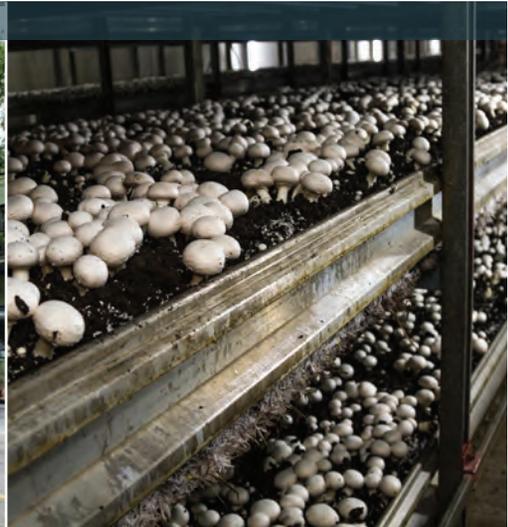




Kennett Area Freight Transportation Study





The Delaware Valley Regional Planning Commission

is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.



DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

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Executive Summary

In response to local initiative and at the request of the Chester County Planning Commission, the Kennett Area Freight Transportation Study was undertaken by the Delaware Valley Regional Planning Commission (DVRPC) with the guidance of a Study Advisory Committee. The purpose was to examine freight conflicts in more detail and provide recommendations that support economic growth and strengthen livable communities by ensuring safe, efficient movement of goods and people. This study concentrated on a six-municipality study area (Kennett Area) which included Kennett Square Borough, Avondale Borough, Kennett Township, East Marlborough Township, London Grove Township, and New Garden Township.

This study explores strategies to address existing geometric constraints, bridge restrictions, truck movement and routing issues; and to protect or enhance historic and commercial boroughs. This report serves as a guide for the Kennett Area municipalities and Chester County to advance improvements that will enhance freight movement and better manage the community impacts of vital local industries.

The study documented the existing land use and employment patterns in the Kennett Area, which is heavily dominated by Agriculture with 12 percent of study area employment. This is directly attributed to the mushroom industry, which makes Kennett Square the “Mushroom Capital of the World.” Agriculture and other freight-intensive industries contribute to a complex pattern of truck activity across the study area. A comprehensive needs assessment and analysis of activity and safety data highlighted issues in the Kennett Area around truck routing in smaller boroughs, activity in residential zones, high volumes on Pennsylvania Route 41 (PA 41), and potential for conflict along some routes. In addition, a patchwork of restrictions, poorly signed routes, and a need for more consistent route planning and communication were identified.

Based on the findings in the needs assessment and analysis, this report lays out a set of recommendations that can be undertaken by Kennett Area municipalities and Chester County to address these concerns, including:

- implementation of traffic-calming strategies;
- designation of a local truck route network; and
- improvements to directional and truck restriction signage.

This report concludes with a brief discussion of next steps to be undertaken by the Kennett Area municipalities and Chester County. Action steps for implementation are outlined, along with potential funding sources and resources available to support these recommendations.

Introduction

The Kennett Area is recognized for its charming small-town feel and rural character. Nestled in bucolic southern Chester County, Pennsylvania, this area also plays a dynamic role in the regional economy as a national center for mushroom production and the packaging and distribution of refrigerated fruits and vegetables. These two defining attributes can sometimes enter into conflict with local residents, most noticeably in the form of tractor-trailer traffic on narrow rural and village streets.

Purpose and Need

The Kennett Area is defined by a cluster of municipalities closely linked by related industries, character, and transportation systems. As illustrated in Figure 1, this study area includes Kennett Square Borough, Avondale Borough, Kennett Township, East Marlborough Township, London Grove Township, and New Garden Township in southern Chester County.

This study focuses on key truck generators to identify existing activity and emphasizes solutions that can better manage truck movements while maintaining community character and safety for trucks, passenger vehicles, pedestrians, and bicycles. With a focus on identifying conflicts with freight, the study team explored strategies that address existing geometric constraints, bridge restrictions, truck movement and routing issues; and strategies that protect or enhance historic and commercial boroughs.

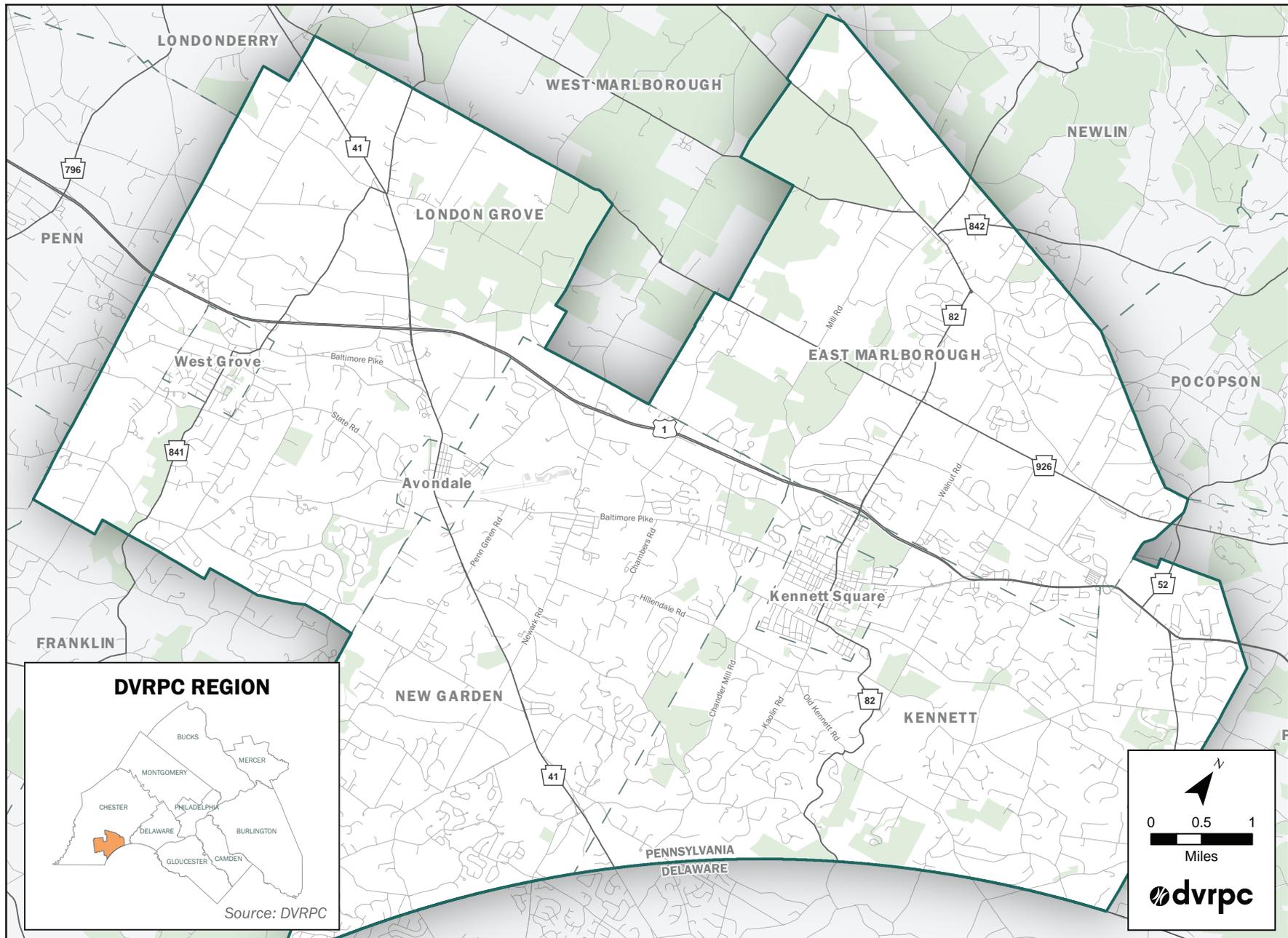
The strategies identified for the study are intended to:

- improve traffic flow;
- designate and improve truck routes;
- provide appropriate wayfinding; and
- minimize conflicts and impacts of freight on other modes.

To support the development of these improvements, the project team conducted a comprehensive needs assessment, documented existing conditions, analyzed and mapped relevant data, and worked with stakeholders to identify achievable recommendations and next steps. The project recommendations provide the local communities and county with a foundation for additional work related to optimizing freight movement and better managing the community impacts of these vital industries in the Kennett Area. These recommendations include proposed local action to improve the visibility and clarity of signage, implementation of new traffic-calming and pedestrian-crossing measures, and the formation of a truck route work group to advance the development of a final truck route network based on the recommended framework.

Through these recommendations, ongoing multimunicipal coordination, and support from the county and DVRPC, the Kennett Area can continue to grow the local economy in a way that supports and preserves multimodal access.

Figure 1: Kennett Area Map



Study Advisory Committee

DVRPC convened a broad-based coalition of public, private, and institutional stakeholders from the six Kennett Area municipalities: Kennett Square Borough, Avondale Borough, Kennett Township, East Marlborough Township, London Grove Township, and New Garden Township. These members helped to guide the needs assessment for the study and provided critical feedback on the recommendations documented in this report. The members of this Study Advisory Committee included:

- Brian Styche, Chester County Planning Commission
- Brian Donovan, Chester County Planning Commission
- Laurie Prysock, East Marlborough Township
- Joe Scalise, Kennett Square Borough
- Tony Scheivert, New Garden Township
- Al Sauer, East Penn Railroad
- Frank Manfredi, Manfredi Cold Storage
- Tim Phelps, TMA of Chester County
- Nate Echevarria, Historic Kennett
- Dan Blevins, Wilmington Area Planning Council (WILMAPCO)

Related Studies

Due to local initiative, the Kennett Area has been the subject of a variety of independent planning studies, including comprehensive plan updates for Kennett Square Borough and New Garden Township; a multimunicipal economic development plan, including Kennett Township; the Southern Chester County Housing and Transportation Plan; a Complete Streets plan for Baltimore Pike led by the Chester County Planning Commission; and an Active Transportation Plan conducted by Alta Planning. This section inventories the relevant studies and documents key findings that inform recommendations.

New Garden Township Comprehensive Plan (2018)

This comprehensive plan contains planning policies and key implementation strategies with priority actions for the next 10 years. The six Priority Focus Areas identified in the plan are open space and natural resources, greenways and trails, PA 41 corridor, historic resources, Village of Toughkenamon, and economic development.

Issues

PA 41 Corridor

- Safety and congestion are key concerns along the PA 41 corridor due to the traffic volumes, high travel speeds, and conflicts between local and through traffic. PA 41 carries an average of 19,000 vehicles per day and over 2,500 trucks.
- Transportation options are limited along PA 41 due to the lack of sidewalks, bicycle facilities, speed differentials, and public transit service.

Village of Toughkenamon

- Unsafe intersection exists at Baltimore Pike and Newark Road due to inadequate geometry.

Economic Development

- Economic pressures, including labor shortages, threaten the mushroom industry's stronghold in Chester County.

Transportation

- Transportation demands often exceed roadway capacity, leading to spill-over onto local roadways as people try to avoid traffic congestion.
- Facilities for people who bike or walk are generally limited throughout New Garden Township.

Key Recommendations

PA 41 Corridor

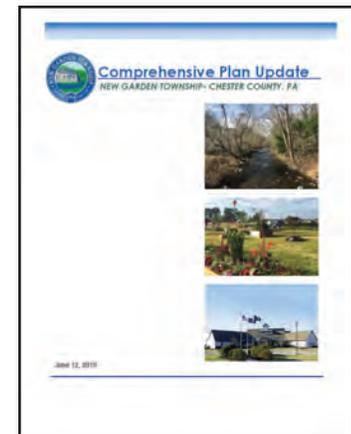
- Promote redevelopment of the PREIT site/former Kaolin Mushroom Facility.
- Preserve open space for agriculture lands.
- Improve safety for pedestrians and cyclists.
- Advocate for future transit service.
- Promote the transportation vision that consists of a two-lane cross section with consistent center-turning lane.

Village of Toughkenamon

- Encourage infill, adaptive reuse, and redevelopment with a mix of uses and housing types in the Village of Toughkenamon core.
- Continue pursuing funding through coordination with the Pennsylvania Department of Transportation (PennDOT), and advance design and construction of improvements at the intersection of Newark Road and Baltimore Pike.

Transportation

- Improve streetscape features along PA 41, Baltimore Pike, and Newark Road.
- Expand pedestrian, biking, transit, and ride-sharing facilities along Baltimore Pike.
- Improve safety at priority intersections and evaluate improvement options (including roundabouts).
- Plan for new roadway connections to relieve congestion and expand access.



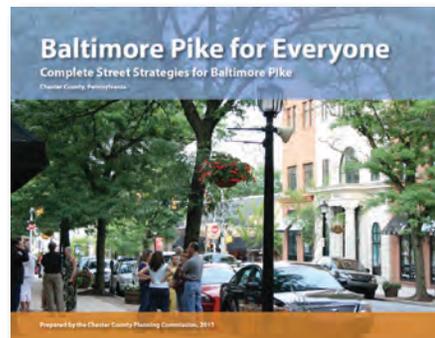
**New Garden Township
Comprehensive Plan**
Source: New Garden Township

Baltimore Pike for Everyone (2015)

A Complete Streets plan was recommended in *Housing & Transportation Options for Southern Chester County*, a study completed in 2014 by the Chester County Planning Commission. *Baltimore Pike for Everyone* builds on that and recommends physical improvements and policy changes that could be implemented to make Baltimore Pike a corridor that is safer and more comfortable for all users, specifically by focusing on non-motorized options and public transportation. This study covers 11 municipalities in southern Chester County: Avondale, Kennett Square, Oxford, and West Grove boroughs; and East Marlborough, Kennett, London Grove, Lower Oxford, New Garden, Penn, and Upper Oxford townships.

Issues

- Low ridership on the Southern Chester County Organization on Transportation (SCCOOT) bus service, the only fixed-route public transit in southern Chester County. Low ridership can be attributed to:
 - low local knowledge of SCCOOT;
 - lack of amenities at stops; and
 - limited “last-mile” connections leading to deviations in bus routes.
- Roadways:
 - many roadways are narrow, with limited shoulders;
 - poor access management; and
 - potential conflict between farm equipment and other road users on Baltimore Pike due to the strong agricultural presence.
- Area from the intersection of Baltimore Pike and PA 41 through Avondale Borough was identified as particularly dangerous due to the high volume and speed of traffic and grade of the roadway.



Baltimore Pike for Everyone
Source: Chester County

Recommendations

- transit improvements: bus turnouts and bus shelters;
- pedestrian facilities: sidewalks and crosswalks;
- traffic calming/access management: median islands, access management, and curb extensions or neckdowns;
- bicycle facilities: bike lanes, bikeable shoulder, shared lanes, and signage; and
- multiuse facilities: multiuse trail.

Kennett Active Transportation Plan (2015)

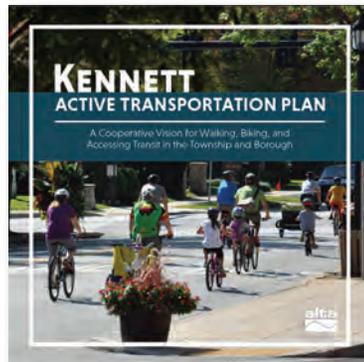
This plan builds on years of local initiative and interest in enhancing the availability and safety of bicycle and pedestrian infrastructure in the Kennett Area. The plan was created with the recognition that perspectives on how people want to experience place and how people live and work is changing. The plan aims to help people connect with their built and natural environments through highlighting best practices and recommending place-making to improve the comfort of bicycling and walking in the study area.

Goals

- **Safety:** Provide a variety of facilities appropriate for multiple user types and encourage safe interactions with education programs.
- **Connectivity:** Provide a network of routes that connect residents and visitors with cultural, recreational, and employment opportunities.
- **Attraction:** Create an active transportation system that attracts new residents and provide safety and comfort to encourage visitors.

Recommendations

- Develop an Active Transportation Network comprising various system features, including a hierarchy of bicycle routes, pedestrian facilities, and intersection improvements.
- Seek funding for three catalyst projects—Kennett Greenway; Park to Park Connector; and State, Cypress, and Birch Complete Street Corridors—identified in the plan.
- Adopt a Complete Streets ordinance that requires future street design to incorporate active transportation.
- Work with PennDOT and Chester County to advance development of the Octorara Trail.
- Develop training materials and conduct beginner driver education to enhance awareness around bicycle and pedestrian users.



Kennett Active Transportation Plan

Source: Kennett Township

Kennett Square Borough Comprehensive Plan (2012)

This is a 10-year plan adopted in 2012 that was created to serve as a guide for making land use and development decisions. The plan sets goals related to land use, housing, economic development, transportation, community services, historic resources, natural resources, parks, and energy conservation; and it provides actions, priority ranking, responsible entities, and methods for implementation of these goals.

Goals

- Maintain appropriate characteristics of roadways by balancing access needs and managing traffic flow.
- Maintain and enhance alternative modes of transportation through the improvement of sidewalks, trails, and appropriate transit alternatives.
- Evaluate and make appropriate changes to adjust behaviors concerning truck movements.
- Address changing on- and off-street parking needs and issues.

Recommendations

- Adjust critical roadways and intersections to minimize effects of truck traffic on safety within the borough.
- Coordinate with municipalities within the region on transportation and development issues that have an effect on truck movements.
- Communicate with known local and regional companies that contribute to truck traffic through the borough to help mitigate and/or reduce the impact of truck traffic within the borough.
- Consider designating spaces for delivery and pickups on State and Cypress streets or investigate alternatives.
- Coordinate with East Penn Railroad about railroad operations and potential to serve businesses within the borough.
- Ensure safety at railroad crossings.

