WILMAPCO

PORT OF WILMINGTON TRUCK PARKING STUDY

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staging

restrictions

idling

non-motorized

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Wilmington Area Planning Council

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RESOLUTION

BY THE WILMINGTON AREA PLANNING COUNCIL (WILMAPCO) TO ENDORSE THE PORT OF WILMINGTON TRUCK PARKING STUDY

WHEREAS, the Wilmington Area Planning Council (WILMAPCO) has been designated the Metropolitan Planning Organization (MPO) for Cecil County, Maryland and New Castle County, Delaware by the Governors of Maryland and Delaware, respectively; and

WHEREAS, the Port of Wilmington has identified an off-site truck parking facility as a transportation need; and

WHEREAS, communities surrounding the Port of Wilmington have identified concern with idling trucks and trucks violating local road restrictions; and

WHEREAS, the *Port of Wilmington Truck Parking Study* found good potential for an electrified truck stop outside the Port's gates; and

WHEREAS, the *Port of Wilmington Truck Parking Study* makes recommendations to address truck idling and truck movement along residential roadways in short-term; and

WHEREAS, the *Port of Wilmington Truck Parking Study* underwent appropriate technical and community review; and

WHEREAS, the *Port of Wilmington Truck Parking Study* falls into line with the goals and objectives of the *2040 Regional Transportation Plan* in supporting economic growth while improving quality of life;

NOW, THEREFORE, BE IT RESOLVED that the Wilmington Area Planning Council does hereby endorse the *Port of Wilmington Truck Parking Study*.

July 11, 2013
Date

Joseph Fisona, Chairperson
Wilmington Area Planning Council

WILMAPCO

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Who is WILMAPCO?

The Wilmington Area Planning Council (WILMAPCO) is the Metropolitan Planning Organization (MPO) for Cecil County, Maryland and New Castle County, Delaware. We are charged with planning and coordinating transportation investments for the Wilmington region.

The Wilmington region is home to nearly 640,000 residents, most of whom (84%) live in New Castle County. Wilmington, a financial hub supporting a population of more than 70,000, serves as the principal city. Urbanized development stretches outside of Wilmington along the I-95 corridor, from the Town of Elkton to the Pennsylvania border. Natural and rural landscapes, sprawling suburbs, and small towns blanket the rest of the region.

WILMAPCO's mission is to create the best transportation Plan for the region, one that meets all the requirements mandated by the Federal Clean Air Act and its Amendments (CAAA) and Moving Ahead for Progress in the 21st Century (MAP-21).

Executive Summary

This study examines the possibility of locating an off-site truck parking lot at the Port of Wilmington, Delaware, while also addressing issues surrounding the violations of truck restrictions on South Wilmington's residential roadways, truck idling and nonmotorized access to the port. In so doing, the study begins the process of addressing what is a key transportation need for the Port while simultaneously tackling truck-related concerns from the surrounding communities.

Truck Staging

We found good potential to continue the pursuit of a truck parking lot outside of Port property. Data and fieldwork revealed heavy truck use and staging in the vicinity of the Port, both during and after business hours. Any future increase of port activity (as is expected) would likely further necessitate this lot, to better manage combination truck movements.

The development of an eventual staging area may take a couple of forms. It could be a private venture, with an investor seeking good long-term returns on TSE and/or short-term ones on comfort services, such as cafés and sanitation. Or, the development could be initiated by the Port or the State to allow for Port expansion and better manage truck flow in South Wilmington.

Whomever the owner, the eventual parking site should have, or work to have, the following amenities:

- Security (lighting, guards, cameras, fencing, etc.)
- Signage (both on-road and electronic)
- Sanitation (toilets and showers)
- Food and beverages (cafés)
- Electric plug-ins

The cost of a staging area varies, depending on the location selected and the services and amenities on offer. The cost of purchasing either the F & H Transport or Pigeon Point LLC properties would run in the neighborhood of $300,000. The electrification of 30-50 parking spots would require an outlay of around $50,000. Fencing, building construction, security camera installation, along with ongoing maintenance and labor fees would add to the cost. A reasonable estimate would be an initial investment of around $500,000. Federal and state grants may defray these costs. More market research would be helpful before an entity pursues this project. It would be useful to survey truck drivers in South Wilmington, for example, to gain insight as to whether or not this site would appeal to them, and what amenities they would recommend.

Truck Restrictions

Residents charge that trucks often pass illegally through their communities. Our truck count data provided support for this claim, showing heavy typical movement of combination trucks along Pyles Lane and Lambsom Lane, for example. Several measures should be pursued to reduce the presence of these trucks in South Wilmington's communities.

- Restrict all currently truck-restricted roadways to "residential delivery only" truck trips
- Enact comprehensive truck signage adjustments across South Wilmington, directing trucks to non-restricted roads and away from restricted roads
- Make GPS directional adjustments to reflect truck-restricted roadways
- Enforce truck violations
- Implement the South Wilmington Signage Study
- Explore the creation of a truck access route to Terminal Avenue or Pigeon Point Road to reduce movements on Terminal Avenue through Hamilton Park

The responsibility of implementing these recommendations cuts across many agencies. Each are, in turn, identified in Section VI.

Truck Idling

Beyond illegal truck movements, residents also charge that trucks illegally idle throughout South Wilmington. The primary trouble spot is at the interstate ramps along Terminal Avenue. The construction of a truck staging lot, especially one that is electrified, would significantly address this problem in the long-term. Even without electrification, the site would be beneficial in terms of removing idling trucks from local roadways–though the cumulative effects upon noise and air quality of dozens of idling trucks is dubious. This underlines the need for the site to be electrified as soon as possible. In the short-term, residents and local police should focus on enforcing the state's anti-idling regulation.

Nonmotorized Access

We addressed nonmotorized issues along Terminal Avenue with this study, in response to concerns from the Port, DelDOT, and community leaders. Below are the recommendations:

- Improve pedestrian conditions at the bus stop next to the Port
- Consider on-road bicycle markings along Christiana Avenue

- Add sidewalks and lighting along Terminal Avenue between Christiana Avenue and Pigeon Point Road
- Add lighting along Terminal Avenue between the I-495 overpass and Pigeon Point Road
- Clear debris and vegetation along existing sidewalks along Terminal Avenue west of Pigeon Point Road
- Correct sloping sidewalk along Terminal Avenue west of Pigeon Point Road
- Upgrade pedestrian safety/crossing opportunities at all intersections along Terminal Avenue
- Address pedestrian safety concerns along SR 9

DTC should lead efforts to make pedestrian improvements at the bus stop. DelDOT should implement the other above recommendations when Terminal Avenue, Christiana Avenue and SR 9 are next repaved.

I. Introduction

The Port of Wilmington identified a new parking area outside its current gates as a short-term transportation need. This parking area would alleviate backups/queuing on Terminal Avenue (which connects the Port to major highways), free three to four acres of space on Port property, and, generally, allow for the expansion of port activity. For the Port, the ideal parking area should be within five minutes of its gate and allow for the parking of 30 to 50 combination trucks[1].

The Port of Wilmington says that additional truck parking beyond its gates will free three to four acres of space within its property.

At the same time community leaders around the Port of Wilmington have been vocal about the social, environmental and health effects of its related truck activity. The present study addresses concerns on both fronts – supporting economic growth via the Port, while setting the table for the curtailment of diesel emissions from truck trips it generates.

We have involved both the Port and members of the local community throughout the study's process, along with members from the Delaware Department of Transportation (DelDOT), the Delaware Department of Natural Resources and Environmental Control (DNREC), the Clean Air Council

[1] Combination (or combo) trucks are those of FHWA classification (two or more units) and above.

and the City of Wilmington. A steering committee with representation from each group met three times, providing critical guidance on the study's course. Guidance from community leaders was gathered on January 23, 2013, April 24, 2013 and May 16, 2013 at the Rose Hill Community Center.

Beyond this introductory section, the study is broken into four components. Section 2 "State of the Practice" considers examples of planned and existing truck parking areas at other seaports, and provides an overview of truck stop electrification. Section 3 "Current Conditions" provides an overview of our study area, the truck counts we collected, and the impacts trucks have on South Wilmington. Section 4 "Possible Staging Area Locations" profiles a few parcels in South Wilmington which may be suited to hosting a truck parking area. Section 5 "Other Transportation Recommendations" reviews some other transportation needs identified by the Port and area residents. Finally, Section 6 "Implementation Needs" collects the study's recommendations, placing them on the course toward implementation.

II. State of the Practice

Greater freight volumes at seaports, improved transportation technologies, and a broader awareness of environmental and population impacts are increasing interest in truck staging lots and pre-gate parking (PGP) areas. This section will profile work at two Pacific Coast ports in the United States, and a pair of North Sea ports in Europe. It will also offer a review of truck stop electrification (TSE), and other amenities, which may be implemented at these staging areas.

Truck Staging Areas at Seaports

Specific parking lots to handle incoming heavy trucks at ports have been studied and implemented. The motivation for these lots varies from alleviating the burden trucks may cause in surrounding neighborhoods, tackling illegal truck parking, reducing congestion on the surrounding road network, lowering air emissions and streamlining port operations, particularly during disturbances which may result in capacity overload.

Port of Oakland, California

The Port of Oakland developed a Comprehensive Truck Management Program to reduce community impacts, increase productivity and develop a sustainable workforce[2]. The Program found that many trucks idle/park illegally in surrounding neighborhoods and often stray from major routes. The Port has offered parking at a newly acquired property (a former Army base) to help mitigate this. Currently the Port provides approximately 20 acres of parking, and is required to provide 15 acres of truck support facilities (including but not limited to truck parking) as part of the environmental mitigation

[2] Jon Haveman and Kristen Monaco. *Comprehensive Truck Management Program: Economic Impact Analysis*. Presented to the Port of Oakland, 2009.

for their redevelopment of this acquired property. The City of Oakland is also required to provide an additional 15 acres of truck support facilities. Further, the City and Port worked with the local communities to develop truck routes to control the flow of commercial traffic in residential areas[3].

Trucks await entry into the Port of Oakland. (Photo: The Chronicle)

Port of Seattle, Washington

The Port of Seattle has been working with the Puget Sound Clean Air Agency on programs to reduce diesel emissions and community impacts[4]. One project involves creating overnight parking spaces for trucks to help alleviate the burden they place on South Park and Georgetown, two neighboring communities. A ten acre site, owned by the Port, is in play. The site could eventually provide space for about 200 trucks, at a cost of $3.2 million, and the Port has plans to eventually use it as a cargo terminal. The Port's plan to charge drivers for parking and provide space for only 200 trucks, however, has triggered criticism from unionized drivers and environmental activists.

In 2009, the Port made a 1.8 acre site (for 100+ trucks) available. No chassis or trailers are allowed on the facility, only truck cabs or the personal vehicles of truck drivers serving the Port. The facility is not secured, but parking is free.

[3] www.oaklandnet.com. Retrieved September 2011.

[4] http://seattletimes.com/html/localnews/2004303826_porttrucks25m.html. Retrieved September 2011.

Port of Hamburg, Germany

The German port of Hamburg has extensively studied PGP, and analyzed its operational acquirements[5,6]. Their system would reduce the number of heavy trucks along roadways in the harbor area, reduce truck parking in restricted zones, allow for the control of truck flow into the port, and lessen environmental impacts. Three operational strategies of the PGP were considered: 1.) PGP for optional use; 2.) PGP for recommended use, such as temporary disturbances at the port; 3.) PGP as a compulsive, regular service. After weighing the pros and cons of each, PGP for recommended use was selected. It was found to combine the benefits of number one and three, without their inherent cons.

In recommending a site for PGP, the Port of Hamburg considered a number of factors. These included its location (outside the port area, easily accessible via motorway, and no more than a one-hour drive from the Port, proximity to existing railways) and amenities (reservation of parking spaces, secure parking, and connections to alternative transportation). The ideal site would feature all of these, along with a fueling station, motorway service area, and sanitation facilities.

The Port feels the PGP system could be implemented and would be beneficial, especially during disturbances, but only in conjunction with present procedures. Incentives for truck drivers to use the PGP area must be uncovered. One is that no parking fees would be charged upon its introduction, but only later introduced to recover infrastructure costs. Terminal operators could also be responsible for some of the funding.

Port of Rotterdam, Netherlands

The Dutch port of Rotterdam began implementation of a more than $5.2 million project to build three secure truck parking areas this past summer[7]. The Port constructed 268 spaces this year, and will open an additional 500 in 2014. The three sites will be accessible each day of the year, 24 hours of the day. Daytime parking is free, while overnight stays cost between $1.30 and $13.

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[5] *Pre-Gate Parking (PGP)* PowerPoint presentation. Hamburg Port Authority. 2010 Annual Polis Conference.

