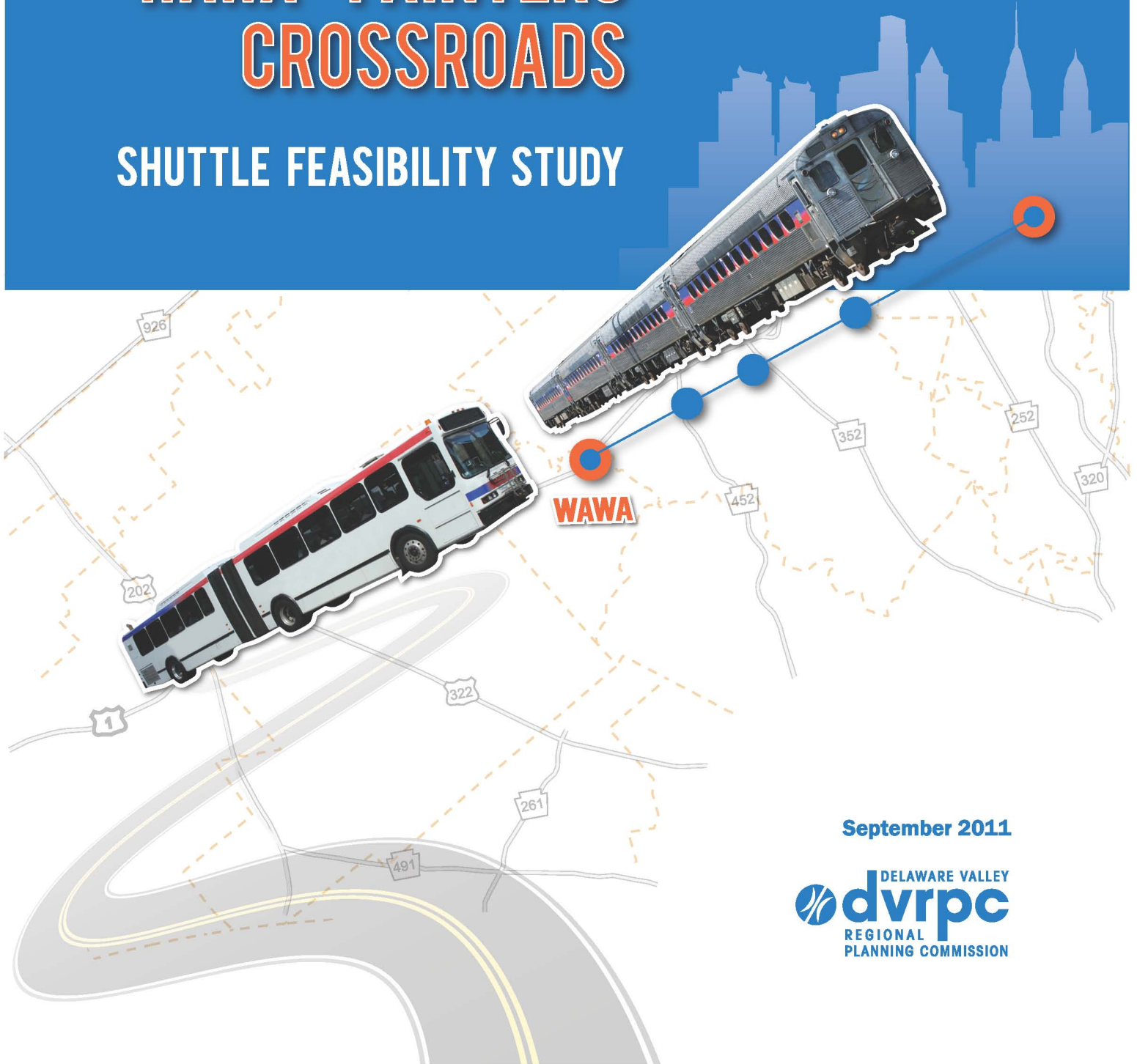


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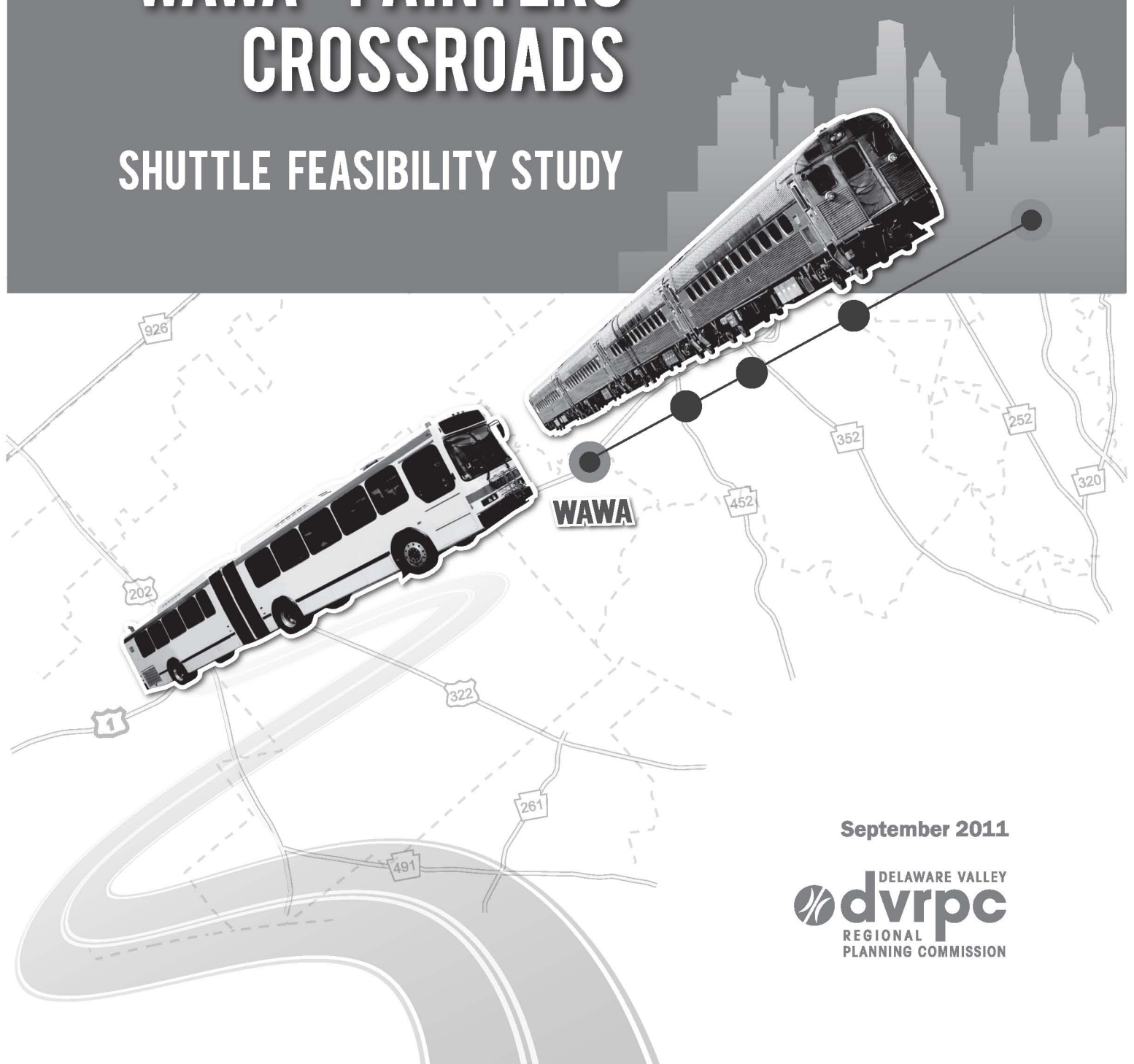


September 2011

DELAWARE VALLEY
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SHUTTLE FEASIBILITY STUDY



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Executive Summary

The combination of rapid development in the Painters Crossroads area in southwestern Delaware County and the extension of Southeastern Pennsylvania Transportation Authority's (SEPTA's) Media/Elwyn line to Wawa spurred the county to request a study of public transit services between the proposed Wawa Station and the Painters Crossroads area. The purpose of this report is to examine the existing conditions and make recommendations concerning a possible shuttle bus route connecting the proposed rail service with the Painters Crossroads area. The study is concerned with the first few years of service after the Media/Elwyn is extended.

The first part of the study examines the existing conditions in and around the study area, finding mostly auto-oriented commercial land uses and poor pedestrian and bicycle infrastructure. This analysis also determined that residents of the area are generally in a higher income bracket than what is supported by many of the locally available jobs. This discrepancy indicates a large commuting population both into and out of the area since the residential demographic does not match the local employment options.

Further investigation found that the area is part of three Congestion Management Subcorridors and will be the subject of two highway widening projects in addition to the rail line extension. This analysis also includes a discussion of the current public transit options in the area, particularly SEPTA's Route 111 bus. Route 111 provides service between 69th Street Terminal in Upper Darby and the Painters Crossroads area; the proposed Wawa Station is along its route.

This study used various data sources and types of analyses to estimate levels of ridership that a shuttle service might experience when the Media/Elwyn Line is extended. Additionally, numerous routing alternatives for service through the Painters Crossroads area were developed and analyzed. Though this study did not specify future ridership estimates or recommend a specific routing alternative, the analyses presented will enable decision-makers to make such decisions when the Media/Elwyn Line extension is imminent.

Conclusions

Painters Crossroads is a growing area, with documented interest from planners and developers alike. The area has seen a lot of growth in the last few years, and holds the potential for much more. Projects for widening the highways nearby reflect an institutional recognition of congestion in the area as well as a focus on transportation via automobile. The Painters Crossroads area land uses are distinctly auto-oriented, and commuting in the area is almost all auto-based. Public transit options in the area are limited, time-consuming, and not coordinated.

A shuttle between Regional Rail and the Painters Crossroads commercial developments could increase the connectivity and accessibility of the area while mitigating congestion. In addition,

service could provide a key link between area employers and those commuting to jobs in Painters Crossroads.

However, Chadds Ford and Concord townships will need to make land use changes such as investment in a pedestrian network, increased zoned density and mixed uses in order to support increased public transportation, as two-way bus ridership is more efficient. Without a nearby residential population, Route 111 will require a method of increasing its catchment area such as bicycle infrastructure or park-n-rides to draw riders from neighboring residential areas. However, both of these solutions present issues in and of themselves, from consumer preference to infrastructure problems. The best option to support public transit in the area would be to foster an environment conducive to both residents and jobs in the Painters Crossroads area.

Introduction

The Delaware County Planning Department (DCPD) requested a study of improved public transit services between the proposed Southeastern Pennsylvania Transportation Authority's (SEPTA's) Wawa Regional Rail Station and the Painters Crossroads area. The combination of rapid commercial development in the Painters Crossroads area and the proposed extension of the Media/Elwyn Regional Rail Line were the catalysts for this study. The study was undertaken by Delaware Valley Regional Planning Commission (DVRPC) as part of the fiscal year 2011 Work Program.

As the title of this study suggests, the public transit service to be assessed was a shuttle bus that would operate between the proposed Wawa Station and the Painters Crossroads area. A shuttle bus is a unique transit entity designed to serve two relatively close termini with regular service. Institutional barriers would prevent the creation of a true shuttle service; therefore, this study sought to provide comparable service within institutional allowances.

Services other than those provided by SEPTA were initially considered though the findings of this report assume SEPTA as the provider. Bus ridership in the study area is low and introducing competition will harm established service as well as limit the success of new services. Additionally, SEPTA owns Wawa Station and may choose to not permit private shuttles to serve the station if they are competing with the established service, or conflict with SEPTA's service circulation through the station. Potential shuttle operators should coordinate with SEPTA before implementing service.

Purpose

SEPTA is expected to advance the extension of the Media/Elwyn Line to Wawa when funding is available. Beyond improving peak direction travel, the extension will enable reverse commuters to more easily reach the Painters Crossroads area if accompanied by improved bus service.

Painters Crossroads is a rapidly developing commercial area centered at the intersection of US 1 and US 202, also the border of Concord and Chadds Ford townships. The study area, which includes the Painters Crossroads extended commercial area, contains a mix of office, retail, hotel, and food establishments. Most retail and food establishments are regional or national chains. There are several large employers in the area: Endo Pharmaceuticals, Maris Grove, Applied Card Systems, and State Farm Insurance. DCPD noted the area as the last remaining portion of Delaware County with significant available developable land.

This study focuses on improving the public transit connection between the proposed Wawa Station and the Painters Crossroads area for the purpose of connecting people to jobs.

Methodology

This study was conducted by DVRPC staff with assistance and direction of a study advisory committee (SAC). The SAC was comprised of representatives from Delaware County, local municipalities, SEPTA, the Delaware County Transportation Management Association, and several private enterprises located in the Painters Crossroads area. Three meetings were held to discuss the study and steer its course.

- ▶ Kick-off meeting held on September 16, 2010; this meeting brought together interested parties and identified key issues that the study needed to address.
- ▶ Review meeting held February 16, 2011; this meeting, DVRPC presented the study's progress and sought feedback from the SAC regarding ridership estimates and routing options. Discussion following the presentation built a consensus on the strengths and weaknesses of the alignment alternatives presented in the study.
- ▶ Final meeting held on June 15, 2011; this meeting discussed findings and finalized the project.

Tasks

The Work Program outlined specific tasks required to successfully complete this project. Following are the identified tasks.

- ▶ Determine potential shuttle ridership – **Chapter 4**
- ▶ Determine potential routing and scheduling – **Chapter 5**
- ▶ Determine costs, revenues, and potential funding sources – **Chapters 6 and 7**
- ▶ Locate capture points for non-rail commuters – **Chapter 5**
- ▶ Analyze SEPTA bus Route 111's relationship to the potential shuttle – Discussed throughout study
- ▶ Determine feasibility – **Chapter 7**

Existing Conditions

Study Area Overview

Painters Crossroads is the colloquial term that refers to a developing commercial center contained in two Delaware County townships: Concord and Chadds Ford. The area is also frequently referred to as Painters Crossing. The postal addresses for the area include Glen Mills, Thornton, and Chadds Ford. Specifically, Painters Crossroads is the area at the intersection of US 1 with US 202. The study area extends from Painters Crossroads along the commercial corridor of US 1 to its intersection with US 322. Throughout this document, the study area is referred to as the Painters Crossroads study area, or simply Painters Crossroads.

Figure 1 provides an overview of the study area.

Regionally, Painters Crossroads is approximately three miles north of the Delaware state line, six miles south of West Chester, nine miles southwest of Media, 11 miles north of Wilmington, and 25 miles southwest of Center City Philadelphia. The area is not in close proximity to major freeways, the closest being US 202 north of West Chester and I-95 approximately eight miles to the south. US 1 has a freeway portion bypassing Media. Reliance on arterial highways is a distinct attribute of the region, and the prospect for restored commuter rail service an important opportunity.

Land Use and Zoning

Land use refers to the state of land development while zoning shows legally permitted uses of land and the intensity at which it may be developed. The two may match in a completely developed area. Often they do not because of undeveloped land, and legacy developments do not adhere to contemporary zoning requirements.

The land use in the Painters Crossroads area has changed significantly over the previous five years. **Figure 2** shows the area's land use as determined from aerial photographs taken in 2010. Several major existing developments are absent in this 2005 aerial, including Concordville Town Centre, Maris Grove, Embassy Suites, and additional surrounding businesses. **Table 1** is a summary of land devoted to commercial use in the area.