Truck Route Planning in the DVRPC Region

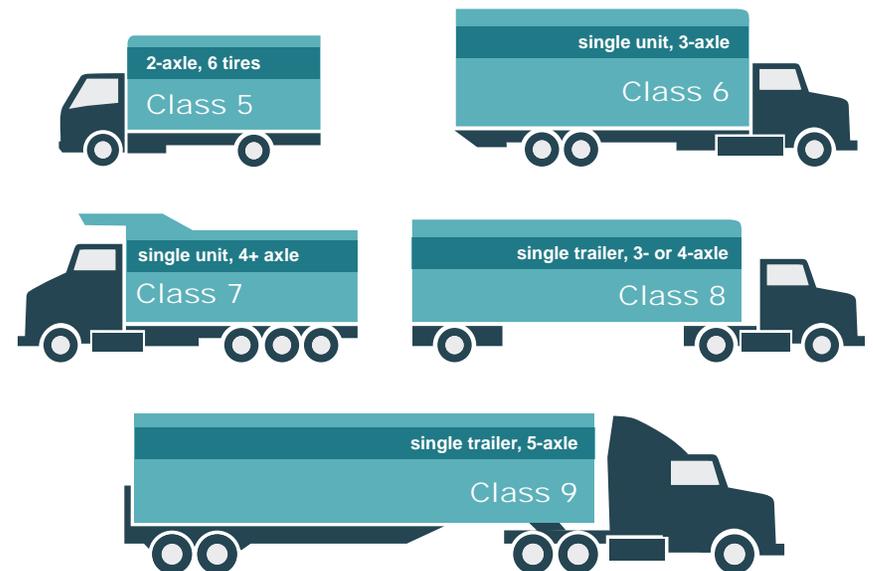
Trucks transport the largest share of freight across the country, serving last-mile connections, trans-national movements of commodities, and everything in between. According to the latest *Pennsylvania Statewide Comprehensive Freight Movement Plan*, an estimated 76 percent of all freight moved by weight is transported by truck. As a leading mode of freight transportation nationally, statewide, and regionally, truck issues remain a primary consideration of DVRPC's ongoing regional planning work. The advent of new digital navigation systems, increases in e-commerce-driven deliveries, and an overall growth in population have added to the challenges of managing truck freight at the regional and local levels.

As the demand for truck freight has grown, DVRPC has been involved in various local and regional efforts to identify solutions around truck routing and urban delivery issues. Through this work, DVRPC has created a truck route development framework for local municipalities in an effort to establish a common system of truck routes regionally. This framework provides resources and education around the various types of truck route components and allows local communities to own the designation process. The approach encourages engagement of the local community to educate them on the role of trucks in the local economy and ensure proper consideration of trucks in Complete Streets planning. Complete Streets are designed and operated to enable safe use and support mobility for all users.

Fundamental to truck freight planning is the understanding of the definition of a truck. Throughout this report there are references to trucks. Each community has a different tolerance for various types of trucks, and local economies inform the types of trucks that are present. Given the confluence of agricultural industries, consumer deliveries, and interstate trucking corridors, this study area experiences a wide variety of truck sizes and body types. These may range from simple van, flatbed trucks, and trailers to stake body and custom dump vehicles for moving bulk materials.

For the purposes of freight planning regionally, DVRPC utilizes the Federal Highway Administration (FHWA) classification of trucks based on the number of axles and presence of a trailer. When classifying trucks for estimating truck activity, DVRPC utilizes Class 5 single-unit trucks and larger, which are illustrated in Figure 2. Class 5 trucks can include smaller straight trucks and delivery vehicles with two axles and six tires. Class 6 and Class 7 trucks are single-unit vehicles with three to four axles. These may include dump vehicles or larger straight trucks and dry vans. Class 8 and larger trucks are what are commonly referred to as tractor-trailers. These can range from smaller truck-trailer combination units to large 53'-tractor-trailers with large sleeper cabs.

Figure 2: FHWA Truck Classification



Source: DVRPC

CHAPTER 2

Background

This chapter provides an overview of the study area, highlighting the rich history of the Kennett community, the demographics and land use patterns of the area, and the economic forces and industries that help to drive growth.

History

The Kennett study area is located in southeastern Chester County, bordering New Castle County, Delaware. The area is home to small towns with valued rural character that host the nation's largest production facilities of mushrooms and a variety of supporting agricultural and industrial facilities. Kennett Square Borough, a main economic center for the region, was formed from Kennett Township and incorporated as a borough in 1855. In the early 1700s much of the land was part of a 30,000-acre tract known as Stenning Manor given by William Penn to his children. The area has a history of agricultural use as many of the early residents were Quakers who established farms and sold crops in Philadelphia and Wilmington markets.¹

In the 1880s William Swayne innovated the use of growing mushrooms in the unused space beneath his greenhouse benches, and a historical accident combined with the ideal location for obtaining cocoa shells, horse manure, and corn cobs took off to become a commercial success. Today mushrooms are the top vegetable crop in Chester County, and 61 farms account for 47 percent of the total U.S. mushroom production.²



Historic Kennett Square

Source: DVRPC

¹History of Kennett Township, <https://kennett.pa.us/218/History-of-Kennett-Township>.

²Mushrooms (August 2018), U.S. Department of Agriculture, National Agricultural Statistic Service.



Demographics

According to the 2017 U.S. Census Five-Year American Community Survey (ACS), the Kennett Area has approximately 46,500 residents and 15,800 households, with an average household size of 2.94 occupants. The population has grown around 30 percent since 2000 and is projected to grow an additional 37 percent by 2045.³ The majority of the study area (84 percent) is made of single-family homes with 75.7 percent of households being owner occupied and 24.3 percent of households being renter occupied. The number of homes has also increased from 12,460 in 2000⁴ to 16,463 in 2017. This demand for housing also means that vacancy is low with only 4 percent vacancy in the study area.⁵

Of the approximately 25,800 residents in the labor force, around 24,800 are employed (96 percent). The highest sectors of employment are Education, Health, and Social Services with 20 percent of the workforce and Agriculture with 15 percent of the workforce. Twelve percent of residents also work in Professional Services and 11 percent in Manufacturing. The median household income for the study area is \$100,390, higher than the median household income of \$92,417 in Chester County. To commute to work, 19,225 residents travel by car alone; 2,349 carpool; 260 take public transit; 1,140 walk; 1,297 work from home; and 208 use other means.⁶

³ DVRPC County- and Municipal-Level Population Forecasts, 2015–2045.

⁴ 2000 U.S. Census.

⁵ U.S. Census 2013–2017 ACS five-year estimates.

⁶ U.S. Census 2013–2017 ACS five-year estimates.

Indicators of Potential Disadvantage

Title VI of the Civil Rights Act of 1964 and President Clinton’s 1994 Executive Order on Environmental Justice (#12898) state that no person or group shall be excluded from participation in or denied the benefits of any program or activity utilizing federal funds. As the Metropolitan Planning Organization for the Delaware Valley, DVRPC is required to evaluate its plans and programs for environmental justice (EJ) sensitivity, including expanding its outreach efforts to low-income, minority, and other disadvantaged populations.

As a result of DVRPC’s EJ work, an internal method of analysis was created, using U.S. Census ACS 2013–2017 five-year estimates data, to identify protected classes and population groups of interest using nine indicators. These Indicators of Potential Disadvantage include low-income, racial minorities, ethnic minorities, older adults (65 years of age and older), youth (18 years of age and younger), persons with a physical or mental disability, limited English proficiency, and female residents. Census tracts with populations that exceed the regional average for any of these indicators are considered EJ sensitive.⁷

There are 11 census tracts in the Kennett Area. Per the U.S. Census ACS 2013–2017 five-year estimates data, seven of the 11 census tracts in the study region have an above-average number of residents who identify as an ethnic minority and have an above-average number of residents who are foreign born. Six census tracts have an above-average number of residents with limited English proficiency. Six census tracts also have an above-average percentage of youth. Any potential transportation improvement projects should consider the interest and concerns of these groups and how they may travel around the region.

⁷ DVRPC’s Equity Analysis for the Greater Philadelphia Region, www.dvrpc.org/webmaps/IPD.

Land Use

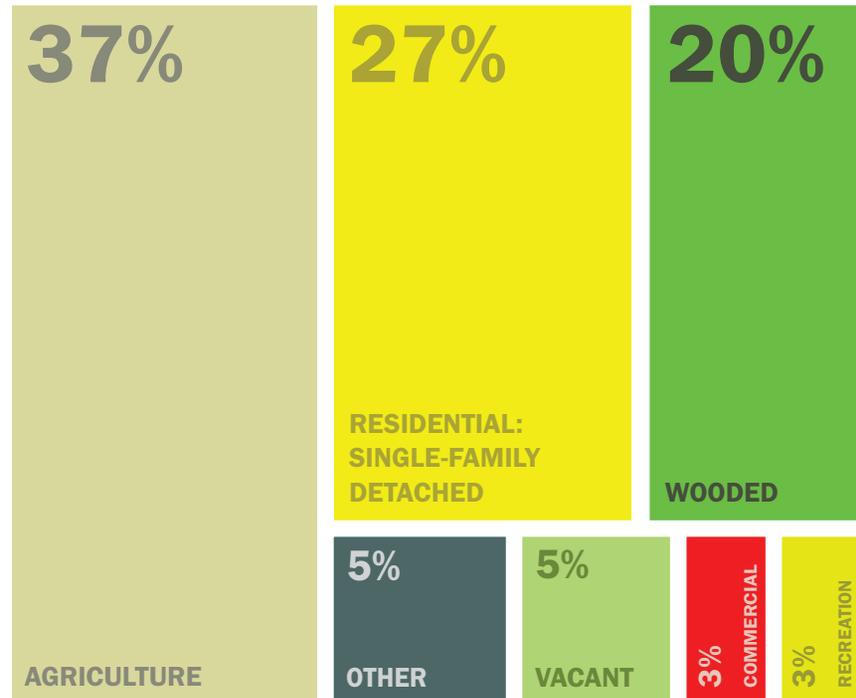
The study boundaries encompass a large area of over 40,000 acres (66 square miles). The study area includes a mix of land uses that is predominantly agriculture land, with around 37 percent of the study area classified as Agricultural land use. Single-Family Residential homes (27 percent) and Wooded (20 percent) land use also cover large areas across the study area. The remaining study area land is occupied by Recreational (three percent), Commercial (three percent), Vacant (five percent), and Other (five percent) land uses. Figure 3 illustrates this land use composition, and Figure 4 shows the geographical distribution.

The strong presence of agriculture and older boroughs with a mix of commercial and residential land uses are what give the study area its charming rural character. However, recent trends show growing pressures from residential development throughout the study area. From 2000 to 2015, residential land use grew by 1,945 acres, a 19 percent increase. According to Census estimates, over 4,000 residential units were added in the study area from 2000 to 2017. This trend is likely to continue with new multifamily residential properties as there are over 370 units currently in the pipeline for development.⁸ The Flats at Kennett, a 175-unit luxury apartment complex on Millers Hill Road in Kennett Township, broke ground in May 2019. Other potential development projects include mixed-use housing and retail on Mill Road at the former National Vulcanized Fiber Company site in Kennett Square Borough, office space for medical and technical services along Millers Hill Road in Kennett Township, and a mixed-density housing development on Ways Lane in Kennett Township.

The commercial centers in the study area are concentrated along US 1 from Greenwood Road to the Baltimore Pike split and along Baltimore Pike from Kennett Square Borough to Avondale Borough. There has been an economic revitalization of the downtown borough areas that maintain their historic small-town appeal with restaurants and retail stores expanding in the area.

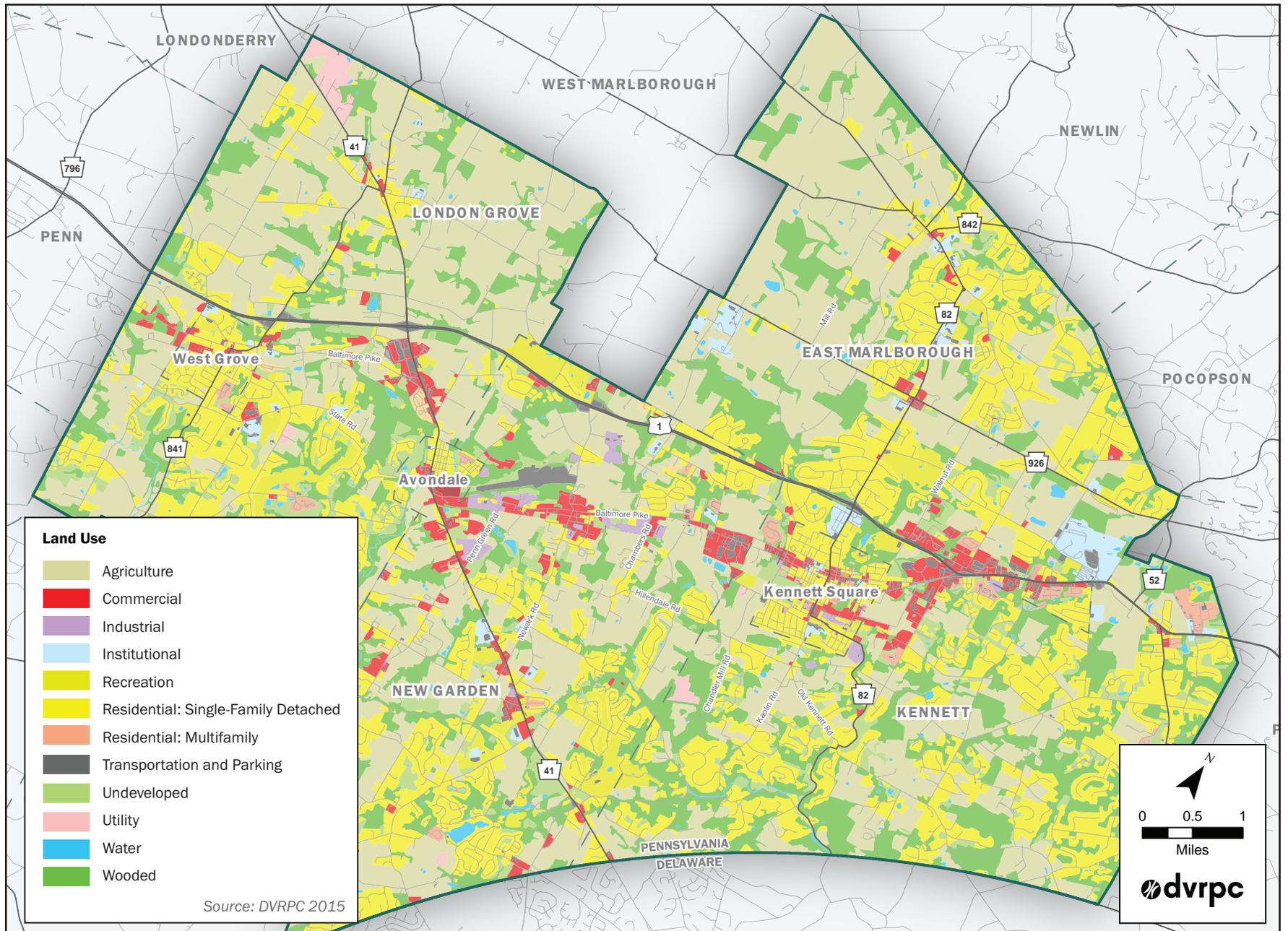
⁸ Chester County 2019 Subdivision and Land Development Reviews.

Figure 3: Study Area Land Use Composition



Source: DVRPC

Figure 4: Kennett Area Land Use



Freight Centers

The industrial and manufacturing land uses in Avondale Borough and New Garden Township have been identified as one of the DVRPC region's Local Manufacturing and Distribution Freight Centers. A Local Manufacturing and Distribution Center is a node focused around locally serving small manufacturing and distribution facilities. It is less dependent on prime location near interstate interchanges but is well served by smaller highway facilities and proximity to consumer populations. This center typology often comprises densely developed, smaller-footprint warehouses and industrial facilities. The Avondale Borough and New Garden Township freight center contains 25 freight-related establishments that occupy around 43 acres of land and employ around 590 people. For more information on DVRPC's Freight Centers, visit www.dvrpc.org/webmaps/PhillyFreightFinder.

Employment

There are 3,688 employers within the boundaries of the study region that employ around 25,000 people. Within a study area of this size, no single industry completely dominates the region's economy, but the two largest industries are Agriculture with 12 percent and Health Care and Social Assistance with 11 percent of the Kennett Area jobs. Jobs in the Agriculture industry are very closely linked to the mushroom industry presence in the Kennett Area, and mushroom production jobs represent 83 percent of agriculture employment. A breakdown of employment by industry can be seen in Table 1 with freight-intensive industries highlighted in orange.

Of the jobs available in the area, 23 percent of employees are in freight-intensive industries. These industries include Agriculture, Forestry, Fishing, and Hunting; Manufacturing; and Transportation and Warehousing. All other industries are considered to be consumption industries. Figure 5 shows that although there are some denser clusters of freight-intensive industries, they are widely scattered throughout the study area and interspersed with consumption industries.

