence	2	0	2	
TOTALS	51	1	52	
Secane	Darby Township	4	0	4
	Glenolden	2	0	2
	Morton	1	0	1
	Ridley Township	4	0	4
	Springfield	11	0	11
	Upper Darby Township	5	0	5
TOTALS	27	0	27	
Primos	Aldan	3	0	3
	Aston	1	0	1
	Bethel	1	0	1
	Clifton Heights	6	0	6
	Collingdale	4	0	4
	Darby Township	18	0	18
	Glenolden	1	0	1
	Haverford	1	0	1
	Morton	1	0	1
	Ridley Township	2	0	2
	Springfield	9	0	9
	Upper Darby Township	27	0	27
	TOTALS	74	0	74
Clifton-Aldan	Aldan	10	0	10
	Clifton Heights	15	0	15
	Collingdale	14	0	14
	Darby Borough	1	0	1
	Darby Township	5	0	5
	Glenolden	1	0	1
	Haverford	1	0	1
	Lansdowne	2	0	2
	Marple	2	0	2
	Springfield	11	0	11
Upper Darby Township	23	0	23	
TOTALS	85	0	85	
Gladstone	Collingdale	1	0	1
	Haverford	4	0	4
	Lansdowne	17	0	17
	Ridley Township	2	0	2
	Upper Darby Township	34	0	34
	TOTALS	58	0	58
Lansdowne	Aldan	1	0	1
	Collingdale	1	0	1
	Darby Borough	8	0	8
	Darby Township	2	0	2
	East Lansdowne	3	0	3
	Lansdowne	17	0	17
	Springfield	1	0	1
	Upper Darby Township	19	0	19
	Yeadon	5	0	5
	TOTALS	57	0	57
GRAND TOTALS		998	75	1073

