CHESTER VALLEY BRANCH JOINT USE STUDY

August 1990





Delaware Valley Regional Planning Commission

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Delaware Valley Regional Planning Commission The Bourse Building 21 South 5th Street Philadelphia, Pennsylvania 19106 This report, prepared by the Transportation Planning Division of the Delaware Valley Regional Planning Commission, was financed in part by the Federal Highway Administration, and the Pennsylvania Department of Transportation. The authors, however, are solely responsible for its finding and conclusions, which may not represent the official views or policies of the funding agencies.

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DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

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ABSTRACT

This report examines the possibility of using an underutilized rail corridor for joint use. The corridor will continue to be used for the delivery of goods to the Philadelphia Electric Company's King of Prussia Substation and would also be used to relieve traffic in the area, particularly on US 202. Relief could come by providing a bypass for high occupancy vehicles or by the provision of improved transit service for the area.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1			
1		3	
	Background	3 4 4 4	
2	HOV ROADWAY	5	
	HOV facilitiesHOV King of Prussia BypassCross sectionSigningComplementary projectsPotential users10Time savings11Related options	56778012	
3	TRANSIT LINE 1 Cross County Metro 1 Some transit options 1 [1] Rail collector-distributor 1 [2] Bus collector-distributor 1 [3] Freight operation 1 [4] Cross-County Metro 1	3 344556	
4	CONCLUSIONS 1	9	
	Summary of findings 1 Next steps 1	9 9	

FIGURES

Ι	PECO Right-of-Way
II	Proposed HOV Roadway
III	Cross Section
IV	Typical Sign for the HOV Roadway
V	Rail Collector-Distributor
VI	Bus Collector-Distributor
VII	Freight Operation on the PECO Right-of-Way 16
VIII	Cross-County Metro on the PECO Right-of-Way 17

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EXECUTIVE SUMMARY

In recent years traffic has grown on US 202 in the vicinity of King of Prussia so that severe congestion is a frequent occurrence, especially during peak commuting hours. Studies have been conducted on ways to relieve this congestion and have focused on increasing the capacity of the road through widening and reducing demand through the promotion of transportation management techniques such as carpooling, transit improvements and staggered work hours. Most recently, studies have been mounted to examine the potential of incentives for using high occupancy vehicles (HOVs), including exclusive travel lanes and metering of ramps with bypass lanes for HOVs.

Transportation planners working in the area have known for some time of the existence of the Chester Valley Branch, an under-utilized rail right-of-way which parallels US 202. Prior to the study described in this report, no analysis has been conducted of the potential uses of this right-of-way for the purpose of relieving traffic conditions on US 202. This report takes a exploratory look at use of the right-of-way as an HOV roadway and as an exclusive transit way.

The eight-mile section of the Chester Valley Branch near King of Prussia is currently owned by the Philadelphia Electric Company (PECO) and is essential for the delivery of transformers to their King of Prussia substation. This purpose must be preserved and so any new service provided will create a joint use.

The HOV facility described herein is a two-directional roadway using almost all the PECO-owned right-of-way with extensions to link the roadway to US 202 at both ends. The only intermediate interchanges would occur at US 422 and I-76 (to and from the east). The roadway would be part of an HOV system which would also include exclusive (diamond) lanes in the part of US 202 to the west of the HOV roadway junction to the proposed Exton Bypass Interchange. Similarly, extensions of diamond lanes in US 422 north to First Avenue and in I-76 east to the I-476 interchange would be included. Ramp meters with HOV bypass lanes would be installed at many of the interchanges feeding the diamond lane sections.

Four transit options are discussed in the report. All assume the existence of SEPTA's proposed "Cross County Metro" (CCM), a light rail line on Conrail's Trenton Cutoff operating between Exton and Morrisville. Briefly, the options include [1] a light rail collector-distributor making local stops and connecting with the CCM and the Norristown High Speed Line, [2] a similar bus collector-distributor which could be extended on existing highways, and [3] use of the Chester Valley Branch for the CCM itself. The fourth option is to direct all freight traffic onto the Chester Valley Branch in order to allow exclusive passenger operations on the Trenton Cutoff right-of-way in the King of Prussia area.

