US 1

ROOSEVELT BOULEVARD CORRIDOR STUDY

Delaware Valley
Regional Planning
Commission

2007

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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency that provides continuing, comprehensive and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties, as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester and Mercer counties in New Jersey. DVRPC provides technical assistance and services; conducts high priority studies that respond to the requests and demands of member state and local governments; fosters cooperation among various constituents to forge a consensus on diverse regional issues; determines and meets the needs of the private sector; and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the Commission.

Our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole, while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for its findings and conclusions, which may not represent the official views or policies of the funding agency.

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1.0 EXECUTIVE SUMMARY

The US 1 Roosevelt Boulevard Corridor Study was conducted by the Delaware Valley Regional Planning Commission (DVRPC) to address the transportation and safety issues within the corridor. The study area extends along US 1, "the Boulevard," in Philadelphia, from Ninth Street to Grant Avenue, a distance of approximately 8 miles.

The Boulevard is a major north-south twelve-lane artery that runs parallel to, and serves as an alternate route for, I-95, which is located to the east. This high volume roadway lies next to a dense urbanized population housed primarily in row homes and other multifamily dwellings, which produces high pedestrian traffic. Conflict between pedestrian traffic and vehicular traffic has led to numerous fatalities over the years. This study documents the existing conditions and identifies operational and safety improvements for corridor traffic.

In an effort to define improvement strategies for this corridor, a field assessment was conducted at nine intersection crosswalks and 11 mid-block crosswalks along Roosevelt Boulevard on typical weekdays, and at four intersection crosswalks on a typical Saturday. These assessments identified utilization rates of crosswalks along the Boulevard, underutilized crosswalks, crosswalks with a potential for consolidation, and priorities based on use. As a result of this assessment, improvements, such as installing pedestrian countdown signals with illuminated pedestrian push buttons, restriping all crosswalks using the international style, installing crosswalk safety educational signs, and retiming pedestrian crossing time allowance, were recommended as improvements.

All 37 roadway crossovers in the corridor were also evaluated to determine how their safety and operation can be improved. It was determined that crossovers should be lengthened only where it is possible to create a significant increase in length. Doing so would allow for an upgrade in functionality. In general, crossovers that are closer than one-quarter mile to another crossover, and adjacent crossovers of different types were identified to be eliminated. Improved signage that marks crossover locations was also recommended. In total, twelve crossovers were targeted for elimination, ten were targeted for expansion, and fifteen would be unchanged.

A long-term reconfiguration of the Boulevard to ten lanes was considered. This would be configured to allow pedestrians, bicycles, buses, and cars to coexist within the cartway in a safe and efficient environment.

An implementation plan was developed that prioritizes the recommendations to improve safety and mobility along the corridor.

2.0 PURPOSE AND NEED

This study was conducted as part of DVRPC's 2030 long-range plan for the region. The selection of this corridor evolved from a combination of evaluating and ranking the corridors identified by the Congestion Management Process and Long Range Planning corridors in Pennsylvania. In light of the safety issues within this corridor, PennDOT and the city of Philadelphia requested that DVRPC conduct a traffic and safety study of this corridor. The section of this corridor studied extends from Ninth Street in the south to Grant Avenue in the north and is approximately 8 miles in length. The extensive breadth of the corridor--twelve travel lanes and three medians--has become an obstacle for pedestrian traffic. The corridor has experienced numerous pedestrian fatalities over the years and also experiences heavy peak-hour vehicular congestion. This study attempts to identify the constraints and opportunities on the Boulevard and makes recommendations for its improvement as a travel corridor in terms of pedestrian safety and mobility.

3.0 LAND USE

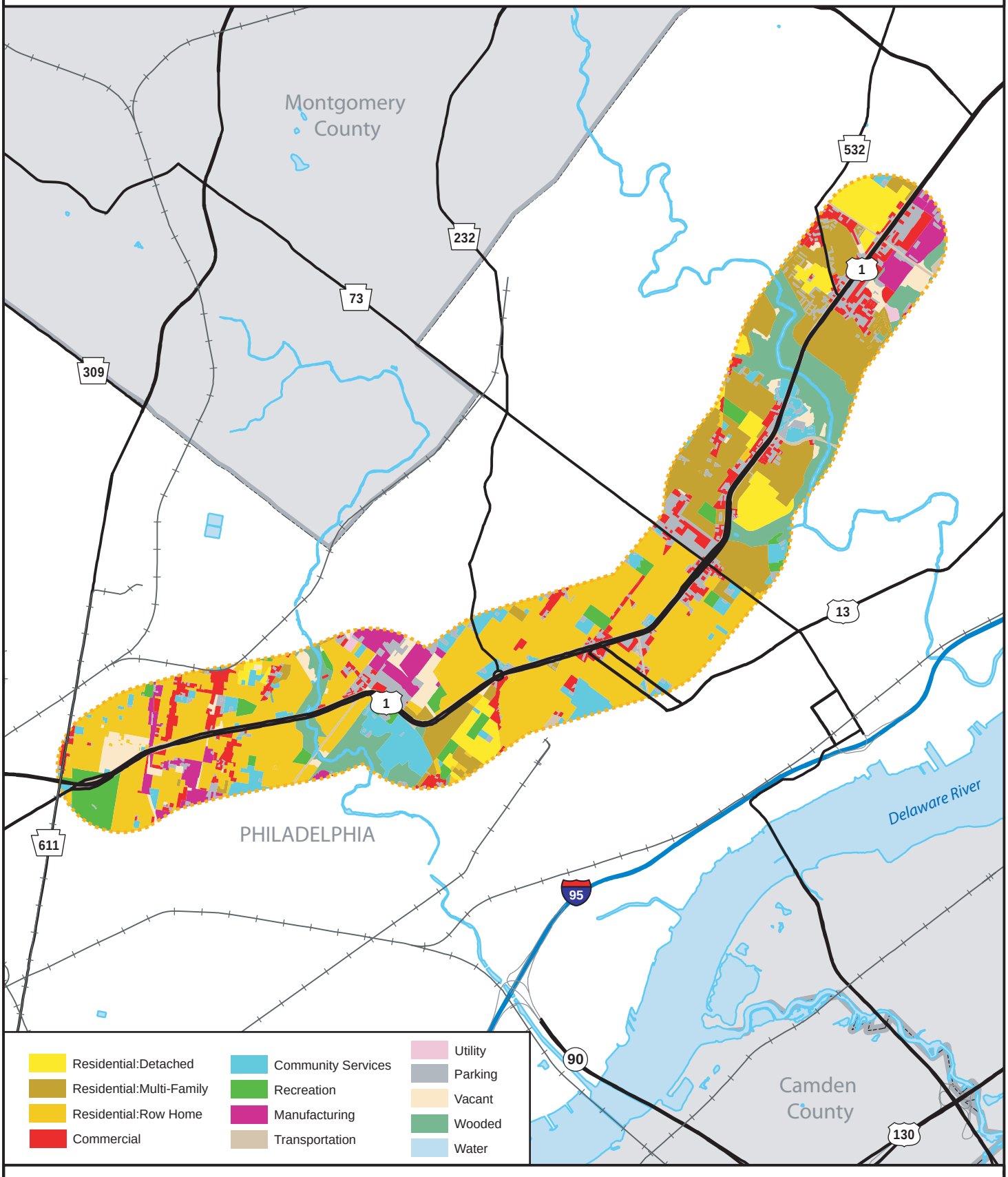
Every five years, DVRPC conducts a land use inventory aimed at cataloging the various types of land use in the region. The most recent available data is from 2005. Roughly 5,600 acres are within a half mile on either side of Roosevelt Boulevard. See **Map 1** for a visualization of the study area's land use.

This section of Philadelphia is very dense, and consequently, most of the land surrounding the corridor has been developed. Open space is limited within neighborhoods, but there are several larger parks, such as Hunting Park, cemeteries, and playgrounds. Additionally, the land on either side of two creeks that cut through the corridor has remained undeveloped and is used for various types of recreation. Vacant land, here more often than not, is in a place where a home or business once stood, and is limited.

The majority of land is used for residential uses, comprising over 50 percent of the area, with the majority being row and multi-family homes. Commercial uses are located along Roosevelt Boulevard, comprising seven percent of the land. The Cottman / Roosevelt Boulevard intersection is a major commercial hub within the corridor, where the 76 unit Roosevelt Mall, 28 unit Cottman – Bustleton Shopping Center, and 16 unit Great Northeast Plaza are all located. Further north between Welsh Road and Grant Avenue are at least five large commercial locations, including the Blue Grass Mall, the Tremont Shopping Center, the Northeast Shopping Center, and the Mall at One. Other commercial shopping centers are located at Harbison Avenue and Adams Avenue. Several smaller neighborhood commercial locations can be found along 2nd Street, 5th Street, Oxford Avenue, and Rising Sun Avenue.

Roosevelt Boulevard Corridor Study
Land Use (2005)

Map 1



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N

0 1 2
Miles

Community Services are plentiful here; there are numerous schools, churches and medical facilities. Specifically, there are 39 public and private schools within the corridor, with 22 schools located west of the Tacony Creek. Two hospitals can be found on Roosevelt Boulevard, including Friends Hospital near Adams Avenue and Nazareth Hospital along Holme Avenue. Several aging facilities, including nursing homes, are located within the corridor, with four facilities located near Holme Avenue and Roosevelt Boulevard. Religious institutions are also plentiful, with over a dozen located on either side of the roadway. **Table 1** illustrates land use by type within the corridor.

Table 1: Study Corridor Land Use

Land Use Type	Total Acres	Percent
Residential:Single-Family Detached	315.0	5.6%
Residential:Row Home	1,812.5	32.2%
Residential:Multi-Family	844.2	15.0%
Commercial	401.9	7.1%
Community Services	358.3	6.4%
Manufacturing:Light Industrial	224.0	4.0%
Recreation	208.8	3.7%
Utility	11.2	0.2%
Transportation	320.5	5.7%
Parking	383.5	6.8%
Vacant	183.5	3.3%
Water	29.5	0.5%
Wooded	536.7	9.5%
Total	5,629.7	100.0%

Source: DVRPC, 2005

4.0 DEMOGRAPHICS

4.1 Population and Employment

The City of Philadelphia is divided into 12 planning areas. This section of Roosevelt Boulevard crosses four planning areas: Upper North Philadelphia, Olney / Oak Lane, Near Northeast Philadelphia, and Far Northeast Philadelphia. The corridor runs through the entire Near Northeast section and portions of the other three.

All demographic information for this study is based on information obtained from the 2000 US Census, except where otherwise noted. The study area had a population of roughly 181,000 residents, approximately 12 percent of Philadelphia's total population, within 188 block groups in 2000. It should be noted that the US Census Bureau estimated that between 2000 and 2006 Philadelphia lost 4.6 percent of its population, although estimates were not provided by planning area.

The block groups in the study area encompass 10,555 acres. Four block groups do not contain residents. When these block groups are removed from the equation, population density is high, roughly 19.3 residents per acre. Densities are higher south of Cottman Avenue, with 12 of the 14 block groups having densities greater then 60 residents per acre. Four square blocks in the southern end of the corridor, between Louden Street, Ruscomb Street, and C Street in Feltonville have some of the highest densities within the corridor, at over 80 residents per acre.

DVRPC forecasts population and employment for the nine county region through 2030. Population is forecasted to remain roughly the same in terms of total number, as illustrated in **Table 2**, increasing by 0.3 percent. The Far Northeast is forecasted to increase by 8,877 residents (5.6 percent) while Olney / Oak Lane is forecasted to lose 5,038 residents (-2.9 percent).

Table 2: Population Forecasts for Philadelphia and Select Planning Areas

	2000	2010	2020	2030	Absolute Change 2000-2030	Percent Change 2000-2030
Philadelphia County	**1,517,550**	**1,484,990**	**1,515,010**	**1,505,000**	**(12,550)**	**-0.8%**
Near Northeast Philadelphia	241,865	235,870	246,110	243,500	1,635	0.7%
Olney Oak Lane	171,538	167,990	169,170	166,500	(5,038)	-2.9%
Far Northeast Philadelphia	158,123	159,030	166,400	167,000	8,877	5.6%
Upper North Philadelphia	93,763	91,160	91,980	90,500	(3,263)	-3.5%

Source: DVRPC Regional Data Bulletin No 73, 2005

In 2000, there were 741,397 jobs in Philadelphia. The Near Northeast has the highest local employment at 69,672 jobs while Olney / Oak Lane has 25,512 jobs. By 2030, employment is expected to increase by 21,779 jobs (2.9 percent) in the city, but the same is not true for this area. The four planning districts are forecasted to have a net loss of 6,110 jobs (-3.2 percent), as is illustrated in **Table 3**.

Table 3: Employment Forecasts for Philadelphia and Select Planning Areas

	2000	2010	2020	2030	Absolute Change 2000-2030	Percent Change 2000-2030
Philadelphia County	**741,397**	**726,205**	**748,136**	**763,176**	**21,779**	2.9%
Near Northeast Philadelphia	69,672	68,535	69,996	69,880	208	0.3%
Far Northeast Philadelphia	60,567	60,117	63,180	63,854	3,287	5.4%
Upper North Philadelphia	32,962	28,135	26,136	26,089	-6,873	-20.9%
Olney Oak Lane	25,512	23,341	22,999	22,781	-2,731	-10.7%

Source: DVRPC Regional Data Bulletin No 73, 2005

4.2 Age

The age distribution of study area residents is very similar to all of Philadelphia. See **Table 4** for age distribution comparisons and **Map 2** for a visualization of youth distribution. While the age distributions compare well overall, certain census block groups within the study area stand out as anomalies with extremes at one end or the other.

Table 4: Population by Age

	Roosevelt Boulevard		Philadelphia	
	Population	**Percent**	**Population**	**Percent**
Under 5	15,109	8.3%	118,695	7.8%
6 to 17	34,625	19.1%	264,174	17.4%
18 to 24	16,471	9.1%	168,484	11.1%
25 to 64	87,260	48.2%	752,053	49.6%
Over 65	27,747	15.3%	214,144	14.1%
Total	181,212	100%	1,517,550	100%

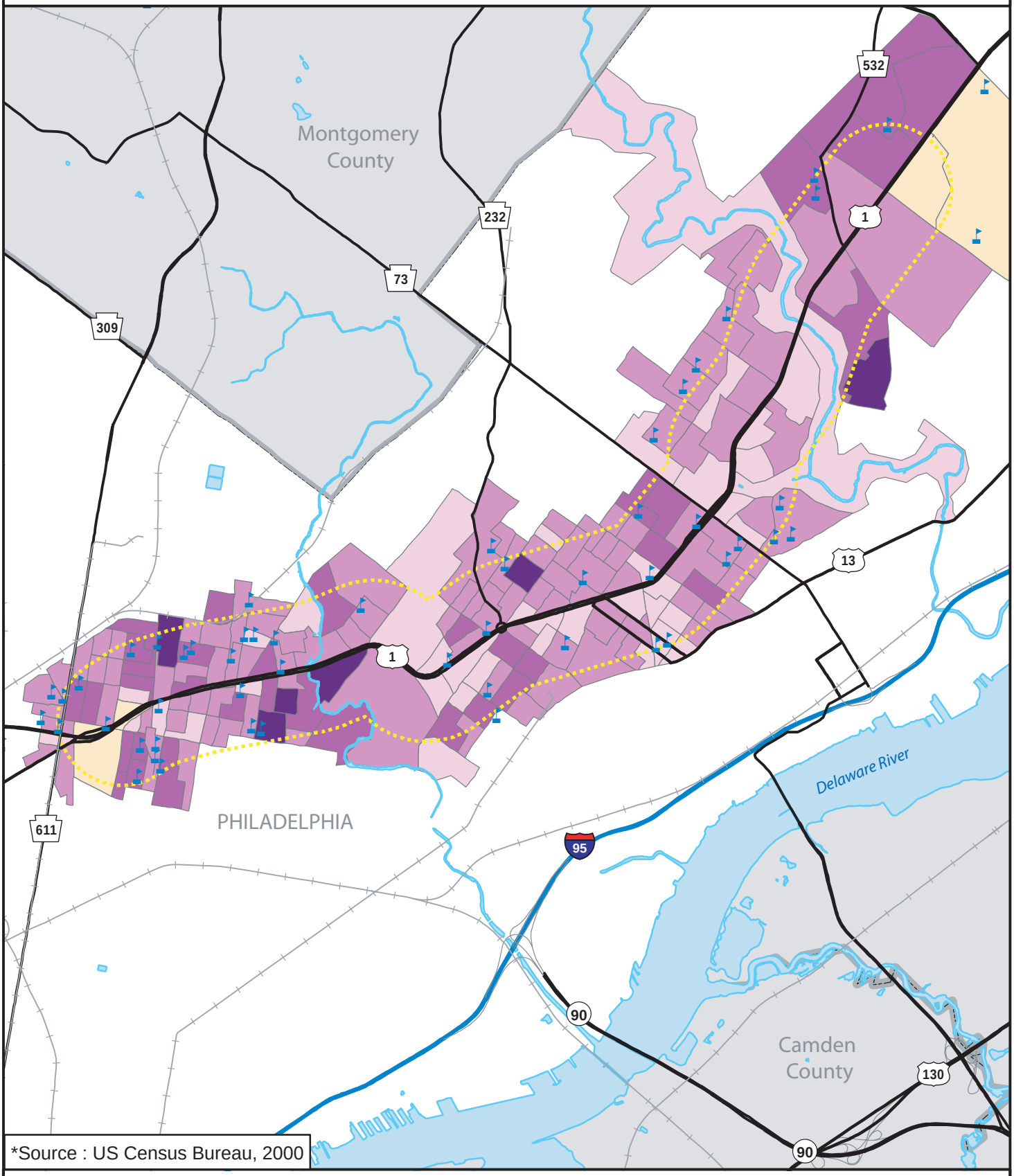
Source: DVRPC Regional Data Bulletin No 73, 2005

South of Tacony Creek Park the majority of block groups are younger, where fewer than ten percent of the block group is over 65 years. North of Tacony Creek Park, ages tend to rise between ten and 35 percent. Several block groups near Holme Avenue in the northern end of the study area have a third to a half of all residents over 65 years.

Roosevelt Boulevard Corridor Study

Total Population of Ages 6 Through 17

Map 2



*Source : US Census Bureau, 2000

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Population*

0 - 100
101 - 250
251 - 400
401 - 628
N/A
Schools

0 1 2
Miles

Those under 18 years are located evenly throughout the corridor, but younger residents tend to be located at the southern end of the study area and are roughly 20 percent of the block groups. As the overwhelming majority of children under 18 do not drive, many walk or bike to places in their community. This is especially true for children who walk to school as there are 39 schools within a half mile of Roosevelt Boulevard. **Map 2** illustrates school age population 5 to 17 years within the corridor. Public and private schools have been included in this figure as well.

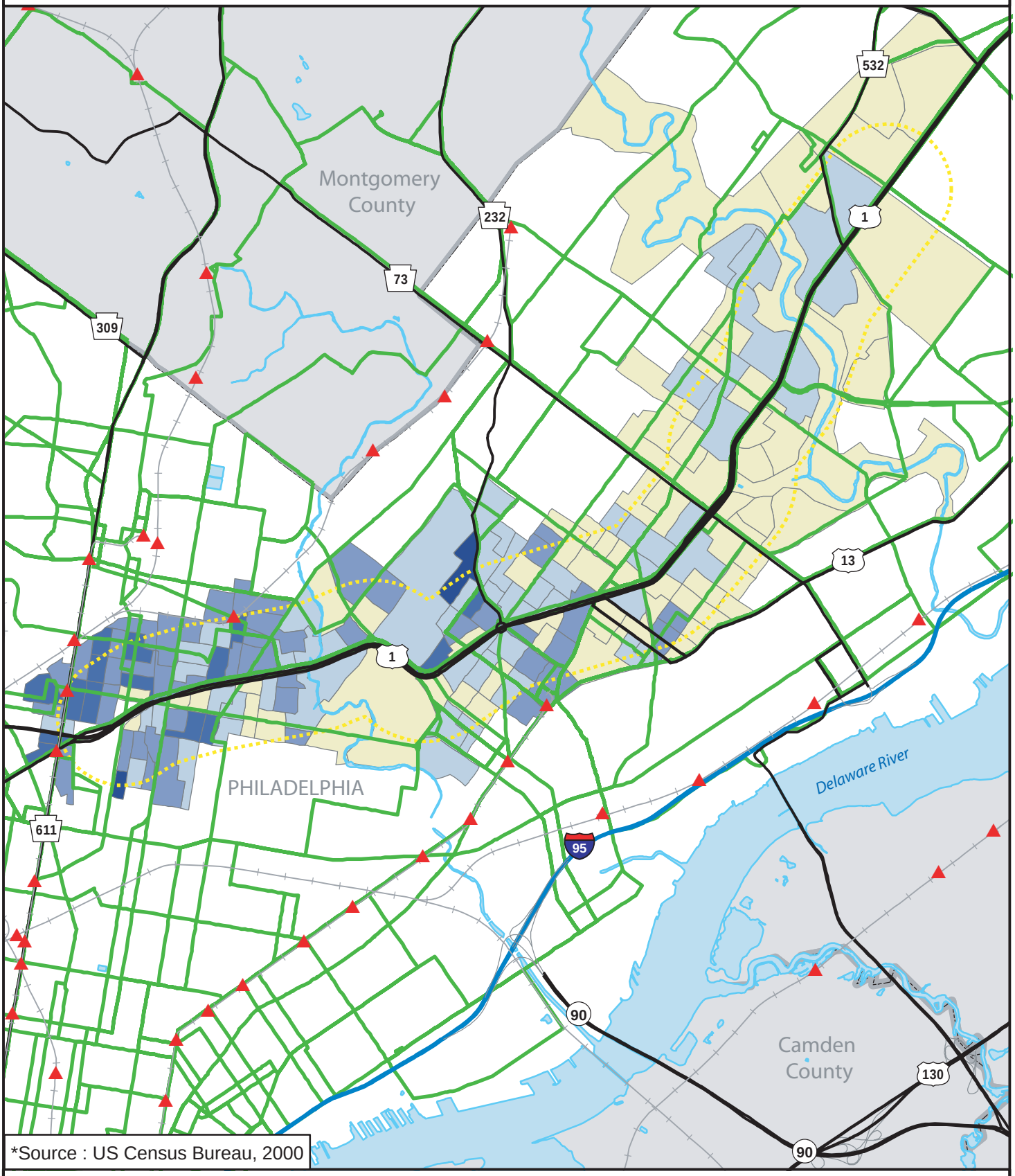
4.3 Public Transportation

Of the 67,000 workers living in the study area block groups, twenty percent use public transportation to get to work. This is lower than the City of Philadelphia as a whole (25 percent) and is illustrated in **Map 3**. Individual block groups range from two to 79 percent, with 66 block groups containing at least 25 percent of the workers using public transportation. Block groups north of Levick Street tend to have less than 20 percent of workers using public transportation. Higher concentrations of workers using public transportation, between 20 and 60 percent, are located in the southern end of the study area.

Four percent of the population walks to work and less than one percent of the population rides a bike to work. Alternate transportation mode usage tends to be higher in the southern half of the study area while the northern half is more likely to use private automobiles.

Roosevelt Boulevard Corridor Study
Workers Using Public Transportation

Map 3



*Source : US Census Bureau, 2000

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Percent of Workers*

- 0% - 15%
- 16% - 30%
- 31% - 40%
- 41% - 60%
- 61% - 80%

- Bus Routes
- Commuter Rail
- Rail Stations

N

0 1 2
Miles

4.4 Environmental Justice

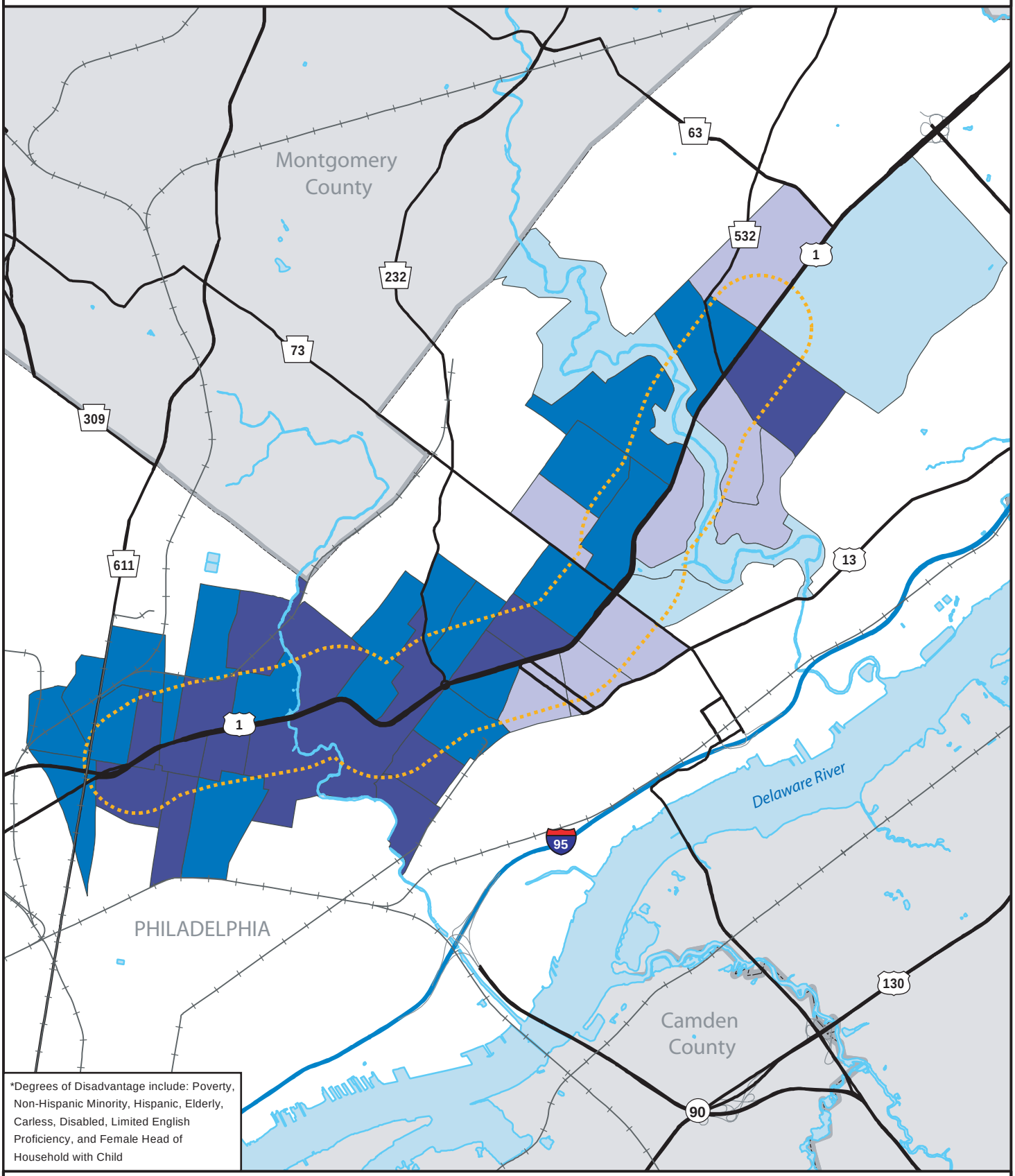
DVRPC employs an environmental justice (EJ) methodology that quantifies levels of disadvantage within the nine-county region. Using 2000 census tract information, categories of eight potential disadvantaged groups are analyzed, including female head of household with child, non-Hispanic minority, Hispanic, carless households, impoverished, elderly over 85 years of age, physically disabled, and limited English proficiency. Each category is analyzed for the total concentration in the region, generating a baseline. If a census tract contains a concentration higher than the baseline, it is considered disadvantaged. Census tracts can therefore contain zero to eight degrees of disadvantage (DOD). Census tracts with five or more DOD are regionally significant in terms of environmental justice sensitivity.

Within a half mile on either side of Roosevelt Boulevard lies part of forty seven census tracts. These census tracts contain one to eight DOD. Thirty-six census tracts, or 77 percent, have five or more DOD, where sixteen census tracts have 7 to 8 DOD. **Map 4** illustrates census track degree of disadvantage within the corridor. While all of the population groups are represented in the EJ analysis, several populations stand out. Population concentrations are itemized in **Table 5** below, and include:

- Forty-one tracts, or 87 percent, contain concentrations of carless households at or above the regional threshold of sixteen percent, while 18 tracts (38 percent) contain concentration levels over thirty-two percent. The highest concentration is over 51 percent of the tract. This finding suggests that in addition to workers using mass transit for employment, mass transit is being used for other trips made by additional family members within the entire corridor.
- Forty-two tracks, or 89 percent, contain concentrations of physically disabled residents at or above the regional threshold. Again, this indicates that collectively there are many residents within the entire corridor that are mobility challenged.
- Thirty-seven tracts, or 78 percent, contain concentrations of non-English speaking populations at or above the regional threshold of two percent. Thirty tracts contain concentration levels twice as high as the regional average. The highest concentration is over 14 percent of the tract.
- Twenty-seven tracts, or 57 percent, contain concentrations of Hispanic populations at or above the regional threshold of five percent. Twenty-three tracts contain concentration levels twice as high as the regional average. The highest concentration is over 62 percent of the tract.