[6] *Analysis of the Operational Requirements for a Pre-Gate Parking Area (PGP) for Terminating Traffic to the Port of Hamburg*. Hamburg Port Authority. February 2011.

[7] "Truck Parking." www.portofrotterdam.com. Retrieved November 2012.

Rotterdam's new truck parks should improve driver comfort and safety. (Photo: Port of Rotterdam)

The Port of Rotterdam's truck parking areas feature a number of facilities. These include showers, toilets, fencing, lighting, camera surveillance, Wi-Fi and power supply to cool vehicle engines. Medical and food establishments will also be available at the sites.

Truck Staging Areas: Key Services and Amenities

As discussed above, ports around the world are thinking about and implementing truck parking/staging areas. While initially these may take the form of an unsecured space for trucks to park, as is the case in Seattle, they may develop into fully-fledged rest and check-in sites, as is planned in Hamburg. Depending on the needs of the Port, the staging area could also act as a processing point for incoming freight.

There is agreement about the nature of these parking areas. They should be well signed, and easy to find both with and without electronic devices. The following are services and amenities to consider on-site:

- Security (lighting, guards, cameras, fencing, etc.)
- Sanitation (toilets and showers)
- Food and beverages (cafés)
- Electric plug-ins

Truck Stop Electrification

An increasing number of truck stops are today equipped with electric plug-ins. These plug-ins enable truck drivers to heat, cool and run electronic appliances within their truck without idling their diesel engines. A pair of these Truck Stop Electrification (TSE) sites have been recently installed in New Castle County, Delaware. One can be found at the I-95 Rest Stop, while another belongs to Trinity Trucking, a private freight agency in South Wilmington.

While the upfront costs for TSE can be prohibitive, this technology reduces costs, emissions, noise and promotes safer driving in the long-term. TSE facilities are expensive to install. A recent project in Georgia to electrify 85 truck parking spots cost $935,000, or $11,000 per spot[8]. These costs are generally recovered by charging by the hour for the electric service. In California, for example, truck owners are ch's him him arged $1.25 per hour to $1.75 per hour for basic heating and cooling[9]. Internet access, movies and other amenities carry an additional cost.

Still, electric power is less expensive than diesel fuel. TSE sites have shown significant savings after they are up and running. The Trinity Trucking TSE site in South Wilmington generates savings of $1,035,556 per year, assuming the 35 to 40% capacity is achieved during the first six months of operation.

Air emissions fall with TSE. It reduces 1,800 gallons of diesel fuel, five tons of nitrogen oxides (NOx), and 21 tons of carbon dioxide per truck annually[9],[10]. Compared against idling a typical diesel engine, electric power offers a 98.8% reduction in fine particulate matter (PM 2.5) emissions and a 98.3% reduction of nitrogen oxides[8]. As shown in Table 1, the 50 TSE spaces at the I-95 Rest Stop helped reduce transportation emissions in 2011[11]. Further, idling trucks are noisy. This can disturb the quality of life in nearby communities as well as negatively impact truck driver performance[12].

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[8] *Georgia Truck Stop Electrification and Green Corridors* (project proposal). Georgia Environmental Protection Division. 2009.

[9] *Truck Stop Electrification*. California Energy Commission. June 2006.

[10] These emissions reductions assume eight hours of truck idling per day, a historical average.

[11] We use figures from 2011, and not 2012 due to low usage rates in 2012. It is believed that the low usage of the electrification system at the I-95 Rest Stop is due to a technical oversight by the private entity operating the equipment.

[12] *Truck Stop Electrification as a Long Haul Tractor Idling Alternative*. New York State Energy Research and Development Authority. TRB Annual Meeting. 2004.

Table 1: Annual Emission Reductions at the I-95 TSE Site in 2011[13]

Pollutant	Emission Reductions (lbs)
Carbon monoxide (CO)	87.72
Carbon dioxide (CO2)	21,287.81
Nitrogen oxides (NOx)	133.38
Particulate matter (PM)	1.52
Volatile organic compounds (VOC)	16.31

III. Current Conditions

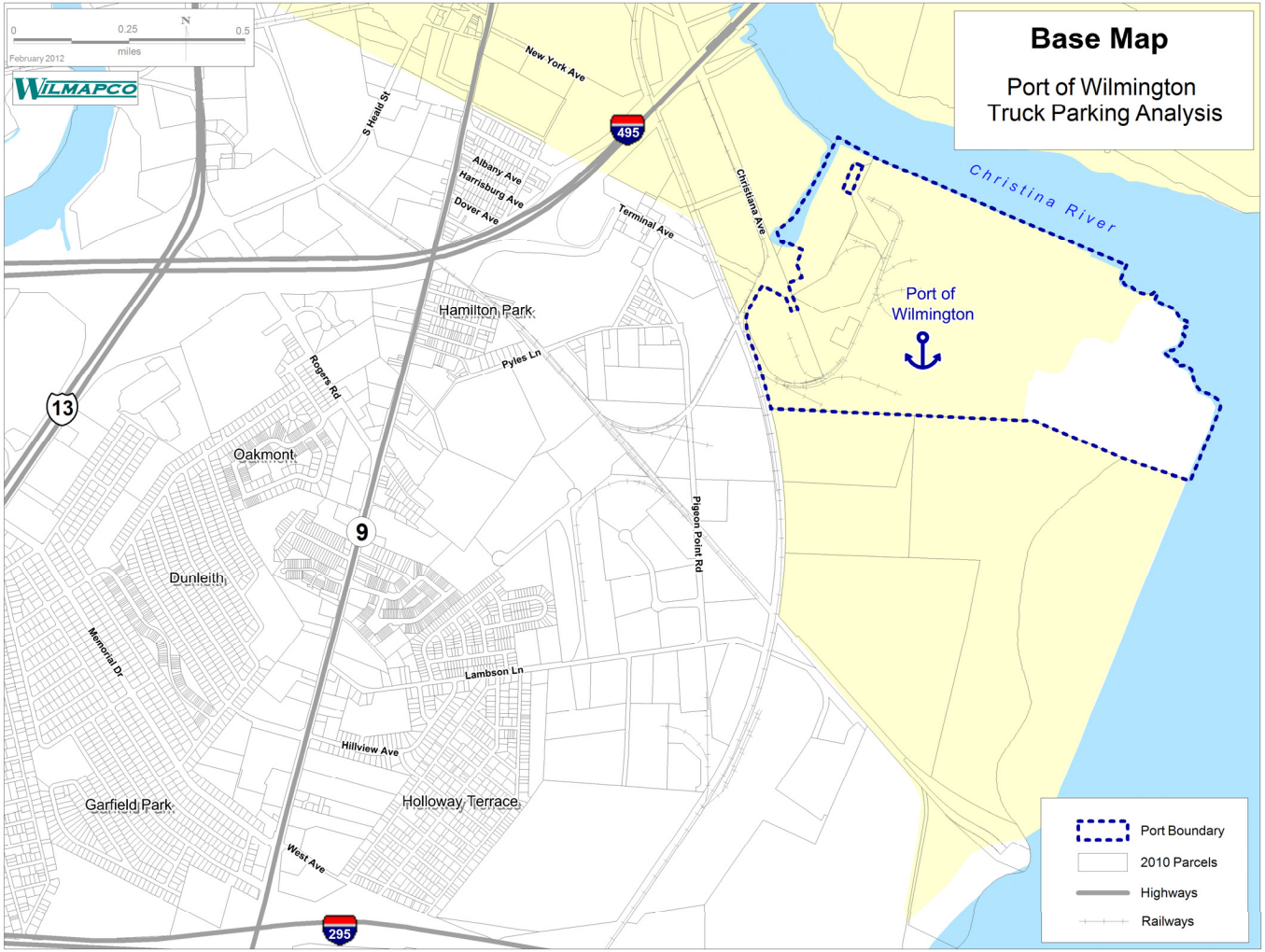
This section examines our study area, identifies how trucks and other motorized traffic move around roadways nearby the Port, reviews the subsequent truck impacts to surrounding neighborhoods, provides an overview of truck parking policies, and examines the early morning combination truck movement.

Study Area

The Port of Wilmington, various industries and a handful of neighborhoods form South Wilmington's built landscape. Several key transportation facilities course through South Wilmington. Interstate 495 dominates the study area. This raised expressway routes I-95's through traffic around Wilmington's downtown. I-495 also links almost directly to the Port of Wilmington – making regional freight movement more efficient. US 13, an important state and regional highway, travels through the study area along with SR 9. Both routes move traffic north and south. Terminal Avenue, Pyles Lane, Lambson Lane and a few other roadways collect east and westbound auto traffic. Beyond the highways, Norfolk Southern operates a pair of heavy rail lines, which serve the Port and local industries. The Christina River wraps around the study area to the north, while the Delaware River forms its eastern boundary.

[13] Source: CabAire

Map 1: Study Area Base Map



The Port of Wilmington is situated at the confluence of these two rivers, some 65 miles from the Atlantic Ocean. Its marine terminal handles more than 400 vessels each year, importing/exporting about five million tons of products. It boasts the largest volume of imported fresh fruit, banana, juice concentrate, and palletized frozen beef in North America. In CY 2012, 1.8 million tons (37% of the total annual tonnage) was from containerized cargo of which most will leave the port via truck.

Hundreds of trucks traverse Terminal Avenue each day.

The Port of Wilmington is the largest generator of freight in our region. The vast majority (at least 90%) of the products it accepts are moved inland via truck. While we and the Port would like to see more goods transported by rail, time and temperature constraints of fresh fruit and juices necessitates a high proportion of truck shipment. Further, the primary markets of over two thirds of its imports are nearby – Western Pennsylvania, Ohio, New York, Massachusetts, and Eastern Canada – all within a one-day truck drive. The Port is owned and operated by the Diamond State Port Corporation, a corporate entity of the State of Delaware.

Traffic Counts

During early December 2011, we counted motorized traffic at 18 locations in South Wilmington. The locations, shown on Map 2, were chosen based on their potential access to the Port and surrounding industries. December was selected because it is the Port's peak month. These resulting data provide a sense of typical movement during active times.

The counts were collected during a seven-day period. Vehicles were classified based on FHWA vehicle classes, and grouped into three categories: autos (classes 1 to 4), unit trucks (classes 5 to 7) and combination trucks (classes 8 to 13). As shown on Chart 1, Thursday was the busiest day for trucks in South Wilmington and Sunday the least. Note that the graph counted the same truck more than once as it passed through the area.