Figure 1: Study Area Overview

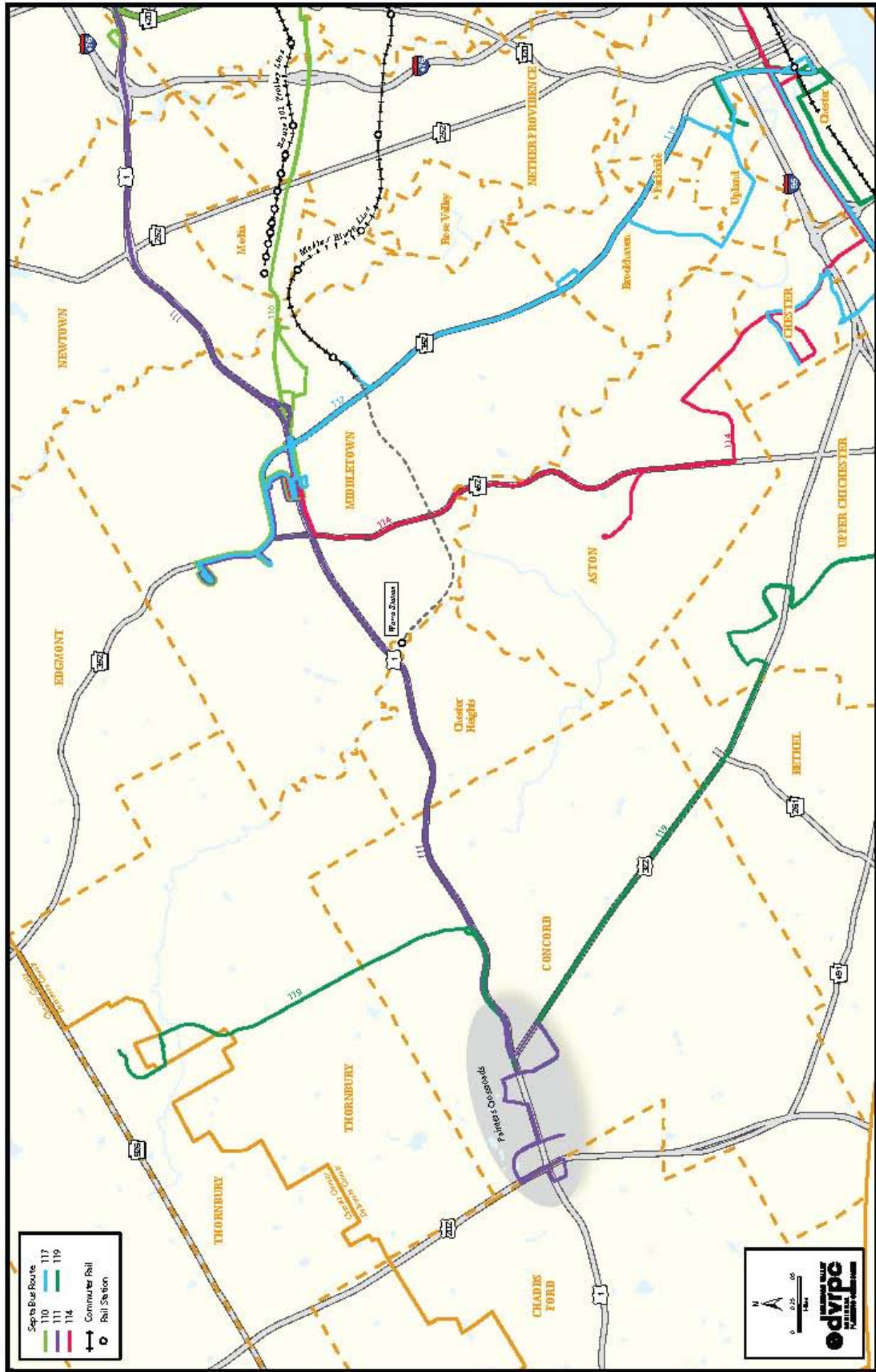


Figure 2: Land Use

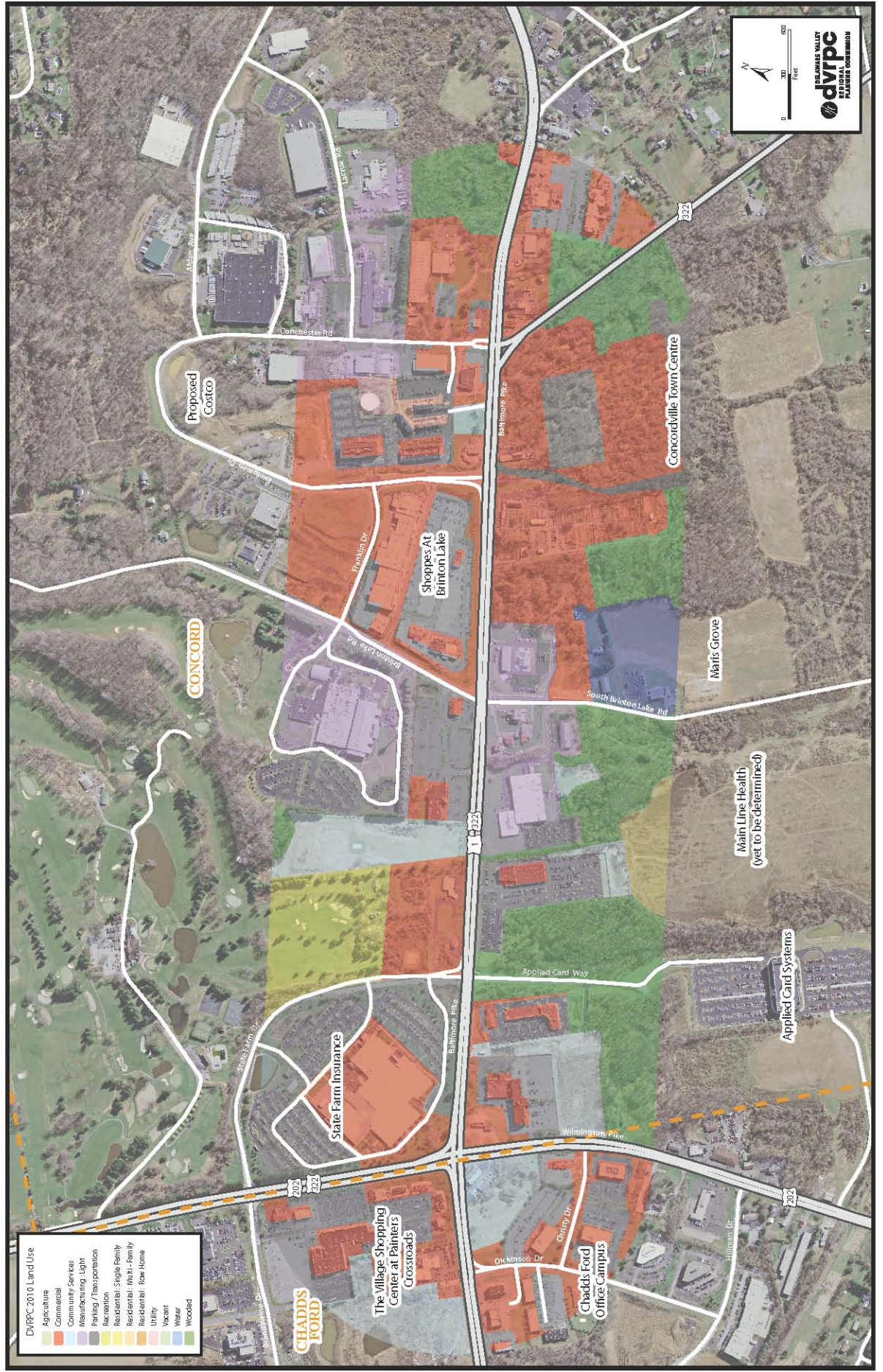


Table 1: Painters Crossroads Commercial Land Use (2005 Land Use Data & 2010 Aerial Analysis)

	Total Area	Commercial Land Use			Commercial w/Parking		Undeveloped	
		Area	%	% of Total	Area	%	Area	%
Chadds Ford Township	5,591	157	2.8%	100.0%				
Painters Crossroads	164	62	37.8%	39.5%	91	55.5%	26	15.9%
Concord Township	8,722	277	3.2%	100.0%				
Painters Crossroads	1,103	424	38.4%	153.1%	522	47.3%	517	46.9%
Combined Township	14,313	434	3.0%	100.0%				
Painters Crossroads	1,267	486	38.4%	24.0%	613	48.4%	543	42.9%

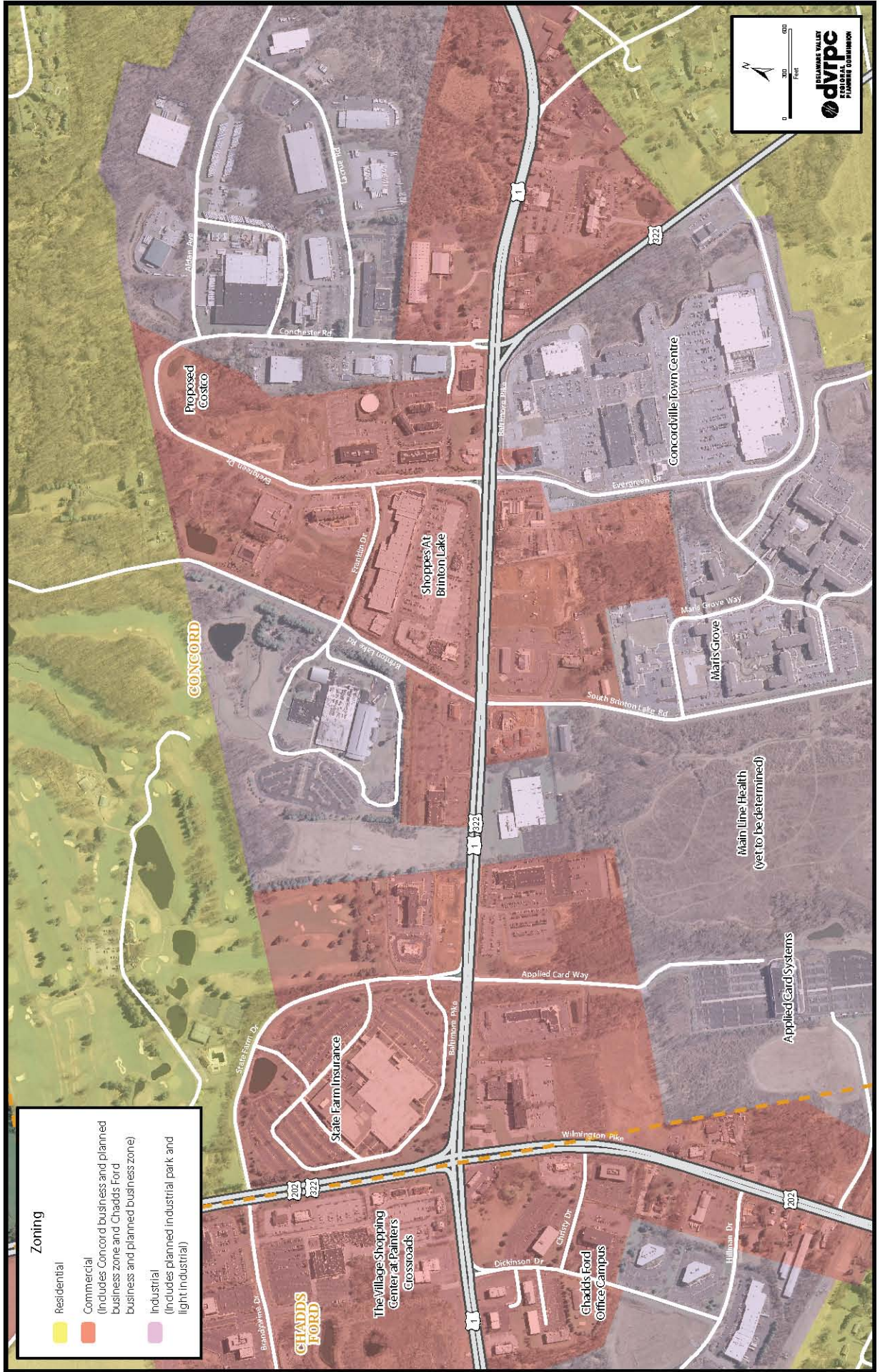
Painters Crossroads = 1/4 mile buffer from Route 202 - Route 322 along US 1
area = acres

DVRPC, 2010

Table 1 shows that the study area has an abundance of commercially used land and associated parking – nearly 50 percent. Some of that land represents commercial development officially defined as “light industrial” such as a car dealership. The large amount of undeveloped land in the remainder of the area represents a large development potential. Developers have proposed two large commercial developments; a Main Line Health facility between Applied Card Systems and Maris Grove, and a Costco coupled with 37,000 square feet of office space north of the Shoppes at Brinton Lake.¹ Future developments may include a mix of redevelopment and infill projects. Finally, the area has 1.2 square acres of multi-family residential land use just northwest of the intersection of US 322 and US 1, in an area zoned “Commercial Local.”

Figure 3 shows zoning in the study area. Concord Township authorized the Maris Grove’s quasi-residential land use with a Continuing Care Retirement Community (CCRC) zoning overlay. All other land in Painters Crossroads is zoned as either industrial, office, or commercial. The distinct separation of residential and commercial land uses coupled with the infrequency of public transit in the area results in motor vehicle travel for nearly all trip purposes.

Figure 3: Study Area Zoning



Demographic Profile

The primary concern of this study is connecting people to jobs in the Painters Crossroads area. Four types of demographic information are useful for this study’s analyses: employment, population, income and journey-to-work (J2W).

Employment

There is significant employment in the Painters Crossroads area. **Table 2** presents employment and population for the two townships and Delaware County. Between 2000 and 2010, employment in the two municipalities grew by an estimated 11 percent, or 1,332 jobs. As the vast majority of commercially used land in both townships is located in Painters Crossroads, this study assumes that most new jobs are also located there. From an analysis of aerial photography, this study assumed that 75 percent of the total Concord and Chadds Ford township employment is located in the Painters Crossroads area.* The two townships are forecasted to gain an additional 1,912 jobs by 2035, bringing their combined total number of jobs to approximately 15,000. Chadds Ford Township has and is forecasted to maintain a significant jobs advantage over population.

Table 2: Employment and Population Growth (2000–2035)

	Year								2010–2035 Gain	
	2000	2005	2010	2015	2020	2025	2030	2035	Absolute	%
Population										
County	551,989	555,206	558,979	556,979	557,795	558,563	558,288	559,956	977	0.2%
Chadds Ford	3,170	3,206	3,640	3,422	3,522	3,616	3,704	3,786	146	4.0%
Concord	11,235	15,207	17,231	16,218	16,685	17,123	17,537	17,919	688	4.0%
Employment										
County	238,164	237,582	238,728	239,809	240,833	241,797	242,708	243,547	4,819	2.0%
Chadds Ford	5,391	5,477	5,592	5,701	5,804	5,901	5,993	6,078	486	8.7%
Concord	6,464	7,256	7,595	7,915	8,218	8,504	8,773	9,021	1,426	18.8%

2000 = Census 2000, 2005 = estimate, 2010 Population = 2010 Census, otherwise, forecasts

Source: ADR # 14
Census 2010

Population

Table 2 also contains population data in five-year intervals between 2000 and 2035. Between 2010 and 2035, an additional 834 people are forecasted to live in the two townships. While this appears to be a moderate increase over a 25-year horizon, Delaware County as a whole is only forecasted to gain 977 new residents, which means that almost 85 percent of net county population growth will occur in Chadds Ford and Concord townships.

*The study advisory committee discussed this number during the 2/16/2011 meeting and deemed it acceptable.