US 1 Corridor Study
Environmental Justice - Degrees of Disadvantage

Map 4



*Degrees of Disadvantage include: Poverty, Non-Hispanic Minority, Hispanic, Elderly, Carless, Disabled, Limited English Proficiency, and Female Head of Household with Child

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Degrees of Disadvantage*

0 | 1 - 2 | 3 - 4 | 5 - 6 | 7 - 8

N

0 1.2 2.4

Miles

Table 5: Environmental Justice - Populations and Concentrations

	Regional Threshold	Number of DOD Census Tracts	Percent DOD Census Tracts	Concentration Level Range	Tracts with 2x Threshold	Tracts with 2x Threshold Percent
Non Hispanic Minority	24%	26	55.3%	1 - 96%	13	27.7%
Carless Households	16%	41	87.2%	7 - 51%	18	38.3%
Poverty	11%	35	74.5%	5 - 47%	16	34.0%
Female Head of House with Child	8%	30	63.8%	1 - 23%	20	42.6%
Physically Disabled	7%	42	89.4%	3 - 18%	4	8.5%
Hispanic	5%	27	57.4%	1 - 62%	23	48.9%
Limited English Proficiency	2%	37	78.7%	0 - 14%	30	63.8%
Elderly over 85	1.60%	17	36.2%	1 - 9%	9	19.1%

Source: DVRPC, 2007

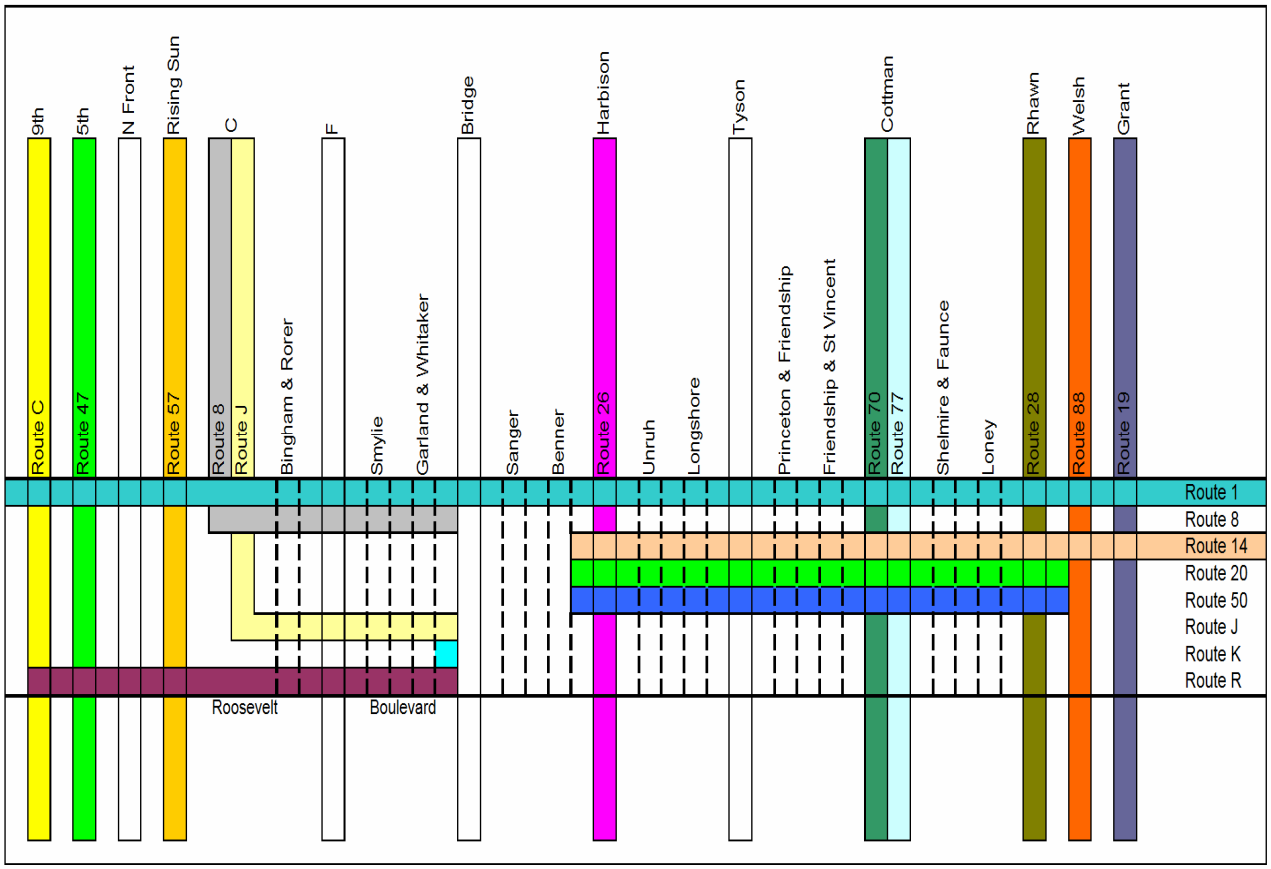
This corridor contains higher concentrations of census tracts with five or more DODs than much of the region. Census tracts south of Oxford Avenue (Route 232) are more disadvantaged than the census tracts to the north. There are other demographic characteristics that further define this disparity between the north and south, such as; higher concentrations of school-aged children, greater levels of public transportation use, and higher population densities in the south. In summary, Oxford Avenue is the line of demarcation between the two distinct population groups that are found in the Roosevelt Boulevard corridor.

5.0 PUBLIC TRANSIT SERVICE

5.1 Bus Network

Bus service offered by the Southeastern Pennsylvania Transportation Authority (SEPTA) is the sole means of mass transit within the study corridor. There are eight routes that operate on Roosevelt Boulevard within the study area and eleven routes that cross Roosevelt Boulevard at intersections analyzed by DVRPC. Route 1 is the only route that travels the entire length of the study area. Routes Eight and J operate on C Street, but only north of Roosevelt Boulevard. C Street and Cottman Avenue each have two routes. The intersections of Roosevelt Boulevard and North Front Street, F Street, Bridge Street, and Tyson Avenue were analyzed but do not have bus routes. **Figure 1**: Study Area Bus Service, below, shows the bus routes that operate on, or cross, Roosevelt Boulevard at an analyzed intersection. Routes that appear to begin or end prior to an intersection enter or exit Roosevelt Boulevard at nonanalyzed cross streets. The cross streets and mid-block crosswalks shown in the **Figure 1** are those that have been analyzed and by no means are an exhaustive list.

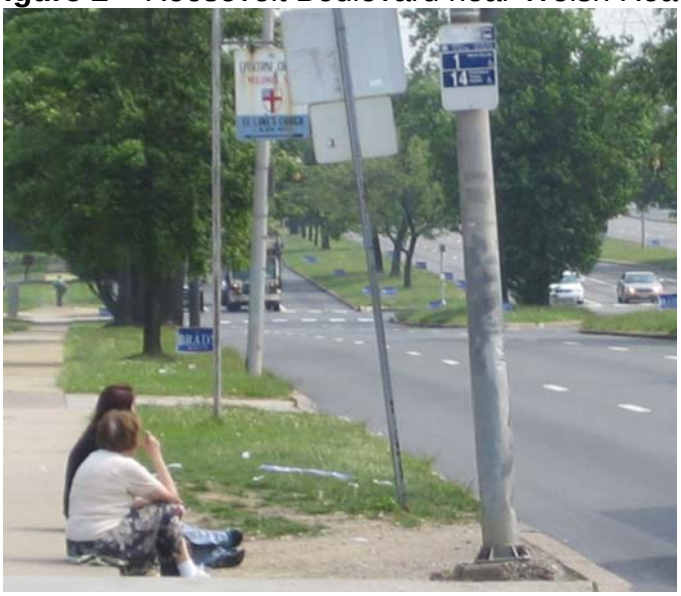
Figure 1 – Study Area Bus Service



Source: DVRPC, 2007, based on SEPTA schedules as of 22 June 2007

In several instances the infrastructure at bus stop locations is not adequate. Particularly, where not already present, bus stop shelters should be installed at peak load points and intersections that act as bus route transfer locations, and, at minimum, benches should be installed at other heavily-used boarding locations. **Figures 2 and 3** demonstrate the need for bus stop shelters and benches.

Figure 2 – Roosevelt Boulevard near Welsh Road



Source: DVRPC, 2007

Figure 3 – Roosevelt Boulevard at Cottman Avenue (SE Quadrant)

Source: DVRPC, 2007

As shown in **Figure 3**, the bus stop at Roosevelt Boulevard and Cottman Avenue, the busiest bus boarding and alighting intersection in the corridor, the adjoining gas station property does not have clearly defined ingress and egress locations, thereby creating

unnecessary pedestrian/vehicle conflict points. These issues are discussed in more detail in **Section 6.0**: Crosswalk Analysis.

5.2 Future Rail Service

In 2003 a team of consultants, including, Parsons Brinckerhoff, STV Incorporated, Eng-Wong, Taub and Associates, Kise Straw and Kolodner, Milligan and Company LLC, and Hill International, published the *Roosevelt Boulevard Corridor Study*. The study analyzed multiple transportation options for improving connectivity between the Greater Northeast and Center City Philadelphia. The Preferred Alternative, called Alternative C Prime, consists of a new subway that branches off of the Broad Street Line at Erie Station and travels under Roosevelt Boulevard's center median most of the way with the final two miles elevated, until it reaches a terminus at Southampton. The report mentioned that it is only one of several similar-topic studies that have been conducted since the Boulevard was constructed.

The study laid out a time line and cost estimate for construction of the proposed subway line. The consultants estimated that the entire project's cost, adjusted for inflation, would be $4.6 billion. The construction would evolve in phases, the first of which would begin in 2009 and end in 2015. The entire project could be completed by 2019.

The potential benefits of improved mobility, better air quality, decreased congestion, and improved pedestrian safety are tremendous if the Preferred Alternative were to become reality. The consultants forecasted daily ridership of 124,500 on the new subway line and a reduction in auto trips by 83,300 per day. Due to its relative cost-effectiveness among proposed New Starts in the region, the project is currently listed as a Major Regional Transportation Aspiration in the DVRPC *Destination 2030* Long Range Plan.

6.0 CROSSWALK ANALYSIS

6.1 Crosswalk Analysis Overview

Introduction

A field assessment was conducted at nine intersection crosswalks and all ten mid-block crosswalks along Roosevelt Boulevard between 9th Street and Grant Avenue on typical weekdays. In addition, a field assessment was conducted on a typical Saturday at five intersections: Roosevelt Boulevard and 9th Street, Welsh Road, Tyson Avenue, Cottman Avenue and Grant Avenue.

Purpose

The assessment was conducted in order to determine the utilization rate of crosswalks along the Boulevard, identify underutilized crosswalks, identify potential for consolidation, determine whether there is a need for vertical separation of pedestrian traffic, and prioritize based on use.

Methodology

Typically, one staff person was assigned to monitor an intersection. In cases where visibility of the intersection was impaired, a second staff member was assigned to provide assistance. Staff were required to tabulate pedestrian movement using the following procedure:

1. Count pedestrians and bicyclists crossing at all four legs of an intersection, or, in the case of a mid-block crosswalk, those crossing the Boulevard at or near the crosswalk.
2. Pedestrian movement was tabulated within 15 minute increments by direction as indicated on a map of the area.
3. Staff recorded the number of pedestrians crossing during the “Walk” phase and “Don’t Walk” phase. If a pedestrian was in the roadway and the indicator turned to a solid “Don’t Walk,” then the pedestrian would be listed in the “Don’t Walk” category. Conversely, if the pedestrian entered and exited the roadway during the “Walk” phase, they would be listed in the “Walk” category. This was used to determine the number of pedestrians who were able to cross successfully during the time allotted.
4. Pedestrians crossing the roadway using a portion of the marked crosswalk but deviating from it for a part of their journey were listed as crossing in the “Don’t Walk” phase. This label was used as surrogate to indicate that the crossing was illegal.

Field Operations

Staff were instructed on how to record pedestrian movement along or parallel to the crosswalks. Each staff person was given a package, which included a map of the intersection identifying how pedestrian movements should be coded, and assessment forms grouped by time of day to be recorded.

Periodic rain showers occurred during the Wednesday and Saturday counts.

Results of the assessment are tabulated in **Appendices I, II, III, and IV.**

A. Intersection Crosswalk Locations

Wednesday Counts

Pedestrian counts were taken at the following intersection crosswalks during discrete time periods: 7:00 am – 9:00 am and 2:00 pm – 7:00 pm on May 16, 2007: a typical weekday. Weekday counts were intended to capture work trips as well as school trips, which are heaviest during the week. These locations were selected based on pedestrian crash clusters, pedestrian fatalities, proximity to schools, and high bus transit boarding and transfer volumes. Pedestrian volumes were tabulated at 15 minute intervals, tracking crossings along the crosswalks.

1. Ninth Street and Roosevelt Boulevard
2. Fifth Street and Roosevelt Boulevard
3. North Front Street and Roosevelt Boulevard
4. Rising Sun Avenue and Roosevelt Boulevard
5. C Street and Roosevelt Boulevard
6. F Street and Roosevelt Boulevard
7. Bridge Street and Roosevelt Boulevard
8. Harbison Avenue and Roosevelt Boulevard
9. Rhawn Street and Roosevelt Boulevard

Weekend Counts

Counts were taken at the following intersection crosswalks during the time period of 12:00 pm - 4:00 pm on Saturday, May 19, 2007. Saturday was chosen as a typical shopping day. These locations were selected based on proximity to major retail areas, high bus transit boardings, and high transfer volumes.

1. Ninth Street and Roosevelt Boulevard
2. Tyson Avenue and Roosevelt Boulevard
3. Cottman Avenue and Roosevelt Boulevard
4. Welsh Road and Roosevelt Boulevard
5. Grant Avenue and Roosevelt Boulevard

In the following crosswalk descriptions section, the intersection crosswalks are discussed in their respective geographic order – south to north, regardless of the day of assessment.

B. Mid-Block Crosswalk Locations

Weekday counts were only taken at the following mid-block crosswalks during discrete time periods: 7:00am – 9:00am and 2:00pm – 7:00pm on Thursday, May 17, 2007. These represent all mid-block crosswalks along the Boulevard between 9th Street and Grant Avenue. Pedestrian volumes were tabulated at 15 minute intervals, tracking pedestrian movement across the Boulevard. The crosswalks are listed as either on Roosevelt Boulevard at the listed perpendicular street, or on Roosevelt Boulevard between listed perpendicular streets.

1. Bingham Street and Rorer Street
2. Smylie Road
3. Garland Street and Whitaker Avenue
4. Sanger Street
5. Benner Street
6. Unruh Avenue
7. Longshore Avenue
8. Princeton Avenue and Friendship Street
9. Friendship Street and Saint Vincent Avenue
10. Shelmire Avenue and Faunce Street
11. Loney Street

Improvements

Several recommended improvements are common among many crosswalk locations. Foremost, we recommend installing pedestrian countdown signals at all intersection crosswalk locations. Additionally, each crosswalk should be restriped, if not so already, in the international style, and have crosswalk safety educational signs posted at each crosswalk. See **Figure 4** for an example of a crosswalk safety educational sign. All of the signalized crosswalks should be timed to allow pedestrians to reach the center median with a 3.5 feet per second gait in a single cycle. Furthermore, we recommend installing pedestrian countdown signals at all mid-block crosswalk locations. **Table 6** summarizes these improvements, along with all other recommended improvements. They are explained in greater detail in the following sections.

Figure 4- Crosswalk Safety Educational Sign (DVRPC, 2007)

Table 6 – Summary of Crosswalk Recommendations

	Short Term	Install ped countdown signals	Install traffic control signal	Restripe crosswalks	Install crosswalk safety signs	Re-time crossing time allowance	Conduct safety outreach at schools	Install crosswalk advisory sign	Install speed display signs	Install regulatory or other sign	Restripe stop bar	Clear vegetation	Move bus stop	Ensure adequate lighting	Ensure signal coordination	Re-align crosswalk	**Long Term**	Create median safety refuge	Install bus stop shelter	Consolidate crosswalk	Eliminate crosswalk	Upgrade sidewalks or walkways	Install a curb	Improve drainage	Consolidate bus stops	Move overhead directional sign	Follow complimentary recommendations	Study pedestrian overpass feasibility
Intersections																												
9th Street		●		●	●	●													●							●		
5th Street		●		●	●	●								●														
North Front Street		●		●	●	●	●			●					●								●					
Rising Sun Avenue		●		●	●	●	●																					
C Street		●		●	●	●	●				●																	
F Street		●		●	●	●				●													●				●	
Bridge Street		●		●	●	●		●	●															●				
Harbison Avenue		●		●	●	●				●		●	●									●						
Tyson Street		●		●	●	●																						
Cottman Avenue		●		●	●	●													●				●					
Rhawn Street		●		●	●	●		●										●				●						
Welsh Street		●		●	●	●												●	●									
Grant Avenue		●		●	●	●												●	●			●						
Mid-Block Crosswalks																												
Bingham & Rorer		●		●	●	●			●																			●
Smylie										●											●				●			
Garland & Whitaker		●		●	●	●		●																				
Sanger		●			●																							
Benner										●											●				●			
Unruh		●		●	●	●													●									●
Longshore										●											●				●			
Princeton & Friendship		●		●	●	●		●												●					●			
Friendship & St Vincent																				●							●	
Shelmire & Faunce			●	●	●			●								●												
Loney																					●				●			

Source: DVRPC, 2007

6.2 Intersection Crosswalks

I. Ninth Street and Roosevelt Boulevard

This intersection is the southernmost intersection prior Roosevelt Boulevard beginning to function as an expressway. The intersection is surrounded by vacant land to the west, Hunting Park to the southeast, and a dense concentration of row homes to the northeast. The area is home to a high concentration of public transportation users (16-

40%). The intersection is angled at approximately 45/135º. The angled nature of the intersection adds an additional 130 feet to the crossing. The total crossing distance is 380 feet. A southbound express-to-local crossover is located approximately 400 feet north of the intersection ({listed: segment/offset, beginning - ending}, 0161/498 – 0161/536). In the southbound direction, a large overhead directional sign is present. The intersection is served by bus stops in all directions and acts as a transfer point between SEPTA Routes 1 and R on Roosevelt Boulevard, and Route C on Ninth Street.

Between 2001 and 2005 numerous pedestrian/vehicle crashes occurred at this intersection. The northbound express lanes saw six crashes over this period; two daylight and four evening. All crashes resulted in injury to the pedestrian. A seventh crash occurred during daylight within the southbound local lanes, also resulted in injury to the pedestrian. Of the seven, five were considered to be caused by the pedestrian.

This intersection was assessed by DVRPC personnel on Wednesday, May 16 and Saturday, May 19, 2007. During the assessment the following observations were noted: 1) There are no pedestrian crossing signals for those crossing Ninth Street; 2) At a normal adult gait (~3.5 feet per second), it would likely require four signal cycles to safely cross Roosevelt Boulevard; 3) There is a long lag time between the “Don’t Walk” signal and the opposing green light; 4) The majority of the crossing activity can be attributed to bus route transfers; 5) Few pedestrians observed were able to cross half of the boulevard in a single light cycle; 6) Many pedestrians were observed crossing diagonally; 7) Traffic traveling from westbound Ninth Street to northbound Roosevelt Boulevard often conflicts with pedestrian movement in the crosswalk; and 8) There is not a bus stop shelter on the northbound side of Roosevelt Boulevard.

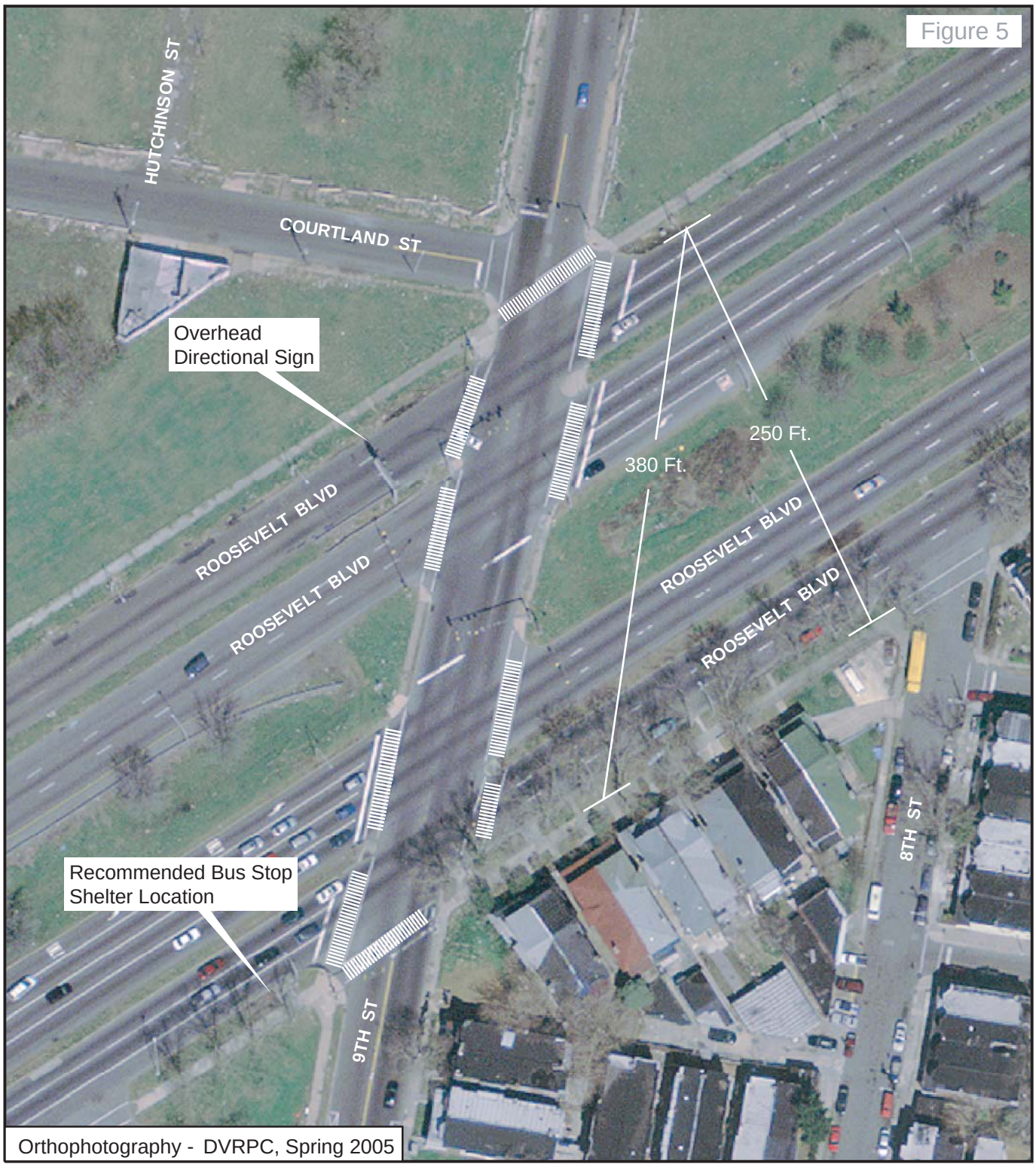
During the Wednesday, May 16 assessment, 172 pedestrians crossed Roosevelt Boulevard and 155 crossed Ninth Street. The morning assessment found an average of 46 pedestrians crossing per hour. The afternoon was higher, averaging 58 pedestrians per hour with a peak hour of 76 pedestrians between 3:30 and 4:30. The Saturday assessment averaged 36 pedestrians per hour between noon and 4:00pm.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Move the overhead southbound directional sign further beyond the intersection to avoid driver distraction.
- Install a bus stop shelter for northbound bus riders.

Roosevelt Boulevard Corridor Study

Ninth Street and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 60 120

Feet

II. Fifth Street and Roosevelt Boulevard

The intersection at Fifth Street and Roosevelt Boulevard is surrounded by dense row home neighborhoods and small pockets of commercial- and light industry-zoned land. The dominant physical characteristic of this intersection is the grade separation. The Roosevelt Boulevard express lanes travel over Fifth Street, requiring Roosevelt Boulevard crossing pedestrians to walk through the underpass. There are no crossovers in the vicinity of this intersection. The intersection is served by SEPTA Routes 1 and R on Roosevelt Boulevard and Route 47 on Fifth Street. It is a bus transfer location.

Despite the grade separation and the need to only cross two series of three traffic lanes, this intersection has realized multiple pedestrian/vehicle crashes between 2001 and 2005. All crashes occurred in the local lanes. The southbound local lanes had two crashes: a daytime driver-caused crash and an evening pedestrian-caused crash. The northbound local lanes had four crashes: two daylight pedestrian-caused crashes, and one daylight and one evening driver-caused crashes. All six crashes resulted in injury to the pedestrian.

This intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment the following observations were noted: 1) Approximately 40% of the pedestrian traffic was attributable to bus route transferring; 2) Pedestrians paid less attention to cross signals during periods of low automobile congestion; and 3) A lot of school-aged children were noted using the crossing around the morning and afternoon peak school traffic times.

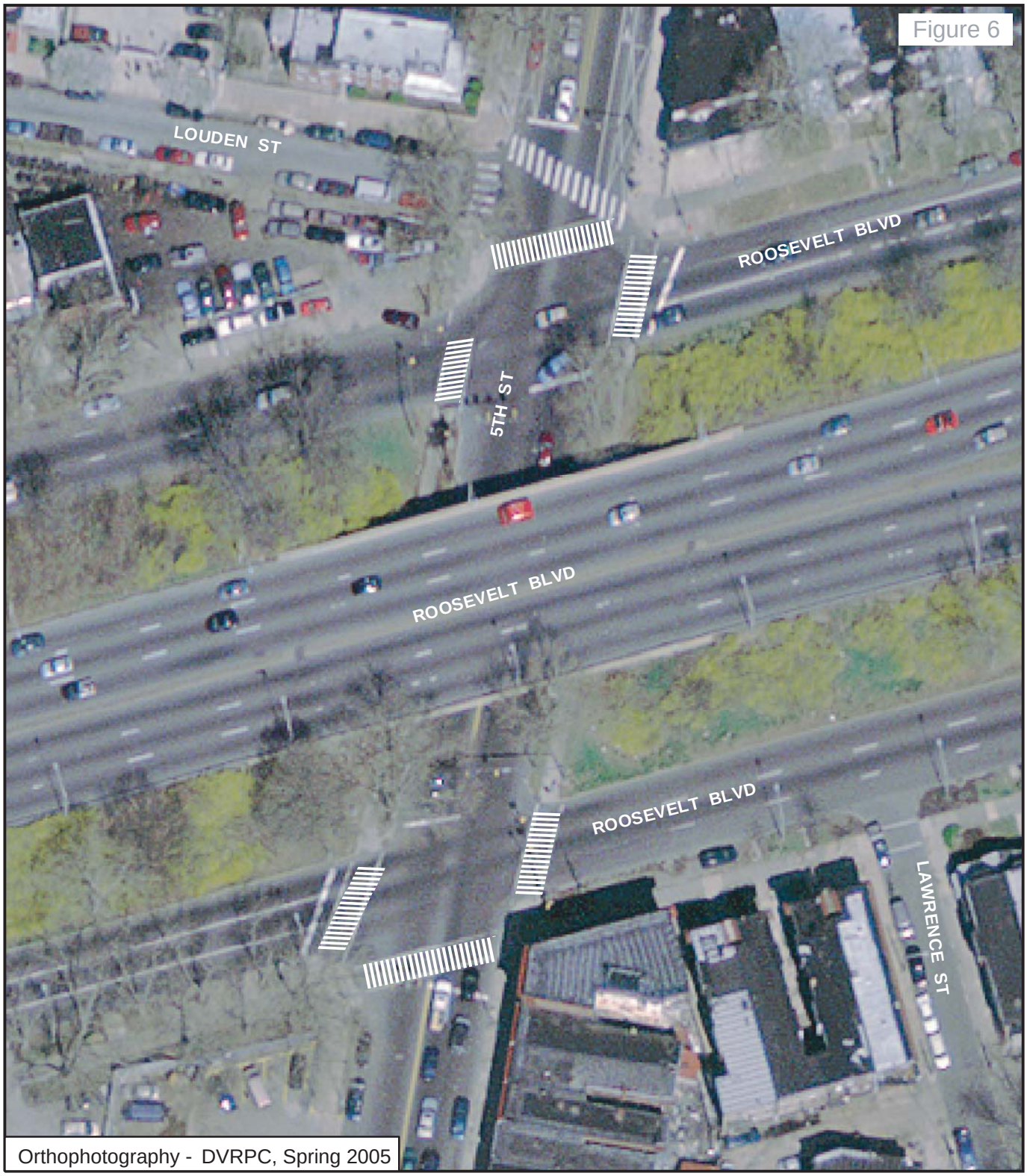
During the assessment 244 pedestrians crossed Roosevelt Boulevard and 274 crossed Fifth Street. The morning assessment averaged 78 pedestrians per hour. The afternoon averaged 73 pedestrians per hour with a 126 pedestrian peak between 3 and 4:00pm. Pedestrian levels declined to a low of 21 pedestrians between 6 and 7:00pm.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Ensure adequate lighting is present through the underpass.

Roosevelt Boulevard Corridor Study

Fifth Street and Roosevelt Boulevard



Orthophotography - DVRPC, Spring 2005

Delaware Valley
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N

0 40 80

Feet

III. North Front Street and Roosevelt Boulevard

This intersection is surrounded by a variety of land uses. The western half is primarily row home neighborhoods, with Olney High School and athletic fields approximately 1,000 feet from the intersection. The eastern side of Roosevelt Boulevard opens primarily to row home neighborhoods and Feltonville Elementary School. This intersection is unique due to its proximity to crossovers and a second intersection. Beginning 100 feet south of the intersection, in the southbound direction, is a local-to-express crossover (0181/249 – 0181/342). Additionally, ending 100 feet south of the intersection, a northbound express-to-local crossover is present (0180/380 – 0180/302). The intersection of Roosevelt Boulevard and Rising Sun Avenue is as close as 225 feet on the eastern side. SEPTA Routes 1 and R serve this intersection.

This intersection has seen four pedestrian/vehicle crashes between 2001 and 2005, including one fatality. The fatality occurred during the day in the southbound express lanes and was pedestrian caused. A driver-caused crash occurred during the evening in the southbound local lanes. The northbound lanes had a driver-caused daylight crash in the local lanes and a pedestrian-caused daylight crash in the express lanes.

The intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment the following observations were noted: 1) The majority of pedestrians were school-aged children, including many who ran across the intersection in one light cycle; 2) North Front Street traffic often encroached on the crosswalk during red lights; and 3) The sidewalks along North Front Street are in disrepair.

During the assessment, 241 pedestrians crossed Roosevelt Boulevard and 201 crossed North Front Street. The morning had 160 pedestrians and the afternoon had 282. Nearly half of the total was school-aged children.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install “Stop on Red” signs where Front Street meets Roosevelt Boulevard.
- Upgrade sidewalks along North Front Street.
- Conduct pedestrian safety outreach at Olney High School.
- Ensure signals are coordinated with Rising Sun Avenue signals to prevent dilemma vehicles (drive indecision) traveling northbound through North Front Street, or southbound through Rising Sun Avenue.

Roosevelt Boulevard Corridor Study

North Front Street and Roosevelt Boulevard

Delaware Valley
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June 2007

N

0 100 200

Feet

IV. Rising Sun Avenue and Roosevelt Boulevard

Rising Sun Avenue crosses Roosevelt Boulevard between 225 and 300 feet, depending on the spot of measurement, north of North Front Street. This intersection is sharply angled, which creates an extended crossing distance of 340 feet. As mentioned, the intersection is very close to its southern neighbor, but it is a quarter-mile from its nearest northern counterpart. There is a local-to-express and an express-to-local crossover north of the intersection on the southbound side (0181/2022 – 0181/2026 and 0181/1536 – 0181/1599). This intersection is served by SEPTA Routes 1 and R on Roosevelt Boulevard and Route 57 on Rising Sun Avenue. It is a bus transfer location.