The major conclusion of this preliminary analysis is that the Chester Valley Branch provides a unique opportunity to create additional capacity to move people through the King of Prussia area. Exclusive use of the right-of-way for transit is probably not advantageous without the presence of the Cross County Metro. Inasmuch as the CCM is unlikely to be constructed in the near term, use of the corridor for HOVs is a more practical approach to helping relieve congestion on US 202. If analyses demonstrate that sufficient traffic will use the facility, further study of the option, including alignment, geometrics and costs should be conducted.

In either case, PennDOT should take steps to acquire rights to the right-of-way now to assure that this asset will not be lost to the region. Challenges are currently being made to PECO's rights to the corridor by landowners who cite PECO's rare use of the line constitutes abandonment.

1 INTRODUCTION

Background

The former Chester Valley Branch of the Reading Railroad connected the Reading main line at Bridgeport with the former Pennsylvania Railroad main line at Downingtown, serving shippers in the Great Valley. The branch became a part of Conrail when the Penn Central (successor to the Pennsylvania) and the Reading were merged to form the new company. The Philadelphia Electric Company now owns the mid-section of this branch, which is referred to as the PECO right-of-way in this report. The PECO right-of-way and nearby portions of the former Chester Valley Branch is shown in Figure I.

Figure I: PECO Right-of-Way



Conrail sought to abandon a part of the branch between Cedar Hollow Junction in Tredyffrin, where another branch to Devault joins the line, and Henderson Road in Upper Merion. The only customer in this segment was the Philadelphia Electric Company (PECO), whose use of the line was infrequent. Although seldom used, the line is essential to PECO to deliver and remove transformers at its King of Prussia substation. To protect its access to the line, PECO acquired the line from Conrail.

PECO's right-of-way is approximately 7.8 miles long. The width is generally 66' throughout, with minor widenings and narrowings. A single track, assumed to be centered in the cross section, runs the length. The track west of the King of Prussia substation is used by PECO to haul the large transformers. This operation involves removing a section of bridge carrying Contention Lane over the track. East of the substation, the track is in place, but no use is made of it. The track ends just short of Henderson Road, where it is broken to accommodate a new underpass for Henderson beneath Conrail's Trenton Cutoff.

The PECO right-of-way is parallel to US 202 throughout its length. Traffic has increased rapidly in recent years as development, particularly offices, has been attracted to the corridor. Average annual daily traffic is now about 90,000 just west of the US 422 interchange. This is forecast to increase further to about 110,000 in the year 2010, even if no further improvement to US 202 is made. The need to accommodate this growth and to eliminate the considerable delays common today has led transportation planners to look for opportunities, both on and off US 202, to relieve the congestion. The PECO right-of-way is one asset which may be tapped for this purpose.

Joint Use Concept

The basic proposal is to adapt the corridor for joint use—that is, to continue its use by PECO to serve the substation, and to help alleviate traffic congestion in the King of Prussia area. Two concepts are described in this study: (1) a roadway for the exclusive use of "high-occupancy vehicles (HOVs)," and (2) a transit right-of-way. In the case of the HOV facility, transformers would be transferred to truck at the Cedar Hollow terminus of the Conrail line. If utilized as a rail line, the rail would need to accommodate an engine and flat bed car suitable for hauling the transformers from Cedar Hollow to a spur track at the substation. PECO has expressed a willingness to entertain proposals which will be helpful to the community without eliminating essential access to the transformer site.

Study objectives

Each of these options is described in greater detail in the following sections. Complementary projects which will enhance the use of the option are also described. Advantages and disadvantages, to the extent that they can be known, are also described. Although it is not within the scope of this study to estimate the use of the proposed facilities and the impact they would have on the volumes on the existing or improved US 202, estimates have been included of the <u>potential</u> market and the time savings which can occur for the HOV option.

