FINAL REPORT

Track A Extension

Feasibility Study

Phase II

submitted to the

Cecil County
Office of Planning, Zoning & Parks

submitted by

Parsons Brinckerhoff
Baltimore, Maryland

in association with
Gallop Corporation
Remline Corporation
Rummel, Klepper, & Kahl, LLP
Sabra, Wang & Associates, Inc.

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TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

1 EXECUTIVE SUMMARY

The information contained in this report is Phase II of the Commuter Rail Service Extension Study. Phase II analyzes a market potential for commuter rail service extension to Baltimore, MD and Washington, DC and is designed to answer the question of:

> *At which point would the extension of SEPTA and/or MARC commuter rail service through Cecil County be financial reasonable, given land use and demographic trends?*

Phase II of the study focuses on the 14.5 mile segment between Elkton, MD and Perryville, MD.

The scope of the work in this document focuses on investigating the following:

- Estimate ridership demand.
- Provide operational analysis of the potential service.
- Identify engineering needs for the potential service.
- Identify any major environmental issues associated with the alternatives.

In analyzing the ridership potential, operational and engineering needs, as well as the environmental impacts, the following alternatives were considered:

- Stopping a limited number of existing Amtrak trains at Elkton, similar to the two daily trains that currently stop at Newark, DE (this option was previously investigated in Phase I).
- Extending the existing level of MARC service at Perryville to Elkton.
- Extending a more robust level of MARC service to Perryville and Elkton.

Ridership estimates show that extending SEPTA or MARC commuter rail service into Cecil County would be difficult to justify at present based solely upon current and projected demographic trends. However, there are clusters of residential density in and around Elkton that meet the minimum thresholds for service and could generate sufficient commuter traffic bound for Philadelphia and Washington, DC, especially if bolstered by longer distance commuters driving to Cecil County stations from out of state. As such, if existing MARC Penn Line service at Perryville were extended northward, in 2025 the new stations at Elkton and North East would attract about 331 weekday boardings. About 457 additional weekday boardings would be attracted to Delaware stations if service were further extended to Wilmington.

The operational analysis came up with the following conclusions based on the forthcoming questions raised by the study team.

Question 1: Is extending Track A between Iron Hill and Perryville (or a similar improvement) an environmentally, technically, and financially feasible approach to improved passenger travel and goods movement?

> *From an operating perspective, the existing level of MARC service at Perryville can be extended to Elkton Station (and peak service only as far as Wilmington, DE) without the necessity of adding additional track between Iron Hill and Perryville. However, it would be needed for a more robust level of service, with increased peak and off-peak service frequencies. It would not facilitate goods movement since current freight trains and those anticipated in the near future serving Delmarva customers are planned during early morning windows when conflicts with passenger trains are minimal.*

Question 2: What is the feasibility of a connection between the CSXT Main Line and the Amtrak Northeast Corridor to support redundant freight access to the Delmarva Peninsula?

> *Norfolk Southern, CSXT, and Amtrak were unanimous that a new connection would have little or no impact on freight access to the Delmarva Peninsula.*

The engineering analysis arrived at a conceptual description of the improvements necessary to implement commuter rail service north of Perryville, MD, to either Newark, DE or Wilmington, DE. Necessary improvements include the construction or rehabilitation of passenger stations at Perryville, MD, North East, MD, and Elkton, MD, and the construction of a new layover facility near the northern terminal of commuter rail service. In addition, the extension of Track 1 from Prince Interlocking to Bacon Interlocking may be required, depending on the frequency of the commuter rail service extension. Improvements required to extend Track 1 include construction of new track and catenary, relocation of the adjacent Maintenance-of-Way access road, and widening of a bridge over a local roadway. A conceptual cost estimate was developed for these improvements, which indicated that the cost for these improvements would range between $44.0 million and $50.6 million

The environmental analysis confers that the addition of a track on the south/east side of this portion of the Amtrak Northeast Corridor will impact several natural resources including wetlands, floodplains and forested areas, however, these impacts are generally routine and should be confined to the existing Amtrak right-of-way. Not many options will be available without any impacts. The analysis shows that these resources will need to be carefully evaluated, but these impacts do not seem to constitute a fatal flaw for the project. A particular concern that will need to be addressed is Environmental Justice issues.

Finally, outreach was conducted at the inception and conclusion of the study effort through meetings with several groups to provide meaningful state and local participation in the transportation planning process. Meetings with the Project Management and

Review Committee (PMRC) were conducted at key intervals to gather feedback and provide stakeholders with a preview of the material to be discussed at the public meetings. Two public meetings were held to provide the widest possible audience with an update of the projects and progress, and to hear their comments and ideas in an interactive forum.

2 INTRODUCTION

Phase I on the Study investigated the market potential for SEPTA commuter rail service to Philadelphia PA and Wilmington DE. Phase II has concentrated on the market potential for MARC commuter rail service to Baltimore MD and Washington DC. More comprehensively, Phase II sought to answer the fundamental question:

> *At what point would the extension of SEPTA and/or MARC commuter rail service through Cecil County be financially reasonable, given land use and demographic trends?*

The Cecil County, Office of Planning, Zoning and Parks is continuing previous and current regional studies of Northeast Corridor commuter and freight rail service in the Wilmington Area Planning Council (WILMAPCO) region. The Phase II portion of the study focuses on the 14.5-mile segment between Elkton, MD and Perryville, MD (see Figure 1).

This report also performs a preliminary evaluation of the operational impacts of changes in passenger rail and freight services associated with the project. More specifically, it addresses two of the three fundamental questions posed by the study scope:

> *Is extending Track A between Iron Hill and Perryville (or a similar improvement) an environmentally, technically, and financially feasible approach to improved passenger travel and goods movement?*
>
> *What is the feasibility of a connection between the CSXT Main Line and the Amtrak Northeast Corridor to support redundant freight access to the Delmarva Peninsula?*

2.1 STUDY CORRIDOR

Amtrak's Northeast Corridor between Washington DC and New York City describes a high-speed thoroughfare for passengers and goods movements through the heart of Cecil County, but no Amtrak train presently stops within the county—the closest stops being at Aberdeen to the south and Wilmington to the north (except for two daily trains that stop at Newark)[1]. Maryland Rail Commuter (MARC) Penn Line terminates at Perryville at the western limits of Cecil County. Baltimore is the northern limit for most MARC trains—only two midday and one evening round trips extend to Perryville on weekdays and none on weekends. Likewise, the Southeastern Pennsylvania Transportation Authority (SEPTA) Route R2 regional rail service extends to Newark during peak periods on weekdays, with base service terminating at Wilmington off-peak weekdays and on Saturdays (there is no Sunday rail service to Wilmington).

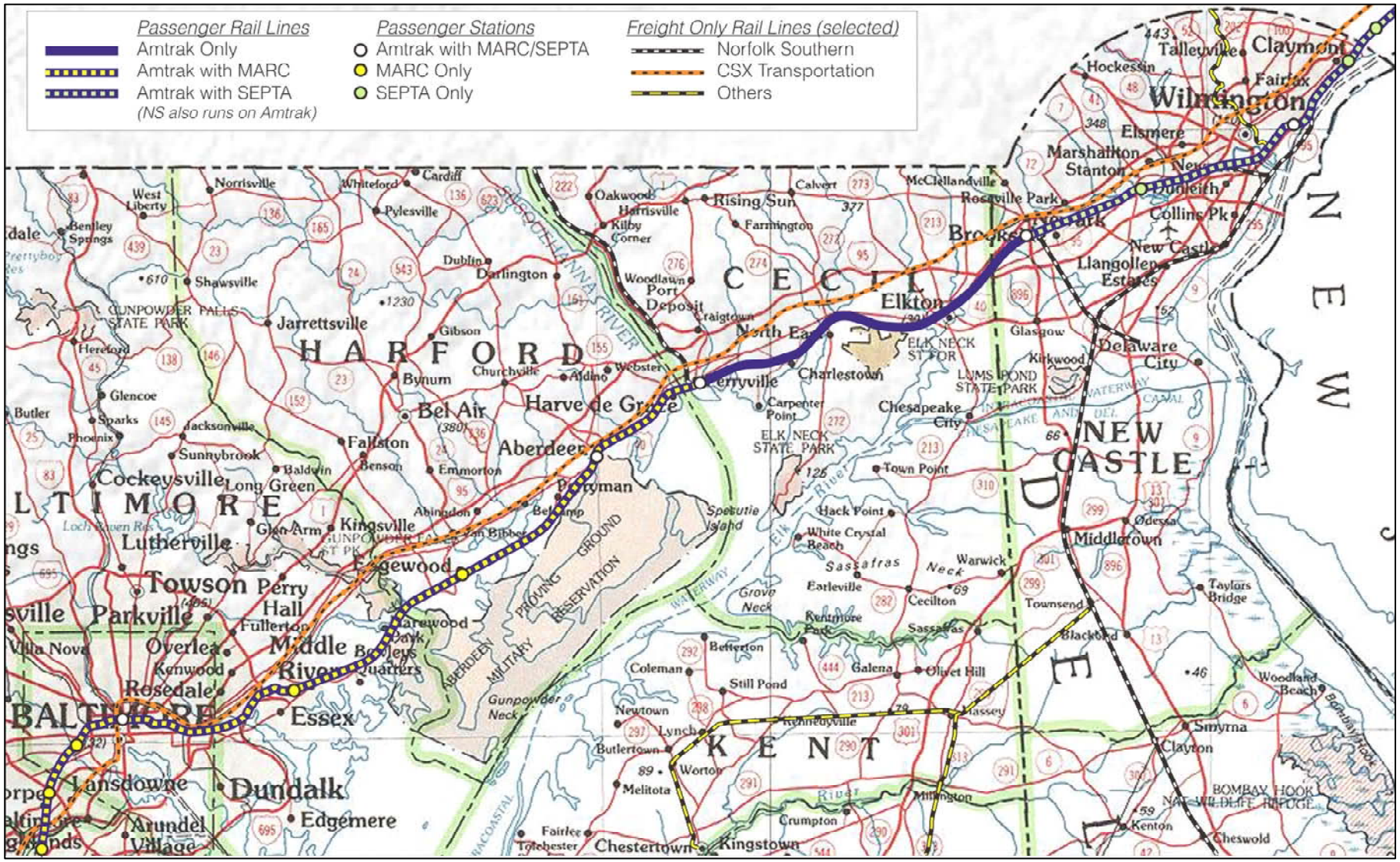
Between Bacon Interlocking (North East) and the former passenger station at Elkton (6.1 miles), there are three tracks numbered 1 to 3 from east to west. The three-track alignment continues northward from Elkton for another 3.4 miles to Iron Interlocking at Iron Hill, just short of the Maryland-Delaware State Line. At Iron Hill, the railroad widens to four tracks for the 3.1 miles north to Davis Interlocking, the additional track designated as the "Track A" referenced in the title of this project.

The 21-mile stretch of the Northeast Corridor between Perryville and Newark is presently the most densely trafficked mixed-use (freight and passenger) segment of the line between Washington DC and New York City. For 6.3 miles of this segment between Prince and Bacon Interlockings (located at Principio and North East, respectively), there are only two tracks, Track 2 and Track 3 (see Figure 2). This represents an operational bottleneck and constrains the growth of passenger and freight train traffic.

[1] Amtrak Train #151 stops southbound at Perryville at 6:50 AM to pick up MARC passengers only. Perryville, however, is not reflected as an Amtrak stop in public timetables or web site materials.

Strategic interconnections for goods movements are located at either end of this segment. The Norfolk Southern (NS) Port Road Branch, affording freight railroad access to Harrisburg and the West, joins Amtrak's Northeast Corridor at Perry Interlocking (Perryville). The NS Delmarva Secondary at Davis Interlocking (Newark) is the freight gateway to Delaware and the Delmarva Peninsula.

Figure 1: Study Corridor Map



Operations over this territory have changed significantly since 1983, when the last scheduled passenger trains served Elkton. One important change is the increased speed and frequency of high-speed trains on the "high speed tracks" in the Northeast Corridor. The other significant change is the increase of freight traffic, although the hours during which freight trains are permitted to operate have progressively decreased.

Tracks 2 and 3 are designated as "high speed tracks" north of Northeast. These are the tracks over which most of the Amtrak traffic is scheduled. Under normal operation, northbound trains run on Track 2 and southbound trains run on Track 3. Track 1 is generally used for freight trains (in both directions) and for Amtrak overtake movements (higher-speed trains passing slower moving trains). In the current timetable there are no scheduled passenger overtakes between Bacon and Davis Interlockings, but the track tends to be used for overtakes when trains are running off-schedule.

In the present timetable that went into effect on April 24, 2004, 90 weekday Amtrak intercity trains are scheduled to pass through Elkton[2]. NS typically operates up to seven daily freight trains through Elkton. These are trains that primarily support the Chrysler plant in Newark with "just-in-time" parts deliveries, coal trains and returning empties supporting Delmarva power plants, and general freight destined to the Wilmington area "chemical coast" and the Delmarva Peninsula. There is also local freight activity to customers along the Northeast Corridor.

2.2 ALTERNATIVES BEING CONSIDERED

The *Mid-Atlantic Rail Operations Study – Summary Report (*April 2002), a previous study conducted for I-95 Corridor Coalition, concluded that an independent, continuous freight track was needed between Prince Interlocking (east of Perryville MD at MP 57.3) to Ragan Interlocking (connection with the NS Shellpot Secondary Track west of Wilmington DE at MP 29.7), a distance of about 27.6 miles. The new track "would separate the freight operation from the passenger operation with minimal impact on freight operations."

Amtrak Planning has subsequently developed a rough layout for the new freight track as part of an internal *Delaware Freight Access Project*. A single-line diagram depicting Amtrak's proposed improvements between Perryville and Wilmington is attached as Figure 2.

Amtrak hopes to achieve better freight access and remove heavy axle loads from Tracks 2 and 3, which are currently designated as high-speed tracks. They proposed to designate existing Track 1, located on the south/east side of Northeast Corridor between Bacon Interlocking (near Northeast MD at MP 51.0) and Regan Interlocking, for freight purposes (although Amtrak and commuter trains could also use the track, as needed).

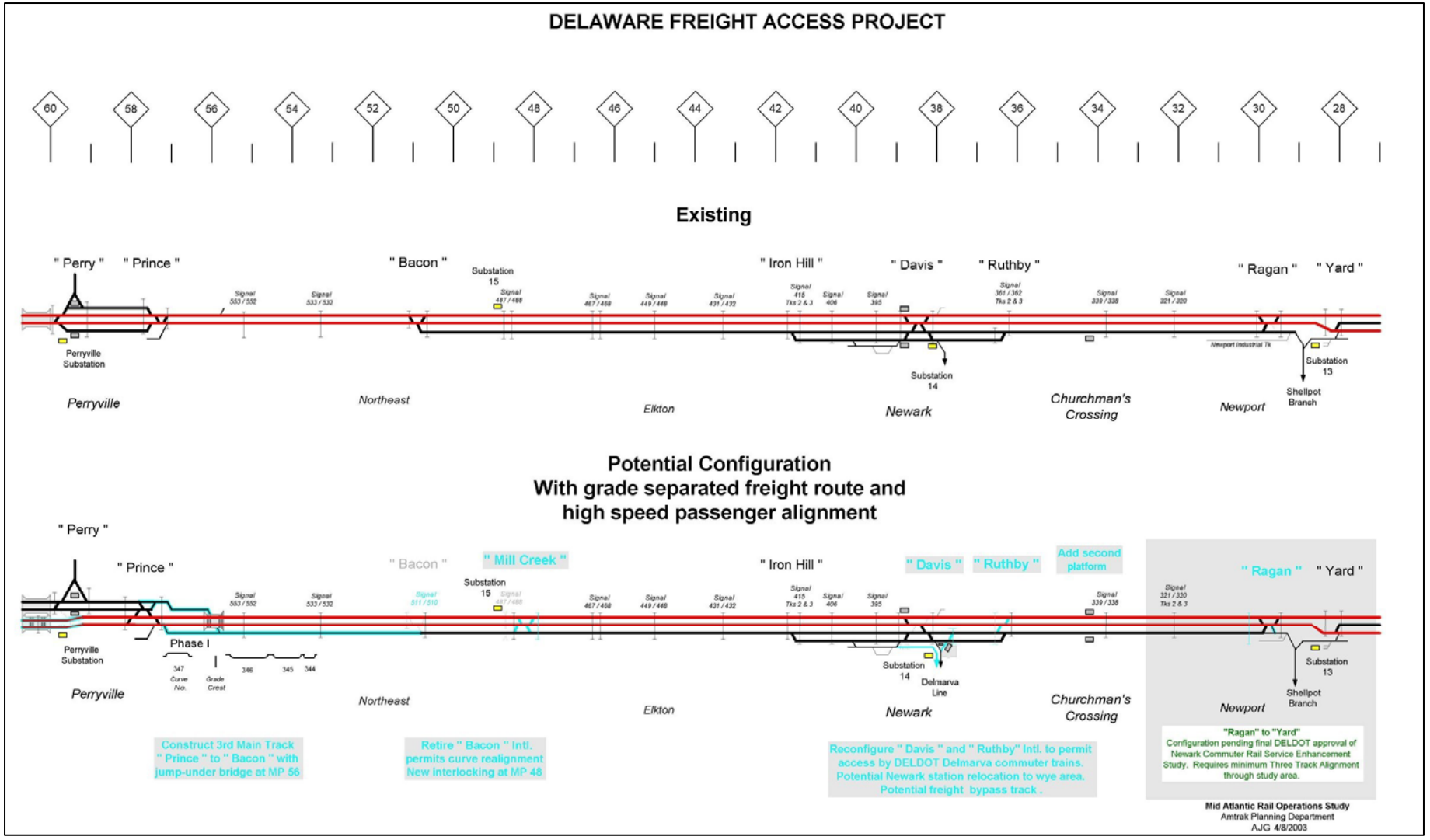
Under Amtrak's concept, Track 1 would need to be extended between Prince and Bacon Interlocking—a distance of about 6.3 miles) to provide a continuous and independent freight track.

3 PUBLIC OUTREACH PART I

This section documents the initial public outreach activities conducted on behalf of the *Track A Extension Feasibility Study (Phase II)* and constituted the first project deliverable. The purpose of this task was to provide meaningful state and local participation in the transportation planning process by a full range of stakeholders and the general public. An initial series of outreach

[2] Two SEPTA trains are also scheduled to pass through Elkton on weekdays—a round trip deadheading to and from Bacon Interlocking in Northeast MD.

Figure 2: Amtrak Proposed Improvements



meetings were conducted at the outset of Phase II in order to provided meaningful input to the PB Team. The purpose of the initial public outreach activities was twofold:

- To discuss and collect comments concerning the results of Phase I.
- To discuss and collect comments about the proposed scope for Phase II.

The initial round of public outreach entailed two separate meetings:

1. Meeting with the *Project Management & Review Committee (PMRC)*, a representative cross-section of public agencies and other stakeholders. This was an effective forum to gather initial feedback and provide stakeholders with a preview of the material to be discussed in the public meetings.

2. A public meeting to provide the widest possible audience with an update of the project findings and progress, and to hear their comments and ideas in an interactive forum.

A project coordination and kick-off meeting was held March 6, 2003, with an executive committee of the PMRC to review Phase I and review the proposed course of the Phase II study. At this meeting, the results from the Phase I efforts were discussed along with Phase II tasks, frequency of meetings, the public involvement process, and the composition of the PMRC.

The first meeting of the full PMRC was held March 26, 2003 and served as an opportunity to introduce a broader group of stakeholders and project team to the project's steering committee. An overview of Phase I results was presented along with preparations for the first public meeting.

PMRC discussion regarding freight railroad issues led to a smaller subsequent meeting held on April 1, 2003 between Amtrak, DelDOT, Norfolk Southern, and PB to resolve scope and coordination issues. This meeting clarified the study's goals and suspended further analysis of CSXT-NS connectivity within Cecil County. Coordination between Phase II and other ongoing analyses by Amtrak was also discussed to avoid duplication of efforts.

The first public outreach meeting was held April 10, 2003 at the Cecil County Commissioners Chambers. About 30 people were in attendance, including a good cross-section of local elected officials and the Press. Presentations were made concerning the Phase I and II efforts, followed by questions from the attendees, who were generally in favor of extending passenger rail service to Elkton. Some concerns were raised as to the feasibility of funding such a service.

Finally, a passenger intercept survey was conducted at the MARC Station in Perryville on the morning of May 8, 2003. Interviews were conducted with 66 out of the approximate 98 passengers boarding that morning using a brief questionnaire to inquire about present passenger's commuting habits. About 75 percent of the passengers were commuting to Washington, DC, with over 80 percent making that trip five days a week. Passenger origins were generally dispersed with virtually all Perryville passengers arriving via car. The majority of boarding passengers surveyed reside in Cecil County (41 passengers) or New Castle County (41 passengers). The results of this passenger survey will be further analyzed and incorporated into the efforts for Task 4, Ridership Demand.

The following items are included in this report to provide further documentation of the aforementioned public outreach activities:

- TAEFS2 Project Coordination Meeting #1 Minutes, March 6, 2003
- TAEFS2 Project Management and Review Committee Meeting #1 Minutes, March 26, 2003
- TAEFS2 Railroad Coordination Meeting Minutes, March 31, 2003
- TAEFS2 Public Meeting #1 Minutes, April 10, 2003
- Presentation Boards used at Public Meeting #1, April 10, 2003

• Perryville Station Passenger Survey, May 8, 2003

This information was used to guide immediate study efforts to develop operating scenarios and ridership forecasts for Phase II.

3.1 MEETING MINUTES PROJECT COORDINATION MEETING #1

Cecil County Office of Planning, Zoning & Parks
Elkton, Maryland
March 6, 2003 — 1:00 p.m.