Six pedestrian/vehicle crashes have occurred at this intersection between 2001 and 2005. Five of the crashes occurred on the northbound side, four of which were in the northbound express lanes. Three of the crashes occurred during daylight hours, one was at night. Three were pedestrian caused and one was driver caused. The northbound local lanes crash occurred during daylight and was pedestrian caused. The single southbound crash occurred in the express lanes during daylight and was pedestrian caused. All crashes resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. The only observation noted was that an additional lane of traffic must be crossed on each side due to the presence of turning lanes.

During the assessment 87 pedestrians crossed Roosevelt Boulevard and 206 crossed Rising Sun Avenue. The average was 65 pedestrians per hour with a peak of 104 pedestrians between 2:30 and 3:30 pm. This intersection had the second fewest illegal crossings, behind only the Harbison Avenue and Roosevelt Boulevard intersection, with a 15% illegal crossing rate.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Ensure signals are coordinated with North Front Street signals to prevent dilemma vehicles traveling northbound through Rising Sun Avenue, or southbound through North Front Street.
- Conduct pedestrian safety outreach at Olney High School.

Roosevelt Boulevard Corridor Study

Rising Sun Avenue and Roosevelt Boulevard

Delaware Valley
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June 2007

N

0 100 200

Feet

V. C Street and Roosevelt Boulevard

The intersection of C Street and Roosevelt Boulevard is surrounded by dense row home neighborhoods and the Saint Ambrose School, which is located in the northwest quadrant of the intersection. Physically, the intersection is not unique. C Street crosses Roosevelt Boulevard at nearly 90º and there is a southbound local-to-express crossover directly south of the intersection (0181/2022 – 0181/2026). The intersection is served by SEPTA Routes 1 and R on Roosevelt Boulevard and Routes 8 and J on C Street. It is a bus transfer location.

This intersection has witnessed six pedestrian/vehicle crashes between 2001 and 2005, including one fatality. The fatality was pedestrian caused and occurred during the evening in the northbound local lanes. The northbound local lanes also had one driver-caused evening crash resulting in injury to the pedestrian. The northbound express lanes had an evening pedestrian-caused crash and a daylight driver-caused crash, both resulting in injury to the pedestrian. The southbound lanes each had one daylight driver-caused crash. 67% of the pedestrian/vehicle crashes at this intersection were caused by the driver.

The intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment the following observations were noted: 1) The pedestrians using this intersection were primarily school-aged children; 2) There was a high percentage of jaywalkers; 3) There is a corner store at the intersection, but otherwise it is primarily surrounded by residential neighborhoods; and 4) The pavement markings on C Street are worn and in need of restriping.

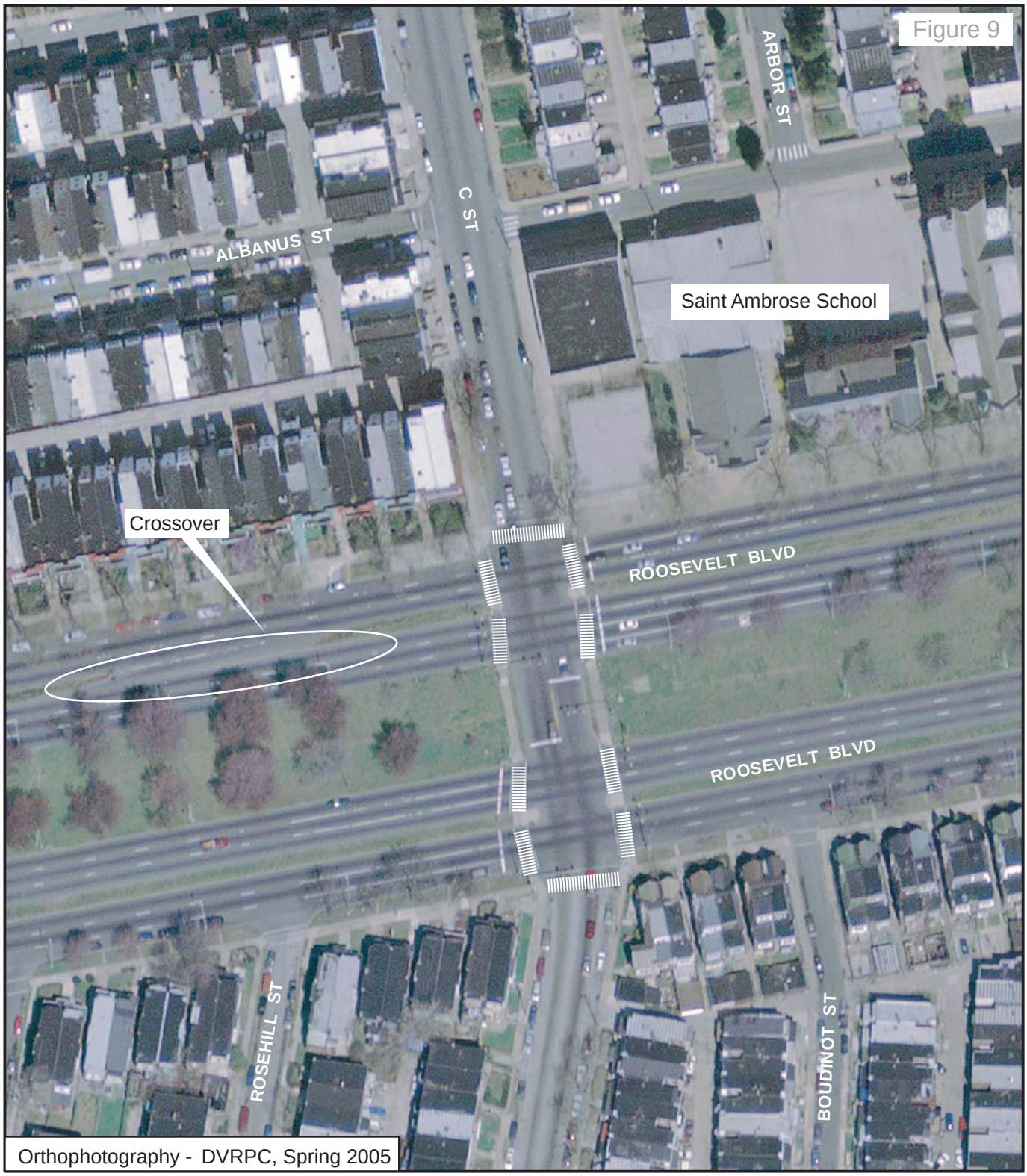
This was the busiest intersection assessed by DVRPC during weekday hours. A total of 376 pedestrians crossed Roosevelt Boulevard and 216 crossed C Street. The assessment averaged 103 pedestrians per hour in the morning, and 77 pedestrians per hour in the afternoon. There was a distinctive afternoon peak between 2:45 and 3:45, with 129 pedestrians crossing.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Improve pavement markings on C Street by restriping the stop bar.
- Conduct pedestrian safety outreach at Saint Ambrose School.

Roosevelt Boulevard Corridor Study

C Street and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 70 140

Feet

VI. F Street and Roosevelt Boulevard

This intersection is surrounded by row home neighborhoods, Tacony Creek Park, a gas station, and two small automobile dealerships. A prominent characteristic of the intersection is its proximity to Tacony Creek Park. Northbound traffic is unimpeded as it crosses the Park for a quarter-mile prior to the intersection. There is also a northbound express-to-local crossover ending 200 feet prior to intersection (0190/1623 – 0190/1862). The intersection is served by SEPTA Routes 1, 8, J, and R.

This intersection has seen seven pedestrian/vehicle crashes between 2001 and 2005, six of which occurred during daylight hours. The sole evening crash occurred in the northbound local lanes and was caused by the driver. The northbound local lanes also had three daylight crashes: two driver caused and one pedestrian caused. The northbound express, southbound local, and southbound express lanes each had one pedestrian-caused daylight crash. All seven crashes resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment the following observations were noted: 1) Approximately 25% of the pedestrian traffic was school related and 25% was bus related; 2) Pedestrians adhered to crosswalk markings; and 3) The southeast corner gas station does not have a curb along its border with Roosevelt Boulevard.

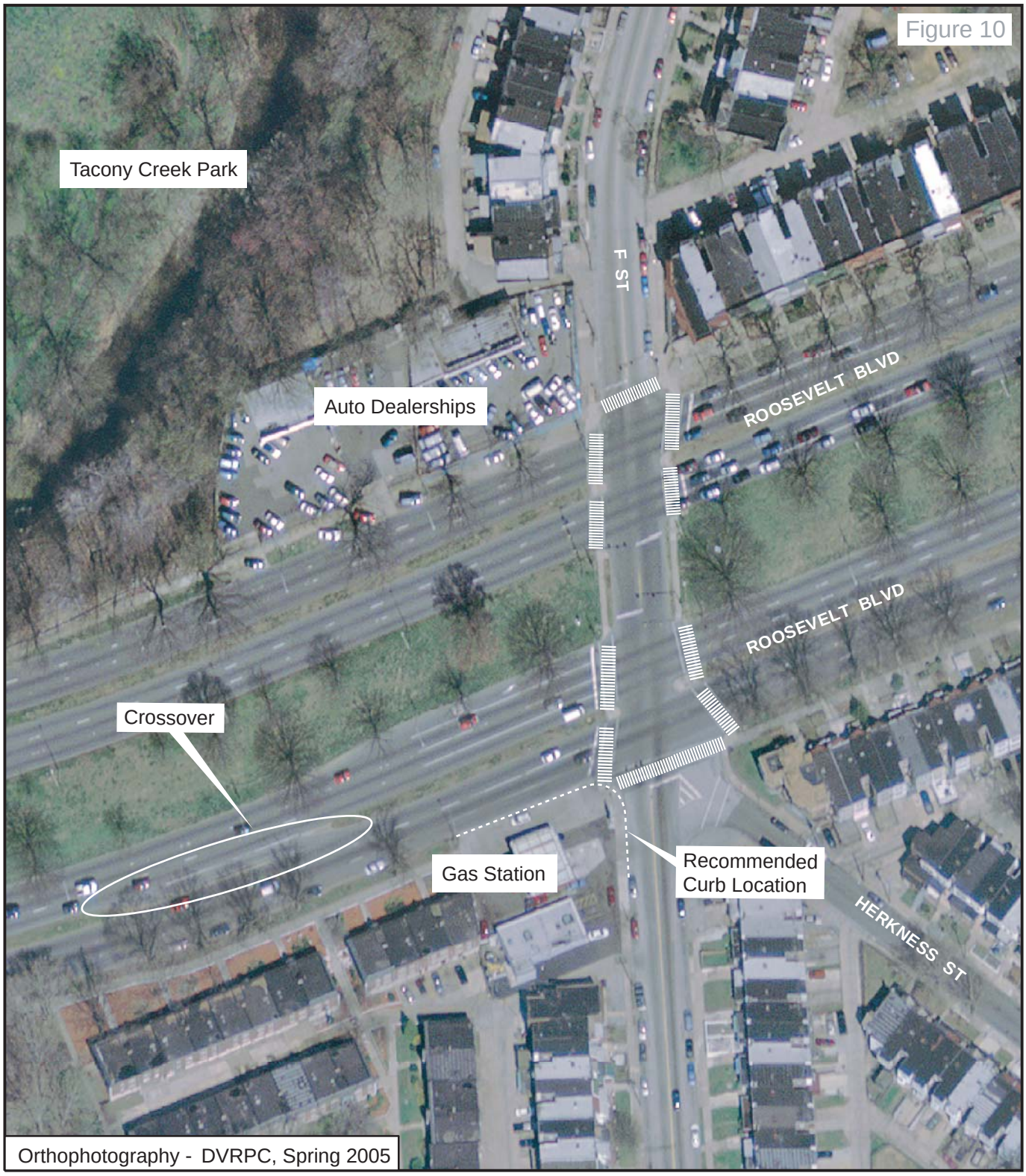
During the assessment at total of 99 pedestrians crossed Roosevelt Boulevard and 248 crossed F Street. This is below average for assessed intersections. The assessment-long average was 50 pedestrians per hour, with a peak between 3:30 and 4:30pm, during which 84 pedestrians crossed. This intersection was noted as having the highest percentage of illegal crossings (74%). People who cross illegally are not necessarily jaywalkers; rather, they are often unable to cross before the walk signal expires.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install a curb along the gas station property to clearly define ingress and egress points.
- Ensure signs are posted in both directions approaching the intersection that indicate Speed Limit, Crosswalk Ahead, and Signal Ahead.
- Follow recommendations for associated crossovers, which include moving NB 4 and eliminating SB 14 (Crossover designations discussed in **Section 7.1**).

Roosevelt Boulevard Corridor Study

F Street and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 70 140

Feet

VII. Bridge Street and Roosevelt Boulevard

The area surrounding the intersection of Bridge Street and Roosevelt Boulevard begins the demographic characteristics more in line with the northern half of the study area. The Saint Martin of Tours School is in the northwest quadrant, but two other Roosevelt Boulevard crosswalks are closer to the school. The land use is dense row home neighborhoods west of Roosevelt Boulevard and multifamily housing neighborhoods to the east. The intersection is served only by SEPTA Route 1 on Roosevelt Boulevard.

This intersection has seen four pedestrian/vehicle crashes between 2001 and 2005. All four were confined to the northbound lanes. The northbound local lanes had a daylight driver-caused crash. The northbound express lanes had two daylight crashes: one pedestrian caused and one driver caused. The fourth crash occurred during the evening and was pedestrian caused. All four crashes resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment the following observations were noted: 1) There are no pedestrian cross signals for crossing Bridge Street; 2) The majority of the pedestrians were school-aged children; 3) A drainage problem exists that causes ponding at the walkway in the southwest quadrant median; 4) The northbound crossover prior to the intersection causes significant weaving due to the grade separation at Oxford Circle; 5) There is poor sight distance for southbound express lane traffic approaching the intersection due to the lanes returning to grade; and 6) The southbound travel lanes do not have advanced advisory signs for the crosswalk.

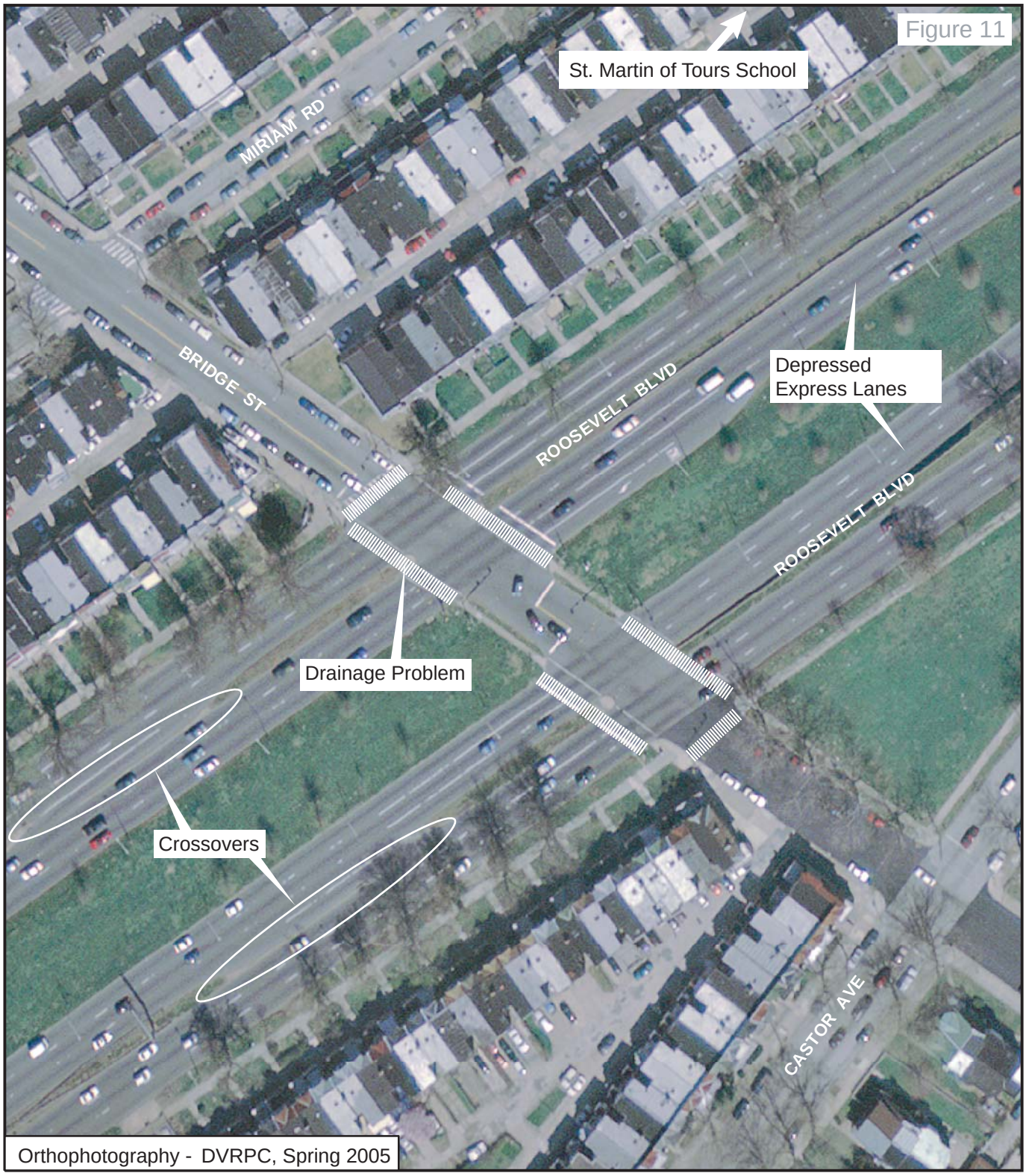
The Bridge Street and Roosevelt Boulevard intersection had the fewest pedestrian crossings of any assessed intersection. In seven hours of DVRPC assessment, 95 pedestrians crossed Roosevelt Boulevard and 118 crossed Bridge Street.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Improve drainage in the southwest quadrant median.
- Install advanced crosswalk advisory signs in the southbound express lanes prior to the intersection.
- Install permanent speed display signs at the southbound overpass at Oxford Avenue.

Roosevelt Boulevard Corridor Study

Bridge Street and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 70 140

Feet

VIII. Harbison Avenue and Roosevelt Boulevard

A variety of land uses surround this intersection. The western side is primarily row homes, multifamily homes, and a school. The eastern side opens to numerous shopping centers. There is a northbound express-to-local crossover ending 280 feet south of the intersection (0240/2359 – 0240/2620) and a mid-block crosswalk 400 feet north of the intersection. Pedestrians crossing the northern side of Harbison Avenue must cross an additional lane of traffic. The intersection is served by SEPTA Routes 1, 14, 20, and 50 on Roosevelt Boulevard and Route 26 on Harbison Avenue. It is a bus transfer location.

The intersection has seen seven pedestrian/vehicle crashes between 2001 and 2005, all caused by the pedestrian. The northbound local lanes had three evening crashes, and the northbound and southbound express lanes each had a day and evening crash. Six of the crashes resulted in injury to the pedestrian and one resulted in a fatality.

This intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment the following observations were noted: 1) Much of the pedestrian traffic was attributable to the ACME store; 2) Most pedestrians crossed legally; however, some crossed in front of the ACME store; 3) Motorist traveling from westbound Harbison to the northbound Roosevelt express lanes often do not yield at the crosswalk; 4) The Harbison Avenue sidewalk needs upgrading in places; 5) The median walkway is narrow and overrun with vegetation; 6) The Harbison Avenue channelized right-turn lane needs a “Yield to Peds” sign; and 7) There is a conflict between the northbound bus stop location and the shopping center driveway.

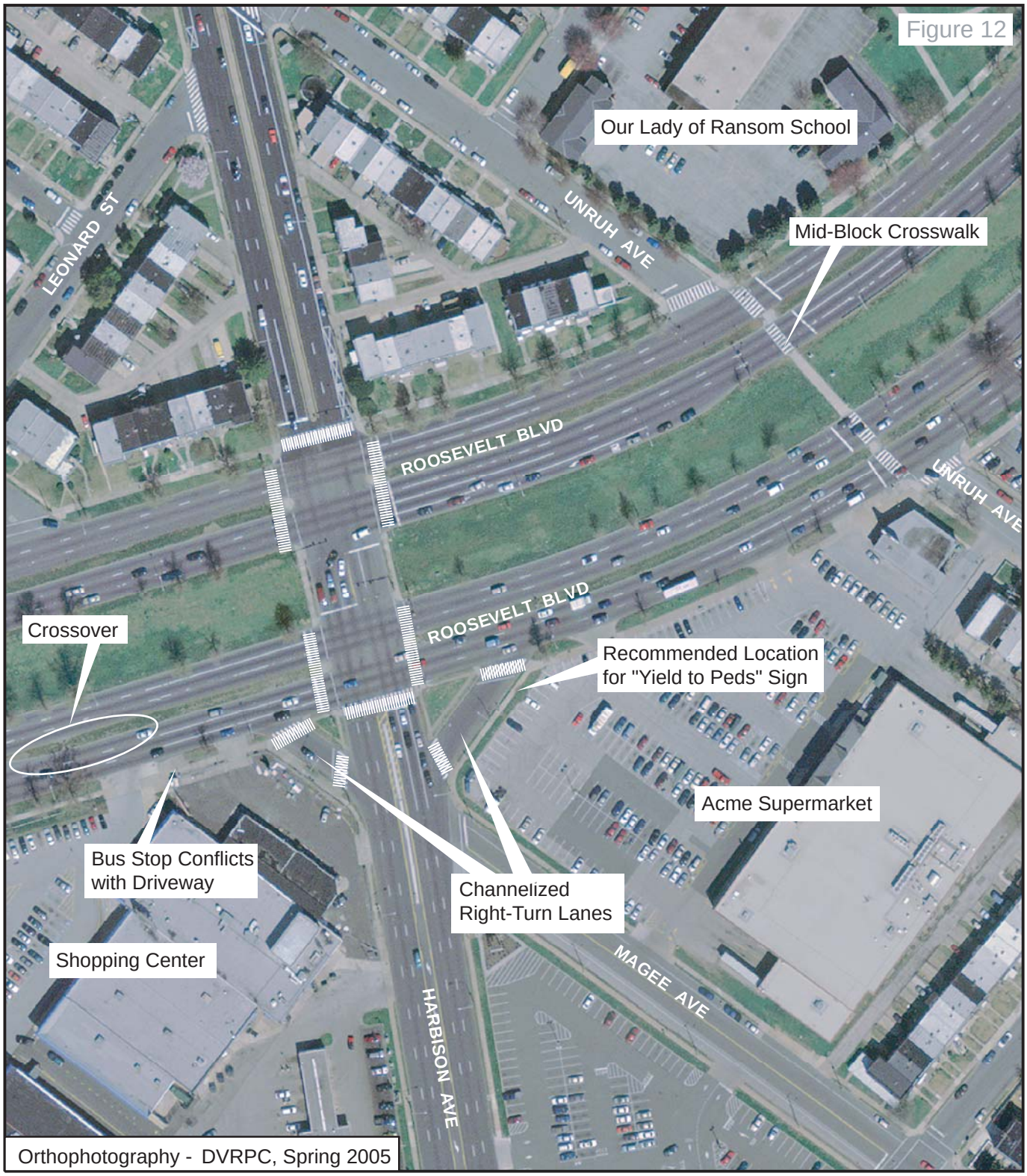
This intersection had the second fewest pedestrian crossings at an intersection recorded during the assessment. 116 pedestrians crossed Roosevelt Boulevard and 113 crossed Harbison Avenue. There were 70 pedestrians during the two morning hours and 159 during the five afternoon hours. Only 6.1 percent crossed illegally.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install a “Yield to Peds” sign at the right turn ramp from Harbison to Roosevelt.
- Increase the width of the pedestrian walkway across Roosevelt Boulevard.
- Keep the median walkways clear of vegetation.
- Move the northbound Roosevelt Boulevard bus stop away from the driveway.
- Upgrade the sidewalk along Harbison Avenue.

Roosevelt Boulevard Corridor Study

Harbison Avenue and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 100 200

Feet

IX. Tyson Avenue and Roosevelt Boulevard

The area surrounding the Tyson Avenue and Roosevelt Boulevard intersection is primarily row home neighborhoods. There is an automobile dealership in the northeast quadrant of the intersection. There are no other significant landmarks near by. The intersection is in between four mid-block crosswalks. There are two southbound crossovers near this intersection: a local-to-express crossover north of the intersection (0261/590 – 0261/660), and an express-to-local crossover south of the intersection (0251/1498 – 0251/1657). The intersection is served by SEPTA Routes 1, 14, 20, and 50 on Roosevelt Boulevard only.

This intersection has seen five pedestrian/vehicle crashes between 2001 and 2005, including one fatality. The fatality occurred during the evening in the northbound express lanes and was caused by the pedestrian. The northbound express lanes also had three other evening crashes: two were caused by the pedestrian and one by environmental conditions, and all three resulted in injury to the pedestrian. The final pedestrian/vehicle crash occurred in the southbound express lanes, was pedestrian caused, and resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Saturday, May 19, 2007. During the assessment the following observation was noted: the intersection crosswalks appeared to be used minimally.

A total of 98 pedestrians crossed Roosevelt Boulevard and 69 crossed Tyson Avenue during the four hours of assessment. The average was 42 pedestrian crossings per hour.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.

Roosevelt Boulevard Corridor Study

Tyson Avenue and Roosevelt Boulevard

Delaware Valley
Regional Planning Commission
June 2007

N

0 125 250

Feet

X. Cottman Avenue and Roosevelt Boulevard

This intersection is surrounded primarily by commercial establishments, most notably by the Roosevelt Mall in the northwest quadrant. Row home neighborhoods are present beyond the commercial establishments. Transportation mode choice stands out as higher than average for the surrounding population; 6 – 10% walk to their place of employment and 16 – 30% use public transportation. Physically, the intersection is grade separated with the Roosevelt Boulevard express lanes traveling beneath Cottman Avenue. This intersection is served by SEPTA Routes 1, 14, 20, and 50 on Roosevelt Boulevard and Routes 70 and 77 on Cottman Avenue. It is a bus transfer location.

Five pedestrian/vehicle crashes occurred at this intersection between 2001 and 2005; all in the northbound local lanes. There were three day and one evening driver-caused crashes, and one day pedestrian-caused crash. All resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Saturday, May 19, 2007. During the assessment the following observations were noted: 1) There are no pedestrian cross signals present; 2) Left-turning cars entered the box before it was clear, which created gridlock; 3) The traffic flow was primarily oriented towards Roosevelt Mall; 4) The traffic signal poles are in the middle of the walkway at the median, thereby impeding pedestrian movement; 5) There are near-side bus stops on both streets in both directions, including at the southeast corner gas station; 6) The southeast corner bus stop does not have a shelter; and 7) The southeast corner gas station does not have a curb along its property border.

By far the busiest assessed intersection, 346 pedestrians crossed Roosevelt Boulevard and 421 crossed Cottman Avenue during the four assessment hours. This translates into 192 pedestrian crossings per hour with no distinct peak in usage. Only 9% of the pedestrians crossed the intersection illegally, which is reflective of the high automobile traffic volume and the minimal crossing distance.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install a curb along the southeast corner gas station's property due to the presence of a bus stop and undefined ingress and egress points.
- Install a bus stop shelter on Roosevelt Boulevard at the southeast corner of the intersection.

Roosevelt Boulevard Corridor Study

Cottman Avenue and Roosevelt Boulevard

Delaware Valley
Regional Planning Commission
June 2007

N

0 120 240

Feet

XI. Rhawn Street and Roosevelt Boulevard

This intersection is the northernmost intersection in the DVRPC corridor study assessed on a weekday. The intersection is surrounded by small commercial establishments and multifamily housing. The small commercial establishments include a southeast corner gas station, a southwest corner car dealership, a northwest corner convenience store, and a northeast corner fast food restaurant. The residential areas surrounding the intersection are the least dense of the entire study area, with only 0 – 15 residents per acre. The intersection is between a mid-block crosswalk and the southern end of the Holme Avenue express-lane grade separation. Also, unique to this intersection are split center medians that contain left turning lanes. These lanes add an additional obstacle for pedestrian crossings. The intersection is served by SEPTA Routes 1, 14, 20, and 50 on Roosevelt Boulevard and Route 28 on Rhawn Street. It is a bus transfer location.

This intersection has seen little pedestrian/vehicle crash activity between 2001 and 2005, though there was one fatality. The pedestrian-caused fatality occurred during the evening in the northbound express lanes. The only other crash occurred during the day in the northbound express lanes and resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Wednesday, May 16, 2007. During the assessment, the following observations were noted: 1) The majority of the pedestrians were adults; 2) All pedestrians crossed within the confines of the crosswalk; 3) There are no pedestrian signals for those crossing Rhawn Street; 4) The walkways in the north-side center median are narrow; and 5) There are not advanced crosswalk advisory signs for southbound express lane traffic.