Availability of the right-of-way

About 9% of the right-of-way is owned by PECO in fee. Of the remaining right-of-way, 8% was acquired by "quitclaim" in which the previous owner relinquishes all interest in the property, 27% was acquired through condemnation, and 56% was acquired through easements. The actual conditions placed on each conveyance have not been determined in this study. Nor, therefore, can the cost to the state to acquire the land for non-railroad use of the right-of-way be determined today. It will be lower if it is determined that PECO controls the right-of-way, and higher if the state is required to condemn property which has reverted to the original owners. Two challenges to PECO's right to the property have been raised. If PECO were to lose control of some of the property, the public costs to acquire the land may be significant. The particulars of the joint use proposal will determine the costs of maintenance for PECO, which will also affect the price.

The study will also not attempt to estimate the costs adapting the right-of-way for joint use. If one or both of the options appear to be feasible and beneficial, a second study may follow.

2 HOV ROADWAY

HOV facilities

The purpose of HOV facilities is to increase the person-trips that are accommodated by a highway while maintaining or decreasing the number of vehicle-trips. People are motivated to change from a single-occupant vehicle to a carpool or bus because of the advantage of speed which is afforded to the HOV.

There are several kinds of HOV facilities. The most common type is the concurrent flow lane, in which one lane of a multi-lane highway (usually the inside lane) is reserved for HOV's during at least a part of the day. Traffic is not physically separated and HOV's may flow into and out of the HOV lane at any point. Concurrent flow lanes will be cited as one of the complementary projects to the HOV roadway.

Contraflow lanes, in which the exclusive lane is taken from off-peak direction lanes for travel in the peak direction, can also be used for HOVs. An example is the Lincoln Tunnel approaches in New York in which one lane of the outbound roadway is used in the morning for buses travelling inbound to Manhattan. This technique is not appropriate in the US 202 corridor in the King of Prussia area because neither direction dominates in peak hour volumes.

Exclusive HOV facilities within the right-of-way of the freeway are physically separated from general traffic lanes by barriers. These facilities may be reversible and open during only part of the day. Pittsburgh has recently opened such a facility on I-579, connecting the northwest suburbs with downtown.

This study examines a fourth type of HOV facility in which HOV's are accommodated on a roadway built on a separate right-of-way. To date, the only such roadways are restricted to buses. Notable examples are found in Pittsburgh and Ottawa.

HOV facilities can be effective. Perhaps the best known and most often cited example is the Shirley Highway in northern Virginia. In the 7:00 to 8:00 AM peak period, the single HOV lane carries almost 200 buses and over 2000 cars and vans at an average occupancy of 7.5. 18,500 persons are carried in the HOV lane. In contrast, the general purpose lanes carry an additional 8000 vehicles, but only 10,000 persons. Vehicle occupancy in the general purpose lanes is 1.25.

To attract users, the HOV needs to offer a significant time savings over travel in the general purpose lanes. According to ITE's <u>A Toolbox for Alleviating Traffic Congestion</u>, HOV facilities have reduced travel times by an average of six percent over the times experienced prior to implementation. They have also reduced the vehicle miles of travel in the corridor by five percent. The reduced number of vehicles will have a positive effect on other highways used to access the facility as well as reducing emissions responsible for ozone violations common in large metropolitan areas.

Although three persons is the usual minimum requirement for number of occupants, some facilities allow two. The requirement should allow for growth in the number of users, while maintaining the speed advantage over the general lanes.

HOV King of Prussia Bypass

This concept entails use of the PECO right-of-way to accommodate a new two-lane highway to be reserved for buses and carpools and vanpools. Figure I shows the extent of the roadway and its interchanges with existing highways. Two lanes built in the median of US 202 east of the PA 29 interchange would flow into a flyover structure which would span the eastbound regular traffic lanes and would descend onto the PECO right-of-way. This connection would lie on land now vacant and would depart from US 202 just west of the Cedar Hollow overpass; it would then pass over Cedar Hollow Road and the Conrail Devault Branch before merging with the PECO right-of-way. The roadway would then continue eastward to the Schuylkill Expressway. Another flyover structure would span the Trenton Cutoff and the eastbound I-76 lanes and descend to the Schuylkill Expressway (I-76), where they would become the two inside lanes. Additional lanes would be built on the existing shoulders so that two general use lanes will be continuous.