Income

Recent demographic trends in the study area’s three census tracts reveal a mismatch between the types of jobs accruing in the area and the local residential demographic profile. The median individual income is approximately \$100,000 in the area, while the median family income is about \$120,000. The average home value in the area is approximately \$400,000. However, the “big box”-type retail and chain restaurant development growing in the area will likely provide jobs in a lower income bracket than that of the residential demographic.

The most currently documented statistics, which are a few years old, support this assessment. The two largest employment sectors in Delaware County were Retail Trade (13 percent) and Health Care and Social Assistance (21 percent). Other large employment sectors included Manufacturing (nine percent), and Accommodation and Food Services (eight percent).² In terms of employers, Retail Trade accounted for 14 percent of Delaware County’s business establishments, Health Care and Social Assistance 12 percent, Manufacturing three percent, and Accommodation and Food Services eight percent.³

Table 3: Selected Delaware County Wages by Sector, 2009

Employment Sector	Annual Wages
Retail Trade	\$25,596
Health Care and Social Assistance*	\$39,002
Manufacturing	\$73,793
Accommodation and Food Services	\$15,762
All Sectors	\$50,085

Bureau of Labor Statistics, 2009

*average of local government and private sector jobs

Many of the jobs available in the Painters Crossroads area likely fall into the Retail Trade, Health Care and Social Assistance, and Accommodation and Food Services categories. As **Table 3** demonstrates, these jobs pay significantly less than the local population earns.

This discrepancy highlights the amount of commuter traffic in the area. Residents are leaving municipalities around Painters Crossroads to work at higher paying jobs elsewhere, while others must come in to work the lower paying jobs.

Journey to Work

The final demographic trait that is useful for this study is journey to work (J2W). **Tables A-1** and **A-2** in **Appendix A** contain the top 30 municipalities of employment for area residents and of greater importance, the top 30 municipalities of residence for area employees. **Table A-3** shows the number of people commuting to the study area from municipalities not on the top 30 list but within the commuting shed of the Media/Elwyn Line, as defined in **Chapter 4**. An analysis of the journey to work data for those employed in the study area appears later in this report in order to show a potential inbound commuting population.

Many Concord and Chadds Ford township residents both live and work in the area—approximately 1,200 people. Overall, 2.0 and 1.8 percent of Concord and Chadds Ford townships' respective employed populations commute to work using public transit.

Local Highway Network

The highways serving the Painters Crossroads area allow for people and goods to move into and out of the area, including on public transit vehicles. **Figure 4** shows the local highway network. Following are brief descriptions of the major roads in the Painters Crossroads area.

US 1

US 1 is a principal arterial highway throughout the study area. Between the intersections with US 202 and US 322 there are six travel lanes and auxiliary lanes at all signalized intersections. The highway is also dual-designated as US 1/US 322 in this segment. North of the US 322 intersection and south of the US 202 intersection, there are four travel lanes. Signalized intersections include (south to north): US 202, State Farm Drive, Brinton Lake Road, Evergreen Evergreen Drive, US 322, and Concord Road. Recent traffic counts show Annual Average Daily Traffic volumes (AADT) of 26,637 south of US 202, 49,066 between US 202 and US 322, and 25,344 north of US 322.

US 202

US 202 is a principal arterial highway throughout the study area, largely serving as the border between Chadds Ford and Concord townships. North of the US 1 intersection, US 202 is dual designated as US 202/US 322. North of the study area, between West Chester and King of Prussia, US 202 operates as a limited access expressway. US 202 in the study area can be defined as the segment between State Farm Drive and Hillman Drive. The highway is configured largely with four travel lanes and a concrete center median. Auxiliary lanes are provided for left turns at all signalized intersections. The only median breaks are at the signalized intersections. Signalized intersections include (north to south): State Farm Drive, US 1, and Hillman Drive. Recent traffic counts show AADTs of 36,280 north of US 1 and 35,306 south of US 1.

US 322

US 322 shares alignments with US 202 and US 1 in much of the study area. The only portion on its own alignment is east of US 1 on the north side of the study area. The non-dual designated portion is locally referred to as the Conchester Highway. In the study area, this segment of US 322 is a two-lane, undivided, principal arterial highway with auxiliary turning lanes at the two signalized intersections: US 1 and Evergreen Drive. A recent traffic count measured the AADT at 22,797 between US 1 and Evergreen Drive.

State Farm Drive

State Farm Drive is an access road/relief route connecting US 1 and US 202 across the northeast quadrant of the intersection. It is functionally classified as a local road. The two-lane undivided road provides access to the State Farm office complex and several businesses that front US 1, including the Hampton Inn, a bank, and several restaurants. Each end of State Farm Drive is a signalized intersection with auxiliary turning lanes. A traffic count from 1999 found an AADT of 6,884 along State Farm Drive.

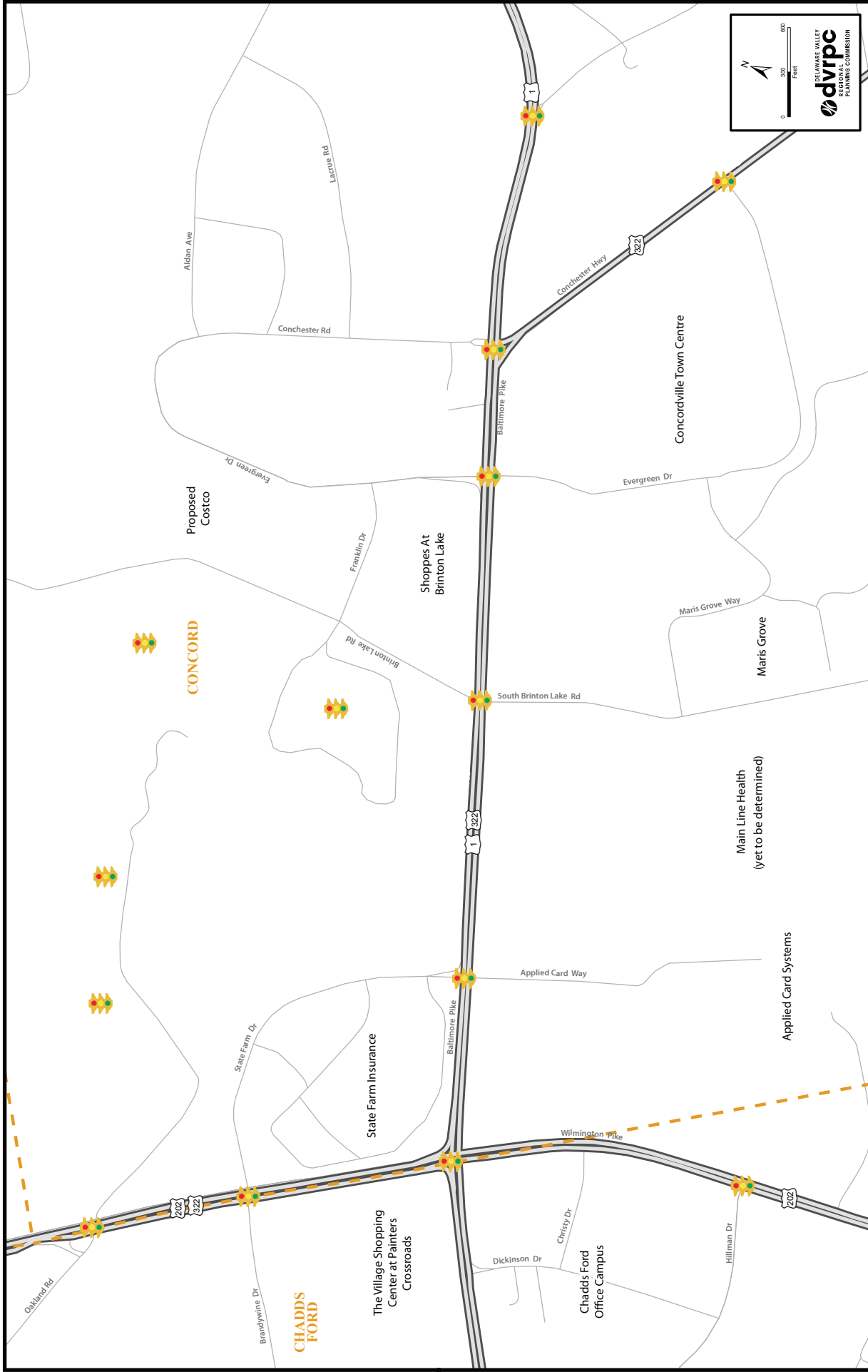
Brinton Lake Road

Brinton Lake Road is a two-lane major collector that intersects US 1 in the center of the study area, and largely parallels US 202. It serves the Shoppes at Brinton Lake and Maris Grove. The US 1 intersection is signalized. A recent traffic count north of US 1 found an AADT of 6,841.

Evergreen Drive

Evergreen Drive is a local road that intersects both US 1 and US 322—its two signalized intersections. The road has two travel lanes and auxiliary turning lanes at all intersections. Evergreen Drive provides access to Maris Grove, Concordville Town Centre, and the Shoppes at Brinton Lake. Traffic counts are not available for Evergreen Drive.

Figure 4: Local Highway Network



Congestion Management Process (CMP)

The CMP is a systematic process for managing congestion that provides information on transportation system performance. It recommends a range of strategies to minimize congestion and enhances the mobility of people and goods. These multimodal strategies include but are not limited to operational improvements, travel demand management, policy approaches, and additions to capacity. The CMP advances the goals of the DVRPC Long Range Plan and strengthens the connection between the Plan and the Transportation Improvement Program (TIP).

The study area contains three congestion management subcorridors:

- ▶ 5A – US 1 south of US 202,
- ▶ 5B – US 1 between US 202 and the Media bypass, and
- ▶ 8A – US 202 between Delaware and West Chester, and US 322 in the same area.

The CMP provides congestion management strategies that are appropriate for each subcorridor. The three subcorridors that comprise the study area all have recommended strategies for new bus service or changes to existing bus services, park-n-ride lots, and other non-autocentric congestion management strategies.

Planned Transportation Projects

The Media/Elwyn Line extension to Wawa will impact Painters Crossroads. The extension project (Long Range Plan project ID P) is discussed in [Chapter 3](#).

There are two major highway projects slated to occur in the Painters Crossroads area:

- ▶ US 202, Section 100 (Delaware to West Chester), widening options currently being studied, scheduled between 2010 and 2025, Long Range Plan project ID 39
- ▶ US 322 between US 1 and I-95, widen to four lanes, scheduled between 2010 and 2025 with right-of-way acquisition beginning in 2008, Fiscal Year 2011 Transportation Improvement Program projects 69816 and 69817

Non-Motorized Environment

The primary perception of transportation is that of motorized modes; however, there are many modes of transportation. Suburban development patterns have traditionally been based on motorized travel and even residences near commercial establishments require motorized connections. Improving non-motorized transportation modes contributes to more walkable, livable communities and creates new commuting options.

Pedestrian Environment

Most trips require the traveler to be a pedestrian on at least one end. In the Painters Crossroads area, most of the pedestrian activity at the end of auto trips is confined to parking lots and the sidewalks in front of businesses. For people using public transportation to reach jobs and shopping in the area, the pedestrian experience is much different. In these instances, one must be a pedestrian from highway to destination, and crossing a highway may be necessary.

Following are a few observations of the pedestrian environment:

- ▶ Several recent developments have installed sidewalks along their frontages.
- ▶ The sidewalk network is currently comprised of a series of unconnected segments.
- ▶ The most continuous sidewalk network is along Evergreen Drive.
- ▶ The US 1/Brinton Lake Road, US 1/Evergreen Drive and US 1/US 322 intersections have pedestrian crossing amenities, such as crosswalks and pedestrian signal phasing.
- ▶ There are no crosswalks or pedestrian signal phases for a pedestrian to cross US 202.

Providing a comfortable and connected pedestrian environment improves the experience for public transportation and other non-auto-based users. The planned improvements to US 202 include Smart Transportation elements, which may include bicycle and pedestrian amenities.

Bicycle Environment

US 1 through the study area is part of the Delaware County Bike Network. However, bike lanes are not present and striped shoulders are intermittent; thus the bicycle network in the study area is not ideal. The Octoraro Branch rail right-of-way runs south of and parallel to US 1 in the study area. A rails-to-trails project has been discussed for the unused rail corridor. Also, as mentioned previously, improvements to US 202 may include bicycle and pedestrian amenities, such as dedicated bicycle lanes.

Non-Motorized Safety

This study analyzed PennDOT pedestrian and bicycle crash data for the years 2005–2009 to examine the area's non-motorized safety. There were no reported bicycle/vehicle crashes; however, three pedestrians were struck by motor vehicles in the study area over the time frame, including one fatality. One pedestrian was struck at each of the following intersections:

- ▶ US 1/US 202
- ▶ US 1/Brandywine Drive
- ▶ US 202/Christy Drive (fatal)

There are no pedestrian amenities at any of the crash locations.

The crash data used in this report was provided by the Pennsylvania Department of Transportation for DVRPC's traffic safety related transportation planning and programming purposes only. The raw data remains the property of PennDOT and its release to third parties is expressly prohibited without the written consent of the Department.

Public Transit Service

SEPTA operates two bus routes serving the Painters Crossroads area—Routes 119 and 111 (shown on **Figure 1**). Two additional bus routes—SEPTA's Route 306 and the TMA of Chester County's SCCOOT bus—previously served the area. Both routes ceased serving the area due to low ridership demand.

Route 119

Route 119 operates between Harrah's Chester Casino in the City of Chester and Cheyney University in Thornbury Township. The route connects to the Wilmington/Newark Regional Rail Line at Chester Transportation Center and Marcus Hook Station. Transfers to/from other bus routes are also available at the Chester Transportation Center. **Appendix B** contains a copy of the weekday service schedule. Service characteristics follow:

- ▶ Weekdays: 17 northbound trips between 5 am and midnight, and 18 southbound trips between 5 am and 11:30 pm
- ▶ Saturdays and Sundays: 12 northbound trips between 6 am and 11 pm, and 13 southbound trips between 5 am and 11 pm

The route provides limited service to the northeast corner of the study area. From Chester, the route travels west on US 322 and turns left on Evergreen Drive. It follows Evergreen Drive to US 1, turns north and exits the study area. The route along Evergreen Drive provides service to both Concordville Town Centre and Maris Grove. Most other destinations in the Painters Crossroads area would be difficult to reach due to the limited pedestrian network.

Route 119 is one of five suburban transit division routes that falls below the minimum acceptable operating ratio. This indicates low ridership and potential changes to the route.

Route 111

The Route 111 bus provides the bulk of service in the Painters Crossroads area. The route operates between 69th Street Terminal in Upper Darby and Painters Crossroads. Intermediate service points include Granite Run Mall, Penn State University-Brandywine, Fair Acres Geriatric Center, and Riddle Memorial Hospital, among others. The route bypasses the Media area by utilizing the US 1 limited access expressway ("Media Bypass") between PA 320 and PA 352.

More than half of the Route 111 southbound trips terminate north of the Painters Crossroads area at Penn State University's Brandywine Campus. The service frequency for trips serving the area is:

- ▶ Weekdays: 15 northbound trips between 6 am and 11 pm, and 14 southbound trips between 6 am and 6 pm
- ▶ Saturdays: 11 trips between 7 am and 11 pm
- ▶ Sundays: seven trips between 8 am and 11 pm

Most trips serving Painters Crossroads occur in the peak periods.

The Route 111 connects with the Norristown High Speed Line, the Market-Frankford Line, the Route 101 trolley, the Route 102 trolley, and numerous bus routes at 69th Street Terminal. Several bus connections are available at the Granite Run Mall. There are no current direct connections to the Regional Rail system along Route 111's alignment.