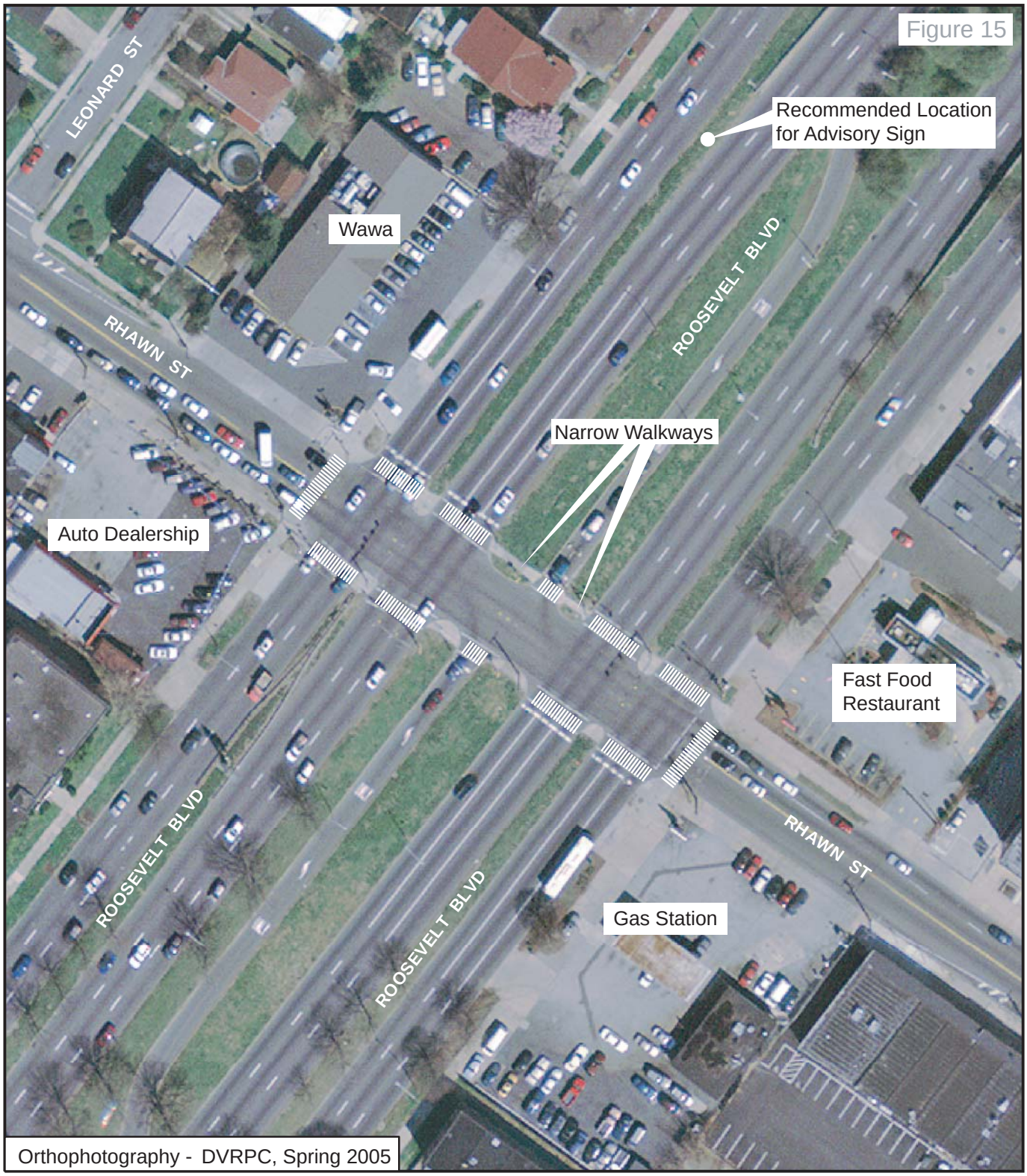
During the assessment 244 pedestrians crossed Roosevelt Boulevard and 226 crossed Rhawn Street. The morning had 171 pedestrians, with an 86 pedestrian hourly average. The afternoon had 299 pedestrians, with a 59 pedestrian hourly average. A peak occurred between 3:00 pm and 4:00 pm, with 114 pedestrian crossings. The intersection had an illegal crossing rate of 65%, all of which can be attributed to pedestrians not completing the crossing prior to signal expiration.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Create a center median pedestrian safety refuge.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install advisory signs for the southbound express lanes returning to grade.
- Widen the walkways in the north-side center median.

Roosevelt Boulevard Corridor Study

Rhawn Street and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 60 120

Feet

XII. Welsh Road and Roosevelt Boulevard

The Welsh Road and Roosevelt Boulevard intersection is surrounded by commercial establishments at all four corners. Beyond the commercial establishments in the northwest and southeast corners is a mix of single-family and multifamily housing. The southwest quadrant has a mixed variety of housing beyond the commercial establishments. The intersection is unique due to the lack of a significant center median. While this decreases the crossing distance to only 220 feet, there is not a safe place for pedestrians who cannot complete the entire crossing in one light cycle to wait. The crosswalks at this intersection are all painted in the international style, which increases their visibility. SEPTA Routes 1 and 14 on Roosevelt Boulevard and Route 88 on Welsh Road serve this intersection. It is a bus transfer location that does not have shelters.

Between 2001 and 2005, five pedestrian/vehicle crashes have occurred at the intersection. All five crashes resulted in injury to the pedestrian. A driver-caused crash occurred during the evening in the northbound local lanes, three pedestrian-caused crashes occurred during daylight in the northbound express lanes, and a final pedestrian-caused crash occurred during daylight in the southbound express lanes.

The intersection was assessed by DVRPC personnel on Saturday, May 19, 2007. During the assessment the following comments were noted: 1) A large portion of the pedestrian traffic was elderly; and 2) Nearly all pedestrians were attributed to either buses or the nearby shopping centers.

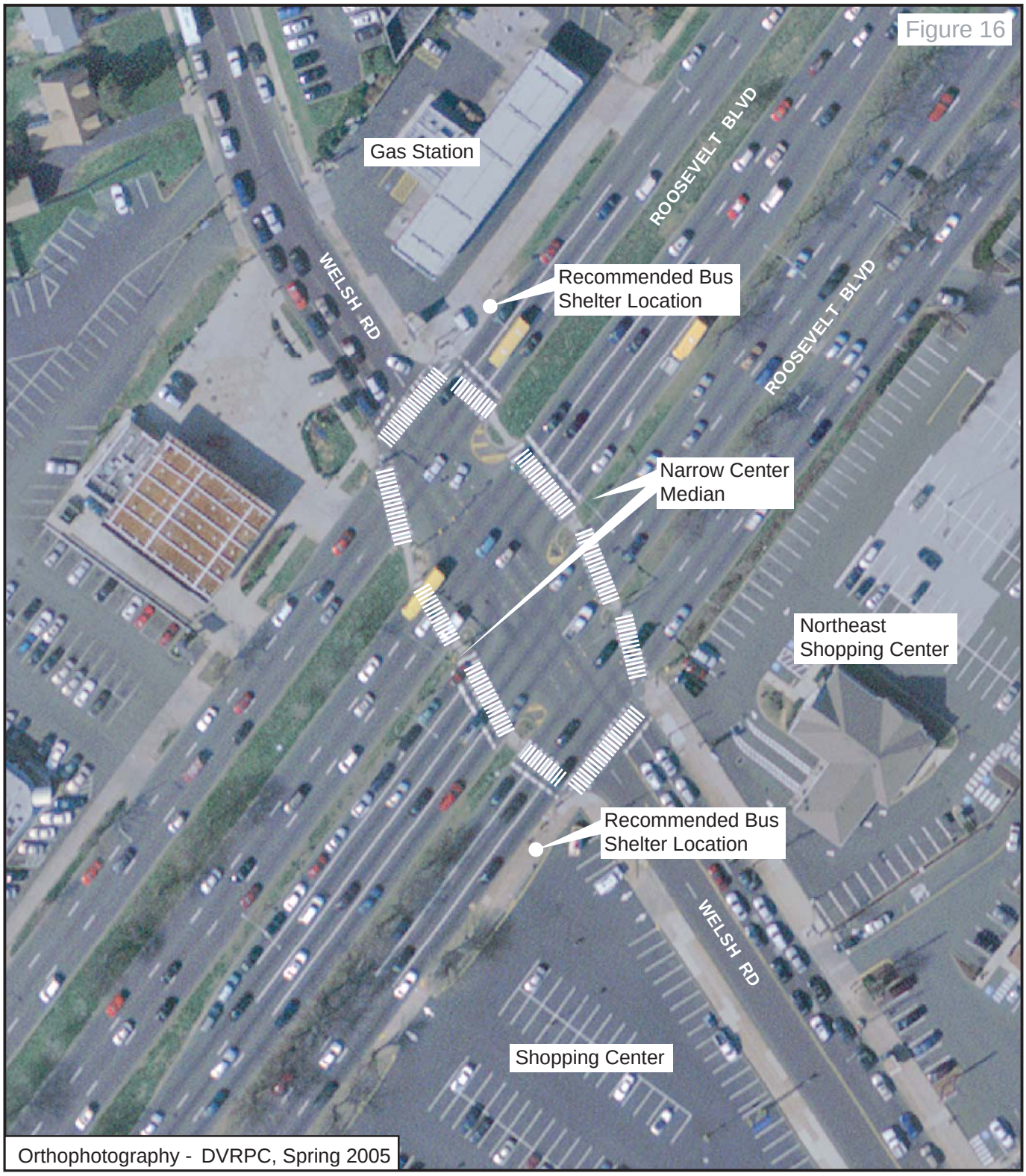
During the assessment 185 pedestrians crossed Roosevelt Boulevard and 100 crossed Welsh Road. The average was 71 pedestrian crossings per hour. The numbers are significant due to the low-density residential neighborhoods in the vicinity of the intersection.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Create a center median pedestrian safety refuge.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install bus stop shelters.

Roosevelt Boulevard Corridor Study

Welsh Road and Roosevelt Boulevard



Delaware Valley
Regional Planning Commission
June 2007

N

0 60 120

Feet

XIII. Grant Avenue and Roosevelt Boulevard

This intersection is between low-density residential housing to the west and commercial establishments to the east. It is in between four local-to-express crossovers from 500 – 600 feet away from the intersection (0310/2119 – 0310/2171, 0311/2148 – 0311/2153, 0321/1063 – 0321/764, and 0320/633 – 0320/900). There are also left-turn lanes adjacent to the express lanes and two in the southbound direction, which increases the crossing distance. Despite the extra lanes, this intersection provides one of Roosevelt Boulevard's shortest crossing distances, only 205 feet. However, the turning lanes have made the center medians narrow in size, as narrow as four feet on the northern side of Roosevelt Boulevard. Lastly, there are no sidewalks present on Roosevelt Boulevard or Grant Avenue in the northeast quadrant of the intersection. The intersection is served by SEPTA Routes 1 and 14 on Roosevelt Boulevard and Route 19 on Grant Avenue. It is a bus transfer location that does not have shelters.

Between 2001 and 2005 four pedestrian/vehicle crashes occurred at this intersection. The southbound local lanes had an evening pedestrian-caused crash and the northbound express lanes had three daylight crashes; two driver caused and one pedestrian caused. All crashes resulted in injury to the pedestrian.

The intersection was assessed by DVRPC personnel on Saturday, May 19, 2007. During the assessment the following observations were noted: 1) Nearly all pedestrian traffic was attributable to buses and the shopping centers; 2) The three-phase signal timing plan confused pedestrians with its all-red control during the third phase and protected left turns from Roosevelt Boulevard. During this interval many pedestrians either started or continued their crossing; and 3) There is heavy truck traffic turning onto eastbound Grant Avenue.

During the four hours of assessment, 88 pedestrians crossed Roosevelt Boulevard and 55 crossed Grant Avenue. This translates into an average of 36 pedestrian crossings per hour. The intersection had a 60% illegal crossing rate, which is in part due to the third signal phase.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe all crosswalks using the international style.
- Install crosswalk safety educational signs.
- Create a center median pedestrian safety refuge.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Construct a continuous sidewalk in the northeast quadrant of the intersection.
- Install a bus stop shelter.

Roosevelt Boulevard Corridor Study

Grant Avenue and Roosevelt Boulevard

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Regional Planning Commission
June 2007

N

0 60 120

Feet

6.3 Mid-Block Crosswalks

I. At Bingham Street and Rorer Street

This is a signalized crosswalk that crosses Roosevelt Boulevard where Bingham Street meets the southbound side of Roosevelt Boulevard and Rorer Street meets the northbound side. It is the southernmost mid-block crosswalk in the DVRPC study corridor. The nearest crosswalk is at the C Street and Roosevelt Boulevard intersection. Both ends of the crosswalk open to dense row home neighborhoods. Landmarks in the vicinity include Tacony Creek Park beginning north of the crosswalk, and The Saint Ambrose School approximately 400 feet from the crosswalk's western end. This is a signalized crosswalk. There is a crossover for each direction of travel directly north of the crosswalk (0190/1102 – 0190/1123 and 0191/991 – 0191/1058). SEPTA Routes 1, 8, J, and R serve the area.

Between 2001 and 2005 two bicycle/vehicle crashes occurred near this crosswalk. The crashes did not physically take place on the crosswalk; however, the locations suggest that the cyclists may have been avoiding one end of the crosswalk due to the associated center-median offset.

This crosswalk was assessed by DVRPC personnel on Thursday, May 17 and Thursday, May 31, 2007. During the assessment the following observations were noted: 1) There are large gaps in north to south traveling traffic, which encourages crossing during "Don't Walk" signals; 2) Most pedestrians did not press the signal button; 3) Pedestrians approaching Roosevelt Boulevard from D Street tended to cross the first half of Roosevelt Boulevard outside of the crosswalk; 4) Either the west-side signal button does not function properly or there is an extensive wait after the button is pushed for a "Walk" signal; and 5) Traffic, particularly southbound, has approximately one-quarter mile of unimpeded flow, causing high speeds to be reached near the crosswalk.

A total of 128 pedestrians used this crosswalk during the DVRPC assessment on May 17. There was a slight peak in usage during afternoon school dismissal.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe the crosswalk using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install permanent speed display signs.
- Examine the potential for a pedestrian overpass for this location.

Roosevelt Boulevard Corridor Study

At Bingham Street and Rorer Street

Delaware Valley
Regional Planning Commission
June 2007

N

0 70 140

Feet

II. At Smylie Road

This crosswalk is located where Smylie Road would theoretically cross Roosevelt Boulevard if it were a through street. It is approximately 500 feet north of the F Street and Roosevelt Boulevard intersection, and approximately 400 feet south of the Whitaker Avenue mid-block crosswalk. There are no significant landmarks in the vicinity. The surrounding area is primarily row home residential neighborhoods. A southbound local-to-express crossover is directly north of the crosswalk (0201/846 – 0201/872). SEPTA Routes 1, 8, J, and R serve the area.

The crosswalk had no pedestrian/vehicle crashes between 2001 and 2005. However, a pedestrian was struck in the southbound express lanes during daylight hours approximately 72 feet south of the crosswalk.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) Traffic regularly backed up past the crosswalk in both directions between 3:00 pm and 6:30 pm, most often in the northbound inner lanes. The outer lanes backed up every signal cycle between 4:00 pm and 6:30 pm; 2) The crosswalk does not have a signal; and 3) There are no northbound warning signs.

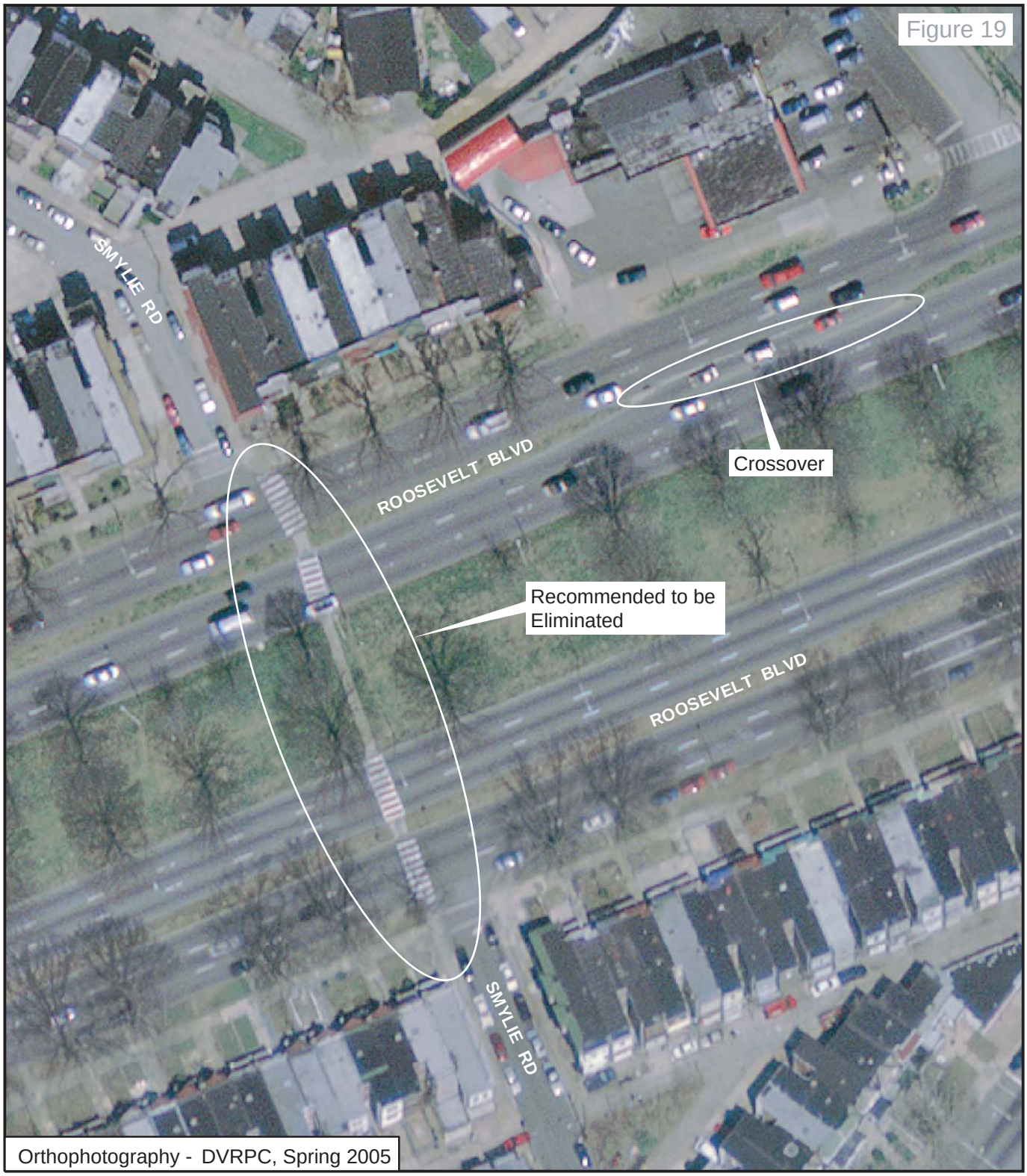
112 pedestrians were witnessed using this crosswalk during the seven hours of the assessment. A slight peak was evident around the afternoon school dismissal time. Due to the nature of the crosswalk, unsignalized and straight across, no pedestrians were noted as crossing illegally.

Recommended Improvements:

- Based on the close proximity to the Whitaker Avenue crosswalk, it is recommended that this crosswalk be eliminated.
- Install signs directing pedestrians to use the Whitaker Avenue or F Street crosswalk.
- Consolidate associated bus stops with the nearby intersection bus stops.

Roosevelt Boulevard Corridor Study

At Smylie Road



Delaware Valley
Regional Planning Commission
June 2007

N

0 50 100

Feet

III. At Garland Street and Whitaker Avenue

This signalized crosswalk runs from where Garland Street meets Roosevelt Boulevard to the west and Whitaker Avenue meets Roosevelt Boulevard to the east. It is the only crosswalk, with the exception of the Smylie Road crosswalk, for a considerable distance. The eastern side is primarily row homes and the western side includes a hotel, a carwash, and row homes. The Wal-Mart shopping center is approximately 1,000 feet north on the western side. There is a southbound crossover directly south of the crosswalk (0201/846 – 0201/872). The area is served by SEPTA Routes 1, 8, J, and R.

Between 2001 and 2005 there were no pedestrian/vehicle crashes at or near this crosswalk.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) The majority of pedestrian foot traffic was school children; 2) The crosswalk signals are pedestrian actuated; 3) A curve in the roadway for southbound approaching traffic shortens the line of sight; and 4) There are no crosswalk advisory signs at the crosswalk on the southbound side.

During the seven hours of DVRPC assessment, 287 pedestrians crossed Roosevelt Boulevard at this crosswalk. An extremely high percentage, 72%, completed the crossing illegally, or against a “Don’t Walk” signal. As with most crossings, a peak pedestrian usage was recorded around the afternoon school dismissal time.

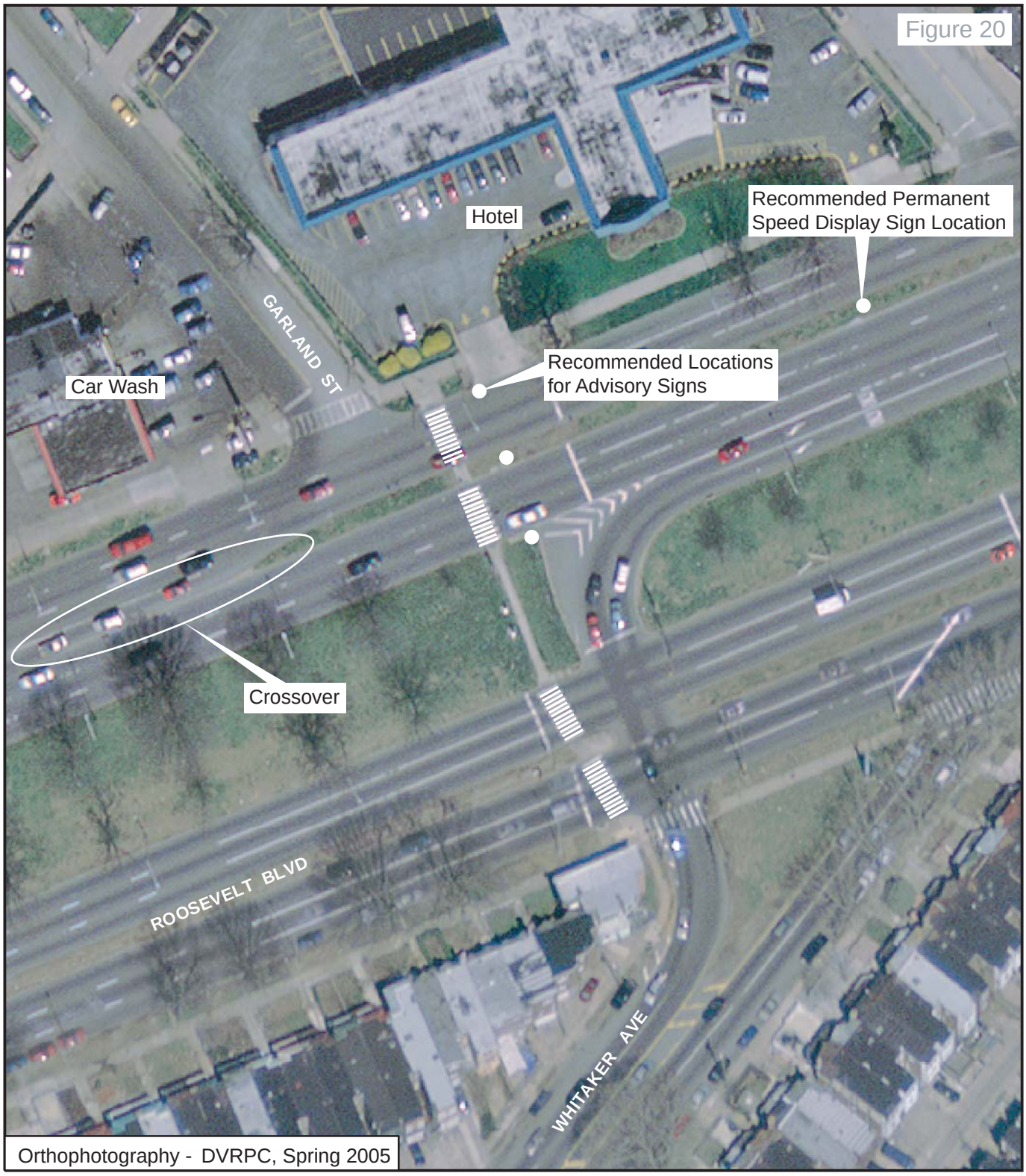
Although this is the most utilized mid-block crosswalk in the corridor, preliminary analysis suggests that the construction of a pedestrian overpass at this location may not be feasible.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe the crosswalk using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Install pedestrian crosswalk advisory signs at the crosswalk on the southbound side.

Roosevelt Boulevard Corridor Study

At Garland Street and Whitaker Avenue



Delaware Valley
Regional Planning Commission
June 2007

N

0 50 100
Feet

IV. At Sanger Street

This crosswalk connects East and West Sanger Streets across Roosevelt Boulevard. The western side of the crosswalk is primarily row home neighborhoods and the Saint Martin of Tours School. The east side is multifamily home neighborhoods and a McDonald's Restaurant. The crosswalk benefits from the grade separation of the Roosevelt Boulevard express lanes under Oxford Avenue. The crosswalk goes over the express lanes, leaving only two series of three lanes for at-grade pedestrian crossing. There are signals present to aid pedestrians across the local lanes of Roosevelt Boulevard. SEPTA Route 1 serves the area.

Between 2001 and 2005 there were no pedestrian/vehicle crashes at or near this crosswalk.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. The surveyors observed no issues.

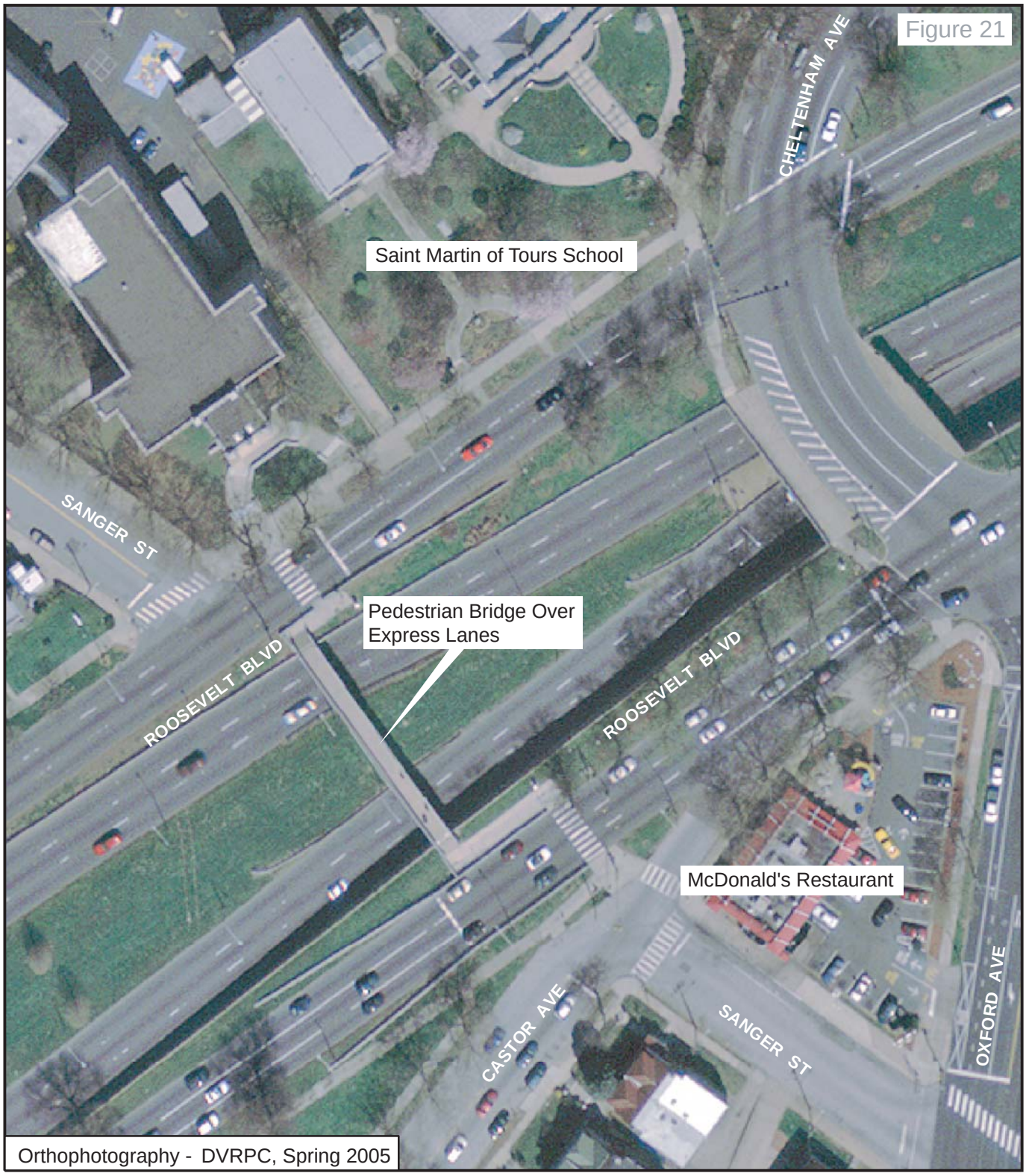
184 pedestrians crossed Roosevelt Boulevard at this crosswalk during the seven hours of assessment. Half of the pedestrians crossed without a "Walk" signal when there were gaps in traffic.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Install crosswalk safety educational signs.

Roosevelt Boulevard Corridor Study

At Sanger Street



Delaware Valley
Regional Planning Commission
June 2007

N

0 60 120

Feet

V. At Benner Street

This crosswalk crosses Roosevelt Boulevard where Benner Street would be if it were a through street. It splits the distance between the Large Street intersection and the Devereaux Avenue intersection, approximately 700 feet from either. Both sides of Roosevelt Boulevard at the crosswalk open to extensive row home residential housing. Physically, the crosswalk is angled at approximately 45º from Roosevelt Boulevard. The angled nature, along with creating a greater crossing distance, forces pedestrians to look over their shoulder during the second half of the crossing to view oncoming traffic. There are crossovers for each direction of travel directly south of the crosswalk (0230/1753 – 0230/2165 and 0231/1724 – 0231/1730). The area is served by SEPTA Route 1.

Two pedestrian/vehicle crashes occurred at this crosswalk between 2001 and 2005, including one fatality. Both crashes occurred in the northbound local lanes. The fatality was at night and caused by the pedestrian, while the other was a daylight driver-caused crash.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) There appears to be a drainage problem at the median walkways; 2) It can be difficult for merging traffic at this location to see pedestrians in the crosswalk ahead of time; and 3) There are no crosswalk advisory signs for southbound traffic at the crosswalk.