Chart 1: Truck Volumes Around Port

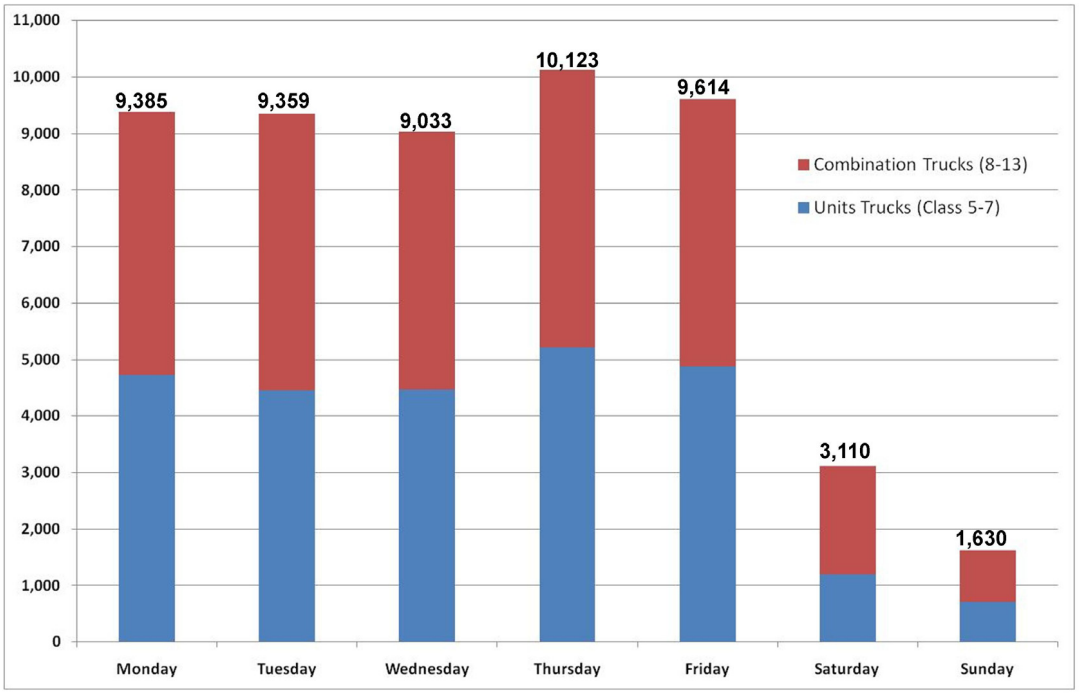
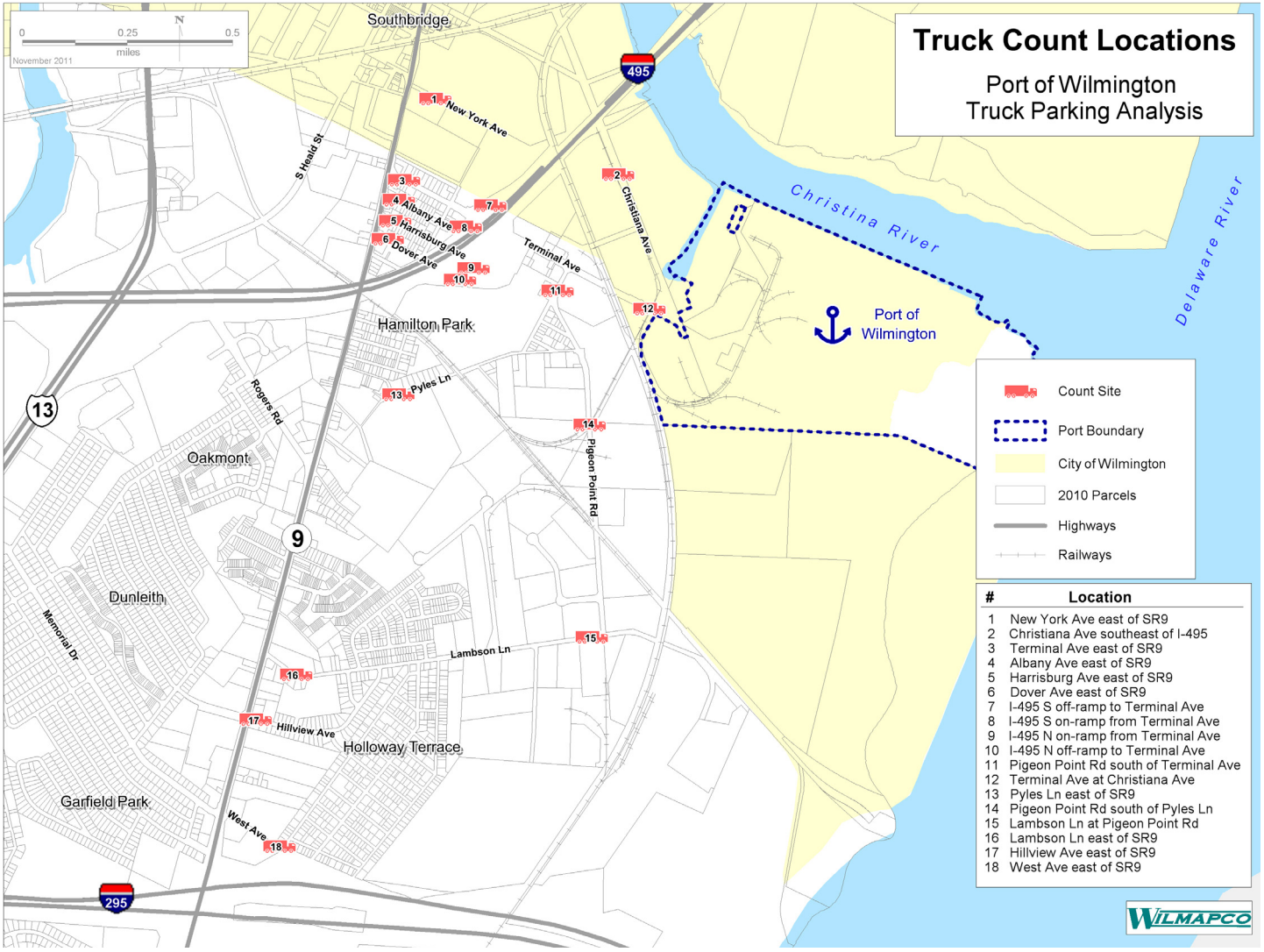


Chart reflects the combined total of all truck types (FHWA class 5-13) for all counts taken.

Map 2: Truck Count Locations



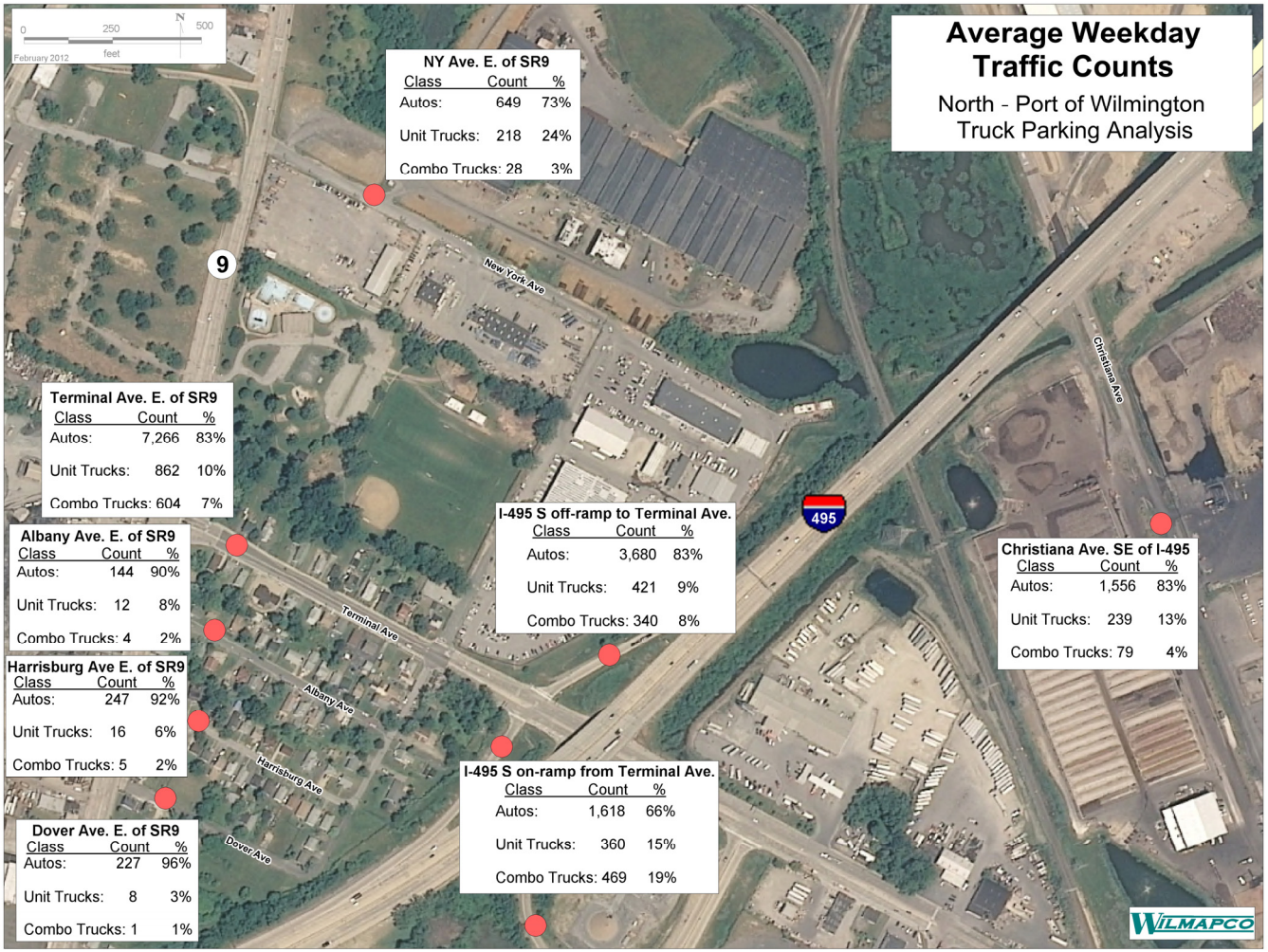
Maps 3 through 6 provide raw count data for the average weekday. Generally, locations closer to the Port, such as those along Pigeon Point Road, showed higher percentages of truck traffic than roadways which serve as the entry point to residential neighborhoods, like Hillview Avenue. Our counter on Pigeon Point Road nearest the Port, for example, found that about 47% of weekday traffic were trucks (21% unit, 26% combo); by contrast only 4% of traffic on Hillview Avenue was comprised of trucks. Unfortunately, one counter malfunctioned, Terminal Avenue at Christiana Avenue, and no data were collected. We did not attempt to re-collect these data, as they were deemed nonessential to the study.

A combination truck moves through South Wilmington.

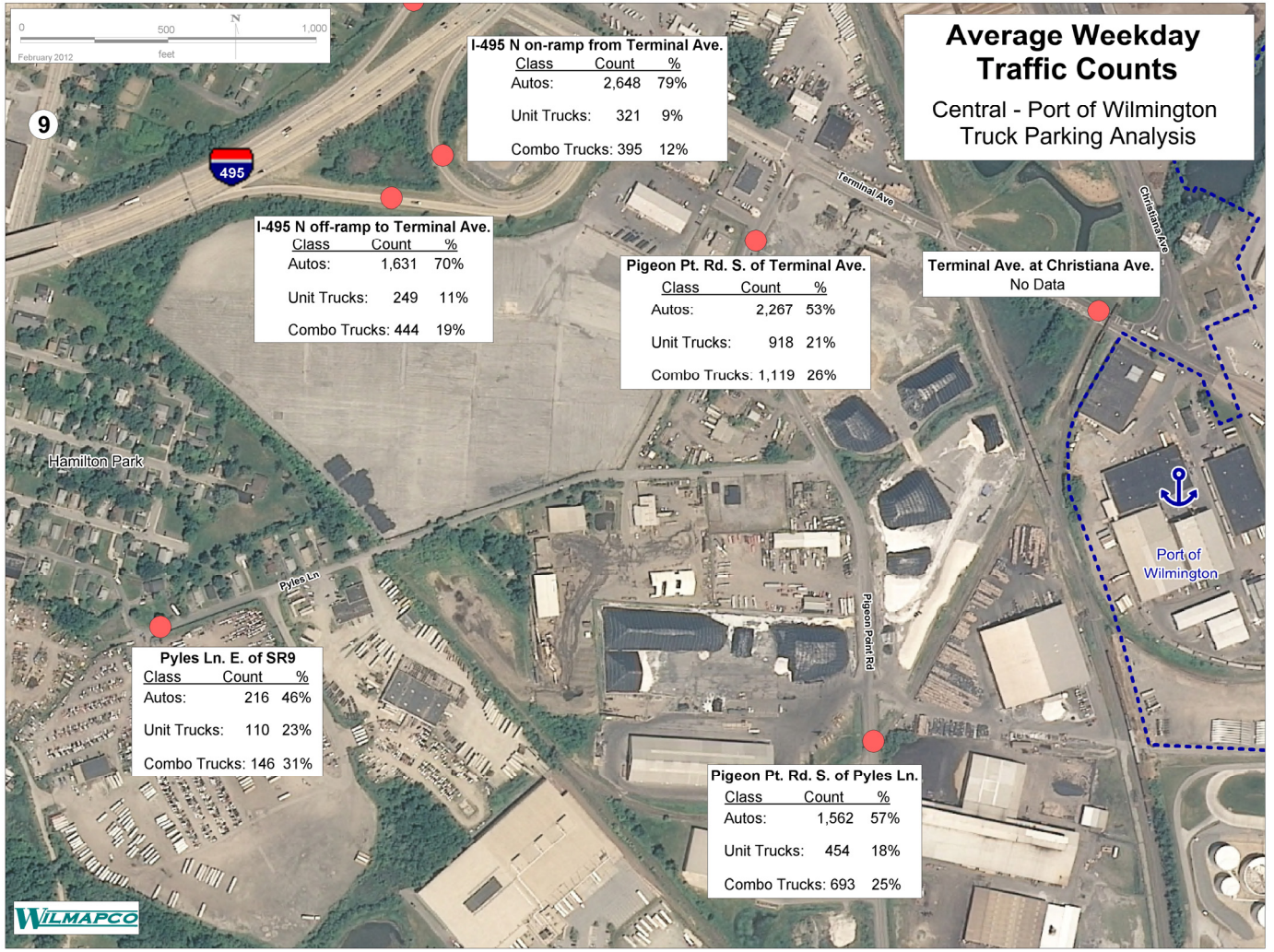
From these data we can identify the key combination truck routes in South Wilmington.