Figure II: Proposed HOV Roadway

Two extensions to this basic roadway are also proposed. The first is a continuation of the roadway on the PECO right-of-way east of the Schuylkill Expressway to Henderson Road. The roadway would continue on the alignment of the present Conrail owned right-of-way east of Henderson Road. The road would then merge with US 202 just to the west of the DeKalb Street interchange. In this way it would be possible for occupants of an HOV to travel without traffic signals (except at DeKalb Street) from the West Chester and Downingtown bypasses to Norristown via the Dannehower Bridge. The congested US 202 arterial section in King of Prussia would be bypassed altogether.

The second opportunity for extending the system would be to build a complete interchange between the HOV roadway and US 422, the Pottstown Expressway. The HOV ramps would enter the median of US 422. This last extension would permit drivers entering the HOV system at any of the other three points to exit onto US 422 and access the considerable employment centers in King of Prussia, and the Trooper Road and the Pottstown Expressway corridors, and vice versa. This alternative would require that the short section between US 422 and I-76 be two lanes by direction.

It is assumed that the HOV facility would be closed during at least a part of the day. It would be open during morning and afternoon peak periods. In addition, it may also be open during the midday period between the peaks and in the evening when the major shopping centers are open. Being closed at least from 10 PM to 6 AM, and open only to cars and buses, the facility will minimize the impact upon nearby residences.

Cross section

The proposed cross section shown in Figure II would be symmetrical about the center line of the right-of-way. In the center would be a four-foot wide rumble strip separately the traffic by direction. On either side would be a 13-foot cartway carrying traffic in each direction in a single driving lane. A 10-foot paved shoulder (breakdown lane) would lie outside each driving lane. Eight feet of right-of-way would remain on each side, which to the greatest degree possible would be occupied by plantings.



Figure III: Cross section

Signing

Signing must be carefully designed for the benefit of infrequent users, inasmuch as the HOV roadway will not permit the driver to exit at the same interchanges available to the driver on the regular roadway. One solution is that the HOV roadway be given its own designation as US 202 BYPASS. Figure III shows how the message would be presented in an overhead sign prior to the entrance to the western end, that is, northbound on US 202.



Signs at the other three major entrances would read:

on US 202 southbound: 202 BYPASS/TO 422 WEST;

on I-76 westbound: TO 422 WEST/TO 202 BYPASS SOUTH; and

on US 422 eastbound: TO 202 BYPASS NORTH-SOUTH/76 EAST.

Complementary projects

To make the HOV roadway effective to the maximum extent, there are several opportunities to include complementary projects. The first and most important, is the extending of exclusive HOV lanes through the designation of concurrent flow lanes in adjacent sections of freeway. At the western end of the HOV roadway, two additional lanes would be built in the existing median of US 202 between the merge with the HOV roadway and the interchange with the proposed Downingtown Bypass. Similarly, the Schuylkill Expressway could be widened to three lanes by direction to the interchange with the Blue Route (I-476). Again, the inside lane in each direction would be a "diamond" lane, the usual designation for a lane reserved for high occupancy vehicles. Finally, some portion of US 422 could accommodate two additional lanes which would be reserved for HOVs. These new lanes might extend only as far as the Turnpike overpass, where bridge supports prevent use of the median for additional lanes, or to the Betzwood Bridge if the Turnpike overpass were to be reconstructed.

The HOV roadway together with the concurrent flow HOV lanes would yield the following total mileage on the HOV system for the five routes which use the PECO right-of-way:

Route	PECO R-O-W	Diamond Lanes	TOTAL
Exton Bypass to Betzwood Bridge	6.5	5.7	12.2
Exton Bypass to DeKalb Street	9.3	4.4	13.7
Exton Bypass to Blue Route	7.1	8.0	15.1
Betzwood Bridge to DeKalb Street	4.0	1.3	5.3
Betzwood Bridge to Blue Route	1.8	4.9	6.7

Exclusive HOV facilities, such as the portion of the system which would exist on the PECO right-ofway, make enforcement relatively easy. Diamond lanes, however, because of the ability to quickly switch to general purpose lanes, are more difficult. Consequently, cheating is common on diamond lanes and almost non-existent on exclusive HOV roadways.