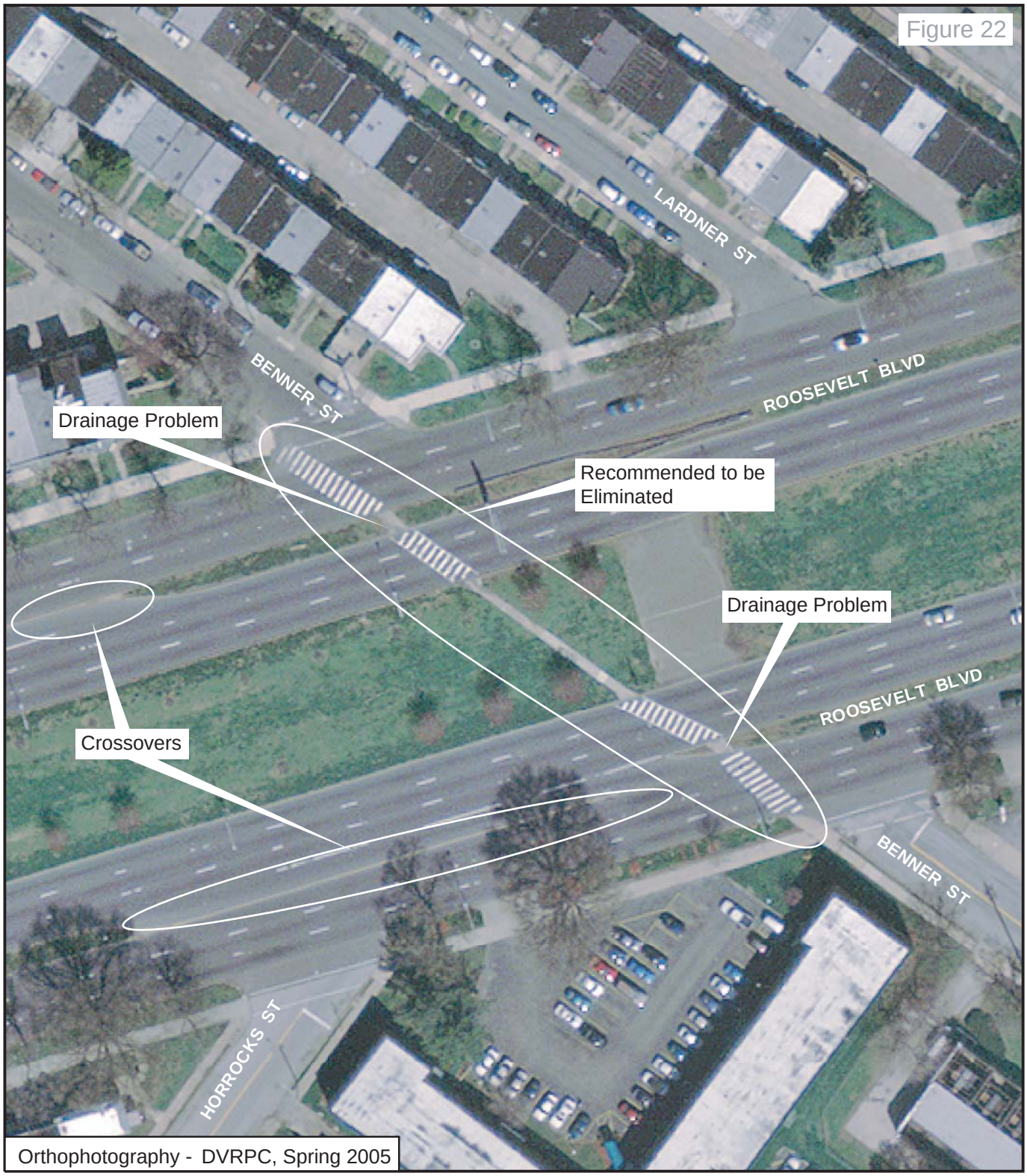
During the seven hours of assessment, only 27 pedestrians used this crosswalk.

Recommended Improvements:

- Based on the minimal usage, proximity to crossovers, and proximity to intersection crosswalks, this crosswalk is recommended to be eliminated.
- Install signs directing pedestrians to use the nearby intersection crosswalks.
- Consolidate the associated bus stops with the nearby intersection bus stops.

Roosevelt Boulevard Corridor Study

At Benner Street



Delaware Valley
Regional Planning Commission
June 2007

N

0 50 100

Feet

VI. At Unruh Avenue

This mid-block crosswalk crosses Roosevelt Boulevard where Unruh Avenue would if it were a through street. It is one block north of the Roosevelt Boulevard and Harbison Avenue intersection and approximately 1,200 feet south of the next crossing point to the north. The crosswalk departs from the northwest corner of the ACME supermarket property and arrives at the southeast corner of Our Lady of Ransom church and school. There is also a large amount of row home housing in the vicinity. This is a pedestrian-actuated, signalized crosswalk. SEPTA Routes 1, 14, 20, and 50 serve the area.

Between 2001 and 2005, two pedestrian/vehicle crashes occurred at this crosswalk; both were pedestrian caused, in the evening, and resulted in pedestrian injury. One was in the northbound local lanes and the other was in the southbound express lanes.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) There are bus stops at both ends of the crosswalk. The one on the southbound side has a shelter; 2) The bus stops were noted as being lightly used; 3) There is a slight curve in the road approaching the crosswalk; 4) Pedestrians were noted as being approximately 50% school-aged children and 50% patrons of the ACME supermarket; 5) The pedestrian-actuated cross signals require a stop and wait at each of the three medians; and 6) Unneeded disruptions to traffic flow were created by pedestrians pushing the signal actuation buttons and then crossing before the signal changed to “Walk.”

During the assessment 144 pedestrians were recorded using the Unruh Avenue mid-block crosswalk. The two AM hours of assessment found light use while the PM assessment had moderate use. There were two distinct peaks in usage: one around the afternoon school dismissal time and another around 6:00 pm. This crosswalk had the third-greatest number of pedestrian mid-block crossings and the greatest percentage (75%) of illegal crossings of all mid-block crosswalks.

Recommended Improvements:

- Install pedestrian countdown signals with illuminated pedestrian push buttons.
- Restripe the crosswalk using the international style.
- Install crosswalk safety educational signs.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Redesign the operation of the pedestrian-actuated push button controls to best prevent vehicle starvation.
- Install a bus stop shelter for the northbound direction.
- Examine the feasibility of constructing a pedestrian bridge at this location due to high pedestrian volumes.

Roosevelt Boulevard Corridor Study

At Unruh Avenue

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N

0 75 150

Feet

VII. At Longshore Avenue

This intersection is located at the approximate midpoint of the DVRPC study area. It connects Longshore Avenue across Roosevelt Boulevard. Longshore Avenue itself does not cross Roosevelt Boulevard. There is considerable distance to the nearest crosswalk to the south, and a one-block distance, or about 450 feet, to the next northern crosswalk at the Tyson Avenue and Roosevelt Boulevard intersection. The surrounding area is entirely row home neighborhoods. There is a southbound express-to-local crossover beginning at the crosswalk (0251/1498 – 0251/1657). SEPTA Routes 1, 14, 20, and 50 serve the area.

This crosswalk had zero pedestrian/vehicle crashes between 2001 and 2005. However, one crash did occur in the vicinity. The location of the crash suggests that the pedestrian was attempting to cross 48 feet south of the crosswalk on the side of Longshore Avenue that does not have a crosswalk.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) The southbound crosswalk advisory signs are absent; 2) The crosswalk was very lightly used; and 3) The pedestrians all either appeared to be school-aged children or bus passengers.

During the seven hours of assessment, only 74 pedestrians crossed Roosevelt Boulevard at this crosswalk.

Recommended Improvements:

- Due to minimal usage and the proximity to Tyson Avenue, it is recommended that this crosswalk is eliminated.
- Install signs directing pedestrians to use the Tyson Avenue intersection crosswalks.
- Consolidate associate bus stops with nearby intersection bus stops.

Roosevelt Boulevard Corridor Study

At Longshore Avenue

Delaware Valley
Regional Planning Commission
June 2007

N

0 60 120

Feet

VIII. Between Princeton Avenue and Friendship Street

This intersection falls between the Tyson Avenue and Roosevelt Boulevard intersection, 630 feet to the south, and another mid-block crosswalk 355 feet north. There is a Kmart shopping center on the eastern side of the crosswalk and row home residential housing on the western side. There is a southbound local-to-express crossover that begins at the crosswalk (0251/1498 – 0251/1657). The area is served by SEPTA Routes 1, 14, 20, and 50.

Between 2001 and 2005 this crosswalk had no pedestrian/vehicle crashes. Several crashes occurred in the vicinity which are further discussed in the Friendship Street and Saint Vincent Avenue mid-block crosswalk section.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) There is no crosswalk advisory signs at the crosswalk on the southbound side; 2) Motorists may be unable to see pedestrians in the southbound median due to a large pole that supports an overhead sign; 3) The majority of jaywalkers were pedestrians who had alighted a bus; and 4) No school-aged children were observed using the crosswalk.

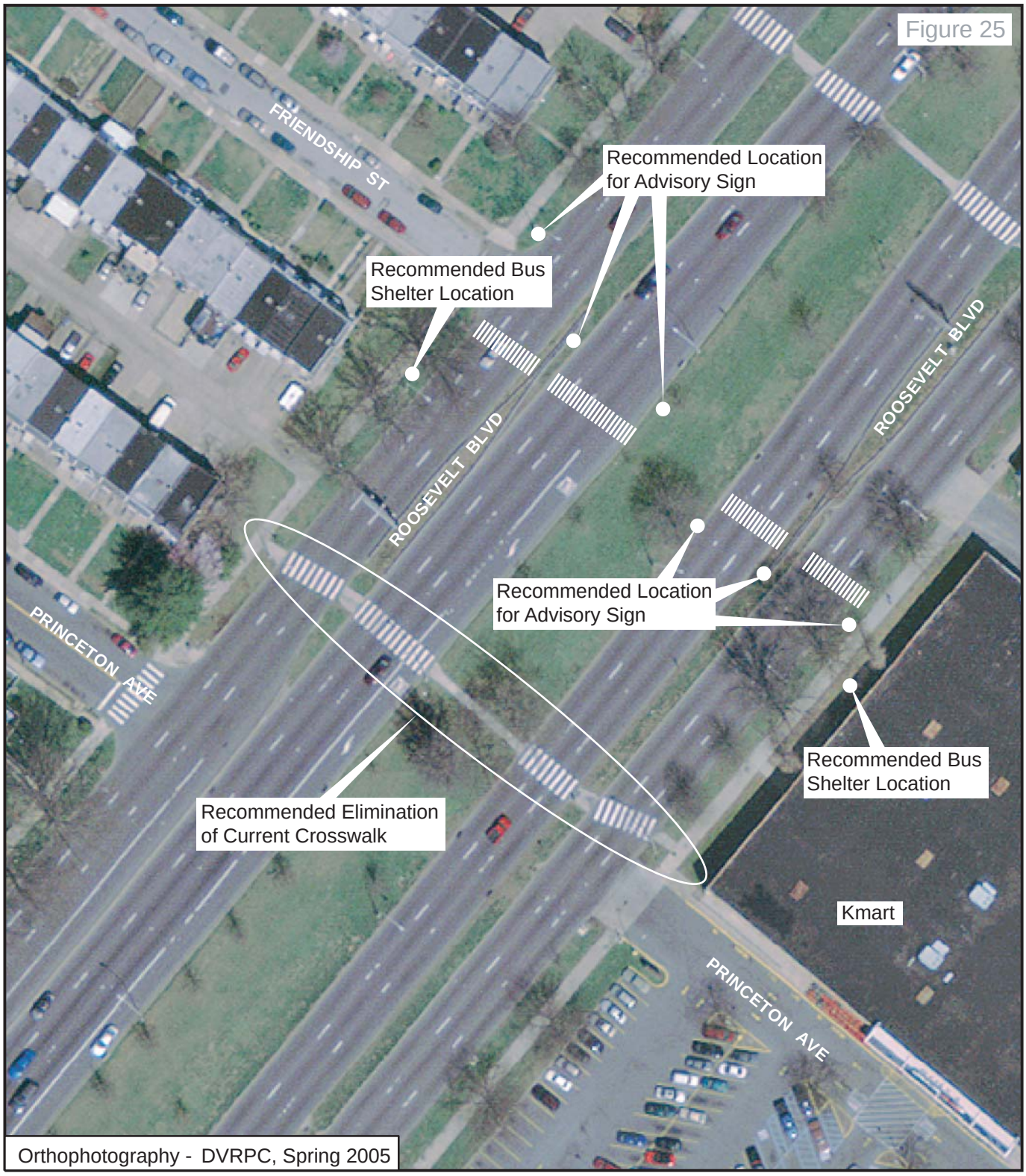
During the seven hours of assessment, 60 pedestrians crossed Roosevelt Boulevard at this crosswalk. There was a fairly even distribution throughout the entire assessment period.

Recommended Improvements:

- Consolidate crosswalk with northern neighbor, between Friendship Street and Saint Vincent Avenue, and create a new signalized crosswalk that extends from the southern side of Friendship Street.
- Install pedestrian countdown signals with illuminated pedestrian push buttons at the new crosswalk.
- Stripe the new crosswalk using the international style.
- Install crosswalk safety educational signs at the new location.
- Retime pedestrian crossing time allowance to accommodate a slower speed of 3.5 feet per second and ensure that the new time enables pedestrians to reach the center median in one signal cycle.
- Ensure crosswalk advisory signs are posted at the crosswalk and at advanced locations.
- Consolidate bus stops in the vicinity to stop at each end of the new crosswalk only.

Roosevelt Boulevard Corridor Study

Between Princeton Avenue and Friendship Street



Delaware Valley
Regional Planning Commission
June 2007

N

0 50 100

Feet

IX. Between Friendship Street and Saint Vincent Avenue

This mid-block crosswalk is very similar to the one located 355 feet to the south between Princeton Avenue and Friendship Street. The eastern end of the crosswalk opens to a shopping center while row home housing and a church dominate the western end. There is a northbound express-to-local crossover beginning at this crosswalk (0260/1043 – 0260/1243). Also north of the intersection is the beginning of the depression of the express lanes for travel under Cottman Avenue. This depression is a safety issue due to southbound traffic returning to grade just prior to the crosswalk, thereby diminishing visibility for both pedestrians and traffic. This portion of Roosevelt Boulevard is served by SEPTA Routes 1, 14, 20, and 50, though the nearest bus stops are 140 feet north of the intersection, again creating a safety issue due to pedestrian traffic crossing at the location of the bus stop as is demonstrated with the third fatality discussed below.

This crosswalk has seen one bicycle/vehicle crash at the crosswalk and numerous pedestrian/vehicle crashes in the vicinity between 2001 and 2005. The bicycle crash occurred in the southbound express lanes and resulted in the death of the cyclist. Between this crosswalk and its southern neighbor, between Princeton Avenue and Friendship Street, three pedestrian/vehicle crashes occurred. One of these crashes resulted in the death of the pedestrian. Additionally, a third fatal crash occurred directly north of the crosswalk in the southbound local lanes.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) There were no school-aged children using the crosswalk; 2) Some pedestrians crossed outside of the marked crosswalk; 3) The associated bus stops are not at the crosswalk; and 4) There are no southbound local warning signs.

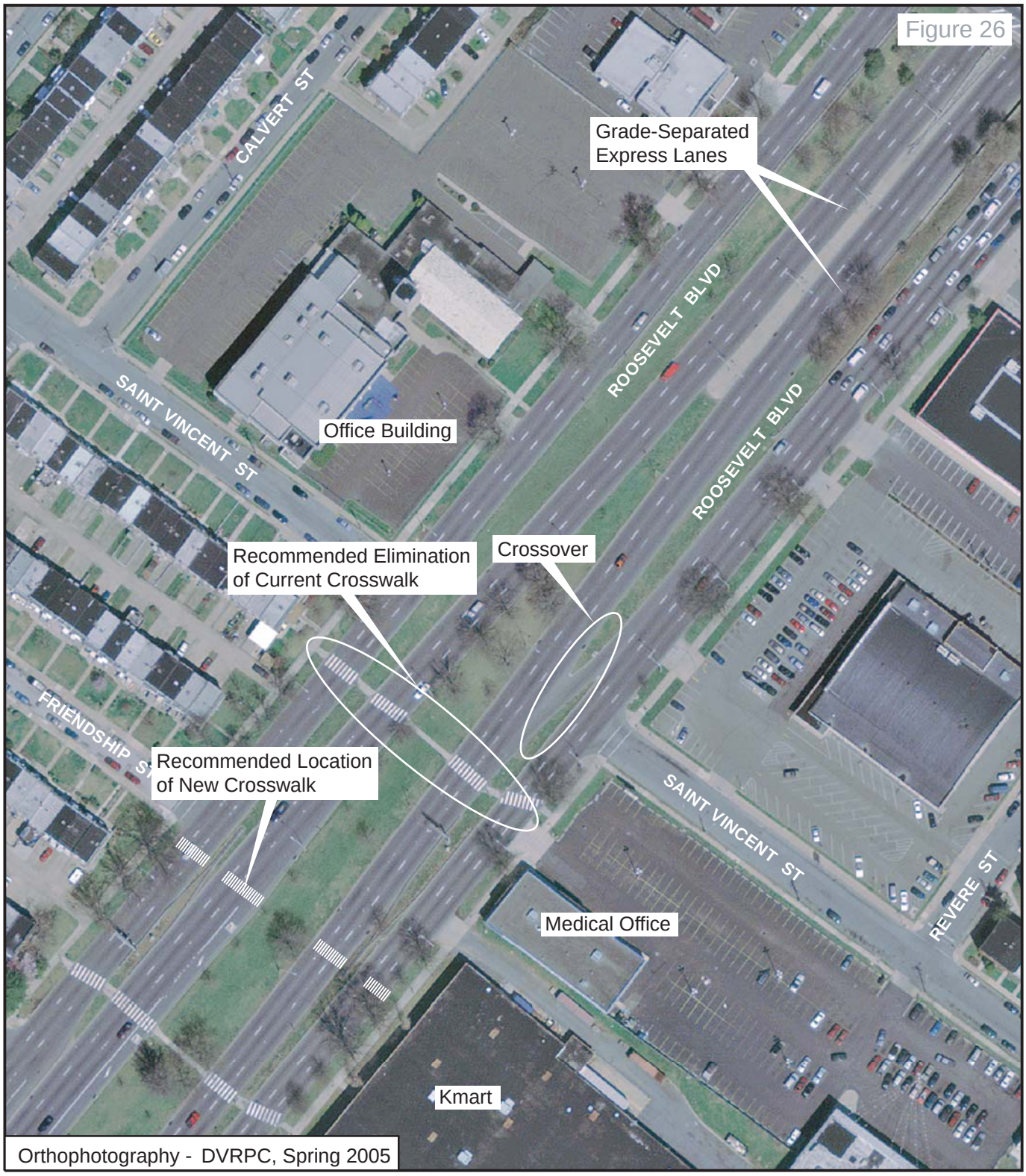
During the assessment 47 pedestrians used this crosswalk. This is an average of seven pedestrians per hour. Though this number may appear to be insignificant, if combined with the nearby mid-block crosswalk, between Princeton Avenue and Friendship Street, the number of pedestrian crossings would be above average for mid-block crosswalks.

Recommended Improvements:

- Remove existing crosswalk and create a new, consolidated crosswalk which extends across Roosevelt Boulevard from the southern side of Friendship Street.
- Follow the recommendations listed for crosswalk VIII.

Roosevelt Boulevard Corridor Study

Between Friendship Street and Saint Vincent Avenue



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June 2007

N

0 90 180

Feet

X. Between Shelmire Avenue and Faunce Street

This crosswalk crosses Roosevelt Boulevard 40 feet south of Faunce Street on the western side, and 170 feet south of Revere Street on the eastern side. The area surrounding the crosswalk is a mix of single-family homes, multifamily homes, and apartments, with the exception of the motel and bar that occupy the land on the crosswalk's eastern end. Very little of the surrounding population walks to work (0-3%) and public transportation use is also very low (0-15%), thereby creating a very auto-dependent portion of the study area. Physical traits include crossovers for each direction of travel beginning at the crosswalk (0271/2097 – 0271/2117 and 0270/2486 – 0270/2528) and a southern curve and down slope, which, particularly for northbound traffic, reduces visibility and contributes to higher automobile speeds. The crosswalk does not end at a street on either end, which does not encourage its use for local pedestrian traffic. SEPTA Routes 1, 14, 20, and 50 serve the area.

No pedestrian/vehicle crashes occurred at this crosswalk between 2001 and 2005. There were two fatal pedestrian/vehicle crashes 175 feet north of the crosswalk. The location of the crashes suggests that the pedestrians were attempting to cross to or from Revere Street.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) No single demographic characteristic stood out among the pedestrians; 2) Many people were seen crossing near Revere Street; 3) High vehicle speeds were witnessed at this crosswalk; and 4) There are no crosswalk advisory signs on the southbound side.

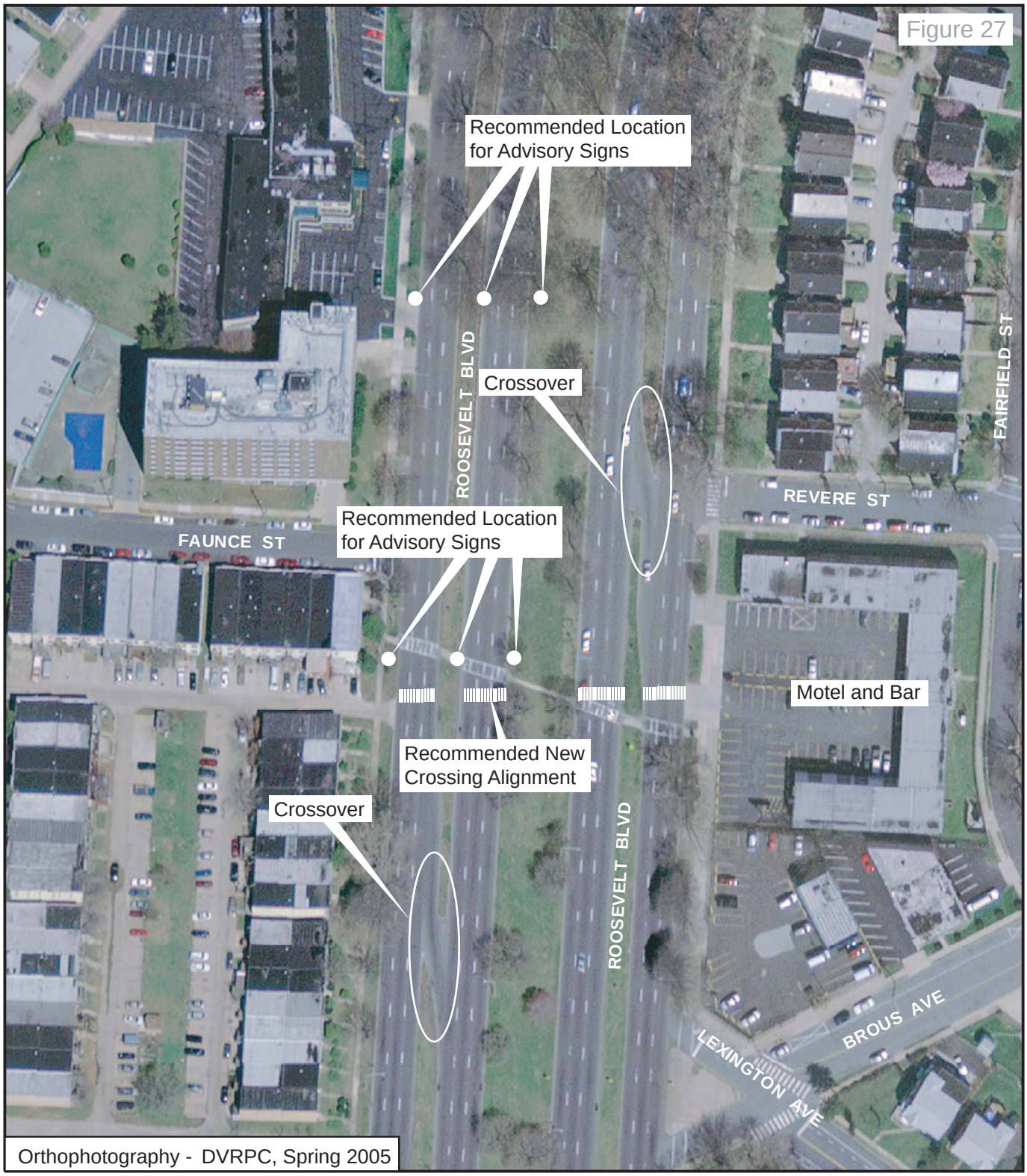
Only 25 pedestrians were seen crossing this crosswalk during the seven hours of assessment. This ranks second in terms of fewest pedestrian crossings. There were periods as long as two hours with no pedestrian activity.

Recommended Improvements:

- Install pedestrian-actuated traffic control signals. Also, install complementary signs that warn pedestrians to only cross with the signal.
- Restripe the crosswalk using the international style.
- Install crosswalk safety educational signs.
- Reconfigure so that the crosswalk crosses Roosevelt Boulevard at 90° with any offset needed occurring in the center median. This will allow pedestrians to view oncoming traffic before and during their crossing.
- Install crosswalk advisory signs for southbound traffic at the crosswalk and at an advanced location.

Roosevelt Boulevard Corridor Study

Between Shelmire Avenue and Faunce Street



Delaware Valley
Regional Planning Commission
June 2007

N

0 80 160

Feet

XI. At Loney Street

The Loney Street mid-block crosswalk is the northern-most mid-block crosswalk within the DVRPC study corridor. It is surrounded by a level of dense housing along Roosevelt Boulevard, which quickly becomes single-family and multifamily housing. There is a catering hall and a fitness center southwest of the crosswalk. The crosswalk is in between the Rhawn Street intersection, 460 feet to the north, and the Borbeck Avenue intersection, 390 feet to the south. There is a crossover for each direction of travel beginning at the crosswalk (0280/681 – 0280/612 and 0281/435 – 0281/544). Unique to this crosswalk is a 200-foot center-median offset. SEPTA Routes 1, 14, 20, and 50 serve the area.

There were no pedestrian/vehicle crashes at this crosswalk, or in the vicinity, between 2001 and 2005.

The crosswalk was assessed by DVRPC personnel on Thursday, May 17, 2007. During the assessment the following observations were noted: 1) There is adequate signage present; and 2) There is not a pedestrian crossing signal.

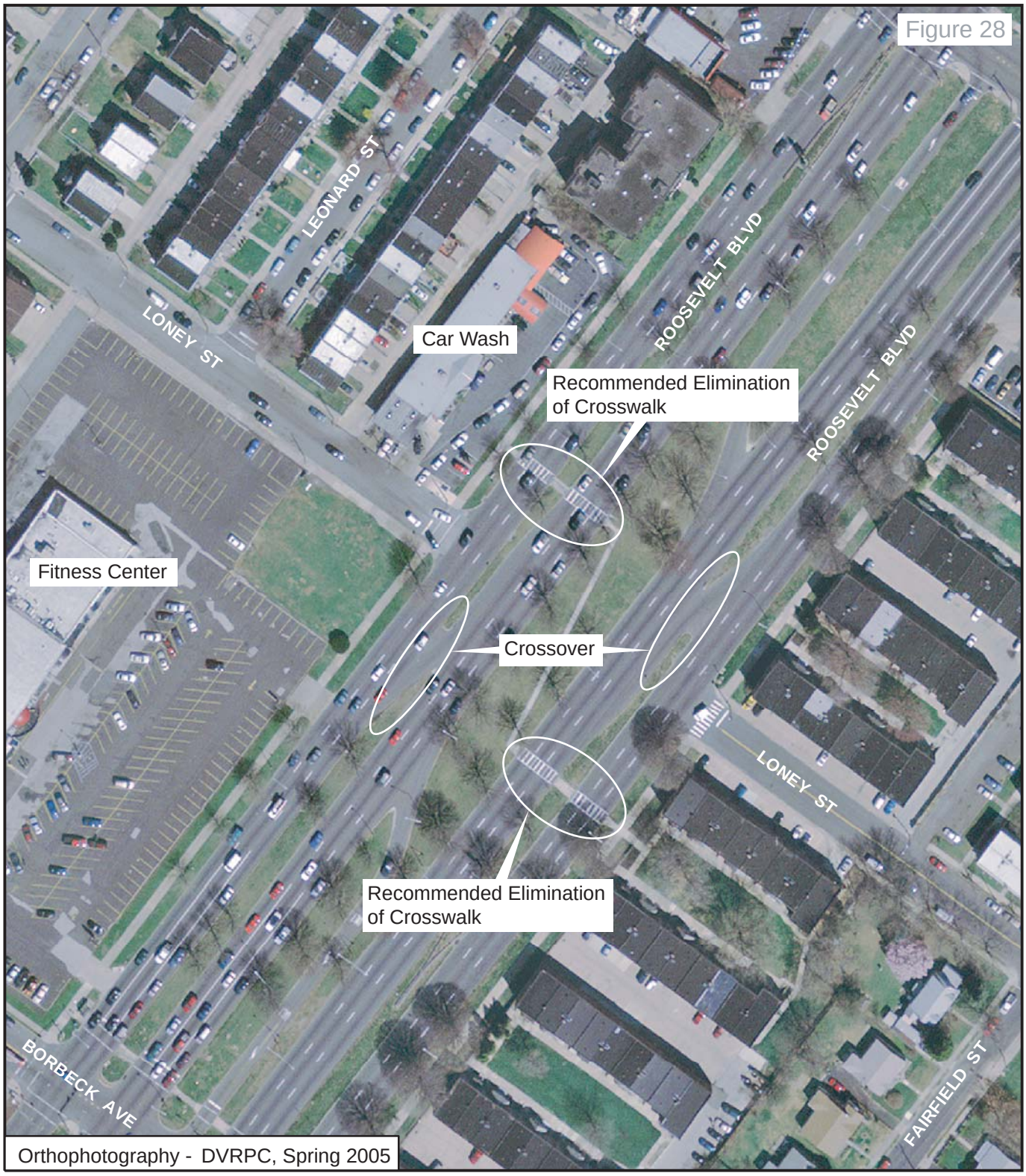
This crosswalk had the fewest pedestrian crossings of any DVRPC study area crosswalk. Only 20 pedestrians used the crosswalk during the seven hours of assessment. Of this total, few used the full length of the crosswalk.

Recommended Improvements:

- Due to low utilization rates and the presence of two nearby crosswalks, this crosswalk is recommended to be eliminated.
- Consolidate associated bus stops with nearby intersection bus stops.

Roosevelt Boulevard Corridor Study

At Loney Street



Delaware Valley
Regional Planning Commission
June 2007

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0 80 160

Feet

7.0 LONG-TERM MOBILITY IMPROVEMENT

7.1 Lane Crossover Redesign

Introduction

Along Roosevelt Boulevard, crossovers are in place to permit traffic to move from the inner roadway to the outer, and vice versa.

There are two types of crossovers: local-to-express and express-to-local. The two types of crossovers have been grouped together at some major intersections. This configuration accommodates all potential movements. Local traffic can move to the express lanes to turn left and express traffic can move to the local lanes to turn right.

DVRPC has studied the Roosevelt Boulevard crossovers in order to identify opportunities for the improvement or elimination of deficient crossovers.

Methodology

There are 37 crossovers on Roosevelt Boulevard between Ninth Street and Grant Avenue. There are 16 crossovers in the northbound direction, approximately one per one-half mile, and 21 crossovers in the southbound direction, approximately one per four-tenths mile. Each of the crossovers is a unique entity. No single factor or set of criteria can be applied across the full spectrum of crossovers. Each crossover has been studied individually, with the exception of their functional relationships, and therefore decision rationale will be discussed for each crossover that DVRPC recommends to change or eliminate.