Travel times vary depending on routing and time of day, ranging from 32 minutes for the trip between 69th Street Terminal and Penn State-Brandywine and 1:32 between 69th Street Terminal and Painters Crossroads. [Appendix B](#) contains the weekday service schedule.

There are approximately 127 riders per day on the route segment between Granite Run Mall in Middletown Township and Painters Crossroads, not including riders traveling to/from nearby Penn State University's Brandywine campus or the Fair Acres Geriatric Center. This is a small proportion of the route's total ridership. Ridership to or from the Painters Crossroads area has been minimal: approximately 100 riders per day for the last seven years. [Table 4](#) presents the ridership as surveyed by SEPTA on January 26th, 2010 for the Painters Crossroads area, and [Table 5](#) presents annual average daily ridership for the same area. [Table 6](#) shows the ridership data for the entire route.

Table 4: 2010 Daily Route 111 Ridership-Painters Crossroads Portion

Hour beginning	Northbound			Southbound		
	Ridership	Service frequency	Avg. ridership per run	Ridership	Service frequency	Avg. ridership per run
5 AM	-	-	-	-	-	-
6	0	1	0.0	2	1	2.0
7	1	1	1.0	16	2	8.0
8	6	2	3.0	7	2	3.5
9	1	1	1.0	3	1	3.0
10	-	-	-	-	-	-
11	-	-	-	-	-	-
12 PM	2	1	2.0	4	1	4.0
1	-	-	-	-	-	-
2	4	1	4.0	4	1	4.0
3	8	1	8.0	3	2	4.0
4	9	2	4.5	3	2	1.5
5	11	2	5.5	4	2	2.0
6	1	1	1.0	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	4	1	4.0	-	-	-
10	-	-	-	-	-	-
11	2	1	2.0	-	-	-
Totals	49	15	3.3	51	14	3.6

notes: Ridership counted as northbound boards and southbound alights, time = Chadds Ford Office Campus arrival/departure

SEPTA, 2010
DVRPC, 2010

Table 5: Annual Average Route 111 Daily Ridership: Painters Crossroads Portion

Year	2003	2004	2005	2006	2007	2009
Westbound	27	32	54	52	70	52
Eastbound	51	53	39	40	51	42
TOTAL	78	85	93	92	121	94

SEPTA, 2009

Table 4 shows that the daily Route 111 roundtrip ridership to the study area equals roughly 50 persons. The passenger volumes show a typical reverse commuting pattern; most morning peak trips are into Painters Crossroads and most afternoon peak trips leave Painters Crossroads for points outside the study area. With no southbound service after 6 PM, the route is not convenient for commuters residing in the area who work standard shifts along the US 1 corridor to the north, as there would be no public transit option for returning home.

Table 6: Route 111 Ridership: Complete Route

Hour beginning	Northbound			Southbound		
	Ridership	Service frequency	Avg. ridership per run	Ridership	Service frequency	Avg. ridership per run
5 AM	9	1	9.0	13	1	13.0
6	86	4	21.5	123	3	41.0
7	45	2	22.5	91	2	45.5
8	44	3	14.7	76	2	38.0
9	23	2	11.5	69	2	34.5
10	23	1	23.0	20	1	20.0
11	17	1	17.0	51	1	51.0
12 PM	30	2	15.0	36	1	36.0
1	12	1	12.0	52	2	26.0
2	110	3	36.7	67	2	33.5
3	97	2	48.5	62	2	31.0
4	82	2	41.0	55	2	27.5
5	38	2	19.0	73	4	18.3
6	11	1	11.0	45	3	15.0
7	17	2	8.5	19	1	19.0
8	29	1	29.0	13	1	13.0
9	22	1	22.0	19	1	19.0
10	14	1	14.0	8	1	8.0
11	21	1	21.0	-	-	-
Totals	721	32	22.5	879	31	28.4

notes: Ridership counted as northbound boards and southbound alights, time = initial route departure

SEPTA, 2010
DVRPC, 2010

Table 6 presents the Route 111 ridership of a typical day for the entire route. There are 32 northbound and 31 southbound trips per day with average ridership of 22.5 and 28.4 passengers respectively. The complete route has fairly consistent ridership across the day with only a slight increase for the southbound AM peak – the reverse commute pattern. The top five bus stops -- not including 69th Street Terminal -- by total activity (both directions, boards and alights) across the day include: Granite Run Mall – 352, Penn State University – 209, State Road/Lansdowne Avenue – 204, Fair Acres Geriatric Center – 156, and West Chester Pike/State Road – 110.

The portion of Route 111 dedicated to Painters Crossroads service accounts for approximately six percent of the route's total daily ridership.

Bus Passenger Survey Results

For this study, DVRPC conducted an onboard survey of patrons of SEPTA's Route 111 on December 14th, 2010 between 6 AM and noon. Two southbound and two northbound trips between Chadds Ford and the Granite Run Mall were surveyed. A copy of the survey is contained in **Appendix C**.

All questions were multiple choice except the question regarding the respondent's home zip code. If respondents made or were going to make a transfer, the survey asked for the connecting route. Participation was high with 19 of 22 passengers completing the survey, providing a sampling rate of nearly 40 percent of the segment's average daily ridership. Following are the survey questions and a summary of the results:

- ▶ What is the purpose of your trip today?
 - ◆ Work – 79 percent, Appointment – 16 percent, Other – 5 percent, Shopping and Social/Visit – 0 percent each
- ▶ On average, how many days per week do you ride the Route 111?
 - ◆ 5 – 7 days – 68 percent; 3 – 4 days, 5 percent; 1 – 2 days, 16 percent; Do not ride every week – 11 percent
- ▶ Did you, or will you make a transfer to complete this journey?
 - ◆ Yes, 42 percent; No, 58 percent
 - ◆ Transfer routes: Trolley routes 101 & 102, Bus Routes 114 & 117, and Market-Frankford Line
- ▶ What is your home zip code?
 - ◆ Corresponding locations (occurrences if > one): Upper Darby (2), West Philadelphia, North Philadelphia (2), Chester (3), Drexel Hill, Newtown Square, Brookhaven, Southwest Philadelphia, Center City Philadelphia, and Lansdowne
- ▶ Was another means to complete this trip available to you?
 - ◆ Yes, 16 percent; No, 84 percent

Two aspects of the survey results stand out – most passengers use the bus to get to and from work and most are captive riders.

Facilities

In Painters Crossroads, amenities such as benches and bus stop shelters for waiting public transit passengers are non-existent. Many bus stops require passengers to wait on unimproved surfaces.

The Granite Run Mall in Middletown Township, along US 1 serves as a transfer center for the area’s bus routes. SEPTA bus routes 110, 111, 114, and 117 all stop there. Passenger facilities include two large bus stop shelters, benches, trash receptacles, and two bus berths.



Typical study area bus stop



Granite Run Mall bus transfer facility

Photos: DVRPC, 2011

Public Transportation Conclusion

Route 111 provides service to the Painters Crossroads area, although that service is infrequent relative to the total number of Route 111’s daily trips and slow due to route deviations and recurring highway congestion. Route 111’s level of ridership is not reflective of the number of jobs in the area. Improved services and associated amenities, along with continued commercial (and residential) development would likely grow the ridership. To give an overview of public transit service times to Painters Crossroads, **Table 7** incorporates the results of the Bus Passenger Ridership Survey (**Chapter 2**) to determine possible origins and thus calculate travel times for Route 111 riders.

Table 7: Existing Public Transit Options to Painters Crossroads

Origin and Possible Transfer Routes	Leg 1	Time	Average Transfer Time	Leg 2	Time	Total Ride Time*	Total Time Inc. Transfer
- 69th Street Terminal (101, 102)	111 to Painters Crossroads	1:20	-	-	-	1:20	1:20
- 69th Street Terminal (101, 102)	110 to Granite Run Mall	0:55	0:19	111 to Painters Crossroads	0:45	1:40	1:59
- Chester Transportation Center (114, 117)	119 to Painters Crossroads	0:55	-	-	-	0:55	0:55
- Chester Transportation Center (114)	117 to Granite Run Mall	0:35	0:20	111 to Painters Crossroads	0:45	1:20	1:40
- Elwyn Regional Rail Station (Media/Elwyn Line, 117)	117 to Granite Run Mall	0:05	0:20	111 to Painters Crossroads	0:45	0:50	1:10
- Marcus Hook (Wilmington/Newark Line)	119 to Painters Crossroads	0:35	-	-	-	0:35	0:35
- Granite Run Mall (114, 117)	111 to Painters Crossroads	0:45	-	-	-	0:45	0:45

*All times approximates/averages of scheduled times.

DVRPC, 2010

Table 7 demonstrates that most public transit options to Painters Crossroads are not attractive due to time costs. In support of that conclusion, survey results showed a low ridership volume and a high transit-dependent population on Route 111. Clearly, routes to Painters Crossroads from various origins are not currently coordinated; transferring adds a significant amount of time to each trip. A transfer time of 15 to 20 minutes is considered good for SEPTA's suburban bus routes. However, an examination of ride time alone still reveals lengthy trips. The final leg of trips to Painters Crossroads is of particular concern. Though the distance is only approximately six miles along US 1, the scheduled travel time is 45 minutes due to several route deviations and recurring highway congestion. The Route 111's travel time along this segment equates to an average travel speed of eight miles per hour. A vehicle traveling the speed limit would traverse the same corridor in approximately eight minutes. As a result of this large time penalty, transit-dependent riders primarily utilize the service.

Route 111 survey results showed the route's patrons were not from the study area, rather people were using the service to commute to the study area for employment opportunities.

Existing Conditions Conclusion

The Delaware County Planning Department noted that the Painters Crossroads area is the last portion of the county with significant developable land. The area has seen extensive growth in commercial development in the recent past and plans exist for projects on much of the remaining undeveloped land. Residential land uses remain segregated from the commercial areas. With the abundance of commercial land uses, there is a growing need to connect people with the area's jobs. The land has been developed in a manner that is highly supportive of travel by personal automobile, while sacrificing the relative comfort of other means of travel. Plans exist to widen two of the area's three major highways which may sustain development pressure in the future.

Two SEPTA bus routes serve the area; Route 119 travels from Chester in the south along US 322, and the Route 111 travels along the US 1 corridor from 69th Street Terminal in Upper Darby. Both routes provide opportunities to connect people to jobs but the current ridership is low. Travel times for these bus routes are excessive due to long distances, route deviations, and highway congestion, all of which may deter the growth of ridership. Current land use patterns do not support efficient two-way bus operations.

Media/Elwyn Regional Rail Line

Introduction

The Media/Elwyn Line, formerly R3-Elwyn, operates between Center City Philadelphia and Elwyn, Middletown Township, Delaware County. It is part of SEPTA's greater Regional Rail system, with 15 stations outside of the three core Philadelphia stations. Stations east to west include: University City, 49th Street, Angora, Fernwood-Yeadon, Lansdowne, Gladstone, Clifton-Aldan, Primos, Secane, Morton, Swarthmore, Wallingford, Moylan-Rose Valley, Media, and Elwyn.

The Media/Elwyn Line is generally aligned east-west and runs south of and parallel to US 1 in Delaware County. SEPTA's Route 101 trolley parallels the service to the north. The rail line runs for approximately 14 miles between the westernmost station at Elwyn and 30th Street Station, a trip scheduled to take 31 to 41 minutes depending on route variation and time of day.

SEPTA's most recent ridership study found strong ridership on the Media/Elwyn line. The study ranked Media/Elwyn number 5 out of 14 Regional Rail lines with an average weekday ridership of 10,400 (2009). Of the total, approximately 800 daily riders exhibited a reverse commuting pattern out of Center City Philadelphia. In 2009, Media station had 529 daily weekday boards while Elwyn Station had 504. Parking at the two westernmost stations is utilized to capacity: Media – 250 spaces, 100 percent utilized; Elwyn – 348 spaces, 100 percent utilized. All Media/Elwyn Line parking except at Lansdowne Station (98 percent) is also 100 percent utilized. The lack of automobile parking will hinder any significant ridership growth for the Media/Elwyn Line in the future. Additionally, the Media/Elwyn Line serves a built-out corridor which leaves little room for ridership gains through future growth and development.

History

The West Chester and Philadelphia Railroad Company built what is now the Media/Elwyn line in the mid-19th century. The segment between West Chester and Media was referred to as both the Media Line and the West Chester Line. The line served both freight and passenger purposes. Passenger services were provided by the Pennsylvania Railroad, later Penn Central, Conrail, and beginning in 1983 by SEPTA. All operations west of Elwyn were suspended on the line in 1986 due to long-time deferred capital maintenance by SEPTA's predecessors. Between West Chester and Glen Mills, the rail is used by the West Chester Railroad, a tourist excursion company.

Extension

Shortly after service was truncated to Elwyn Station, Delaware County officials called for an extension of the line back to a station near the Wawa headquarters. SEPTA commissioned an engineering study in 1992, a feasibility study in 2000, and the URS Corporation is currently conducting a second engineering study that includes design. Due to many years of neglect going back to before SEPTA's operating control of the line and the age of the infrastructure, the scope of the service restoration project is large. SEPTA estimates the total cost of restoring service to Wawa Station to be approximately 80 million dollars. A 10-million dollar stimulus-funded project to conduct track bed stabilization and catenary structure repair has recently been completed. Funding for the remaining elements has not yet been secured.

The extension of the rail line will add approximately three miles to the Media/Elwyn Line. SEPTA noted that the travel time between Wawa and Elwyn will be scheduled for approximately six minutes. Between Wawa and Elwyn several other stations existed; Williamson School, Glen Riddle, and Lenni. The service extension will not include any of these abandoned stations, although SEPTA plans to construct a storage and maintenance facility at Lenni.

Prior to the line being truncated to Elwyn Station in 1986, service was offered to the line's terminus in West Chester. Restoring service to Wawa creates the possibility for additional service restoration efforts in the future, eventually reconnecting Philadelphia and West Chester.

The project will greatly expand the current parking capacity for the western portion of the rail line. Plans for Wawa Station currently include a 600+ space parking garage. While some diversion from Media and Elwyn Stations is expected, the *Elwyn to Wawa Service Restoration Study* forecasted just over 600 new passenger trips on the rail line by 2020. The diversions from Media and Elwyn Stations will allow for new ridership at those stations as well.

The proposed Wawa Station is in a rural portion of Middletown Township along US 1 near Chester Creek. Nearby is the site of the former Franklin Mint, for which developers have proposed a mixed use "town center." The debate concerning the development, primarily its density, is currently in the midst of public hearings. The headquarters of the Wawa convenience store chain are also nearby. However, unless pedestrian amenities improve, these locations will be unreachable from the station except by motor vehicle. Plans for the Franklin Mint site include pedestrian connections to Wawa Station, so its development may increase the station's utilization without detracting from its parking capacity.⁴

Shuttle Ridership Estimates

Estimating ridership for a proposed shuttle that feeds a proposed rail station is difficult at best. The estimation process used five methods to create a potential range:

- ▶ Existing Route 111 Ridership, US Census Journey to Work, Local Employee Survey Results, Future Growth and Development, and Park-n-Ride Potential

Existing Route 111 Ridership

The foundation of a Painters Crossroads shuttle ridership would be the existing Route 111 ridership. Both a shuttle and the Route 111 serving the Painters Crossroads would not be viable for demand or financial reasons. The Route 111 will provide approximately 50 round trip riders per day, or 100 daily trips. The onboard survey, previously discussed in brief, found that 16 percent were choice riders meaning that changes to accommodate shuttle operations, such as a lengthy layover at Wawa Station, cannot unduly affect the existing ridership or that portion may be lost.