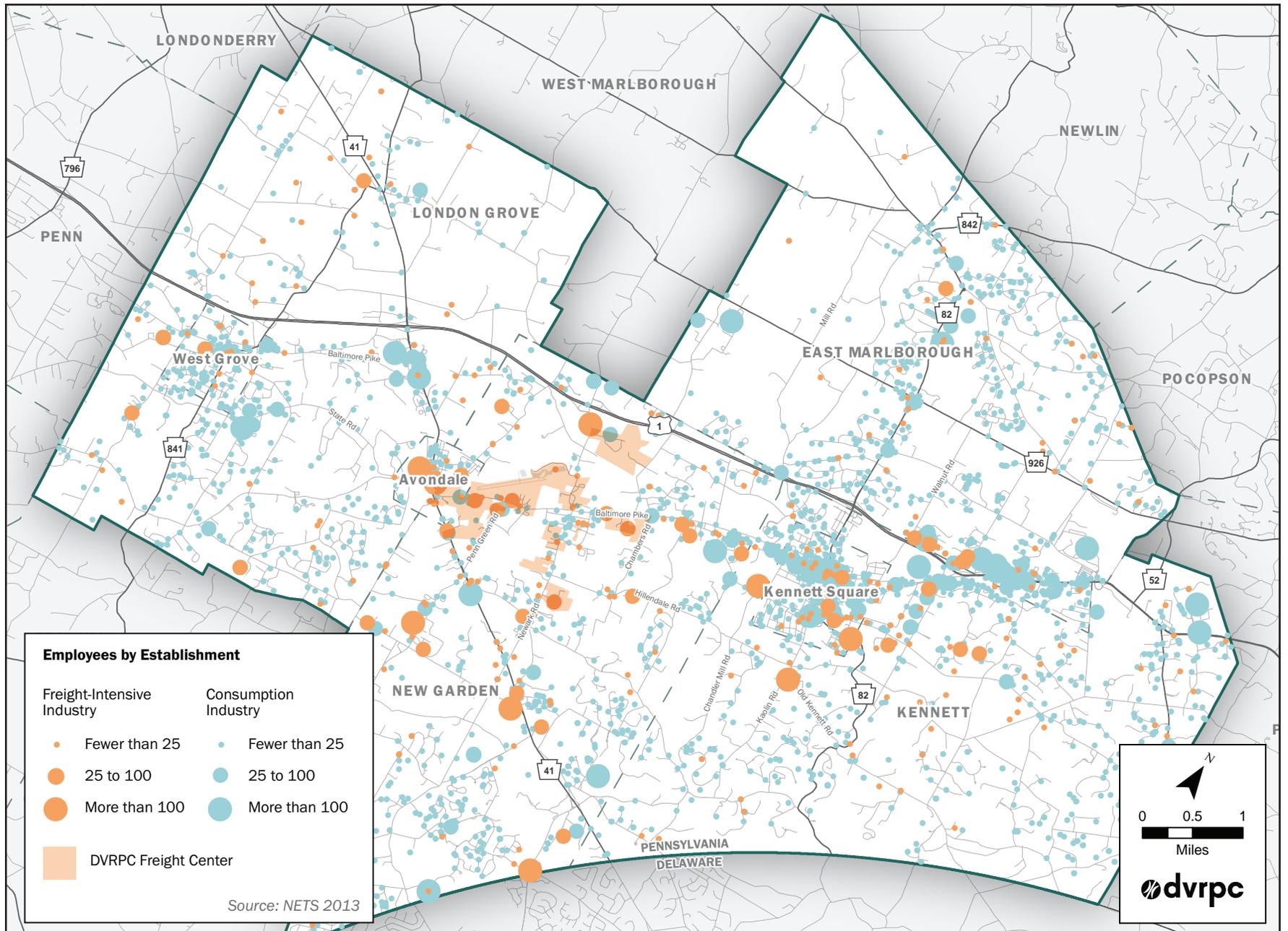
Table 1: Employment by Industry

Industry	Employment in Study Area	Employment Percentage
Agriculture, Forestry, Fishing and Hunting	3,120	12%
Health Care and Social Assistance	2,807	11%
Retail Trade	2,163	9%
Manufacturing	2,135	8%
Construction	2,055	8%
Educational Services	1,722	7%
Administrative and Support and Waste Management and Remediation Services	1,596	6%
Professional, Scientific, and Technical Services	1,524	6%
Wholesale Trade	1,415	6%
Other Services (except Public Administration)	1,403	6%
Real Estate and Rental and Leasing	1,052	4%
Accommodation and Food Services	1,018	4%
Arts, Entertainment, and Recreation	914	4%
Transportation and Warehousing	643	3%
Other	1,807	6%

Source: NETS 2013

*Freight-intensive industries are highlighted in orange.

Figure 5: Kennett Area Employment



Mushroom Industry

The mushroom industry is prominent in this area, with Kennett Square widely recognized as the “Mushroom Capital of the World” and home to an annual Mushroom Festival that attracts over 100,000 guests. Some of the predominant mushroom farms include **South Mill Mushrooms** located in the southwest corner of Kennett Square Borough, **Phillips Mushroom Farms** located on Kaolin Road and West Hillendale Road, **Country Fresh Mushroom Company** in Toughkenamon, **Basciani Foods** in Avondale, and **Buona Foods** on Newark Road. Figure 6 highlights some of these facilities.

There has been relatively little change in the number of grow houses in the Kennett Area, with numbers fluctuating between 280 and 290 houses since 2005. However, many traditional grow houses have been replaced by larger facilities. This follows trends reported by the American Mushroom Institute that the number of mushroom growers in the United States has dropped 32 percent from 2007 to 2017 as the industry is consolidating into larger, expanding operations. In 2018, there were two land development permit requests for the construction of commercial mushroom houses and one additional request for the development of three lots in 2019.⁹



Mushroom Grow Houses

Source: DVRPC

ECONOMIC IMPACTS OF THE MUSHROOM INDUSTRY

The American Mushroom Institute, a national voluntary trade organization that represents growers, processors, and marketers of mushrooms nationwide, released a report compiled by Econsult Solutions, Inc. in early 2019, documenting the economic impacts of the mushroom industry in Pennsylvania and nationwide. Some of the Pennsylvania impact highlights include:

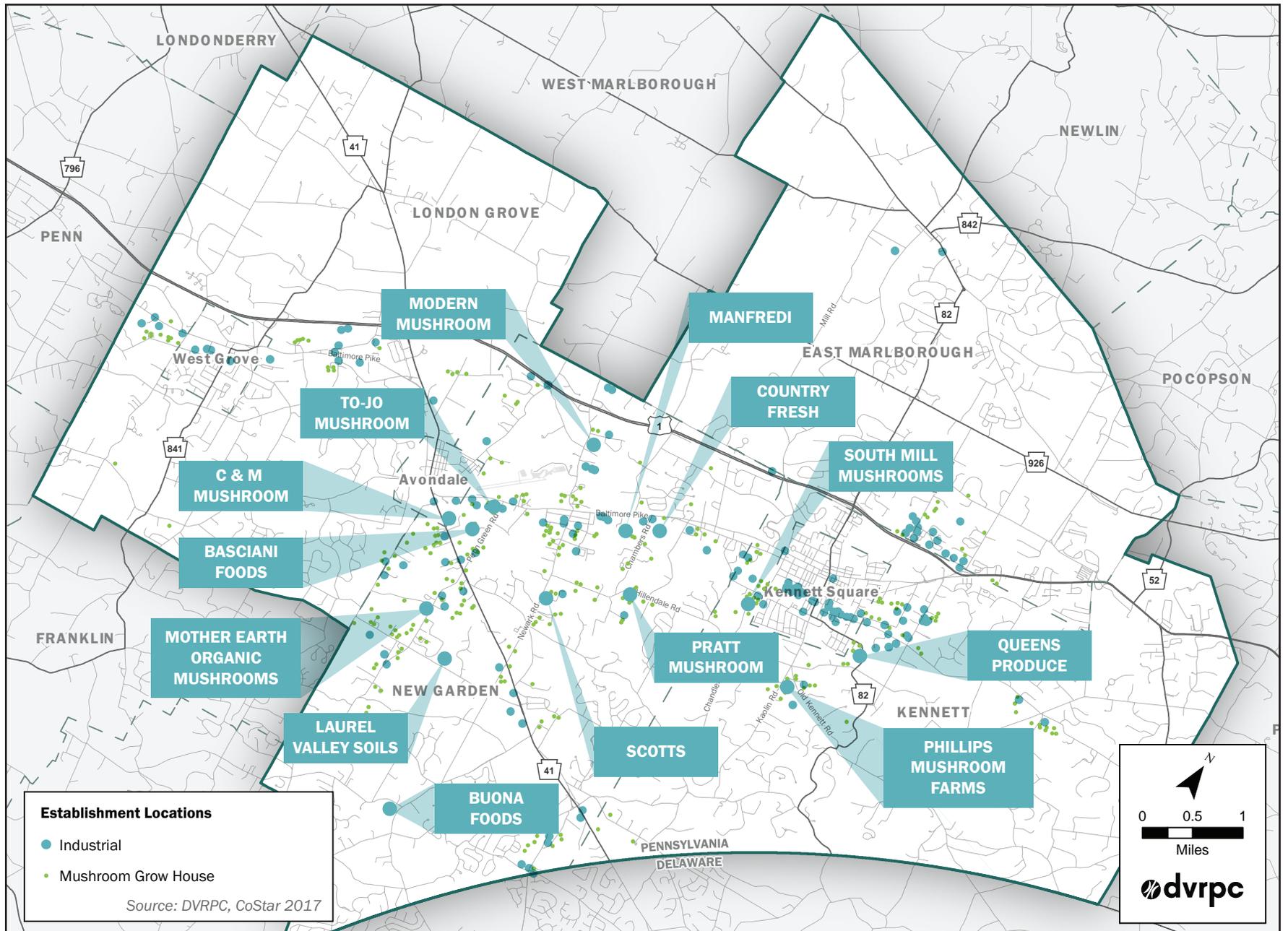
- \$764 million total economic impact;
- \$16.4 million in tax revenue;
- 572 million pounds of annual mushroom crop (60 percent of National Sales); and
- supports 8,600 jobs.



Source: Getty Images

⁹Chester County Subdivision and Land Development Reviews.

Figure 6: Kennett Area Mushroom Facilities and Industrial Establishments

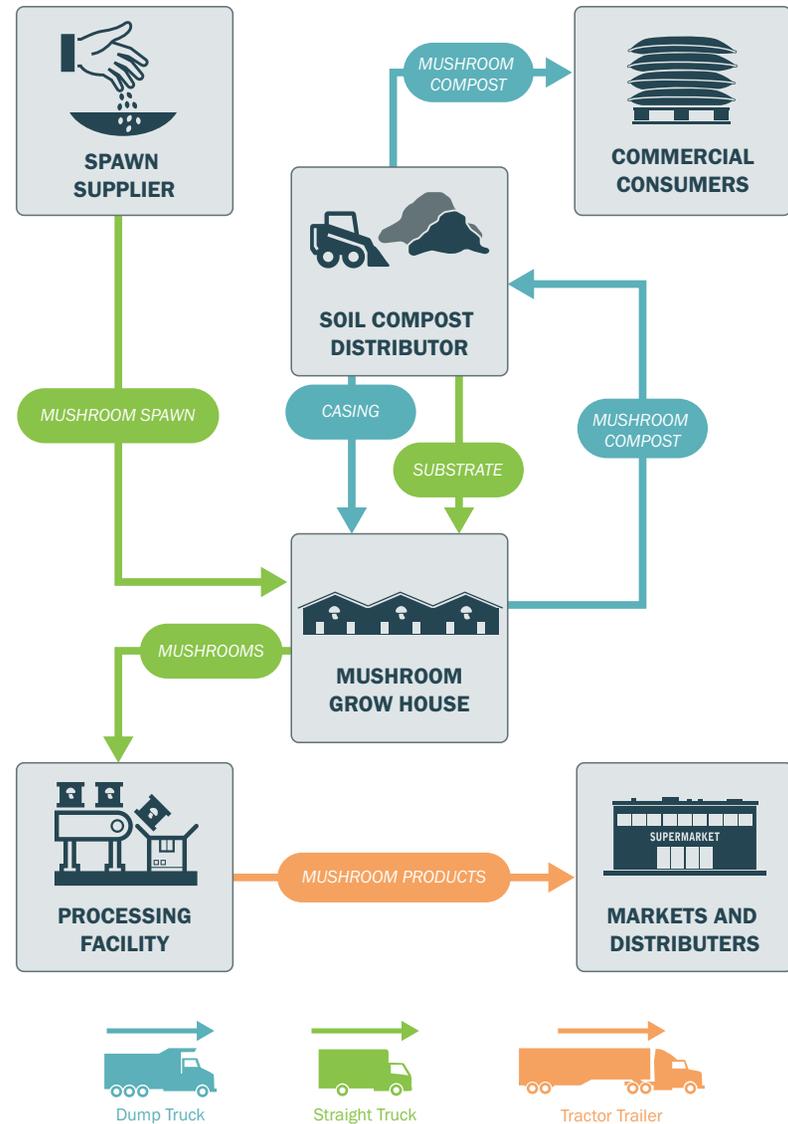


Mushroom Supply Chain

The mushroom industry supply chain is important to understand in this study area as it is suspected that much of the freight trip generation can be attributed to this and supporting industries. A simplified version of this supply chain can be seen in Figure 7. The mushroom industry itself has several types of facilities that exist in the study area. The foundation of the industry is the mushroom grow houses that are used for the production of mushrooms and are scattered throughout the study area. These grow houses attract freight trips that bring in the essential inputs for mushroom growing operations, including sterile compost (substrate), spawn, and casing. As mushrooms are harvested, the product is loaded onto smaller straight trucks and shuttled to larger, centralized facilities for processing. After a growing cycle has been completed, the spent substrate, or mushroom compost, is removed from the beds and shipped for reuse in other agricultural operations or to be sold as top soil.

The larger processing facilities serve as key aggregation points for the mushrooms that are being produced throughout the study area in mushroom grow houses. These central facilities handle the preparation, packing, and distribution of the mushrooms. As the primary point of distribution, these facilities receive the many daily trips of small straight trucks moving product from growing facilities, as well as large tractor-trailers that move the packed product to markets across the country.

Figure 7: Mushroom Supply Chain



Source: DVRPC

Existing Conditions

This chapter provides a summary of the data collection and analysis performed for this study. The focus was to identify the needs and priorities of the community, evaluate the existing transportation conditions, and highlight the ongoing transportation projects in the region.

Needs and Priorities

A key component of the needs assessment for this study was the engagement of local stakeholders and the public in identifying issues and priorities. This outreach was conducted through a table-top map exercise with Study Advisory Committee members, interviews with key industrial property owners, and community engagement using a public outreach tool and issue reporter.

The table-top map exercise was conducted as a part of one of the Study Advisory Committee meetings and allowed participants to identify issue areas, upcoming projects, or other comments on a printed map. This provided the project team with a solid foundation to understand the areas of concern across the study area.

The project team conducted targeted outreach with industrial stakeholders in the study area, and a standardized establishment survey was conducted via phone interviews. This provided the study team with additional details on the activity levels of various businesses. These interviews also provided more detail on the mushroom supply chain, revealing the types, patterns, and frequency of trips between mushroom grow houses and packing/distribution facilities.

Finally, an integral part of identifying the needs and priorities of this study involved community participation. Using an interactive web map, public input was gathered in addition to data collection efforts. The web map tool allowed community members to share their concerns and experiences with trucks by locating an issue on the map and identifying it as a Bike/Pedestrian, Intersection Design, Safety, or Truck Routing issue. These comments help to unveil the public perception of trucks in the study area.

A summary of the most prevalent comments are described below:

- **Trucks on narrow rural roads:** Trucks have been observed leaving their lane in order to navigate narrow, winding roads like Hillendale, Penn Green, Sunny Dell, Limestone/Kaolin, and Newark south of PA 41.
- **Kennett Square Borough, State and Union Streets:** Trucks traveling southbound on Union Street have been seen making illegal right turns onto State Street, damaging the curb, planters, and parked cars, as well as endangering pedestrians on the sidewalk. Trucks also stop traffic when they cannot complete the turn.
- **Truck activity in school zones:** There is a perceived conflict between trucks and school zones across the study area at schools such as New Garden Elementary, Bancroft Elementary, Mary D. Lang Elementary, Kennett High School, and Kennett Middle School. This seems to be a general concern for the safety of children interacting with all types of traffic in these areas.

- **Truck volume and traffic speeds on PA 41:** The speed of trucks along PA 41, especially through Avondale Borough, creates concern for drivers, pedestrians, and cyclists along this route.
- **Need for pedestrian facilities:** The observed lack of pedestrian facilities makes it difficult for pedestrians to cross busy streets, especially in denser boroughs.
- **Cyclists on rural roads:** Cyclists on small, country roads without designated bike facilities or shoulders slow down car traffic due to a lack of space and safe sightlines that allow cars to pass.
- **Truck routing equity:** There is a general concern among residents regarding where truck routes and restrictions should be placed.

The full details of these activities and the outreach findings are available in Appendix A.

Transportation Highway and Streets

Many of the roads in this study area are rural, two-lane roads that connect agricultural facilities to state and interstate roads for access to major regional markets. Within the boroughs, roads are even more narrow and often with limited buffer between a dense landscape of historic homes and retail buildings.

The major roads highlighted in this study include US 1, Baltimore Pike (including both State Street and Cypress Street), PA 41, Newark Road, Union Street (PA 82), and Hillendale Road; and they can be seen in Figure 8. These roads all contain heavy vehicular and freight traffic and serve as the primary connectors between the boroughs and neighboring communities.

US 1 is a limited-access freeway that runs east-west through the study area and serves as a major route between Baltimore and Philadelphia. It is also a major East Coast roadway that runs from Florida to Maine. Because of this connection, it is a primary freight highway in the region, and US 1 interchanges serve as key access points for freight traffic to and from local businesses. US 1 has five interchanges in the study area: Baltimore Pike, North Union Street, Newark Road, PA 41, and Chatham Road (PA Route 841).

Baltimore Pike is a Minor Arterial that splits off from US 1, running parallel through the study area until it intersects with PA 41. This route serves as an alternative to US 1 during closures and disruptions. Through Kennett Square Borough, Baltimore Pike splits into two, one-way streets: State Street going west and Cypress Street going east.