1.) I-495 at Terminal Avenue: 1,648 total combo truck moves (between 8% and 19% of traffic) between all on and off ramps
2.) Pigeon Point Road (between Terminal Avenue and Pyles Lane): 1,119 moves (26%)
3.) Pigeon Point Road (between Pyles Lane and Lambson Lane): 693 moves (25%)
4.) Terminal Avenue (east of SR 9): 604 moves (7%)
5.) Lambson Lane (at Pigeon Point Road): 342 moves (15%)
6.) Pyles Lane (east of SR 9): 146 moves (31%)

Map 3: Average Weekday Traffic Counts (North)



Map 4: Average Weekday Traffic Counts (Central)



Map 5: Average Weekday Traffic Counts (South)

Impact to Surrounding Communities

The Port of Wilmington, nearby businesses, and the truck trips they generate contribute to poor air quality in South Wilmington and throughout our region. Studies have found elevated emissions rates in the surrounding communities – particularly related to particulates and fine particulate matter (PM 2.5), nitrogen oxides (NOx) and various air toxins. Diesel exhaust from trucks, ships, and cargo-handling equipment are major contributors to these emissions[14]. Concurrently, poor respiratory health has been identified among the 3,500 nearby residents. Curtailing illegal truck movements on residential roadways and reducing truck idling will help improve the air quality in this area.

About two dozen combo trucks move east (23) and west (25) along Lambson Lane on the average weekday.

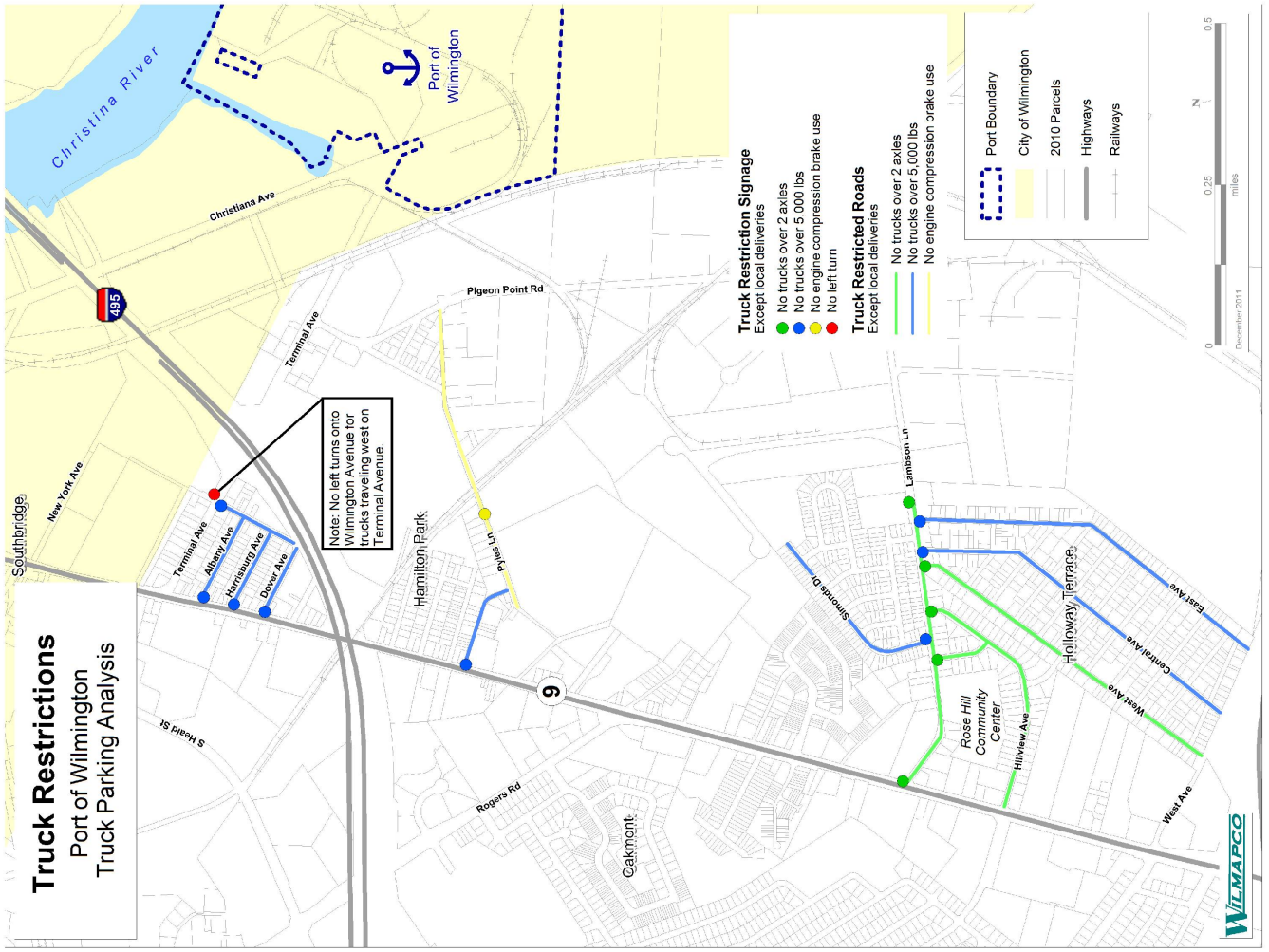
Truck-restricted Roadways

Many roadways in South Wilmington are restricted to non-local truck trips. These include Pyles Lane and smaller roadways in Hamilton Park, along with Lambson Lane, Hillview Avenue and the smaller roads that they connect in Holloway Terrace.

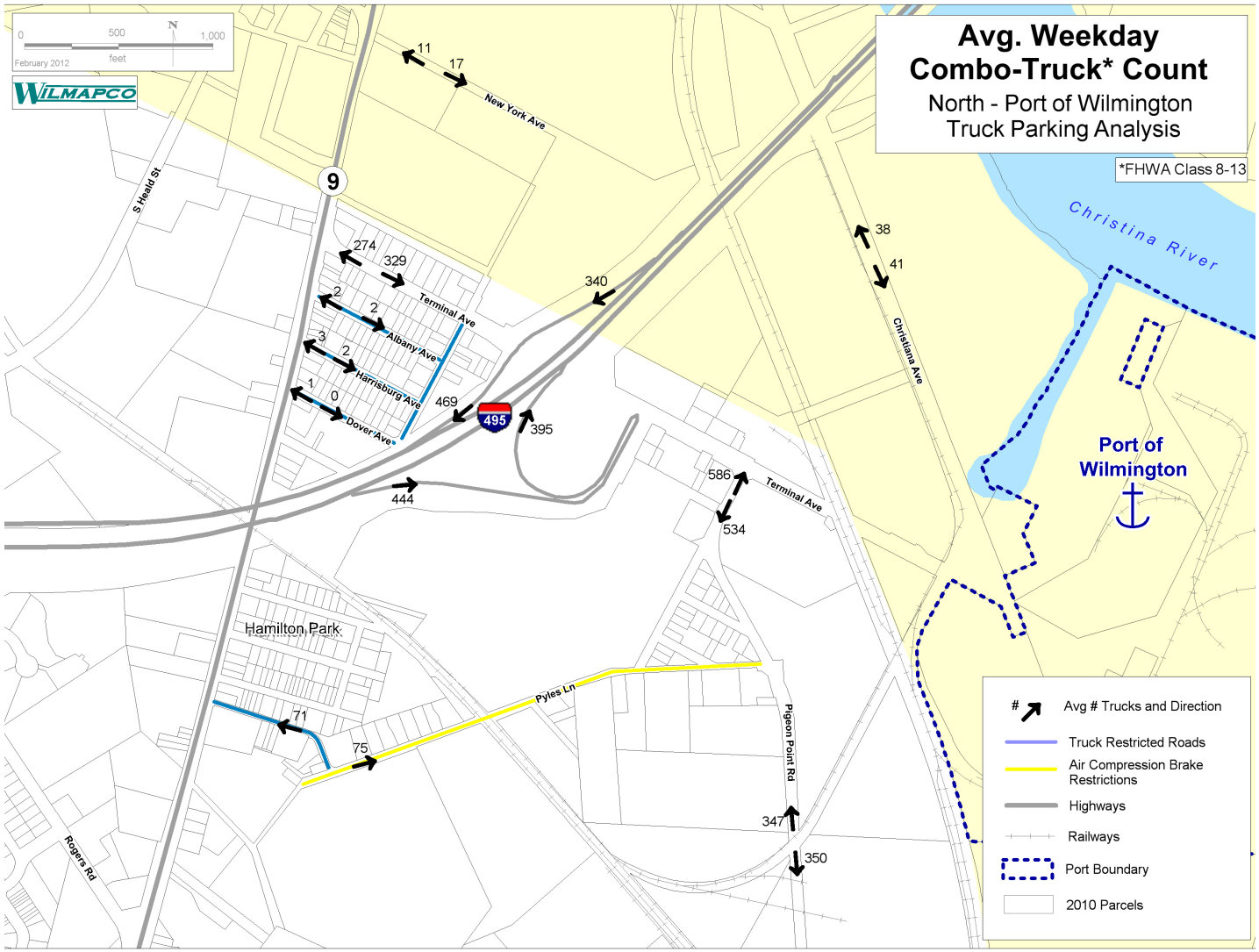
Area residents repeatedly report that combination trucks violate these restrictions. Maps 6 and 7 overlay combination truck movements with restricted roadways. While we are unable to tell how many of these trips are local versus non-local, the sheer volume on two roadways in particular – Pyles Lane and Lambson Lane – suggests numerous violations each day.

[14] *Harboring Pollution: Strategies to Clean Up U.S. Ports*. By NRDC and the Coalition for Clean Air. March 2004.

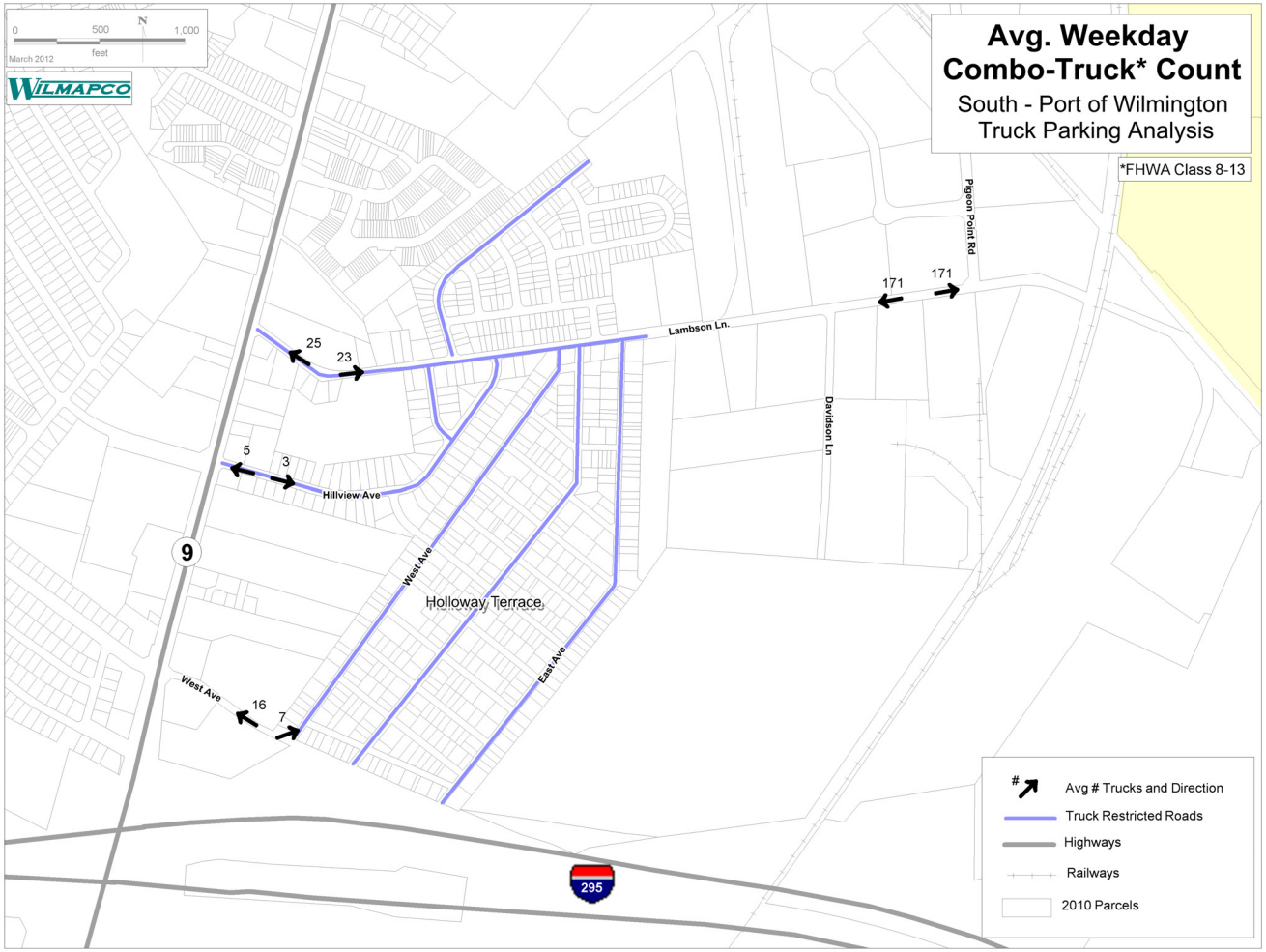
Map 6: Local Truck Restricted Roads



Map 7: Combo Trucks versus Truck Restricted Roads (North)