US Census Journey to Work

This study analyzed US Census Journey to Work (J2W) data to find where people are coming from to work in the Painters Crossroads area. The most recent J2W data is from 2003 and is at the Minor Civil Division (MCD) level. [Appendix A](#) contains J2W data tables.

The American Public Transport Association (APTA) defines a secondary catchment area for commuter rail at five miles, and the primary catchment area at a half mile.⁵ As described in Delaware County's 2009 Transit Report and in [Chapter 3](#), the limited parking at Media/Elwyn Line stations decreases the line's catchment area, as do parallel public transit options. Therefore, this study considered municipalities for which a portion of their area fell within half a mile of a stop on the Media/Elwyn line. As employment data is only available at the MCD level, the catchment area studied is in reality larger than one-half mile. For example, portions of Springfield Township are located within one-half mile of two Media/Elwyn Line stops. However, the Township itself extends to points almost three miles away. The study discounted Chester Heights Borough; although it is within one-half mile of the future Wawa Station, Chester Heights residents would likely find a drive far more convenient than accessing the proposed 111 shuttle from either the Wawa Station or points along Route 111. Some municipalities within the catchment area are among the top 30 employee suppliers, but not all.

Applying these constraints, 1,388 people work in Chadds Ford or Concord townships and live within the Media/Elwyn Line catchment area . Using the 75 percent assumption, this study found a potential commuting population of 1,041 – a theoretical maximum.

Table 8 applies the American Community Survey transit mode share data to create an estimate of 144 potential riders, inclusive of any already commuting via the Route 111.

Table 8: Journey to Work and Transit Mode Share in Painters Crossroads

Municipality of Residence	Population Commuting to Chadds/Concord	75% Population	Transit Mode Share	Estimate
Aldan Borough	8	6	10.3%	1
Clifton Heights Borough	27	20	13.6%	3
Darby Township	44	33	9.5%	3
East Lansdowne Borough	8	6	13.3%	1
Lansdowne Borough	12	9	19.0%	2
Media Borough	44	33	8.3%	3
Middletown Township	162	122	4.6%	6
Morton Borough	7	5	12.9%	1
Nether Providence Township	127	95	8.0%	8
Ridley Township	227	170	6.7%	11
Rose Valley Borough	15	11	8.1%	1
Rutledge Borough	4	3	7.4%	0
Springfield Township	178	134	5.3%	7
Swarthmore Borough	6	5	16.7%	1
Upper Darby Township	272	204	15.7%	32
Upper Providence Township	63	47	5.6%	3
Yeadon Borough	18	14	20.6%	3
Philadelphia City	312	234	25.8%	60
Total	1534	1151	-	144

Source: US Census 2003 & ACS 2009
DVRPC, 2010

A potential shuttle can serve commuters residing within Chadds Ford and Concord Townships as well. However, considering the lack of residential land uses in the study area, park-n-ride facilities may be required to promote a commute starting with the shuttle. The population that commutes to Philadelphia, areas served by Regional Rail, and the US 1 corridor (north) are potential shuttle users. Census 2000 found that 2.0 and 1.8 percent, respectively, commute to work using public transit. This commute population could add a small number of riders to the proposed shuttle. However without more specific data it is difficult to estimate this increase.

Local Employee Survey Results

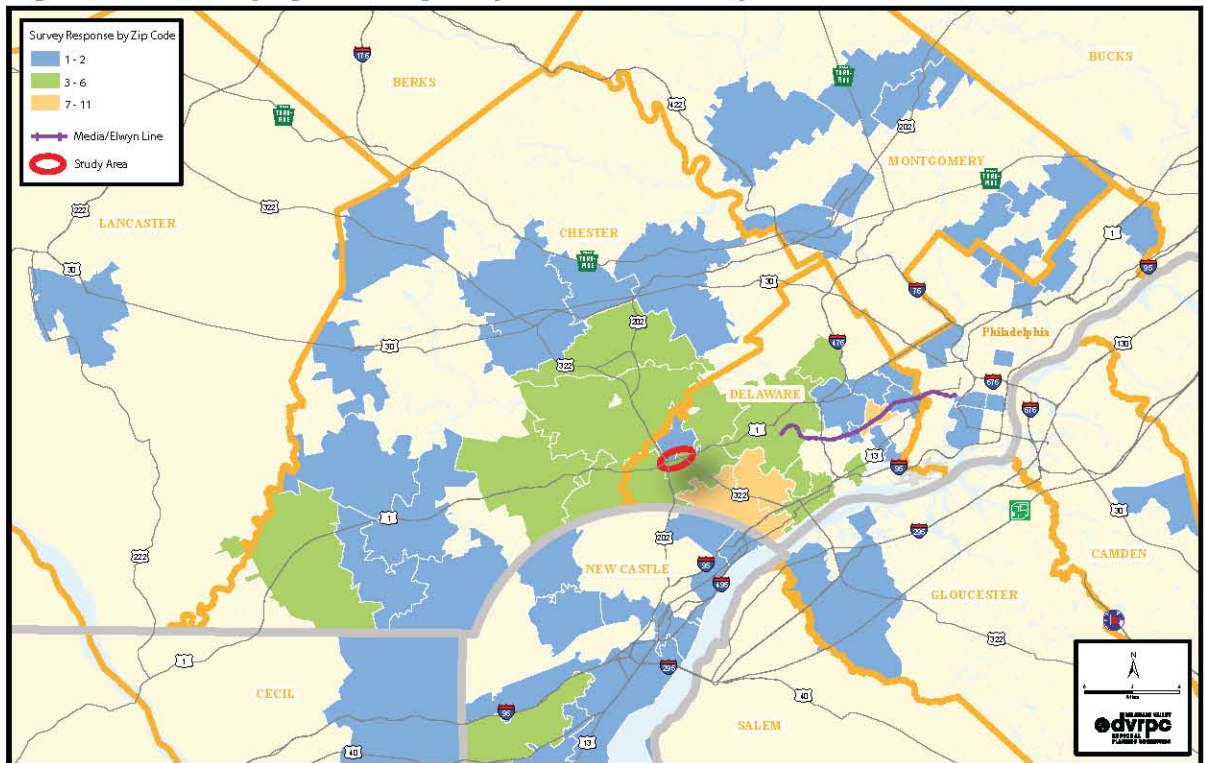
DVRPC conducted a survey of Painters Crossroads area employees in October and November 2010. Two versions of the survey—a paper version distributed to 12 area businesses and an electronic version—promoted both to the businesses receiving paper surveys and to several other large employers. A combined total of 158 completed paper and electronic surveys were returned. It should be noted that there is believed to be a high representation of State Farm Insurance employees. Nevertheless, the survey results are useful for determining the commuting patterns of employees in the study area. Below are the survey questions and answers.

- ▶ Do you, or have you ever commuted to your current job using public transportation?
 - ◆ Yes, every day, 1.9 percent; Yes, occasionally, 7.6 percent; Yes, but rarely, 6.4 percent; No, 84.1 percent

- ▶ If public transportation options were more convenient would you consider using them for commuting to work?
 - ◆ Yes, 80.6 percent; No, 18.7 percent; I already commute via public transportation, 0.6 percent
- ▶ Which best describes your work schedule?
 - ◆ Day, 69.5 percent; Second shift, 1.3 percent; Third shift , 1.3 percent; Retail type (i.e., 11 am – 7 pm) , 6.5 percent; Other, 21.4 percent
- ▶ What is your home zip code?
 - ◆ See **Figure 5**
- ▶ Do you regularly have intermediate stops during your work commute (i.e., daycare)?
 - ◆ Yes, 19.1 percent; No, 80.9 percent
- ▶ How long does a typical one-way commute to or from work generally take?
 - ◆ 1–15 minutes, 10.1 percent; 16–30 minutes, 32.9 percent; 31–45 minutes, 31.0 percent; 46–60 minutes, 13.9 percent; More than one hour, 12.0 percent

A copy of the local employee survey form is in [Appendix C](#).

Figure 5: Local Employee Survey Respondent's Home Zip Codes



Estimating Shuttle Ridership from the Survey Results

Survey respondents residing within the Media/Elwyn Line’s catchment area and in the City of Philadelphia were identified. This found that approximately 20 percent of Painters Crossroads area employees could potentially commute to work on an extended Media/Elwyn Line.

The other factor to consider is those who indicated that they would use public transportation if it were more convenient. Although “more convenient” is admittedly nebulous, this answer provides a good indicator as to who would not use public transportation. Eighty one percent of respondents said that they would consider public transit. Combined, these factors identify 16 percent of the population as potential new ridership. The estimated 2010 study area employment equals approximately 9,900. Sixteen percent of the employment equals 1,625.

The upper limit is 1,625 potential new riders, which is not realistic. The question regarding public transportation convenience is vague. Actual improvements may not satisfy the threshold for many. Turning most of these potential new riders into actual riders would provide Center City-like modal split patterns in a suburban/exurban setting—something not likely to occur.

Future Growth and Development

Simply increasing the employment opportunities in Painters Crossroads is a means to increase public transit ridership; as more people commute to the area public transit becomes a more attractive option. In addition, if the increase follows similar mode share patterns of the past, the number of public transit riders will increase. The Future Growth and Development assessment in this study does not seek to create a ridership estimate; instead it attempts to describe how the ridership might grow based on continuing growth and development in the Painters Crossroads area.

This study assessed land use in Painters Crossroads to identify undeveloped lands in the area. Although public transportation does not currently serve all of these parcels, their development will increase overall traffic to the area and could draw a corresponding increase in ridership. Project proposals exist for some of the identified undeveloped lands, which are listed below.

Chadds Ford Township

- ▶ A large parcel west of The Village Shopping Center, zoned Planned Business Center.
- ▶ A vacant property in the southwest quadrant of the US 1/US 202 intersection. Behind it is another parcel that is also vacant. Both are zoned Planned Office Center.
- ▶ A large parcel west of the Chadds Ford Business Campus that is zoned Light Industrial.
- ▶ Several parcels fronting US 202, mostly zoned Planned Business Center and Commercial.

Concord Township

- ▶ Land owned by Applied Card Systems between US 202 and Applied Card Way. It is currently zoned Planned Business and Commercial.
- ▶ A large parcel east of Applied Card Way. It is currently zoned Light Industrial and owned by Main Line Health. The development plans are unknown.
- ▶ A medium-sized parcel between Evergreen Drive and Spring Valley Road. Maris Grove plans to expand on this parcel. Their Neighborhood 2 is partially complete, Neighborhood 3 approved, and Neighborhood 4 indefinitely extended. It is zoned with an overlay as a Continuing Care Retirement Community.
- ▶ A parcel south of Concordville Town Centre. Brandolini Companies has filed several zoning challenges, the latest of which seeks to integrate the land into the Town Centre.⁶ PennDOT has also expressed intent to acquire part of that land for use in the widening of US 322.⁷ The parcel is currently zoned partially as a Planned Industrial Park and as Residential.
- ▶ A large parcel along the northern portion of Evergreen Drive. Brinton Lake Land Development has proposed a two building office complex and a Costco store on the parcel. The area is currently zoned as a Planned Business Park.

The intensity with which the remaining land is developed will have a major impact on any increased public transit ridership. The volume of remaining land alludes to future growth in the area. DVRPC regional employment forecasts show an expected gain of 1,434 new jobs, or a growth of 14.5 percent to 2035. However, this projection is based on 2005 conditions and the preceding years.⁸ The study area has experienced growth at a higher rate than previous trends. DVRPC forecasts underestimated the 2010 population of Delaware County by nearly 3,000 people, and that of Concord Township by about 1,500 people. The remaining land has the potential to house more than the forecasted gain. Thus, the actual employment increase to 2035 could be higher.

In summary, growth and development will continue into the foreseeable future. The intensity and type of development will determine employment and/or population growth, and in turn any increase in public transit ridership.

Park-n-Ride Potential

The possibility of a park-n-ride facility in the study area was mentioned at the first advisory committee meeting. Park-n-ride facilities can be stand-alone entities, or they can be shared lots located at facilities that do not use their full parking capacity during the work week. This analysis estimates ridership assuming a park-n-ride is developed. A park-n-ride facility would offer universal benefits and may attract carpoolers in addition to public transit users.

Numerous factors: speed, frequency, and reliability of shuttle service: park-n-ride capacity, lot safety, and cost; among others will dictate the degree to which a park-n-ride would be utilized.

This estimation considers residents of Concord and Chadds Ford townships, though recognizes the potential for a larger catchment area. According to 2003 J2W data, 927 residents work in

municipalities along the Media/Elwyn Line. Of those, 567 work in the city of Philadelphia. The convenience of reaching a workplace destination in a municipality outside of Philadelphia is relevant, yet cannot reliably be included in an estimate. Applying mode share data to the 2010 population, 249 study municipality residents commute to work in Philadelphia using public transportation. Two hundred forty-nine is the upper limit to the ridership potential that is based on the park-n-ride.

Beyond an institutional agreement for shared parking, another option is to lobby PennDOT to construct a park-n-ride as a congestion management strategy during the widening of either US 202 or US 322. A developer could also contribute a park-n-ride lot as part of their development approval. They could convey it to PennDOT who would own and maintain the park-n-ride lot as a congestion management strategy. A study conducted for PennDOT in 2001 rejected a lot at the intersection of 322 and US 1, citing land acquisition as a significant obstacle to construction. As the widening of US 322 nears, another assessment of the potential park-n-ride lot should be undertaken.

Ridership Estimate Summary

It is impossible to accurately estimate the potential shuttle's ridership; there are too many unknowns. This study used several methods of analysis and presented the results to the advisory committee. A brief summary of the results from each analysis follows:

- ▶ Existing Route 111 Ridership – 100 rides per day (i.e., 50 people per day)
- ▶ Journey to Work – 288 rides per day (i.e., 144 people per day)
- ▶ Local Employee Survey – a maximum of 3,250 rides per day (i.e., 1,625 people per day)
- ▶ Future Growth and Development – a minimum growth of 14.5 percent by 2035 (e.g., 115 total rides per day or 57 passengers if this increase is applied to the existing Route 111 ridership)
- ▶ Park-n-Ride Potential – a maximum potential of 498 rides per day (i.e., 249 people per day)

Ridership Estimate Conclusion

After the second advisory committee meeting, SEPTA provided the historic ridership numbers presented in **Table 5**. Despite recent commercial development in the area, Route 111 ridership has remained static. This indicates that if service is maintained at its current level, the ridership numbers will also hold steady. There is a lot of variability in creating future estimates; particularly land use and development patterns in the area will have a great impact on ridership growth.

For these reasons, the advisory committee felt that ridership growth on the Route 111 route would be on the low end of the estimates. The lowest estimate is that based on DVRPC's regional employment projections, which projects a very minor increase in daily passengers.

Shuttle Routing and Scheduling

Shuttle Routing

This study presents four alternatives for shuttle service within the Painters Crossroads area. Each alternative is concerned with the area south of the US 1/US 322 intersection. The location is identified on **Figure 6** (Routing Start/End). Service north of the Painters Crossroads area is discussed following the presentation of the four alternatives.

Implementing any of these alternatives could be done by altering the Route 111 or by creating a new route. These options are discussed in **Chapter 7**.