PA 41 is a two-lane, Principal Arterial roadway that connects the study area south to Newport, Delaware, and north to Gap, hence its name Gap Newport Pike. Where the road continues into Delaware, it becomes DE 41. PA 41 is the most direct route from the Port of Wilmington to Lancaster and Harrisburg, Pennsylvania serving as a key connection to major freight

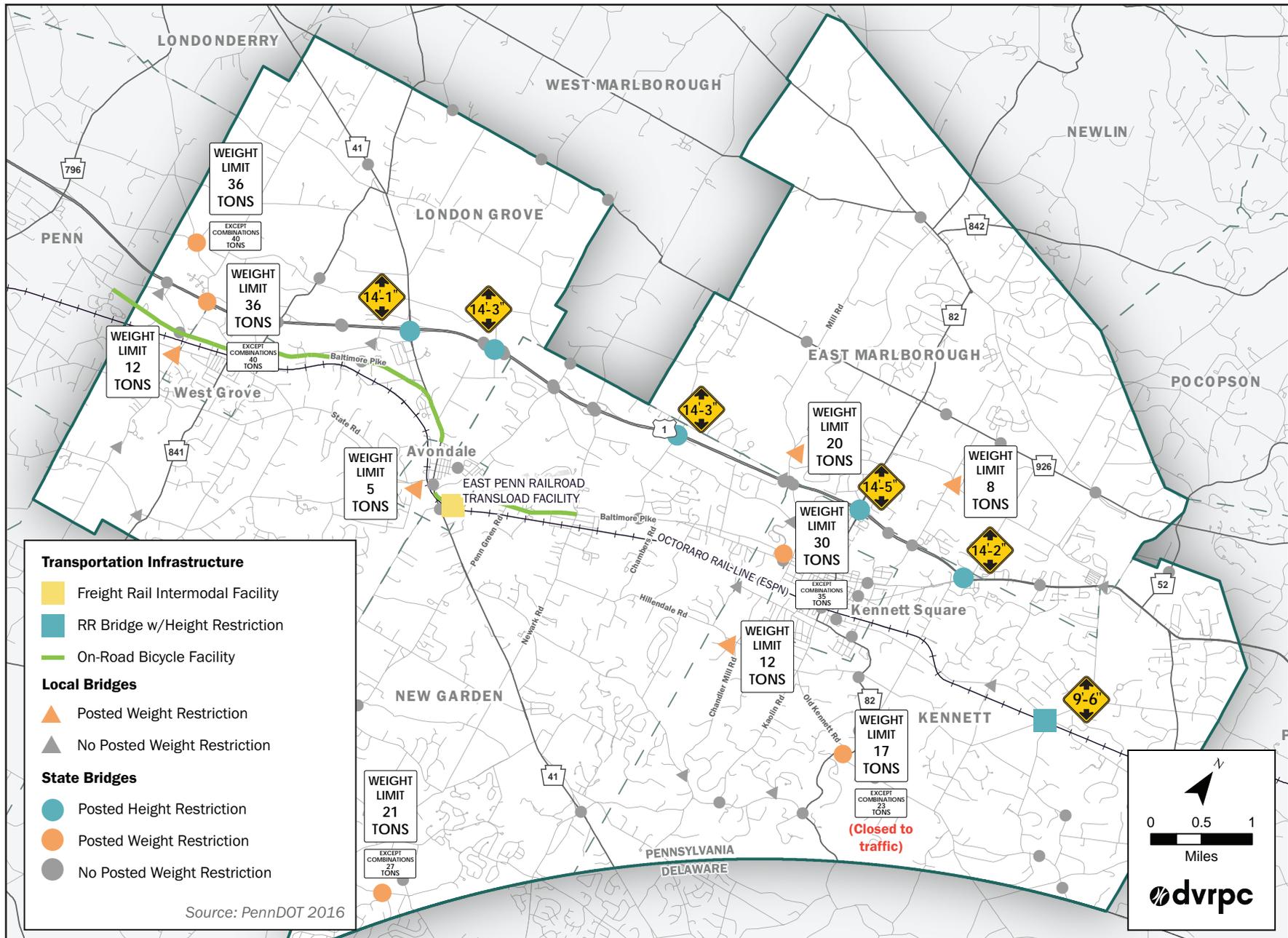
generators across Pennsylvania. As a result, this road sees a significant amount of heavy truck traffic and has been the subject of previous studies, including the *Wilmington–Harrisburg Freight Study* completed in 2003 by WILMAPCO.

Newark Road is a narrow two-lane Rural Major Collector that serves as a connection to US 1 for car and truck traffic in the study area. The Newark Road exit off US 1 also provides access to New Garden Flying Field, a general aviation airport.

Union Street (PA 82) is a two-lane, Minor Arterial that runs north-south through the study area. This road has one of the five interchanges on US 1 in the study area and runs through the center of Kennett Square Borough.

Hillendale Road is a two-lane, Rural Major Collector that runs east-west between Union Street (PA 82) and Newark Road. There are many residential developments along this road, as well as access to multiple mushroom farms. The speed limit is 35 miles per hour (mph), and there are no road shoulders.

Figure 8: Kennett Area Transportation Facilities



Bridges

There are 95 bridges in the study area, 27 of which are locally maintained bridges and 68 are state maintained bridges. Ten of these bridges have a posted load restriction, and one is currently closed to all traffic (over East Branch Red Clay Creek where Route 82 meets Old Kennett Road). These restrictions can be seen in Figure 8. Nine bridges are eligible for federal critical bridge funds for replacement, and 40 are eligible for rehabilitation only.

Bicycle and Pedestrian Facilities

There are limited on-road bicycle facilities in the study area since many roadways are narrow with limited shoulder space as identified in multiple previous studies (*Baltimore Pike for Everyone*, *Kennett Active Transportation Plan*). Baltimore Pike has an existing shoulder from Newark Road in Toughkenamon to PA 41 in Avondale and from PA 41 in Avondale to Penn Ridge Way in West Grove (west of study area). In 2014, there was also a shoulder widening along Route 52 from US 1 to Fairville Road leading to Longwood Gardens.

Freight Rail Facilities

The East Penn Railroad Company owns the only rail line through the study area, the Octoraro Line, which runs from Sylmar, Pennsylvania, east to Chadds Ford where it connects to the Wilmington and Northern Line. This connection to the Wilmington and Northern Line provides switching connections to both Norfolk Southern and CSX. Operating out of its headquarters in Kennett Square, East Penn Railroad serves a number of key industries in Chester County with Herr's, Tasty Baking Company, and Manfredi all having rail-served properties along the Octoraro Line. Other regional industries are served via the East Penn transload facility in Avondale, Pennsylvania (see Figure 8), allowing for the transfer of a variety of bulk commodities such as grain and chemicals.



Union Street Bridge over the Octoraro Line

Source: DVRPC



Bicycle Facilities Southbound on PA 41 North of Avondale

Source: DVRPC



East Penn Railroad Company's Octoraro Line

Source: DVRPC

Safety

Crash data from PennDOT was collected for the study area from 2013 to 2017. There were 2,227 total crashes that occurred in the study area boundaries during this time, with dense concentrations in Kennett Square Borough, Avondale Borough, and at the intersection of PA 41 and US 1. These concentrations of crashes highlight the need for traffic-calming measures in these areas.

Of the total crashes, 117 involved one or more heavy trucks, accounting for around 5 percent of the total crashes. Figure 9 shows both the non-truck and truck crashes in the study area. Five percent of truck crashes resulted in one or more serious injuries, and zero resulted in a fatality. The most common crash types were rear-end (38 percent), angle (27 percent), and same-direction sideswipe (17 percent), the breakdown of which can be seen in Table 2.

Table 2: Kennett Area Truck Crashes from 2013 to 2017

Crash Type	Crash Count	Share of Crashes
Rear-End	45	38%
Angle	32	27%
Sideswipe (Same Dir.)	20	17%
Hit Fixed Object	9	8%
Sideswipe (Opposite Dir.)	4	3%
Head-On	3	3%
Backing	2	2%
Hit Pedestrian	1	1%
Other or Unknown	1	1%

Source: PennDOT 2018

Three subareas were identified as having a density of heavy truck crashes greater than 10 crashes per square mile over the five-year period: (A) PA 41 near the US 1 interchange, (B) PA 41 and Baltimore Pike through and just outside of Avondale, and (C) Kennett Square Borough.

- **Area A:** Of the 10 truck crashes that occurred in the area around PA 41 and the US 1 interchange, only one resulted in a major injury. Seven crashes were rear-end crashes, two were angle crashes, and one was a sideswipe.
- **Area B:** Near Avondale Borough, and the intersection of PA 41 and Baltimore Pike, there were 17 truck crashes. Eight truck crashes were rear-end crashes, four were angle crashes, one was a sideswipe, and three involved hitting a fixed object. None of these caused a serious injury.
- **Area C:** In Kennett Square Borough, 14 truck crashes occurred. Three of the truck crashes were rear-end crashes, four were angle crashes, and three were sideswipes. None of these crashes caused a serious injury.

Volumes

To better understand the activity on the study area roads, 24-hour classification counts were conducted. These provided hourly counts of the number of vehicles using the roads, by direction and by vehicle class, allowing the study team to differentiate between trucks and passenger vehicles. Trucks in FHWA Class 5 or higher were analyzed, which includes single-unit straight trucks, tri-axle dump trucks, and tractor-trailers with three or more axles. Figure 10 shows the summary of the count activity and truck volume percentage for each of the roads on which counts were conducted.

These counts show significant truck volumes across the primary arterial roads in the study area. The highest truck volumes reached 20 percent northbound and southbound on PA 41 north of US 1 and 20 percent southbound on PA 41 south of Avondale Borough, reinforcing the importance of PA 41 as a major truck route.

Much smaller volumes of trucks are seen on Minor Arterials and Rural Major Collector roads such as Baltimore Pike, Union Street (PA 82), and Newark Road. All of these roads have less than 10 percent truck traffic by volume. Despite community comments indicating heavy truck traffic on local and residential roads, the volume percentages of truck traffic do not confirm this. However, given the scale of these roads, only a few large tractor-trailers can be cause for concern for local residents.

These truck volumes are representative of all truck types Class 5 or larger. For streets in Kennett Square Borough, the counts were assessed to better understand the number of tractor-trailers (Class 8 or higher) utilizing these streets. For Union Street (PA 82) north of the borough, tractor-trailer volumes were around 100 per day, 62 northbound and 41 southbound. South of Cypress, tractor-trailer activity drops off markedly to about 25 per direction per day. For Cypress and State streets, volumes varied across the borough with between 100 and 200 tractor-trailers per day on each of the facilities.

Figure 10: Kennett Area Traffic Volume

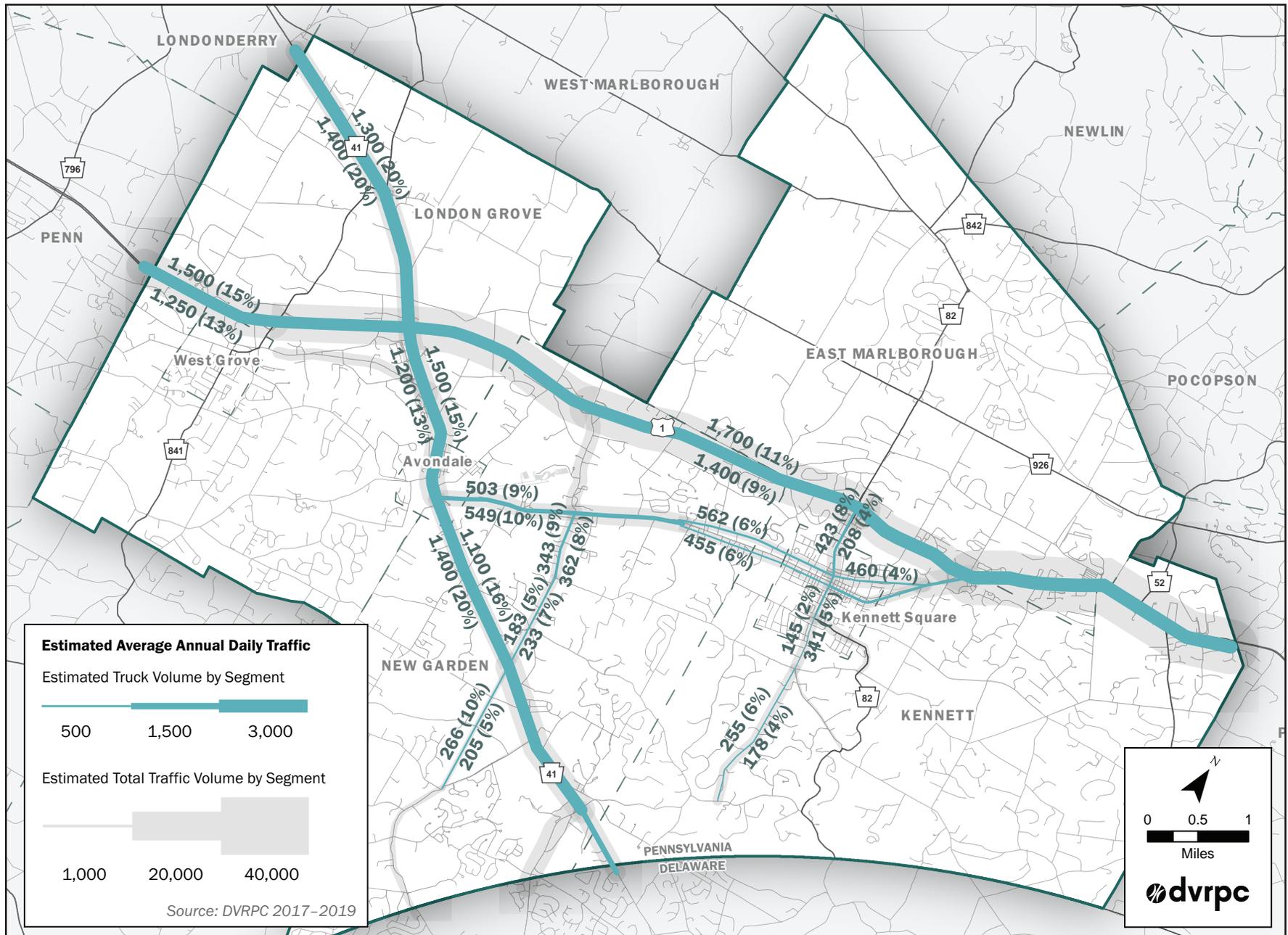


Figure 11: Truck Route Signage in Kennett Square Borough



Source: DVRPC

Existing Routes

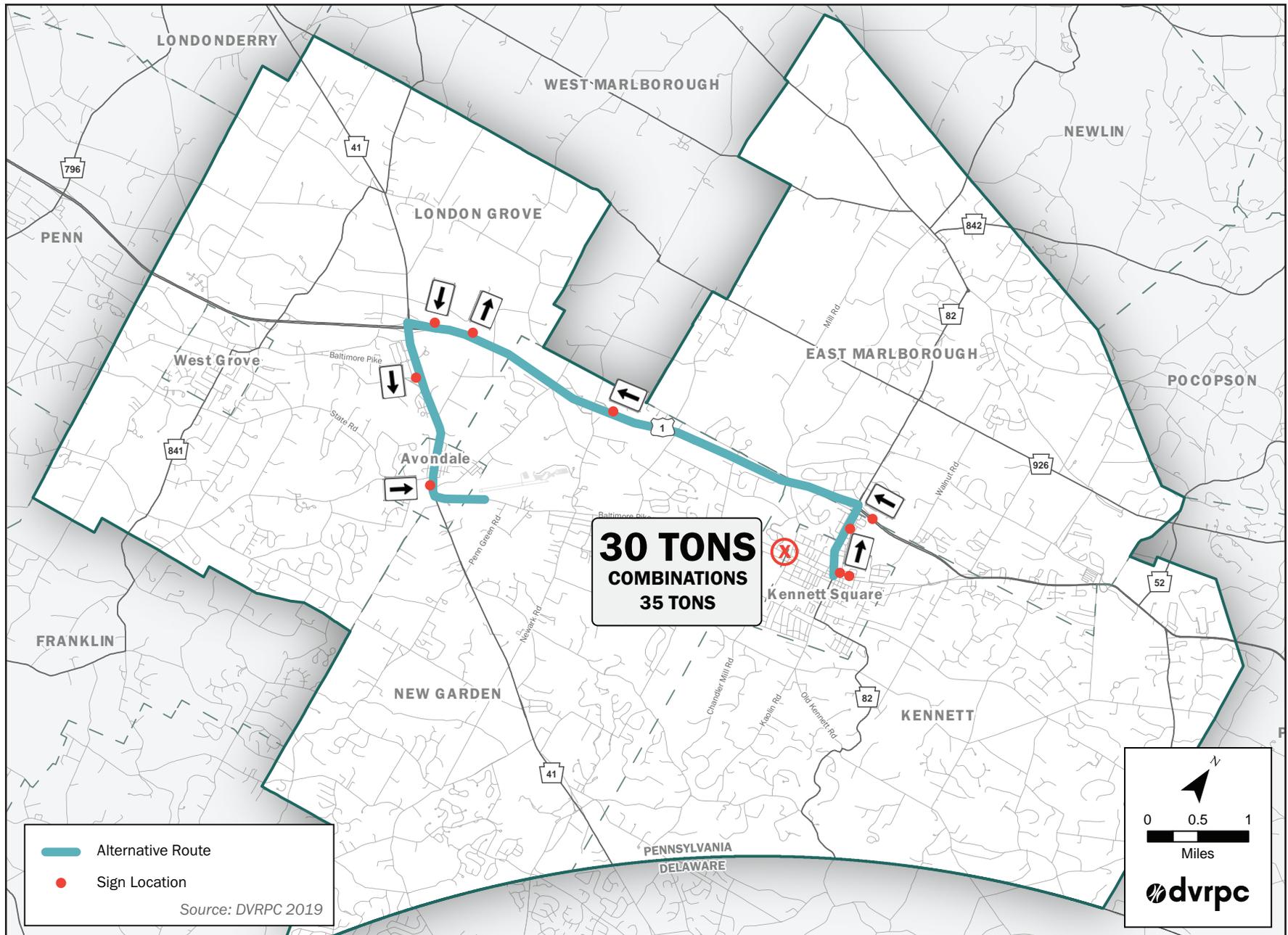
Truck Route

There is only one truck route in the Kennett Area, and it is located in Kennett Square Borough. Trucks traveling southbound on Union Street are prohibited from making a right turn onto State Street. Truck routing signage directs trucks to continue through the intersection and make three consecutive left turns on Cypress Street, Broad Street, and State Street to orient themselves westbound on State Street. Figure 11 shows the location of this truck route signage and the required maneuver.

Alternate Routes

The West Bridge over Red Clay Creek on State Street in Kennett Square Borough has a weight restriction of 30 tons (combinations 35 tons), limiting many trucks from passing west on State Street. There is a truck alternative route provided that diverts trucks northbound on Union Street, west on US 1, exit on PA 41 southbound, and turn left on Baltimore Pike east for access to locations west of this restricted bridge. Figure 12 shows this alternative route.