TABLE 13: 2020 ASSIGNED STATION PARKING

Stations	Municipality	Assigned Station Parking With Latent Demand At Elwyn & Wallingford	Incremental Trend Growth (Parkers)	Trend Growth 2020 Assigned Station Parking Demand (Parkers)	
Elwyn	Birmingham (ChesCo)	5	3	8	
	East Goshen	2	1	3	
	East Marlborough	3	2	5	
	Kennett Township	2	1	3	
	New Garden	1	1	2	
	Pennsbury	3	2	5	
	Pocopson	1	0	1	
	Thornbury (ChesCo)	1	1	2	
	West Chester	3	1	4	
	West Goshen	4	1	5	
	Westtown	19	6	25	
	Willistown	3	0	3	
	Aston	26	4	30	
	Bethel	2	1	3	
	Chadds Ford	7	6	13	
	Brookhaven	13	2	15	
	Chester Heights Borough	9	5	14	
	Concord	5	2	7	
	Edgmont	5	1	6	
	Middletown	62	7	69	
	Thornbury (DelCo)	12	4	16	
	Upper Chichester Township	6	1	7	
Upper Providence	2	0	2		
TOTALS	196	52	248		
Media	Birmingham (ChesCo)	3	2	5	
	East Bradford	2	2	4	
	East Marlborough	2	1	3	
	Kennett Square Borough	1	0	1	
	Kennett Township	4	2	6	
	New Garden	1	1	2	
	Pennsbury	4	2	6	
	Pocopson	1	0	1	
	Thornbury (ChesCo)	2	2	4	
	Westtown	10	3	13	
	Willistown	2	0	2	
	Aston	6	1	7	
	Bethel	1	1	2	
	Chadds Ford	5	4	9	
	Brookhaven	4	0	4	
	Chester Heights Borough	10	6	16	
	Concord	21	9	30	
	Edgmont	7	2	9	
	Marple	7	1	8	
	Media	13	0	13	
	Middletown	28	3	31	
	Ridley Township	1	0	1	
Springfield	1	0	1		
Thornbury (DelCo)	2	1	3		
Upper Chichester Township	3	1	4		
Upper Providence	28	3	31		
TOTALS	169	47	216		
Moylan-Rose Valley	Kennett Square Borough	1	0	1	
	Thornbury (ChesCo)	1	1	2	
	Aston	21	4	25	
	Brookhaven	19	2	21	
	Chester Heights Borough	1	1	2	
	Concord	3	1	4	
	Media	4	0	4	
	Middletown	29	3	32	
	Nether Providence	13	2	15	
	Rose Valley	10	4	14	
	Upper Providence	15	2	17	
	TOTALS	117	20	137	
Wallingford	Aston	1	0	1	
	Brookhaven	13	2	15	
	Media	4	0	4	
	Middletown	4	0	4	
	Nether Providence	36	5	41	
	Rose Valley	7	3	10	
	Upper Providence	5	1	6	
TOTALS	70	11	81		
Swarthmore	Willistown	1	0	1	
	Aston	3	1	4	
	Brookhaven	3	0	3	
	Concord	1	0	1	
	Marple	5	1	6	
	Middletown	1	0	1	
	Nether Providence	41	6	47	
	Newtown	1	0	1	
	Ridley Township	5	0	5	
	Rose Valley	2	1	3	
	Springfield	8	0	8	
	Swarthmore	20	1	21	
	Upper Providence	3	0	3	
TOTALS	94	10	104		
Morton	Aston	1	0	1	
	Marple	7	1	8	
	Media	2	0	2	
	Middletown	1	0	1	
	Nether Providence	6	1	7	
	Ridley Township	11	0	11	
	Rutledge	1	0	1	
	Springfield	17	0	17	
	Swarthmore	3	0	3	
	Upper Providence	2	0	2	
	TOTALS	51	2	53	
Secane	Darby Township	4	0	4	
	Glenolden	2	0	2	
	Morton	1	0	1	
	Ridley Township	4	0	4	
	Springfield	11	0	11	
	Upper Darby Township	5	0	5	
TOTALS	27	0	27		
Primos	Aldan	3	0	3	
	Aston	1	0	1	
	Bethel	1	1	2	
	Clifton Heights	6	0	6	
	Collingdale	4	0	4	
	Darby Township	18	0	18	
	Glenolden	1	0	1	
	Haverford	1	0	1	
	Morton	1	0	1	
	Ridley Township	2	0	2	
	Springfield	9	0	9	
	Upper Darby Township	27	0	27	
	TOTALS	74	1	75	
	Clifton-Aldan	Aldan	10	0	10
		Clifton Heights	15	0	15
Collingdale		14	0	14	
Darby Borough		1	0	1	
Darby Township		5	0	5	
Glenolden		1	0	1	
Haverford		1	0	1	
Lansdowne		2	0	2	
Marple		2	0	2	
Springfield		11	0	11	
Upper Darby Township		23	0	23	
TOTALS		85	0	85	
Gladstone	Collingdale	1	0	1	
	Haverford	4	0	4	
	Lansdowne	17	0	17	
	Ridley Township	2	0	2	
	Upper Darby Township	34	0	34	
	TOTALS	58	0	58	
Lansdowne	Aldan	1	0	1	
	Collingdale	1	0	1	
	Darby Borough	8	0	8	
	Darby Township	2	0	2	
	East Lansdowne	3	0	3	
	Lansdowne	17	0	17	
	Springfield	1	0	1	
	Upper Darby Township	19	0	19	
	Yeadon	5	0	5	
	TOTALS	57	0	57	
GRAND TOTALS		998	143	1141	

5 ASSESSMENT OF FUTURE CONDITIONS

The appropriate station's activity growth percentages (calculated from changes in base year assigned station activity levels, shown in Table 7, to those for 2005 and 2020 shown in Table 12 and Table 13, respectively) were applied to current parking levels (highest and most conservative values available) to project Year 2005 and Year 2020 station conditions. These values serve as the basis for evaluating alternative rail line and/or station parking supply configurations.

PROPOSED PARKING EXPANSION PROGRAM

Table 14 presents existing and projected 2005 and 2020 parking levels and parking utilization rates assuming that the Parking Program has been implemented (adding 228 parking spaces along the line).