Attending	**Representing**
Tony DiGiacomo	Cecil County Office of Planning, Zoning & Parks
David Campbell	Delaware Transit Corporation
Michael Kirkpatrick	Delaware Department of Transportation
Mike Nixon	Maryland Department of Transportation
Heather Dunigan	Wilmington Metropolitan Area Planning Council
T. R. Hickey	Parsons Brinckerhoff
Anna Lynn Smith	Parsons Brinckerhoff
Linda Moreland	Remline Corp

The meeting served as the kick-off for the Track A Feasibility Study Phase II Project. Comments from the meeting are summarized as follows, with questions or action items shown in **boldface**:

- Tony DiGiacomo began the meeting with an overview of the project and the partnership that he hopes will include the many stakeholders involved, reaching beyond Cecil County.
- Ken Goon and Earl Leach continued with a discussion of the Phase I efforts, distributing copies of the relevant drawings and documents. Ken would provide PB with a copy of the plans and appendices for Phase I. Ken explained how the ridership model showed that a downtown Elkton station would have higher ridership than one located off of I-95 (estimated 2015 total daily ridership was 336 for a downtown Elkton station and 136 for a station off of I- 95). **David Campbell inquired about Alternative 4 and the additional crossover that was shown on the drawings, asking if it could also be a part of other alternatives.** Ken explained how the cost assumptions were at a gross order of magnitude level and that certain elements of the estimate could potentially be discussed and negotiated with the railroads, the contiguous access road being one example.

David inquired about having both an I-95 station as well as one in downtown Elkton. Ken responded that RK&K's model did not show enough ridership to warrant both. However, Tony added that Phase II efforts might show the contrary, particularly with the inclusion of

David mentioned the need to coordinate with NS, Amtrak and SEPTA. **RK&K would provide PB with a copy of the FLI-MAP video for the northern part of the corridor. PB will need to get appropriate plans from the railroads for the Phase II effort. Ken will be following up with polished versions of the draft documents that were distributed.**

- Tom Hickey launched an overview of the Phase II portion of the study, indicating that the second phase will bring a synergy between the northern and southern portions of the study. He distributed copies of the schedule and organization chart and explained both. **Tom offered to send a PDF version of the proposal to anyone who needed it.**

- Linda Moreland discussed the first public meeting. The meeting would focus on the purpose of the study and explain and gain input on Phase I efforts, particularly since there was no public outreach in Phase I. It was decided that there would be one initial

meeting in Elkton, and if warranted, a second meeting would be held at an additional location in Cecil County. The meeting notice would be published in the Cecil Whig, with invitations also provide to the Planning Commissions in Elkton, Perryville, North East and Charlestown. Heather Dunigan added that there was much interest in this area from WILMAPCO's Long-Range Plan update. Flyers would also be posted at SEPTA stations in Delaware, the DART Route 65, and on cars parked at rail stations in DE and Perryville. Seat drops (flyers on train seats) could also be used. **Tony would get Kevin Racine involved in the public outreach efforts.** Remline would produce a fact sheet that could be posted on the web sites of Cecil County, MTA, SEPTA and DART. **Tony would be in communication with the Delmarva Rail Passenger Association.**

- The approach for the public meeting would be an informational workshop with several big boards and occasional presentations. The meeting may be held at the Commissioners Chambers on 107 North Street. It was suggested that a project board also be on display at the Perryville train station.

- The Project Management & Review Committee (PMRC) was next discussed. **Tony would provide PB with the names of contact persons for the groups representing the PMRC. The PB team will prepare the correspondence, and Tony will distribute. Amtrak, SEPTA, and the Delaware TMA will be added to the PMRC. Chambers of Commerce would also be potentially added.**

- April 10th was set as the date for the first public meeting, to run from approximately 4:00 to 8:00 p.m. The date for the PMRC meeting was set for the afternoon of March 26th (final time TBD) to allow adequate time before the public meeting.

- PMRC "smaller group" meetings would be conducted on an as-needed basis, to potentially coincide with the technical memos, but email would be the primary means of communication. A second meeting in August would likely occur prior to the second round of public outreach. The next meeting of this smaller group will take place April 3rd at 1 p.m. at the Cecil County offices.

3.2 MEETING MINUTES PROJECT MANAGEMENT AND REVIEW COMMITTEE MEETING #1

Cecil County Office of Planning, Zoning & Parks
Elkton, Maryland
March 26, 2003 — 1:00 p.m.

Attending	**Representing**
Stanley Slater	Amtrak (attended by phone)
Tony DiGiacomo	Cecil County Office of Planning, Zoning & Parks
David Campbell	Delaware Transit Corporation
Michael Kirkpatrick	Delaware Department of Transportation
Mike Nixon	Maryland Department of Transportation
Harry Romano	Maryland Transit Administration
Bill Schafer	Norfolk Southern (attended by phone)
Jeanne Minner	Town of Elkton
Betsey Vennell	Town of North East
Steve Luxenberg	Wilmington Metropolitan Area Planning Council
John Baesch	Parsons Brinckerhoff
Bob Boot	Parsons Brinckerhoff
T. R. (Tom) Hickey	Parsons Brinckerhoff
Colin Lewis	Parsons Brinckerhoff
Anna Lynn Smith	Parsons Brinckerhoff

Dudley Whitney .....Parsons Brinckerhoff
Linda Moreland.....Remline Corp
Jaime Vrabel.....Remline Corp
Earl Leach .....RK&K

The meeting served as the kick-off for the Track A Feasibility Study Phase II Project Management and Review Committee (PMRC). Comments from the meeting are summarized as follows, with questions or action items shown in **boldface**:

- Tony DiGiacomo opened the meeting with an overview of the project and a round of introductions of the PMRC.

- Tom Hickey reviewed project's goals, noting three fundamental questions taken from the RFP that provided direction to Phase II efforts. Bill Schafer challenged the relevance of the third question concerning investigations into the feasibility of new connections between the CSXT Main Line and the Northeast Corridor, suggesting it was merely a thinly veiled reference to the issue of open access.

  Tom indicated the question originated with the problem statement contained in the WILMAPCO Unified Work Program that was the progenitor of the present study. Such connections were suggested from time to time in the past, primarily by Delmarva shippers, but neither railroad or state ever pursued the matter. This seemed to make sense since without open access—representing a broader and unprecedented change in carrier and government policies—such connections would be of little benefit. He suggested the study could be an opportunity to document these concerns and lay the matter to rest, once and for all.

  Tony responded that Cecil County would be interested in the new connections if it would enhance freight service and reminded the group that the original WILMAPCO problem statement also referenced potential homeland defense and national security interests. Nevertheless, he had no objection to deleting those elements from the scope if the railroads, WILMAPCO, DelDOT and MDOT were not interested in pursuing this matter. No objections were made to this statement. **PB will meet separately with the railroads to discuss this matter.**

- Earl Leach reviewed the Phase 1 Alternatives for SEPTA service between Newark and Elkton. Bill inquired about the impacts on Acela Express traffic. Earl also reviewed the projected ridership numbers. Tom added that this phase did not address demographic growth and other indicators for transit service raised by the second "fundamental" question in the Phase II RFP but would serve as the basis for that analysis. **PB will provide electronic copies of Phase I summary documents to the PMRC for their review.**

- Tom provided an overview of Phase II program and schedule. Project correspondence, including technical memos for each task, would be distributed to the PMRC via email. There are no PMRC meetings scheduled until the September timeframe, but the team will be looking for continuing guidance from the committee throughout the study process – guidance on stations, demand for services, development in Cecil County, and other concerns. Emphasis was placed on the importance e-communications rather than face-to-face meetings.

- John Baesch provided a preliminary overview of operational conditions in the study area. Approximately 90 trains per day traverse the Northeast Corridor (NEC) in this area – the longest stretch of doubletrack in the NEC. Most freight is confined to an overnight window from 10:30 PM to 6 AM along with deadhead train movements, work trains, and local freight trains that travel this section of track during the day. Bill added that a lot of freight

is generated adjacent to the NEC and NS hopes for significant growth in through trains. NS wants to route the trains more directly and add more premium intermodal trains outside of the night window. It is important to consider the vastly different train speeds in intercity vs. commuter vs. freight trains.

- Linda Moreland next discussed the public outreach efforts for the study. This initial round of public outreach will be held Thursday, April 10th, from 4:00 to 8:00 PM. at the County Commissioners Chambers. Tony suggested that a few boards be placed at the Perryville Station for review by morning commuters. **RK&K will present the Phase 1 alternatives. Remline will create boards showing track configurations, key elements, and challenges associated with each. For Phase II, boards will be created showing the study work program and study area. Sign-in sheets and comment sheets will be provided. Remline will create flyers for posting in the town halls of Elkton, North East, Charlestown and Perryville, at MARC and DelDOT stations, and on DART Route 65. A press release will be created for the Cecil Whig, Newark Post, and News Journal. Tony would contact Jim Wolfe at Chrysler regarding the meeting. Tony would contact Eric Morsicato regarding the April 10th meeting and the outreach at the Perryville Train Station.**

- Dudley Whitney suggested a brief passenger intercept survey be conducted at Perryville during the (very early) a.m. rush. Rider's zip codes could be requested as part of the intercept survey. The alternative of a license plate survey was raised, but Mike Nixon indicated there have been privacy issues with other recent surveys in Maryland. About 50- 100 persons board at Perryville. Eric Morsicato of Perryville and MARC will need to be contacted prior to this effort. A two to three day notice to commuters would be required prior to the survey. **Dudley Whitney will draft a passenger survey to administer to MARC riders at the Perryville Station.**

- Tom next explained that a smaller subcommittee of the PMRC will meet about once per month to coordinate study progress and administrative matters. Minutes of these meetings will be distributed to the full PMRC.

3.3 MEETING MINUTES TAEFS2 MEETING—RAILROAD COORDINATION

Held at Parsons Brinckerhoff, Philadelphia PA
March 31, 2003, at 2:00 p.m.

Attending	**Representing**
A. J. (Drew) Galloway	Amtrak
Stanley J. Slater	Amtrak
Michael Kirkpatrick	Delaware Department of Transportation
Bill Schafer	Norfolk Southern
T. R. (Tom) Hickey	Parsons Brinckerhoff
John Baesch	Parsons Brinckerhoff
Anna Lynn Smith	Parsons Brinckerhoff

The meeting was arranged as a follow-up to the Project Management and Review Committee (PMRC) of March 26, 2003, addressing issues of particular concern to the railroad owner and its franchisee. Comments from the meeting are summarized as follows, with questions or action items shown in **boldface**:

- Tom began the meeting with an explanation of the current work program for the study, offering the possibility to rearrange the task flow to conduct the bulk of the engineering effort in the earlier part of the study if that would facilitate other rail-related studies. He emphasized that the study is directed to investigate what levels of development density

are necessary in Cecil County to warrant direct passenger service–essentially placing the focus on *when* should passenger rail services be expanded rather than *how*. The scope equally emphasizes freight rail operational issues between Perryville MD and Newark DE as they may affect service for Delmarva customers and goods movements to and from the Delmarva peninsula as well as on the Northeast Corridor in general.

- Drew provided a line diagram depicting Amtrak's proposed improvements between Perryville and Wilmington under the Delaware Freight Access Project. He stated that Amtrak has expended much effort to investigate the feasibility of extending Track 1 between Bacon (Northeast MD) to Prince (Principio MD). Amtrak hopes to achieve better freight access and remove heavy axle loads from the high speed tracks (Tracks 2 & 3).

- Bill indicated that NS has a waiver to run heavy axle loads south of Perryville. Currently, eight to ten daily freight trains run between Perry (Perryville) and Davis (Newark DE). NS wants to expand traffic to about 15 trains per day but the capacity issues at Newark make this level of traffic a challenge, given the constraints of the current physical plant. NS plans adding one intermodal train this summer from Lane (Newark NJ) to Landover (Washington DC) via the Shellpot Bridge (Wilmington DE), the repair of which is expected to be complete by October 2003, along with other Perry-Prince improvements. Their goal is to get the heavy loads off high speed tracks but the additional capacity of a third track between Prince and Bacon is needed to achieve this scenario.

- DelDOT essentially wants to double the number of passenger trains between Wilmington and Newark. Bill mentioned that the commuter and slower intercity trains could also make use of the new track proposed on Drew's line diagram and that there is a need to get creative in the ownership of the improvements. NS is seeking funds through the TEA-21 reauthorization in concert with DelDOT to provide the improvements described in Drew's line diagram. Michael added that they are working to get a cost estimate that Amtrak, NS and the States could agree upon for the improvements. **Bill will keep the study team informed of NS on-going coordination efforts with DelDOT.**

- Tom asked if it would benefit Amtrak, DelDOT or NS to expedite the study's engineering effort to provide cost estimates for the improvements sooner that currently planned (the present scheduled calls for cost estimates to be complete by Fall 2003). Drew responded that Amtrak prefers to develop engineering estimates in-house as such results are more meaningful and reflect "emotional buy-in" by Amtrak engineering staff. Conversely, Tom asked if Amtrak engineering estimates would be timely enough and could made available to substitute to the study effort, as it seemed duplicative and possibly provocative to produce estimates in parallel. Upon further discussion, it was concluded that there would be little benefit in rearranging the study work program or combining efforts. **John will act as liaison between the study and these other efforts.**

- Drew suggested that a more timely issue for the study to address would be a capacity analysis taking into account future Amtrak, MARC and SEPTA service levels as well as expanded freight rail traffic. Drew suggested that a northerly extension of MARC service will increase deadheading or require a storage yard. SEPTA seems reluctant to establish new remote storage facilities so Elkton service would also require longer movements on the corridor.

- Drew mentioned that resurrecting the *Chesapeake* may be an option for the study to consider. The *Chesapeake* (Train 420/421) was a state-sponsored 403B Amtrak train that ran between Philadelphia and Washington DC in the early 1980s using leased Arrow III MUs. It ran southbound in the morning earlier than Amtrak's present services and made several intermediate stations not presently served by Amtrak including Elkton MD and Chester PA. Service ceased October 28, 1983. Drew indicated that such a service could mesh well with current operations.

- Discussion turned to the feasibility of a connection between the CSXT Main Line and the Northeast Corridor to provide redundant freight access to the Delmarva Peninsula. Tom indicated that those elements of the study scope originated with the problem statement in the WILMAPCO Unified Work Program that eventually led to the present study. He was uncertain of the present relevance of those concerns. In the past when he was Delaware's State Railroad Administrator, such issues were raised on occasion by shippers but there was little or no interest from either railroad in pursuing the matter. He did not believe the issue has ever been identified as a concern in the State Railroad Plan Updates for either state. Michael concurred that he was not aware of any present interest from either railroad and confirmed that new connections between CSXT and NS are not addressed in Delaware's latest State Railroad Plan Update. Bill indicated that the goal of NS is to stress connectivity with other carriers but there was little perceived benefit to new connections within the study area unless accompanied by open access, a global policy issue far beyond scope of the study. **Tom will recommend to Cecil County and WILMAPCO that investigations into the feasibility of new CSXT-NS connections within Cecil County be deleted from the project scope.**

3.4 MEETING MINUTES PUBLIC MEETING #1

Cecil County Commissioners Chambers
Elkton, Maryland
April 10, 2003 — 4:00 to 8:00 p.m.

This public meeting served as the first opportunity to obtain public comment on the Track A Extension Feasibility Study. The meeting focused on the Phase I results of options for rail service between Newark and Elkton and gave an overview of the Phase II efforts recently commenced to investigate feasibility of service between Elkton and Perryville. Approximately 30 persons attended the meeting, not counting the study team members that were also in attendance. Boards were placed around the room that presented the potential Phase I options between Newark and Elkton, maps of the study area, and the proposed task flow and activities for Phase II.

A formal presentation began at about 4:30. It began with introductory remarks by Cecil's County's Tony DiGiacamo, who welcomed the participants and explained the study background. PB's Tom Hickey then presented the overall study work program and upcoming activities for Phase II. Tom emphasized that the focus of this feasibility study is to identify what changes in local demographics and development densities are needed to achieve the levels of travel demand that would warrant improved passenger rail service, as well as to determine the magnitude and cost of physical improvements and operating expense to support such improvements. There is a freight railroad service component to the study as well, which is equally important in terms of benefits to the Delmarva economy and for the synergies that may be associated with infrastructural investments in the study area. RK&K's Ken Goon also reviewed the findings of Phase I analysis.

Following these presentations, the floor was opened for questions. The initial intent was to repeat this pattern of an "open house," a formal presentation, and a question/answer session every hour. There were far fewer attendees present for the subsequent presentations, however, so one-on-one discussions substituted for the formal presentation and question/answer session. The following is a summary of comments made during the public meeting and on comment sheets filled out by attendees.

- In general, the audience was very interested in and supportive of extending commuter rail service from Newark and Perryville to serve Cecil County communities. Though no formal prioritization of demand was conducted in the meeting, desired destinations in order of interest seemed to be Baltimore, Washington DC, Philadelphia, New York, Wilmington and other Delaware destinations.

- Commenters noted that having a stop in Downtown Elkton (and, to a lesser degree, other Cecil County urban centers such as Perryville, Northeast, and Charlestown) would help to address the community development and economic needs.

- An inquiry was made regarding the State of Maryland Study for MARC service to Elkton, suggesting that it be referenced as part of our efforts. Tom responded that the team would refer to this effort during the course of the Phase II study.

- An analogy was made to Amtrak service through less developed areas of the Carolinas and Florida, where one or two trains per day stop to provide a basic level of service at small towns. Could a similar level of service be replicated in Elkton and Perryville using existing Amtrak corridor services? In response, Tom noted that one of the Phase I options proposed two a.m. and p.m. trains do just that and include a stop at Elkton. However, Amtrak operates many trains between New York and Washington DC, so the operating windows are constrained on the two or three-track segments through Cecil County. There are fewer trains operating on Amtrak southeastern routes below Washington DC, so these trains have greater flexibility to serve smaller towns along the way.

- Similarly, a “slower” Amtrak train was suggested that does stop at the smaller towns along the Northeast Corridor, similar to the former Chesapeake service Amtrak operated in the 1980s. This option would require support from Amtrak as well as from state and local governments, as was the case with the Chesapeake.

- Questions were raised concerning steps to implementation. Tom responded this was a preliminary cursory study of the feasibility of rail service improvements. If there was interest in pursuing service options, a more in-depth study would likely be pursued as part of WILMAPCO’s Long Range Planning Process. Tony added that this study represents the initial step of a long project-development process and the “big picture” for long-term transportation needs and solutions in Cecil County and the WILMAPCO region. How infrastructural and service improvements would be funded is beyond the scope of this study.

- Bicycles were identified as an important but often overlooked means of station access.

- It was suggested that we include a comparison of these rail alternatives’ costs with the cost of adding lane miles to I-95 or other non-rail options. This information could potentially justify why this rail service is necessary when compared to increases in Vehicle Miles Traveled (VMT), and reduction in air quality.

- It was suggested that the study work program be modified to add a task that investigates other (non-train) alternatives to relieve future congestion.

- It was suggested that a page be added to the Cecil County and/or WILMAPCO websites that summarizes the Phase I study results as well as provides updates on the Phase II efforts. A total of six comment sheets were completed and one written statement was received at the meeting. The comments were all in favor of establishing commuter rail service in Elkton, with occasional intercity trips to Baltimore, Washington, or Philadelphia and points beyond appearing to be very much of interest. Only one commenter was identified as a current commuter from Perryville to Washington.

4 RIDERSHIP DEMAND

A ridership demand analysis was performed to identify the market orientation and ridership potential for Elkton passenger rail service issues. Phase I of the Study investigated the market potential for SEPTA commuter rail service to Philadelphia PA and Wilmington DE. Phase II concentrated on the market potential for MARC commuter rail service to Baltimore MD and Washington DC.

Three alternative levels of Elkton passenger rail service were considered in this market analysis:

1. Stopping a limited number of existing Amtrak trains at Elkton, akin to the two daily trains that currently stop at Newark DE (this option was previously investigated in Phase I).
2. Extending the existing level of MARC service at Perryville to Elkton.
3. Extending a more robust level of MARC service to Perryville and Elkton.

4.1 LAND USE & DEMOGRAPHIC TRENDS

Cecil County, Maryland, is situated in the heart of the mid-Atlantic region. Half way between Baltimore, MD and Philadelphia, PA, the county is experiencing suburbanization due to the proximity of major metropolitan areas and more reasonable housing costs. The County has become a desirable place to live for people working in both the Philadelphia-Wilmington and the Baltimore-Washington job markets.

According to the U.S. Census Bureau, the population of Cecil County has grown over 20 percent (from 71,347 to 85,951) in the decade between 1990 and 2000. Projections produced by WILMAPCO indicate that the growth trend will continue into the foreseeable future. Table 1 shows County population and household data from the 1990 and 2000 federal census and projections through 2030.

TABLE 1: CECIL COUNTY POPULATION & GROWTH

Year	Population	Population per Sq Mile	Households	Households per Acre
1990	71,347	198	24,730	0.11
2000	85,951	239	31,223	0.14
2005	91,002	253	33,649	0.15
2010	95,396	265	36,080	0.16
2025	99,600	277	38,398	0.18
2020	103,001	286	40,326	0.18
2025	106,403	296	41,875	0.19
2030	108,803	303	43,097	0.20

Source: US Census (1990 & 2000) & WILMAPCO

According to figures published by the Cecil County Office of Economic Development in 2002, about 20,000 county residents (about half the Cecil County workforce) commute to jobs outside of the County. Commuters to New Castle County in Delaware outnumber by more than a two-to-one ratio the commuters traveling to other Maryland counties. About 6,400 workers of all classifications were identified as commuting to other Maryland counties.

4.2 PERRYVILLE PASSENGER SURVEY

The Study Team conducted a passenger survey on Thursday, May 8, 2003, at the train station in Perryville, Maryland to provide insight into who is using the existing MARC passenger service and as an aid in estimating potential ridership for expanded MARC service to Elkton, Maryland.

Four MARC trains and one Amtrak train depart Perryville each morning during the week. The four MARC morning trains leave Perryville at 4:45 am, 5:40 am, 6:15 am and 7:40 am. MARC commuters are also permitted to board one southbound Amtrak train that is scheduled to depart

Perryville at 6:45 am. The survey consisted of interviewing passengers prior to boarding each morning train, following the questionnaire shown in Appendix A.

Sixty-six (66) out of 98 passengers observed boarding trains at Perryville on the morning of the survey completed questionnaires, resulting in a response rate of 67 percent. The 6:45 Amtrak train attracted the most passenger boardings (32 percent), followed by the four MARC trains departing at 5:40 (26 percent), 6:15 (21 percent), 4:45 (12 percent) and 7:40 (eight percent), respectively.