Crossovers

In order to easily identify the individual crossovers, DVRPC has provided a designation based on its order in the direction of traffic flow (see **Maps: 5, 6, 7, 8, and 9**). There are two general types of crossovers: express-to-local, and local-to-express. Additionally, all crossovers have been constructed in different lengths and at different distances from each other. The following are two tables **(Tables 7 and 8)** of crossover data and include; DVRPC designations, locations, functional types, lengths, and approximate distances from the next of the same type:

Table 7 – Southbound Crossovers

Southbound				
DVPRC Designation	**Nearest Street**	**Type**	**Length (feet)**	**Distance to next (feet)***
SB 1	Michener	local-to-express	235	4,000
SB 2	Goodnaw	express-to-local	122	3,500
SB 3	Winchester	express-to-local	180	4,800
SB 4	Rahle	local-to-express	226	5,800
SB 5	Loney	express-to-local	213	3,300
SB 6	Shelmire	local-to-express	197	3,600
SB 7	Sandyford	express-to-local	314	3,300
SB 8	Princeton	local-to-express	287	3,200
SB 9	Longshore	express-to-local	281	5,400
SB 10	Hellerman	local-to-express	251	6,400
SB 11	Benner	express-to-local	269	3,600
SB 12	Bridge	local-to-express	255	5,800
SB 13	Pratt	express-to-local	246	2,800
SB 13B	Langdon	express-to-local	244	3,600
SB 14	Garland	local-to-express	245	3,100
SB 15	Bingham	express-to-local	292	1,700
SB 16	C	local-to-express	250	1,500
SB 17	Rising Sun	express-to-local	237	2,300
SB 18	Front	local-to-express	234	N/A
SB 19	Rockland	express-to-local	241	2,500
SB 20	Eighth	express-to-local	216	N/A

*Distance to next of the same type

Source: DVRPC, 2007

Table 8 – Northbound Crossovers

Northbound				
DVPRC Designation	**Nearest Street**	**Type**	**Length (feet)**	**Distance to next (feet)***
NB 1	Second	local-to-express	256	4,200
NB 2	Front	express-to-local	269	3,600
NB 3	Rorer	local-to-express	178	7,000
NB 4	Front	express-to-local	230	7,000
NB 5	Kenwyn	local-to-express	232	6,700
NB 6	Bridge	express-to-local	226	3,400
NB 7	Benner	express-to-local	405	2,900
NB 8	Levick	local-to-express	260	8,800
NB 9	Harbison	express-to-local	246	3,700
NB 10	Saint Vincent	express-to-local	184	5,100
NB 11	Revere	local-to-express	223	7,600
NB 12	Loney	express-to-local	123	4,900
NB 13	Winchester	express-to-local	236	3,200
NB 14	Woodward	local-to-express	252	4,000
NB 15	Welsh	express-to-local	230	N/A
NB 16	Grant	local-to-express	233	N/A

*Distance to next of the same type

Source: DVRPC, 2007

Roosevelt Boulevard Corridor Study - Crossover Locations (Panel 1)

Map 5

Orthophotography - DVRPC, Spring 2005

0 250 500
Feet

Express to Local Crossover
Local to Express Crossover

SB 19 Crossover ID

L Crossover Lengthening Recommended
X Crossover Elimination Recommended

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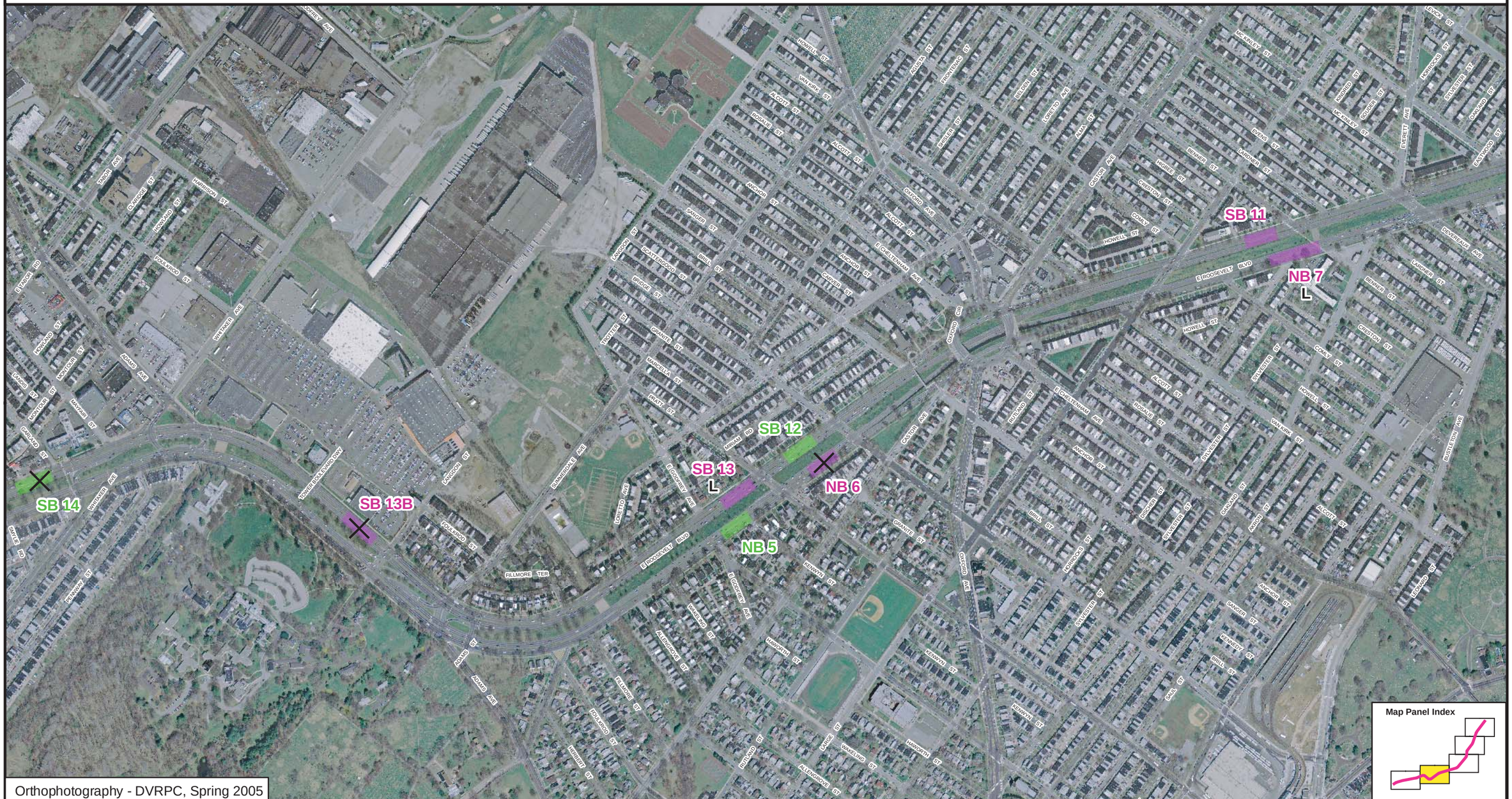
Roosevelt Boulevard Corridor Study - Crossover Locations (Panel 2)

Map 6



Orthophotography - DVRPC, Spring 2005

0 250 500
Feet

Express to Local Crossover

Local to Express Crossover

SB 19 Crossover ID

L Crossover Lengthening Recommended

X Crossover Elimination Recommended

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Roosevelt Boulevard Corridor Study - Crossover Locations (Panel 3)

Map 7

0 250 500
Feet

Express to Local Crossover

Local to Express Crossover

SB 19 Crossover ID

L Crossover Lengthening Recommended

X Crossover Elimination Recommended

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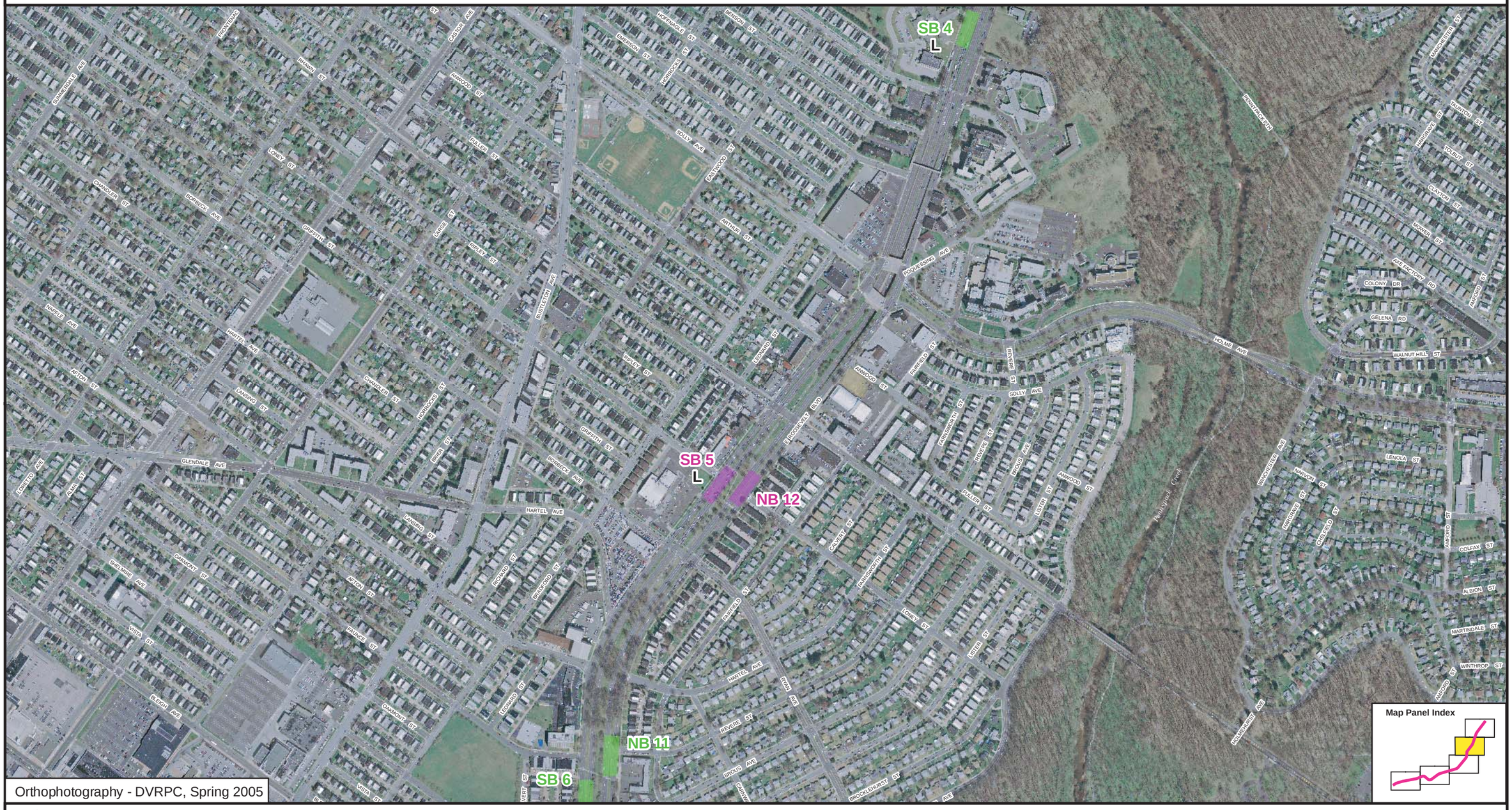
Roosevelt Boulevard Corridor Study - Crossover Locations (Panel 4)

Map 8



0 250 500
Feet

Express to Local Crossover
Local to Express Crossover

SB 19 Crossover ID

L Crossover Lengthening Recommended
X Crossover Elimination Recommended

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Roosevelt Boulevard Corridor Study - Crossover Locations (Panel 5)

Map 9

0 250 500
Feet

Express to Local Crossover

Local to Express Crossover

SB 19 Crossover ID

L Crossover Lengthening Recommended

X Crossover Elimination Recommended

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Existing Conditions

Approximately one-half the crossovers have signage at the crossover to mark the location, but the signs are small. There is no advanced advisory signage upstream of the crossovers. In most instances, there are also no signs that identify a connection between crossovers and major streets or destinations downstream to which they provide access.

Most crossovers are between 200 feet and 250 feet in length. The shortest is 123 feet and the longest is 405 feet. Most of the crossovers have one or more functional defects, including the following:

1. Lack of acceleration lane. This creates a speed differential with traffic on the roadway.
2. Lack of storage capacity. This causes traffic to backup onto the roadway
3. Lack of deceleration lane/taper. This causes exiting traffic to slow on the roadway ahead of the crossover, impeding through traffic.

In general, there are two types of entry points onto Roosevelt Boulevard from adjacent residential neighborhoods and businesses. Major entry points at complete intersections provide access to express and local lanes. Minor entry points, for example, retail driveways, provide access to local lanes only. Traffic that enters at minor entry points must use a crossover to enter the express lanes.

Improvement Strategy

To reduce impedance and vehicle conflicts associated with Roosevelt Boulevard crossovers, the following strategies are recommended:

- Construct longer, safer crossovers where conditions permit.
- Provide one-mile spacing between crossovers where possible, per PennDOT Design Manual: *Urban Highway Interchange Standards*.
- Direct traffic from adjacent neighborhoods to major entry points (cross streets that offer access to local and express lanes). Rely more on the local street network to reach express lanes, and rely less on crossovers.

To implement these strategies, the following design concepts have been used in the analysis of Roosevelt Boulevard crossovers:

1. Lengthen crossovers only where it is possible to create a significant increase in length. “Significant” is defined as 500 feet being available (including the existing crossover) for construction. It is assumed that this length would allow an upgrade in functionality. The top priority should be increasing the length of acceleration lanes.
2. Eliminate crossovers that would become redundant after construction of improved crossovers.

3. Eliminate crossovers that are closer than one-quarter mile to another crossover. If adjacent crossovers are different types, crossing traffic creates vehicle conflicts.
4. Maintain existing crossovers where there is an overriding reason to do so, such as access to a hospital.
5. Add/improve signage that marks crossover locations.
6. Improve signage upstream of crossovers. The signage should identify connections between crossovers and major streets or destinations downstream to which they provide access.

Summary of Recommendations

Table 9 – Summary of Crossover Recommendations

Southbound	Best opportunity	Lengthen deceleration lane	Lengthen acceleration lane	Eliminate	Move	Install signs
SB 2			•			•
SB 3				•		
SB 4	•	•				
SB 5	•	•	•			•
SB 7				•		
SB 9				•		
SB 10				•		
SB 12						•
SB 13	•		•			•
SB 13B				•		
SB 14				•		
SB 16	•		•			
SB 17				•		
SB 18				•		
SB 19		•	•			

Northbound	Best opportunity	Lengthen deceleration lane	Lengthen acceleration lane	Eliminate	Move	Install signs
NB 1	•	•	•			•
NB 3				•		
NB 4		•	•		•	•
NB 6				•		
NB 7	•	•				•
NB 8	•	•	•			
NB 9				•		
NB 12						•
NB 13				•		

Source: DVRPC, 2007

Crossovers Recommended to Remain "As Is"

The following crossovers have been determined by DVRPC to be, at a minimum, satisfactorily serving their intended purpose:

- Southbound - SB 1, SB 6, SB 8, SB 11, SB 12, SB 15, and SB 20
- Northbound – NB 2, NB 5, NB 10, NB 11, NB 12, NB 14, NB 15, and NB 16

Exception: SB 12 and NB 12 are recommended to have advanced signs installed upstream of their locations.

Crossovers Considered "Best Opportunities"

Crossovers in this category have significant room for expansion and a functional deficiency. Following is a list of crossovers considered to be the "Best Opportunities" for improvement along with the associated rationale:

- SB 4 – This crossover is located at the end of a long stretch of unimpeded roadway as Roosevelt Boulevard crosses Pennypack Park. It provides express lane access from the local lanes, which enables drivers to benefit from the grade separation at the Solly Avenue/Holme Avenue underpass. This is the final opportunity for drivers who wish to turn left onto Rhawn Avenue or Ryan Avenue to enter the express lanes. There are no scenarios in which this crossover must be used. All traffic to this point could use the like crossover south of Grant Avenue, or enter Roosevelt Boulevard at a signalized intersection. However, due to the relatively short length of the crossover (226 feet), and associated unimpeded traffic flow prior to the crossover, it is recommended that the deceleration lane be lengthened to allow traffic to reduce speed within the confines of the crossover. This will allow for safer crossovers. There is ample room for easy expansion of the deceleration lane at this location.
- SB 5 – This crossover is located in a highly residential portion of Roosevelt Boulevard. DVRPC recommends lengthening this crossover for two reasons: first, the like crossovers before and after are recommended to be eliminated, which will increase demand, and second, the site is favorable for lengthening both the acceleration and deceleration lane. There is a mid-block crosswalk that would interfere with lengthening; however, the crosswalk is recommended to be eliminated. Since SB 7, the next like crossover to the south, is recommended to be eliminated, this crossover would gain all of the demand of drivers who previously used SB 7 to access Cottman Avenue and Roosevelt Mall. Additionally, a sign that dictates "Cottman Ave and Roosevelt Mall Crossover" should be installed prior to SB 5.
- SB 13 – This crossover is located at the beginning of a long block, which enables the easy expansion of its acceleration lane. It is followed by SB 13B, which is recommended to be eliminated. The traffic that previously used SB 13B to access the Northeast Tower Center and Wal-Mart will now be using SB 13. This increased demand and the crossover's suitable location are the decisive factors leading to the recommendation for the lengthening of the acceleration lane. Additionally, a sign should be placed prior to this crossover that directs Northeast Tower Center and Wal-Mart traffic to use this crossover.
- SB 16 – This crossover will see increased demand due to the elimination of the before and after same-type crossovers. The crossover with which this one shares a block, SB 17, is also recommended to be eliminated. SB 16 provides express lane access, enabling left turns onto Rising Sun Avenue, North Front

Street, Third Street, and Ninth Street. In addition, it allows for the avoidance of traffic controls at the Fifth Street overpass. If SB 18 is eliminated, SB 16 would be the final southbound crossover of its type, with the exception of the last-chance crossover located 6,900 feet south where Roosevelt becomes an expressway,. The block that the crossover is situated on is long and straight, thereby providing the opportunity for easily lengthening the acceleration lane.

- NB 1 – This is the first northbound local-to-express crossover within the study area. There is another like crossover south of Ninth Street. The next like crossover (NB 3) provides for left turns into the Northeast Tower Center and Wal-Mart, and is recommended to be eliminated. With that elimination, it is expected that this crossover will experience increased demand. The location of the crossover provides ample space for the lengthening of both the acceleration and deceleration lanes. A sign that informs drivers to use the crossover for Northeast Tower Center, Wal-Mart, and Oxford Avenue should be installed prior to the crossover.
- NB 7 – This crossover is located north of Oxford Circle. The residential areas west of Roosevelt Boulevard have the opportunity to choose express or local lanes at intersection access points other than Oxford Circle. The elimination of NB 9, located south of Harbison Avenue, will increase the crossover demand at this location. There is a mid-block crosswalk at the north end of this crossover. The median prior to the crossover is suitable for the lengthening of the deceleration lane. A sign should be installed prior to this crossover that directs drivers to use this crossover for right-turn access onto Harbison Avenue and Tyson Avenue.
- NB 8 – This is the only crossover of its type for considerable distance in both directions. It allows for left turns onto Harbison Avenue and Tyson Avenue, as well as the avoidance of the signalized intersection at Cottman Avenue. The crossover with which this one shares a block, NB 9, is recommended to be eliminated. The extensive space for easy expansion is the primary decisive factor leading to the lengthening recommendation. It is recommended that both the acceleration and decelerations are lengthened.

<u>Crossovers Recommended to be Eliminated</u>

Following is a list of crossovers, including decision rationale, recommended to be eliminated:

- SB 3 – This crossover is a redundancy of SB 2. It is located along an unimpeded portion of the roadway across Pennypack Park and does not have the physical space for expansion. There are no scenarios in which this crossover must be used: southbound traffic can use the preceding crossover or enter the roadway in the local lanes at any signalized intersection. If eliminated, a sign would need to be installed prior to SB 2 that directs drivers to use that crossover for access to Oxford Avenue.
- SB 7 – Despite this crossover potentially being the best engineered crossover on Roosevelt Boulevard, it is unsafe. The approaching roadway is unimpeded and

curving. Additionally, Bleigh Avenue enters the local lanes at the crossover. There is a dedicated local lane for those using this crossover; however, it is also the turning lane for left turns onto Cottman Avenue. Southbound local lane traffic merges into this lane for left turns and the crossover traffic crosses three traffic lanes to make right turns onto Cottman Avenue. The distance between this crossover and Cottman Avenue is not sufficient to handle all of the lane changes safely. Due to the unimpeded traffic and extensive lane changing in the vicinity, the elimination of the third obstacle - this crossover - would greatly enhance safety. A sign should be installed at SB 5 directing traffic to use SB 5 for Cottman Avenue and Roosevelt Mall.

- SB 9 – This crossover is located on a heavily-traveled portion of Roosevelt Boulevard: between Harbison Avenue and Cottman Avenue. A mid-block crosswalk is present at the beginning of the crossover. The primary factor leading to this recommendation is that there are no significant traffic-drawing locations on the western side of Roosevelt Boulevard between this crossover and SB 11. Therefore, SB 9 is a redundancy of SB 11.
- SB 10 – This crossover is a redundancy of SB 8. Traffic entering the roadway in between SB 8 and this crossover has the opportunity to choose local or express when they enter Roosevelt Boulevard at a signalized intersection. It is recommended to be eliminated due to its redundant nature.
- SB 13B – This crossover is a redundancy of SB 13. Its location entices drivers to use the crossover and cross three lanes of traffic in a short distance to enter the Northeast Tower Center and Wal-Mart. The traffic can more safely cross over at SB 13.
- SB 14 – This crossover is a redundancy of SB 16. There is very little traffic entering the roadway between the before and after like crossovers, with the exception of the Northeast Tower Center and Wal-Mart traffic. Motorist who had previously used this crossover to execute left turns onto F Street and C Street will now need to use SB 12. This scenario can be compensated for by installing an advisory sign prior to SB 12.
- SB 17 – This crossover is a redundancy of SB 15 and SB 19. Also, it is located on the same block as SB 16, which creates unnecessary traffic conflicts.
- SB 18 – This crossover is located on a short block and is a redundancy of SB 16. Within the study corridor, this is the final attempt to cross over into the express lanes. However, an additional opportunity is present one mile south, at the location where Roosevelt becomes an expressway.
- NB 3 – This crossover is a redundancy of NB 1 and NB 5. It is located on an unimpeded portion of roadway, contributing to high speeds and an unsafe crossover. The elimination will not hamper access to any locations. Local traffic can enter express or local lanes at signalized intersections, and through traffic has the opportunity to enter the express lanes at NB 1. The site of this crossover is not conducive to lengthening.

- NB 6 – This crossover is on a short block, which prevents significant lengthening. No traffic entering the roadway between NB 4 and NB 6 is without the opportunity to enter the local lanes. A sign that directs Oxford Avenue traffic to use the NB 4 should be installed prior to NB 4.
- NB 9 – The primary function of this crossover is to allow for right turns onto Harbison Avenue. However, the crossover is located too close to Harbison Avenue to allow for the crossing of three traffic lanes safely in order to execute the right turn. Eastbound Harbison Avenue traffic is better served by using NB 7. Additionally, there is a conflicting crossover located on the same block. A sign should be installed prior to NB 7 that directs motorists to use NB 7 for eastbound Harbison Avenue access.
- NB 13 – This crossover is a redundancy of NB 15. It is located at the end of a long stretch of unimpeded roadway. Also, it is located a short distance prior to a conflicting crossover. The primary access lost through this elimination is right turns onto Welsh Road. This can be compensated for by installing a sign prior to NB 12 directing traffic wishing to turn east onto Welsh Road to use NB 12.

Crossovers Recommended for Lengthening

Though all "Best Opportunity" crossovers were recommended for lengthening, this section contains a second tier of crossovers that can be lengthened. Following is a list of those along with the associated rationale:

- SB 2 – This crossover is currently the shortest crossover on Roosevelt Boulevard. The site of this crossover is suitable for acceleration lane lengthening. A sign should be installed prior to SB 2 that directs drivers to use this crossover for access to Oxford Avenue.
- SB 19 – This crossover will see increased demand due to the elimination of others. Its site is suitable for the lengthening of both the acceleration and deceleration lanes.
- NB 4 – This crossover is located at the end of a long stretch of unimpeded roadway. The crossover length is 230 feet, but the site is not suitable for lengthening. It will see increased demand due to the elimination of SB 2, so it is recommended that the crossover is moved to the block framed by C Street and Rorer Street. The new location provides ample room for lengthening as well as potentially slower speeds due to the nearby signalized intersection and signalized mid-block crosswalk.

7.2 Boulevard Lane Reduction and Consolidation

Introduction

At the request of the city of Philadelphia's Streets Department, DVRPC analyzed Roosevelt Boulevard reconfigured from twelve to ten lanes to determine its potential impact on mobility and safety. This design would consolidate the existing inner and

outer (express and local) lanes into one roadway. This consolidation would take place in both the north and southbound directions of the Boulevard, which would still be separated by the central median. This would simplify vehicle operations for travel along, as well as at cross streets on Roosevelt Boulevard. Parallel to this effort is an interest in reducing excessive speeding, as well as encouraging multimodal travel along the corridor. The resulting roadway would be ten lanes, directionally split by a landscaped central median, but without any further separation. The remaining cartway width would be reconfigured to accommodate bus/transit and bicyclists. **Figure 29** is a graphic representation of this reconfigured roadway. These are stylized cross sections that illustrate the concept of accommodating all users – cars, buses, bicycles, and pedestrians. While this design may not be applicable at all areas of the Boulevard, it contains elements that should be considered in any redesign.

A direct benefit of the consolidation would be an immediate reduction in the number of vehicular conflict points, such as those posed by crossovers. This reduction is a result of the elimination of the outer medians, which create a redundancy in vehicular conflict points due to the division of both the northbound and the southbound roadways. **Figures 30** and **31** illustrate the difference between the existing number of conflict points and the proposed number of conflict points, respectively. Though the diagrams exhibit only one lane of travel in either direction, the positive implication of a lane reduction is strengthened by the growing number of conflict points introduced with each additional lane. Furthermore, lane consolidation would also improve pedestrian safety by reducing the distance pedestrians would be exposed to traffic in the crosswalk.

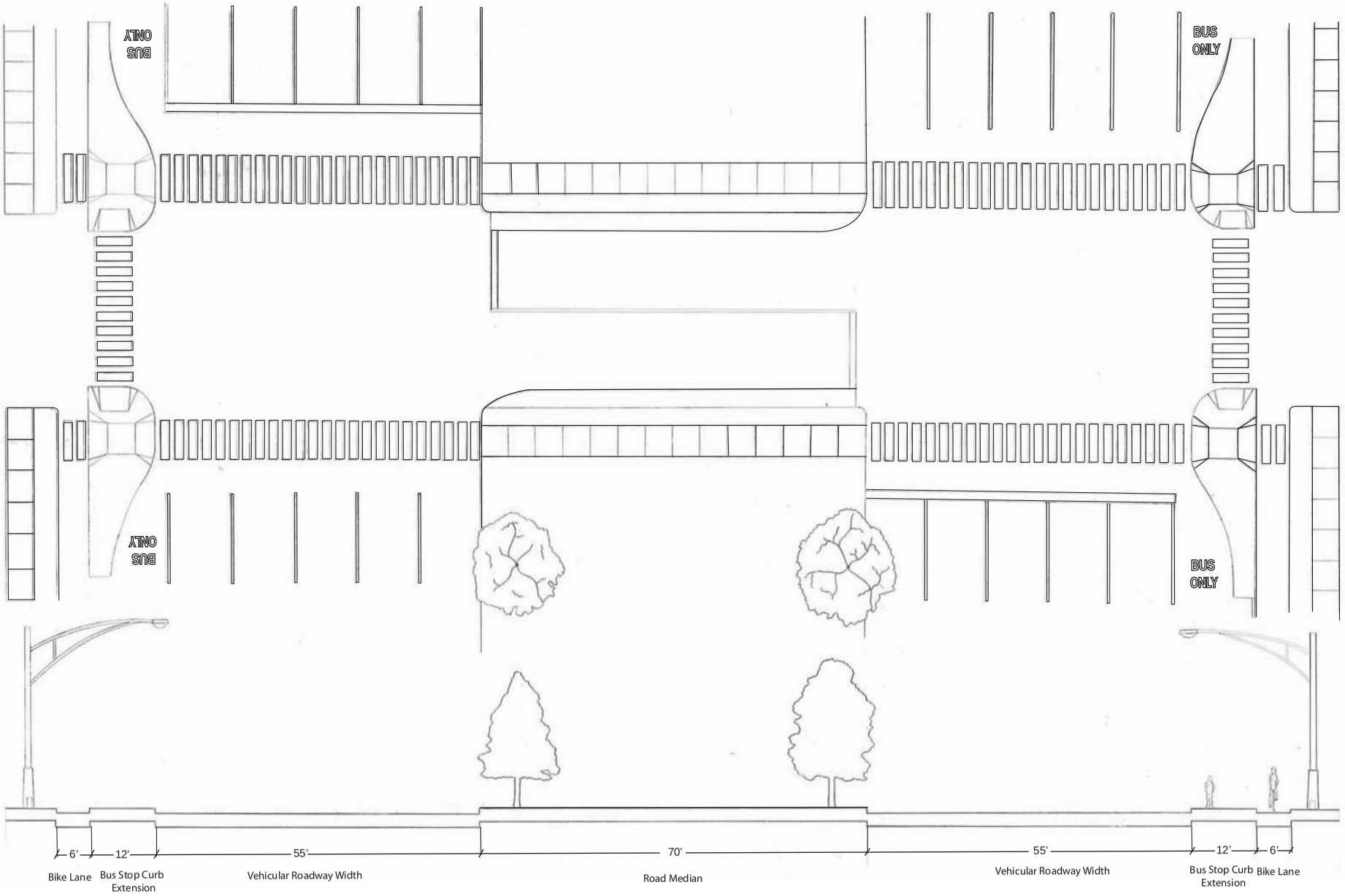
Lastly, DVRPC sought to quantitatively evaluate the impacts of such a roadway design upon vehicular service.

Background

Gannett Fleming has been contracted by PennDOT to create a coordinated signal plan along the entire length of Roosevelt Boulevard. The project is currently progressing in segments. Thus, in order to perform the necessary timing and delay equations, turning movement counts were taken at each signalized intersection along the southern one-third of the corridor. These counts were taken during three time periods throughout the day: morning, midday, and, evening. With these counts, as well as the pertinent signal timing information, a SYNCHRO network utilizing the respective volumes, signal timing, roadway geometrics, and geographic layout was created for each time period. These SYNCHRO files provided the data necessary to evaluate Roosevelt Boulevard as a consolidated ten-lane roadway.