Station	Current Number of Spaces	Current Spaces Utilized	Proposed Number of Spaces 2001	Spaces Utilized 2005	% Utilized 2005 (vs 2001 SUPPLY)	Spaces Utilized 2020	% Utilized 2020 (vs 2001 SUPPLY)
ELWYN	217	210	357	275	77%	306	86%
MEDIA	269	263	269	297	110%	336	125%
MOYLAN-ROSE VALLEY	149	142	149	155	104%	166	111%
WALLINGFORD	66	66	154	96	62%	99	64%
SWARTHMORE	249	249	249	265	106%	275	110%
<i>Subtotal Fare Zone 3</i>	<i>950</i>	<i>930</i>	<i>1,178</i>	<i>1,088</i>	<i>92%</i>	<i>1,182</i>	<i>100%</i>
MORTON-RUTLEDGE	171	169	171	172	101%	176	103%
SECANE	40	40	40	40	100%	40	100%
PRIMOS	118	118	118	118	100%	119	101%
CLIFTON-ALDAN	146	146	146	146	100%	146	100%
GLADSTONE	108	93	108	93	86%	93	86%
LANSDOWNE	127	115	127	115	91%	115	91%
<i>Subtotal Fare Zone 2</i>	<i>710</i>	<i>681</i>	<i>710</i>	<i>684</i>	<i>96%</i>	<i>689</i>	<i>97%</i>
TOTAL	1,660	1,611	1,888	1,772	94%	1,871	99%

By the Year 2005, projected total utilization for parking at the 11 regional rail stations along the Media / Elwyn Rail Line will be at 94 percent of capacity (a marginal improvement, if compared to existing conditions - 97%). The improvement is attributable to parking expansions in fare zone 3 (at the Elwyn and

Wallingford stations). By the Year 2020 the projected total parking utilization at the 11 stations will be 99 percent – representing a slight worsening of conditions in both fare zones, if compared to existing conditions.

WITHOUT PARKING EXPANSION AT ELWYN

SEPTA requested that DVRPC estimate the R3 Rail Line's parking supply and demand relationships if parking expansion were not pursued at Elwyn Station. Table 15 presents existing and projected 2005 and 2020 parking levels and parking utilization rates assuming only the expansion at Wallingford has been implemented (adding 88 parking spaces along the line).

Station	Current Number of Spaces	Current Spaces Utilized	Proposed Number of Spaces 2001	Spaces Utilized 2005	% Utilized 2005 (vs 2001 SUPPLY)	Spaces Utilized 2020	% Utilized 2020 (vs 2001 SUPPLY)
ELWYN	217	210	217	243	112%	274	126%
MEDIA	269	263	269	297	110%	336	125%
MOYLAN-ROSE VALLEY	149	142	149	155	104%	166	111%
WALLINGFORD	66	66	154	96	62%	99	64%
SWARTHMORE	249	249	249	265	106%	275	110%
<i>Subtotal Fare Zone 3</i>	<i>950</i>	<i>930</i>	<i>1,038</i>	<i>1,056</i>	<i>102%</i>	<i>1,150</i>	<i>111%</i>
MORTON-RUTLEDGE	171	169	171	172	101%	176	103%
SECANE	40	40	40	40	100%	40	100%
PRIMOS	118	118	118	118	100%	119	101%
CLIFTON-ALDAN	146	146	146	146	100%	146	100%
GLADSTONE	108	93	108	93	86%	93	86%
LANSDOWNE	127	115	127	115	91%	115	91%
<i>Subtotal Fare Zone 2</i>	<i>710</i>	<i>681</i>	<i>710</i>	<i>684</i>	<i>96%</i>	<i>689</i>	<i>97%</i>
TOTAL	1,660	1,611	1,748	1,740	100%	1,839	105%

Without parking expansion at the Elwyn Station, utilization for parking at the 11 regional rail stations along the line will reach 100 percent of capacity by the Year 2005.

PARKING EXPANSION AT WALLINGFORD (PASSENGER SURVEYS)

A more refined investigation into parking conditions surrounding the Wallingford Station was also undertaken as part of this study. Parking preferences were

ascertained through passenger surveys expressly conducted for the study at the Moylan-Rose Valley, Wallingford and Swarthmore stations in October 1998.

The survey's results indicated a demand for 104 additional parking spaces at Wallingford to accommodate the volume of people who would divert from adjacent stations and/or would change mode of approach to the Wallingford Station as a consequence of a parking expansion provided there. Conversely, the Parking Program proposes to build a new lot with only 88 parking spaces. Table 16 summarizes the findings of the survey work.

Station	Current Number of Spaces	Current Spaces Utilized	Proposed Number of Spaces 2001	Incremental Effects of Wallingford Parking Expansion	Parking Utilization After Expansion 2001	% Utilized 2001
MOYLAN-ROSE VALLEY	149	142	149	- 28	114	77%
WALLINGFORD	66	66	154	+ 104	170	110%
SWARTHMORE	249	249	249	- 46	203	82%
TOTAL	464	457	552	+ 30	487	88%

A more complete description of the passenger effort, including its findings and effects, are provided in APPENDIX II of this report.