A summary of survey results by question are as follows:

QUESTION 1: How often do you ride MARC?

- Over 83 percent of the passengers ride five days a week.
- Over 97 percent of the passengers ride three or more days a week.

QUESTION 2: How did you get to the station today?

- All but one passenger surveyed drove to the station.

QUESTION 3: What is your primary destination today?

- Overall, 75 percent of the passengers were traveling to Washington DC, 23 percent were traveling to Baltimore, and two percent were traveling to other destinations.
- All passengers on the 4:45 a.m. MARC train were going to Washington DC.

QUESTION 4: What is your zip code?

- About 44 percent of the passengers originated in Maryland, 43 percent in Delaware, and 13 percent in Pennsylvania.
- The majority of Maryland passengers reside in Cecil County, with about three percent originating from Harford County (mostly from Havre de Grace, a short distance to the south across the Susquehanna River).
- All of the Delaware passengers live in New Castle County, primarily from areas north of the C&D Canal.
- Pennsylvania passengers were more dispersed, coming mostly from the southern portions of Chester County and Delaware County. A small percentage of passengers originated in Philadelphia.

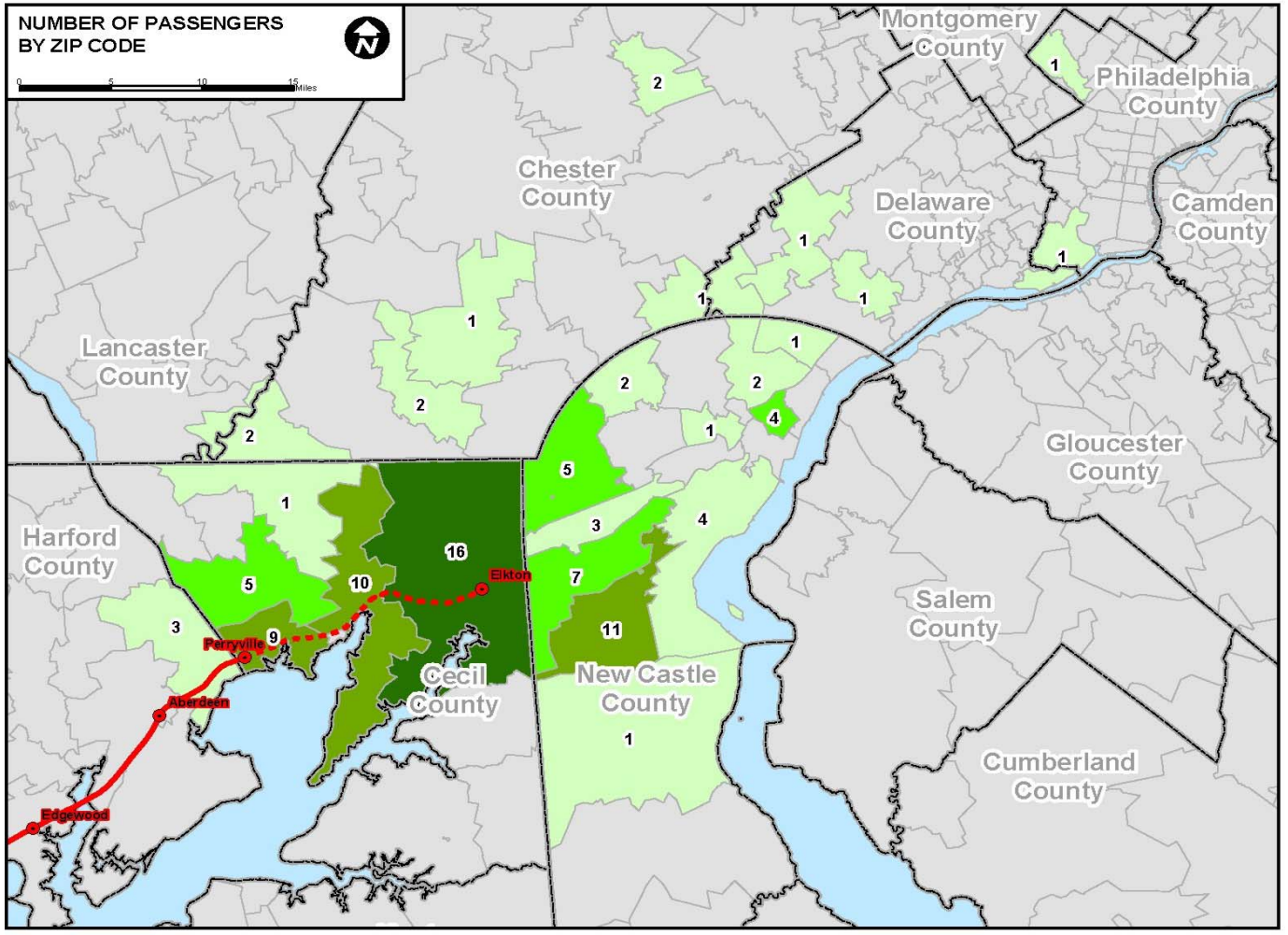
Figure 3 graphically depicts the distribution of origins of those passengers surveyed while boarding trains at Perryville. This figure depicts a typical passenger distribution pattern for a terminal station, with a significantly larger commutershed than found at most intermediate stations. It is significant to note the number of Delaware and Pennsylvania commuters who would have access to Washington DC-bound Amtrak train service at stations much closer to their point of origin.

4.3 TRANSIT WARRANTS

There is no hard and fast answer for when commuter rail or any other transit service is considered financially reasonable. Turning the question around, the question, “What constitutes a locally acceptable loss to subsidize public transport?” is typically determined by regional and state transportation policies, rather than by generalized land use and demographic trends.

A set of generic “transit warrants” were developed by members of the Study Team for the *Delaware Transit Corporation Five-Year Business Management Plan (*2001), however, that attempted to answer the question, “Where does transit work?,” from the perspective of land use

Figure 3: Distribution of Trip Origins for Perryville Station Survey Respondents



and demographics. The "transit warrants" were drawn from the seminal research of U.S. rail systems conducted by Jeffery Zupan and Boris Pushkarev and documented in their book, *Public Transportation and Land Use Policy* (1977).

The research identified and evaluated various factors that the authors believed influenced the "appropriateness" of different transit modal application. These included development density, distance, coverage, service frequency, passenger comfort, ridership levels, energy use, fuel consumption, capital costs, and operating and maintenance costs. Their conclusions were that population density and employment concentration were significant determinates for where transit "works." In particular, the size of the destination business district was reflected in the ultimate viability of specific transit mode, and that residential density at the origin end of a trip reflected what constituted an acceptably viable service frequency.

Generally, researchers found that "higher-order" transit modes (e.g., heavy rail) provide an attractive return on their investment for very high volumes of transit passengers—justifying their high financial and energy cost, for example, by their ability to transport many travelers very efficiently. At the other end of the spectrum, efficiency is optimized by using "lower-order" modes (e.g., local bus) whose cost-benefit comparison is relatively more attractive for the lower density settings in which they operate.

Zupan found that commuter rail systems are most suited to regions with very large downtowns, which attract large markets of long-distance commuters. Heavy rail, in comparison, operates most productively in corridors with very large downtowns and very high residential densities, which together can produce enough all-day ridership to justify the high financial and energy expenditures of the mode, to the point that heavy rail becomes the most appropriate choice in very high density settings. Light rail, meanwhile, functions as a slower, lower-cost, and lower-capacity version of heavy rail, and predictably operates most appropriately in areas with medium residential and employment densities. Finally, bus can be the best choice for areas with low- to medium residential and employment densities.

The on-going validity of these findings was confirmed by more recent studies conducted by the Tri-County Metropolitan Transportation District of Oregon (Portland OR) in 1997 and by the *Transit Capacity and Quality of Service Manual* published by the Transit Cooperative Research Program in cooperation with the Transportation Research Board in 2000.

4.3.1 Transit Warrant Review

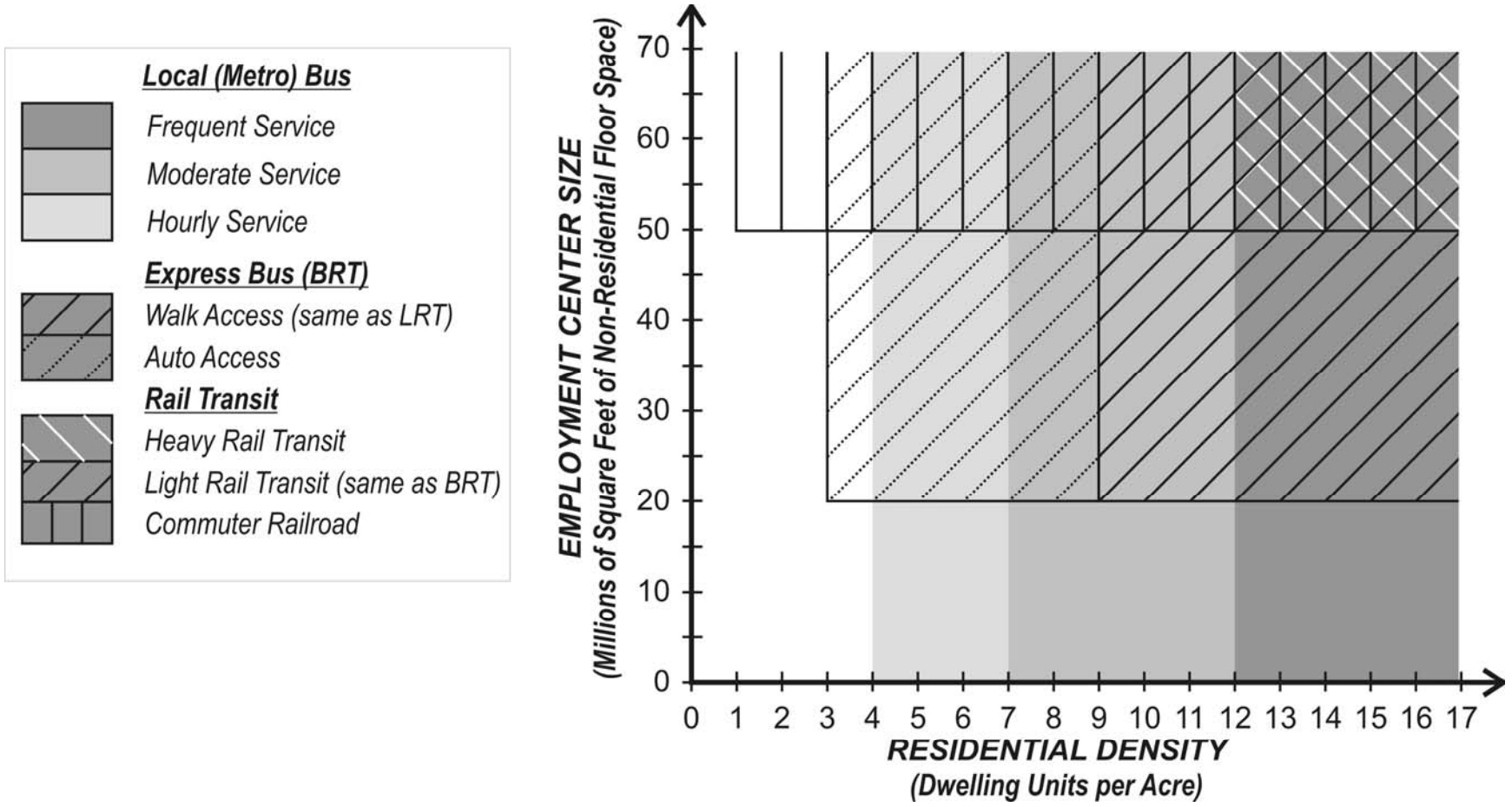
A nomograph was produced for the Delaware study the represented these relationships (Figure 4). The vertical axis of the nomograph is Downtown Employment Center Size in terms of millions of square feet of non-residential floor space. Table 2 provides present day figures and future projections for Philadelphia, Wilmington, Baltimore and Washington DC, derived from employment data provided by the Delaware Valley Regional Planning Commission (DVRPC), Wilmington Area Planning Council (WILMPACO), Baltimore Metropolitan Council (BMC), and Washington Council of Governments (COG).

TABLE 2: DOWNTOWN EMPLOYMENT CENTER SIZE
(Square Feet of Non-Residential Floor Space)

City	Present Day	Future Projection
Philadelphia PA	79 million (2000)	
Wilmington DE	13 million (1999)	24 million (Build Out)
Baltimore MD	43 million (2000)	45 million (2025)
Washington DC	98 million (2000)	118 million (2025)

Applying these figures to the nomograph suggest that Philadelphia and Washington DC are presently viable destinations to anchor commuter rail service, while Baltimore and Wilmington are not at present or in the projected future. This statement should not be misconstrued to mean that no passenger would use a commuter rail service to jobs in Baltimore and Wilmington—such a

Figure 4: Transit Warrants Nomograph



notion is dispelled on daily by passenger traffic on existing MARC and SEPTA trains. What it means is that commuter rail started primarily to serve employment in Baltimore and Wilmington would likely not be financially viable.[3]

As previously noted in Table 1, residential density in Cecil County as a whole is presently about 0.15 households per acre and projected to only grow to 0.20 households per acre by 2030. When applied to the nomograph, these countywide figures fall well below the minimum warrants for commuter rail service.

The Perryville Station Passenger Survey, however, identified a large commutershed for the existing MARC service with the majority of passengers drawn from out of state origins. The analysis was refined to more narrowly look at residential densities immediately adjacent to the Amtrak Northeast Corridor alignment. The results are summarized in Figures 5 and 6. Traffic Analysis Zones (TAZs) that meet or exceed the one household per acre minimum threshold of the Transit Warrant are highlighted in red (n.b., no Cecil County TAZ exceeded 2.2 households per acre in 2005 or 2030).

The residential density maps identify a clustering of higher density development around Elkton that meet of exceed the minimum warrant for commuter rail, surrounding by a number of TAZs that almost meet the minimum warrant. Another, albeit smaller, clustering is apparent in Northeast and adjacent TAZs. Interestingly, the existing station location in Perryville does not exhibit a strong warrant for commuter rail service. There is no indicator that Charlestown (a potential station site proposed as an alternative to Northeast) would be any more viable as a station location.

4.3.2 Transit Warrant Conclusion

Extension of SEPTA and MARC commuter rail service further into Cecil County would be difficult to justify based solely upon current and projected demographic trends, following an analysis of Transit Warrants applied on a countywide basis. There are clusters of residential density in and around Elkton and Northeast, however that meet the minimum thresholds for service that at present could generate sufficient commuter traffic bound for Philadelphia and Washington DC job markets to warrant commuter rail service, especially if bolstered by longer distance commuters driving to Cecil County stations from out of state residences.

4.4 PIVOT POINT ANALYSIS

Assuming no significant changes in MARC service levels from the present Perryville service, ridership estimates were developed for a proposed Elkton MARC station, including the impacts on ridership at the Perryville station, using a standard "pivot point" or incremental model. This approach uses existing ridership as the base and incrementing that existing ridership to future year estimates based on forecasted demographic changes and proposed changes in service. In this case, the proposed service changes include the new station at Elkton.

4.4.1 Methodology

4.4.1.1 Existing Commuter Rail Trips

Existing commuter rail trips were determined by conducting a survey at the Perryville station. The survey was conducted on May 8, 2003 and counted 98 persons boarding the four MARC trains and the one southbound Amtrak train. The survey data was factored up to the average daily ridership of 105 as reported by MARC. Figure 3 depicts the zip codes of the origins for the passengers presently boarding at Perryville.

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[3] This introduces the concept of Primary and Secondary Markets for commuter rail service. The Primary Market for commuter rail services is generally peak period commuters bound for jobs in large central business districts (e.g., SEPTA Route R2 service to Philadelphia). Secondary Markets can be the result of deliberate Policies (e.g., providing off-peak and weekend service to Wilmington) or Opportunities that are an adjunct to serving the Primary Market (e.g., "reverse peak" service to Wilmington employment centers results from trains moving from Philadelphia to be in position for morning Delaware-to-Philadelphia peak service).

Figure 5: 2005 Cecil County Residential Density

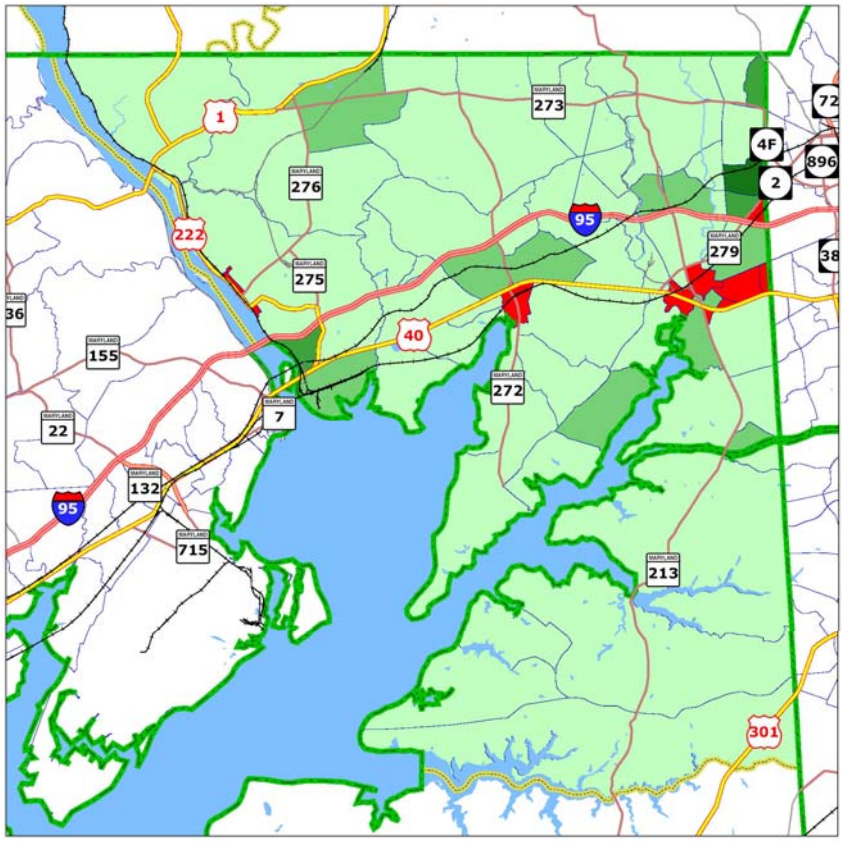
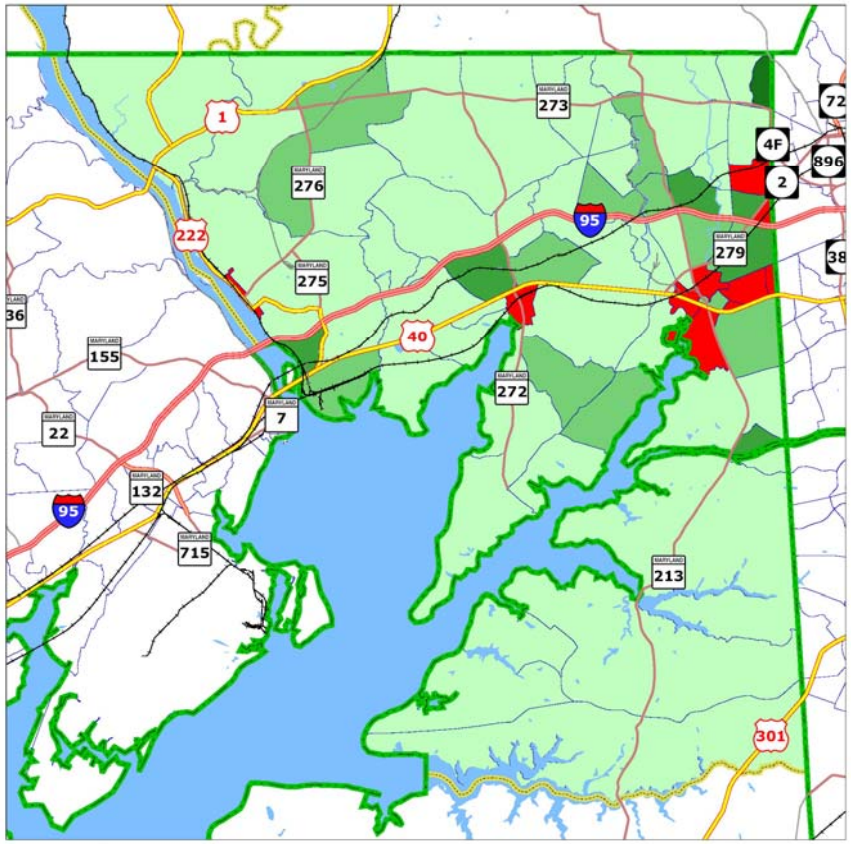
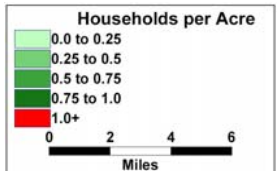


Figure 6: 2030 Cecil County Residential Density





Housing Density by Traffic Analysis Zones (TAZs)
Source: Wilmington Area Planning Council

4.4.1.2 Changes in Demographics

Between now and the forecast year of 2025, changes in population in the WILMAPCO area and changes in employment in the Central Business Districts of Washington DC and Baltimore will affect commuter rail ridership, regardless of whether a station is built at Elkton. To account for that change, the 77 existing rail trips to Washington, DC were apportioned (by population) to each census tract within their respective zip codes. These apportioned trips were then factored by the average of the change of population in the census tract and the change in employment in downtown Washington DC to derive the base 2025 commuter rail passenger trips, as shown in Table 3.

TABLE 3: PERRYVILLE STATION PASSENGER SURVEY
Zip Code of Trip Origin (Residence)

Origin	2003	2025
Cecil Co.	22	28
New Castle Co.	42	52
Chester Co.	4	5
Delaware Co.	3	4
Harford Co.	5	6
Philadelphia Co.	1	1
Total	77	97

4.4.1.3 Pivot Point Procedure

The pivot point procedure consists of estimating the existing mode share (percent of person trips from the WILMAPCO area to Baltimore and DC who use rail), the future mode share, the ratio between the two, and then applying that ratio to the 2025 base trips. For those census tracts that are nearby to Perryville, the ratio is 1.0. For those census tracts closer to Elkton, the ratio ranges between 1.22 and 1.58. Applying those ratios to the 2025 base trips results in the estimated 2025 rail trips to Washington, DC as shown in Table 4.