Map 8: Combo Trucks versus Restricted Roads (South)



Trucks will be common in South Wilmington so long as the Port and area businesses continue to utilize them. Strong efforts must be made, however, to limit their presence on residential roadways. Below are several recommendations:

- Restrict all currently truck-restricted roadways to "residential delivery only" truck trips
- Enact comprehensive truck signage adjustments across South Wilmington, directing trucks to non-restricted roads and away from restricted roads
- Make GPS directional adjustments to reflect truck-restricted roadways
- Enforce truck violations
- Implement the South Wilmington Signage Study
- Explore the creation of a truck access route to Terminal Avenue or Pigeon Point Road to reduce movements on Terminal Avenue through Hamilton Park

Port Parking, Idling and Early Morning Combination Truck Movements

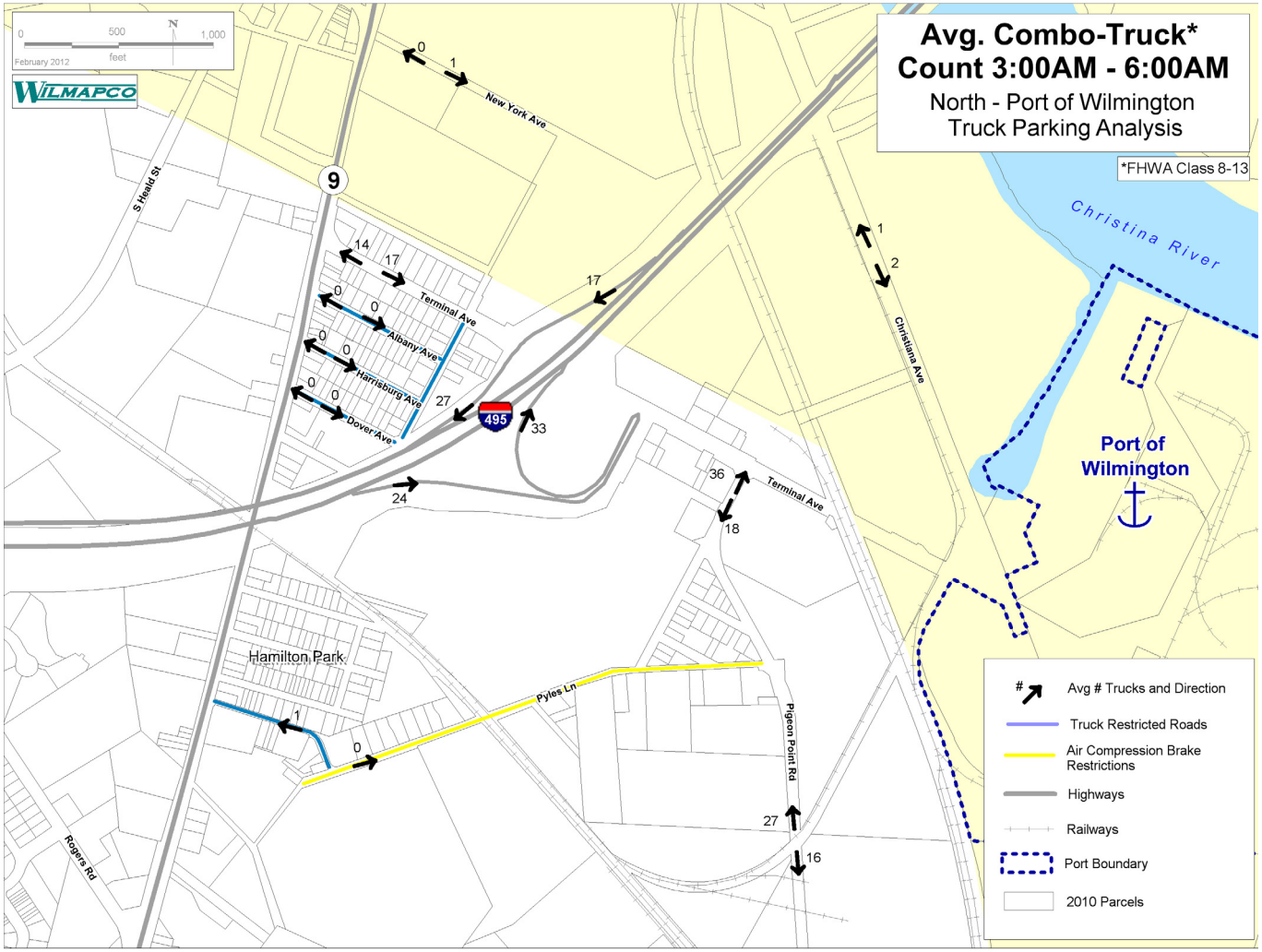
The Port of Wilmington is a daytime operation. Its gates open at 7 AM and close at 5 PM, while those of Chiquita and Dole (two of its biggest shippers) open an hour later and also are lowered at 5 PM. The Port reports no queuing problems in the morning, with trucks jockeying for position at the start of the day. According to the Port, there are spaces within the facility where trucks may queue if there is a backup.

Community leaders, however, have reported that combo trucks sometimes idle for several hours overnight[15]. They have primarily been spotted along Terminal Avenue, near its interchange with I–495. It is speculated that these trucks are waiting for the Port, or some other business to open.

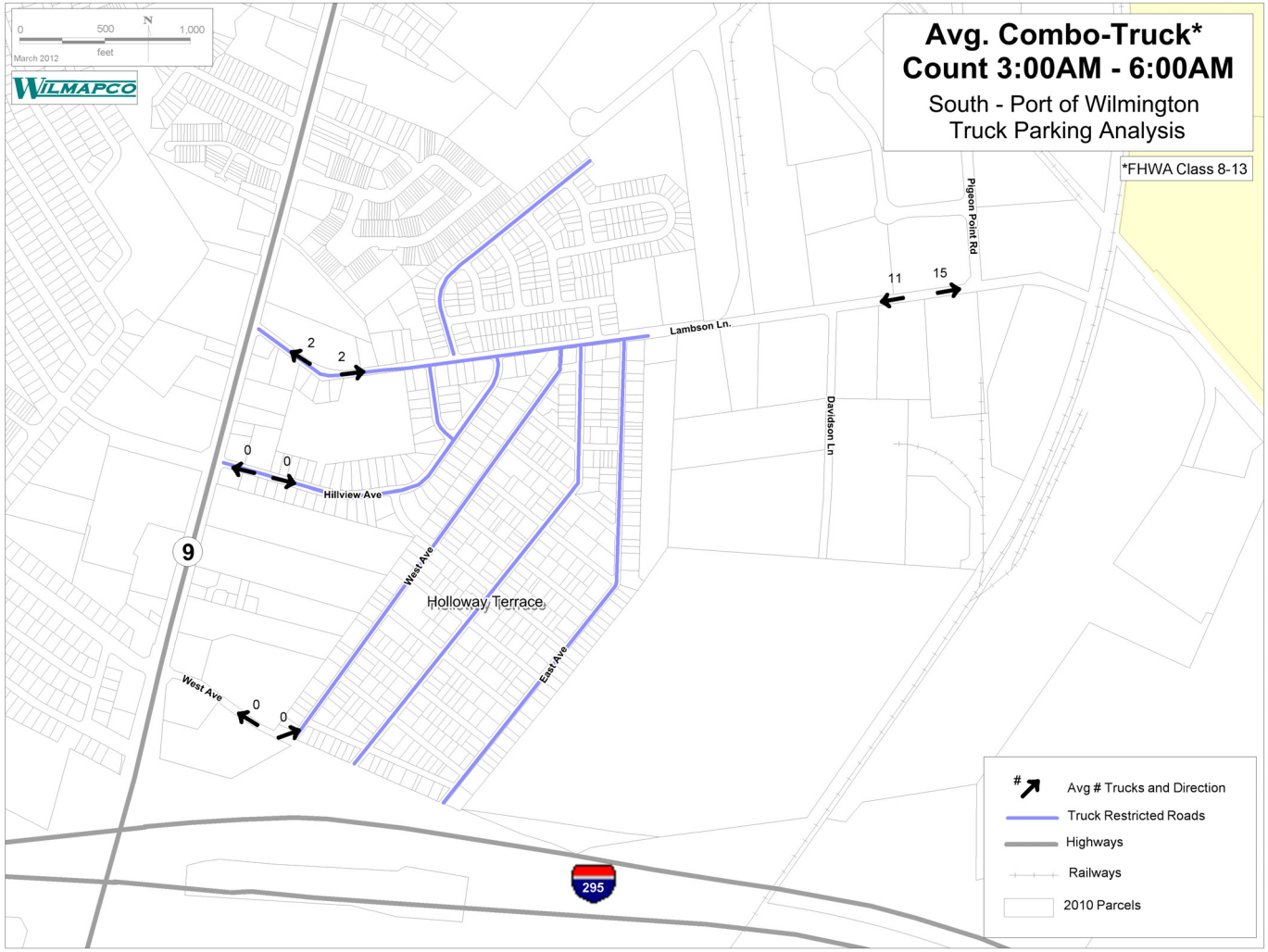
We can scan some of the data collected in our traffic counts to get a sense of combination truck movement during the nighttime hours. Dozens of combination trucks were tracked moving about the study area between 3 AM and 6 AM on the average weekday. Illustrated in maps 9 and 10, most of this activity was found at counters around the interchange, and along Terminal Avenue and Pigeon Point Road. On average, 41 combo trucks exited I–495 and onto the local roadway network during these early hours. Meanwhile, some 60 combo trucks accessed the interstate. About 18 traveled south on Pigeon Point Road, while 36 moved north. About a dozen rolled east (15) and west (11) on Lambson Lane, though only a couple exited and entered in the restricted residential area. WILMAPCO staff visited the study area a couple early mornings in January 2012, and found a hive of activity along Pigeon Point Road as the data suggest.

[15] Truck idling is illegal in Delaware. In 2005 DNREC adopted "Regulation 1145 – Excessive Idling of Heavy Duty Vehicles," which, in most cases, prohibits trucks over 8,500 pounds in gross vehicle weight for idling longer than three minutes. The regulation is specifically aimed at tackling excessive diesel exhaust. Enforcement of the regulation has proven difficult, however, due to the dearth of environmental officers in the state.

Map 9: Early Morning Combination Truck Movements (North)



Map 10: Early Morning Combination Truck Movements (South)



Based on these data and observations, a truck parking area has the potential to be utilized outside of daytime business hours. One important knowledge gap is the origin/destination of these early morning truck movements. Many may not be associated with the Port, which throws into question whether or not the parking area would be open to them. A survey of truck drivers during these off-hours is warranted. It could assess their origin and destination, as well as the driver's interest in using a parking area.

The truck parking area should be electrified as soon as possible, to avoid noise and idling concerns that a congregation of two or three dozen trucks would pose. In the meantime, residents should report truck idling violations[16] and local police should be vigilant with enforcement.

IV. Possible Staging Area Locations

This section reviews potential locations for a truck parking area in South Wilmington. In selecting the locations, we considered proximity to the Port, access to major roadways, and lot size and function. Two locations, shown on map 10, were identified as having good potential: 1.) The F & H Transport property on Terminal Avenue at I–495; 2.) The Pigeon Point Road LLC property on Terminal Avenue at Pigeon Point Road. Six additional properties were considered during the course of the study, but were dismissed due to one factor or another.

Table 1 provides some broad characteristics of these two good potential sites. Both are close by the Port, but each is unique in terms of its current use and property class. The merits of each will be discussed below.