In addition to the diamond lanes, there are some other projects which may complement the system. One of these is ramp metering with bypass lanes for HOV vehicles. Ramp metering uses a modified traffic signal at the foot of a freeway access ramp to control access onto the freeway. In some cases the lights are pretimed and in others they are actuated by gaps in the traffic in the outside freeway lane. Delays on the ramp encourage some drivers to use other facilities. In addition, traffic on the freeway is subject to fewer delays and greater safety, thereby increasing average speeds. Bypass lanes for HOVs, which are not subjected to the signal will create an incentive for motorists to form carpools.

The potential locations for ramp meters with HOV bypass include all of those interchanges on freeways where there are diamond lanes and on sections of freeways beyond the diamond lanes which take traffic toward the HOV system. In particular:

US 30 (Exton Bypass)/PA 100 (EB only) US 30/US 202 (EB only) PA 29/US 202 I-76/PA 320 (WB only) I-76/PA 23 (WB only) I-76/Belmont Avenue (WB only) US 422/PA 23 (EB only) US 422/PA 363 (EB only)

With the cooperation of the Pennsylvania Turnpike Commission, an advantage may be given to Turnpike HOV riders. The King of Prussia TMA has proposed that certain carpools be permitted to charge tolls to their employers. This might be combined with a proposal to establish special lanes for carpools in which delays for HOV users could be minimized.

Park and ride lots could be established for the purpose of forming carpools. In all cases, the lots may be used for transit as well. In this way, some of the poolers may have the opportunity of making the same trip by transit, thereby providing a backup (in some areas) in the event the carpool does not operate or is missed. Among the locations which might be considered are:

Exton Bypass at PA 100 (which could also serve R5 trains and 92 buses),
US 30 and US 202 (which could also serve 92 buses),
PA 29 and US 202 (which could also serve 206 buses),
PA 320 and I-76 (which could also serve 100 trains, 124 and 125 buses),
I-476 and US 30 (which could also serve 100 and R5 trains),
PA 23 and US 422 (which could also serve 99 buses),
PA 23 and US 202 (which could also serve 100 trains, 95 and 99 buses), and
Norristown Transportation Center (which could also serve 100 and R6 trains, 91, 93, 96, 97, and 98 buses).

Additional small lots might be adjacent to the HOV roadway. Buses or carpools could pickup or discharge passengers at pulloffs on the HOV, but there would be no interchange of vehicles with the local roads. The Westlakes development, for example, could be served in this way.

Potential users

The DVRPC simulation for the Year 2000 was queried to determine the number of vehicles which could potentially use the HOV system. In the list below are shown the number of vehicle trips which are forecasted to pass points just before the entrance to the HOV system and which also pass points on the highway just past the merge with the regular roadway. It is not known how many of these drivers would choose to carpool if the HOV roadway and lanes were to be put into place.

	From	То І	Daily Volume
1a	US 202 SB north of Henderson Road	US 202 SB north of PA 29	5,700
1b	US 202 NB north of PA 29	US 202 NB north of Henderson Ro	ad 5,700
2a	US 422 EB south of First Avenue	I-76 EB south of US 202	13,600
2b	I-76 WB south of US 202	US 422 WB south of First Avenue	10,200
3a	US 202 NB north of PA 29	I-76 EB south of US 202	15,000
3b	I-76 WB south of US 202	US 202 SB north of PA 29	13,000
4a	I-276 WB between PA 9 and I-476	US 202 SB north of PA 29	6,700
4b	US 202 NB north of PA 29	I-276 EB between I-476 and PA 9	6,200
5a	US 422 EB south of First Avenue	US 202 SB north of PA 29	7,300
5b	US 202 NB north of PA 29	US 422 WB south of First Avenue	7,400

Time Savings

A comparison was made between travel times on the HOV system (assumed to occur at the speed limit of 55 MPH) and actual driving times made during current peak periods. For example, for a trip between the US 30/US 202 interchange and the I-76/I-476 interchange, the following comparison can be made for the afternoon peak period:

System	Eligible peak hour volume*	Distance (miles)	Driving time (minutes)	Speed (mph)
Current	1,350	15.5	21	46
HOV	1,350	15.1	16	55

*Peak hour factor (K) is 9% of daily volume

The savings of five minutes represents a decrease of 23% driving time on the system or a 17% savings in a 30-minute commute. In the reverse direction, the following comparison applies, resulting in a slightly greater savings of time:

System	Eligible peak hour volume*	Distance (miles)	Driving time (minutes)	Speed (mph)
Current	1,170	15.7	22	43
HOV	1,170	15.1	16	55

*Peak hour factor (K) is 9% of daily volume

Very little savings are found during the morning period for eastbound traffic, which moves more efficiently. In the morning westbound direction, the savings are modest, about two minutes.

The most impressive reduction of driving time in terms of minutes saved is in the trip from US 30/US 202 to the US 202 and DeKalb Street intersection in Bridgeport in the afternoon peak hour:

System	Eligible peak hour volume*	Distance (miles)	Driving time (minutes)	Speed (mph)
Current	510	13.6	24	34
HOV	510	13.7	15	55

*Peak hour factor (K) is 9% of daily volume

This nine minute savings represents a 38% reduction in driving time and a 31% reduction on a 30minute commute. Lesser, but still substantial, savings occur in the other direction. Even in the morning when no shopping traffic is encountered, the HOV system reduces travel times by 12%.

Finally, the greatest savings in terms of percent reduction over current driving times is the US

System	Eligible peak hour volume*	Distance (miles)	Driving time (minutes)	Speed (mph)
Current	1220	6.3	15	27
HOV	1220	6.2	7	55

422/First Avenue to I-76/I-476 trip in the afternoon peak hour. The profile of the savings here is:

*Peak hour factor (K) is 9% of daily volume

Driving time on the system is about cut in half and results in a 25% reduction in driving time on a 30-minute commute.

Other combinations of entrances and exits and peak periods also offer some savings in time. It should be noted that all of these times savings may be made greater with the addition of ramp meters with HOV bypass lanes at congested interchanges.

Related options

It would be reasonable to restrict use of the HOV system to buses and passenger cars and vans carrying three or more persons. Sufficient time needs to be allowed for travelers to make arrangements before the system reaches its maximum efficiency. Should the HOV facility not achieve the desired level of use, occupancy requirements could be reduced to two. As a last resort, the system could be limited to buses and passenger cars of any occupancy, creating additional capacity during peak periods of the day.

3 TRANSIT LINE

The second option examined in this study is that of development of a transit-only option, presumed to be a light rail line, although some alternates to this basic idea are also presented.

Cross-County Metro

Although the Southeastern Pennsylvania Transportation Authority (SEPTA) lacks an officially adopted long-range plan, the transit authority has made frequent mention of the development of a "Cross County Metro," here referred to as the "CCM". The concept is appealing because of the existence of Conrail's Trenton Cutoff, on which right-of-way the CCM would lie. This high-speed rail line links the Amtrak Philadelphia-Harrisburg line at Frazer and the Amtrak Northeast Corridor Line at Morrisville and bypasses the City of Philadelphia. It parallels the Pennsylvania Turnpike, even running alongside it near Swedesburg and again from Fort Washington to Bryn Athyn. Conrail's use of this line has declined in recent years, creating the possibility of joint use.

This right-of-way is a rare and valuable asset to the region. It is very wide, with gentle curves and inclines, and completely grade-separated. Two tracks of heavy, welded rail are in place. At one time the line was electrified, and the upright structures to carry power lines and catenary are still in place. It passes through suburban areas which have developed rapidly in the last forty years. The proximity of the Turnpike has made the areas around interchanges attractive to commercial, office and industrial use. The CCM would link all of these areas. Moreover, the CCM will cross many of SEPTA regional rail lines, as well as the Route 100, the Norristown High Speed Line. From west to east, the line could make the following connections:

at Exton, the R5; near King of Prussia, the Route 100; near Norristown, the R6; at Fort Washington, the R5; at Willow Grove, the R2; at Southampton, the R8; at Oxford Valley, the R3; and at Trenton, the R7.