TABLE 4: PROJECTED 2025 TRIP ORIGINS

Origin	2025 (without Elkton)	2025 (with Elkton)
Cecil Co.	28	32
New Castle Co.	52	75
Chester Co.	5	6
Delaware Co.	4	6
Harford Co.	6	6
Philadelphia Co.	1	2
Total	97	127

Escalating the trips in Table 4 to include trips to all other destinations (primarily to Baltimore) and a 30 percent contingency results in the total trips shown in Table 5. Those total boardings were apportioned to each of the two stations based on their proximity to each census tract, with the final results shown in Table 6.

TABLE 5: PROJECTED 2025 TRIP ORIGINS; WASHINGTON DC VERSUS ALL MARC DESTINATIONS

Origin	To Washington DC	to All MARC Destinations
Cecil Co.	32	43-46
New Castle Co.	75	102-114
Chester Co.	6	9-10
Delaware Co.	6	9-10
Harford Co.	6	9-10
Philadelphia Co.	2	3-4

4.4.2 Pivot Point Conclusion

At present, about 105 passengers board the four MARC and one southbound Amtrak train stopping at Perryville each weekday morning. Without the new Elkton station, the number of passengers boarding at Perryville in Year 2025 is estimated to increase to about 135 per weekday morning based on projected increases in population in the corridor and increases in employment in the city centers of Washington, DC and Baltimore.

With the Elkton station, 35 to 60 additional trips are estimated due to the improved attractiveness of commuter rail with a station closer to their homes. Many of the passengers now using Perryville would likely switch to boarding at the closer Elkton station. The relative boardings at each station as presented in Table 6 below:

TABLE 6: ACTUAL VERSUS ESTIMATED FUTURE BOARDINGS WITH ELKTON STATION

Station	2003	2025
Perryville	105	32-38
Elkton	0	139-155
Total	105	170-195

4.5 H-1 MODEL FORECAST

There are shortcomings to applying a standard "pivot point" or incremental model approach to a relatively low volume population such as the present-day level of ridership at Perryville. Therefore, ridership was also estimated for a proposed extension of MARC Penn Line commuter rail to Cecil County. For modeling purposes, two new MARC stations were added in Northeast and Elkton. Ridership was also projected for a further extension of that service to Wilmington DE, with trains stopping at existing SEPTA at Newark, Churchman's Crossing[4], and Wilmington. Service would continue to be primarily oriented to commuting trips to jobs in Baltimore and Washington DC.

4.5.1 H-1 Model Methodology

Estimates were developed using the Transit Cooperative Research Program (TCRP) H-1 sketch planning model developed by Parsons Brinckerhoff, with standard "pivot point" adjustments to account for proposed variations in service levels.

The H-1 sketch planning model uses basic station-area demographic variables as inputs to estimate weekday commuter rail boardings by station. The demographic variables, in order of importance, include the availability of parking, average household income, CBD employment density, availability of feeder bus access, distance from the CBD, and population density. Mid-Atlantic cities of Baltimore, Philadelphia, and Washington, D.C. were among the 14 cities included in the model's estimation set. As with any ridership model, accuracy improves at the aggregate level; thus, estimates for the line as a whole are more reliable than estimates for particular stations.

[4] The stop at Churchman's Crossing was subsequently deleted in the Operations Analysis (see Technical Memorandum #3). It is still reflected in this portion of the market analysis, however.

The "pivot point" or incremental approach uses existing or future ridership as a base and increments that ridership based on proposed changes in service attributes, such as fares, frequency, or speed. Relationships between ridership and particular service attributes is provided by TCRP's comprehensive draft handbook, *Traveler Response to System Changes*, which compiled results of research of observed ridership changes in response to a wide range of service attributes, for numerous cities during recent decades.

Two service scenarios were evaluated:

Scenario 1: Extend MARC Penn Line service to five additional stations, terminating at Wilmington, Delaware, assuming an extension of existing service levels and fare policies.

Scenario 2: Extend MARC Penn Line service to five additional stations, terminating at Wilmington, Delaware, assuming existing fare policies but a doubling of peak period service levels.

The following approach was used:

1. Calibrate the H-1 model based on the corridor's observed ridership and demographics in 2000.
2. Collect comparable demographic and transportation system data for future years, including 2005, 2010, 2015, 2020, and 2025.
3. Apply the calibrated H-1 model to estimate future-year ridership (Scenario 1).
4. Apply a pivot point analysis to estimate travelers' response to improved peak period frequency (Scenario 2).

4.5.2 Data Collection

Demographic and transportation system data were collected for all station areas on MARC's Penn Line and proposed extension, from northern Delaware through central Maryland and Washington, D.C., for five-year increments between 2000 to 2025 inclusively.

Population and employment data at the Traffic Analysis Zone (TAZ) level were provided by the Wilmington Area Planning Council (WILMPACO), Baltimore Metropolitan Council (BMC), and Washington Council of Governments (COG).

Observed ridership counts at existing commuter rail stations were provided by the Maryland Transit Administration (MTA) and Southeastern Pennsylvania Transportation Authority (SEPTA).

Information about scheduled bus connections, existing service levels, and other system characteristics was gathered from publicly available sources provided by MTA, SEPTA, and the Delaware Transit Corporation (DTC).

Finally, income projections were obtained from Claritas, Inc., a private vendor that projects income levels further into the future than other available sources.

4.5.3 Calibration

The model provides some limited opportunity for calibration to observed ridership levels. Two important variables that offered some opportunity for calibration included downtown employment density and distance from the CBD.

4.5.3.1 Employment Density

CBD employment density is challenging to measure accurately, since estimates for density vary widely depending on how the boundary for downtown is defined. A more focused definition inevitably yields a higher density of fewer jobs, whereas a broader definition yields a lower density but captures a much greater portion of downtown-area employment.

Another important question is which downtown to use in the model: Washington, Baltimore, or both.

Two definitions were tested for each downtown: a "focused" definition that included only TAZs where the highest concentrations of employment are projected, and a "broad" definition that included all centrally located zip codes where high proportions of office employment are projected. The broad, zip-code-based definitions match what the H-1 model's developers used to estimate their original model. Altogether, four definitions of downtown and combinations thereof were tested:

- Downtown Baltimore, defined by TAZs
- Downtown Baltimore, defined by zip codes
- Downtown Washington, defined by TAZs
- Downtown Washington, defined by zip codes

Most likely, a model that uses Baltimore as the CBD would be most appropriate, since the 526 stations to which the H-1 model was estimated were located an average of 20 miles and 39 minutes from the CBD. The 90th percentile in the set was 38 miles and 66 minutes. Similarly, downtown Baltimore is 12 to 37 miles and 15 to 45 minutes from Penn Line stations northeast of the city. In contrast, downtown Washington is 52 to 77 miles, and 70 to 100 minutes away. The presence along the way of a major employment center, downtown Baltimore, further discourages long-distance commuting via the Line to Washington, by providing excellent nearby job accessibility. Nevertheless, some commuting along this portion of the Line inevitably occurs to downtown Washington, and the challenge is how to accurately capture those trips in the ridership estimates.

4.5.3.2 Distance

The MARC Penn Line operates faster than most U.S. commuter rail systems, with operating speeds of about 50mph (including time lost due to stopping) along its northeastern segment between Baltimore's Penn Station and Perryville, Maryland. In contrast, commuter rail systems in the H-1 model's estimation set averaged only about 28 mph. Since the H-1 model's variable for distance from the CBD might also serve as a proxy for travel time to downtown, the model may need to be calibrated to the Penn Line's higher operating speeds. Another remaining question is whether distance should be measured to downtown Baltimore or downtown Washington.

Thus, four variables were tested for "distance":

- Rail distance to downtown Baltimore
- Speed-adjusted rail distance to downtown Baltimore, using a distance that corresponds to a 28mph system traveling the same amount of time as MARC's Penn Line to each non-CBD station
- Rail distance to downtown Washington
- Speed-adjusted rail distance to downtown Washington, using the same method described above for Baltimore

4.5.3.3 Calibration Results

The H-1 model was run several times using various combinations of the specifications for distance and CBD employment density discussed above. The "best fit" resulted from using solely the Baltimore CBD, defined broadly using zip codes, and by using actual rail distance from downtown Baltimore. Not surprisingly, these are the same definitions used by the H-1 model's developers to estimate the original model, for which Baltimore served as part of the estimation set.

The "best fit" estimates for 2000 are compared in Table 7 and Table 8 to observed 2000 ridership at the same stations. Downtown Baltimore was defined as zip codes 21201 and 21202, consistent with the H-1 model's original specification. In 2000, Baltimore had 173,700 jobs in these zip codes, for an average employment density of about 91 jobs per acre.

TABLE 7: YEAR 2000 "BEST FIT" SPECIFICATIONS

Station	Parking?	Feeder Bus?	Average Household Income	Population Density (persons per acre)	Distance to CBD (miles)
Perryville	Yes	No	$ 41,425	0.8	36.4
Aberdeen	Yes	Yes	$ 34,197	1.8	30.4
Edgewood	Yes	No	$ 37,538	2.3	20.6
Martin State Airport	Yes	No	$ 54,150	2.8	11.9

TABLE 8: YEAR 2000 "BEST FIT" RESULTS[5]

Station	Estimated Ridership	Actual Ridership[6]	Percent Diff. (Est. vs. Act.)
Perryville	112	104	+8%
Aberdeen	183	179	+2%
Edgewood	121	204	-41%
Martin State Airport	131	205	-36%
TOTAL	547	692	-20%

Overall, the model estimates ridership about 20 percent lower than actual ridership levels in 2000. A 20 percent variance for just four stations seems within a reasonable level of tolerance for a sketch model. Overall, the model seems to be estimating ridership fairly accurately.

A "correction factor" was incorporated into the model for existing stations, so that estimates for future years would change incrementally from accurate base levels. However, in the interest of being conservative, no correction factor was included in the model for new stations northeast of Perryville, since the observed 20 percent difference for the small calibration set may be part of the model's normal variance, which ostensibly washes out over a larger number of stations.

4.5.4 Future-Year Estimates

Table 9 shows year 2000 specifications for demographics and the transportation system, for stations that are proposed to be served by the extended MARC Penn Line. Compared to currently served stations, these newly served stations show average household incomes about 13 percent lower and about the same population density—just three percent higher. Distance from the CBD, of course, is much greater for newly served stations. New stations are between 44 and 69 miles from downtown Baltimore, compared to just 12 to 37 miles for existing stations.

TABLE 9: YEAR 2000 SPECIFICATIONS

Station	Parking?	Feeder Bus?	Average Household Income	Population Density (persons per acre)	Distance to CBD (miles)
Wilmington	Yes	Yes	$ 22,953	4.4	68.8
Churchman's Crossing	Yes	Yes	$ 50,844	2.1	62.6
Newark	Yes	Yes	$ 40,685	1.2	56.7
Elkton	Yes	No	$ 34,158	1.4	50.6
Northeast	Yes	No	$ 36,489	0.8	44.4

[5] Results are expressed in terms of average weekday boardings at each station.

[6] Figures include boardings that occur on the one Amtrak train that stops at some MARC stations each morning. Amtrak daily AM-peak ridership estimates, which are less reliable than MARC ridership counts, are roughly 30 boardings at Perryville, 90 at Aberdeen, and 30 at Edgewood.

Between 2000 and 2025, demographic characteristics in the corridor are expected to remain fairly stable, as shown in Table 10.

TABLE 10: CHANGE IN REAL INCOME AND POPULATION (2000 to 2025)

Station Area	Real Income Change	Population Change
Wilmington	+ 2.4 %	+ 2.2 %
Churchman's Crossing	+ 3.9 %	+ 1.7 %
Newark	- 4.2 %	+ 1.2 %
Elkton	- 5.7 %	+ 28.3 %
Northeast	- 3.1 %	+ 11.0 %
Perryville	- 0.9 %	+ 7.9 %
Aberdeen	- 2.8 %	+ 31.7 %
Edgewood	+ 1.3 %	+ 3.9 %
Martin State Airport	- 5.6 %	+ 6.5 %
Existing Stations:	**- 1.2 %**	**+ 6.3 %**
New Stations:	**- 1.9 %**	**+ 11.7 %**
Overall:	**- 1.5 %**	**+ 8.7 %**

Real income in the corridor is expected (and partially observed) to rise by about three percent between 2000 and 2005 but then fall by about five percent from 2005 to 2010, as Baby Boomers retire in larger numbers and the work force shrinks. Income projections from are availably only through 2010, so real 2010 incomes are used as the best estimate of all future year real incomes beyond 2010. Income levels near Martin State Airport, Elkton, and Newark are expected to erode the most in the upcoming decade. Meanwhile, incomes near Churchman's Crossing and Wilmington are expected to rise the most.

Population in most station areas is expected to grow slowly between 2000 and 2025, with 1.2 percent to 3.9 percent increases at most stations. The center portions of the corridor are expected to grow more rapidly, near Aberdeen (32 percent growth), Elkton (28 percent), Northeast (11 percent), and Perryville (eight percent). Overall, newly served stations are expected to grow about twice as fast as existing stations, though the growth in both cases is relatively small.

Meanwhile, downtown Baltimore is expected to grow by about five percent over the 25-year period, to about 181,700 jobs in 2025, or 95 jobs per acre.

4.5.4.1 Extend MARC Penn Line with Existing Service Levels (Scenario 1)

Table 11 shows ridership estimates by station, and summarized by segment and overall, between 2000 and 2025. The estimates assume that the MARC extension to Wilmington would be in operation well before 2010 and would provide comparable levels of service as existing service to Perryville.

Importantly, the H-1 model does not account for shifting of trips that would occur between Perryville and stations farther northeast, if the Penn Line were extended. A survey conducted by Parsons Brinckerhoff in May 2003 shows that the highest concentration of morning origins for travelers who board at Perryville actually is in the zip code that includes Elkton. The next largest number of travelers originate in the zip code that includes Northeast, followed by areas around Newark. Areas near Perryville include the fourth highest number of passengers boarding at Perryville. If the MARC Line were extended, ostensibly many boardings would shift from Perryville to Elkton, Northeast, or Newark. The Parsons Brinckerhoff analysis estimated that based on observed residential locations, about 66 percent of passengers who currently board at Perryville would shift to stations farther north if the Penn Line were extended one station to Elkton.

Because the H-1 model would not account for this type of shift on its own, the shift is performed manually by reducing Perryville's weekday boardings by about 66 percent once the Penn Line is extended. The H-1 model's base estimates for Northeast, Elkton, and Newark implicitly already account for trips that shift from Perryville, since the model assumes a continuous line, so no need exists to manually increase ridership at these stations to account for the manual decrease at Perryville.

Overall, the new part of the line, with five stations in addition to the existing section's four stations, would carry more ridership. In 2025 the existing portion of the line would attract about 723 daily boardings if the line is not extended, or 649 if it is extended. In comparison, new stations would attract about 788 daily boardings (331 at Maryland stations, 457 at Delaware stations). Total ridership on the line would increase ridership by just under 100 percent as a result of the extension.

On a per-station basis, new stations are estimated to attract ridership within the same general range as existing stations. In 2025, the extended line would average about 143 weekday boardings per new station, compared to 142 boardings per existing station. If the line is not extended, then existing stations would attract an average of 180 boardings each.

TABLE 11: RIDERSHIP ESTIMATES FOR MARC EXTENSION

Station Area	Year					
	2000	2005	2010	2015	2020	2025
Wilmington			122	124	124	125
Churchman's Crossing			228	229	230	231
Newark			163	163	164	165
Elkton			158	161	163	166
Northeast			98	99	100	101
Perryville	104	108	36	36	36	36
Aberdeen	179	187	184	188	190	193
Edgewood	204	217	212	214	215	215
Martin State Airport	205	206	200	202	203	204
Existing Stations:	**692**	**719**	**632**	**639**	**644**	**649**
New Stations:			**769**	**777**	**782**	**788**
Overall:	**692**	**719**	**1,401**	**1,416**	**1,426**	**1,437**

4.5.4.2 Extend MARC Penn Line with Augmented Service Levels (Scenario 2)

Current service provides three peak-period MARC trains and one Amtrak train in the peak direction of travel, for an average 45-minute headway on an irregular schedule.

Additional service could be justified possibly as a strategy to increase ridership or as a method to provide enough capacity for the higher loads of passengers that would be riding from newly serve stations through the peak load point near downtown Baltimore.

The synthesis of research contained in the draft "Traveler Response to Transportation System Changes" indicates that commuter rail patronage seems to be very sensitive to changes in frequency, with service frequency elasticity of +0.5 to +0.9 with regard to ridership – meaning nominally that for a ten percent increase in frequency, a five to nine percent increase in ridership could be expected. Longer trips seemed even more sensitive.

For any transit mode, sensitivity to frequency improvements is greatest for service whose initial frequency is low and whose riders primarily are middle and upper income. These riders are more likely to have a choice to switch to or from other modes and therefore can change their travel habits more readily in response to transportation system changes. Meanwhile, improving upon an initially low service frequency yields disproportional benefits in terms of reduced waiting time and greater convenience of departure time.

Also, for commuter rail in particular, ridership tends to be more sensitive for longer trips. According to the Traveler Response handbook, three experiments in Boston, Philadelphia, and New York City show that longer commuter rail lines within these systems are more sensitive to frequency improvements.

The Penn Line matches these characteristics well. Its initial service frequency is low, about 1.3 trains per hour, and its extension to Wilmington would increase its average distance from suburban stations to downtown Baltimore to 43 miles or 53 minutes. In comparison, the 526 commuter rail stations in the H-1 model's estimation set averaged about 20 miles or 39 minutes from downtown, and the 90th percentile was about 38 miles or 66 minutes. The extended line, between Baltimore and Wilmington, would be among the longer regional rail lines in the U.S.

Thus, a ridership elasticity of +0.5 with respect to service frequency – the low end of observed response to frequency improvements in Philadelphia, Boston, and New York – should describe the minimum ridership increase that could be expected for frequency improvements.

Assuming that service frequency is doubled at the same time that MARC service is extended to Wilmington, Table 12 shows estimated ridership for the line with augmented service. Applying a +0.5 elasticity to an assumed doubling of service yields an estimated ridership increase of 50 percent, or 718 boardings, over estimated patronage levels without only an extension to Wilmington.

TABLE 12: RIDERSHIP ESTIMATES FOR MARC EXTENSION WITH DOUBLED FREQUENCY

Station Area	Year					
	2000	**2005**	**2010**	**2015**	**2020**	**2025**
Wilmington			183	186	187	188
Churchman's Crossing			342	344	345	347
Newark			244	245	246	247
Elkton			238	242	245	249
Northeast			147	149	150	151
Perryville	104	108	53	54	54	54
Aberdeen	179	187	276	281	286	289
Edgewood	204	217	319	321	322	323
Martin State Airport	205	206	300	302	304	306
Existing Stations:	**692**	**719**	**948**	**958**	**966**	**973**
New Stations:			**1,153**	**1,165**	**1,173**	**1,182**
Overall:	**692**	**719**	**2,102**	**2,123**	**2,139**	**2,155**

4.5.5 H-1 Model Conclusions

Results demonstrate that the combination of extended service, more frequent service, and gradually changing demographics over time would triple ridership on the line by 2025, as compared to current ridership levels.

In terms of justification for service extension and frequency improvement, the estimates above are conservatively on the low end of the reasonable range, since they:

- Duly account for trips shifting away from Perryville to stations farther north;
- Apply the most conservative elasticity of ridership with respect to frequency that has been observed on built commuter rail systems; and
- Apply the calibrated H-1 model "as is" to new stations, without an upward 20 percent correction factor to account for the observed underestimate of ridership at existing stations. The method acknowledges that the observed 20 percent difference for the small calibration set may be part of the model's normal variance, which ostensibly washes out over a larger number of stations.

Demographic changes, independent of any Line extension or frequency improvement, are estimated to yield roughly a five percent increase in ridership over the 25-year period. Adding five stations to the existing four-station segment northeast of Baltimore would yield a 99 percent increase. Finally, improving service frequency would yield at least an additional 50 percent increase. The synergistic effects of these changes would yield a combined ridership increase of about 208 percent, or 1,463 daily boardings, over year 2000 patronage levels, bringing total 2025 ridership on the section northeast of Baltimore to 2,155 daily boardings.

4.6 SUMMARY

Extending SEPTA and MARC commuter rail service into Cecil County would be difficult to justify at present based solely upon current and projected demographic trends. There are clusters of residential density in and around Elkton and Northeast, however that meet the minimum thresholds for service that at present could generate sufficient commuter traffic bound for Philadelphia and Washington DC job markets to warrant commuter rail service, especially if bolstered by longer distance commuters driving to Cecil County stations from out of state residences.

If existing MARC Penn Line service at Perryville were extended northward, in 2025 the new stations at Elkton and Northeast would attract about 331 weekday boardings. About 457 additional weekday boardings would be attracted to Delaware stations if service were further extended to Wilmington. If peak period service levels were doubled, another 50 percent increase in ridership would be attracted to Penn Line North stations.

5 OPERATIONS ANALYSIS

An operations analysis was performed to identify the market orientation and ridership potential for Elkton passenger rail service issues. Three alternative levels of Elkton passenger rail service were identified for consideration in the operations analysis:

1. Stopping a limited number of existing Amtrak trains at Elkton, akin to the two daily trains that currently stop at Newark DE (previously evaluated in the Phase I report).
2. Extending the existing level of MARC service at Perryville to Elkton.
3. Extending a more robust level of MARC service to Perryville and Elkton.

Phase I on the Study investigated the potential for SEPTA commuter rail service to Philadelphia PA and Wilmington DE. Phase II has concentrated on the potential for MARC commuter rail service to Baltimore MD and Washington DC.