Roosevelt Boulevard Corridor Study - Five-Lane Cross Section Concept

Figure 29



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Roosevelt Boulevard Corridor Study - Existing Roadway Configuration Conflict Points

Figure 30

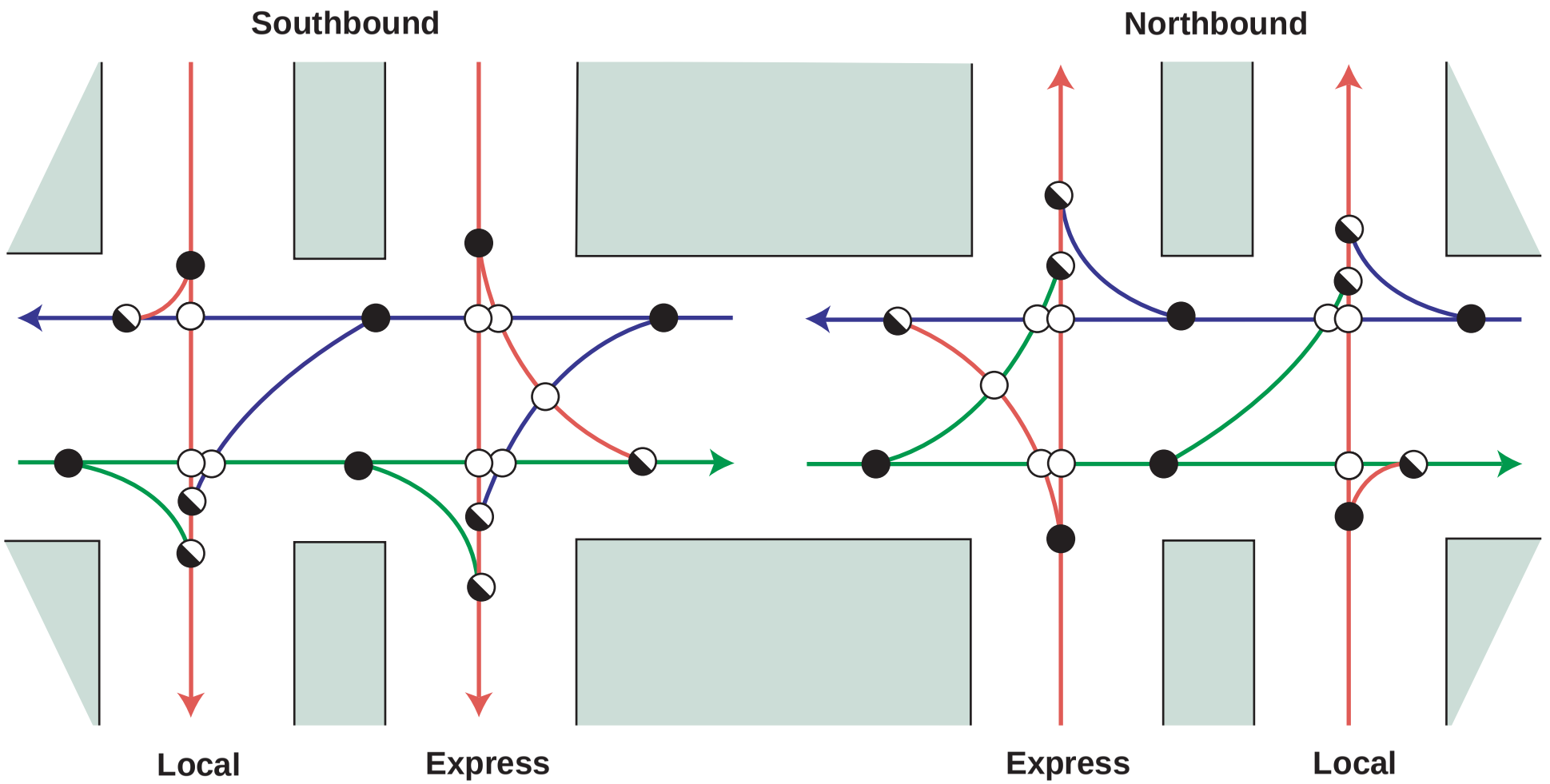

Diagram not to scale

● Diverging ◒ Merging ○ Crossing

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Roosevelt Boulevard Corridor Study - Proposed Roadway Configuration Conflict Points

Figure 31

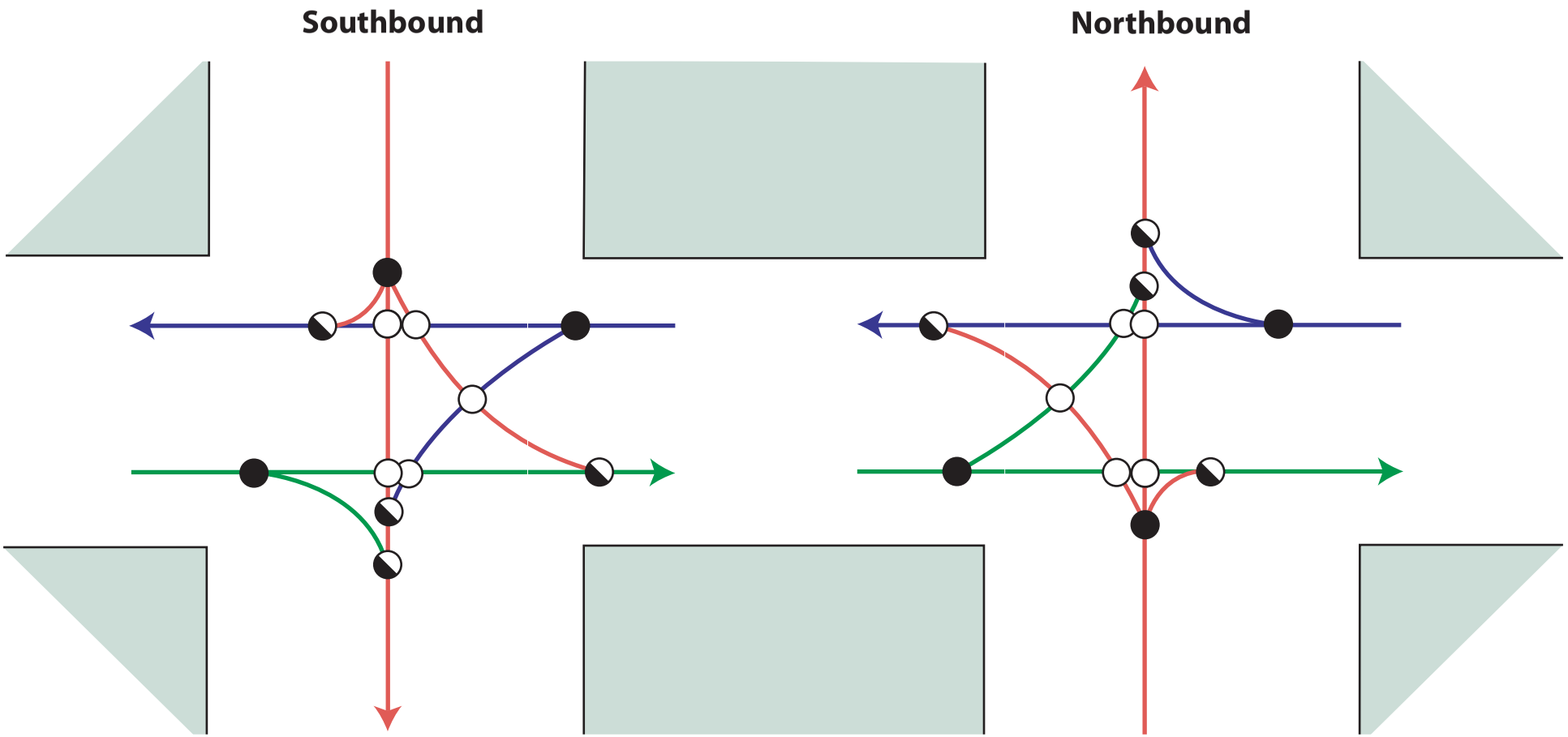

Diagram not to scale

● Diverging ◒ Merging ○ Crossing

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Methodology

The Gannett Fleming Synchro files were designed as the roadway exists today: three local and three express lanes separated by a local median in both directions. The resulting ten-lane SYNCHRO files simply removed the outer local three-lane roadway in each direction. Two travel lanes were then added to the remaining three-lane express roadway. But before doing so, the turning-movement volumes were tabulated for every potential movement at each intersection, for each of the three time periods. The summation of these movements would provide the volumes that would use the consolidated roadway, as well as the total volume of turning vehicles at each signalized intersection. As a result, the new SYNCHRO files carry the exact equivalent number of vehicles per turning movement, per direction of travel, per intersection, and per time period.

Furthermore, only intersections that were considered to have typical cross sections were analyzed for comparison. Specific details that excluded an intersection include exclusive left turn lanes, grade separation, and closely spaced intersections.

Interpretation of Results

Utilizing data extracted from the Gannett Fleming SYNCHRO files, delay and Level of Service (LOS) measures were calculated and consequently tabulated for each local and express roadway, per direction of travel, intersection, and time of day. These delay and LOS measures would serve as the baseline, or “before,” scenario in order to offer future comparison. The alternative, or “future,” scenario calculated and tabulated the same data, except that it no longer needed to account for separate local and express lanes. Thus, delay and LOS measures were exclusively ascertained per direction of travel, intersection, and time of day. However, these measures only reflect the effects of the lane reduction and consolidation, since the signal timing was neither revised nor optimized to reflect the new roadway geometry.

The differences in delay and LOS between the “before” and “future” scenarios are color coded per time period and per intersection in **Appendix V**. A positive valued “% reduction” implies a beneficial impact upon delay and LOS, while a negative value signifies a detrimental impact.

Interesting implications of the analysis include the performance of consolidated Roosevelt Boulevard approaches, whereas they currently carry imbalanced volumes between local and express lanes. A consolidated roadway would lead to an equalization of volume on all lanes.

Of the 11 intersections analyzed between Ninth Street and Langdon Street, almost all exhibit a negative percent reduction for the relevant peak direction per peak period, i.e.

southbound during the AM peak hour and northbound during the PM peak hour. Specifically, for these peak directions there is an average delay increase of 33 and 56 seconds per intersection for the AM and PM peak hours, respectively. However, it is possible that a combination of signal timing optimization and coordination may appreciably reduce these delay increases. Such signal timing measures may also minimize or possibly eliminate the minor delay increases exhibited by the non-peak direction intersections, of which roughly half actually experience a benefit in service already. And as for the mid-day peak, the proposed roadway geometry benefits the majority of intersections, for either direction.

With regards to specific intersections along Roosevelt Boulevard, the lane reduction and consolidation would most positively impact the intersections at 3rd/4th Street, Front Street, and Rising Sun Avenue; whereas, F Street, Whitaker North Avenue, and Langdon Street would experience the most detrimental effects. The remaining intersections exhibit a mixture of delay increases and reductions.

8.0 IMPLEMENTATION PLAN

The *Improvements Implementation Matrix* can be used as a dynamic long-range tool for the systematic selection of projects to create a significantly improved transportation system within the study area. This document can serve as a punch list for the government agencies with a stake in the implementation of improvements.

Characteristics

In choosing which projects should advance first, stakeholders can be guided by the information presented in **Table 10** below. Each improvement scenario identified is evaluated in terms of project priority, cost range, and project benefits.

Priority

Priorities are estimated in terms of three categories: high, moderate and low. Priorities are assigned based on the perception of the extent of the problems they present drivers, with safety being most important, but congestion (or time delay) and mobility also being considered.

Cost Range

Costs are also assigned to categories of high, moderate, and low. High-cost projects usually involve a major commitment from one or more funding sources, lengthy public involvement, and several years lead time in programming the required funds. They are typically large-scale, complex, or multiphased improvements and can entail the construction of new facilities. In general, a project in this category is estimated to cost between $5 and $35 million; however, some major projects have been known to cost in the hundreds of millions of dollars. An improvement estimated to have a moderate cost could involve a major reconstruction of an intersection, construction of a short connector road, or a widening of an existing road. In general, a project in this category is estimated to cost between $2 and $5 million. Low-cost projects can often be fast tracked with maintenance or pool funding. They are often operational type improvements at isolated locations and typically cost less than $2 million. These cost ranges are generalized estimates and could be significantly changed for a specific location due to environmental, right-of-way, or other factors uncovered during detailed design of the improvement.

Benefits

Benefits describe the kind of impact the improvement will yield, such as enhancing safety, lessening congestion, or improving mobility.

Table 10 - Improvements Implementation Matrix

INTERSECTION CROSSWALKS

Improvement	Priority	Cost Range	Benefits
Install Pedestrian Countdown Signals	H	L	Safety
Locations: 9th St, 5th St, N Front St, Rising Sun Ave, C St, F St, Bridge St, Harbison Ave, Tyson St, Cottman Ave, Rhawn St, Welsh St, Grant Ave			
Restripe Crosswalks	H	L	Safety
Locations: 9th St, 5th St, N Front St, Rising Sun Ave, C St, F St, Bridge St, Harbison Ave, Tyson St, Cottman Ave, Rhawn St, Welsh St, Grant Ave			
Install Crosswalk Safety Signage	H	L	Safety
Locations: 9th St, 5th St, N Front St, Rising Sun Ave, C St, F St, Bridge St, Harbison Ave, Tyson St, Cottman Ave, Rhawn St, Welsh St, Grant Ave			
Create Median Safety Refuge	L	L	Safety
Locations: Rhawn St, Welsh St, Grant Ave			
Re-time Crossing Time Allowance	H	L	Safety
Locations: 9th St, 5th St, N Front St, Rising Sun Ave, C St, F St, Bridge St, Harbison Ave, Tyson St, Cottman Ave, Rhawn St, Welsh St, Grant Ave			
Conduct Crosswalk Safety Outreach	H	L	Safety
Locations: N Front St, Rising Sun Ave, C St			
Install Bus Stop Shelter	M	L	Safety
Locations: 9th St, Cottman Ave, Welsh St, Grant Ave			
Upgrade Sidewalks or Walkways	M	L	Safety
Locations: N Front St, Harbison Ave, Rhawn St, Grant Ave			
Install Crosswalk Advisory Signage	H	L	Safety
Locations: Bridge St, Rhawn St			
Install Regulatory or Other signage	M	L	Safety
Locations: N Front St, F St, Harbison Ave			
Restripe Stop Bar	H	L	Safety
Locations: C St			
Install a Curb	M	L	Safety
Locations: F St, Cottman Ave			
Improve Drainage	M	L	Safety
Locations: Bridge St			

Source: DVRPC, 2007

INTERSECTION CROSSWALKS (Continued)

Improvement	Priority	Cost Range	Benefits
Clear Protruding Vegetation *Locations: Harbison Ave*	H	L	Safety
Move Bus Stop *Locations: Harbison Ave*	M	L	Safety
Move Overhead Destination Sign *Locations: 9th St*	L	M	Safety
Ensure Adequate Lighting *Locations: 5th St*	H	L	Safety
Ensure Signal Coordination *Locations: Rising Sun Ave*	H	L	Safety
Follow Complimentary Recommendations *Locations: F St*	H	L	Safety

MID-BLOCK CROSSWALKS

Improvement	Priority	Cost Range	Benefits
Install Pedestrian Countdown Signals *Locations: Bingham & Rorer, Garland & Whitaker, Sanger, Unruh, Princeton & Friendship*	H	L	Safety
Install Traffic Control Signal *Locations: Shelmire & Faunce*	H	M	Safety
Restripe Crosswalks *Locations: Bingham & Rorer, Garland & Whitaker, Unruh, Longhore, Princeton & Friendship Shelmire & Faunce*	H	L	Safety
Install Crosswalk Safety Signs *Locations: Bingham & Rorer, Garland & Whitaker, Sanger, Unruh, Princeton & Friendship Shelmire & Faunce*	H	L	Safety
Re-time Crossing Time Allowance *Locations: Bingham & Rorer, Garland & Whitaker, Unruh, Princeton & Friendship*	H	L	Safety
Install Bus Stop Shelter *Locations: Unruh*	M	L	Safety
Consolidate Crosswalks *Locations: Princeton & Friendship, Friendship & Saint Vincent*	H	L	Safety

Source: DVRPC, 2007

MID-BLOCK CROSSWALKS (Continued)

Improvement	Priority	Cost Range	Benefits
Eliminate Crosswalk: *Locations: Smylie, Benner, Longshore, Loney*	M	L	Safety
Install Crosswalk Advisory Signage *Locations: Garland & Whitaker, Princeton & Friendship, Shelmire & Faunce*	H	L	Safety
Install Permanent Speed Display Signs *Locations: Bingham & Rorer*	M	M	Safety
Install Regulatory or Other Signage *Locations: Smylie, Benner, Longshore*	H	L	Safety
Consolidate Bus Stops *Locations: Smylie, Benner, Longshore, Princeton & Friendship, Loney*	H	L	Safety
Follow Complimentary Recommendations *Locations: Friendship & Saint Vincent*	H	L	Safety
Re-Align Crosswalk *Locations: Shelmire & Faunce*	H	L	Safety

CROSSOVERS

Improvement	Priority	Cost Range	Benefits
Best Opportunity Crossover *Locations: SB 4, SB 5, SB 13, SB, 16, NB 1, NB 7, NB 8*	H	M	Mobility, Safety
Lengthen Deceleration Lane *Locations: SB 4, SB 5, SB 19, NB 1, NB 4, NB 7, NB 8*	H	M	Mobility, Safety Congestion
Lengthen Acceleration Lane *Locations: SB 2, SB 5, SB 13, SB 16, SB 19, NB 1, NB 4, NB 8*	H	M	Mobility, Safety
Eliminate Crossover *Locations: SB 3, SB 7, SB 9, SB 10, SB 13B, SB 14, SB 17, SB 18, NB 3, NB 6, NB 9, NB 13*	M	M	Mobility, Safety
Move the Crossover *Locations: NB 4*	M	H	Mobility, Safety
Install Advisory Signs *Locations: SB 2, SB 5, SB 12, SB 13, NB 1, NB 4, NB 7, NB 12*	H	L	Mobility, Congestion

Source: DVRPC, 2007

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APPENDIX I
Summary of Pedestrian Count Data

Appendix I. - Summary of Pedestrian Count Data

Wednesday May 16th - Intersections

Intersection Crossings (and Roosevelt Blvd.)									
	9th	5th	N. Front	Rising Sun	C	F	Bridge	Harbison	Rhawn
7 - 9 AM									
Pedestrian*	92	155	160	160	206	101	62	70	171
Bicycle	1	7	5	3	6	4	2	2	2
Roosevelt only**	51	74	87	27	131	28	27	30	91
2 - 7 PM									
Pedestrian	235	363	282	293	386	246	151	159	299
Bicycle	7	19	21	10	27	19	8	5	11
Roosevelt only	121	170	154	60	245	71	68	86	153
Total									
Pedestrian	327	518	442	453	592	347	213	229	470
Bicycle	8	26	26	13	33	23	10	7	13
Roosevelt only	172	244	241	87	376	99	95	116	244

Thursday May 17th - Mid-Block

Mid-Block Crossings (on Roosevelt Blvd., between or at)											
	Bingham & Rorer	Smylie	Garland & Whitaker	Sanger	Benner	Unruh	Longshore	Princeton & Friendship	Friendship & Saint Vincent	Shelmire & Faunce	Loney
7 - 9 AM											
Pedestrian	25	44	77	40	12	23	18	3	9	7	5
Bicycle	1	0	1	0	1	2	2	0	0	1	0
2 - 7 PM											
Pedestrian	103	68	210	144	15	121	56	57	38	18	15
Bicycle	22	2	8	1	0	8	2	2	1	2	0
Total											
Pedestrian	128	112	287	184	27	144	74	60	47	25	20
Bicycle	23	2	9	1	1	10	4	2	1	3	0

Saturday May 19th - Intersections

Intersection Crossings (and Roosevelt Blvd.)					
	9th	Tyson	Cottman	Welsh	Grant
12 - 4 PM					
Pedestrian	142	167	767	285	143
Bicycle	37	12	41	8	11
Roosevelt only	84	98	346	185	88

* Includes all pedestrian movements at the intersection
** Includes pedestrian movements across Roosevelt Blvd only

APPENDIX II
Wednesday, May 16 Pedestrian Count Data

Appendix II. - Wednesday May 16th Pedestrian Count Data

TIME	DIRECTION	LOCATION 1			LOCATION 2			LOCATION 3			LOCATION 4			LOCATION 5			LOCATION 6			LOCATION 7			LOCATION 8			LOCATION 9		
		9th Street			5th Street			N. Front Street			Rising Sun Avenue			C Street			F Street			Bridge Street			Harbison Avenue			Rhawn Street		
7:00am - 9:00am		"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
	SW -SE	1						2	3			1		7	8		1	1			1		2			1	1	
7:00am -	SW - NW	4						3			2			4			1			1								
7:15am	SE - NE	2			8	1		6						2		1	3	1	1							8	2	1
	NE - NW		1		3	5		4			4	5		3	2		1	10		5	1					3	3	
Total		7	1	0	11	6	0	15	3	0	6	6	0	16	10	1	6	12	1	6	2	0	2	0	0	12	6	1
	SW -SE				2	1	1	5	5		1	1		6	9	1							2				6	
7:15am -	SW - NW	1	1		5	3		4		1	7			4	1	2				2							3	
7:30am	SE - NE	7	4		3		1	2		1				2			2	3		1			1			1	2	
	NE - NW				1			1			7		2	3			1	9					3				7	
Total		8	5	0	11	4	2	12	5	2	15	1	2	15	10	3	3	12	0	3	0	0	6	0	0	1	18	0
	SW -SE	2	1		3	1	1	5	1					6	14			1			3	2	3				8	
7:30am -	SW - NW	3				2		3		1	4	1		2	5					2	1					4		
7:45am	SE - NE	1			7	2					1			2		1	3			4			3			3		
	NE - NW	6	2		4	6		4	1		11			5	3		1	13			1		2				7	
Total		12	3	0	14	11	1	12	2	1	16	1	0	15	22	1	4	14	0	6	5	2	8	0	0	7	15	0
	SW -SE				4	1	1	15	4		2	2	1	12	8	1		1					2				2	
7:45am -	SW - NW	2			2	2		9			9			9					1	2	1		8					
8:00am	SE - NE	3	1		2	4		2						2			1	1		6	1					7		
	NE - NW	3	2		1	1		9	2		15	2		5	2			9			2		5	1	1		10	
Total		8	3	0	9	8	1	35	6	0	26	4	1	28	10	1	1	11	1	8	4	0	15	1	1	7	12	0
	SW -SE	1	5					10	7		2	9		2	7			3			2		3			2	14	
8:00am -	SW - NW	3			1	4		1			1			2	1			1		2	1		1			2	2	
8:15am	SE - NE	6		1	3	2		2			2						2									7		
	NE - NW	1			3	7	1	9	3		21			7				10		4			2				8	
Total		11	5	1	7	13	1	22	10	0	26	9	0	11	8	0	2	14	0	6	3	0	6	0	0	11	24	0
	SW -SE	3			4	2		4	6		1			3	6			1			2		2	2			3	
8:15am -	SW - NW							2			5				2								1	4		9		
8:30am	SE - NE	1			6													1			1		2			4	2	
	NE - NW		1		1	8		5	2		6	2		4				4					1	2			2	
Total		4	1	0	11	10	0	11	8	0	12	2	0	7	8	0	0	6	0	0	3	0	6	8	0	13	7	0
	SW -SE				3	1		2	1	1	4			9	8					1			2	2			5	
8:30am -	SW - NW	3						1			1				1			1					2			3		
8:45am	SE - NE	7			2	3		1						4	1					3			1			3	4	
	NE - NW	1	2		3	7	1	2	5	1	9	5		2	4			6			8		2		1		8	
Total		11	2	0	8	11	1	6	6	2	14	5	0	15	14	0	0	7	0	4	8	0	7	2	1	6	17	0
	SW -SE		2		2			2	1		1			7	6								3				3	1
8:45am -	SW - NW	3	1		1						5			2	2		1		1	2			1				1	
9:00am	SE - NE	4			6	1		1									1	2			2					3		
	NE - NW	1			9	2	1	1	2		9	2						5	1		8		5				8	
Total		8	3	0	18	3	1	4	3	0	15	2	0	9	8	0	2	7	2	2	2	0	9	0	0	3	12	1
AM TOTAL		**69**	**23**	**1**	**89**	**66**	**7**	**117**	**43**	**5**	**130**	**30**	**3**	**116**	**90**	**6**	**18**	**83**	**4**	**35**	**27**	**2**	**59**	**11**	**2**	**60**	**111**	**2**
2:00pm - 7:00pm		"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
	SW -SE	1			1	2	1	2	3	1	2			6	6			1	1		2						2	
2:00pm -	SW - NW				1						1			3		1	2			1	2						2	
2:15pm	SE - NE	2			4						1			1	1					3						7	1	
	NE - NW	2	1		8	3			1		4	1		4	4			2			2					1	5	
Total		5	1	0	14	5	1	2	4	1	8	1	0	14	11	1	2	3	1	4	6	0	0	0	0	8	10	0
	SW -SE			1	5	1		2	3		1			1	13	1		2					3				5	
2:15pm -	SW - NW	3	2					1			7			5		2	1			5						1		
2:30pm	SE - NE	2	2		2	1		3		1				2				1		2			2			3	1	
	NE - NW		2		1	7		2	4		2	3		5	1	1		3				1	3		1		4	
Total		5	6	1	8	9	0	8	7	1	10	3	0	13	14	4	1	6	0	7	0	1	8	0	1	4	10	0
	SW -SE		1	1	4	3		8	8		4			4	2								3				2	1
2:30pm -	SW - NW	1			3	1					8			1			8									1		
2:45pm	SE - NE	2				1		5						7			1	1	1	6			1			3	1	
	NE - NW	1	2		2	7		20	15		5	2		6	2			3	1	1			3				4	
Total		4	3	1	9	12	0	33	23	0	17	2	0	18	4	0	9	4	2	7	0	0	7	0	0	4	7	1

Source: DVRPC, 2007

TIME	DIRECTION	LOCATION 1			LOCATION 2			LOCATION 3			LOCATION 4			LOCATION 5			LOCATION 6			LOCATION 7			LOCATION 8			LOCATION 9		
		9th Street			5th Street			N. Front Street			Rising Sun Avenue			C Street			F Street			Bridge Street			Harbison Avenue			Rhawn Street		
7:00am - 9:00am		"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
2:45pm - 3:00pm	SW -SE	4			7			9	2		6			10	3			1		1	1		5				1	1
	SW - NW							1			3						1	1	1	2						7		
	SE - NE	7			7	6		4						3			4	2			1		1			2	1	
	NE - NW	6	2		1	12	1	5	7		13	1		12	1			7			2		4				5	
Total		17	2	0	15	18	1	19	9	0	22	1	0	25	4	0	5	11	1	3	4	0	10	0	0	9	7	1
3:00pm - 3:15pm	SW -SE	3	1		4			6	4		5			15	4		1			4	3		5			2	6	1
	SW - NW	2	1		2			4			8	1		2	3	1	2			2						5	7	
	SE - NE	3			6	2		5						4	1			1	1	4				1		1	5	
	NE - NW	2	1	1	3	7	1	6	7		9	2		3	1			8		3	9		9				6	1
Total		10	3	1	15	9	1	21	11	0	22	3	0	24	9	1	3	9	1	13	12	0	14	1	0	8	24	2
3:15pm - 3:30pm	SW -SE	1			3	1		11		1	2		2	7	4				1		2		4	1	1	1	9	
	SW - NW				2			2			4			4	1		4									3	3	1
	SE - NE	4			10	3		6			1			3	1		1			1			2			6		1
	NE - NW	1	3		5	9	1	1		8	7	2		11	11			13		4	2					1	3	
Total		6	3	0	20	13	1	20	0	9	14	2	2	25	17	0	5	13	1	5	4	0	6	1	1	11	15	2
3:30pm - 3:45pm	SW -SE	1			6			4	2		3	1		8	7	1		8			1		4				6	
	SW - NW	4	1		2						6	1	1	3		1	2	3		1						7	3	
	SE - NE	4	3		5			1			1			2		1			3	1	2	1				10	6	
	NE - NW	7	2	2	9	12		2	2		25	3	1	4	1	1		16			1		4				7	
Total		16	6	2	22	12	0	7	4	0	35	5	2	17	8	4	2	27	3	2	4	1	8	0	0	17	22	0
3:45pm - 4:00pm	SW -SE	5	1		3	4		5	1		3	1		9	1			1		5	2		4			1	2	
	SW - NW	2			5	1		3			1			1		1	7	2		3			4			1		
	SE - NE	7			9			1		1				4	2	1			3				8			3	5	
	NE - NW	2	1		8	5	1	1	4		9	2	1	3	1	1	4	3			2	1	9	1			5	
Total		16	2	0	25	10	1	10	5	1	13	3	1	17	4	3	11	6	3	8	4	1	25	1	0	5	12	0
4:00pm - 4:15pm	SW -SE				1	1		5	3		3			3	7			1		1	1	2	5				6	
	SW - NW	3		1				4		1	5		1	3	1			2		4						3		
	SE - NE	3			7	1					3			6	3	1	1		1			1	1			2		
	NE - NW	2	7		4	8	1				9	1		1		1		11					4		1	2	10	1
Total		8	7	1	12	10	1	9	3	1	20	1	1	13	11	2	1	14	1	5	1	3	10	0	1	7	16	1
4:15pm - 4:30pm	SW -SE	2			10	2		3	1	1	2		1	7	7	4		3					6				3	
	SW - NW	2	2		1		1				3			4		4	2	1	1	1								
	SE - NE	6	2		3	1	4	6	1	3				5			9	2		3			2			4	2	
	NE - NW	3	4		4	1		2	2		2	4			3			6			1		2		1	1	5	
Total		13	8	0	18	4	5	11	4	4	7	4	1	16	10	8	11	12	1	4	1	0	13	0	1	5	10	0
4:30pm - 4:45pm	SW -SE	2			2	3		7	1		10			3			1	2	1		2		5				3	
	SW - NW		2		2			1			3				1		2		1	3						4	1	
	SE - NE	8	3		1	1		5						3		1	2	1					2				1	
	NE - NW		1	1	7		1	5	1	1	6	2					1	9					5		1		7	
Total		10	6	1	12	4	1	18	2	1	19	2	0	6	1	1	6	12	2	3	2	0	12	0	1	4	12	0
4:45pm - 5:00pm	SW -SE	2					1	5	1					5	8			3			4		7				2	
	SW - NW	2			1						2	3		3	1	1		1	1				2			2		
	SE - NE	4	2		8			5		1				2			1						1			1	2	
	NE - NW	1			6	5	1	2	3		6			1							3		4			1	4	
Total		9	2	0	15	5	2	12	4	1	8	3	0	11	9	1	1	4	1	0	7	0	14	0	0	4	8	0
5:00pm - 5:15pm	SW -SE	1			2				1		1			6	1						4						3	
	SW - NW	2			1			2			6			3	1			1		7								
	SE - NE	3				3		2	1					3			2	1	1	3						4		
	NE - NW				2	6	1		4		2				2			9			2	1					2	
Total		6	0	0	5	9	1	4	6	0	9	0	0	12	4	0	2	11	1	10	6	1	0	0	0	4	5	0
5:15pm - 5:30pm	SW -SE	2	1					1			2			2	1						1							
	SW - NW	2	1		2						6			1			2			3						1		
	SE - NE	3	3		7												3									3		1
	NE - NW	1	1		7	4		3	2		10			1	2			6									1	
Total		8	6	0	16	4	0	4	2	0	18	0	0	4	3	0	5	6	0	3	1	0	0	0	0	4	1	1
5:30pm - 5:45pm	SW -SE	2			1	1							1	6	3	1				2			1				4	1
	SW - NW	5	1					1			2			2			1			2	2					3	1	
	SE - NE	3			1																		2			2	3	
	NE - NW	3	2		2	3					2			1	2			2			2		5			1	2	
Total		13	3	0	4	3	1	1	0	0	4	0	1	9	5	1	1	2	0	4	4	0	8	0	0	6	10	1