The CCM will provide the opportunity to transfer among these lines, without the necessity of travelling to Center City, as well reach destinations along the corridor.

Inasmuch as regional rail service is relatively infrequent, the CCM must offer frequent service so that wait times for transferring passengers can be minimized. This requirement suggests a small vehicle. The assumed design is that of the cars currently on order for the Norristown High Speed Line. These cars will carry sixty passengers in comfortable, wide cushioned seats. The cars will also be fast. They will offer a significantly more attractive vehicle than the current cars. Use of the Norristown design also permits an early stage of the CCM to operate as a spur of the Norristown line.

The existence of the CCM as described above is assumed in the following discussion.

Some transit options

Several options are possible which use the PECO right-of-way and which are consistent with SEPTA plans to establish the CCM. They are listed below followed by a discussion of their advantages and disadvantages.

[1] Rail Collector-Distributor: CCM-type trains could begin at Norristown Transportation Center with a connection to the R6 (see Figure IV), travel on the Route 100 right-of-way and stop at Bridgeport and King Manor where connection could be made with the Route 100 in the direction of 69th Street. Trains could then turn onto the PECO right-of-way alongside the CCM, making local stops to a new CCM King of Prussia Station near the shopping malls. The line would then continue on the PECO right-of-way which lies parallel to the CCM, but about 1/2 mile north. It may also be possible for the distributor to then turn southward, linking with the CCM at another station at Cedar Hollow. It may also be possible to extend the line farther to Paoli Station on the R5. A variation of this option could incorporate a spur of the Norristown High Speed Line: some (or all) trains from 69th Street could turn onto the PECO line north of Hughes Park station and make the same local stops as the collector-distributor and at the King of Prussia CCM Station. These Norristown Line Spur trains might then depart the PECO line and terminate at a station inside or adjacent to the Court and Plaza at King of Prussia. Spur tracks could connect the line with the Conrail Chester Valley Branch and the PECO substation at King of Prussia permitting rail access when necessary for large electrical equipment.

Figure V: RAIL COLLECTOR-DISTRIBUTOR



<u>Discussion</u>: This option represents the highest level of service of those offered. It could therefore expect to draw more passengers out of automobiles than any other option. It could also result in more dense development in the area surrounding stations, with mixed impact inasmuch as more traffic will be drawn to the highways as well. Between Cedar Hollow and Henderson Road, four new passenger tracks would be established: two "express tracks" carrying the CCM and two "local tracks" carrying the collector/distributor route(s). Connections are maximized and each line would benefit from the existence of the other.

Yet the investment required may not be justified by the potential ridership. Many residents and employees in the area will live or work beyond walking distance and will continue to prefer driving. All crossings of the PECO line will need to be grade-separated. The western end of the line, beyond Cedar Hollow, will need to ascend rapidly to meet the CCM and R5 lines. The three-way junction with the Norristown High Speed Line will be difficult to engineer, hemmed in as it is between the CCM and the Turnpike.

[2] Bus Collector-Distributor: In this option, the PECO right-of-way would be paved for use by buses (see Figure VI). The cross section of the roadway would be similar to the one shown in Figure II for a high-occupancy vehicle road. Ordinary streets could be used to connect the eastern end of the right-of-way with the Norristown Transportation Center and the western end with the Paoli Station. Similarly to the rail option, the line could serve stations on the CCM. The figure shows an assumption of stations on the CCM at Church Road near Yerkes (providing a connection to the Route 100), at King of Prussia (where shuttles can provide rapid access to the shopping and employment centers), and at Cedar Hollow (critical for bus connections serving the busway. The route could replace or supplement the Route 92 and could also serve other rerouted lines, such as the 124, or new lines.



Figure VI: BUS COLLECTOR-DISTRIBUTOR

<u>Discussion</u>: This alternative could be expected to be much less expensive than the rail collector-distributor Grade separations will not be necessary and continuing routes beyond the limits of the PECO line need not be on exclusive right-of-way. Buses can utilize only a part of the PECO line, or depart from it to serve a large trip generator. If justified, the route can be upgraded to rail service at some time in the future. On the other hand, if the busway fails to justify its operation, the right-of-way can be converted to a general purpose or HOV road, where it can help to increase overall capacity of the street system.