5.1 HISTORICAL PERSPECTIVE

Railroad service through Elkton along the alignment now known as the Amtrak Northeast Corridor was begun in 1837 by the Philadelphia, Wilmington & Baltimore Railroad Company (PW&B), although a bridge across the Susquehanna River was not completed until 1866. The original alignment through the center of town was abandoned in 1934 in eliminate grade crossings and speed-limiting curves and the existing station building was constructed in 1935. There were four previously passenger stations in Cecil County: Elkton (MP 44.7), North East (MP 49.9), Charlestown (MP 53.5), and Principio (MP 56.7), in addition to the sole remaining station at Perryville (MP 58.9).

The PW&B and its successors provided limited service to Elkton and the other Cecil County stations, a practice that continued into the Amtrak era. The last Amtrak service scheduled to stop in Cecil County was the *Chesapeake*, a 403B-service that operated from 1979 t0 1983, jointly sponsored by the States of Maryland and Delaware and the Commonwealth of Pennsylvania. In addition to providing a commuter service for the Washington DC employment market—its primary service market—the train provided Amtrak with an opportunity to cycle NJ Transit-owned Arrow III rolling stock (leased at that time by MARC) to and from the Philadelphia maintenance base.[7]

The Chesapeake
Philadelphia
Chester
Elkton
Baltimore
Bowie
Washington

READ DOWN				Train Number	READ UP
421					420
ⓜM thru F				Frequency of Operation	ⓜM thru F
7 10 A	Km 0	Mi 0	Dp	**Philadelphia, PA** *(30th St. Sta.) (ET)* Ar	6 55 P
7 24 A	20	12		**Chester, PA** ✠	6 38 P
7 36 A	41	26		Wilmington, DE	6 25 P
7 47 A	61	38		Newark, DE ●	6 15 P
7 53 A	70	44		**Elkton, MD** ●	6 09 P
8 04 A	93	58		Perryville, MD ●	5 58 P
8 10 A	103	64		Aberdeen, MD ●	5 52 P
8 19 A	119	74		Edgewood, MD ●	5 43 P
8 37 A	151	94		**Baltimore, MD** *(Penn. Sta.)*	5 25 P
8 54 A	180	112		Odenton, MD ●	5 07 P
9 01 A	191	119		**Bowie, MD** ●	4 59 P
9 20 A	216	134	Ar	**Washington, DC** *(ET)* Dp	4 45 P

Source: Amtrak April 1979 Timetable

The *Chesapeake* ran too late in the morning and too early in the evening to provide an effective option for commuters and was lightly patronized. Despite subsequent schedule changes to better accommodate commuter needs, it never attracted a significant following. NJ Transit recalled the leased rolling stock in 1983 for its re-electrified Hoboken Division, so the Philadelphia maintenance movements were no longer necessary and were no longer a factor in the train's retention.

MARC extended its Penn Line commuter rail service between Washington DC and Baltimore along the Amtrak Northeast Corridor in to Perryville in 1990. Service was limited to peak periods only, with trains and crews based in Baltimore. Trains would deadhead 36.3 miles from Baltimore before reversing at Perryville and initiating revenue service to Baltimore and Washington DC (this

[7] The Primary Market for commuter rail services is generally peak period commuters bound for jobs in large central business districts (e.g., SEPTA Route R2 service to Philadelphia). Secondary Markets can be the result of deliberate policies (e.g., providing off-peak and weekend service to Wilmington) or opportunities that are an adjunct to serving the Primary Market (e.g., "reverse peak" service to Wilmington employment centers results from trains moving from Philadelphia to be in position for morning Delaware-to-Philadelphia peak service).

pattern was repeated in reverse with evening peak trains). Two midday Perryville trains were added with the Spring 2004 timetable. There is one evening train operating north to Perryville from Washington DC, which then deadheads to Baltimore.

As previously noted, southbound Amtrak Train #151 also stops at Perryville at 6:50 AM to pick up MARC passengers. This stop is not reflected as an Amtrak stop in public timetables or web site materials.

5.2 OPERATING CONSTRAINTS

5.2.1 Track Access Considerations

Amtrak, MARC and Norfolk Southern all share the same Northeast Corridor tracks through Cecil County (in addition to the two wayward SEPTA movements previously noted). Where MARC shares tracks with Amtrak, scheduling commuter trains is severely constrained. Amtrak trains require priority access to the high-speed tracks and must operate on the high-speed tracks with no diverting moves (i.e. track changes) in order to maintain their schedule.

Schedule slotting is problematic because each class of Amtrak train (Acela Express, Metroliner, Regional) and MARC trains operate at different speeds with different stopping patterns. A slower southbound commuter train requires a slot between faster trains that allows it to operate between Elkton and the Gunpowder River bridge (where a two track section fans out to four tracks) before a following faster train would catch up. When northbound, most MARC trains are overtaken by the faster Acela Expresses while they are operating on a slower track in a three-track section between Washington and Baltimore. There is also the opportunity to overtake a MARC train in the four-track section between Baltimore and the Gunpowder River Bridge. Once released from "Gunpow" (north of the station stop at Martin Airport) the train requires a slot on the high-speed track until it can clear on Number 1 track at Bacon in advance of a following faster train.

This is not an issue with the service terminating at Perryville per se, but it becomes an issue if the evening service were extended to Elkton because Metroliners and Acela Expresses that left Washington much later than the local would now catch up to the local over the longer distance, resulting in unacceptable delay to the faster trains. Freight activity is concentrated in a window between 10:30 PM and 6:30 AM in order to give passenger trains an unimpeded right of way during the day and also to promote safety by separating the freight from the high-speed passenger operation.

The double track territory between Prince and Bacon Interlockings is a significant bottleneck in a mixed traffic environment. Freight trains operate much more slowly than the passenger trains and consume a disproportionate share of the available line capacity (it is relevant to note that a freight train traveling north in this territory is going uphill and is slowed by its trailing tonnage even more than by the speed limit). Extending MARC service north of Perryville would worsen congestion in this critical double-track territory during the relatively narrow time window in which freight trains operate.

Routine and special track maintenance also requires that one of these tracks be taken out of service to accomplish the work. Maintenance must be accomplished within the freight-operating window, effectively bringing the freight operation down to a single-track operation during track maintenance. This becomes significant for commuter service if early morning trains—in revenue service live or deadhead—also need to operate through the bottleneck.

One approach to relieving the congestion would be the construction of an additional track between Prince and Bacon Interlockings as proposed by Amtrak and the Mid-Atlantic Rail Operations Study. While such a scheme has been included in various long-range corridor capacity studies, the construction would be extremely expensive and may not be a practical short-tern solution. An alternative approach could be to mitigate line congestion by relocating the

overnight layover from Baltimore, although that alternative would also introduce its own (albeit smaller) capital and operating budget implications.

5.2.2 Service Planning Considerations

MARC Penn Line schedules are designed around the needs of the core market of Baltimore to Washington DC commuters. When service was extended to Perryville, selected existing Baltimore-Washington DC trains were extended northward. This resulted in early morning departures and late evening arrivals at Perryville. Based on the existing schedule, if the three morning peak departures from Perryville were simply extended north to Elkton, departure times would be 4:35 AM, 5:30 AM and 6:15 AM. Applying the same approach to evening peak arrivals in Elkton would be 6:16 PM, 7:18 PM, and 8:38 PM.

The span of these service times describe would make a long day for a routine commuter. However, they are well within the extremes seen on MARC's Martinsburg WV service in the Washington DC commute market and on Amtrak, NJ Transit, and Amtrak in the comparable New York City commute market.

The two midday and one evening round trips to Perryville in the present timetable change were achieved by extending existing Washington-Baltimore trains further north rather than turning them back at Baltimore. These trains reverse at Perryville and are scheduled to assume the slots formerly occupied by Baltimore-Washington trains. There is not enough layover time at Perryville for these trains to run to Elkton and return to Perryville in time to represent the same southbound trains as they do at present. Therefore, extending off-peak train service to Elkton will require rearranging crew assignments and train turns in Baltimore for several Baltimore-Washington DC runs as well as for the present Perryville trains.

5.2.3 Interlockings

MARC trains at Perryville typically reverse direction on the southbound platform, having crossed over from the northbound to southbound track at Perry Interlocking (MP 59.5), immediately south of the station on the north bank of the Susquehanna. There is no similarly configured interlocking at present immediately south of Elkton, however, if the service were extended. MARC trains serving Elkton would need to continue 6.3 miles further north past Newark DE to Davis Interlocking (MP 38.4) in order to reverse direction. This movement can be avoided by adding a new interlocking and layover track closer to Elkton (as investigated in Phase I), but that would be a costly proposition.

5.2.4 Labor Considerations

MARC Penn Line service is currently operated and maintained by Amtrak under contract. MARC Penn Line trains layover and are serviced overnight at Penn Station, Baltimore. Train crews report to work in Baltimore as early as 3:25 AM in order to get to Perryville in time for the first southbound revenue movements. Engineers and Conductors are limited by law as to the amount of time they can be on duty and the existing crew assignments have been optimized to efficiently use the time allowed.

Simply extending the existing service north to Elkton would extend some crew assignments beyond their legal limit. MARC would need to authorize Amtrak to hire additional crews and restructure crew assignments. Extension of service to Elkton would require at least one, and possibly two, additional operating crews depending on the actual schedules.

The Susquehanna River marks the dividing line between Amtrak's Washington and Philadelphia crew bases. Under the current Amtrak agreements, the Washington crew base supplies the

manpower for the MARC Penn Line and all MARC Penn Line crews sign on and off at Baltimore. If the report location was moved north of the Susquehanna, the Philadelphia crew base would have jurisdiction over the work, splitting the MARC Penn Line labor pool between the two crew bases. The practical implication of this would be that some economies of scale may be lost in terms of crew assignments and a requirement for additional crews, resulting in increased operating cost.

The Penn Line rolling stock for the Perryville service is maintained overnight at Penn Station, Baltimore, by Amtrak maintenance workers under contract to MARC. Anecdotal information was received but not confirmed that the Amtrak crews maintaining MARC equipment in Baltimore were actually off the Wilmington Shop roster. If this is indeed the case, moving equipment storage and servicing north of the Susquehanna should not have as pronounced an affect on maintenance crews as it would on operating crews.

5.2.5 Passenger Station Considerations

Extension of MARC service north of Perryville would require changes at that station, where all MARC movements presently work off of a single platform (the “southbound” side platform adjacent to the station building). That would require rehabilitation of the northbound platform at Perryville and retrofitting the station with a pedestrian crossing compliant with the Americans with Disability Act (ADA) so that trains could load or discharge on either the northbound or the southbound tracks. That crossing, by necessity, must need to be fully grade separated.

Elkton Station has been out of service since Amtrak discontinued *Chesapeake* service in 1983. The track area, platforms, and remaining facilities are cut off from public access by chain link fences. The station building has been converted to a field office for the Amtrak Communications and Signals Department and much of the former station grounds are used for associated material storage. The pedestrian underpass at Elkton has been sealed and is said to be in fairly good condition, but is not ADA accessible. Both platforms would need to be completely reconstructed.

There are no functional traces of the other three former stations in Cecil County (Principio, Charlestown, and North East). Parking will be needed at any new station; those requirements are addressed in the Engineering Analysis.

5.2.6 Layover and Servicing Considerations

The feasibility of service to Elkton cannot be adequately assessed without considering where the layover facilities would be located to support this service. Currently, all MARC Penn Line equipment is stored and serviced overnight at Penn Station Baltimore, then deadhead 36.3 miles between Baltimore and Perryville before and after revenue service. If the service were extended to Elkton under current circumstances, trains would deadhead 57.3 miles from Baltimore to Davis interlocking in Newark DE (the next interlocking north of Elkton where trains can reverse).

MARC operating costs are determined by a complex formula with fixed thresholds defined by their agreements with Amtrak. Train miles (in revenue service or deadhead) are a key determinate for Amtrak access and power fees. Crew costs—which are time based—also increase proportional to distances travel. The current deadhead to Perryville is considered by MARC to be the limit of operational practicality and financial prudence.

The current deadhead to Perryville has prompted MARC to investigate an alternate overnight layover site at Aberdeen or Perryville, independent of any consideration of Elkton service. In considering a potential extension, sites at Elkton as well as Wilmington will have to be evaluated. The interrelation of access fees, equipment maintenance requirements, crew costs, and the elimination of nonproductive deadhead miles need to be considered in the overall context of system-wide service design.

5.2.7 Indemnification Considerations

Insurance represents a significant portion of MARC's operating budget. Like most commuter rail agencies, MARC's parent—the Maryland Mass Transit Administration—protects itself from catastrophic loss by a combination of self-insurance and multiple layers of high-deducible commercial insurance coverages, ultimately backed by the good faith of the State of Maryland and the Maryland Transportation Trust Fund.

Maryland's sovereign immunity statues limit MARC's liability in the event of a catastrophic occurrence when performing services deemed to be in the public interests. Sovereign immunity is integral to multi-tiered coverages of this sort but typically does not apply out of state. The State of Delaware, however, extended its sovereign immunity to cover SEPTA in 1988 and again in 1992 to cover the Maryland Mass Transit Administration, MARC and Amtrak when providing services on behalf of the Delaware Transportation Authority, predecessor of the Delaware Transit Corporation. In the event MARC service is extended to Elkton, it should be confirmed that the Delaware sovereign immunity statutes still contain these provisions and are sufficient to provide adequate indemnification for MTA, MARC and Amtrak.

5.3 PASSENGER TRAIN ALTERNATIVES

Three alternative levels of Elkton passenger rail service were identified for consideration in the operations analysis:

1. Stopping a limited number of existing Amtrak trains at Elkton, akin to the two daily trains that currently stop at Newark DE.
2. Extending the existing level of MARC service at Perryville to Elkton.
3. Extending a more robust level of MARC service to Perryville and Elkton.

5.3.1 Scenario 1: Stop Amtrak Trains at Elkton

Under this scenario, Elkton passenger service would be provided by stopping existing Amtrak trains at Elkton. A similar scenario was previously evaluated in the Phase I report and identified as having the potential of attracting about 299 daily passengers at Elkton. The operating impacts associated with this alternative should be minor if it only entails adding a stop to existing scheduled movements. The likelihood of Amtrak adding an Elkton stop to several existing trains is remote, however, given the long-established Amtrak service pattern at nearby Aberdeen and Newark stations consists only of single stop service in each direction.

Reviving a new local passenger service like the former *Chesapeake*, however, would have operating impacts throughout its run between Philadelphia and Washington DC and require more detailed analysis. More significant would be addressing its capital requirements since there is not a readily available pool of high-speed commuter rail equipment, as was the case in the late1970s.

5.3.2 Scenario 2: Extend Existing MARC Perryville Trains to Elkton

Under this scenario, the existing MARC train service at Perryville conceptually would be extended 14.7 miles to Elkton. As discussed in the previous section on Operating Constraints, this would actually entail extending service 21.0 miles to Newark DE in order to turn trains at Davis Interlocking unless a new overnight storage yard and crew reporting location was established for the MARC Penn Line service somewhere closer to Elkton. This scenario was evaluated as part of the market analysis and identified as having the potential of attracting about 303 daily passengers at Perryville, Elkton and North East stations combined, plus another 165 passengers at Newark if doors were opened when passing through that station.

Running times for MARC service between Perryville and Elkton were developed using the Rail Traffic Controller train performance calculator and dispatching software by Berkeley Simulations Software. The results of the computer running time simulations are summarize in Figure 7. A cursory review of operating capacity indicated that this limited level of service could be accommodated with minor schedule adjustments to MARC trains between Perryville and Davis (if necessary to operate that far north) advantageous to Amtrak movements.

The major operating implications of this option were also described at length as part of the aforementioned Operating Constraints discussion. Foremost among these would be the capital expense associated with a new storage yard/crew reporting location, improvements to existing station facilities at Elkton and Perryville, and construction of a new station in North East.

Operating cost impacts are difficult to quantify due to the complexity of the Amtrak-MARC agreements. Using train miles as a proxy for costs, on each weekday this option would add about 231 train miles (11 new daily train movements between Perryville and Davis) but eliminate about 254 deadhead train miles, yielding a minor net reduction (23 train miles) in weekday train miles. Reductions in operating cost would be partly offset, however, by some of the diseconomies associated with a split crew base and an additional overnight servicing location.

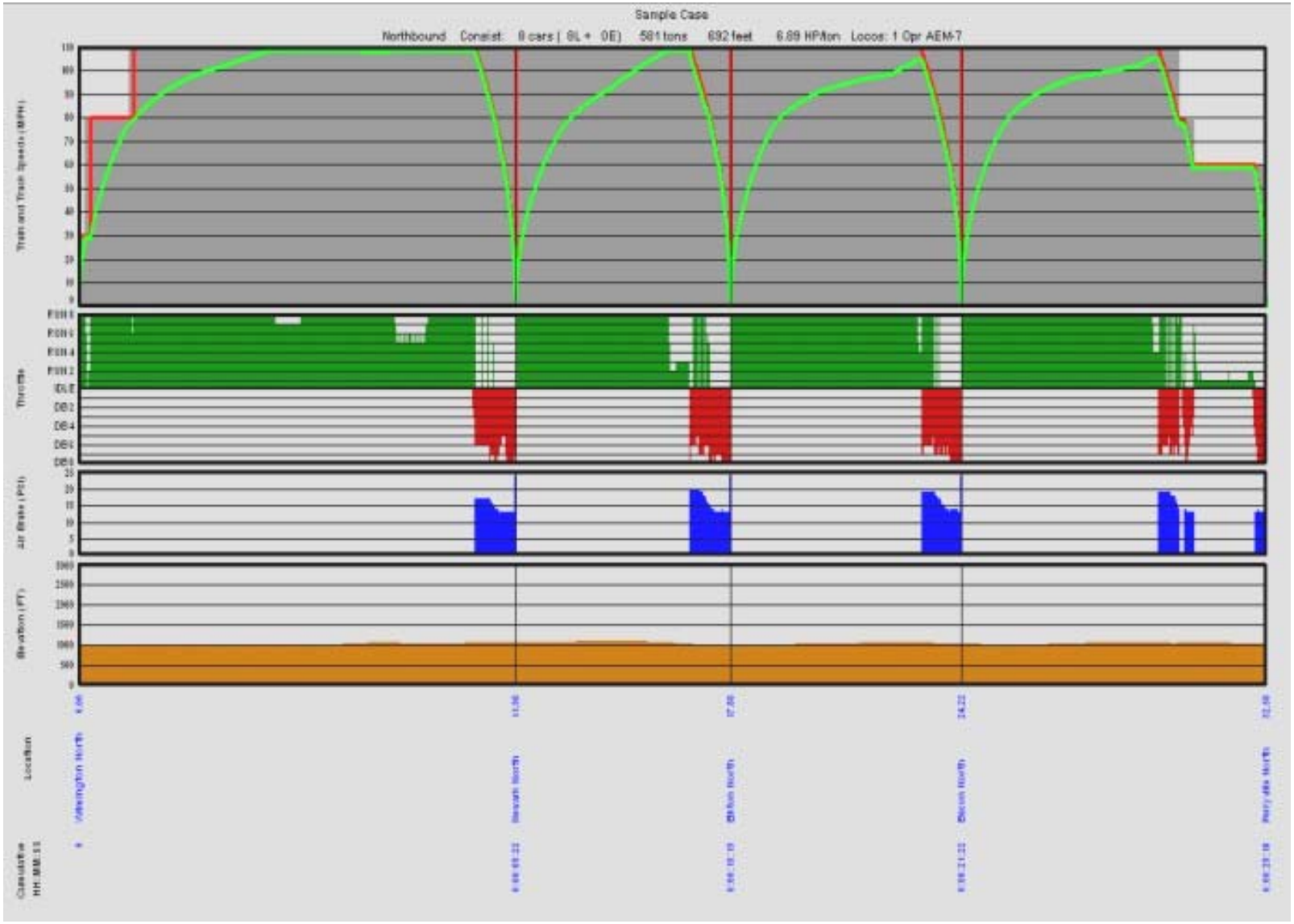
5.3.3 Scenario 2A: Extend Existing MARC Perryville Trains to Wilmington

A variation of Scenario 2 was investigated under which the existing MARC train service at Perryville was extended further to Wilmington. Only three peak trains in each direction were proposed to be extended under this concept.

The benefit of this alternative was the possible synergies associated with using a portion of Amtrak's Wilmington Shops as the new overnight storage yard and crew reporting location, as well as the potential of attracting more, high revenue trips from Delaware and Southeastern Pennsylvania markets. This option was also evaluated as part of the market analysis and identified as having the potential of attracting about 521 daily passengers at Delaware stations, in addition to the 303 trips already identified for Cecil County stations.

Running times were likewise calculated for MARC service between Elkton and Wilmington and are also summarized in Figure 7. A cursory review of operating capacity suggested indicated that this peak only level of service could be accommodated with minor schedule adjustments to MARC trains between Perryville and Landlith (the interlocking at Wilmington Shops at MP 25.4) advantageous to Amtrak and SEPTA movements. The operating analysis initially assumed that MARC trains would share existing SEPTA stations at Wilmington and Newark but not Churchman's Crossing, as that station currently has only a single platform accessible from Track 1, which would complicate PM peak period operations. The Delaware Transit Corporation indicates that it plans to add a southbound platform to the station, so a Chruchman's Crossing stop was restored to this alternative.

Figure 7: Train Performance Calculator Results



In comparison to the base Scenario 2, this option would reduce the capital expense associated with a new storage yard/crew reporting location, although some improvements will be necessary to existing tracks in Wilmington Shop. With respect to operating cost, this option would add about 204 train miles (six new daily train movements between Perryville and Landlith) but eliminate about 218 train miles, again yielding a minor net reduction in weekday train miles. As before, reductions in operating cost would be partly offset by some of the diseconomies associated with a split crew base and an additional overnight servicing location, but those might also be reduced in comparison to the independent facility proposed in the base alternative.

5.3.4 Scenario 3: Double Existing MARC Perryville Trains to Elkton

Under this scenario, the existing MARC train service would be conceptually doubled at Perryville and extended 14.7 miles to Elkton. As discussed in the previous section on Operating Constraints, this would actually entail extending service 21.0 miles to Newark DE in order to turn trains at Davis Interlocking unless a new overnight storage yard and crew reporting location was established for the MARC Penn Line service somewhere closer to Elkton. This scenario was evaluated as part of the market analysis and identified as having the potential of attracting about 454 daily passengers at Perryville, Elkton and North East stations combined, plus another 247 passengers from Newark if doors were opened when passing through that station.