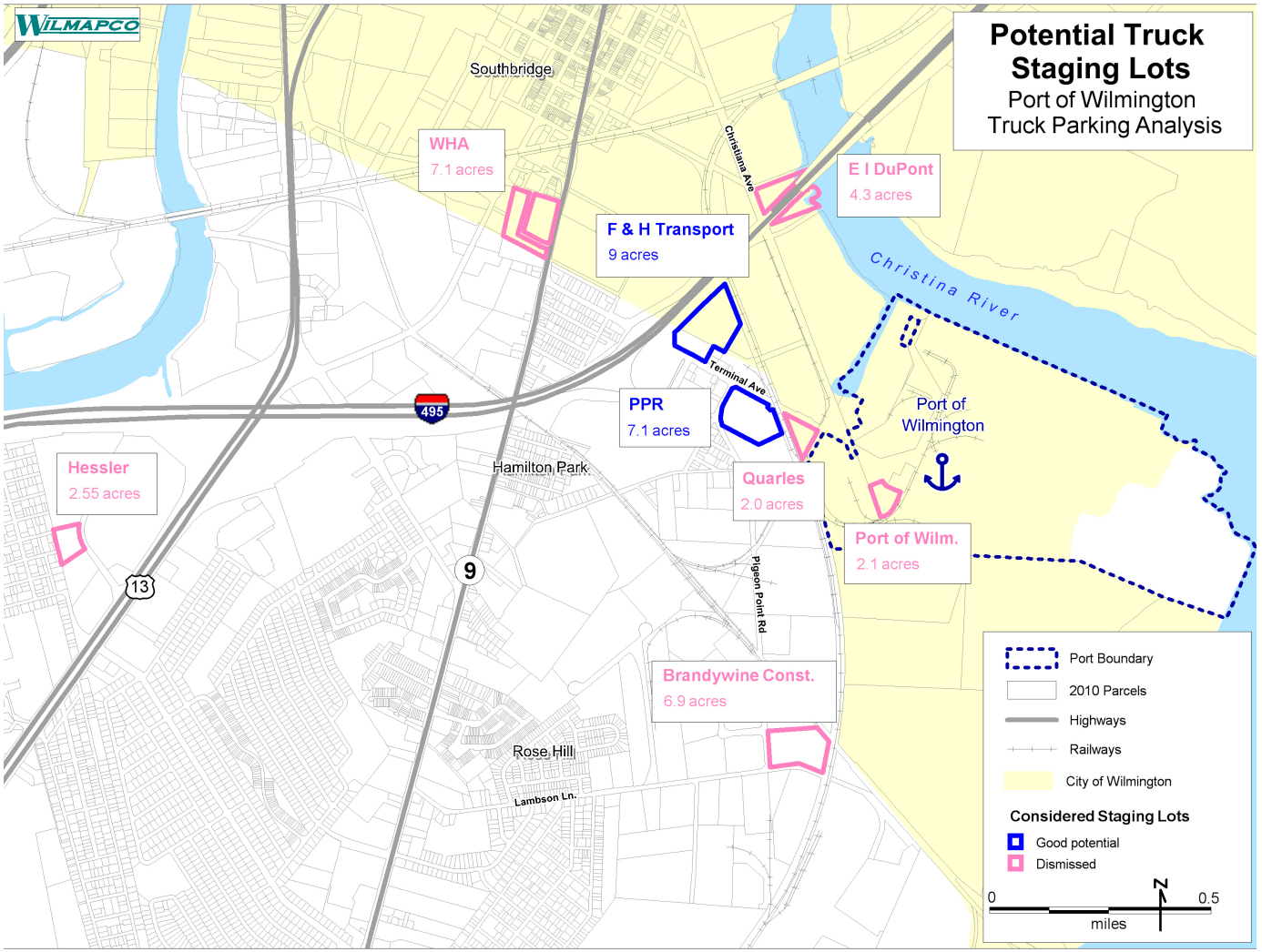
Table 1: Characteristics of the Two Potential Staging Areas[17]

Owner	Acres	Distance	Housing w/in 0.25 mi.	Land Value	Property Value	Property Class
F & H Transport	9	0.5 mi. (1 min.)	55	$7,000	$269,000	Commercial
Pigeon Point LLC	7	0.4 mi (1 min.)	7	$210,600	$83,000	Industrial

[16] Idling violations can be reported to DNREC at: 800 – 662 – 8802.

[17] Sources: New Castle County, 2012; Google Maps

Map 11: Possible Staging Area Locations



Site 1: F & H Transport, Terminal Avenue at I-495

Our first site is the F & H Transport property on Terminal Avenue at I–495. This commercial site developed in the latter half of the 20th century. The property already functions as a way station for company trucks, and boasts a small café. At 9 acres it is the larger of the two properties under consideration, and the closest to the I–495 interchange. It is exactly a half-mile from the Port's main gate, or about 1 min. The land is valued at $7,000, while the structure is estimated at $269,000. Map 12 provides an aerial view of the property.

F & H Transport already serves as a truck stop and boasts a café.

Below are some pros and cons of developing a staging area on the F & H Transport site:

- The site is the closest to the I–495 at Terminal Ave. interchange, and is the largest of the two at 9 acres.
- It already operates as a truck parking area, with some amenities.
- A traffic signal would likely be necessary to regulate movements in and out of the site. The nearby I-495 northbound off-ramp would likely complicate matters.
- Sidewalk is in place along the properties frontage with Terminal Avenue, and potential rail access.
- Hundreds of housing units are nearby (0.5 mile), and dozens of Hamilton Park residents are very close (0.25 mile) to this property.
- The southwestern portion of the parcel would be challenged with a 1.5 meter rise in sea levels.

Site 2: Pigeon Point Road LLC

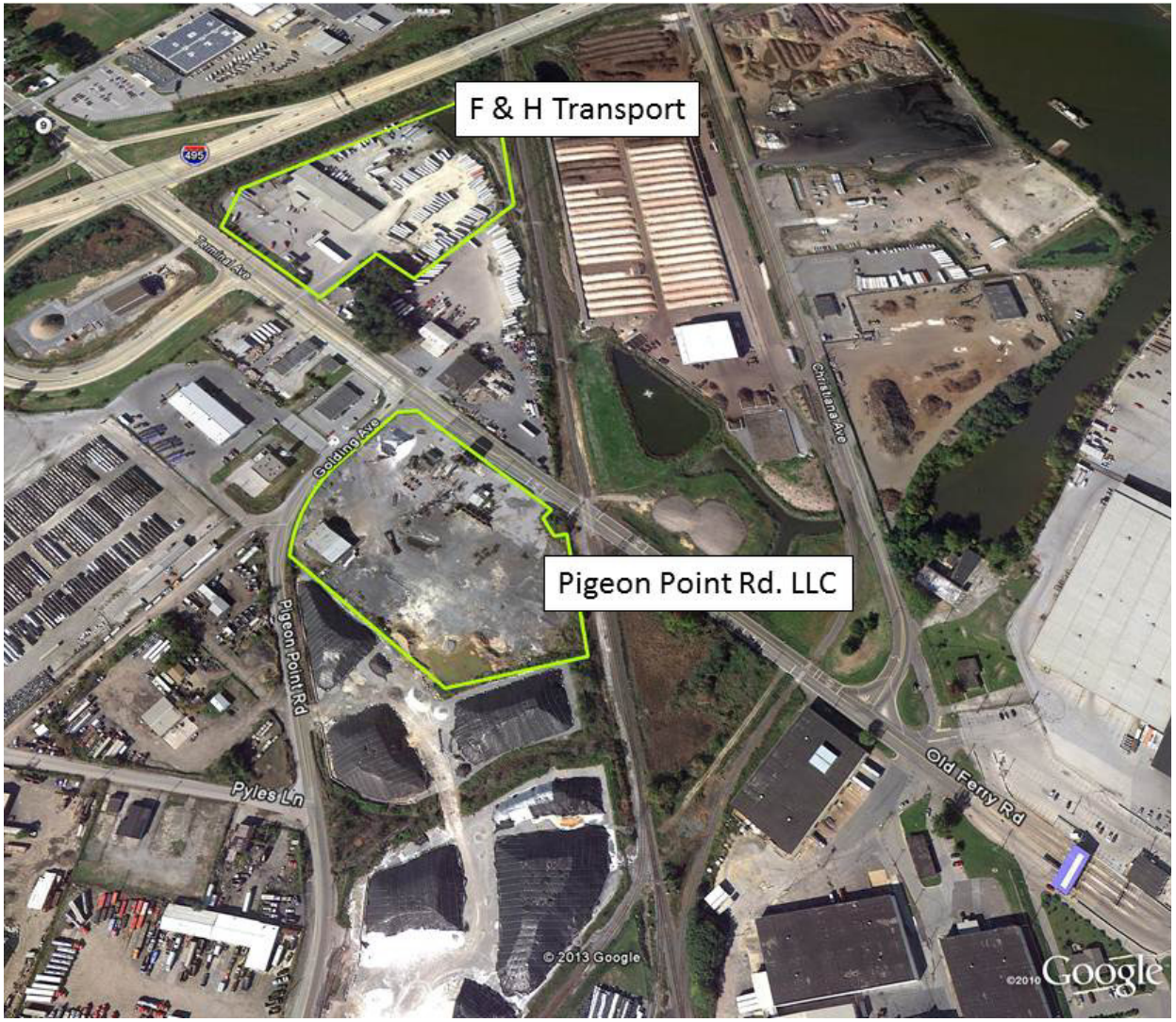
Our second site has featured in Wilmington's industrial landscape since the middle of the past century. Its size and cost are similar to the F & H property, but fewer households are nearby.

Piles of material dot the Pigeon Point Road industrial site.

Below are some pros and cons to consider about this site:

- At 7 acres this site boasts plenty of room.
- Much of the property is unpaved and undeveloped, serving as a staging area for loose material.
- Unlike the F & H site this property rests at an existing intersection, which should make it easier for trucks to enter and exit.
- The property has rail access, but no sidewalks.
- Only a handful of housing units (7) are within a quarter-mile.
- The eastern quarter of the property would be challenged at a 1.0 meter sea level rise.

Map 12: Aerial View of the Two Potential Staging Sites



Other Locations

Six other potential truck staging locations (shown on Map 10) were considered during the course of this study. Each, however, presented a major concern which led to its dismissal from consideration. We list each site, along with the reason(s) for its dismissal, below.

- **Wilmington Housing Authority (WHA) Southbridge Extension**: significant housing impacts, additional truck traffic along Terminal Avenue through Hamilton Park
- **Hessler**: significant housing and environmental impacts; property lies alongside a housing subdivision
- **El DuPont**: property's position underneath I-495 was a homeland security concern for DelDOT
- **Quarles Petroleum**: property is designated a tidal wetland, out of play
- **Port of Wilmington (existing parking)**: acreage too small; questions about whether non-port related trucks could utilize the site
- **Brandywine Construction**: potential to increase truck traffic along Lambson Lane; far from port gate

V. Other Transportation Needs

The Port of Wilmington and surrounding communities have identified a number of transportation concerns beyond the need for a truck staging area. While most are well beyond the scope of this study, the present section seeks to highlight these concerns and offer specific recommendations where we can.

Identified Concerns

Working with DelDOT, the Port of Wilmington has identified numerous short- and long-term needs. These range from making pedestrian improvements along Terminal Avenue to extending freight rail lines to the dock area. All are listed in table 2.

Table 2: Port of Wilmington Needs

No.	Improvement	Description
	Short-Term Needs	
1.)	Truck parking areas	Alleviate backups on Terminal Avenue; free space at Port
2.)	Terminal Avenue	Sidewalks; lighting
3.)	Pigeon Point Road	Add shoulders; access for Magellan tankers
4.)	Dredging sites	Identify locations for silt
5.)	Add Dolfin to autoberth	Would accommodate larger ships
6.)	Cranes	Develop schedule for replacement
7.)	New Gate	Improve gate to ease future backups
8.)	Integration of CVISN	Install virtual WIM at the port
	Long-Term Needs	
1.)	Extension of autoberth	Add 170 acres on River; this would add four docking sites
2.)	I-495 Interchange	Ensure good future access to highway
3.)	Rail	Extend rail to dock; increase rail car storage capability

Communities around the Port of Wilmington have similarly voiced a number of needs, many of which directly and indirectly relate to transportation. Table 3 outlines those, which were gathered from a March 2010 meeting of area civic leaders and interested residents.

Table 3: Community Needs

No.	Improvement	Description
1.)	Zoning changes or voluntary relocation	Industry not compatible with residential; social justice issue
2.)	Industrial site regulation	Not enough regulation by DNREC
3.)	Truck traffic	Destroys roads, worsens air quality, late-night trips, idling at interstate ramps
4.)	Terminal Avenue	Left turn violations
5.)	Pyles Lane	Reduce truck volume
6.)	Beautification	Prevent trash dumping, remove unused rail tracks, streetscape

While we are unable to address most of these concerns given the context of the present study, each deserves attention. The remainder of this section will tackle some issues with nonmotorized access to the Port.