Figure 12: Kennett Area Truck Alternate Route Around State Street Weight Restriction



Restrictions

Weight Restrictions

Weight restrictions are applied to roads that are not structurally adequate to support heavy loads. These restrictions may apply to and be posted by the gross load of a vehicle or the axle weight. In the study area there are four different types of weight restrictions:

- Bridge Weight Limit 12 Tons (on Hillendale Road in Kennett Township);
- Bridge Weight Limit 30 Tons Except Combinations 35 Tons (on State Street over Red Clay Creek in Kennett Township);
- Bridge Weight Limit 5 Tons (on State Street in Avondale Borough); and
- Weight Limit 8 Tons (on New Garden Road in New Garden Township).

The locations of these restrictions are illustrated in Figure 13.



Bridge Weight Restriction on Westbound State Street Outside of Kennett Square Borough

Source: DVRPC



Bridge Weight Restriction on Hillendale Road Over West Branch Red Clay Creek

Source: DVRPC

Geometric Restrictions

The national standard trailer width is 102 inches, and 102-inch wide trailers are permitted on all state roads in Pennsylvania unless there is a geometric constraint. In Pennsylvania, trailers are restricted to a maximum of 53 feet in length for a single trailer and 28-½ feet for a twin trailer combination. Signage must be used to specify the length, width, or height limits of a road constrained beyond these standards. In the study area, there are roads with restrictions on:

- 102-inch twins and trailers over 28-½ feet; and
- trucks over 30 and 45 feet.

The locations of these restrictions are illustrated in Figure 13.

Local Traffic Only

Municipalities may restrict truck traffic on local roads using a “No Trucks” sign with the option to allow an exception for local deliveries using an “Except Local Deliveries” sign. In the study area, there are multiple residential roads with the following truck restrictions:

- No Trucks Except Local Deliveries; and
- No Tractor-Trailers.

The locations of these restrictions are illustrated in Figure 13.



Geometric Restrictions on Newark Road North of Baltimore Pike

Source: DVRPC



Local Traffic Only Truck Restriction in the Gardens Neighborhood of New Garden Township

Source: DVRPC

Programmed Projects

There are multiple projects planned within the study area that support economic revitalization, transportation enhancement, and future growth. Figure 14 shows the location of these projects.

Transportation Improvement Program (TIP)

The TIP lists all projects that intend to use federal funds, along with non-federally funded projects that are regionally significant. The TIP represents the multimodal transportation improvement priorities of the region and is required by federal law, currently the Fixing America's Surface Transportation Act. TIP projects are listed by their PennDOT Multimodal Project Management System (MPMS) number.

14581: US 1 Expressway Reconstruction (Northern Section)

The project consists of pavement rehabilitation and reconstruction; guiderail upgrades; vertical and lateral clearance compliance corrections of overhead structures; and interchange improvements, such as length of acceleration and deceleration lanes and loop ramp radii. This reconstruction is along US 1 between PA 896 and School House Road.

16169: Thompson Road Railroad Warning Devices

This project will install railroad warning devices on Thompson Road between Chambers Road and Scarlett Road in New Garden Township, Chester County. This project is part of the statewide Highway-Rail Grade Crossing Program.

57664: Newark Road at Hillendale Road

This project in New Garden Township will widen Newark Road to add a left-turn lane for the southbound Newark to Hillendale Road turn movement, and widened shoulders to meet criteria and improve sight distance, allowing for a left turn from westbound Hillendale Road onto Newark Road.

102708: PA 41 at PA 841 Improvements

Construction of a roundabout is anticipated at this location. Currently, the intersection of PA 41 and PA 841 has a confusing layout, traffic is forecasted to be heavily congested at the PA 841 approaches to the intersection in the design year (2035), and there are limited pedestrian

accommodations. An improvement study of Chatham Village recommended a gateway treatment on PA 41 that would support many of the short-listed alternatives. This gateway treatment is a companion project: MPMS #105755.

103215: Chambers Road Grade Crossing

This project will install railroad warning devices at the Chambers Road grade crossing, which is located between Hillendale Road and Baltimore Pike in New Garden Township, Chester County. This project is part of the statewide Highway-Rail Grade Crossing Program.

107544: Baltimore Pike over Branch of Red Clay Creek

This project, which is a part of Bridge Group N, will replace the structurally deficient bridge on Baltimore Pike over the branch of Red Clay Creek in New Garden Township. An estimated service life extension of 30 years is anticipated.

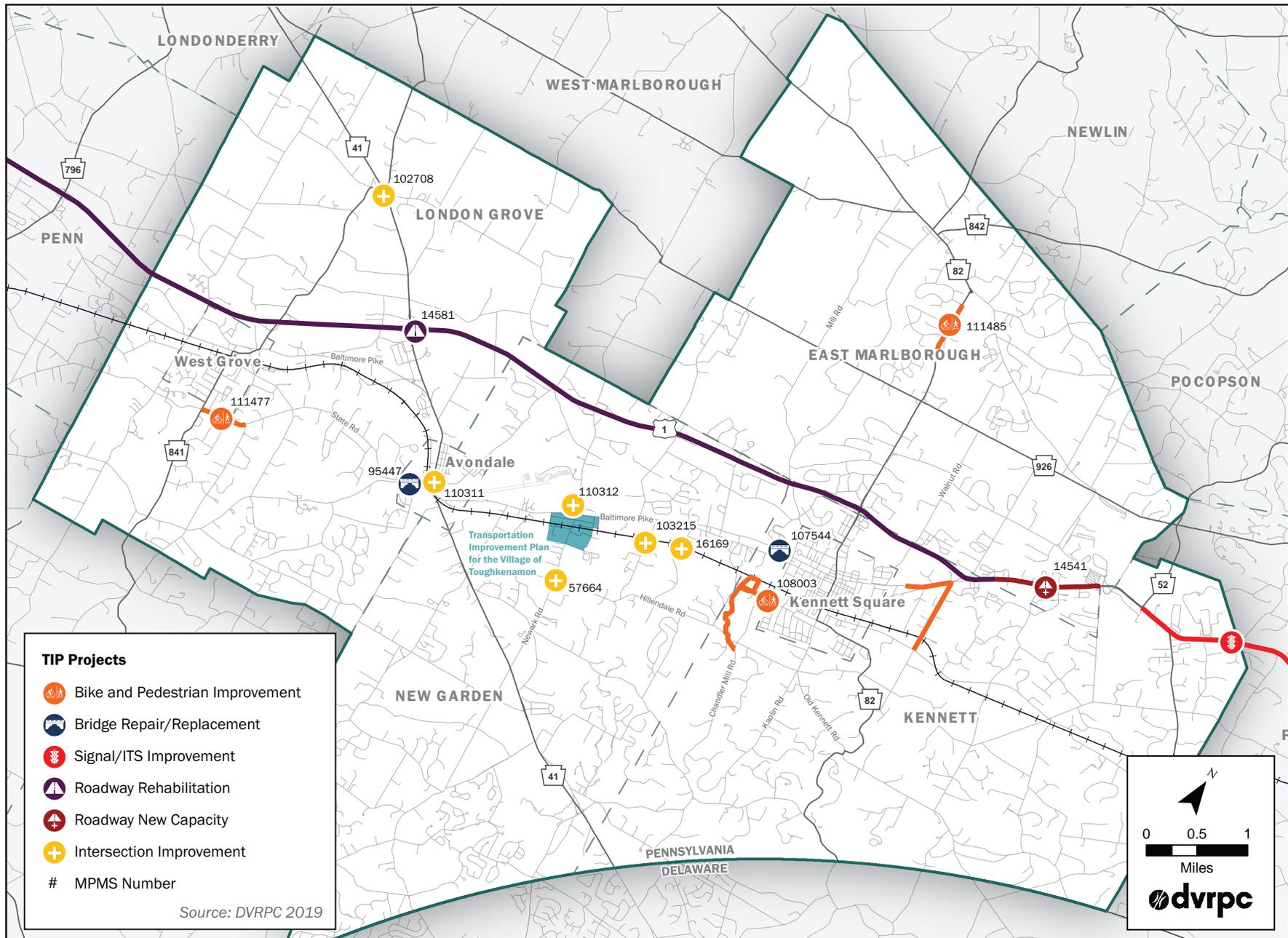
108003: McFarlan Road Sidewalks (Transportation Alternatives Program)

This project will construct a new sidewalk along McFarlan Road, from Rosedale Road to East Baltimore Pike. It will connect to a previous Transportation Alternatives Program project, Kennett Township Sidewalks (MPMS #102832), at the intersection of McFarlan Road and Rosedale Road. This project and MPMS #102832 will provide connections between Kennett Township and Kennett Square Borough, improving access to a number of residential and commercial developments.

110311: PA 41 at State Road Intersection

This project will address the geometry of the intersection at PA 41 and State Road in Avondale Borough. It will realign the intersection, improve sight distance, improve turning lanes, incorporate Intelligent Transportation Systems (ITS), improve sidewalk and pedestrian access, and accommodate heavy vehicle traffic at the intersection.

Figure 14: Kennett Area Programmed Projects



110312: Baltimore Pike/Newark Road Intersection Improvements

This project in New Garden Township will improve safety by realigning the northern leg of Newark Road at Baltimore Pike and upgrading and modernizing the traffic signal, including pedestrian signals and emergency preemption. Dedicated left-turn lanes on all four approaches, as well as a right-turn lane from northbound Newark Road to eastbound Baltimore Pike will be installed. Turning radii will be widened to accommodate trucks and larger vehicles. Access management enhancements and driveway adjustments for homes and businesses will improve access management. New sidewalk connections and Americans with Disabilities Act-compliant curb ramps will be installed.

111477: State Road Sidewalks (Transportation Alternatives Program)

This project will construct approximately 2,500 feet of sidewalk and curb on the south side of State Road between Prospect Avenue/Wickerton Road (State Route 0841) and Schoolhouse Road (using Safe Routes to School [SRTS] program funding) in London Grove Township.

111485: Route 82 Crosswalks and Sidewalk (Transportation Alternatives Program)

This project will construct safety improvements for better access to the Unionville-Chadds Ford Middle/High School campus through sidewalks, crosswalks, medians, and roadway adjustments (using SRTS funding) in East Marlborough Township.

14541: US 1, Baltimore Pike Widening

Improvements include construction to provide a consistent three-travel-lane curbed section in each direction by roadway widening, replacing shoulders with full depth pavement, and revising pavement markings; upgrading five existing signalized intersections with new equipment where needed and timing changes to accommodate the three-lane pattern; installing an adaptive signal system and connecting it to the Township Building; placing overhead directional and regulatory signs and two dynamic message signs. Improvements will also include coordination with development highway occupancy permits; placing concrete barriers near two buildings; modifying existing drainage system with additional inlets and pipes; maintaining traffic

(at least two travel lanes) during construction; placing islands at Orchard Avenue to prohibit left-turn movements from side street. The project will complete an existing sidewalk on the southbound side from Schoolhouse Lane to the Shoppes at Longwood Village Shopping Center.

Transportation and Community Development Initiative (TCDI)

TCDI is a DVRPC grant program to support smart growth initiatives that implement the *Connections 2045* Plan for Greater Philadelphia.

Transportation Improvement Plan for the Village of Toughkenamon

Toughkenamon received an award to create a transportation plan that will reenergize the Village of Toughkenamon with a variety of local commercial establishments, a diversity of housing options for all ages, and attractive open spaces and streetscapes.

Recommendations

This chapter details a list of recommendations to improve safety, traffic conditions, and truck maneuverability throughout the study area. These recommendations were the product of analysis of incident history, existing signage, and input from key stakeholders.

The recommendations in this report focused primarily on areas of concern associated with the safe and efficient movement of trucks in the context of a diverse set of road users and community types. These recommendations are intended to be achievable through local actions and coordination. Although there were additional transportation improvement opportunities that could have been considered, the scope of this study was focused on the truck freight impacts.

The improvements and actions outlined in this section are intended to not only benefit the freight community but also to enhance the quality of life for residents and reduce the possibility of conflict with other road users.

The recommendations that have been identified include three focus areas:

- implementing traffic calming strategies;
- designating and implementing a local truck route network; and
- increasing usability of directional and truck restriction signage.

Traffic Calming

Analysis of the study area found several locations where higher-speed roads run through small villages/towns that have narrow lanes and higher volumes of pedestrian activity. In addition, schools and other facilities along busy routes were found to have no controlled crossings. To address safety concerns at these locations, traffic-calming measures should be pursued. Traffic calming uses physical and visual interventions that alter driver behavior and reduce motor vehicle speed to improve the conditions and safety of all road users. This can be used to reduce the speed of vehicles as they transition from rural arterial roads to slower-speed borough streets or on sections of road where extra driver attention is warranted. These recommendations are consistent with previous studies that have also identified traffic calming as an important improvement for locations in the study area.

The study team identified several types of traffic-calming measures that should be explored for locations in the study area. These include:

Gateway Treatments

Median Gateways

Installing raised or mountable medians can be used to narrow travel lanes and may require a shift in an otherwise straight travel path for drivers. These physical changes manage driver speed as drivers inherently slow down to navigate the change in lane geometry.

Since Avondale Borough has a high density of crashes and a significant amount of non-motorized road users, median gateways could be installed at the entrances to the borough on PA 41 and Baltimore Pike where the speed limit reduces from 45 mph to 35 mph. Median gateways were installed at the intersection of PA 41 and PA 841, and similar features could be used at the Avondale Borough entrances.

Overhead Speed Display

Overhead speed displays alert drivers of the posted speed limit or a change in posted speed limit. These displays can include flashing lights for additional visibility and speed radar to display the speed of passing vehicles.

Overhead speed displays can be used in conjunction with median gateways, and both were installed for traffic calming at the intersection of PA 41 and PA 841 in Chatham. Like the recommendation for median gateways, overhead speed displays could be installed at the same entrances to Avondale Borough on PA 41 and Baltimore Pike.



Median Gateways in Chatham along PA 41

Source: DVRPC



Overhead Speed Display on PA 41 North of US 1

Source: DVRPC

Pedestrian Crossings

High-Visibility Crosswalks

High-visibility crosswalks use longitudinal ladder markings that can be seen from about twice as far away as the traditional two-transverse-lines marking. The use of PennDOT's R1-6 "In-Street Pedestrian Crossing" signs can also bring extra visibility to the intersection.

Recommended installation locations for high-visibility crosswalks are in borough areas where there is significant interaction between vehicular and pedestrian traffic and at locations near schools where children are crossing roads. These crosswalks can be installed at any crossing location- but should especially be considered at uncontrolled crossing locations.

Rectangular Rapid-Flashing Beacon (RRFB)

RRFBs use light-emitting diodes (LEDs) to supplement warning signs at uncontrolled intersections or mid-block crosswalks. They can be activated by a pedestrian using a manual push button or using a passive pedestrian detection system. The flashing beacon can be paired with PennDOT-recommended "Pedestrian" and "Bicycle" signs, W11-2 and W11-15, and with the "Diagonal Downward Point Arrow Plaque," W16-7P. Figure 15 illustrates this arrangement.

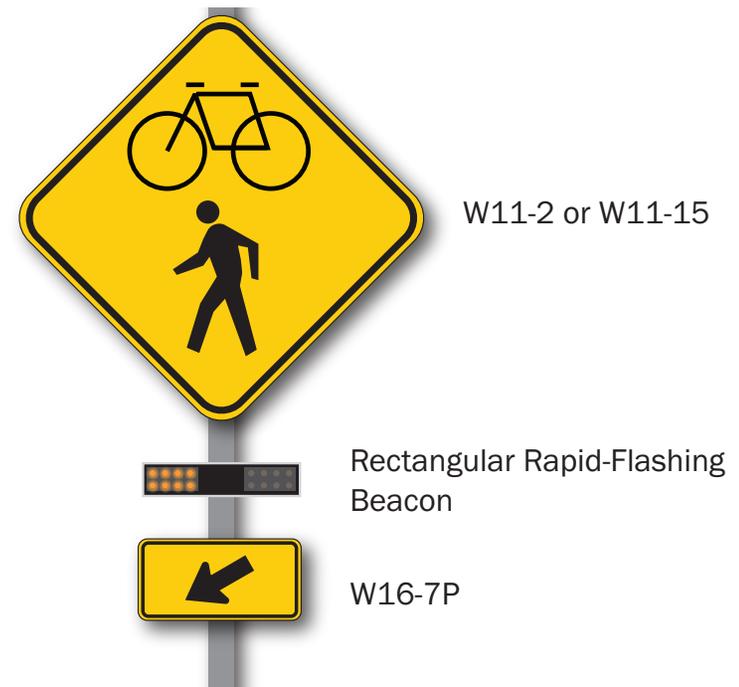
RRFBs can be installed at any of the same locations recommended for high-visibility crosswalks and are especially recommended at uncontrolled crossing locations.



High-Visibility Pedestrian Crosswalk on W. South Street near South Mill Mushroom Farm uses PennDOT's R1-6 "In-Street Pedestrian Crossing" sign and W11-2 "Pedestrian" sign.

Source: DVRPC

Figure 15: PennDOT Standard RRFB Signage Layout



Source: DVRPC

Truck Route Development

Throughout this study, concerns around the route selection for trucks were raised by a variety of stakeholders. Although the analysis showed that total volumes of trucks were at or below expected volumes for the road types, the concerns about tractor-trailers leaving preferred routes were significant. The first step in addressing these concerns is the identification and designation of a truck route network. This truck route network development is a critical step because it serves as the foundation for future geometric improvements and truck wayfinding signage, and it informs the development of other modal improvements, ensuring that proper consideration is given to trucks where they are expected.

This study was not intended to designate and approve a truck route network. Route designation is a local activity that will require substantial outreach and engagement of the community to ensure appropriate buy-in. The following truck route recommendations outline the process and recommended components of the truck route network that will need to be further refined and adopted locally.

Form a Multijurisdictional Work Group

The formation of a multijurisdictional work group is critical to the success of the truck route network. In many cases where neighboring communities fail to coordinate on route designations and restrictions, a patchwork of networks create new problems across a wider area. Working together to identify priorities, balance impacts in various communities, and establish common goals and systems can help to ensure a successful, cohesive network.