Running times developed for Scenario 2 were also applied in analysis of Scenario 3. A complete rescheduling of whole MARC Penn Line service would be necessary to put this scenario into effect with considerations of service planning concerns beyond the scope of this study. Instead, a cursory review of operating capacity was conducted for selected peak and off-peak trips on the two-track segment on the Amtrak Northeast Corridor between Prince and Bacon Interlockings that is the focus of this study. The conclusion of the analysis was that doubling MARC service frequencies would significantly overtax the operating capacity of this line segment in both peak and off-peak periods. While the off-peak service conflicts identified could be relieved by aggressive scheduling techniques (e.g., holding northbound and southbound MARC trains at Perryville to allow Amtrak trains to pass), as a practical matter this would create a less attractive service for passengers (subjecting them to scheduled holds enroute) and require a degree of operating precision unlikely to be reliably achieved on a continuing basis.

The major implication of this scenario is that the extension of Track 1 would be required between Prince and Bacon, in addition to the capital improvements outlined for Scenario 2 in the previous section. As with Scenario 2, operating cost impacts are difficult to quantify due to the complexity of the Amtrak-MARC agreements. Using train miles as a proxy for costs, on each weekday this option would add about 1,492 train miles (22 new daily train movements between Baltimore and Davis and 11 new movements between Perryville and Davis) but eliminate about 254 deadhead train miles, yielding a significant net increase (1,238 train miles) in weekday train miles. Operating costs would be further increased the diseconomies associated with a split crew base and an additional overnight servicing location.

5.4 FREIGHT TRAIN ALTERNATIVES

The Study's operational analysis address freight rail operational issues between Perryville MD and Newark DE as they may affect service for Delmarva customers as goods movements to and from the Delmarva Peninsula, as well as on the Amtrak Northeast Corridor in general.

5.4.1 Existing Freight Operations and Trends

Currently, Norfolk Southern runs from eight to ten daily freight trains over the Amtrak Northeast Corridor between Perry (Perryville) and Davis (Newark DE). These movements are typically limited to an operating window that roughly extends from 10:30 PM to 6:00 AM. At a minimum, daily movements typically include:

- A set of Perry-Davis movements to and from the Delmarva Peninsula.
- A set of Perry-Regan (Wilmington DE) movements to and from the New Castle Secondary.
- One Perry-Davis movement carrying coal and/or grain bound for the Delmarva Peninsula (empties return via one of the other movements).
- set of Perry-Regan movements serving local shippers along the Amtrak Northeast Corridor.

NS anticipates traffic potentially expanding to about 15 trains per day. This expansion includes:

- *New Through Intermodal Traffic*: Last summer, NS experimented with one intermodal train in each direction over the Amtrak Northeast Corridor between Lane (Newark NJ) and Landover (Washington DC). The test runs were considered successful. NS anticipates operating such a service on a regular basis via the Christina Swing Bridge (Wilmington DE), soon to be restored to service with assistance from DelDOT. The southbound movement would pass through Cecil County about 5 or 6 AM and the northbound movement about 2 AM.
- *New Delaware City Intermodal Traffic*: NS may start a set of Triple Crown "Road-Railer" intermodal trains through Cecil County service in the next two to three years. These would be in conjunction with a new intermodal terminal planned near Delaware City. The southbound movement would pass through Cecil County late in the afternoon or early evening, while the northbound movement would pass through about 8 AM.
- *Extending Existing Trains*: NS may extend an existing Edgemoor DE-Allentown PA movement to Baltimore. The train presently originates in Delaware at dawn, and so the extended movement would pass through Cecil County earlier in the morning.
- *Growth in Port of Wilmington Traffic*: Although not quantified at this time, NS is pursuing options with the Port of Wilmington for increased intermodal traffic through that facility.
- *Growth in Delmarva Peninsula Traffic*: Other growth is anticipated in Delmarva Peninsula traffic, although it also has not been quantified at this time. One change noted by NS is the shift to using Powder River Basin coal by the Delmarva Electric Indian River power plant. While there are good economic justifications for the shift, Powder River Basin coal yields less BTUs per ton than previous coal sources, resulting in more tonnage shipped by railroad for the same amount of power generated.

5.4.1.1 Proposed Physical Improvements

NS considers achieving increased levels of traffic a challenge given capacity constraints in the Newark area associated with the current physical plant. Operating conflicts are most acute in the morning peak when SEPTA trains are present at the same time freight trains are working in Chrysler Yard adjacent to Newark Station.

Amtrak has been working with DelDOT and NS to address the Newark area concerns as well as other improvements between Perryville and Wilmington under the Delaware Freight Access Project. Amtrak has expended much effort to investigate the feasibility of extending Track 1 between Bacon (North East MD) to Prince (Principio MD) with hopes of achieving better freight access and removing heavy axle loads from the high-speed tracks (Tracks 2 & 3). Other improvements in Cecil County are being investigated to ease operating conflicts, such as providing an 80 mph turnout for northbound moves at Bacon.

NS engineers conducted an assessment of the Track 1 extension between Bacon and Prince in 2003. They concluded that adding another track would be an expensive proposition, requiring

extensive relocation of existing catenary support structures and right of way acquisition. While the improvement was considered desirable for the standpoint of operational flexibility, the project did not advance internally due to the magnitude of its cost relative to benefits.

The cursory operational analysis of freight operations conducted by this study concurs with NS' evaluation of benefits. Extension of Track 1 between Bacon and Prince would provide additional capacity and reduce conflicts by diverting freights, commuter trains and slower intercity trains to the new track. But existing freight trains and virtually all anticipated growth in freight traffic takes place within the existing freight-operating window between 10:30 PM and 6:00 AM, when conflicts with passenger train traffic are at a minimum. Therefore, there is little justification for the improvement from the perspective for enhancing freight access to the Delmarva Peninsula.

The capital cost side of the Track 1 extension is addressed in the Engineering Analysis.

5.4.1.2 Redundant Freight Access

The feasibility of a connection between the CSXT Main Line and the Northeast Corridor to provide redundant freight access to the Delmarva Peninsula was explored with Amtrak, NS and DelDOT[8]. The idea of redundant freight access has been raised on occasion in the past by the Port of Wilmington and other shippers to enhance competition. WILMAPCO has renewed interest on the subject following the 9-11 terrorism attacks based on security concerns. Redundant freight access was perceived as a potential means of protecting the Delmarva economy in the event of future attacks on transportation infrastructure.

However, no interest identified on the part of either NS or CSXT in pursuing the matter and the issue has not been identified as a concern in the State Railroad Plan Updates for either state. DelDOT confirmed that new connections between CSXT and NS are not addressed in Delaware's latest State Railroad Plan Update. NS indicated that its strategic approach stresses connectivity with other carriers wherever such investment are justified by market forces, but it would be difficult to justify the expenditure of scarce capital resources just on the basis of contingency.

There was general concurrence that a degree of redundancy was already present in the Delmarva railroad network. This contention was supported by looking at the minimal long-term impacts on Delmarva shippers that resulted from:

- The eight-year suspension of freight service over the Christiana River Swing Bridge; and
- The six-month suspension of freight service over the C&D Canal Lift Bridge after it was stuck by a ship in 1985.

In both case, freight was rerouted via less efficient but viable itineraries to sustain service to local customers. Freight trains that currently access the Delmarva from the south through Perryville and Newark can be rerouted from the north through Philadelphia and Edgemoor if needed, or vice versa.

In summary, a connection between the CSXT Main Line and the Amtrak Northeast Corridor in Cecil County to support redundant freight access to the Delmarva Peninsula was not identified as a priority in comparison to other pending investments freight railroad improvements.

5.5 SUMMARY

[8] CSXT was invited to participate in these discussions but declined.

With respect to the two fundamental questions posed in the Introduction of this operational analysis:

Is extending Track A between Iron Hill and Perryville (or a similar improvement) an environmentally, technically, and financially feasible approach to improved passenger travel and goods movement?

> From an operating perspective, the existing level of MARC service at Perryville can be extended to Elkton Station (and peak service only as far as Wilmington DE) without the necessity of adding additional track between Iron Hill and Perryville. It would be need for a more robust level of service, however, that increased peak and off-peak service frequencies.
>
> It would not facilitate good movements since current freight trains and those anticipated in the near future to serve Delmarva customers are planned during early morning windows when conflicts with passenger trains are minimal.

What is the feasibility of a connection between the CSXT Main Line and the Amtrak Northeast Corridor to support redundant freight access to the Delmarva Peninsula?

> Norfolk Southern, CSXT, and Amtrak were unanimous that a new connection would have little or no impact in freight access to the Delmarva Peninsula.

6 ENGINEERING ANALYSIS

This engineering analysis has been performed at a conceptual level, looking at the general scope of capital improvements that are necessary, without producing any detailed engineering designs or plans. The intent is to identify the major infrastructure elements that are required, and produce an order of magnitude cost estimate for those items. While the operations analysis indicated that the extension of Track 1 between Prince and Bacon interlockings is not necessary for all of the operating scenarios for commuter rail service north of Perryville, MD to Newark, DE and/or Wilmington, DE, this analysis includes a discussion of (and conceptual cost estimate for) the major capital investments necessary for extending Track 1. Once a decision is made regarding any potential service or infrastructure improvements, additional engineering and cost estimation work will be necessary to validate and refine this conceptual analysis. This analysis of necessary infrastructure improvements (and their costs) is based on data and mapping provided by Amtrak, and no additional field survey work has been conducted.

6.1 PASSENGER FACILITIES

As part of the extension of MARC commuter rail service north from Perryville, new or restored passenger stations would be located at North East, MD (approximately MP 51.5) and Elkton, MD (approximately MP 44.8). In addition, the northbound platform at Perryville Station (currently not used by MARC trains, which reverse on Track 4), would need to be restored to use. No improvements are required at Delaware passenger stations, as these are already in active service. The proposed improvements to passenger facilities are shown conceptually in Figure 8.

6.1.1 Americans with Disabilities Act Compliance

Any new or renovated station facilities must comply with the Americans with Disabilities Act (ADA), which requires full access for those with mobility impairments. The key physical obstacles for the disabled are vertical circulation at station underpasses or overpasses, and access from the platform to the train car. Because operating practices with respect to ADA compliance vary within the study area, it was necessary to make assumptions about the solutions that would be employed.

- In terms of vertical circulation, MARC generally uses either ramps or elevators (depending on the grade differential), whereas at the SEPTA stations located in Delaware, stair glides attached to the stairway railings are employed (requiring the presence of a guard or attendant to operate the machinery during the hours the station is open). For the purposes of this analysis, elevators were assumed for vertical circulation, as this represents the most costly capital option and is therefore the most conservative assumption.
- For access from the platform to the train, MARC currently employs portable, hand-operated lifts that are stored at each station, while SEPTA uses permanent mini-high platforms that are accessed via a ramp from the low section of the platform. As with elevators for vertical circulation, mini-high platforms represent the more costly option (and therefore the most conservative assumption), and are therefore used in this analysis

The following specific improvements are proposed at the stations located along the proposed service extension.

6.1.2 Perryville Station (MP 59.4)

The southbound platform (located adjacent to Track 4) is already in service and would be maintained in its current configuration. The northbound track (adjacent to Track 1) is currently in dilapidated condition and would be completely restored and placed back in use to serve trains that are continuing north beyond Perryville Station. This restoration would include a new platform, covered shelters, lighting, telephones, and a mini-high block platform and ramp to provide ADA-compliant access to trains. In addition, the existing pedestrian underpass would be fully rehabilitated and made wheelchair accessible (using either elevators or stair glides).

6.1.3 North East Station (MP 51.5)

No traces of the former North East Station remain, so a completely new station must be constructed at this location. The original station was located at approximately MP 51.3, to the north of where SR-272 crosses the Northeast Corridor, and this is a possible location for restoring the station. In addition, an alternate location just south of SR-272 has also been proposed, and land at the rear of a new commercial development on US-40 has been reserved for a potential park-and-ride facility. The exact location of the station would be determined if and when this service is studied in greater detail in future stages of project development, but the likelihood is that the station would be located in the vicinity of SR-272. If Track 1 is not built, railway operations would dictate that North East Station be located on the triple track segment north of Bacon Interlocking, so as to be clear of the double track segment and provide flexibility to accommodate overtakes.

The station itself would consist of two new platforms, one adjacent to Track 3 and the other adjacent to Track 1. Each platform would be equipped with covered shelters, lighting, telephones, and a mini-high block platform and ramp to provide ADA-compliant access to trains. Because the former pedestrian underpass at this location is no longer serviceable (and because the potential exists for the station to move to a new location), access across the tracks would be provided via a new pedestrian overpass, equipped with an elevator on either side to provide ADA accessibility.

6.1.4 Elkton Station (MP 44.8)

The former Elkton Station (which was in service as a passenger station until October 1983) is still in existence, and is used by Amtrak as a staging and storage area for various maintenance-of-way activities. The historic station is located to the north of where SR-213/Bridge Street crosses the Northeast Corridor, and the intent is to restore the station to service at this location. The existing platforms adjacent to Track 1 and Track 3 would be restored in their former locations, and the existing platform shelters would be repaired and repainted. Each platform would also be equipped with lighting, telephones, and a mini-high block platform and ramp to provide ADA-compliant access to trains. The pedestrian underpass at Elkton is still in existence, and would be fully rehabilitated and returned to use. ADA-accessibility would be ensured through the use of either elevators or stair glides.

6.2 TRACK

Extension of Track 1 from Prince to Bacon requires the construction of approximately 6.3 miles of new track between the two interlockings (The proposed track improvements are shown conceptually in Figure 8). This new track would be built on the east side of the existing alignment, taking advantage of the existing location of the adjacent Maintenance-of-Way (MOW) access road. The MOW road would then be relocated to either the east or west side of the alignment, depending on where space is most readily available. Conceptually, this construction requires the clearing and grading of the area where the MOW road is currently located, followed by the installation of new 132 lb. track and the required sub-ballast and ballast. The new MOW road would then be built, either adjacent to the new Track 1 on the east side of the alignment or adjacent to existing Track 3 on the west side of the alignment (with cut and fill as required). Because of structural limitations in certain locations, the MOW road would have short discontinuities at certain bridges, but access would be available from either side of those structures.

In addition to the new mainline track, improvements would be made at both Prince and Bacon interlockings. At Prince, the existing curve and turnout that ties Track 1 into Track 2 would be converted into a crossover between Track 1 and Track 2 (heading north). In addition, a new crossover would be installed between Track 2 and Track 1 (heading north), creating a universal crossover between Track 1 and Track 2 in this location. Similarly, the existing turnout and curve where Track 1 branches from Track 2 at Bacon would be converted to a crossover from Track 2 to Track 1 (heading north), while a new crossover would added between Track 1 and Track 2 (heading north), creating a universal crossover.

6.3 SIGNALS/TRAIN CONTROL

Upgrades and additions to the signal/train control system would be relatively limited. The extension of Track 1 between Prince and Bacon would be signaled as Rule 261 (bi-directional) track with cab-signals and speed control in force (as on the other main lines), allowing for maximum flexibility in train operations. At either end of the track extension, minor modifications to the existing interlocking signals would be required in response to the added crossovers and the turnouts converted to crossovers.

6.4 OVERHEAD CONTACT SYSTEM

Construction of a new Overhead Contact System (OCS, or catenary) would be required for the 6.3 miles where Track 1 is being extended. This work can be divided into two sections: areas where the existing OCS support structures bridge over the extended Track 1 and areas where the existing OCS support structures only bridge over the two tracks that are currently in use.

6.4.1 OCS Structures Three Tracks or Wider

In locations where the existing OCS support structures are at least three tracks wide, the new extension of Track 1 would fit between the existing columns that support the OCS. As a result, new OCS for Track 1 can simply be strung from the existing support structures, without requiring the installation of new foundations or structures. This situation is predominant between Charlestown and Bacon Interlocking, extending from approximately MP 56.0 to approximately MP 51.0.

6.4.2 OCS Structures Two Tracks Wide

Where the existing OCS support structures are only wide enough for the two tracks that are currently in place, the extension of Track 1 would be built outside the existing structures, to avoid disturbing the infrastructure already in place. In this case, the OCS for the new track would be supported either by a new backspan support built off the side of the existing support structure, or by a new, separate support structure adjacent to the existing one. For the purposes of cost estimation, completely new support structures were assumed, since this represents the most conservative assumption (and would no doubt be employed if building additions to the existing structures was found to be more expensive). This situation exists between approximately MP 56.0 (Charlestown) and approximately MP 57.3, at the northern limits of Prince Interlocking.

6.5 STRUCTURES

The only location where structural improvements are necessary is at the point where the Northeast Corridor crosses Mountain Hill Road, at approximately MP 56.5. This is an existing two-track bridge, which must be widened to accommodate three tracks. In all other locations, the existing structures can already accommodate at least three tracks, with this space currently being used by the Maintenance-of-Way (MOW) road (or simply left empty). Expansion of the railroad to three tracks may result in locations where the MOW road is not continuous across the structure, but full MOW access would be available from either side. Although the MOW road would ideally cross each structure, this type of discontinuity is commonly accepted throughout the Northeast Corridor and other railroads (and is the current situation at the Mountain Hill Road crossing).

6.6 LAYOVER FACILITY

Extension of commuter rail service beyond Perryville requires the construction of a new layover facility somewhere near the northern terminal of service, because the existing deadhead from Baltimore to Perryville is considered to be at the outer limit of acceptable operations. Potential locations include a new facility in the vicinity of Davis Interlocking (if Newark, DE is the northern limit of service) or rehabbing surplus space at Wilmington Shops to serve this purpose (if Wilmington, DE is the northern limit of service). The layover facility would have to be large enough to accommodate secure storage of three MARC trains, as well providing light servicing facilities and a crew reporting location. For the purposes of cost estimation, the construction of a new layover facility was assumed, since this would be most costly option and therefore represents the most conservative assumption in terms of cost.

6.7 CAPITAL COST ESTIMATE

Capital cost estimates were produced for all of the infrastructure and facility improvements described in the previous sections, as well as additional items such as utility relocation and production of environmental clearance documents. Cost estimates were developed using a library of average cost estimates that were produced for more detailed engineering studies, broken down into unit costs. For example, previous detailed estimates for the construction of new railroad track were simplified into distance-based unit costs (per track-foot or track-mile), and then used as a basis for estimating costs for this study, based on the length of new track to be constructed. Similar techniques were used for the other major infrastructure elements described previously, to produce a reasonable conceptual cost estimate. While this estimate provides a general order of magnitude estimate for the costs of these improvements, significant additional engineering and cost estimation work is required prior to reaching final decisions about the physical and financial feasibility of these improvements.

Because this study did not address right-of-way impacts, no cost estimates were included for this item. However, based on the existing conditions, it is likely that the vast majority of the proposed improvements could be constructed on land that is already in public ownership. The only major potential right-of-way need is to provide space for a layover facility near Davis Interlocking, if this location is chosen for that function. Similarly, the cost estimate does not include information about rolling stock, because the analysis was not conducted at the level of detail necessary to assess future loading patterns and ridership demand as a basis for determining rolling stock needs. Based on the operations analysis, Scenario 1 would require no additional rolling stock, while Scenarios 2 and 2A could likely be implemented with a minimal investment in vehicles, perhaps requiring the addition of a single car to each train that is extended to Newark or Wilmington (at a cost of $1.5 million per car). Developing rolling stock requirements for Scenario 3 would require significant additional analysis that was beyond the scope of this study.

In addition to the direct cost of construction, various factors and contingencies were added to the estimate, in line with standard cost estimating techniques:

- 10 percent factor for contractor mobilization.
- 10 percent factor for engineering and design.
- 10 percent factor for construction management.
- General contingency to cover costs not included in a conceptual cost estimate, ranging from 25 percent to 50 percent.

Table 13 presents the results of this cost estimate, by major cost category, along with the various factors and contingencies. The estimate is subdivided into the cost of the Track 1 Extension and the Independent Facilities (stations and yard), since the Independent Facilities may be built separately from the extension of Track 1. Based on this estimate, the total cost for these improvements ranges from $44.0 million (low contingency) to $50.6 million (high contingency). Additional details about the cost estimate are provided in Tables 2-4 at the end of this document.

TABLE 13: CONCEPTUAL CAPITAL COST ESTIMATE

Cost Category	Track 1 Extension	Independent Facilities
Grading & Track Work	$6,117,354	
Highway/Road Improvements	$989,291	
Train Control Systems	$1,515,746	
Structures	$1,500,000	
Traction Power	$1,957,000	
Passenger Facilities		$8,180,282
Layover Facilities		$ 4,304,883
Utilities	$1,864,586	

Environmental Clearance	$1,000,000	$2,000,000
Contractor Mobilization (10 percent)	$1,394,398	$1,248,517
Design Engineering (10 percent)	$1,394,398	$1,248,517
Construction Management (10 percent)	$1,394,398	$1,248,517
Low Contingency (25 percent)	$3,485,994	$3,121,291
High Contingency (50 percent)	$6,971,989	$6,242,583
Total (with 25 percent contingency)	**$22,613,164**	**$21,352,007**
Total (with 50 percent contingency)	**$26,099,159**	**$24,473,298**

6.8 SUMMARY

This section provides a conceptual description of the improvements necessary to implement commuter rail service north of Perryville, MD, to either Newark, DE or Wilmington, DE. Necessary improvements include the construction or rehabilitation of passenger stations at Perryville, MD, North East, MD, and Elkton, MD, and the construction of a new layover facility near the northern terminal of commuter rail service. In addition, the extension of Track 1 from Prince Interlocking to Bacon Interlocking may be required, depending on the frequency of the commuter rail service extension. Improvements required to extend Track 1 include construction of new track and catenary, relocation of the adjacent Maintenance-of-Way access road, and widening of a bridge over a local roadway. In addition, a conceptual cost estimate was developed for these improvements, which indicated that the cost for these improvements would range between $44.0 million and $50.6 million.