EXTENSION TO WAWA

Substantial growth in rail ridership and station parking demand is forecast in fare zone 3. Opportunities to accommodate that growth are limited. To address a possible solution, SEPTA asked DVRPC to estimate the parking effects of re-activating the R3 Line from its terminus at Elwyn to a terminal location at Wawa.

The proposed Wawa Station is situated three miles west of the Elwyn Station, just south of the rail line's crossing of Baltimore Pike (US 1), at the Middletown Township / Chester Heights Borough line. The R3 Line's extension, previously studied by SEPTA⁸, is envisioned without intervening stations between Elwyn and Wawa, and with a 414 space parking lot constructed to support the Wawa Station.

⁸ Source: *Elwyn - Wawa Service Restoration Project Report* (SEPTA, July 1992).

Table 17 shows estimates of "parkers" who would shift to the Wawa Station if the line and current service levels were extended from Elwyn by the Year 2020⁹. The basis of the estimate is a sum of likely municipal diversions — from the parking projections at Elwyn, Media and Moylan-Rose Valley without the extension (i.e., per Table 14). The Wawa Station estimates assume consistent fare and service levels with those offered at the Elwyn, Media and Moylan-Rose Valley stations and 100 percent diversion of "parkers" from the Elwyn, Media and Moylan-Rose Valley station sheds, for the following municipalities.

<u>CHESTER COUNTY</u>		<u>DELAWARE COUNTY</u>
Birmingham	New Garden	Aston
East Bradford	Pennsbury	Chadds Ford
East Goshen	Pocopson	Chester Heights
East Marlborough	Thornbury	Concord
Kennett Square	West Chester	Thornbury
Kennett Twp	West Goshen	
Westtown		

As shown on Table 17, 388 parked cars are projected to utilize the Wawa Station in the Year 2020. The estimated number of parkers at Wawa represents a 94 percent utilization of the proposed supply of 414 parking spaces.

	Station			
	Wawa	Elwyn	Media	Moylan-Rose Valley
SPACES UTILIZED WITHOUT EXTENSION (YEAR 2020)	---	306	336	166
ESTIMATED PARKED VEHICLES DIVERTED TO WAWA	388	176	171	41
PROPOSED NUMBER OF PARKING SPACES AT ...	414	357 ¹⁰	269	149
PARKED VEHICLES REMAINING AT ...	-	130	165	125
PARKING SPACES REMAINING AVAILABLE AT ...	26	227 ¹¹	104	24

⁹ Note that the R3 Line service extension to Wawa is currently contained in the long range portion of SEPTA's Capital Budget.

¹⁰ If the proposed 140 space parking expansion at Elwyn is not undertaken, the existing supply of 217 spaces will be the amount of parking available to serve future demand at the station.

¹¹ Without the Elwyn parking expansion, 87 parking spaces are estimated to remain available at the station, after the line is extended to Wawa.

It is estimated that 74 percent of the parking utilization projected at the Wawa Station will be attributable to existing riders. Conversely, 26 percent of the parking will be attributed to new ridership anticipated from the population growth forecasted within the Elwyn, Media and Moylan-Rose Valley station sheds. The extension to Wawa will yield parking surpluses at the next three inbound stations — providing SEPTA more opportunity to grow its business. □

6 CONCLUSIONS / RECOMMENDATIONS

Based upon the foregoing parking demand analysis along the R3 Media / Elwyn Rail Line, the following conclusions and recommendations have been reached.

1. From a practical viewpoint, the entire supply of parking spaces along the R3 Line is fully utilized (96% parking utilization rates in fare zone 2, and 98% in fare zone 3).
 2. The proposed Parking Program for the line (by SEPTA / PennDOT) is anticipated for operation in 2001. It will add 140 parking spaces at Elwyn and 88 spaces at the Wallingford Station. Both stations are in fare zone 3. These expansions will provide sufficient additional supply to ease parking constraints encountered in fare zone 3 through the Year 2005. By the Year 2020, however, parking supply will be 100 percent utilized.
 3. If the Elwyn Station's parking lot is not expanded, full utilization of parking within fare zone 3 will occur before the Year 2005.
 4. The Parking Program does not adequately address parking needs within fare zone 2. On the other hand, SEPTA is actively exploring opportunities for additional surface parking lots in fare zone 2, notably in the vicinity of the Primos Station.
 5. By the Year 2020, even with the Parking Program in place, estimated parking utilization rates in fare zone 3 will be 100 percent. In order to effect a long term improvement within the fare zone, SEPTA should actively investigate additional opportunities for surface or structure parking at the existing stations or extend the line to a new terminal park-and-ride station located at Wawa.
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APPENDIX I RAIL STATION ACTIVITY ASSIGNMENT MODEL

This section serves as a guide to the Rail Station Activity Assignment Model (RSAAM) as it was applied in the SEPTA R3 Media / Elwyn Rail Line Parking Demand Study (DVRPC, May 1999).