Pedestrian, Bicycle and Streetscape Improvements

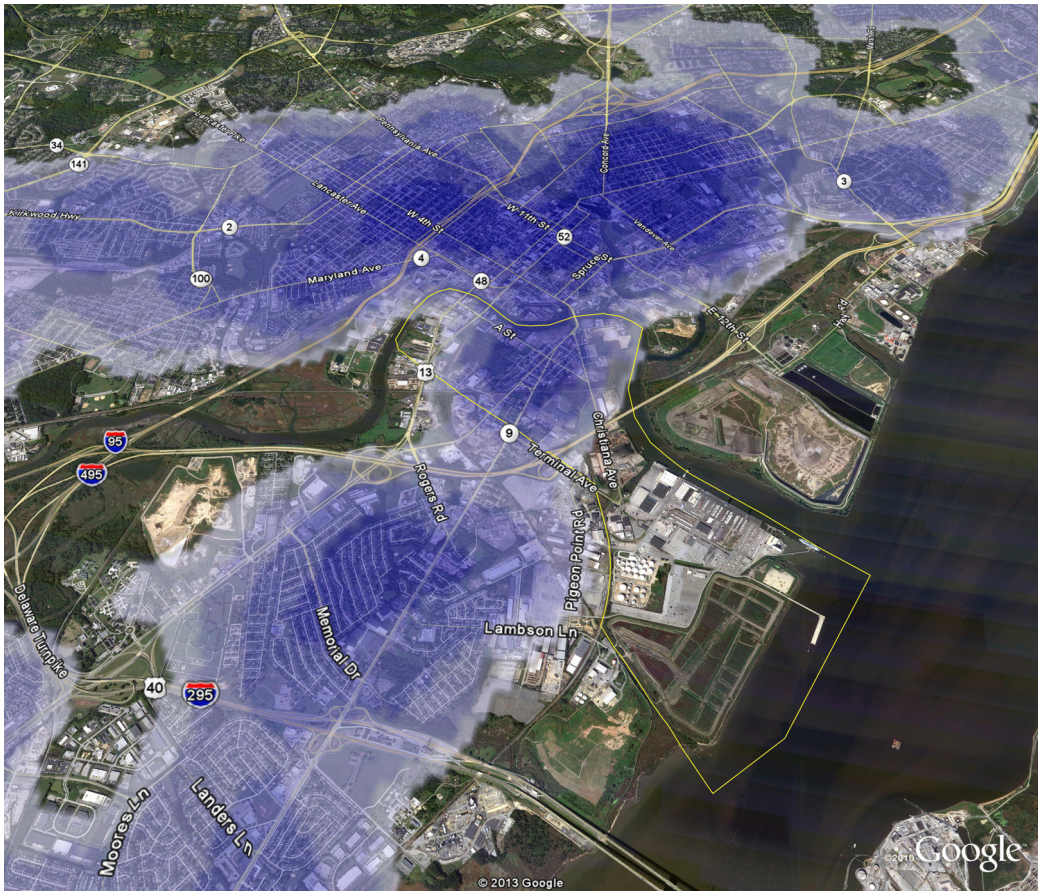
Both the Port and surrounding communities would like to see streetscape and beautification improvements around the Port. This is a particular concern for workers who travel to the Port on foot or by bus. The Port area is significantly lacking in pedestrian infrastructure and has no bicycle infrastructure.

It is not known what percentage of the Port's workers reach its gate via alternative transportation. It can be estimated, however, that over half of the workers live less than 10 miles away. Using census data we can map workers who commute to tract 19.02, within which the Port is the largest employer. Of the 1,700 jobs in the census tract, more than 1,000 belong to workers that live less than 10 miles away. Map 12 displays hotspots of these nearby workers. With so many workers living nearby, we can say that there is good potential for bus, bicycle and pedestrian commutes to the Port.

DART Route 8 provides fixed-route bus service to the Port. The route terminates at a bus stop in front of the Port's gates at the intersection of Christiana Avenue and Terminal Avenue. It connects into Wilmington's West Side neighborhoods and the Downtown, running every half-hour during weekdays and every 45 minutes on Saturdays. Route 8 does not operate on Sundays.

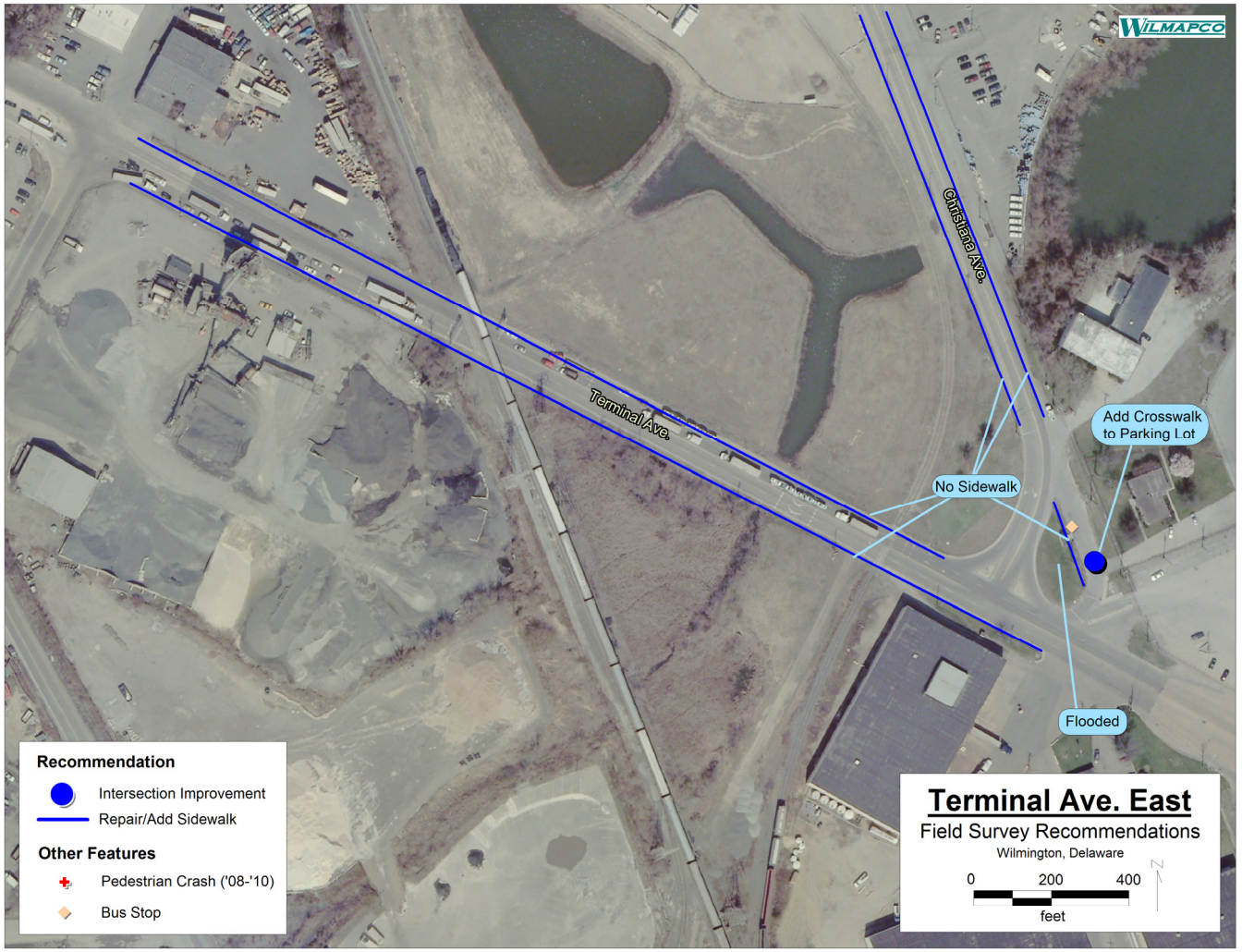
WILMAPCO conducted fieldwork along Terminal Avenue in February 2013 to examine the connectivity of alternative transportation into the Port. Terminal Avenue can be broken into three logical segments: Terminal Avenue East (Port gate to bus stop), Terminal Avenue Central (bus stop to Pigeon Point Road) and Terminal Avenue West (Pigeon Point Road to SR 9). Our recommendations and observations are described below, and are illustrated on maps 13 – 15.

Map 13: Hotspots of Tract 19.02 Worker Residence[18]