Figure 8: Existing and Proposed Infrastructure Improvements (with Track 1 Extension)

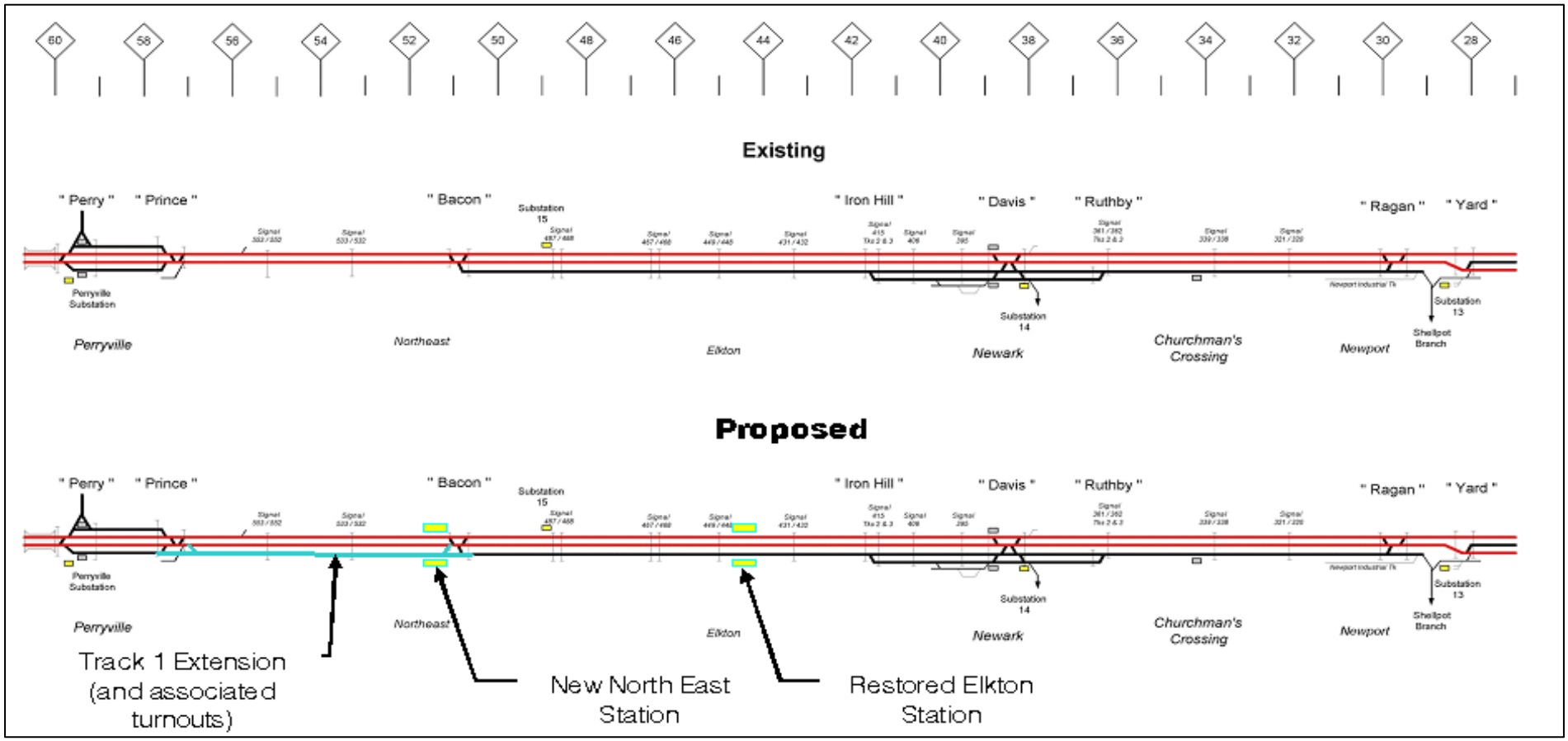


TABLE 14: CONCEPTUAL CAPITAL COST ESTIMATE – TRACK 1 EXTENSION

Type of Work	Location	Quantity	Unit Cost	Unit	Total
Grading & Track Work					
Clearing & Grubbing	Bacon to Prince	15.3 acres	$4,045	AC	$61,775
New Subballast	Bacon to Prince	6.3 track miles	$73,223	TM	$461,302
New Track	Bacon to Prince	6.3 track miles	$760,356	TM	$4,790,242
New #20 Crossover	Bacon and Prince	2	$268,037	EA	$536,074
New #20 Turnout	Bacon and Prince	2	$133,980	EA	$267,961
				Total – Grading & Track Work	**$6,117,354**
Highway/Road Improvements					
Private Crossing	MOW Road	1	$44,724	EA	$44,724
Relocate MOW Access Road	Bacon to Prince	1	$944,567	LS	$944,567
				Total – Highway/Road Improvements	**$989,291**
Train Control Systems					
Add Crossover to Interlocking	Bacon (2) and Prince (2)	4	$292,515	LS	$1,170,060
Intermediate Signal Locations	Bacon to Prince	3	$115,229	LS	$345,687
				Total – Train Control Systems	**$1,515,746**
Structures					
Add Bay to Existing Bridge	Mountain Hill Road	1	$1,500,000	LS	$1,500,000
				Total - Structures	**$1,500,000**
Traction Power					
Restore OCS (reuse structures)	MP 56.0 to MP 51.0	5.0 track miles	$257,500	TM	$1,287,500
New OCS (new structures)	MP 57.3 to MP 56.0	1.3 track miles	$515,000	TM	$669,500
				Total – Traction Power	**$1,957,000**
Utilities					
Utility Allowance	Bacon to Prince	6.3 track miles	$82,400	TM	$519,120
Fiber Optic Relocation	Bacon to Prince	6.3 track miles	$213,566	TM	$1,345,466
				Total – Utilities	**$1,864,586**

TABLE 15: CONCEPTUAL CAPITAL COST ESTIMATE – PASSENGERS FACILITIES

Type of Work	Quantity	Unit Cost	Unit	Total
Perryville Station				
New Platforms	1	$52,062	EA	$52,062
Platform Shelters	2	$133,444	EA	$266,888
Miscellaneous Amenities	1	$92,456	LS	$92,456
Electrical/Lighting/Telephone	1	$13,163	LS	$13,163
Mini-High Platforms	1	$46,086	EA	$46,086
		Total – Perryville Station		**$1,470,656**
North East Station				
New Platforms	2	$52,062	EA	$104,125
Platform Shelters	4	$133,444	EA	$533,776
Miscellaneous Amenities	1	$92,456	LS	$92,456
Electrical/Lighting/Telephone	1	$13,163	LS	$13,163
Mini-High Platforms	2	$46,086	EA	$92,173
New Pedestrian Overpass	1	$2,500,000	LS	$2,500,000
New Off-Street Parking	135	$2,884	SP	$389,340
		Total – North East Station		**$3,725,033**
Elkton Station				
New Platforms	2	$52,062	EA	$104,125
Platform Shelters	4	$133,444	EA	$533,776
Miscellaneous Amenities	1	$92,456	LS	$92,456
Electrical/Lighting/Telephone	1	$13,163	LS	$13,163
Mini-High Platforms	2	$46,086	EA	$92,173
Rehab Pedestrian Underpass	1	$1,500,000	EA	$1,500,000
New Off-Street Parking	225	$2,884	SP	$648,900
		Total – Elkton Station		**$2,984,593**

TABLE 16: CONCEPTUAL CAPITAL COST ESTIMATE – LAYOVER FACILITY

Type of Work	Quantity	Unit Cost	Unit	Total
Layover Facility – Location To Be Determined				
New Storage Tracks	2000	$144	TF	$288,014
OCS for Storage Tracks	2000	$98	TF	$195,076
New #20 Turnout	1	$133,980	EA	$133,980
Add Turnout to Interlocking	1	$292,515	EA	$292,515
New #10 Turnout	2	86,086	EA	$172,173
Track Pan	2000	$29	TF	$57,783
Toilet Dump	1	$86,675	LS	$86,675
Fencing	5000	$8	LF	$40,448
Modular Building (with Office Equipment)	10000	$69	SF	$693,396
Utility Hookup (Water/Sewage)	1	$57,783	LS	$57,783
Standby Power & Lighting	1	$866,745	LS	$866,745
Track Pit (100 ft)	300	$809	LF	$242,689
Asphalt Roadway	4000	$58	SY	$231,132
Jacking Pads & Hydraulic Lifts	1	$300,000	LS	$300,000
Site Work	1	$57,783	LS	$57,783
Oil-Water Separator (& Associated Plumbing)	1	$260,024	LS	$260,024
Yard Air	1	$312,028	LS	$312,028
Bumping Post	3	$5,547	EA	$16,642
		Total – Layover Facility		$4,304,883

7 ENVIRONMENTAL ANALYSIS

This environmental analysis has been performed to identify potential issues, which were determined through limited field investigations and already existing data. Focus has been on items that might affect the feasibility of implementation, particularly items that could constitute "fatal flaws" to proposed improvements. While this work does not constitute a SEE Report level or identify specific mitigation strategies for environmental impacts, we have coordinated with Amtrak and appropriate state and local agencies.

This Environmental Analysis assumes an additional track be placed on the south/east side of the existing track between Prince and Bacon Interlockings.

7.1 SOCIOECONOMIC

The project is located entirely in Cecil County, Maryland, situated in the heart of the mid-Atlantic region. Half way between Baltimore, MD and Philadelphia, PA, the county is experiencing suburbanization due to the proximity of major metropolitan areas and more reasonable housing costs.

According to the U.S. Census Bureau, the population of Cecil County has grown over 20 percent (from 71,347 to 85,951) in the decade between 1990 and 2000.

The project area is situated in Cecil County MD, southwest of Wilmington DE and northeast of Baltimore MD. The area of the county adjacent to the Amtrak Northeast Corridor (NEC) consists of the following 2000 census tracts: 304, 305.03, 309.01, 309.03 and 312.02. During the period 1990-2000, the total population in the area defined by the census tracts experienced almost a 40 percent growth in population. Census tract 305.03 (northwest of Elkton, adjacent to the Maryland-Delaware state line) experienced the largest increase with 38.2 percent. Table 17 shows population data for the project area for 1990 and 2000.

TABLE 17: POPULATION & GROWTH IN THE PROJECT AREA

Area	1990	2000	Change
Cecil County	71,347	85,951	+20.5%
NEC Census Tracts			
304	5,019	5,099	+1.6%
305.03	3,398	4,695	+38.2%
309.01	7,294	8,683	+19.0%
309.03	----	4,622	-----
312.02	4,106	4,628	+12.7%
Total NEC Census Tracts	**19,817**	**27,727**	**+39.9%**

Source: US Census

7.2 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations issued on February 11, 1994, requires federal agencies "to identify and address as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" The term "minority" is defined as "individual(s) who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, African-American, not of Hispanic Origin, or Hispanic." Also, "low-income means a household income at or below the Department of Health and Human Services poverty threshold for a four-person household." These populations are to be provided access to public information and an opportunity to participate in matters relating to the environment.

The purpose of environmental justice is to identify and address "disproportionately high and adverse impacts" on minority populations and low-income populations resulting from alternatives

under consideration and to provide the opportunity for these populations to be involved in the public participation process.

According to the 2000 census data, 93.4 percent of the total population of Cecil County were White, 3.9 percent were African-American, 0.3 percent were American Indian or Alaskan Native, 0.7 percent were Asian, 1.5 were Hispanic or Latino origin, and 0.5 were reported as some other race. Also, 2000 census data indicated the percentage of persons below the poverty level was 7.2 percent in Cecil County.

The percentage of minority populations in each of the project area census tracts ranges from 4.9 percent to 12.6 percent with a combined average of 8.1 percent. This amount is higher than the overall number of minorities in Cecil County, which is 6.6 percent. Additionally, three of the five census tracts (304, 305.03 and 312.02) exceeded the average minority population for the project area (by 4.5 percent, 1.5 percent and 2.0 percent, respectively).

The percentage of low-income households in each of the census tracts ranges from 12.1 percent to 34.5 percent with a combined average for the project area of 20.2 percent. This amount is higher than the overall number of low-income households in Cecil County, which is 15.0 percent. Two of the five census tracts (304 and 309.03) exceeded the average low-income household for the project area (by 14.3 percent and 6.1 percent respectively). The year 1999 was used for the household poverty threshold of $17,029 for a family of four.

Additional detailed analysis of the census tracts and an in-depth public outreach program would determine minority and low-income populations within the project area. This preliminary inventory of the census data shows that environmental justice issues may need to be addressed during additional studies.

7.3 PARK AND RECREATION AREAS

Two parks and recreation areas exist adjacent to the existing tracks: Furnace Bay Golf Course and Elk Neck State Forest. The Furnace Bay Golf Course, an 18-hole public golf course, is located on the northern side of the tracks just northeast of Perryville. Elk Neck State Forest is owned and maintained by the Maryland Department of Natural Resources. Located between North East, MD and Elkton, MD, just south of the MD 7, Elk Neck State forest contains a portion of the Mason Dixon Trail. The 190-mile trail connects the Appalachian Trail, in Cumberland County, PA, with the Brandywine Trail near Chadds Ford, PA.

7.4 CULTURAL RESOURCES

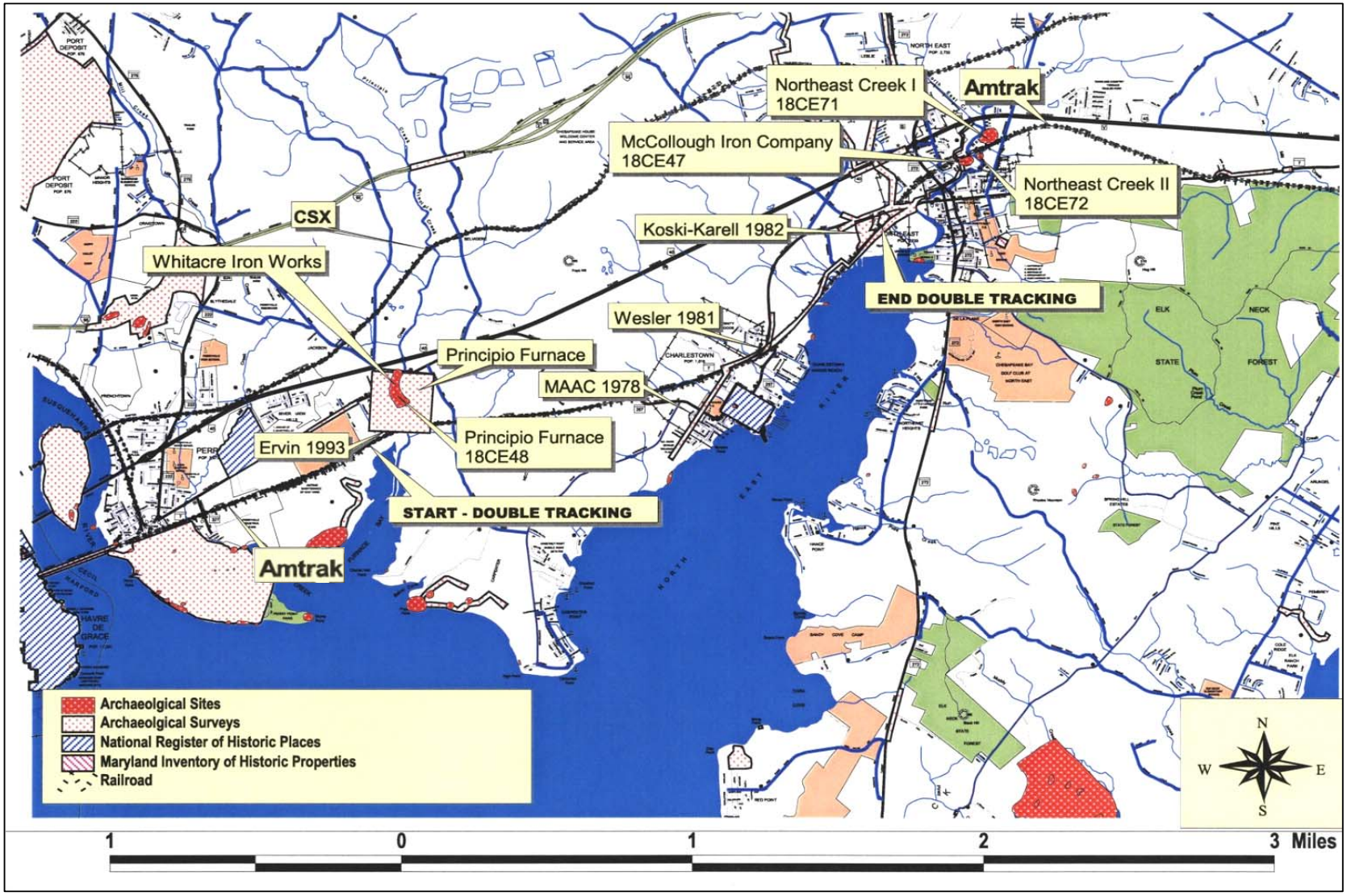
The current evaluation is limited to an inventory of the archeological sites and historic properties already identified and listed within the records of the Maryland Historical Trust (MHT). This evaluation did not include any additional archaeological or architectural survey efforts to evaluate the potential location and significance of archaeological and historic resources within or adjacent to the Area of Potential Effect (APE). Such survey efforts will be required to fully assess the potential effect of the projects, and these evaluations should occur during subsequent stages of project development.

The specific APE for this project has a number of distinct elements:

1. The potential direct impact to archaeological resources which may lie within the actual construction Limits of Disturbance (LOD);
2. The potential indirect impacts resulting from increased rail traffic (visual, noise and vibration); and
3. The direct and indirect impacts resulting from the renovation and reopening of the Elkton Station.

In general, the potential impacts to historic and archaeological resources from the proposed Track A Extension appear to be minor. There are three previously identified archaeological sites

Figure 9: Cultural Resources Map



and three historic architectural resources in the direct vicinity of the APE for the project (see Figure 9). Although some level of additional survey and impact assessment will be required when more detailed project plans are available, the potential impact to these resources would appear to be minor and not require significant redesign or mitigation.

The three previously identified archaeological resources in the vicinity of project APE are: McCullough Iron (18CE47), Northeast Creek II (18CE72) and Principio Furnace (18CE48) (Table 18).

In addition, there are three previously identified historic resources in the vicinity of the project APE: Rodgers Tavern, Perryville Station and the Elkton Historic District (Table 19). However, none of these resources lie in the portion of the alignment, which is slated for the construction of the additional track. As result, the project will not result in any substantial new effects, only direct and indirect effects resulting from the incremental increase in rail operation along the already busy rail corridor. Potential impacts to the Perryville Station and Elkton Historic District resulting from station development or renovation will have to be taken into consideration when more complete station development plans become available.

The potential for previously unidentified historic properties also would appear to be limited. The alignment passes through or in the vicinity of four communities with Historic Districts (Perryville, Charlestown, North East and Elkton); however the district boundaries and specific contributing properties within these districts are well defined. As a result, it is unlikely that significant unidentified resources would be discovered in these portions of the rail APE. An old railroad alignment is usually considered an undesirable location for residential development and is therefore unlikely to contain potentially historic residential structures. In contrast, the rail alignment would have been a desirable location of rail related commercial and industrial development, and the alignment will need to be evaluated to see if such potentially eligible resources exist adjacent to the tracks.

7.5 NATURAL RESOURCES

7.5.1 Topography, Geology and Soils

Cecil County's topography transitions from the Atlantic Coastal Plain in the south and east to the Pennsylvania Piedmont in the north.

The construction work will be limited and have minor and temporary impacts to these resources. Best management practices and approved erosion control techniques will need to be implemented to control soil erosion.

7.5.2 Forested Areas

Forests in Maryland are regulated under the Forest Conservation Act, Natural Resources Article, Section 5-1609, Annotated Code of Maryland. The Act requires the Department of Natural Resources (DNR), Forestry Division, to review and approve a Forest Stand Delineation (FSD) and a Forest Conservation Plan (FCP) before it issues a sediment and erosion control permit. The FSD is a general survey of the type and quality of existing forests within the project area. The FCP, submitted after approval of the FSD, describes the proposed forest impacts, conservation and avoidance practices to be used, acres of mitigation required, and detailed mitigation plans.

The existing corridor is located in rural forested areas. Impacts to forests will occur and mitigation measures will need to occur.

7.5.3 Wetlands, Floodplains and Stream Crossings

National Wetland Inventory (NWI) maps prepared by the U.S. Fish and Wildlife Service (USFWS) were reviewed for probable wetland areas near the project area. See Figure 10 for a map depicting the NWI wetland areas. No field delineations or surveying was completed to further identify wetland areas.