The study advisory committee for the *Kennett Area Freight Transportation Study* could serve as this work group. Together they would be tasked with coordinating the restrictions and preferred routes, conducting outreach with their local constituents, and ensuring that the governing bodies and citizens support the overall plan for a new truck route network.

Define Truck Network Components

A truck route network should be composed of several components that establish the system. Not all of the route components are communicated to road users through signage, as some may be established primarily for planning purposes. The following recommended components are consistent with the standards established by DVRPC for truck route networks in communities throughout the region.

Truck-Restricted Routes

These are streets that have been identified and/or signed as restricted for all trucks or some trucks based on size. Some truck restrictions may be based on time of day.

It is recommended that municipalities demonstrate sound engineering judgment in establishing the need for truck restrictions and accompanying signage per PA Code Title 67, Chapter 212.117. Although the formal requirement to submit a study was waived by Act 31 in 2018, documenting why a restriction was placed is critical if the restriction is ever challenged.¹⁰ One of the following engineering studies can be documented by submitting form TE-109 to PennDOT:

- Crash Analysis;
- Geometric Review;
- Past Experience;
- Pavement Analysis;
- Speed Data;
- Structural Analysis; and
- Traffic Volumes.

Given evidence collected, the engineer should consider whether all trucks should be restricted from the road segment or only trucks above a certain height, weight, or class, and whether exceptions such as local deliveries will be permitted.

¹⁰ PennDOT Local Technical Assistance Program Technical Information Sheet #194.

There are currently a number of truck restriction signs throughout the study area. Since engineering studies are recommended to formally restrict streets from heavy trucks for some restriction types, existing signs should be evaluated for compliance and updated if necessary. Signs that are poorly placed should be taken down to prevent confusion and reduce visual clutter (see “Wayfinding and Signage” recommendation on page 49). The following restrictions are recommended for inclusion:

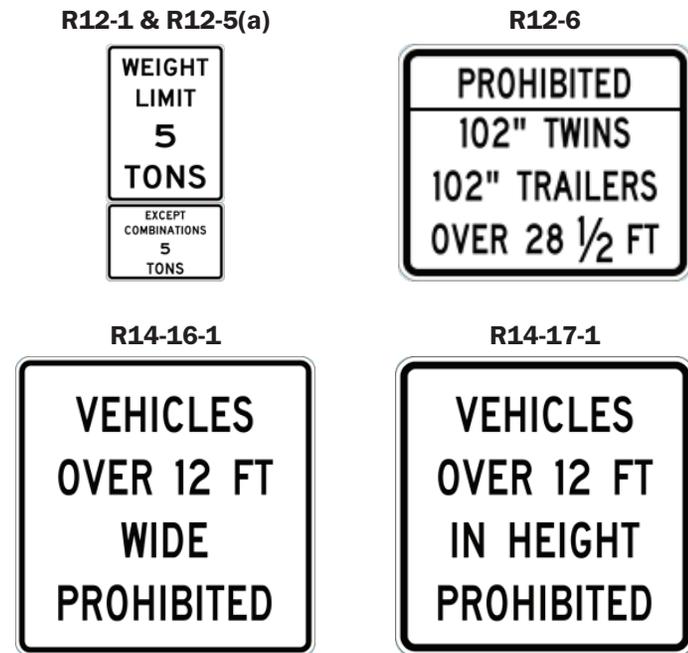
Geometric Restrictions: Length, Width, Height, and/or Weight Restricted

These restrictions should be considered where road geometry or bridge capacity limits truck access based on truck size. Possible restrictions may include length, width, height, and weight, and the restriction postings for these routes should be supported by the appropriate engineering and traffic studies. In order to meet the standards established in PennDOT Publication 236 (See Appendix B), it is recommended that these restrictions be signed as illustrated in Figure 16.

Local Truck Prohibitions

Community restrictions may be considered on local roads that are not necessary for access to industrial or commercial facilities. These will be identified locally and supported by local ordinance and should be carefully considered as a part of the wider system. It is recommended that the study area municipalities adopt common language for truck restriction ordinances. Examples of truck restriction ordinances are available in Appendix C. For local restrictions, it is recommended that consistent signage be deployed across the entire study area. In order to meet the standards established in PennDOT Publication 236, it is recommended that these routes be signed with “No Truck” (R5-2) and “Except Residential Deliveries” (R5-2-3) as illustrated in Figure 17. The use of “Residential” in place of “Local” is acceptable for sign type R5-2-3 when there is commercial development in the area and satisfactory alternative access roadways exist for the commercial development.

Figure 16: PennDOT Standard Signage for Geometric Restrictions



Source: DVRPC

Figure 17: PennDOT Standard Signage for Local Truck Prohibitions



Source: DVRPC

Truck-Appropriate Routes

Truck-appropriate routes represent a hierarchy of truck route designations that provide appropriate connectivity across the study area. These are in addition to existing designated regional, state, and federal networks.

Regional Freight Corridors

This component of the draft truck network represents the highest level of the truck-appropriate routes and is composed of regionally and nationally significant through routes. These include all mainline Primary Highway Freight System components of the network, as well as major limited-access facilities or state and U.S. routes that serve regional travel. These facilities are often high-speed facilities that have limited interaction with pedestrians and other non-vehicular modes. However, in rural areas these facilities can traverse a wide range of development typologies. The points at which this network interchanges with the surface street network are significant ingress/egress points for freight traffic to access the study area.

Primary Truck Routes

Primary Truck Routes create redundancy and move trucks from the Regional Freight Corridors network to lower-level routes, and final origin/destinations. These routes will require special consideration for the design of transit, bike, and pedestrian activity, as they are likely to carry higher volumes of trucks, including tractor-trailers. Design standards for Primary Truck Routes should consider a specification that supports the largest 53' tractor-trailers (WB-67).

Secondary Truck Routes

Secondary Truck Routes fill the gaps in the network, providing key connections to commercial corridors and individual freight generators. Although at a lower intensity than the Primary Truck Routes, this network will need to accommodate tractor-trailers that continue to serve commercial and industrial clients. As such, additional consideration should be made in the design of transit, bike, and pedestrian facilities that coexist on these routes.

Although local design standards should be further explored, it is recommended that routes at this level have a Design Vehicle specification of WB-40 (intermediate semi-trailer with 40' wheelbase) and a Control Vehicle of WB-67 (53' tractor-trailer). This means that design standards would meet the acceptable specifications for the WB-40s, but additional measures would be provided to allow the larger Control Vehicle (WB-67) to navigate the system. In this study area, as is common in many rural and suburban communities, tractor-trailers are the predominant vehicle type to serve commercial establishments. In addition, the industry types that exist in the Kennett Area have a high rate of trip generation/attraction for large tractor-trailers that cannot be ignored when establishing the truck network.

DESIGN AND CONTROL VEHICLES

The **Design Vehicle** traditionally reflects the largest vehicle assumed to use a given roadway. However, in urban and town center areas with a strong emphasis on creating livable spaces, The National Association of City Transportation Officials recommends that it may be more appropriate to consider a smaller vehicle with smaller turning movements for intersection design where cross streets are not expected to see large amounts of heavy truck traffic. In this approach, the smaller Design Vehicle is a frequent user of a given street and must be accommodated without encroachment into opposing traffic lanes. A larger **Control Vehicle** is then considered to be an infrequent user and may encroach into opposing lanes or into the street side area as long as there is no median or critical infrastructure present. This design approach allows the intersection to be more compact, reducing traffic speeds and making it safer for other road users.

Draft Truck Network

A proposed draft truck network has been identified in this study and is intended as a starting point for the truck route work group to consider. This network, as seen in Figure 18, provides proposed route designations based on the hierarchy of components outlined in the previous section of this report. These routes were identified based on existing movement patterns, trip generators, and key connections to the national network.

Truck-Restricted Routes

The draft route network includes existing truck-restricted facilities. The routes identified in this draft network are based on existing signage and local designations. The inclusion of these is not validation that they have been appropriately justified and these facilities should be reviewed by local entities prior to adoption into the network.

Truck-Appropriate Routes

The draft network of truck-appropriate route components has been created based on existing activity and required network connectivity. This has been created as a starting point for evaluation by the local communities and the truck route working group. Several routes have existing restrictions and may require additional engineering studies to determine feasibility. Due to the timing of improvements and clearing of existing restrictions, it may be necessary to phase the truck route designations to ensure appropriate connectivity is maintained. Proposed truck route components are outlined in Figure 18 and Table 3.

Figure 18: Draft Truck Network

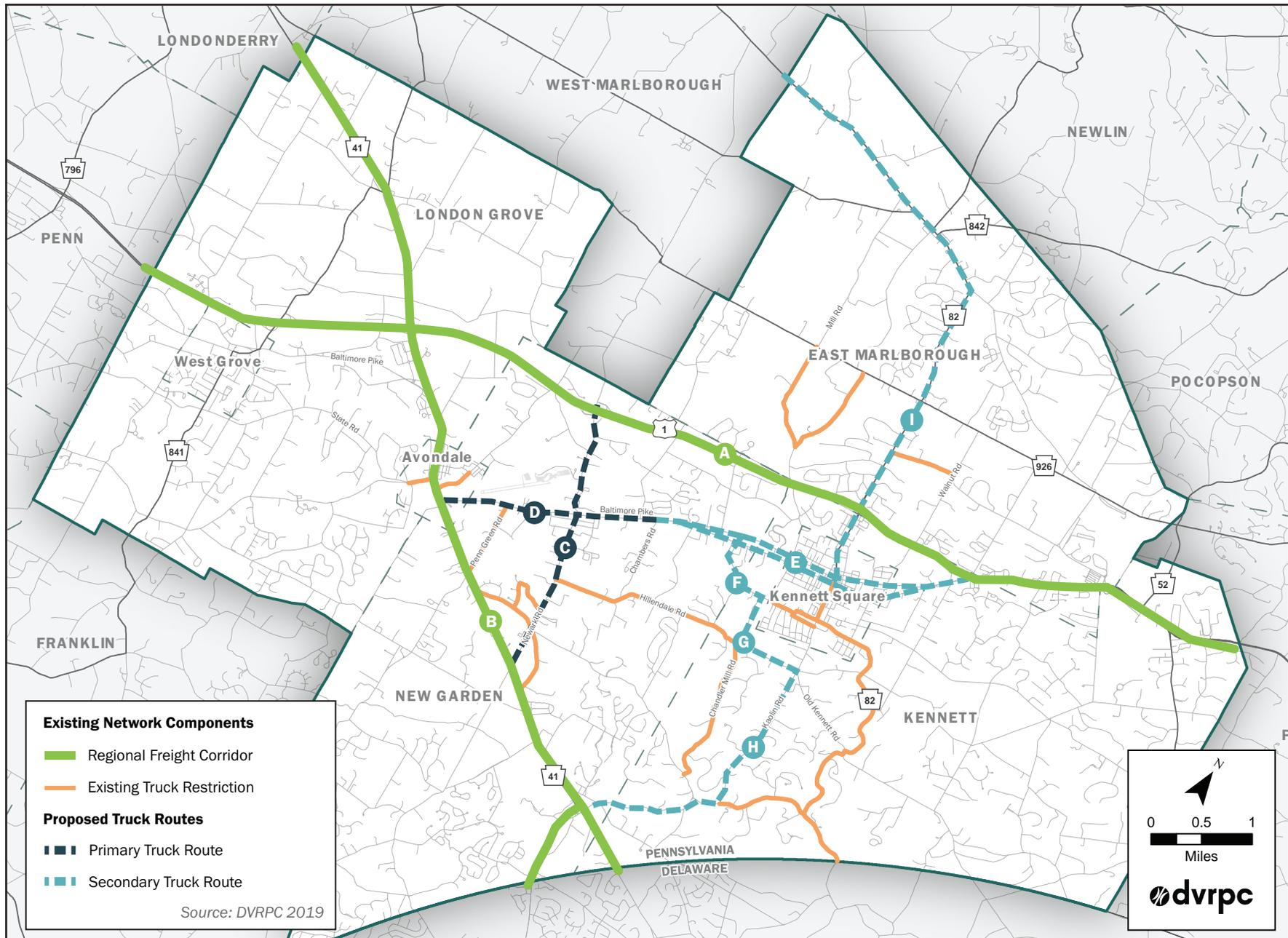


Table 3: Truck Route Classification

Highway Name	Extent	Classification	Notes
A US 1	Full	Regional Freight Corridor	Significant freight corridor serving as major regional connector and an access point for many study area trips.
B PA 41	Full	Regional Freight Corridor	Critical corridor connecting Wilmington, Delaware with major freight distribution centers in the Harrisburg, Pennsylvania region.
C Newark Road	PA 41–US 1 interchange	Primary Truck Route	Requires the completion of improvements to the Newark Road/Baltimore Pike and Newark Road/Hillendale intersections, as well as additional improvements to remove any remaining 102” restrictions. Serves as an alternative access point to the western end of the Baltimore Pike freight generators.
D Baltimore Pike	PA 41–Chambers Road	Primary Truck Route	Connects major freight generators to the PA 41 corridor, the primary source of heavy truck traffic in/out of the study area.
E Baltimore Pike/ Cypress/State	Chambers Road–US 1	Primary Truck Route (short term) Secondary Truck Route (long term)	In the short term, this route will be required to provide northern and western connections in/out of the study area. In the long term, the designation of Newark Road and the improvements to allow the utilization of this facility as a primary route could serve as the alternative to the Baltimore Pike corridor east of Chambers Road. (Alternative routing would be served via US 1 to Newark to Baltimore Pike)
F Scarlet Road– South Street	State Street–Chandler Mill Road	Secondary Truck Route	Serves as alternative access to South Mill to avoid trips on smaller residential routes in the borough. Connections south provide alternative routing to Newark Road.
G Chandler Mill Road–W Hillendale Road	South Street–Kaolin Road	Secondary Truck Route	Serves as alternative access to Kennett Township freight generators and to connections south.
H Kaolin Road	Hillendale Road–PA 41	Secondary Truck Route	Serves as an alternative connection south.
I PA 82	Cypress Street–US 30	Secondary Truck Route	Serves as a connector from Coatesville to US 1 and Baltimore Pike and as an alternative to PA 41 for north-south traffic.

Source: DVRPC

Implement the Truck Route Network

Following the completion of the truck route designation, several ongoing actions could be considered by the municipalities to make best use of the data created in this effort and to improve the safety and efficiency of truck freight operations in the Kennett Area.

Signage Plan and Wayfinding

The municipalities, upon adoption of a truck route network, should seek to develop a truck signage plan for the study area. This system of wayfinding for trucks will guide drivers to the appropriate primary and secondary routes throughout the study area, reducing the likelihood of trucks operating on inadequately sized streets. This plan should also include a review and improvement to existing truck restriction signage across the study area to ensure consistency and completeness. This is outlined in more detail in the “Wayfinding and Signage” section of the recommendations.

Incorporate Network in Regional Database

Upon completion of the designation and adoption of a truck route network, the components of the network can be incorporated into the regional truck route database maintained by DVRPC. The existing conditions inventory data that is relevant to the network has already been documented and incorporated. Any future verification and designation of routes/restrictions that is done locally will be incorporated once it is reported back to DVRPC by local parties. This data is being collected at the regional level for sharing with navigation data providers, as appropriate, in an effort to improve access to local truck route data that can be incorporated into navigation software packages.

Develop Communication Materials

In order to capitalize on the development of a truck route network, municipalities should seek to distribute the information in a variety of formats. The truck route work group should develop a downloadable and printable static version of the network map for reference by truck drivers. This information could also be incorporated into official maps of each municipality. Additionally, printed material could be prepared for individual freight facilities for distribution to truck drivers that highlight appropriate routes and restrictions for accessing the facility. This serves as an easy way to get the information directly to the drivers, which is especially effective for drivers that repeatedly serve a single generator.

Incorporate into Multimodal Planning

The municipalities should seek to incorporate the truck route network into the process of developing additional multimodal improvements across the study area. It is important to remember that the designation of a truck route is as much about the recognition of a route’s importance in regional/local truck movement as it is to providing guidance to drivers. As such, some routes may not be signed as a truck route but should still be incorporated into planning and engineering decisions. Proper integration of this network into the process will elevate the consideration of design requirements for various non-vehicular network facilities that are proposed to coexist or interact with the truck route network.

Wayfinding and Signage

The inventory of existing signage and truck issues revealed deficiencies in the quality and usability of the current wayfinding and restriction signage. Although some routing issues may be attributed to Global Positioning System (GPS) navigation systems, the lack of clarity, visibility, and consistency in signage throughout the study area creates usability issues for truck drivers. Several steps should be considered in order to address these issues.

Improve Existing Signage

Clear Vegetation that Obstructs Signage

Narrow road right-of-ways and overgrown vegetation often combine in the study area to cause signs to become obstructed. Overgrown vegetation can quickly block signs that convey important information for drivers. Implementing a regular maintenance program to cut back vegetation will ensure that essential signage is visible to road users.

Declutter Signage

Too many signs can make it confusing for drivers to understand what information is trying to be conveyed. Removing duplicate signage and placing remaining signage in effective locations may help to better direct drivers. In addition, local municipalities should undertake a review of the current inventory of signs (see Appendix D for Geographic Information System [GIS] service layer provided by DVRPC) and establish a hierarchy based on priorities.

Signage Standards for Consistency

Review Location of Signage

Advanced communication of preferred and alternate routes, as well as restrictions, is an essential part of establishing a usable truck wayfinding system. Existing signage restricts trucks on some local streets and on other streets provides direction of routes and alternate routes. However, in some locations the signage is located after the appropriate decision point, leading to drivers committing to a route they should not be on or looking for alternatives on streets that are not appropriate for large trucks. To address these issues, the location of signage should be carefully reviewed.

Signing Truck Routes

The designation of a network of truck routes is the first step in developing a functional signage plan. Utilizing these designated routes, the municipalities and county should undertake a plan to install and maintain a series of truck route wayfinding and restriction signs that support the preferred routes identified and supported by the study area municipalities.