Foremost, it is important to keep in mind that the Model's predictive ability is best at a sketch planning level, and that its most important output / indicator is percent change(s) in station activity between alternatives or scenarios. The calculated changes in station activity levels between scenarios, from the Model, are ultimately applied to actual station parking levels — to forecast future parking utilization.

ADDRESS MATCHING COMPONENT

Addresses obtained as part of the customer and license plates surveys, conducted at the R3 stations in 1995 and 1996, were "matched" with the appropriate municipality. Table 7, in the report's main body, indicates the actual relationships between residences and stations as tabulated from those surveys. Positively linking the rider's origin municipality and boarding station, in correct proportions, provides the foundation of the Model. Accurately defining the station shed area allows future demographic conditions, within the shed, to be accounted for in estimating future station parking activity levels.

The following examples are given, using Table 7, as a means of explaining the exhibit and its importance in the Model. At the Media Station 169 surveyed parked cars were capable of being "addressed matched" to specific municipalities, 21 (or 12.4%) originated in Concord Township and 28 (or 16.6%) came from Middletown Township. Another example: most of the surveyed parked cars in the study corridor originated in Middletown Township (113 addresses matched), the largest share of the Middletown's parkers use the Elwyn Station (51 responses).

The information contained within Table 7 has the following ramifications for the Model:

1. The number of matched license plates serve as surrogates for present rail station parking utilization (i.e., base conditions);
2. The rates of forecasted municipal growth within each station's shed area is applied in proportion to the number of parkers at the station -- yielding a weighted average of growth for the station.

CALIBRATING LATENT DEMAND

This step calibrates the Model for the effects of parking expansions which are proposed by the year 2001 along the R3 Line. Latent demand for parking space is based upon historical parking lot count data along the line. Actual before-and-after parking supply / utilization changes are replicated within the Model to estimate latent demand. The Model is "calibrated" when it computes the actual or appropriate change in station parking utilization between the "before" and the "after" parking expansion scenarios.

The municipal latent demand factors, which when applied within the study area yield a calibrated model — are shown in Table 10 in the main body of the report.

ESTIMATING FUTURE LATENT DEMAND

In applying latent demand factors, the Model estimates the immediate effects that the Parking Program — expansions proposed by SEPTA and PennDot — will have upon parking demand at the Elwyn and Wallingford stations. Table 11, in the report's main body, is the worksheet for this exercise. It uses the contents of Table 7 as inputs for the current parking situation at the stations (see the third column in Table 11). The municipal latent demand factors, shown in Table 10, are applied to base year assigned parking levels for the stations proposed for expansion. Table 11's last column illustrates the resulting modeled station parking levels at Elwyn and Wallingford — responding to the proposed parking expansions.

Upon completion of the parking expansion program in 2001, the following changes in station activity are projected in the model:

1. Elwyn + 26 "parkers" (+ 15.3% in assigned station parking);
2. Wallingford + 16 "parkers" (+ 29.6% in assigned station parking).

ESTIMATING FUTURE GROWTH

Future ridership and/or station parking growth, for the years 2005 and 2020, is guided by changes reflected in DVRPC's municipal population and employment forecasts¹² averaged with modeled transit work trip making in the study area. Worksheets summarizing the effects of forecasted growth are included in the main body of the report: Table 12 for Year 2005 conditions, and; Table 13 for the Year 2020 scenario.

¹² Source: 2020 Zonal Population and Employment Forecasts, Report 25 - Direction 2020 (DVRPC, April 1995).