Source: DVRPC, 2007

TIME	DIRECTION	LOCATION 1			LOCATION 2			LOCATION 3			LOCATION 4			LOCATION 5			LOCATION 6			LOCATION 7			LOCATION 8			LOCATION 9		
		9th Street			5th Street			N. Front Street			Rising Sun Avenue			C Street			F Street			Bridge Street			Harbison Avenue			Rhawn Street		
7:00am - 9:00am		"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
5:45pm - 6:00pm	SW -SE							2			1		1	1							1		2				3	
	SW - NW	2	1											3		1	2			1								
	SE - NE	1			1	1		4		1				1			1				1						2	
	NE - NW	1			3				1					1			1	4									3	
Total		4	1	0	4	1	0	6	1	1	1	0	1	6	0	1	4	4	0	1	2	0	2	0	0	0	8	0
6:00pm - 6:15pm	SW -SE	1	2								2			8				3					2				3	1
	SW - NW	2			1						4			4						2						1		
	SE - NE	1			3			2						4	1						1		1				1	
	NE - NW	1			3	1		2	4		1	1	1	2	1			5	1				7			1		
Total		5	2	0	7	1	0	4	4	0	7	1	1	18	2	0	0	8	1	2	1	0	10	0	0	2	4	1
6:15pm - 6:30pm	SW -SE										1			7				2		2							4	
	SW - NW	2	1								5									1	2						1	1
	SE - NE		2			1												1					1				1	
	NE - NW	1	1						1	1	6	2						4		2			1				1	
Total		3	4	0	0	1	0	0	1	1	12	2	0	7	0	0	0	7	0	5	2	0	2	0	0	0	7	1
6:30pm - 6:45pm	SW -SE				1				1		3	1		3	1													
	SW - NW		1									1															1	
	SE - NE	2	4		1			2							1			1			1		1			1		
	NE - NW	1				1	2				1	2		1				4		1	1		3			1	1	
Total		3	5	0	2	1	2	2	1	0	4	4	0	4	2	0	0	5	0	1	2	0	4	0	0	2	2	0
6:45pm - 7:00pm	SW -SE				1	1								1	3			2					2					
	SW - NW				1						2						1			1		1						
	SE - NE	1	1		4	1								2			1	3					1			1		
	NE - NW		2			1	1				4			1	2			6								1	3	
Total		1	3	0	6	3	1	0	0	0	6	0	0	4	5	0	2	11	0	1	0	1	3	0	0	2	3	0
PM TOTAL		162	73	7	229	134	19	191	91	21	256	37	10	263	123	27	71	175	19	88	63	8	156	3	5	106	193	11
		"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
DAY TOTAL		231	96	8	318	200	26	308	134	26	386	67	13	379	213	33	89	258	23	123	90	10	215	14	7	166	304	13

Source: DVRPC, 2007

APPENDIX III
Thursday, May 17 Pedestrian Count Data

Appendix III. - Thursday May 17th Pedestrian Count Data

TIME	LOCATION 1			LOCATION 2			LOCATION 3			LOCATION 4			LOCATION 5			LOCATION 6			LOCATION 7			LOCATION 8			LOCATION 9			LOCATION 10			LOCATION 11		
	Bingham & Rorer			Smylie			Garland & Whitaker			Sanger			Benner			Unruh			Longshore			Princeton & Friendship			Friendship & Saint Vincent			Shelmire & Faunce			Loney		
7:00am - 9:00am	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
7:00am - 7:15am Total		3		4			3	9	1	1			4			3			2												1		
7:15am - 7:30am Total		3		8			3	1		2	3		2		1	2	4		4		1						1			1		
7:30am - 7:45am Total		4		5			3	6		7	11		1					1	4						1				1		1		
7:45am - 8:00am Total		3		6			3	16					1			2	1	1	1		1				3			1			1		
8:00 - 8:15am Total		4		10			8	12		1						2	2		3			2							1				
8:15am - 8:30am Total		2		9			1	8			3		2				1		1	1		1			3			1					
8:30am - 8:45am Total		3						1		1	2		1			1	3		1									1	2				
8:45am - 9:00am Total		3	1	2				3		5	4		1			1	1		1						2						1		
AM TOTAL	**0**	**25**	**1**	**44**	**0**	**0**	**21**	**56**	**1**	**17**	**23**	**0**	**12**	**0**	**1**	**11**	**12**	**2**	**17**	**1**	**2**	**3**	**0**	**0**	**9**	**0**	**0**	**3**	**4**	**1**	**5**	**0**	**0**
2:00pm - 7:00pm	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
2:00pm - 2:15pm Total		1		1			5	7		2	1						1		2			2			3				3				
2:15pm - 2:30pm Total		2		4			1	2		1	1		2						1			1			2				1		1		
2:30pm - 2:45pm Total		1		2				3		1	1		1			5	1		5		1	1			2								
2:45pm - 3:00pm Total			1	2			1	2		2	3		1				7		1			3			2						2		
3:00pm - 3:15pm Total		12		3			1	10		1			1				15		7						2						2		
3:15pm - 3:30pm Total		7		15			5	29	2	2	11					4	9		7			7			1						1		
3:30pm - 3:45pm Total		9		5			4	13		2	6		1				2	1	2						2						1		
3:45pm - 4:00pm Total		3	1	3		1	7	3		5	4	1	2				5	2	7			12			1								
4:00pm - 4:15pm Total		7	2	4			1	5		6	10		1			1	5	1				5			1			3			1		
4:15pm - 4:30pm Total		6		2			6	8	1	9	13					3	3	1	1			3			1					1			
4:30pm - 4:45pm Total		6	1	5			4	7	1	7	1		3			1	1		2			1						1	3		1		
4:45pm - 5:00pm Total		3		3			2	9	1	8	1					5	1		1			3							2		2		
5:00pm - 5:15pm Total		7		4			5	4		6	3					3	3	1							6								
5:15pm - 5:30pm Total		6		8				7		1			1				7		5			1			2				3		1		
5:30pm - 5:45pm Total		6	2	2		1	2	6		5	6					1	7	1	1		1	1		1	1				1	1	2		
5:45pm - 6:00pm Total		6	9				3	8		4	1						6	1	1	3		6			2								
6:00pm - 6:15pm Total		2	4	3			5	11	2	1	4		2			2	13		5			3			2		1						
6:15pm - 6:30pm Total		6	2	1			3	9		3	2						4		1			3		1	5								
6:30pm - 6:45pm Total		9		1			2	6	1	2							4		3			4			2						1		
6:45pm - 7:00pm Total		4					3	1		7	1						2		1			1			1				1				
PM TOTAL	**0**	**103**	**22**	**68**	**0**	**2**	**60**	**150**	**8**	**75**	**69**	**1**	**15**	**0**	**0**	**25**	**96**	**8**	**53**	**3**	**2**	**57**	**0**	**2**	**38**	**0**	**1**	**4**	**14**	**2**	**15**	**0**	**0**
	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles	"walk"	'don't walk'	Bicycles
DAY TOTAL	**0**	**128**	**23**	**112**	**0**	**2**	**81**	**206**	**9**	**92**	**92**	**1**	**27**	**0**	**1**	**36**	**108**	**10**	**70**	**4**	**4**	**60**	**0**	**2**	**47**	**0**	**1**	**7**	**18**	**3**	**20**	**0**	**0**

Source: DVRPC, 2007

APPENDIX IV
Saturday, May 19 Pedestrian Count Data

Appendix IV. - Saturday May 19th Pedestrian Count Data

TIME	DIRECTION	LOCATION 1			LOCATION 2			LOCATION 3			LOCATION 4			LOCATION 5		
		9th Street			Tyson Avenue			Cottman Avenue			Welsh Road			Grant Avenue		
12:00pm - 4:00pm		"walk"	"don't walk"	Bicycles	"walk"	"don't walk"	Bicycles	"walk"	"don't walk"	Bicycles	"walk"	"don't walk"	Bicycles	"walk"	"don't walk"	Bicycles
12:00pm - 12:15pm	SW -SE		5	1	1	2		9			5	9			1	
	SW - NW	1		1				4								
	SE - NE	3	4	1				5	3		5	1				
	NE - NW		4					9	4		1	3				
Total		4	13	3	1	2	0	27	7	0	11	13	0	0	1	0
12:15pm - 12:30pm	SW -SE	3	2		1			19	4		5					
	SW - NW		1		1			15	3			10				
	SE - NE	1						2	1		3				2	
	NE - NW		3	2				16	1	1	1			1	1	
Total		4	6	2	2	0	0	52	9	1	9	10	0	1	3	0
12:30pm - 12:45pm	SW -SE		1		1			13	1		10				3	1
	SW - NW				3			14	3		3					
	SE - NE				7	2	1	12		3	4	2			3	
	NE - NW		2					16	1	3	1	2			1	
Total		0	3	0	11	2	1	55	5	6	18	4	0	0	7	1
12:45pm - 1:00pm	SW -SE		1	1	1			9	3		2	1			1	1
	SW - NW	2		1	1			6	1			2	1			1
	SE - NE		4	1	3	1		10			1	1		2	3	1
	NE - NW		1			2		23			3					
Total		2	6	3	5	3	0	48	4	0	6	4	1	2	4	3
1:00pm - 1:15pm	SW -SE				3			9		2	9	2	1		2	
	SW - NW							14		3	6	1	1		1	
	SE - NE				3		1	12		1				2		
	NE - NW		2		1			20	4	3	3	1				
Total		0	2	0	7	0	1	55	4	9	18	4	2	2	3	0
1:15pm - 1:30pm	SW -SE		3		5			7		3	8	12				
	SW - NW		2		6		1	10		1	4	1			1	
	SE - NE	1	1	1	1		1	5	2		1			3	1	
	NE - NW		1		10		1	15	6	1	2				2	1
Total		1	7	1	22	0	3	37	8	5	15	13	0	3	4	1
1:30pm - 1:45pm	SW -SE		5		2			22	4	5	2	1			1	
	SW - NW	1			1			16			4			3		
	SE - NE	2			1		1	5			1	2		1		
	NE - NW		1		3			8	1				1		4	
Total		3	6	0	7	0	1	51	5	5	7	3	1	4	5	0
1:45pm - 2:00pm	SW -SE		3	1	2			16		3	12	1			2	
	SW - NW	2			1			10		2		2	1			
	SE - NE	2	1		1		1	9	2			3		4		1
	NE - NW		3		1	1		10	3	1	2	1				1
Total		4	7	1	5	1	1	45	5	6	14	7	1	4	2	2
2:00pm - 2:15pm	SW -SE		4		4			13	1		8	2		2	4	
	SW - NW	2		1	1			8				1		2		
	SE - NE	2			5			13			2	2		3	1	
	NE - NW		5		1			16	1	2	2	2				
Total		4	9	1	11	0	0	50	2	2	12	7	0	7	5	0
2:15pm - 2:30pm	SW -SE		1	3	9			7	2	2	4	1	1		9	1
	SW - NW			3				5						1	7	1
	SE - NE			1	4			8				1		4		
	NE - NW		4		2		1	14			1			4	2	
Total		0	5	7	15	0	1	34	2	2	5	2	1	9	18	2
2:30pm - 2:45pm	SW -SE		4		2			8		1	7	2	1	3	2	
	SW - NW			4	1			9	1	1	1	1		3	2	
	SE - NE	3	2		1		1	11	1					1		
	NE - NW		3		5			15	1		3					
Total		3	9	4	9	0	1	43	3	2	11	3	1	7	4	0
2:45pm - 3:00pm	SW -SE		9	2	5			9	1		5	2			1	
	SW - NW				1			5			1	2				
	SE - NE	3			3			10		1	1			1		
	NE - NW		4	1	7			12	8		1			1	2	
Total		3	13	3	16	0	0	36	9	1	8	4	0	2	3	0
3:00pm - 3:15pm	SW -SE		3		2			2			7	1				
	SW - NW		1		1			6			6	2			1	
	SE - NE	2	3					9			3			5	2	2
	NE - NW		9		1		1	11	1		6		1	1		
Total		2	16	0	4	0	1	28	1	0	22	3	1	6	3	2
3:15pm - 3:30pm	SW -SE		1	3	3	2		11	4		9	4		1	2	
	SW - NW		1		3			3	1		2	2		1	1	
	SE - NE	2		4	1			6				2		2	1	
	NE - NW			1	5			16			4	2		3	2	
Total		2	2	8	12	2	0	36	5	0	15	10	0	7	6	0
3:30pm - 3:45pm	SW -SE			1	10			17	2	1	3				4	
	SW - NW	1			1			17				3		1	5	
	SE - NE				3			8							3	
	NE - NW				3			14		1						
Total		1	0	1	17	0	0	56	2	2	3	3	0	1	12	0
3:45pm - 4:00pm	SW -SE				1			13			12	3		1	5	
	SW - NW				3			8				3			1	
	SE - NE	3		3	6		1	6			1					
	NE - NW		2		3		1	15	1		2			1		
Total		3	2	3	13	0	2	42	1	0	15	6	0	2	6	0
TOTAL		**36**	**106**	**37**	**157**	**10**	**12**	**695**	**72**	**41**	**189**	**96**	**8**	**57**	**86**	**11**

Source: DVRPC, 2007

APPENDIX V
Five-Lane Cross Section Concept

Appendix V - Five-Lane Cross Section Concept
AM, Mid-Day, and PM Peak Hour LOS with Average Delay / Vehicle

Intersection	Direction of Travel	Existing Geometry (90 second Cycle Length)									5-Lane Geometry (90 second Cycle Length)								
		AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
9th Street		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
	Blvd NB Local	937	12.1	B	1000	14.5	B	1691	17.5	B									
	Blvd NB Express	1991	16.7	B	1652	49.0	D	2453	35	C									
	Blvd NB Total		15.2	B		36.0	D		27.9	C	16.1	B	-5.7%	16.3	B	54.7%	65.6	E	-135.5%
	Blvd SB Local	3220	165.6	F	988	12.6	B	1165	12.4	B									
	Blvd SB Express	2136	9.1	A	1778	6.1	A	2000	5.6	A									
	Blvd SB Total		103.2	F		8.4	A		8.1	A	208.1	F	-101.7%	7.9	A	6.2%	7.4	A	8.7%
	NB Local	1772	16.6	B	1460	16.2	B	2435	18.9	B									
	NB Express	2854	15.5	B	2258	37.4	D	3293	29.6	C									
	Total NB Intersection		15.9	B		29.1	C		25.1	C	19.3	B	-21.2%	18.4	B	36.7%	59.4	E	-137.1%
	SB Local	3870	149.0	F	1364	12.8	B	1800	14.4	B									
	SB Express	2877	10.0	A	2428	9.6	A	2751	7.9	A									
	Total SB Intersection		89.7	F		10.8	B		10.5	B	177.6	F	-97.9%	10.4	B	3.3%	9.9	A	5.5%
		AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
7th Street		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
	Blvd NB Local	944	12.8	B	961	14.5	B	1685	14.5	B									
	Blvd NB Express	1998	11.3	B	1704	9.6	A	2494	16.2	B									
	Blvd NB Total		11.8	B		11.4	B		15.5	B	10.8	B	8.3%	9.9	A	12.9%	16.7	B	-7.6%
	Blvd SB Local	3109	76.9	E	908	8.7	A	1054	22.6	C									
	Blvd SB Express	2712	10.9	B	1552	12.6	B	2275	32.8	C									
	Blvd SB Total		46.2	D		11.2	B		29.6	C	179.6	F	-289.2%	15.8	B	-41.6%	18.3	B	38.1%
	NB Local	1071	11.5	B	1042	13.6	B	1801	13.6	B									
	NB Express	2223	10.1	B	1866	8.7	A	2722	14.8	B									
	Total NB Intersection		10.6	B		10.5	B		14.3	B	10.3	B	2.4%	9.4	A	10.1%	15.9	B	-11.0%
	SB Local	3372	73.0	E	1103	12.3	B	1296	23.4	C									
	SB Express	2965	10.0	A	1715	11.3	B	2503	29.8	C									
	Total SB Intersection		43.5	D		11.7	B		27.6	C	172.7	F	-296.8%	16.2	B	-38.6%	18.3	B	33.7%
		AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
3rd/4th Street		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
	Blvd NB Local	406	4.3	A	559	5.7	A	909	8.9	A									
	Blvd NB Express	2126	13.9	B	1739	17.8	B	2745	64	E									
	Blvd NB Total		12.4	B		14.9	B		50.3	D	10.1	B	18.3%	10.2	B	31.3%	49.7	D	1.2%
	Blvd SB Local	1705	16.2	B	862	11.7	B	1196	14.8	B									
	Blvd SB Express	2625	20.0	B	1854	23.6	C	2233	19.9	B									
	Blvd SB Total		18.5	B		19.8	B		18.1	B	19.4	B	-4.8%	9.6	A	51.6%	14.4	B	20.5%
	NB Local	706	8.0	A	864	10.3	B	1345	15.3	B									
	NB Express	2643	12.9	B	2040	15.8	B	3197	54.6	D									
	Total NB Intersection		11.9	B		14.2	B		43.0	D	10.8	B	9.0%	10.7	B	24.5%	45.1	D	-5.0%
	SB Local	2258	20.3	C	1171	12.1	B	1754	14.2	B									
	SB Express	3116	17.9	B	2351	23.1	C	2832	19	B									
	Total SB Intersection		18.9	B		19.4	B		17.2	B	19.7	B	-4.2%	12.7	B	34.7%	16.2	B	5.6%

Source: DVRPC, 2007

Appendix V - Five-Lane Cross Section Concept (Continued)

Mascher Street	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	794	11.5	B	1043	13.0	B	1498	15.1	B									
Blvd NB Express	2124	22.3	C	2329	12.9	B	2795	22.4	C									
Blvd NB Total		19.4	B		12.9	B		19.9	B	16.5	B	14.8%	19.4	B	-50.0%	27.7	C	-39.5%
Blvd SB Local	1846	15.5	B	1033	13.4	B	1149	14.2	B									
Blvd SB Express	2622	6.4	A	1757	5.6	A	2172	14.7	B									
Blvd SB Total		10.2	B		8.5	A		14.5	B	12.9	B	-27.0%	7.3	A	14.0%	15.2	B	-4.6%
NB Local	1441	7.7	A	1530	9.0	A	2080	11.2	B									
NB Express	2811	17.5	B	2883	11.1	B	3457	18.5	B									
Total NB Intersection		14.2	B		10.4	B		15.8	B	13.9	B	2.0%	17.2	B	-65.8%	24.4	C	-54.8%
SB Local	2770	46.9	D	1835	26.9	C	2015	29.8	C									
SB Express	3551	8.4	A	2450	4.4	A	2999	11.5	B									
Total SB Intersection		25.3	C		14.0	B		18.9	B	27.5	C	-8.8%	11.6	B	17.4%	17.7	B	6.1%

Front Street	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	920	10.6	B	1164	12.2	B	1477	12.8	B									
Blvd NB Express	2214	12.9	B	2355	5.8	A	2983	8.3	A									
Blvd NB Total		12.2	B		7.9	A		9.8	A	6.1	A	50.1%	6.9	A	12.8%	6.9	A	29.5%
Blvd SB Local	1915	13.9	B	967	11.7	B	1285	12	B									
Blvd SB Express	2522	6.6	A	1503	4.7	A	2082	5.1	A									
Blvd SB Total		9.8	A		7.4	A		7.7	A	27.4	C	-181.0%	5.2	A	30.1%	6.9	A	10.8%
NB Local	1292	17.3	B	1547	17.5	B	2035	20.5	C									
NB Express	2557	11.1	B	2740	5.2	A	3546	7.3	A									
Total NB Intersection		13.2	B		9.6	A		12.1	B	8.2	A	37.8%	8.6	A	10.8%	9.2	A	24.0%
SB Local	2422	11.3	B	1371	9.3	A	2023	8.3	A									
SB Express	3046	7.3	A	1924	5.4	A	2891	7.4	A									
Total SB Intersection		9.1	A		7.0	A		7.8	A	25.6	C	-182.2%	6.0	A	14.6%	8.5	A	-9.4%

Rising Sun Avenue	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	951	11.0	B	892	12.3	B	1488	14.7	B									
Blvd NB Express	1806	5.1	A	1682	2.1	A	2465	70.6	E									
Blvd NB Total		7.1	A		5.6	A		49.6	D	3.0	A	58.0%	1.3	A	76.9%	57.9	E	-16.8%
Blvd SB Local	1652	12.6	B	810	1.5	A	1146	13.1	B									
Blvd SB Express	2455	48.8	D	1428	79.4	E	2111	13.7	B									
Blvd SB Total		34.2	C		51.2	D		13.5	B	5.9	A	82.8%	8.5	A	83.4%	12.5	B	7.3%
NB Local	1582	11.7	B	1503	13.0	B	2209	15.9	B									
NB Express	2437	8.0	A	2293	5.3	A	3188	56.1	E									
Total NB Intersection		9.5	A		8.3	A		39.6	D	15.0	B	-58.6%	7.3	A	12.6%	51.2	D	-29.1%
SB Local	2304	14.2	B	1455	12.3	B	2026	12.6	B									
SB Express	3006	41.8	D	2008	57.2	E	2934	14.2	B									
Total SB Intersection		29.8	C		38.3	D		13.5	B	9.4	A	68.5%	13.7	B	64.3%	14.8	B	-9.3%

Source: DVRPC, 2007

Appendix V - Five-Lane Cross Section Concept (Continued)

C Street	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	563	9.6	A	597	10.5	B	1077	11.4	B									
Blvd NB Express	1669	30.5	C	1569	9.5	A	2281	17.2	B									
Blvd NB Total		25.2	C		9.8	A		15.3	B	22.9	C	9.2%	9.5	A	2.8%	18.9	B	-23.2%
Blvd SB Local	1956	3.3	A	990	7.3	A	1402	20.9	C									
Blvd SB Express	2412	4.8	A	1503	5.0	A	2155	15.2	B									
Blvd SB Total		4.1	A		5.9	A		17.4	B	7.9	A	-91.4%	9.6	A	-62.3%	15.5	B	11.2%
NB Local	1040	10.5	B	918	10.5	B	1672	12.2	B									
NB Express	2416	23.6	C	2027	9.4	A	3090	15.3	B									
Total NB Intersection		19.7	B		9.7	A		14.2	B	21.2	C	-7.8%	11.4	B	-17.0%	19	B	-33.7%
SB Local	2634	8.5	A	1373	10.5	B	2131	20.2	C									
SB Express	3079	4.5	A	1875	4.7	A	2909	13	B									
Total SB Intersection		6.3	A		7.2	A		16.0	B	9.3	A	-46.6%	10.5	B	-46.8%	16.4	B	-2.2%

F Street	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	2490	18.6	B	2349	20.3	C	3552	191.9	F									
Blvd NB Express	1687	10.3	B	1470	11.6	B	2228	59.3	E									
Blvd NB Total		15.2	B		17.0	B		140.8	F	22.2	C	-45.6%	40.5	D	-138.9%	261.2	F	-85.5%
Blvd SB Local	1756	14.6	B	960	12.1	B	1282	13.5	B									
Blvd SB Express	2249	9.6	A	1499	8.8	A	2067	13	B									
Blvd SB Total		11.8	B		10.1	B		13.2	B	42.5	D	-260.4%	16.0	B	-58.6%	20.5	C	-55.4%
NB Local	3146	17.9	B	2748	19.2	B	4262	162.1	F									
NB Express	2373	8.1	A	1956	10.6	B	2905	45	D									
Total NB Intersection		13.7	B		15.6	B		114.6	F	20.6	C	-50.5%	37.4	D	-139.4%	227.4	F	-98.4%
SB Local	2706	18.2	B	1538	13.1	B	2301	16.9	B									
SB Express	3150	9.2	A	2072	9.3	A	3049	12.7	B									
Total SB Intersection		13.4	B		10.9	B		14.5	B	38.3	D	-186.7%	16.6	B	-52.0%	20.8	C	-43.4%

Whitaker South/Garland Street	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	977	11.7	B	957	11.8	B	1681	15.8	B									
Blvd NB Express	1688	23.8	C	1466	9.3	A	2187	12.9	B									
Blvd NB Total		19.4	B		10.3	B		14.2	B	24.6	C	-27.0%	2.4	A	76.7%	17.7	B	-25.0%
Blvd SB Local	1859	11.6	B	1137	8.1	A	1347	9	A									
Blvd SB Express	2197	13.5	B	1387	16.1	B	1991	10.4	B									
Blvd SB Total		12.6	B		12.5	B		9.8	A	15.4	B	-21.9%	7.7	A	38.4%	15.0	B	-52.5%
NB Local	1609	9.0	A	1314	9.9	A	2128	13.4	B									
NB Express	2328	26.8	C	1814	13.1	B	2660	18.2	B									
Total NB Intersection		19.5	B		11.8	B		16.1	B	26.6	C	-36.2%	6.0	A	49.0%	19.7	B	-22.6%
SB Local	1859	11.6	B	1137	8.1	A	1347	9.0	A									
SB Express	2197	13.5	B	1387	16.1	B	1991	10.4	B									
Total SB Intersection		12.6	B		12.5	B		9.8	A	15.4	B	-21.9%	7.7	A	38.4%	15.0	B	-52.5%

Source: DVRPC, 2007

Appendix V - Five-Lane Cross Section Concept (Continued)

Whitaker North Avenue	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	990	13.8	B	1020	13.8	B	1768	18.9	B									
Blvd NB Express	2002	22.8	C	1762	8.3	A	2651	113.1	F									
Blvd NB Total		19.8	B		10.3	B		75.4	E	14.1	B	28.9%	9.1	A	11.8%	152.8	F	-102.6%
Blvd SB Local	1717	16.9	B	1021	14.0	B	1199	13.6	B									
Blvd SB Express	2522	8.9	A	1518	1.3	A	2135	42.7	D									
Blvd SB Total		12.1	B		6.4	A		32.2	C	60.3	E	-396.7%	2.4	A	62.5%	34.8	C	-8.0%
NB Local	990	11.1	B	1020	11.3	B	1768	16.1	B									
NB Express	2002	17.8	B	1762	6.8	A	2651	89.2	F									
Total NB Intersection		15.6	B		8.4	A		60.0	E	11.9	B	23.6%	8.4	A	0.6%	130.4	F	-117.5%
SB Local	2990	24.3	C	1970	20.7	C	2425	23.4	C									
SB Express	3598	6.8	A	2351	1.8	A	3198	27.8	C									
Total SB Intersection		14.7	B		10.4	B		25.9	C	51.5	D	-249.3%	7.8	A	25.1%	31.5	C	-21.6%

Langdon Street	AM Peak			Mid-Day Peak			PM Peak			AM Peak			Mid-Day Peak			PM Peak		
	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction	Delay (sec)	LOS	% Reduction
Blvd NB Local	1520	19.9	B	1333	21.2	C	1934	33.8	C									
Blvd NB Express	1736	19.2	B	1478	20.7	C	1769	232.7	F									
Blvd NB Total		19.5	B		20.9	C		128.8	F	97.7	F	-400.3%	25.5	C	-21.8%	496.4	F	-285.3%
Blvd SB Local	2384	28.4	C	1643	24.1	C	2142	28.5	C									
Blvd SB Express	2246	22.3	C	1484	10.1	B	2015	30.5	C									
Blvd SB Total		25.4	C		17.5	B		29.5	C	106.9	F	-320.2%	18.9	B	-8.3%	138.2	F	-369.0%
NB Local	1717	18.2	B	1612	19.9	B	2283	42.5	D									
NB Express	2042	18.0	B	1929	17.5	B	2259	184.1	F									
Total NB Intersection		18.1	B		18.6	B		112.9	F	87.9	F	-385.9%	24.0	C	-29.1%	434.4	F	-284.7%
SB Local	2631	27.9	C	2125	24.7	C	2615	29.3	C									
SB Express	2526	20.7	C	2058	12.1	B	2627	28.9	C									
Total SB Intersection		24.4	C		18.5	B		29.1	C	100.6	F	-312.7%	20.4	C	-10.3%	123.1	F	-323.0%

Source: DVRPC, 2007

Title of Report: *US 1 – Roosevelt Boulevard Corridor Study*

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Geographic Area Covered:
The study area includes the US 1 – Roosevelt Boulevard Corridor between 9th Street and Grant Avenue in Northeast Philadelphia.

Key Words:
Intersection analysis, crossovers, crosswalks, mid-block crosswalks, level of service, improvement options, crashes, traffic calming, sight distance, lane reconfiguration, bus transit

ABSTRACT: *This study was conducted as part of DVRPC's 2030 long-range plan for the region. The section of this corridor studied extends from Ninth Street in the south to Grant Avenue in the north and is approximately 8 miles in length. The extensive breadth of the corridor has become an obstacle for pedestrian traffic. The corridor has experienced numerous pedestrian fatalities over the years and also experiences heavy peak-hour vehicular congestion. This study attempts to identify the constraints and opportunities on the Boulevard and makes recommendations for its improvement as a travel corridor in terms of operational safety and mobility.*

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