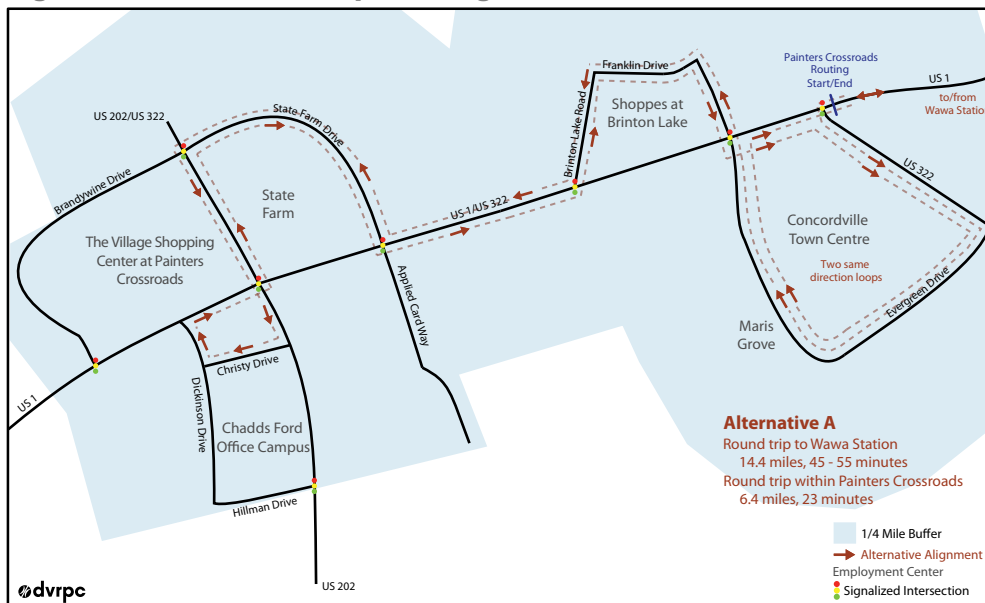
All presented travel times are based upon published Route 111 schedules.

Following the presentation of the routing alternatives, **Table 9** provides a summary of the strengths and weaknesses of each.

Alternative A – No Change (Figure 6)

This alternative uses the alignment of the Route 111. This alignment within Painters Crossroads is 6.4 miles and would require 23 minutes to complete.

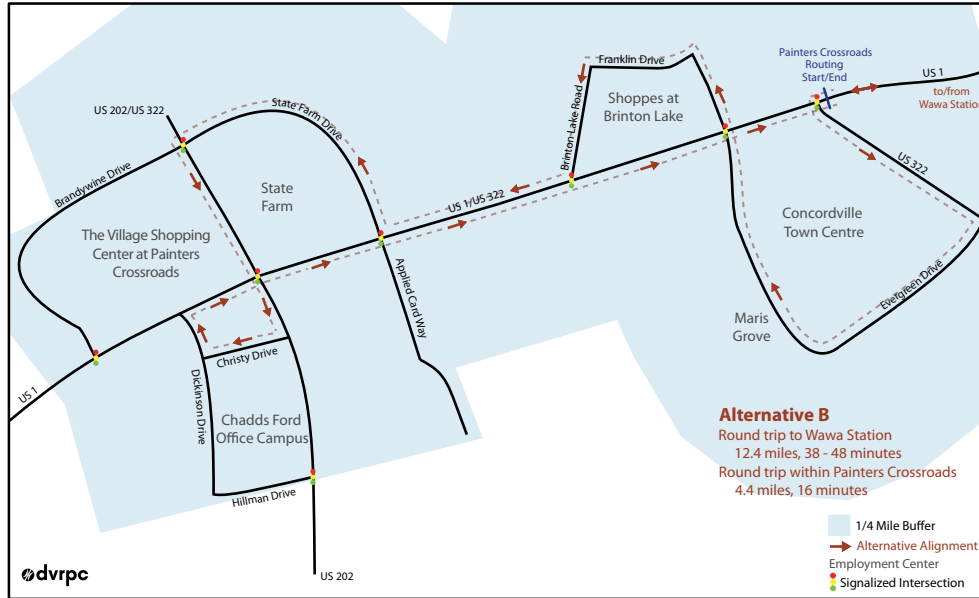
Figure 6: Alternative A Proposed Alignment



Alternative B (Figure 7)

Alternative B follows the Route 111 alignment to the Chadds Ford Office Campus. The alternative stays on US 1 as it returns to Wawa Station. This alignment is 4.4 miles and requires 16 minutes.

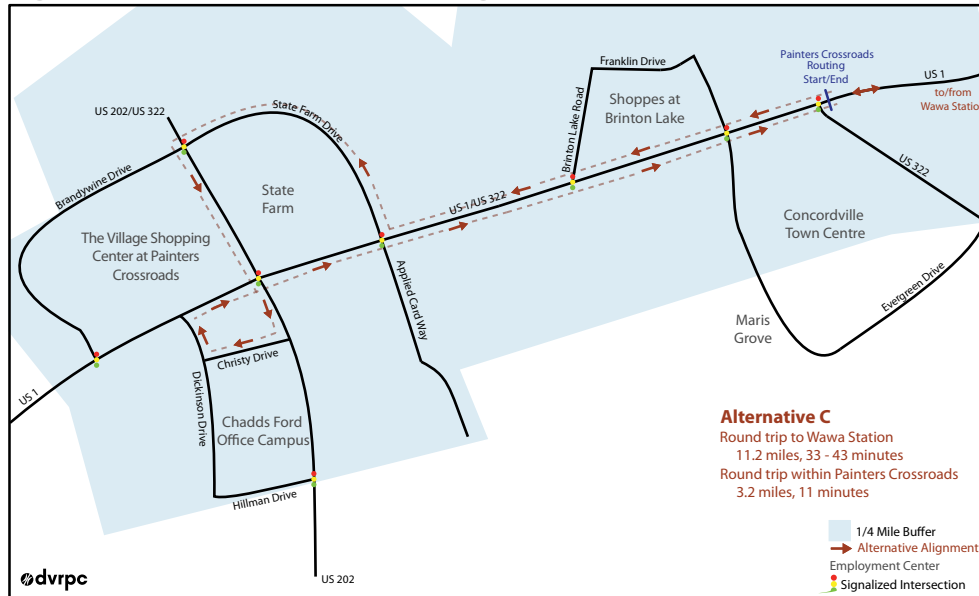
Figure 7: Alternative B Proposed Alignment



Alternative C (Figure 8)

In Alternative C, the Shoppes at Brinton Lake and Concordville Town Centre loops are removed. Service into Chadds Ford Township is still required due to the lack of pedestrian crossings along US 202. The alignment is 3.2 miles and would require roughly 11 minutes.

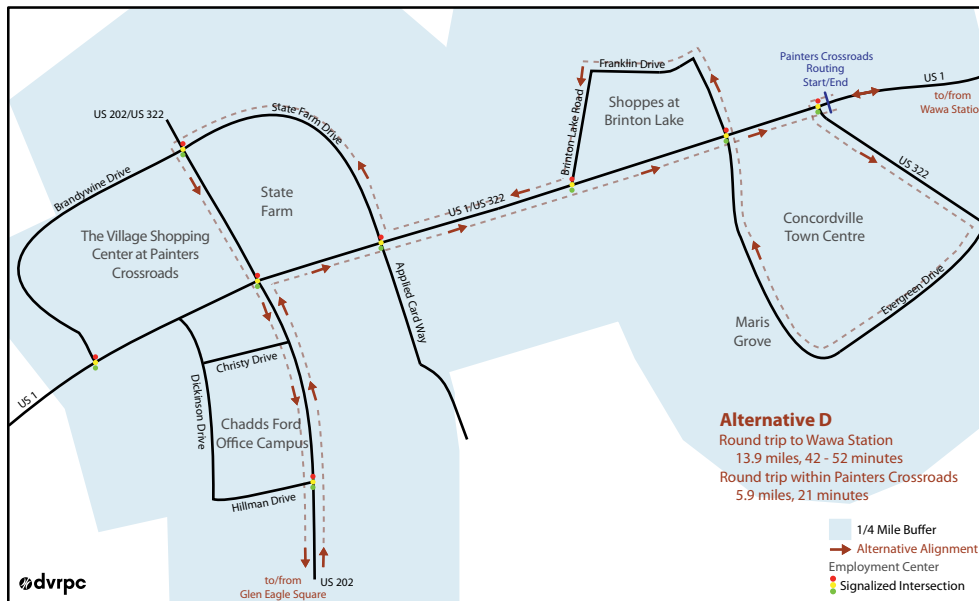
Figure 8: Alternative C Proposed Alignment



Alternative D – Glen Eagle Access (Figure 9)

This alternative serves Glen Eagle Square, another major shopping center in the area. This would connect three major shopping centers. The alignment is 5.9 miles and would require 21 minutes to complete. SEPTA does not support this alternative due to circulation constraints at Glen Eagle Square, the lack of any formal service requests, and the poor performance of previous routes that served the area.

Figure 9: Alternative D Proposed Alignment



Alternatives Summary

The alternatives trade off varying degrees of access for speed. Ultimately, the right balance between access and speed needs to be achieved to best attract and satisfy ridership. The alternative alignments were presented to the project advisory committee and discussed. The group decided that there is not a need at this time to select a preferred alignment.

Table 9: Service Alignment Alternatives Strengths and Weaknesses Summary

Alternative	A	B	C	D
Strengths	<ul style="list-style-type: none"> - Same as existing - New bus stops not required 	<ul style="list-style-type: none"> - Removes service duplication - Decreased trip time - Improved Regional Rail coordination - Maintains Route 119 connection 	<ul style="list-style-type: none"> - Streamlined service - Shortest trip time - Improved Regional Rail coordination - Potential for more frequent service 	<ul style="list-style-type: none"> - Glen Eagle Square service - Retains current coverage - Removes duplicative routing - Maintains Route 119 connection - Reduced walking times compared to alternative C
Weaknesses	<ul style="list-style-type: none"> - Long round trip - Difficult Regional Rail coordination - Circuitous routing - Service duplications 	<ul style="list-style-type: none"> - Changes existing routing - Less frequent service to major employers 	<ul style="list-style-type: none"> - Changes existing routing - Lack of pedestrian amenities - New bus stops/amenities may be required - Less opportunity for Route 119 connection 	<ul style="list-style-type: none"> - Changes existing routing - May not be possible for buses to turn around - Chadds Ford Office Campus only served along US 202
Round Trip Time to Wawa	45-55 min	38-48 min	33-43 min	42-52 min

DVRPC, 2011

US 1 Corridor North of Painters Crossroads

Not discussed in the alternatives is the US 1 corridor between the study area and Wawa Station. Existing and future ridership along this corridor needs to be accommodated with any plan. This segment is approximately four miles long with travel times ranging from 11 to 16 minutes. Along this segment, there are six eastbound bus stops and eight westbound bus stops. They are all currently served by the Route 111 and ridership is low.

Continuing service to the existing bus stops should not be an issue under any of the alternatives. This study considers these stops in timing calculations.

Route Scheduling

Route scheduling concerns service frequency and trip timing. The service frequency is a function of the available funding and ridership and is discussed as such in [Chapters 6 and 7](#).

Table 10 presents possible trip timing for the portion of the route between the proposed Wawa Station and the southern terminus. Should a shuttle be developed as a retiming/route deviation of Route 111, the timing could simply be worked backwards from the existing schedule.

Table 10: Sample Schedules for Alignment Alternatives

Bus Stop / Time Point	Alternative A		Alternative B		Alternative C		Alternative D	
	Uncongested	Congested	Uncongested	Congested	Uncongested	Congested	Uncongested	Congested
Wawa Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conchester Hwy/US 1	11.06	15.89	11.06	15.89	11.06	15.89	11.06	15.89
Evergreen Dr/Maris Grove Way	13.88	18.72	13.88	18.72			13.88	18.72
Evergreen Dr/US 1	15.12	19.95	15.12	19.95	12.30	17.13	15.12	19.95
Brinton Lake Rd/Franklin Dr	17.24	22.07	17.24	22.07			17.24	22.07
State Farm Dr/US 1	19.18	24.01	19.18	24.01	14.24	19.07	19.18	24.01
US 202/Village S.C.	20.41	25.25	20.41	25.25	15.47	20.31	20.41	25.25
Chadds Ford Office Campus	21.12	25.95	21.12	25.95	16.18	21.01	21.12	25.95
Glen Eagle Square							24.12	28.95
Chadds Ford Office Campus							27.12	31.95
Dickinson Dr/US 1	22.88	27.72	22.88	27.72	17.94	22.78		
US 202/State Farm Dr	24.47	29.31						
State Farm Drive/Pond Dr	25.00	29.84						
State Farm Dr/US 1	26.06	30.89	23.94	28.78	19.00	23.84	28.18	33.01
US 1/Brinton Lake Rd	27.30	32.13	25.18	30.01	20.24	25.07	29.41	34.25
Evergreen Dr/US 1	28.88	33.72						
Conchester Hwy/US 1	29.41	34.25						
Evergreen Dr/US 1	32.77	37.60						
Conchester Hwy/US 1	34.00	38.84	26.41	31.25	21.47	26.31	30.65	35.48
Wawa Station	45.34	55.13	37.75	47.54	32.81	42.60	41.98	51.77

DVRPC, 2010

Table 10 describes normal and congested travel times. SEPTA accounts for congestion in scheduling, with Route 111's slowest scheduled trips occurring between 7:30 and 8:30 AM and 4:00 and 6:00 PM. An assessment of hourly traffic volumes (indicator of congestion) along the US 1 corridor generally corresponded with the peak periods.

Coordination with Rail

The ultimate goal of the shuttle service is to provide a reliable connection to/from rail services. Shuttles arriving shortly before trains depart and leaving shortly after trains arrive is paramount.

Ideally the rail schedule would provide consistent headways allowing for easy shuttle scheduling. SEPTA provided a draft peak period schedule for the Wawa Extension service, listed below:

- ▶ AM Peak
 - ◆ Arrivals – 7:05, 8:06, 8:39, 9:40
 - ◆ Departures – 5:28, 6:00, 6:28, 6:53, 7:11, 7:33, 8:10, 8:22, 8:54
- ▶ PM Peak
 - ◆ Arrivals – 2:52, 3:37, 4:13, 4:52, 5:23, 5:35, 6:04, 6:11, 6:39, 7:09, 7:51
 - ◆ Departures – 3:06, 3:56, 4:39, 4:54, 5:37, 6:31, 7:11

SEPTA noted that the times shown will likely hold true due to tight scheduling windows coming into and out of 30th Street Station.

The draft schedule lacks consistent headways that would benefit scheduling a shuttle. The AM peak has two arrival/departure pairs. The PM peak has three scheduled pairs, though with varying lengths of time between. The current Route 111 schedule does not complement the draft rail schedule.

High levels of coordination between the two services may require additional peak vehicles. Peak vehicles add significant costs to service and should be considered when assessing the appropriate level of warranted service.

Sample Rail Complimentary Shuttle Schedule

If implemented as a Route 111 deviation, a shuttle service could follow the pattern shown in **Table 11** as an example.

Table 11: Sample Shuttle Schedule

	69th Street	Wawa Station		Wawa Station	Chadds Ford
Vehicle 1 →	5:20			5:56	6:21
Vehicle 2 →	6:00	6:45	↻	6:55	6:30
	7:40	6:55	↻	7:04	7:29
	7:50	8:15	↻	8:03	7:38
Vehicle 2 ←	8:50	8:25	↻	8:12	8:37
Vehicle 1 ←	9:49			9:11	8:46

DVRPC, 2011

This sample schedule considers the first few trips of Route 111’s current schedule. The route deviation (blue) that serves the shuttle portion of the route allows for more scheduling flexibility. Service to the remainder of the route (green) may be accomplished with fewer peak vehicles.

Table 11 provides just one example. As discussed earlier in this chapter, there are several routing options to make Route 111 function more like a shuttle. Using Wawa Station as the break

point for a shuttle along this route re-emphasizes the stop as an important commuter node, allowing for connections to Center City, points in Painters Crossroads, and 69th Street Terminal.