Inputs to both worksheets are shown in the third column of the respective table and reflect the assigned station parking levels after parking expansions are implemented at the Elwyn and Wallingford stations (i.e., the last column in Table 11). The fourth column of each worksheet shows the forecasted parking growth contributed by each municipality within the station shed. The last column reflects the total assigned municipal parking demand for the Year 2005 (Table 12) and the Year 2020 (Table 13) within the station shed. Columns four and five, in Tables 12 and 13, are the outputs of the Model — accounting for appropriate growth and latent demand where applicable¹³.

The appropriate station growth factors are weighted in-line with growth forecasted within the station shed, and are calculated from changes in the assigned total station parking demand values between those shown in the third column of Table 11 to those shown in the last column of Table 12 (for 2005) or Table 13 (for 2020). These station factors are subsequently applied to the actual number of spaces utilized at the station to reflect Year 2005 and Year 2020 station parking utilizations.

For example, at Elwyn there is a 31.1 percent increase between base year assigned station parking levels (170) and the estimated Year 2005 assigned parking level indicator (223). The 31.1 percent increase is subsequently applied to current space utilization at Elwyn (210 spaces, shown in Table 14) to yield the forecast of spaces utilized in the Year 2005 (275). Similarly, at the Media Station, Year 2020 assigned station parking levels from the RSAAM are 27.8 percent above the assigned base year utilization (216 ÷ 169). That growth applied to current parking demand at Media yields the forecasted parking utilization of 336 spaces in the Year 2020 (shown in Table 14).

The forecasted parking demands, summed at the fare zone level, are compared with the supply of parking provided by the Year 2001 (i.e., the expected supply after the expansions proposed within the Parking Program the R3 Line are implemented). □

¹³ The term "Trend" is used in the title of these columns because the growth in station activity is based upon trends exhibited in the forecasted 2005 and 2020 demographics.

APPENDIX II PASSENGER SURVEY EFFORT

In October 1998, passenger surveys were conducted at the Moylan-Rose Valley, Wallingford and Swarthmore regional rail stations. The surveys were completed in conjunction with the preparation of the R3 Media / Elwyn Rail Line Parking Demand Study. Passenger surveys were administered to inbound riders during the morning peak period as means of determining existing parking preferences at the stations and to quantify the demand for the proposed parking lot expansion at the Wallingford Station.

Other information was also ascertained through the surveys. This included determining travel and parking characteristics of commuters using the stations, and station area improvement suggestions from the customers.

The following significant findings emanated from the tabulation of 466 passenger surveys administered at the Moylan-Rose Valley Station (120 respondents), the Wallingford Station (118 respondents) and the Swarthmore Station (228 respondents).

- 1) The overall response rate represented 58 percent of the morning peak period inbound boardings for the stations (inbound peak period ridership for these three stations average 75% of the daily inbound boarding volume).
- 2) Arrival mode varied dependent upon options available at the station.

MODE SPLIT OF ARRIVING PASSENGERS

<u>STATION</u>	<u>MODE OF ARRIVAL</u>	<u>%</u>
Moylan-Rose Valley	drive	79
	drop-off	8
	walk	13
Wallingford	drive	50
	drop-off	25
	walk	25
Swarthmore	drive	58
	drop-off	9
	walk	26
	bus (SEPTA 109)	4
	carpool	1
	bicycle	2

- 3) Information regarding the customer's trip origin (residence), obtained through the surveys, confirm the station sheds identified through the license plate surveys conducted in the Parking Demand Study (i.e., listed in Table 7, and illustrated on Figure 2 in the main body of the report).
 - 4) Wallingford's parking demand would increase by 104 parked cars, as documented through the AM peak period passenger survey. The composition of the demand is as follows.
 - a) 28 parkers will divert from Moylan-Rose Valley Station.
 - b) 30 customers who presently patronize the Wallingford Station (including walkers - 6, drop-offs - 15, and off-site parkers - 9), will continue to do so, but will drive to the expanded parking facility. These will be new parkers for SEPTA.
 - c) 46 parkers will divert from the Swarthmore Station.
 - 5) Sixty four percent of the present riders who indicated they would park at a new lot at Wallingford are residents of Nether Providence Township. Another four percent are residents of Rose Valley Borough.
 - 6) Station area improvement suggestions, emanating from the survey of the customers, are listed below.
 - a) Sidewalk improvements in the vicinity of the Moylan-Rose Valley and Wallingford stations were the most often cited improvements identified by customers using those stations.
 - b) Improved station area lighting was also a priority at Wallingford.
 - c) Instituting express train service to the Swarthmore Station was the most frequently offered improvement of customers at that station.
-