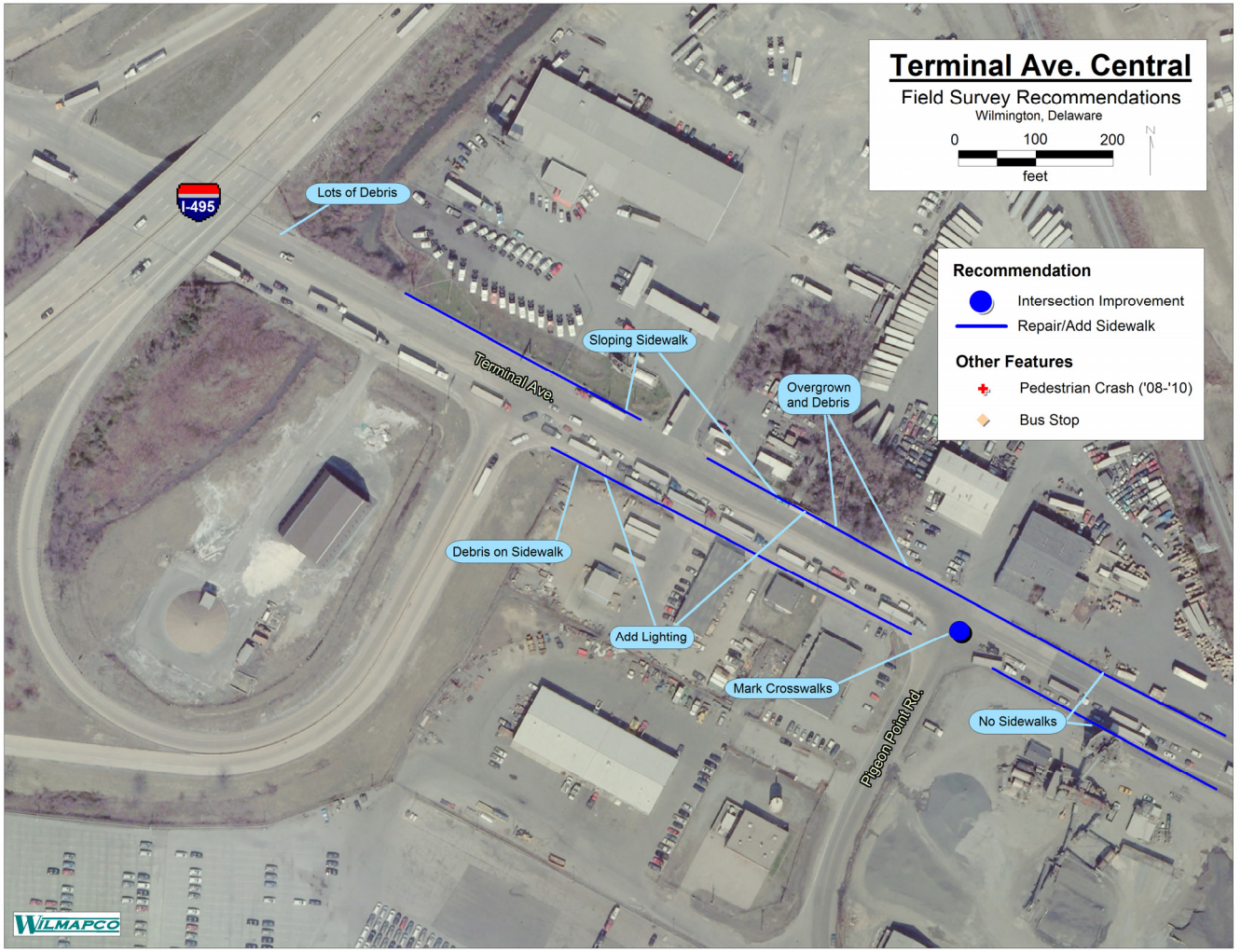


[18] Source: US Census, Job Counts by Distance/Direction in 2010

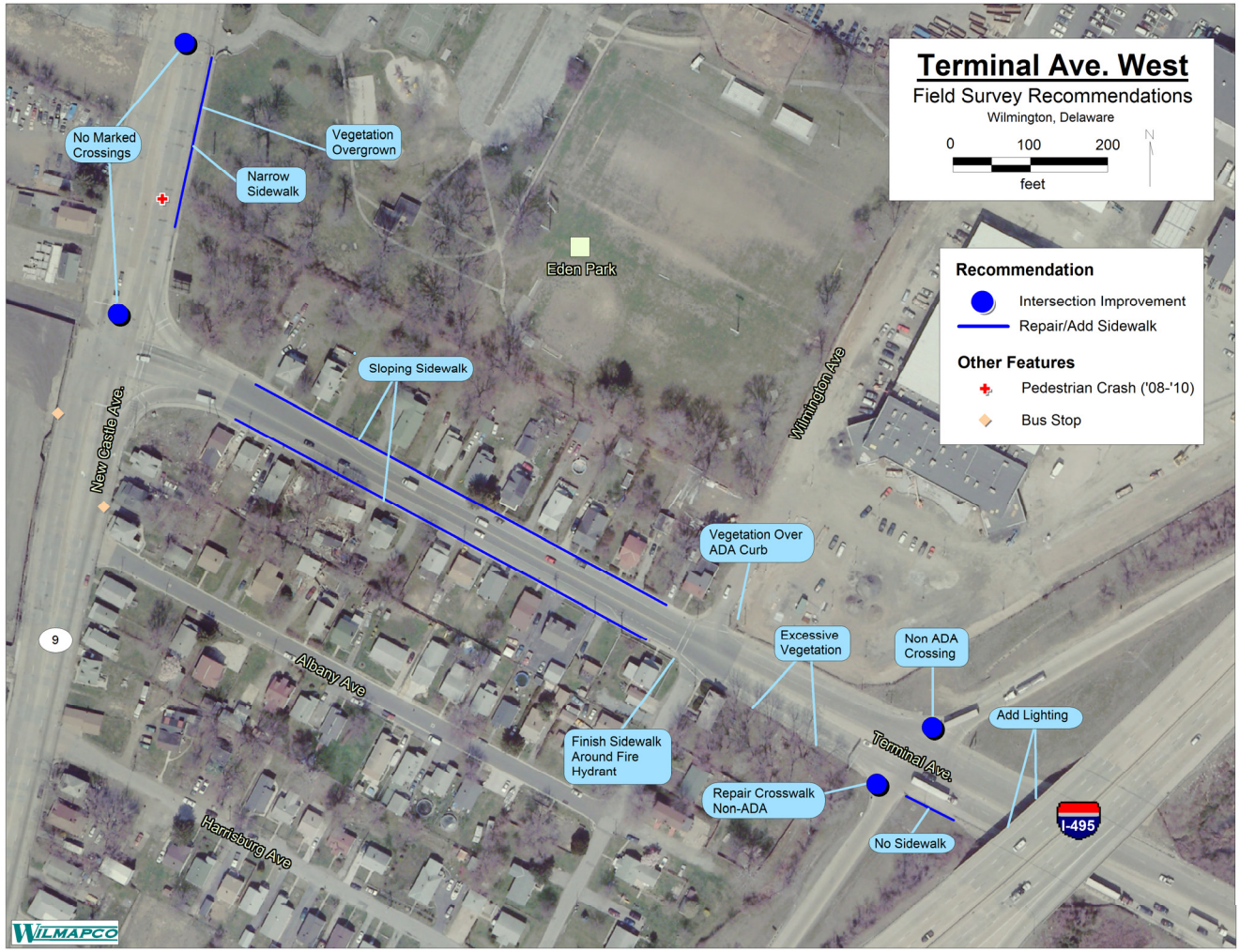
Map 14: Nonmotorized Recommendations Terminal Avenue East



Map 15: Nonmotorized Recommendations Terminal Avenue Central



Map 16: Nonmotorized Recommendations Terminal Avenue West



Terminal Avenue East is the most challenging of the three segments for nonmotorized traffic. No sidewalks are in place, or even crosswalks to access the bus stop. Sidewalk should be added in front of the bus stop, along with a safe, marked pedestrian crossing of Christiana Avenue into the Port. Sidewalks (and lighting) should be considered along at least one side of Terminal Avenue between Pigeon Point Road and the Port. This would provide a connection into the existing sidewalk west of Pigeon Point Road, Terminal Avenue's shops and, importantly, the bus lines which operate along SR 9. On-road bicycle markings should be considered on Christiana Avenue, along with bicycle parking opportunities at the bus stop and on Port property[19].

Conditions at the Route 8 bus stop are shown here.

[19] Bicycle connections into the Port were discussed at the May 2013 meeting of Wilmington's Bicycle Committee. It was agreed that Terminal Avenue's heavy truck traffic would not be conducive towards safe bicycling. Christiana Avenue, however, could provide a bicycle link from Wilmington into the Port.

There is little room for pedestrians along this stretch of Terminal Avenue near the Port.

Terminal Avenue Central is problematic for a pedestrian to safely traverse. While sidewalk is in place, it is often sloping, or covered with debris/vegetation. Lighting is needed throughout this segment to improve safety during non-light hours. Additionally, the intersection of Pigeon Point Road and Terminal Avenue requires marked pedestrian treatments.

Debris and vegetation cover much of the sidewalk along Terminal Avenue.

Terminal Avenue West faces many similar issues. Lighting is lacking underneath I–495 and road crossings should be upgraded to improve pedestrian safety. Solid sidewalk exists throughout most of this segment, but excessive vegetation along it should be cleared east of Wilmington Avenue. Further, the sidewalk begins to noticeably slope as it passes through Hamilton Park, between SR 9 and Wilmington Avenue. SR 9 itself is also in rough shape, with no crossing opportunities, narrow sidewalk and overgrown vegetation.

After completing their journey along Terminal Avenue, pedestrians are faced with yet another challenge – SR 9.

VI. Implementation Needs

Many recommendations were made throughout this study. They can be broken into the following categories: truck staging area development, enforcement of truck roadway restrictions and idling, and nonmotorized recommendations. This section summarizes them, and outlines the steps to realize their implementation.

Truck Staging Area Development

We found good potential to continue the pursuit of a truck parking lot outside of Port property. Data and fieldwork revealed heavy truck use and staging in the vicinity of the Port, both during and after business hours. Any future increase of port activity (as is expected) would likely further necessitate this lot, to better manage combination truck movements.

After an examination of properties nearby the Port two – F & H Transport and Pigeon Point Road LLC – were found to meet the necessary criteria to house this lot. Both are nearby the Port on Terminal Avenue, have plenty of room, and would have minimal noise/emissions impacts to nearby housing. Both properties are privately owned.

The development of an eventual staging area may take a couple of forms. It could be a private venture, with an investor seeking good long-term returns on TSE and/or short-term ones on comfort services, such as cafés and sanitation. Or, the development could be initiated by the Port or the State to allow for Port expansion and better manage truck flow in South Wilmington.

Whomever the owner, the eventual parking site should have, or work to have, the following amenities:

- Security (lighting, guards, cameras, fencing, etc.)
- Signage (both on-road and electronic)
- Sanitation (toilets and showers)
- Food and beverages (cafés)
- Electric plug-ins

Security is a particular concern for local police and community leaders. With its abundance of truck drivers, South Wilmington experiences particularly high levels of prostitution. Both local police and community leaders can foresee this staging area attracting prostitutes. While this would seem on the surface to be a benefit by reorienting the illegal trade away from local roadways, there is a fear that prostitution (and downstream crime) would increase overall. All this underlines the need for security measures at the staging area. Strategically placed cameras and electronic screening tools should be incorporated at the staging area, and perhaps along restricted roadways, to help police with enforcement and support the Commercial Vehicle Information Systems and Networks (CVISN) Program.

Just as community leaders suspect prostitution may become more common with the introduction of a staging area, there is a feeling that overall truck presence will increase. The suggestion here is that a staging area shining with new amenities may attract truck drivers on trips unrelated to South Wilmington. This is unlikely, however, so long as the nearby I-95 rest area (with many more diversions) remains operational.

The cost of a staging area varies, depending on the location selected and the services and amenities offered. The cost of purchasing either the F & H Transport or Pigeon Point LLC properties would run in the neighborhood of $300,000. The electrification of 30-50 parking spots would require an outlay of around $50,000. Fencing, building construction, security camera installation, along with ongoing maintenance and labor fees would add to the cost. A reasonable estimate would be an initial investment of around $500,000.

Federal and state grants may defray these costs. Diesel Emission and Reduction Act (DERA) funding was used to construct the TSE at Trinity Trucking. Unfortunately, federal support for this initiative has waned, and the program is not currently funded. Funding may be reintroduced in future years. Another program, Congestion Mitigation and Air Quality (CMAQ), may be a perfect fit. Delaware receives about $10 million each year in CMAQ, and the reduction of fine particulate matter (of which diesel exhaust is a primary contributor) is a federal priority for CMAQ spending. State-specific programs, such as environmental penalty funds and local legislator funds, may also be tapped to realize the project.

An important caveat with these government grants is that while they may help with the initial financial outlays, ongoing maintenance and labor costs would be the responsibility of the entity ultimately responsible for the site. Theoretically, these costs could themselves be defrayed by revenues generated from the on-site café, along with TSE equipment charges.

More market research would be helpful before an entity pursues this project. It would be useful to survey truck drivers in South Wilmington, for example, to gain insight as to whether or not this site would appeal to them, and what amenities they would recommend.

Truck Restrictions and Idling

Residents charge that trucks often pass illegally through their communities. Our truck count data provided support for this claim, showing heavy typical movement of combination trucks along Pyles Lane and Lambsom Lane, for example. Several measures should be pursued to reduce the presence of these trucks in South Wilmington's communities. The responsible entities are noted in parentheses.

- Restrict all currently truck-restricted roadways to "residential delivery only" truck trips *(community leaders/DelDOT)*
- Enact comprehensive truck signage adjustments across South Wilmington, directing trucks to non-restricted roads and away from restricted roads *(community leaders/DelDOT)*
- Make GPS directional adjustments to reflect truck-restricted roadways *(WILMAPCO/New Castle County/State)*
- Enforce truck violations *(Law enforcement/community leaders)*
- Implement the South Wilmington Signage Study *(DelDOT/local elected officials)*

- Explore the creation of a truck access route to Terminal Avenue or Pigeon Point Road to reduce movements on Terminal Avenue through Hamilton Park *(DelDOT)*

The responsibility of implementing these recommendations cuts across many agencies. The first two bullets are already being pursued by community leaders and DelDOT. The third bullet, truck GPS directional adjustments, will be completed by WILMAPCO in partnership with either New Castle County or the state. Enforcement of violations falls into the purview of law enforcement agencies, as well as residents themselves who can support enforcement. According to New Castle County police, errant truck drivers should also be subjected to load inspections. This time-consuming effort is thought to be more of a deterrent than the minor fines associated with trip violations. County police currently do not have the expertise, however, to complete load inspections and would require additional training. Implementation of the South Wilmington Signage Study is the responsibility of DelDOT and/or local elected officials, while the exploration of a new truck access route would be the responsibility of DelDOT.

Beyond illegal truck movements, residents also charge that trucks illegally idle throughout South Wilmington. The primary trouble spot is at the interstate ramps along Terminal Avenue. The construction of a truck staging lot, especially one that is electrified, would significantly address this problem in the long-term. Even without electrification, the site would be beneficial in terms of removing idling trucks from local roadways–though the cumulative effects upon noise and air quality of dozens of idling trucks is dubious. This underlines the need for the site to be electrified as soon as possible.

In the short-term, residents and local police should focus on enforcing the state's anti-idling regulation. Violators are subject to the penalties of up to $500 for each offense. It is important that local police help DNREC officers enforce this regulation. Violation should be reported to DNREC at: 800 – 662 – 8002.

Other Transportation Needs

Numerous other needs were identified by both the Port and the local community (see Tables 2 and 3). DelDOT and WILMAPCO should continue to bear the transportation needs of the Port in mind, and address them as appropriate. The identified community needs are much broader and requires consideration from New Castle County (in terms of zoning and beautification), DNREC (with industrial violations and beautification) and DelDOT and WILMAPCO for the other transportation concerns.

We specifically addressed nonmotorized issues along Terminal Avenue with this study. Below are the recommendations:

- Improve pedestrian conditions at the bus stop next to the Port
- Consider on-road bicycle markings along Christiana Avenue
- Add sidewalks and lighting along Terminal Avenue between Christiana Avenue and Pigeon Point Road
- Add lighting along Terminal Avenue between the I-495 overpass and Pigeon Point Road

- Clear debris and vegetation along existing sidewalks along Terminal Avenue west of Pigeon Point Road
- Correct sloping sidewalk along Terminal Avenue west of Pigeon Point Road
- Upgrade pedestrian safety/crossing opportunities at all intersections along Terminal Avenue
- Address pedestrian safety concerns along SR 9

DTC should lead efforts to make pedestrian improvements at the bus stop. DelDOT should implement the other recommendations above when Terminal Avenue, Christiana Avenue and SR 9 are next repaved.