Painters Crossroads-Wawa Shuttle Options

Shorter, more shuttle-like trips within the Route 111 could decrease the cost compared to Route 111's current service through Painters Crossroads. The biggest determinant of overall cost will be the frequency and days of service – and the number of peak vehicles required to accommodate the resulting schedule. Several options exist which can be considered when the implementation schedule is clear.

- ▶ No change; allow coincidental coordination between the Route 111 and the Regional Rail. Costs would stay at their current levels.
- ▶ Retime several Route 111 runs to coordinate with Regional Rail; this option may increase costs by requiring an additional peak vehicle.
- ▶ Create a Route 111 route deviation that allows for several back and forth trips between Wawa Station and Painters Crossroads with coordinated service with Regional Rail; costs depend on how much service is provided to Painters Crossroads with midday ridership being expensive to serve.
- ▶ Truncate Route 111 to Wawa Station and create a new 200-series route to operate as a shuttle between Wawa Station and Painters Crossroads; this would add peak vehicles and likely be the most costly option. However, overall costs for Route 111 would be reduced.

When Regional Rail service restoration to Wawa is imminent, a reassessment of development in the study area and ridership on Route 111 will be necessary to determine the level of service warranted and the preferred method for providing that service.

It should also be noted that SEPTA is currently unable to offer expanded service without offsetting the associated costs elsewhere. This signifies that any service expansion is regionally competitive.

Shuttle Routing and Scheduling Conclusion

There are numerous paths to route shuttle service through the study area. Travel time savings are possible. Traveling to/from the study area while using Regional Rail for one leg is currently inconvenient. With the Regional Rail service to Wawa Station and a streamlined Route 111/shuttle service, reaching the area will become more convenient for a wider array of people. Coordinated services between bus and rail could minimize transfer times improving the efficiency of trips in the area. Ultimately, the selected alignment should provide scheduling coordination with rail service at Wawa Station and serve the Painters Crossroads commuters. Scheduling challenges remain regarding how to best coordinate with sporadically scheduled rail service. The next chapter explores the costs associated with shorter, more shuttle-like service.

Costs, Revenues, and Funding

This chapter seeks to provide an overview of the costs and revenues associated with a shuttle-type service. To simplify the cost analysis, the cost of a single round trip between Wawa Station and Painters Crossroads was estimated for each alternative, and for a Route 111 trip. The cost estimates are for judging the difference between existing and potential Route 111/shuttle services. The level of service (frequency, days) have huge implications on the costs, therefore estimating annual costs is not valuable until the degree of warranted service is determined.

Cost Estimation

A simplified version of the Federal Transit Administration's Fully Allocated Operations and Maintenance (O&M) Cost Model was used to estimate costs. The estimates do not consider peak vehicles for reasons discussed later.

$$\text{Annual O\&M Cost} = (\text{Cost per revenue hour} * \text{Revenue hours}) + (\text{Cost per revenue mile} * \text{Revenue miles}) + (\text{Annual vehicle cost} * \text{Peak vehicles})$$

SEPTA's annual *Route Operating Ratio Report* (FY 2010) provided the default cost values.

- ▶ Revenue hour = \$52.79
- ▶ Vehicle mile = \$2.30
- ▶ Vehicle = \$102,100/year

Revenue Hours

Revenue hours account for operations costs such as wages, utilities, and other supplies.⁹ They represent the entire time a bus is in service, including time to/from route termini.

Revenue Miles

Revenue miles accumulate with miles traversed in revenue service and account for maintenance related costs such as tires, mechanics' wages, and fuel.¹⁰

Peak Vehicles

The cost associated with a peak vehicle represents what it costs SEPTA to own or lease, maintain, and insure a single bus for a year. Many variables control the peak vehicle need and cannot accurately be determined. However, when implementing any new service, the number of required peak vehicles should be a primary concern.

Cost Analysis Results

Table 12 shows the cost analysis and estimation results for the four alignments shown in **Chapter 5**. Meant for comparison only, the table does not show vehicle costs, or the cost of potential deadhead time and mileage accrued between each alignment and Victory Division Depot.

Table 12: Simplified O&M Cost Model Calculation Results

	Revenue Hour Cost (Peak Time)	+ Revenue Miles	Cost =	Simplified Cost of One Roundtrip
Alternative A	\$48.39		\$33.12	\$81.51
Alternative B	\$42.23		\$28.52	\$70.75
Alternative C	\$37.83		\$25.76	\$63.59
Alternative D	\$45.75		\$31.97	\$77.72

DVRPC, 2011 SEPTA, 2009

Potential Revenues

A shuttle coordinated with Regional Rail has the potential to increase ridership. As this new ridership would come from Regional Rail, most if not all new riders would be pass holders and would not increase fare collections. If the service draws people because they are now able to complete their trip, there may be a minimal increase to the Regional Rail fare collections. SEPTA's average fare for Victory Division bus routes is \$1.16 per passenger. Based upon Route 111's annual ridership, an unchanged route will likely continue to collect around \$35,000 annually.

Costs, Revenues, and Funding Conclusion

Revenue forecasts based on ridership estimates are as wide ranging as the ridership estimates. Erring on the side of caution, future revenues would likely not increase much over existing ones.

Any significant service change on Route 111 poses a threat to the already low current ridership. Until demand increases, the most feasible change to the service is to provide limited coordination and realign for a more efficient service. In order to reroute the Route 111 to be more like a "shuttle," or otherwise expand the service, a large gain in ridership, a business improvement district, or some other privately based funding mechanism would likely need to contribute.

SEPTA planners noted a Route 111 deviation as a preferred implementation option. However, this study is being completed an estimated five years before the Wawa extension is complete.

Feasibility Assessment, Recommendations, and Conclusion

Local land use, synchronization with Regional Rail, pedestrian networks, the investment of employers in the area, and other factors will all dictate the success of existing and future public transit services in the study area. The planning and development decisions and regulations of the local municipalities will have the greatest impact on the viability of the shuttle service.

DVRPC's Transit Score methodology for assessing the likely success of public transit services assigned a score of 0.57 to the study area which falls into the "low" category (2005). To achieve a "medium" score, the lowest where population and/or employment density truly support public transit service, the four traffic analysis zones that encompass the study area would need to realize an average of 170 percent growth in population density, or 534 percent growth in employment density, or a combination of the two over 2005 numbers. Enabling a mixed-use development scheme is a means to promote a higher transit score.

Future development will increase demand on the subregion's transportation network. The study area already falls into three of the DVRPC's congestion management subcorridors. Thus to support and draw future development, transportation options into Painters Crossroads will become crucial. In particular, the discrepancy between the jobs and workers in the area, discussed in [Chapter 3](#), creates a situation where many of the area's residents will commute out for employment, while others must commute in to satisfy local labor needs.

Over 550 residents of the two study area townships commute to Philadelphia daily. As discussed in [Chapter 3](#), parking at the Regional Rail stations in the area is utilized to capacity. Extending a reliable link through Painters Crossroads via the Route 111 could draw more riders who currently drive due to lack of parking at the rail stations.

Meanwhile, the employees who commute to Painters Crossroads will also require a reliable mode of transportation. As congestion in the corridor increases, public transit may become a more attractive option. As [Table 3](#) highlights, many of the jobs available in the area are quite low income and may attract a transit-dependent population.

Shuttle service must be able to reliably link to Regional Rail, especially to draw non-transit dependent riders. Currently, transfers between services are lengthy. A synchronization between the services could not only draw ridership from those who could then reliably reach their jobs in Painters Crossroads, but could also compel the use of park-n-rides along the shuttle route for those commuting away from the Painters Crossroads area. Although the three-seat commute could be unattractive, a "shuttle" between a park-n-ride lot and Regional Rail could appeal to

drivers as more than a “bus.” Coordination will require some adjustment of the Route 111, as the Regional Rail scheduling is less flexible. Shorter, more shuttle-like routes through Painters Crossroads would give Route 111 more chances to reliably link to the Regional Rail service.

Following national trends, any shuttle service should also include the ability to carry bicycles on board.¹¹ This can work to increase ridership as it increases the catchment area.¹² Roads in the study area are wide enough to support bicycle infrastructure and the townships should consider additional bicycle accommodations. South of the study area is the Octoraro Branch railroad corridor for which a rails-to-trails project has been discussed. If that project were to come to fruition, more commuters could travel to the area via bicycle. Bicycling not only has the potential to reduce congestion by enabling mode switches, but promotes active, healthy lifestyles.

In addition, the municipalities in the study area will need to invest in both a plan for future development and pedestrian infrastructure. A mixed-use development scheme in the area will support the efficient establishment of public transit such as a shuttle and allow for two-way ridership. SEPTA recently drew a similar conclusion regarding its subway extension to the Navy Yard in Philadelphia.¹³ Currently, there are no plans or regulations to enforce such land use. Local municipalities should create a mixed-use zoning overlay to encourage residential development in what is currently predominantly commercial land in Painters Crossroads and they should consider public transit accessibility in their land development review process. As discussed in [Chapter 2](#), Painters Crossroads lacks adequate and safe pedestrian amenities to convey travelers from bus stops to their destinations. Local municipalities should invest in the pedestrian network, particularly in those routes that connect to bus stops. The combination of mixed land uses and an improved pedestrian environment will have the added benefit of providing more activity to the area.

In summary, there are strengths, weaknesses, opportunities, and threats to public transit service in the Painters Crossroads area.

Strengths

- ▶ Continuing growth and development in the study area
- ▶ Existing current public transit ridership
- ▶ A recognition by county officials of the need to better serve the area
- ▶ Undeveloped land in and around the study area which could become more transit-supportive
- ▶ Recommendations and strategies for congestion management exist for the area through DVRPC’s Congestion Management Process, including increasing the efficiency of bus service in the area

Weaknesses

- ▶ Current Route 111 ridership is low and has remained flat despite recent development
- ▶ High cost of providing public transit service to the area
- ▶ High cost of Regional Rail as compared to bus service

- ▶ Auto-oriented development patterns
- ▶ Poor pedestrian network and amenities

Opportunities

- ▶ Wawa Regional Rail restoration allows for greater numbers of people to potentially reach the area by public transit
- ▶ Route 111 could be rerouted to a more streamlined alignment
- ▶ Highway improvements to US 202, Section 100, and US 322 will increase access to Painters Crossroads, driving development that will support public transit
- ▶ Mismatch between lower income jobs and higher income workers in the area creates a need for public transit both into and out of the study area
- ▶ Octoraro Branch railroad provides an opportunity to improve bicycle commuting in the area

Threats

- ▶ Funding for public transit services may be static or reduced
- ▶ Distance between the study area and other centers of development
- ▶ Development may continue in the same auto-oriented pattern
- ▶ Route 111 is not coordinated with Regional Rail
- ▶ Lengthy trip times on Route 111

Public transit services in the future, including shuttle service between Wawa Station and Painters Crossroads, will be more successful if future development is transit-supportive. Proactive planning and recognition of future transportation challenges are essential.

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- ¹³ Gates, Kellie Patrick, "If the subway is to reach the Navy Yard, SEPTA planner says, people will need to live there," *Plan Philly: News*, April 27, 2011, <http://planphilly.com/if-subway-reach-navy-yard-septa-planner-says-people-will-need-live-there>

APPENDIX A



Journey to Work Data

Table A-1: Journey to Work, Employed in Study Municipality

Work in Concord Township		Work in Chadds Ford Township	
Reside In:	Frequency	Reside In:	Frequency
New Castle Co. DE	881	New Castle Co. DE	328
Concord Twp. Delaware Co. PA	748	Chadds Ford Twp. Delaware Co. PA	258
Upper Chichester Twp. Delaware Co. PA	254	Upper Chichester Twp. Delaware Co. PA	97
Upper Darby Twp. Delaware Co. PA	242	Philadelphia city Philadelphia Co. PA	95
Bethel Twp. Delaware Co. PA	224	Bethel Twp. Delaware Co. PA	94
Philadelphia city Philadelphia Co. PA	217	West Chester bor. Chester Co. PA	93
Aston Twp. Delaware Co. PA	195	Birmingham Twp. Chester Co. PA	67
Chester city Delaware Co. PA	187	Pennsbury Twp. Chester Co. PA	58
Ridley Twp. Delaware Co. PA	174	Westtown Twp. Chester Co. PA	56
Springfield Twp. Delaware Co. PA	132	Concord Twp. Delaware Co. PA	53
Middletown Twp. Delaware Co. PA	123	Ridley Twp. Delaware Co. PA	53
Thornbury Twp. Delaware Co. PA	115	West Goshen Twp. Chester Co. PA	46
Brookhaven bor. Delaware Co. PA	107	Springfield Twp. Delaware Co. PA	46
Haverford Twp. Delaware Co. PA	106	Thornbury Twp. Chester Co. PA	43
Nether Providence Twp. Delaware Co. PA	105	London Grove Twp. Chester Co. PA	42
Chester Heights bor. Delaware Co. PA	101	Aston Twp. Delaware Co. PA	41
Lower Chichester Twp. Delaware Co. PA	90	Middletown Twp. Delaware Co. PA	39
Tinicum Twp. Delaware Co. PA	87	Kennett Square bor. Chester Co. PA	36
West Chester bor. Chester Co. PA	84	East Marlb. Twp. Chester Co. PA	32
West Goshen Twp. Chester Co. PA	73	East Nottingham Twp. Chester Co. PA	32
Westtown Twp. Chester Co. PA	67	Chester city Delaware Co. PA	30
Thornbury Twp. Chester Co. PA	62	Upper Darby Twp. Delaware Co. PA	30
West Whiteland Twp. Chester Co. PA	61	West Whiteland Twp. Chester Co. PA	28
Chadds Ford Twp. Delaware Co. PA	60	Kennett Twp. Chester Co. PA	27
Birmingham Twp. Chester Co. PA	51	Lower Merion Twp. Montgomery Co. PA	26
Marple Twp. Delaware Co. PA	51	Uwchlan Twp. Chester Co. PA	24
East Bradford Twp. Chester Co. PA	50	Lower Oxford Twp. Chester Co. PA	23
Upper Providence Twp. Delaware Co. PA	48	Darby bor. Delaware Co. PA	22
Glenolden bor. Delaware Co. PA	47	Haverford Twp. Delaware Co. PA	22
Penn Twp. Chester Co. PA	44	Nether Providence Twp. Delaware Co. PA	22