[3] Freight Operation: This is not a transit option for the PECO line, but a means of enhancing the operation of the CCM. The remaining freight service on the Conrail Trenton Cutoff would be rerouted onto the PECO line west of King of Prussia. This would permit the corresponding section of the Trenton Cutoff to be used exclusively for passenger service. Freight service on the PECO line would continue on the Conrail Chester Valley Branch eventually merging with the continuation of the Trenton Cutoff at Downingtown.

Figure VII: Freight Operation on the PECO Right-of-Way



<u>Discussion</u>: The exclusive use of the Trenton Cutoff for passenger travel allows a more amenable right-of-way for residential and office development adjacent to stations. Although the PECO right-of-way is inferior in terms of its geometrics, speed is not important on the route, and customers on the PECO line, including PECO itself, can be somewhat more assured of continuing service.

Nearby property owners, both residential and commercial, may object to the reinstitution of freight service on this line, however infrequent. There may also be a few customers on the Trenton Cutoff between King of Prussia and Glenloch whose requirements will need to be met. Although grade crossings of highways may be feasible, if trains are frequent or long, there may be a need to build bridges where high-volume roads intersect with the PECO line.

[4] **Cross-County Metro:** Finally, the option exists to operate the CCM on the PECO right-ofway west of King of Prussia instead of the Trenton Cutoff. In this case the western terminus of the CCM, and its connection with the R5, would be at Downingtown instead of Glenloch. The Trenton Cutoff would continue to serve as a freight line.

<u>Discussion</u>: Among the advantages to this option is the visibility which the CCM will enjoy due to being located for a good distance alongside of US 202. Potential users will have the superior speed and reliability visually demonstrated to them each time they use US 202. The PECO alignment also lies closer to more commercial and office development than does the Trenton Cutoff; therefore a larger number of people may use walking to access the line. To the west of the PECO line, the CCM would continue on the Conrail Chester Valley Branch until it merges with the Philadelphia-Harrisburg line. This alignment bisects the Churchill development on the Church Farm site in West Whiteland Township, and provides an opportunity to serve it well.

The disadvantage to this option is that great investment must be made in transforming the right-of-way into one which can accommodate two tracks, complete grade separation and electrification, all of which exist already on the alignment of the Trenton Cutoff.

Figure VIII: Cross-County Metro on the PECO Right-of-Way



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4 CONCLUSIONS

Summary of findings

- The PECO right-of-way provides a rare opportunity to create additional capacity to move people in an area which is experiencing significant congestion.
- The right-of-way will accommodate a two-lane highway or a two-track rail line, provided some additional land is acquired to accommodate grade separation from crossing streets.
- The highway option can be expected to cost less than any of the rail options due to the more extensive connections needed to be made at each end with rail.
- Under the assumptions that projections for traffic in this section of US 202 materialize, it is likely that the greatest increases in corridor mobility can be achieved by limiting the the use of the roadway to high-occupancy vehicles, including buses.
- HOV use of the right-of-way should be considered only in a system which includes complementary facilities such as diamond lanes and ramp metering with HOV bypasses.
- If an HOV roadway were to be constructed and fail to attract the desired proportion of total traffic, its use could revert to general automobile traffic, providing a by-pass to the King of Prussia area.
- Inasmuch as the right-of-way is new, it may be limited to certain kinds of traffic and to certain hours, without the perception that a privilege is being withdrawn.
- Exclusive use of the right-of-way for transit is probably not justified except in the case that the proposed Cross County Metro is constructed simultaneously.
- The cost of acquiring the right-of-way is indeterminate until the issue of ownership of the constituent parcels is determined.

Next Steps

- If traffic analyses demonstrate that sufficient traffic will use an HOV roadway, the option should be explicitly studied to determine alignment, geometrics and costs,.
- If the option of an HOV roadway is ultimately rejected, SEPTA should take steps to work with PECO to assure the right-of-way is protected from dissolution and available for future transit use.