ABOVE: Four “No Turning” Signs Create Signage Clutter at State and Union Streets

LEFT: Tree Branch Obstructs Clear View of Signage on Southbound Union Street

BELOW: Tree Blocks View of Truck Routing Signage on Westbound State Street

Source: DVRPC



Truck-Appropriate Route Signage

In order to guide trucks onto the roads that are intended to accommodate them, the signage plan should include consistent placement of signs to reinforce the route. This can be done through the use of three types of truck route signs: directional, advance, and on-route signs. These signs are described in detail in Table 4 and displayed in Figure 19.

Table 4: Truck Route Signs and Recommended Locations

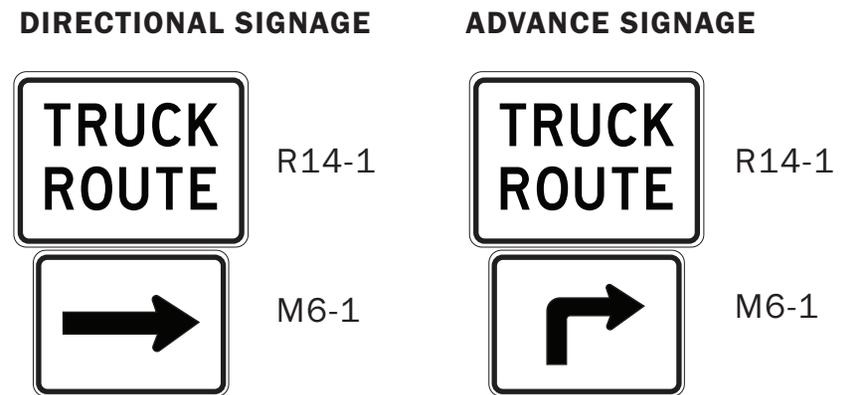
Sign Type	Description	Location
Directional	Truck route sign (R14-1) with 90-degree turn arrow plaque (M6-1R/L) pointing to truck route at intersections or other decision points.	All intersections
		Points at which truck routes turn left or right at intersections with non-truck routes.
		At base of exit ramps
		At tunnel and bridge exits
Advance	Truck route sign (R14-1) with advance 90-degree turn arrow plaque (M5-1R/L) in advance of intersections where trucks have to turn onto truck route.	150 feet before intersection
On-route	Truck route sign (R14-1) reassuring driver that they are on a truck route.	All truck routes One-half-mile increments

Source: DVRPC

*Based on best practices established by the New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study (New York City, NY: 2007), Technical Memorandum 3: Truck Signage Program*

In addition to the truck route signage, the signage plan should consider utilizing a “TO Marker” (M4-5) in conjunction with U.S. route or Pennsylvania route markers, along with corresponding arrow plaques to direct truck traffic to major regional freight routes. This helps to supplement the truck route wayfinding and reinforce to drivers that the route provides the necessary highway interchange for their trip.

Figure 19: Truck Route Sign Configuration



Source: DVRPC

Truck Restriction Signage

Similar to the application for truck route signs, restriction signage should also be incorporated into the signage plan. The study area contains a variety of restriction types, and many of these are currently signed to appropriate standards. The type of sign for each restriction varies. It is important however to consider the location of the signage to ensure the necessary notice to drivers. This can be done through the use of two types of signage: advance and restriction signs. These signs are described in detail in Table 5.

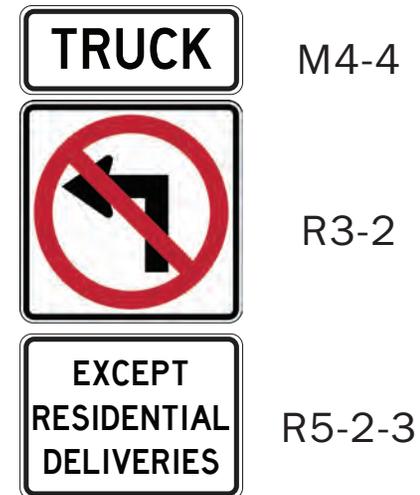
Although most study area restrictions were signed to standards, some locations may require additional consideration as a part of the review of existing sign locations. The study area would also benefit from consistent signage for local truck prohibitions. To ensure consistency and provide more advanced notice to drivers, it is recommended that municipalities with local truck prohibitions utilize the sign standard shown in Figure 20. The inclusion of this signage, on streets in advance of their intersection with restricted routes, will improve the effectiveness of the restriction signage that may already exist but is not visible until a truck has committed to a turning movement onto the restricted route.

Table 5: Truck Route Signs and Recommended Locations

Sign Type	Description	Location
Advance	Applicable restriction sign with advance move restriction.	150 feet before intersection
Restriction	Applicable restriction sign at the intersection marking the beginning of the restricted route.	At intersections nearest the beginning of the restriction, at which point an alternative move is available to the driver.

Source: DVRPC

Figure 20: PennDOT Standard Local Truck Prohibition Advance Signage



Source: DVRPC

Next Steps

The recommendations outlined in this report provide a foundation for addressing issues related to truck activity in the Kennett Area. A number of actions will need to be taken by the local community in order to advance these recommendations. This chapter highlights these steps.

This study identified attainable recommendations that will provide the Kennett Area with a more clearly defined and functional transportation system that safely and efficiently accommodates truck traffic. These recommendations will require local action and ongoing coordination to ensure that they are completed. Local participation and engagement with the community will be critical in the development of some of the recommendations, and additional studies will be necessary to refine the design of recommendations. This chapter provides an overview of funding sources that exist for these types of transportation projects, implementation steps for each of the major components of the recommendations, and a summary of the benefits of recommendations and the resources developed as part of this study.

Funding Programs

Securing funding is a crucial step toward project implementation. There are a number of competitive grant programs available in the DVRPC region to help municipalities cover the cost of the transportation improvements described in this report. Possible funding sources for the improvements identified in this study are detailed below.

Transportation and Community Development Initiative (TCDI)

The TCDI is an opportunity for DVRPC to support growth in individual municipalities of the Delaware Valley through planning initiatives that implement the region's Long-Range Plan. TCDI grants support early stage planning, design, and feasibility studies. Eligible projects reinforce and implement improvements in designated centers and improve the overall character and quality of life within the region. Among the eligible activities are wayfinding plans and mobility elements of master plans. Funding is awarded every two years.

DCED Municipal Assistance Program (MAP)

The DCED MAP provides funding to assist local governments to plan for and efficiently implement a variety of services and improvements. Shared service activities and community planning are eligible for MAP funding. Community planning projects that could be funded through MAP include parts of comprehensive plans and land use ordinances. Activities related to the multimunicipal effort to develop updated ordinances and designate the truck route network and wayfinding system could fall under the eligibility of this funding program.

Act 89 Multimodal Transportation Fund (MTF)

The design recommendations in this report are multimodal in nature, making these improvements eligible for the Act 89 MTF program. The MTF provides grants to encourage economic development and ensure that a safe and reliable system of transportation is available to the residents of the commonwealth. The program is administered by PennDOT and the Department of Community and Economic Development (DCED) under the direction of the Commonwealth Financing Authority (CFA).

MTF–PennDOT

Eligible projects for PennDOT’s MTF program include projects related to streetscape, bicycle and pedestrian facilities, improved signage, and improvements to an integrated transportation corridor in order to improve the productivity, efficiency, and security of goods movement to and from Pennsylvania ports.

MTF–DCED/CFA

On behalf of the CFA, the DCED accepts applications every year between March 1 and July 31 for multimodal projects. Project eligibility for this funding source is similar to the PennDOT MTF.

Transportation Alternatives Set-Aside Program (TA)

TA is a federal program administered by PennDOT and DVRPC. TA provides federal funds for community-based “non-traditional” surface transportation projects designed to strengthen the cultural, aesthetic, and environmental aspects of the nation’s intermodal system. Projects must be directly related to surface transportation and be accessible to the public. TA funds are provided on a reimbursement basis. Eligible projects include design and construction of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation. Projects must be authorized for construction within two years of the grant notification, and they must have formal community support.

Vision Partnership Program (VPP)

The VPP is a grant available to all Chester County municipalities and multimunicipal groups seeking to improve their planning programs while achieving consistency with and implementation of the goals, objectives, recommendations, and map of their comprehensive plan, *Landscapes3*. General project types that may be eligible include plans, ordinances, ordinance amendments, and planning studies that advance one or more of the *Landscapes3* goals and objectives. There are two VPP cash grant application rounds per year, funding permitting.

Implementation Plans

Moving forward, implementation of the recommendations will require coordination across multiple improvement efforts and jurisdictions. The following implementation plans help to summarize roles and outline steps for each of the recommendations. These include identification of responsible agencies, the timeline for acting on the recommendation component, and a rough cost estimate.

Project element cost estimates are provided for each of the action steps identified by the project team. The cost estimates are assigned to categories of high (\$\$\$), moderate (\$\$), and low (\$). High-cost steps involve a larger commitment from multiple funding sources and construction of new facilities or signage, and may require several years of lead time in programming the required funds. This category will generally cost in excess of \$750,000. Moderate-cost (\$\$) project elements are smaller construction activities and/or planning and engineering efforts that help to refine implementation components. Components in this category are estimated

to cost between \$100,000 and \$750,000. Low-cost (\$) components are small planning projects, maintenance, or communication efforts. These projects could be handled by municipal staff if capacity exists. These components are estimated to cost less than \$100,000. Components without an assigned category for cost are items that will have no cost but will require local action and coordination to complete.

Traffic Calming

The traffic-calming improvements identified in the study recommendations are critical for the reduction of potential conflict between large trucks and other modes, especially in the small villages/boroughs in the Kennett Area. The implementation of these recommended improvements could be funded through grant programs such as the TA or MTF, incorporated into TIP projects, and/or included as a component of new land development projects. Table 6 outlines the priority actions for advancing these recommendations.

Table 6: Traffic-Calming Next Steps

Recommendation	Responsible Agency	Timeline	Cost
Refine locations for gateway treatments around Avondale Borough	Avondale Borough New Garden Township Chester County	Short	\$
Identify and pursue funding for design and construction of Avondale gateways	Avondale Borough New Garden Township Chester County	Medium	\$\$
Evaluate locations in Kennett Area for pedestrian crossings	Municipal Officials Chester County	Short-Medium	\$
Incorporate traffic-calming measures and pedestrian improvements into planned transportation improvement projects	Municipal Officials Chester County PennDOT	Medium-Long	\$\$

Source: DVRPC

Truck Routing and Signage

The study recommendations for enhancing the effectiveness of truck-related signage and designation of a truck route network are essential to addressing traffic flow issues, reducing conflicts with other modes, and preserving the quality of life of residents while accommodating ongoing economic growth. The development and implementation of an effective truck route network and signage plan will require action across several

major phases as outlined in Table 7. Several recommendations could be funded through local activities and worked into ongoing coordination efforts. For planning and engineering activities related to truck route and signage plans, TCDI and/or MAP could be a source for funding. Implementation of the final signage plan will require a combination of local funding with support from grant programs, such as MTF and MAP.

Table 7: Truck Routing and Signage Next Steps

Recommendation	Responsible Agency	Timeline	Cost
Multijurisdictional Working Group (Truck Work Group)			
Identify members and form multijurisdictional working group	Municipal Officials Chester County DVRPC	Short	—
Define clear purpose and role around the evaluation, communication, and designation of truck routes and restrictions across the Kennett Area	Truck Work Group Municipal Officials	Short	—
Create an action plan and schedule building on actions outlined in the Kennett Area Freight Transportation Study	Truck Work Group Municipal Officials	Short	\$
Designate Truck Route Components			
Undertake an inventory and evaluation of all signed geometric restrictions to ensure proper engineering justification and conduct updated engineering studies where necessary	Truck Work Group Municipal Officials PennDOT	Short-Medium	\$\$-\$
Conduct additional evaluation of draft route designations, including engineering studies where appropriate to identify any remaining geometric restrictions not scheduled to be addressed in currently programmed projects	Truck Work Group Municipal Officials Chester County PennDOT	Short-Medium	\$\$-\$
Update the draft route and restriction designations in response to updated engineering analysis	Truck Work Group Municipal Officials Chester County PennDOT	Short-Medium	\$
Hold information sessions and conduct outreach with residents and industry on the draft network to provide education on the purpose and need of the routes, as well as gain feedback on the current designations	Truck Work Group Municipal Officials	Short-Medium	\$

Source: DVRPC

Table 7: Truck Routing and Signage Next Steps (Continued)

Recommendation	Responsible Agency	Timeline	Cost
Truck Route Implementation			
Draft and adopt local ordinances across all municipalities for designation of routes and restrictions (see Appendix C for examples)	Truck Work Group Municipal Officials	Short-Medium	-
Integrate truck routes into municipal maps and share final designations with DVRPC for inclusion in regional network products	Municipal Officials DVRPC	Medium	\$
Develop printed route guides for distribution to drivers at major freight generators. These can be customized per generator to improve the usability and better reach drivers that frequent the study area.	Truck Work Group Freight Generators	Medium	\$
Adopt local geometric standards for Design and Control vehicles on designated truck routes in coordination with PennDOT engineers	Municipal Officials PennDOT	Medium-Long	\$
Wayfinding and Signage Improvements			
Complete/update the signage inventory prepared as a part of the Kennett Area Freight Transportation Study	Municipal Officials Chester County	Short	\$
Conduct vegetation clearing on all obstructed signs in the Kennett Area	Municipal Officials	Short	\$
Integrate signage maintenance into local operating budgets	Municipal Officials	Short	\$
Update local truck restriction signage to be consistent with recommendations in this report, including the deployment of new advance signs for local restrictions	Municipal Officials PennDOT	Short-Medium	\$\$
Undertake a study for the development of a final signage plan with engineering and costs for clear communication of the final designated truck routes and restrictions, as well as any supplemental signage to aid in truck wayfinding	Truck Work Group Municipal Officials	Medium	\$\$
Implement the final signage plan	Municipal Officials Chester County PennDOT	Medium-Long	\$\$\$

Source: DVRPC

Resources for Implementation

This study summarized the needs and priorities in the Kennett Area related to truck freight activity. The study analysis highlighted freight patterns and safety issues, and documented existing truck routes and restrictions. The resulting recommendations and implementation steps support the goals of improving truck movements in the Kennett Area while preserving the community's character. Through this effort, a variety of resources were created and identified to support the local community as they undertake future steps toward implementation of the recommendations. These resources include:

- up-to-date truck classification counts;
- a spatial database of existing signage, restricted routes, and draft truck routes;
- rough geometric data for key routes; and
- a database of the public input collected in this effort.

These supporting resources, along with best practice materials and reference guides, are outlined in detail with access information in Appendix D.



Appendices

A: Community Outreach

B: Relevant Sign Types

C: Sample Ordinance Language

D: Additional Resources

Community Outreach

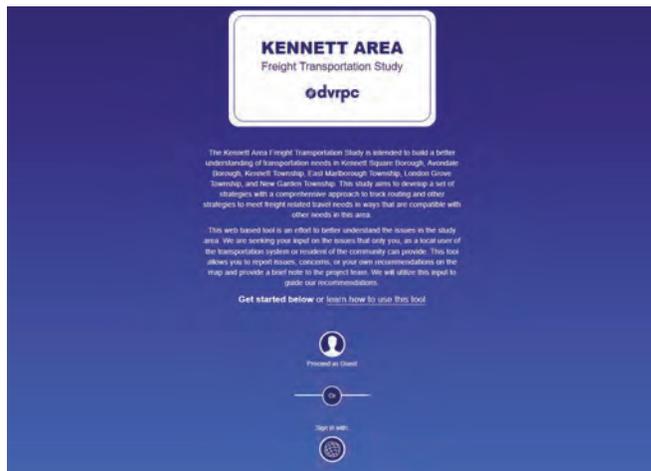
Interactive Web Map Tool

In addition to gathering community input in person at stakeholder meetings, an interactive Wikimap was launched on social media to gather input from members of the community. See Figure A-1. In total, 102 issues were raised, and 150 comments were made.

This tool allowed users to comment on the study area map by identifying a location with a transportation-related issue. Users were asked to leave a brief description of the issue and to categorize it into one of the following: Bike/Pedestrian, Intersection Design, Other, Safety, and Truck Routing. Other users could then make additional comments on already identified issues. See web map instructions in Figure A-2.

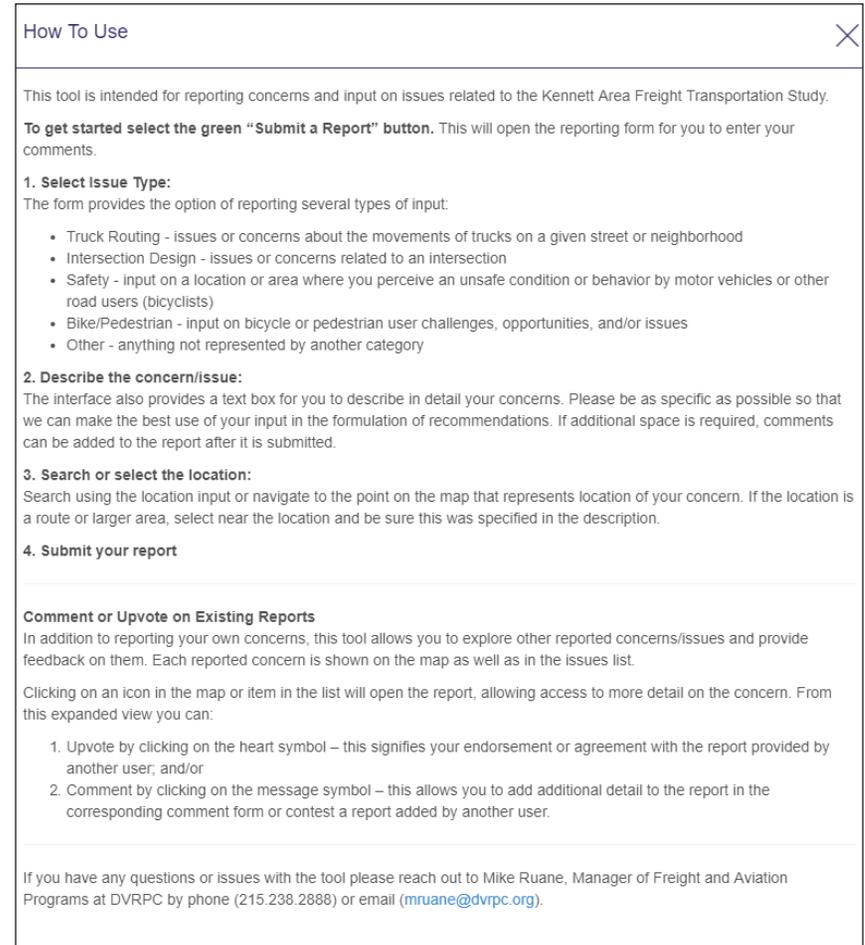
Comments made on the Web Map Tool are available at www.dvrpc.org/webmaps/kennett-freight.