Source: US Census 2003
DVRPC, 2010

Table A-2: Journey to Work, Reside in Study Municipality

Reside in Concord Township		Reside in Chadds Ford Township	
Work In:	Frequency	Work In:	Frequency
Concord Twp. Delaware Co. PA	748	New Castle Co. DE	402
New Castle Co. DE	652	Chadds Ford Twp. Delaware Co. PA	258
Philadelphia city Philadelphia Co. PA	382	Philadelphia city Philadelphia Co. PA	185
Middletown Twp. Delaware Co. PA	204	Concord Twp. Delaware Co. PA	60
Media bor. Delaware Co. PA	146	Tredyffrin Twp. Chester Co. PA	37
Upper Chichester Twp. Delaware Co. PA	141	Middletown Twp. Delaware Co. PA	34
Radnor Twp. Delaware Co. PA	101	West Goshen Twp. Chester Co. PA	32
Ridley Twp. Delaware Co. PA	96	Upper Chichester Twp. Delaware Co. PA	30
Upper Darby Twp. Delaware Co. PA	92	Thornbury Twp. Delaware Co. PA	25
Aston Twp. Delaware Co. PA	87	East Marlb. Twp. Chester Co. PA	21
Chester city Delaware Co. PA	79	Ridley Twp. Delaware Co. PA	21
Lower Merion Twp. Montgomery Co. PA	76	Springfield Twp. Delaware Co. PA	20
Newtown Twp. Delaware Co. PA	71	Lower Merion Twp. Montgomery Co. PA	20
Tredyffrin Twp. Chester Co. PA	66	West Chester bor. Chester Co. PA	19
East Whiteland Twp. Chester Co. PA	62	Newtown Twp. Delaware Co. PA	18
West Goshen Twp. Chester Co. PA	60	Ridley Park bor. Delaware Co. PA	18
Nether Providence Twp. Delaware Co. PA	60	Manhattan bor. New York Co. NY	17
Chadds Ford Twp. Delaware Co. PA	53	Westtown Twp. Chester Co. PA	17
Upland bor. Delaware Co. PA	50	Upland bor. Delaware Co. PA	17
Upper Providence Twp. Delaware Co. PA	49	Montgomery Co. MD	16
Marple Twp. Delaware Co. PA	46	Birmingham Twp. Chester Co. PA	16
Tinicum Twp. Delaware Co. PA	46	East Whiteland Twp. Chester Co. PA	16
Upper Merion Twp. Montgomery Co. PA	44	Media bor. Delaware Co. PA	16
Springfield Twp. Delaware Co. PA	43	Nether Providence Twp. Delaware Co. PA	16
Chester Heights bor. Delaware Co. PA	40	Tinicum Twp. Delaware Co. PA	16
Cecil Co. MD	34	Pennsbury Twp. Chester Co. PA	15
Haverford Twp. Delaware Co. PA	34	Upper Darby Twp. Delaware Co. PA	15
Glenolden bor. Delaware Co. PA	29	Upper Providence Twp. Delaware Co. PA	15
West Deptford Twp. Gloucester Co. NJ	28	East Goshen Twp. Chester Co. PA	13
East Goshen Twp. Chester Co. PA	27	West Marlb. Twp. Chester Co. PA	12

Source: US Census 2003
DVRPC, 2010

Table A-3: Journey to Work, Study Municipality Residents - In Commuting Shed (Not Top 30 Supplier)

Work in Concord Township		Work in Chadds Ford Township	
Reside In:	Frequency	Reside In:	Frequency
Darby Township, Delaware Co. PA	38	Upper Providence Borough, Delaware Co. PA	15
Media Borough, Delaware Co. PA	37	Collingdale Borough, Delaware Co. PA	11
Aldan Borough, Delaware Co. PA	19	Prospect Park Borough, Delaware Co. PA	9
Clifton Heights Borough, Delaware Co. PA	19	Clifton Heights Borough, Delaware Co. PA	8
Yeadon Borough, Delaware Co. PA	18	Media Borough, Delaware Co. PA	7
Rose Valley Borough, Delaware Co. PA	13	Morton Borough, Delaware Co. PA	7
Lansdowne Borough, Delaware Co. PA	12	Darby Township, Delaware Co. PA	6
East Lansdowne Borough, Delaware Co. PA	8	Rose Valley Borough, Delaware Co. PA	2
Swarthmore Borough, Delaware Co. PA	6		
Rutledge Borough, Delaware Co. PA	4		

Source: US Census 2003
DVRPC, 2010

APPENDIX B



SEPTA Service Schedules

Figure B-1: Route 111 Weekday Schedule

MONDAYS THROUGH FRIDAYS																	
To Penn State and Chadds Ford										To 69th Street Terminal							
69th Street Terminal (West Terminal)	State Rd and Lansdowne Av	State & Township Line Rds (Drexel Hill)	State & Sprout Rds (Springfield)	Granite Run Mall	Fair Acres Geriatric Center	Penn State University	Concordville * Town Centre	Chadds Ford Business Campus	Chadds Ford Business Campus	Concordville Town Centre	Fair Acres Geriatric Center	Penn State University	Granite Run Mall	State & Sprout Rds (Springfield)	State & Township Line Rds (Drexel Hill)	State Rd and Lansdowne Av	69th Street Terminal (West Terminal)
AM SERVICE																	
5:20	5:25	5:31	5:35	5:42	5:50	5:52	6:10	6:21	---	---	---	---	---	---	5:35	5:42	5:49
6:00	6:05	6:12	6:16	6:24	6:32	6:35	6:56	7:10	---	---	---	---	---	---	6:00	6:09	6:17
6:30	6:35	6:42	6:47	6:56	7:05	7:09	7:34	7:49	---	---	---	---	---	---	6:30	6:39	6:47
6:57	7:04	7:13	---	---	---	---	---	---	---	---	---	---	---	---	6:50	6:59	7:07
7:00	7:07	7:16	7:22	7:31	7:41	7:45	8:11	8:21	6:30	6:40	6:54	6:57	7:03	7:14	7:19	7:29	7:38
7:30	7:37	7:46	7:55	8:04	8:14	8:18	8:37	8:47	---	---	---	---	---	---	7:42	7:52	8:01
8:00	8:08	8:16	8:24	8:34	8:44	8:48	9:07	9:17	A7.20	7:34	---	EXPRESS	7:51	8:02	8:06	8:16	8:23
8:30	8:38	8:46	8:54	9:04	9:14	9:18	---	---	8:00	8:13	---	EXPRESS	8:30	8:41	8:20	8:30	8:37
9:00	9:08	9:16	9:24	9:34	9:44	9:48	---	---	8:35	8:48	---	EXPRESS	9:05	9:16	9:20	9:30	9:37
9:30	9:37	9:45	9:51	9:59	10:07	10:09	---	---	---	---	---	---	---	---	---	---	---
10:00	10:07	10:15	10:21	10:29	10:37	10:39	---	---	9:30	9:40	9:53	F9.24	9:34	9:45	9:50	9:58	10:05
11:00	11:06	11:13	11:19	11:28	11:36	11:38	11:55	12:03	---	---	---	F10.35	10:43	10:54	10:59	11:07	11:14
PM SERVICE																	
12:00	12:06	12:13	12:19	12:26	12:36	12:38	---	---	---	---	---	---	---	---	---	---	---
1:00	1:06	1:14	1:19	1:27	1:37	1:40	1:58	2:06	A12.15	12:27	---	EXPRESS	12:14	12:25	12:30	12:39	12:46
1:30	1:36	1:44	1:49	1:57	2:07	2:10	---	---	---	---	---	F12.05	2:10	2:22	2:26	2:34	2:42
2:00	2:06	2:14	2:19	2:27	2:37	2:41	3:02	3:10	---	---	---	F1.05	2:10	2:22	2:26	2:34	2:42
2:30	2:37	2:45	2:52	3:01	3:11	3:15	3:36	3:44	---	---	---	F2.00	2:10	2:22	2:26	2:34	2:42
3:00	3:08	3:16	3:23	3:32	3:42	3:46	4:12	4:20	2:22	2:31	2:43	2:46	3:11	3:16	3:26	3:35	---
3:30	3:38	3:48	3:55	4:05	4:14	4:17	4:40	4:48	---	---	---	F3.25	3:41	3:53	3:59	4:07	4:15
4:00	4:08	4:16	4:23	4:32	4:42	4:45	5:12	5:23	3:25	3:36	3:51	3:54	4:09	4:23	4:29	4:38	4:46
4:30	4:38	4:46	4:53	5:03	5:12	5:15	5:42	5:53	4:00	4:14	4:33	4:36	4:43	4:55	5:01	5:10	5:17
5:05	5:15	5:23	5:30	5:39	5:48	5:51	---	---	4:35	4:49	5:07	5:10	5:19	5:33	5:39	5:48	5:55
5:20	5:30	5:40	---	---	---	---	---	---	A5.00	5:16	5:36	5:39	5:49	6:02	6:07	6:15	6:22
5:35	5:45	5:55	6:02	6:10	6:19	6:22	---	---	---	---	---	---	---	---	---	---	---
5:50	6:00	6:09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6:05	6:14	6:23	6:30	6:38	6:46	6:48	---	---	---	---	---	---	---	---	---	---	---
6:20	6:29	6:38	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6:50	6:56	7:04	7:09	7:17	7:25	7:27	---	---	---	---	---	---	---	---	---	---	---
7:40	7:46	7:54	7:59	8:07	8:15	8:17	---	---	---	---	---	---	---	---	---	---	---
8:40	8:46	8:54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9:40	9:45	9:51	9:56	10:03	10:10	10:12	---	---	---	---	---	---	---	---	---	---	---
10:40	10:45	10:51	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9:15 9:25 9:39 9:41 9:47 9:57 10:00 10:07 10:11 11:05 11:15 --- F10.35 10:41 10:51 10:54 11:01 11:05 11:05 11:15 --- 11:27 11:37 11:40 11:46 11:50																	
A - Trip operates via Applied Card Systems F - Trip operates via Fair Acres.																	

SEPTA, 2010

Figure B-2: Route 119 Weekday Schedule

MONDAYS THROUGH FRIDAYS																
To Cheyney University								To Harrah's Chester								
Harrah's Chester Casino	Chester Transportation Center	3rd St and Highland Av (Chester)	Market St (Chester)	Market St and Delaware Av (Marcus Hook)	Market St and Ridge Rd (Limeskill)	Larkin's Corner Shopping Center	Concordville Town Centre	Cheyney University	Cheyney University	Concordville Town Centre	Larkin's Corner Shopping Center	Market St (Limeskill)	Market St and Delaware Av (Marcus Hook)	3rd St and Highland Av (Chester)	Chester Transportation Center	Harrah's Chester Casino
AM SERVICE																
4:40	4:44	4:53	5:01	5:08	5:20	5:30	5:40	---	---	---	---	---	---	---	---	---
6:15	6:21	6:32	6:41	6:48	7:01	7:16	7:26	---	---	---	---	---	---	---	---	---
7:13	7:19	7:30	7:39	7:47	8:01	8:13	8:27	---	---	---	---	---	---	---	---	---
8:15	8:21	8:32	8:41	8:49	9:01	9:14	9:25	---	---	---	---	---	---	---	---	---
9:15	9:19	9:30	9:39	9:46	9:58	10:11	10:23	---	---	---	---	---	---	---	---	---
10:17	10:21	10:32	10:41	10:48	11:00	11:12	11:24	9:40	9:52	10:01	10:13	10:20	10:30	10:40	10:46	---
11:15	11:19	11:31	11:40	11:47	11:59	12:11	12:23	10:40	10:52	11:01	11:13	11:20	11:30	11:40	11:46	---
PM SERVICE																
12:15	12:19	12:31	12:40	12:47	12:59	1:11	1:26	---	---	---	---	---	---	---	---	---
1:15	1:19	1:31	1:40	1:47	2:00	2:13	2:26	12:40	12:56	1:07	1:20	1:27	1:37	1:48	1:55	---
2:15	2:19	2:31	2:40	2:48	3:01	3:14	3:27	1:40	1:55	2:06	2:19	2:26	2:36	2:46	2:53	---
3:15	3:19	3:31	3:40	3:48	4:02	4:13	4:27	2:40	2:54	3:05	3:19	3:27	3:37	3:47	3:54	---
4:15	4:20	4:32	4:41	4:49	5:03	5:15	5:27	3:40	3:54	4:05	4:24	4:32	4:45	4:58	5:05	---
5:15	5:20	5:33	5:42	5:50	6:03	6:15	6:27	4:40	4:56	5:08	5:21	5:29	5:40	5:50	5:57	---
6:15	6:19	6:31	6:40	6:47	6:59	7:09	7:19	5:40	5:54	6:04	6:16	6:24	6:34	6:44	6:50	---
7:15	7:19	7:31	7:40	7:47	7:59	8:09	8:18	6:40	6:53	7:02	7:13	7:20	7:30	7:39	7:45	---
8:15	8:19	8:29	8:38	8:45	8:57	9:07	9:16	7:40	7:53	8:02	8:13	8:20	8:28	8:37	8:42	---
9:15	9:19	9:29	9:38	9:45	9:57	10:07	10:16	8:40	8:51	9:00	9:10	9:17	9:24	9:33	9:38	---
10:15	10:19	10:29	10:37	10:44	10:56	---	---	9:35	9:46	9:55	10:05	10:12	10:19	10:28	10:33	---
11:30	11:34	11:44	11:52	---	---	---	---	10:30	10:41	10:50	11:00	11:06	11:13	11:22	11:27	---

SEPTA, 2010

APPENDIX C



Study Survey Forms

Figure C-1: Local Employee Survey

A study investigating possible improvements to public transportation services in the Painters Crossroads area is ongoing. Please take a minute to complete the survey in support of the study.

1. **Do you, or have you ever commuted to your current job using public transportation?**
 - a. Yes, every day
 - b. Yes, occasionally
 - c. Yes, but rarely
 - d. No

2. **If public transportation options were more convenient would you consider using them for commuting to work?**
 - a. Yes
 - b. No
 - c. I already commute via public transportation

3. **Which best describes your work schedule?**
 - a. Day (i.e., 8 am – 4 pm)
 - b. Second shift (i.e., 4 pm – 12 am)
 - c. Third shift (i.e., 12 am – 8 am)
 - d. Retail type (i.e., 11 am – 7 pm)
 - e. Other

4. **What is your home zip code?**

5. **Do you regularly have intermediate stops during your work commute (i.e., daycare)?**
 - a. Yes
 - b. No

6. **How long does a typical one-way commute to or from work generally take?**
 - a. 1 – 15 minutes
 - b. 16 – 30 minutes
 - c. 31 – 45 minutes
 - d. 46 – 60 minutes
 - e. More than one hour

THANK YOU



Figure C-2: Route 111 Ridership Survey

A study investigating possible improvements to Route 111 is ongoing. Please take a minute to complete the survey in support of the study.

1. **What is the purpose of your trip today?**
 - a. Work
 - b. Shopping
 - c. Social / Visit
 - d. Appointment (medical, dental, etc.)
 - e. Other

2. **On average, how many days per week do you ride the Route 111?**
 - a. 5 – 7
 - b. 3 – 4
 - c. 1 – 2
 - d. I do not ride it every week

3. **Did you, or will you make a transfer to complete this journey?**
 - a. Yes
 - b. No

If yes, to or from what other route (For example – Market-Frankford Line or Route 117)?

4. **What is your home zip code?**

5. **Was another means to complete this trip available to you?**
 - a. Yes, I could have driven or gotten a ride
 - b. No, I need to take the bus

THANK YOU



Publication Title: Wawa-Painters Crossroads Shuttle Feasibility Study

Publication Number: 11009

Date Published: September 2011

Geographic Area Covered: Chadds Ford Township, Concord Township, Chester Heights Borough and Middletown Township; Delaware County

Key Words: shuttle bus, pedestrian facilities, employment centers, public transit service, journey-to-work

Abstract: This study was conducted at the request of the Delaware County Planning Department to analyze potential public transit improvements between the proposed Wawa Regional Rail Station and the Painters Crossroads area. The Painters Crossroads area is experiencing high levels of commercial development, and with the proposed extension of the Media/Elwyn Regional Rail line improved public transit service to the area is possible. Existing development and mobility conditions were assessed and various scenarios for improving public transit services were explored and presented. Ultimately, the need to better accommodate public transit usage in the study area through dense, mixed-use development and investments in pedestrian infrastructure was found to be a major impediment for improving public transit services. This study can be used by decision-makers when the Media/Elwyn extension is imminent to determine the appropriate level of public transit service connecting the two termini that is warranted.

Staff Contact:

Michael Becker
Senior Transportation Planner
☎ (215) 238-2834
✉ mbecker@dvrpc.org

Delaware Valley Regional Planning Commission
190 N. Independence Mall West, 8th Floor
Philadelphia PA 19106
Phone: (215) 592-1800
Fax: (215) 592-9125
Internet: www.dvrpc.org



190 N. Independence Mall West
8th Floor
Philadelphia, PA 19106-1540
Phone 215.592.1800
Fax 215.592.9125
www.dvrpc.org