Figure 10: National Wetlands Inventory Map

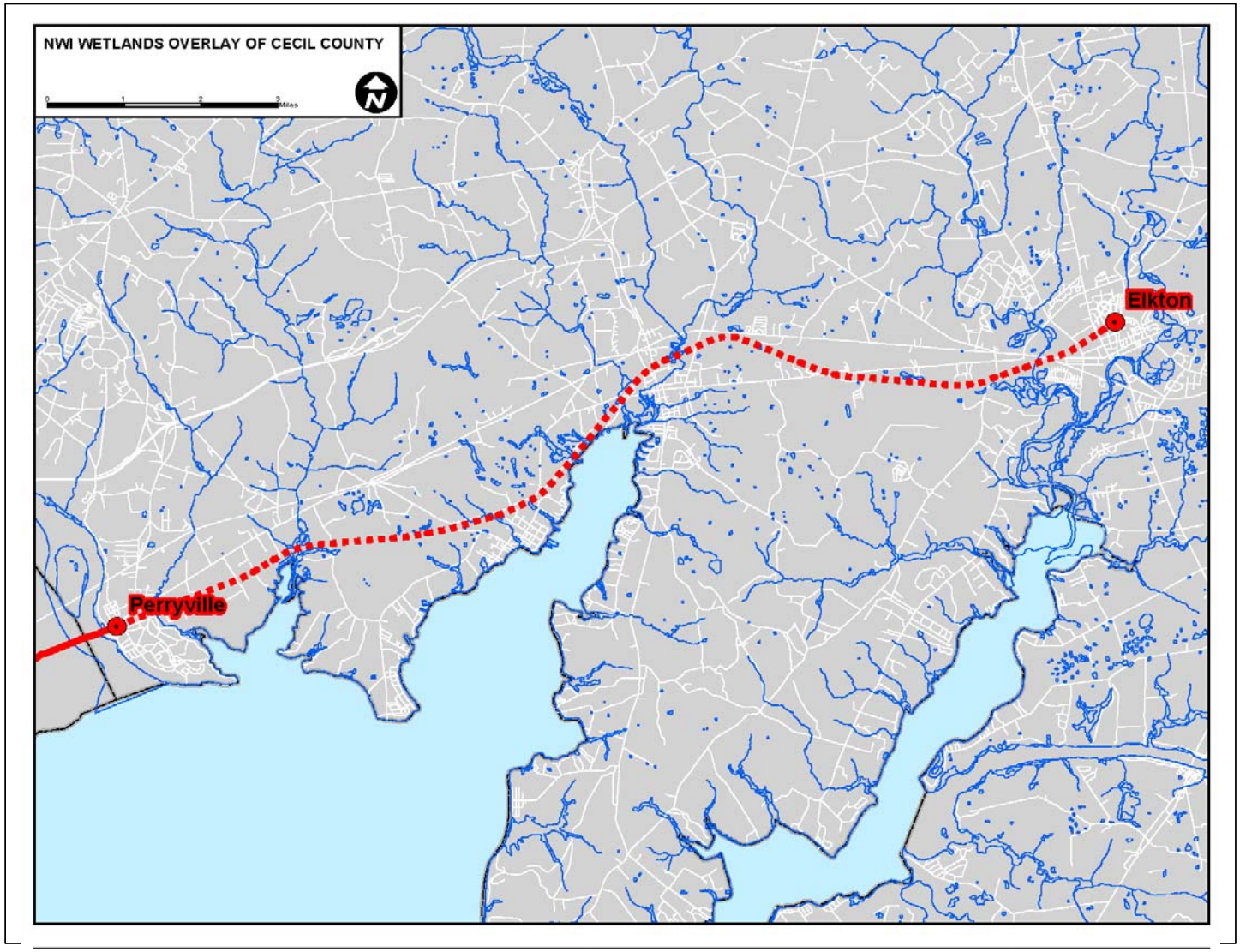


TABLE 18: ARCHAEOLOGICAL SITES IN VICINITY OF AREA OF POTENTIAL EFFECT (APE)

MHT Site #	Name	Site Type	Location	DOE Status	Planning Issue
18CE15	Rodgers' Tavern	18th Cent. Tavern	100' North of tracks	NRHP	No, not in APE
18CE47	McCullough Iron	19th Cent. Iron Mill	South of Tracks	Not Determined	Yes, LOD bridge
18CE48	Principio Furnace	18-19th Cent. Furnace	In APE	NRHP	Yes, LOD tracks/bridge
18CE69	Garden Point	Prehist. Lithic Scatter	1000' Southeast of tracks	Not Determined	No, Not in APE
18CE70	Oyster Shell Point	Prehist.- Unknown	450' Southeast of tracks	Not Determined	No, Not in APE
18CE71	Northeast Creek I	Prehist. - Archaic	240' North of tracks	Not Determined	No, Not in APE
18CE72	Northeast Creek II	Prehist. Archaic -	50' South of track	Not Determined	Yes, LOD bridge
18CE258	Perry Point 1-7	19th Cent. House site	350' South of tracks	Not Determined	No, Not in APE
18CE259	Perry Point 1-4	Prehist. – Lithic Scatter	60' South of tracks	Not Determined	No, Not in APE
18CE265	Perry Point 14	20th Cent. - Unknown	1000' South of tracks	Not Determined	No, Not in APE
18CE266	Perry Point 15	18-19th House site	1500' South of tracks	Not Determined	No, Not in APE
18CE286	Red Mill Grist Mill	19th Cent. Grist Mill	In APE	Not Determined	No, Not in APE

TABLE 19: HISTORIC PROPERTIES IN VICINITY OF AREA OF POTENTIAL EFFECT (APE)

MHT #	Name	Site Type	Location	DOE Status	Planning Issue
CE:112	Principio Iron Works	18-19th Cent. Furnace	2300' North of tracks	NR:74	No, Not in APE
CE112A	Whitaker Irons Works	18t-19th Cent. Iron Work	2000' North of tracks	" "	No, Not in APE
CE:113	Whitaker Mansion	19th Century Mansion	2100' North of tracks	" "	No, Not in APE
CE:129	Rodger's Tavern	18th Cent. Tavern	175' North of tracks	NR:81	Yes, Indirect to North
CE:135	Woodlands	19th Cent. House	1500' North of tracks	NR:74	No, Not in APE
CE:538	Shipley Farm	19th Cent. Farm	1400' South of tracks	Not Determined	No, Not in APE
CE:146	Perry Point Mansion	18th Cent. House	2500' South of tracks	NR:314	No, Not in APE
CE:998	MD 40 Bridge	1939 Concrete Bridge	In APE	Removed	No not in APE
CE:1035	Elkton Armory	1915 Masonry Armory	300' South of tracks	NR:929	No, not in APE
CE1231	Whitaker School	19th Cent. School	2100' North of tracks	Not Determined	No, Not in APE
CE:1289	Charlestown District	18-19th Cent. Hist. Dist.	800' South of tracks	NR:279	No, Not in APE
CE 1442	Perryville Station	1905 Train Station	In APE	Eligible(7/1/01)	Yes, in APE
CE:1295	Elkton District	18-19 Cent. Hist. Dist.	South of tracks	Eligible (9/11/02)	Yes, Indirect to South
CE:1455	Doughboy Monument	1921 WWI Monument	650' South of Tracks	Not Determined	No, Not in APE

The 100-year floodplains were identified using the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps (FIRM). Several floodplain areas exist within the project corridor, usually in areas associated with the tidal water crossings.

With such a linear project, several water crossings exist. The following is a list of the named stream crossings. Several unnamed crossings also exist.

- Mill Creek
- Principio Creek
- Floodplains associated with Northeast River
- Stony Run
- Northeast Creek
- Mill Creek
- Little Elk Creek

These crossings will need to be upgraded to provide additional space for a third track. Also, in the floodplain areas, additional fill will need to be placed for a third track. These crossing upgrades and fill areas will impact both floodplain and wetland areas.

7.5.4 Rare, Threatened and Endangered Species

The Maryland Department of Natural Resource's Natural Heritage Program (NHP) is responsible for the identification and protection of rare, threatened and endangered species and their habitats. They also track known occurrences of federally listed threatened and endangered species. No official letters were submitted to the USFWS or DNR for review of historical records.

The nature of the habitat and coastal water has the potential for the existence of rare, threatened and endangered species along the corridor. Coordination with DNR and USFWS will need to occur as the planning studies proceed.

7.5.5 Water Quality

The study area lies completely within the Chesapeake Bay watershed. The major river sub-watersheds include the Northeast River and Elk River.

Best management practices for soil erosion and sediment control will need to be implemented to avoid impact to the water quality of these watersheds.

7.5.6 Noise & Vibration

The Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment manual (April 1995) lists three main levels of analysis that may be used to assess noise and vibration impacts from transit projects. They include a screening procedure, a general assessment, and a detailed analysis.

Due to the existing tracks, the first two methods should be sufficient for this project. The addition of a track may impact operations, which will determine the noise and vibration impacts.

7.5.7 Air Quality

Through the Clean Air Act of 1970, as amended 1990, administered by the U.S. Environmental Protection Agency, the Delaware Valley has been classified as a severe ozone non-attainment area. Attainment of the federal ozone standards is required to be met by the year 2005. The complete ozone non-attainment area for the Philadelphia region includes Cecil County, Maryland.

Construction impacts on air quality include various types of emissions, however, the primary pollutant is fugitive dust. Best management practices will need to be implemented to control fugitive dust.

7.6 SUMMARY

The addition of a track on the south/east side of this portion of the Amtrak Northeast Corridor will impact several natural resources including wetlands, floodplains and forested areas, however, these impacts are generally routine and should be confined to the existing Amtrak right-of-way.

Not many options will be available with no impacts. These resources will need to be carefully evaluated and coordination with the appropriate permitting processes will be required, but these impacts do not seem to constitute a fatal flaw for the project. A particular concern that will need to be addressed is Environmental Justice issues. Public coordination and involvement will need to occur throughout the project.

8 PUBLIC OUTREACH PART II

This section documents the second round of public outreach activities conducted on behalf of the *Track A Extension Feasibility Study (Phase II)*. The purpose of this task was to provide a second round of meaningful state and local participation in the transportation planning process by a full range of stakeholders and the general public once the engineering, operational, and ridership demand investigations were conducted. This final outreach meeting was conducted at the conclusion of Phase II in order to obtain meaningful input on the preliminary conclusions from stakeholders and the general public. The purpose of the second group of outreach activities was twofold:

- To report preliminary conclusions to stakeholders and the general public.
- To collect feedback regarding the preliminary conclusions from stakeholders and the general public.

This second round of public outreach entailed two separate meetings:

1. Meeting with the *Project Management & Review Committee (PMRC)*, a representative cross-section of public agencies and other stakeholders. Similar to the first round of meetings, this was an effective forum to gather feedback and provide stakeholders with a preview of the material to be discussed in the public meeting.
2. A public meeting to provide the widest possible audience with an update of the project findings and progress, and to hear their comments and ideas in an interactive forum.

The second project coordination meeting was held June 9, 2004, with an executive committee of the PMRC to review Technical Memoranda numbers 2, 3, and 5 as well as preparations for the second public outreach meeting.

The second public outreach meeting was held June 16, 2004 at the Cecil County Commissioners Chambers. Approximately 20 people were in attendance, including a good cross-section of local elected officials and the Press. Presentations were made concerning the Phase II efforts, followed by questions from the attendees. As part of this effort, the three service alternatives were described along with their comparative order of magnitude costs.

The following items are included in this document to provide further documentation of the aforementioned public outreach activities:

- TAEFS2 Project Coordination Meeting #2 Minutes, June 9, 2004
- TAEFS2 Public Meeting #2 Minutes, June 16, 2004
- Presentation Boards used at Public Meeting #2, June 16, 2004

8.1 MEETING MINUTES PROJECT COORDINATION MEETING #2

Cecil County Office of Planning, Zoning & Parks
Elkton, Maryland
June 9, 2004 — 1:30 p.m.

Attending	**Representing**
Tony DiGiacomo	Cecil County Office of Planning, Zoning & Parks
Mike Nixon	Maryland Department of Transportation
Ron Spalding	Maryland Department of Transportation
Heather Dunigan	Wilmington Metropolitan Area Planning Council
Ken Potts	Delaware Transit Corporation
T. R. Hickey	Parsons Brinckerhoff
Anna Lynn Smith	Parsons Brinckerhoff

The meeting reported on the progress since the last meeting and discussed preparations for the next public meeting. Comments from the meeting are summarized as follows, with questions or comments for further discussion or follow-up in **boldface:**

- Tom began the meeting with a discussion of Tech Memo #5, Environmental Analysis. In summary, the memo states that there are no fatal environmental flaws with the proposed alternatives for service, but that more detailed analysis would be needed for each alternative.

- Tony added that the population projections listed in the memo have been conservative; Cecil County is currently at the 2010 projection levels. It was commented that there are large Transportation Analysis Zones (TAZs) in Cecil County, and that there may be more areas showing up with higher density populations if the TAZs were smaller.

- Tom next described the Transit Warrants graphic, noting that transit service in the form of commuter railroad is indeed warranted. The next step is to determine exactly how much service is warranted, noting that the density will not likely increase to where another mode of service is necessary.

- Mike added that some days the parking lot in Perryville is over capacity and commuters are parking in the town streets. **Tom would check with the Perryville town manager regarding this situation.**

- Tom then described the methodologies employed in Tech Memo #2, Market Analysis. Tony inquired about how the H-1 model handles higher speeds than the 28 mph incorporated into the model. **Tom would find out how MARC's higher speeds were accounted for in the H-1 model.**

- Ken added that the Downstate Feasibility Study would be adding an interlocking at Churchmans Crossing at build out. He mentioned that between this addition, and existing SEPTA and Amtrak service that additional opportunity to serve Wilmington would be limited. He requested that the study team not yet discount Churchmans Crossing as an additional Delaware stop. Amtrak and DelDOT are proceeding ahead with the design for modifications to Track 3 at Churchmans Crossing.

- Tom explained how the numbers for new stations at Elkton and Delaware were modeled adding that it would double the existing Penn Line ridership. This would have revenue implications in that the longer-distance riders are those that pay the proportionately higher fares. **Tony requested that Tom re-check the source of household income data in Table 9 for Newark and Churchmans Crossing.**

- The final memo presented was Tech Memo #3, Operations Analysis. In summary, it was the conclusion at this time that Track 1 was not necessary as an improvement for extending MARC service from Perryville. **Tom explained that this memo was still incomplete, and that he would have it completed by June 14. This additional material would also include his discussions with NS regarding how they are planning to handle increased weights – which numbers are correct and what are the implications.**

- Tom next presented the stringline diagrams showing the movement of trains along this area of track and where the delays were found, both currently and with extensions of Amtrak and MARC Service.

- Tom summarized that at approximately $6M/mile to construct Track A, the return on investment would likely not be worth it for freight improvements. He added that he was not able to get costs from MARC so the cost estimates were based on train miles. **Tom would get a range of comparative capital costs to the PMRC by first thing on Monday, June 14.**

- Tom mentioned that the engineering effort had not yet been undertaken and was instructed to continue the effort as scoped.

- Anna Lynn continued with a discussion of the public meeting to be held June 16. Emails had been sent out to interested parties and the same general format as the previous public meeting would be used. This would consist of boards posted around the room with formal presentations and Q&A roughly on the half hour. **Anna Lynn would work with Tom to get appropriate boards prepared from the new tech memos. Tony would get the boards from the first public meeting from WILMAPCO's Offices and bring them to the meeting. Tony requested that the boards show that this is a joint effort between MDOT, DelDOT and WILMAPCO. PB would also make the new boards available for inclusion on WILMAPCO's website.** New boards will include:
    - Population density maps (2)
    - Transit Warrants Nomograph
    - Amtrak "stick" diagram for Track A improvements
    - Relative order of magnitude cost estimates for the three alternatives
    - Cultural resources map

- Ron mentioned that he would defer to Tony for any "fatal flaw" questions in advance of the public meeting June 16.

- Ken added the desire to potentially see feeder bus service to Perryville in the near future along US-40. It was also mentioned that we not ignore Charlestown at this point in the study effort.

- Once Tech Memo #3 was completed, comments on all three memos will be requested from members of the PMRC.

8.2 MEETING MINUTES PUBLIC MEETING #2

Cecil County Commissioners Chambers
Elkton, Maryland
June 16 — 4:00 to 8:00 p.m.

This public meeting served as the second and final opportunity to obtain public comment on the Track A Extension Feasibility Study. The meeting focused on the Phase II initial results investigating the feasibility of extending passenger rail service from Perryville north. Approximately 20 persons attended the meeting, not counting the study team members that were also in attendance. Boards were displayed around the room presenting the study corridor and potential service options for Phase II.

Tony DiGiacomo of Cecil County began the meeting by introducing the study team and explaining the purpose of this study and how it compliments the Phase I Study. Tom Hickey of PB continued with the study goals and explained the three questions that the team was attempting to address. Tom then explained the transit warrants nomograph describing residential density, employment center size, and the types of transit service that are reasonable. The three service alternatives were also described along with their comparative order of magnitude costs. Tom added that they would need to be revisited for more detail in further iterations of the study. Tom then opened up the floor for questions. The following is a summary of this discussion.

1. Why did MARC decide to terminate service in Perryville, there are other towns along the corridor which are more centrally located and have the population density to warrant commuter rail service? Agreed. The study team is looking at other locations that make sense in terms of potential ridership.
2. Why is there a gap in service between Perryville and Newark? An explanation was given as to where and when new track is needed and how trains run together in areas with three tracks.
3. While is the six-mile stretch in Cecil County the only place with two tracks on the Northeast Corridor? Historical 1836 business decision; tracks could've potentially been in existence but removed, however current electrification was clearly for two tracks.
4. What is the feasibility for a stop in Elkton? When could service begin? The warrant for commuter rail service to Elkton currently exists, particularly with present commuter rail service to the south. The potential net financial gain of operating to Newark or Wilmington was discussed. Engineering numbers would need to be refined to reflect capital costs associated with extending the existing service. Tony added that subsequent conversations would be needed with Maryland and Delaware to get funding to put in WILMAPCO's Transportation Improvement Program and State Plans in Delaware and Maryland.
5. Was reverse commuting included in the numbers presented? Transit needs at Union Hospital and the new location of the Cecil County Community College were mentioned as two attractions that could extend the reach of the current service. Tom responded that the study team would address the details of reverse commuting in the final report.
6. If MARC service continues to Wilmington, would SEPTA continue service to Newark? Synergies in these two services would exist, where northbound commuters on MARC could then catch trains north to Philadelphia. Wilmington would benefit from having both SETPA and MARC service.
7. When will the study be finished? End of July.
8. Did the study consider Elkton and North East commuters to Philadelphia? The Phase 1 study primarily focused on Elkton to Wilmington service. Tony responded that the Phase 1 study concluded that there are limited options for commuting from Elkton northbound. It was noted that adding service north of Perryville could take parking pressures off of the town. Tony also mentioned that Cecil County's population levels are currently above projections, and that population growth has been slightly underestimated.
9. Has Chrysler presented any problems? The study did not investigate this. MARC trains would not likely conflict with NS moves at Chrysler. If the Newark Station moved to Davis, that also should not present problems for MARC operations – the layover would then be beyond Newark if that was the terminus of service. Tony added that 2 of the 5 alternatives in the Phase I study considered the new Newark Station north of Davis. He also mentioned the potential for a northbound station at Newark.
10. Is the study team involved with the Newark Train Station relocation? No.
11. SEPTA has set a precedent by traveling into Delaware, how would MARC handle a similar situation? MARC currently runs three lines to West Virginia and could likely arrange a similar agreement with Delaware.
12. Has a cost comparison of building additional lane miles on I-95 vs. extending transit been conducted? While transit is generally cheaper to build, it does cost more to operate, with higher annual costs compared to that of highway maintenance. The benefits of transit – more livable communities, etc. were mentioned.
13. When will the build out of Wilmington's office space be completed at the 24M square feet? No likely date was specified.
14. Does MARC do maintenance in Bear? No, but these individuals are Delaware Amtrak employees.
15. Would these new operations create union confusion or conflict? It is not a union issue, but there would likely be a shift of job reporting locations. There is a potential concern of how all of MARC's current crews are Washington based and how they would potentially

need another crew base somewhere further north, particularly if service began in Wilmington.

16. Will there be a stop in North East? Potentially. It was added that the old station there was demolished some time ago.
17. Did the study consider the need for the additional six miles of track? Yes – the study team decided during the operations analysis that Track A is not needed for the passenger service options proposed. It was added that Norfolk Southern was not interested in footing the cost for such a project, as they would not derive significant benefit from it.
18. Would additional land in Newark be needed? Potentially for a siding if service terminated there.
19. What is the cost for the six miles of track? Approximately $6-6.5M/mile.
20. Would extending service to Wilmington be more productive than just extending it to Elkton? Yes, because of operating costs, the opportunity to obtain additional ridership suggests that this could be more cost effective.

PB would send Harry Romano a copy of the minutes, diagrams, and boards from the meeting. The study team would continue a discussion with MARC to further understand crew implications from extending service to Delaware. Tom would be presenting the study interim results at the WILMAPCO Meeting the morning of June 17.

APPENDIX A
Perryville Station Survey Questionnaire

PB conducted a passenger survey on Thursday, May 8, 2003, at the train station in Perryville, Maryland to aid in estimating potential ridership from a proposed station and expanded MARC service to Elkton, Maryland.

Four MARC trains and one Amtrak train depart Perryville each morning during the week. The four MARC morning trains leave Perryville at 4:45 am, 5:40 am, 6:15 am and 7:40 am. MARC commuters are also permitted to board one southbound Amtrak train that is scheduled to depart Perryville at 6:45 am. The survey consisted of interviewing passengers prior to boarding each morning train, following the questionnaire shown in Figure 1.

SURVEY QUESTIONNAIRE

60-SECOND COMMUTER SURVEY
Potential Rail Service to Elkton

Please circle your response to the following questions.

1) *How often would you ride MARC?*

-1- -2- -3- -4- -5- *round trips/week*

2) *How did you get to the station today?*

-DROVE- -DROPPED OFF- -BUS-
-WALK ED- -OTHER-

3) *What is your primary destination today?*

-BALTIMORE- -WASHINGTON DC- -OTHER _____

4) *What is your zip code?* _____
Used for estimating ridership

Thank you for completing this survey.

Sixty-six (66) out of 98 passengers observed boarding trains at Perryville on the morning of the survey completed questionnaires, resulting in a response rate of 67 percent. The 6:45 Amtrak train attracted the most passenger boardings (32 percent), followed by the four MARC trains departing at 5:40 (26 percent), 6:15 (21 percent), 4:45 (12 percent) and 7:40 (eight percent), respectively.

A summary of survey results by question are as follows:

QUESTION 1: *How often do you ride MARC?*

- Over 83 percent of the passengers ride five days a week.
- Over 97 percent of the passengers ride three or more days a week.

QUESTION 2: *How did you get to the station today?*

- All but one passenger surveyed drove to the station.

QUESTION 3: *What is your primary destination today?*

- Overall, 75 percent of the passengers were traveling to Washington DC, 23 percent were traveling to Baltimore, and two percent were traveling to other destinations.
- All passengers on the 4:45 a.m. MARC train were going to Washington DC.

QUESTION 4: *What is your zip code?*

- About 44 percent of the passengers originated in Maryland, 43 percent in Delaware, and 13 percent in Pennsylvania.
- The majority of Maryland passengers reside in Cecil County, with about three percent originating from Harford County (mostly from Havre de Grace, a short distance to the south across the Susquehanna River).
- All of the Delaware passengers live in New Castle County, primarily from areas north of the C&D Canal.
- Pennsylvania passengers were more dispersed, coming mostly from the southern portions of Chester County and Delaware County. A small percentage of passengers originated in Philadelphia.

Figure 3 graphically depicts the distribution of origins of those passengers surveyed while boarding trains at Perryville. This information was used to guide immediate study efforts to develop operating scenarios and ridership forecasts for Phase II.