Figure A-1: Web Map Home Screen



Source: DVRPC

Figure A-2: Web Map Instructions



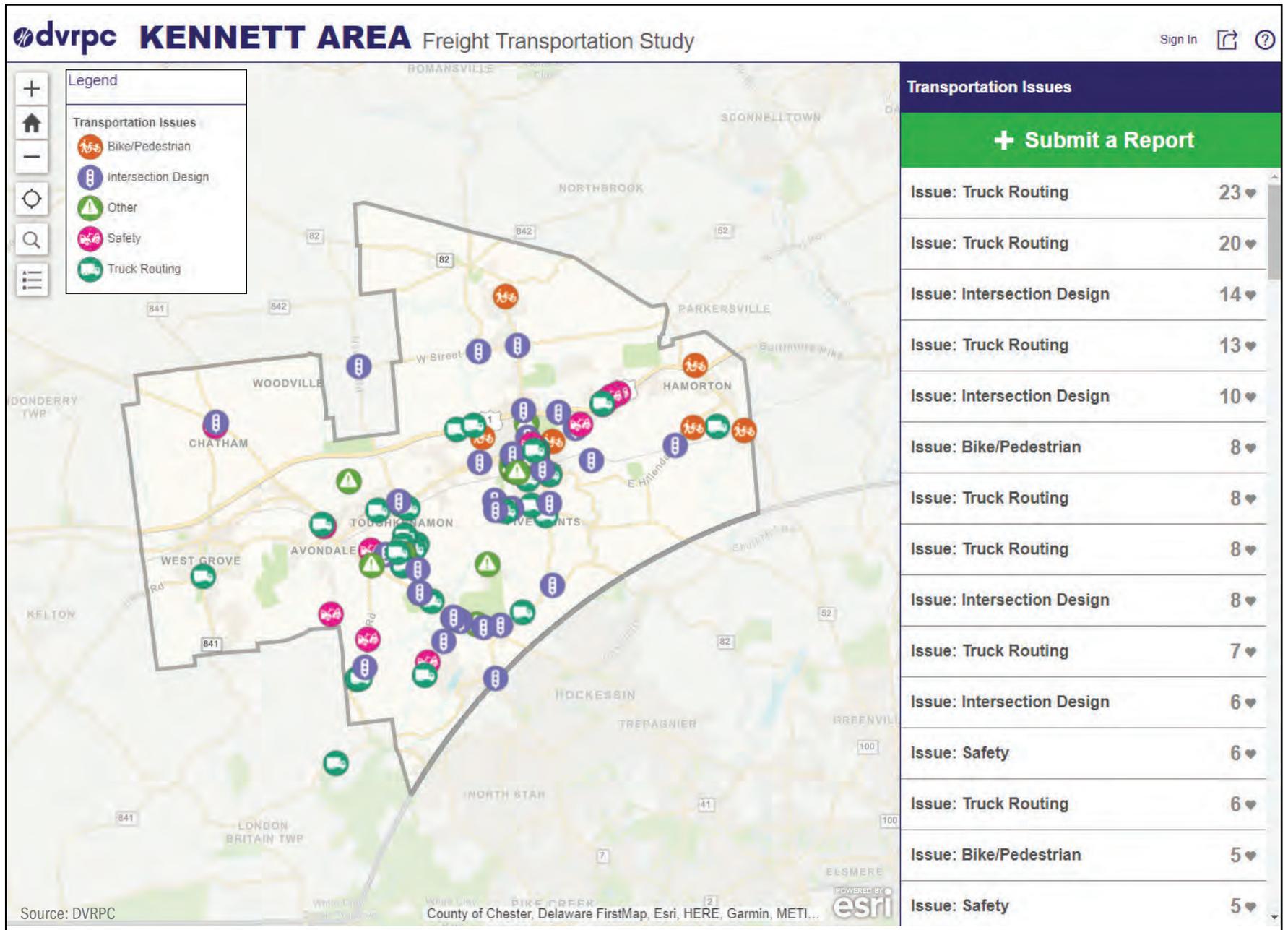
Source: DVRPC

Web Map Highlights

1. **State Street:** Trucks on State Street rattle merchandise in shops, detract from the aesthetics of the town, damage properly parked vehicles (taking off mirrors), and slow traffic.
2. **State and Union Streets:** Trucks southbound on State Street turning right onto Union Street damage the curb, pedestrian pedestals, and planters and are a danger to pedestrians on the sidewalk. They also stop traffic when they cannot complete the turn.
3. **PA 41 Intersections:** Safety concerns at intersections along PA 41 (Sunny Dell, Newark, Penn Green) where fast traffic does not allow for turning onto PA 41 and could use signalization at Sunny Dell and a dedicated turn signal at Newark Road.
4. **Avondale:** Speed along PA 41 causes problems through Avondale Borough, which sees a lot of tractor-trailer traffic.
5. **Newark Road and Baltimore Pike:** Newark Road and Baltimore Pike is a difficult intersection for trucks to navigate due to tight geometries and the steep hill.
6. **Bike Lanes:** Need for bike lanes on South Street (to connect school, YMCA, parks) and better (paved) facilities on Route 52 to Longwood Gardens.
7. **Pedestrian Facilities:** Need for pedestrian facilities connecting North Walnut Street to State Street in Kennett Square.
8. **Trucks on Narrow Roads:** Trucks on narrow roads like Penn Green, Sunny Dell, Limestone/Kaolin, and Newark south of PA 41 must leave their lane in order to navigate winding roads.
9. **Trucks in Residential Areas:** Loud trucks and engine brakes on US 1, Hillendale Road, and Newark Road south of PA 41 in residential areas disturbs residents.
10. **Union Street South and Five Points:** Union Street south of Kennett Square Borough and Five Points was not designed for the amount of truck traffic that it sees. There are also safety concerns near schools with heavy pedestrian traffic and trucks exceeding speed limits.
11. **Scotts:** Trucks going to Scotts park on the side of Newark Road before the site is open and use The Gardens neighborhood despite “No Trucks” posting.
12. **US 1 and Baltimore Pike:** Split between US 1 and Baltimore Pike has confusing signage and is the site of multiple crashes.
13. **North of Kennett:** Safety concerns regarding geometry of intersections in London Grove (Newark Road and 926), Willowdale (Unionville and 926), and Chatham (PA 41 and PA 841).
14. **Cyclists:** Concern having cyclists on small, country roads that slow down car traffic with no space to allow cars to pass.
15. **South Mill Extension:** Need for extension of South Mill Road over railroad tracks.
16. **Hillendale Road:** Difficulties with trucks turning from Hillendale Road onto intersecting roads and blocking traffic or running through private yards. One-lane bridge is a barrier to truck usage of Hillendale Road.
17. **Schools:** Conflict between trucks and school zones across study area (New Garden Elementary, Bancroft Elementary, Mary D Lang Elementary, Kennett High School, Kennett Middle School).

These highlights are displayed in Figure A-2.

Figure A-3: Study Area Web Map with Comments



Kennett Area Freight Study Advisory Committee Meeting

October 31, 2018

This meeting gathered key stakeholders from the Kennett Area for a presentation on the scope of this study and an interactive workshop. The workshop split the stakeholders into three groups to identify freight concerns on a map of the study area (See Figure A-3) and to share other comments and knowledge about freight and local industries. Comments were then organized into the following categories:

Identified Intersections of Concern

N. Union Street and State Street

- difficult turning radius at intersection;
- trucks constantly taking out signage when turning;
- local deliveries double park;
- high speeds and loud noises; and
- truck traffic from US 1: Borough would prefer that trucks were routed through US 1 and Newark Road.

Baltimore Pike and Newark Road

- difficult turning radius;
- north of intersection is a hill at a sharp turn; and
- project at this location is included in the FY2019 TIP (MPMS #110312).

Kaolin Road and Hillendale Road

- five-way intersection with heavy truck traffic; and
- roundabout proposed.

PA 41 and State Road

- project at this location is included in the FY2019 TIP (MPMS #110311);
- heavy congestion; and
- there are a lot of historic buildings in Avondale which can make construction, especially with roads, difficult and tricky.

Figure A-4: Map Exercise Posters



Source: DVRPC

South Street and Lafayette Street

- tight turning radius; and
- local road used to access South Mill Mushroom Farm.

Figure A-5: Newark Road and East Penn Rail Line

- identified as a challenging road crossing

Known Bridge Restrictions

Hillendale Road and Rosedale Road (Over Octoraro Tracks)

- only overhead rail crossing in this area;
- 9'-6" height restriction; and
- lacks early warning signage.

State Street between North Mill Road and Penns Manor Drive

- PennDOT bridge restriction: weight limit 30 tons (35 combination);
- lacks signage before Baltimore Pike/US 1 split, so drivers end up on local roads trying to avoid bridge; and
- Manfredi has permits to use this bridge.

Route 82 and Old Kennett Road

- bridge closure with no detour offered

Chandler Mill Road and Hillendale Road

- bridge on Hillendale restricted to one lane and weight limit of 12 tons

Identified Freight Conflict Routes

Route 82

- state highway: drivers routed onto this road; and
- two lanes, sharp curves, tight clearances.

Kaolin Road east of PA 41

- Kaolin Road is a state road (Route 7) in Delaware, but in Pennsylvania it is not;
- road design changes from truck-appropriate to narrow and winding crossing from Delaware to Pennsylvania; and
- the preferred route would be PA 41 to Newark Road.

Newark Road between PA 41 and Baltimore Pike

- alternative route for cars and trucks trying to avoid congestion in Avondale Borough

State and Cypress Streets

- both streets were previously two way;
- converting State and Cypress streets to two-way roads does not currently have much political momentum or clear funding source (this change would be expensive because intersections would need to be redesigned, re-signed, etc.);
- Cypress Street could be a truck route and State Street could remain more commercial; and
- traffic-calming measures and other impediments could be used to block trucks from certain areas, especially in or close to the boroughs.

Comments on Rail/Truck Balance

- there are barriers to industrial development along the Octoraro Line that are causing an increase in trucks because rail cannot serve; and
- train parking from Scarlett Road to S. Walnut Street because there is no train yard.

Other

- many trucks are also present on PA 41 because they are transporting refuse to Southeastern Chester County Refuse Authority in West Grove;
- funding is limited for developing trails;
- there are general concerns with trying to develop more bike and pedestrian facilities regarding who is to blame if users of such trails were to be injured or killed in an accident;
- school buses now pick up and wait for each and every student from their home, unlike in the past when each student had to be at a bus stop;
- mushroom compost creates smells around facilities; and
- mushroom trucks are often unmarked, which does not allow the community to understand the trucks' purpose.

APPENDIX B

Relevant Sign Types

Table B-1: Relevant Sign Types from PennDOT Publication 236

Nomenclature	Description	Sign Dimensions – Conventional Road
R1-6	IN-STREET PEDESTRIAN CROSSING	12" × 36"
R3-1	NO RIGHT TURN	24" × 24" (single lane), 36" × 36" (multilane)
R3-2	NO LEFT TURN	24" × 24" (single lane), 36" × 36" (multilane)
R5-2	NO TRUCK	24" × 24"
R5-2-3	EXCEPT LOCAL DELIVERIES	24" × 18", 36" × 30", 48" × 36"
R12-1	WEIGHT LIMIT (__) TONS	24" × 30"
R12-1-2	BRIDGE	24" × 12"
R12-5A	EXCEPT COMBINATIONS (__) TONS	24" × 18"
R12-6	102" - WIDE TRAILER ADVANCE PROHIBITED	24" × 36", 36" × 48", 60" × 72"
R12-6A	102" - WIDE TRAILER PROHIBITED	24" × 24", 36" × 36", 60" × 48"
R14-1	TRUCK ROUTE	24" × 18"
R14-16-1	VEHICLES OVER (__) FT WIDE PROHIBITED	60" × 60"
R14-17-1	VEHICLES OVER (__) FT IN HEIGHT PROHIBITED	60" × 60"
W11-2	PEDESTRIAN	30" × 30" (single lane), 36" × 36" (multilane)
W11-15	COMBINED BICYCLE /PEDESTRIAN	30" × 30" (single lane), 36" × 36" (multilane)
W16-17P	DIAGONAL DOWNWARDS-POINTING ARROW PLAQUE	24" × 12"
M4-4	TRUCK (marker)	24" × 12"
M4-5	TO (marker)	24" × 12"
M5-1R/L	ADVANCE 90° LEFT/RIGHT TURN (marker)	21" × 15"
M6-1R/L	90° LEFT/RIGHT TURN (marker)	21" × 15"

Source: PennDOT, *Handbook of Approved Signs*: Publication 236 (2013)

APPENDIX C

Sample Ordinance Language

Example 1: Middletown Township, Pennsylvania

Chapter 470. Vehicles and Traffic

Article III. Restrictions on Size, Weight and Type of Vehicle and Load

§ 470-304. Truck traffic restricted on certain streets.

A. It shall be unlawful for any person to drive a vehicle other than a passenger car on any of the following streets or parts of streets:

Street

All Township streets

B. Provided that nothing in this section shall prohibit any person from driving an emergency vehicle on any of those streets or parts of streets or from driving on any of those streets or parts of streets a truck or other commercial vehicle making local deliveries to or pickups from premises located along that street or part of a street.

C. Any person who violates any provision of this section shall, upon conviction, be sentenced to pay a fine of \$25 and costs.

Example 2: Marcus Hook Borough, Pennsylvania

Chapter 191. Vehicles and Traffic

Article VIII. Schedules

§ 191-76. Schedule XI: Closing of Certain Streets to Certain Vehicles; Prohibiting Trucks Except for Local Deliveries.

[Amended 7-11-2011 by Ord. No. O-11-3, approved 7-11-2011]

A. In accordance with the provisions of § 191-17, it shall be unlawful for any person to drive any vehicle, except a passenger vehicle (but not including any passenger vehicle drawing any trailer or towing any other vehicle), upon any of the streets or parts of streets described below:

Name of Street

Limits

Church Street

From Delaware Avenue to Fourth Street

Church Street

From Eighth Street to Tenth Street

<continued...>

B. In accordance with the provisions of § 191-17, trucks are prohibited from accessing the streets described below, except for local deliveries. Local deliveries are defined as deliveries or picking up materials or merchandise going to or from a residence, commercial/business establishment, or public property.

Name of Street

Limits

Church Street

From Tenth Street to Eighth Street

Green Street

From Tenth Street to Delaware Avenue

<continued...>

C. In accordance with the provisions of § 191-17, trucks are prohibited from accessing the streets described below, except for local residential deliveries. Local residential deliveries are defined as deliveries or picking up materials or merchandise going to or from a residence.

[Added 11-7-2016 by Ord. No. O-16-5, approved 11-7-2016]

Name of Street

Limits

Plaza Street

Entire length

Yates Avenue

From Tenth Street to Chestnut Street

Example 3: City of Pittsburgh, Pennsylvania

§ 503.12 - TRUCK ROUTES.

No person shall operate a vehicle with a gross registered vehicle weight in excess of fourteen thousand (14,000) pounds except on a designated truck route unless the vehicle is moving from its point of origin to the nearest truck route, or from the nearest practical and safe street that can be used from the truck route to its destination.

(Ord. 1-1991, eff. 2-4-91)

Additional Resources

The actions and recommendations identified in this report represent a road map for improving the interaction between freight and other users in the Kennett Area. Local action and initiative will be necessary to advance many of these recommendations. To support this effort, the DVRPC study team has assembled a variety of resources to support these initiatives. Many of these resources are data collected as part of this study; however, others provide guidance and best practices worth exploring while advancing the various recommendations.

Existing Conditions Data

These data resources were created by the DVRPC project team during the inventory phase of the project. These data layers are available to the project stakeholders as ArcGIS shapefiles upon request.

- **Traffic Counts:** Classification counts were collected on key routes throughout the study area and provide details on the number of vehicles, broken down by class for each of the count locations. These counts are mapped to their location of collection, and count reports are available.
- **Draft Truck Routes:** These polyline features are road centerline elements corresponding to each of the draft route designations proposed in this study.
- **Truck-Restricted Routes:** Based on existing signage, these road centerline elements represent the signed restrictions in the study area and include the signed restriction. This layer may not be all inclusive, with some local restrictions not included.
- **Signage Inventory:** A point file of truck-related and wayfinding signage in the study area. This includes restrictions, alternate routes, and relevant highway directional signage.

Public Comments on Truck Issues

The public outreach conducted as a part of this study provided input and comments on truck-related issues in the study area. These are available at www.dvrpc.org/webmaps/kennett-freight.

Best Practices Guides

To support the ongoing development of truck-related initiatives in the study area, the DVRPC project team assembled several key guides that will aid in the process. These guides are best practices in the field.

Urban Freight

- **Philadelphia Delivery Handbook:** <http://bit.ly/dvrpc16012>
A guide providing background and best practices on accommodating urban deliveries.
- **Strategies for Downtown Deliveries:** <http://bit.ly/dvrpc16012a>
A simple one-page educational document on why deliveries in towns are growing and how to help address the increases.
- **Initiative Selector Tool for Improving Freight System Performance:** <http://bit.ly/ncfrp33>
An online tool for identifying potential initiatives to address freight concerns in communities.

Truck Routing and Complete Streets

- **Complete Streets Considerations for Freight and Emergency Vehicles Guidebook:** <http://bit.ly/cs-freight>
A guidebook for incorporating the needs of freight activities and emergency services into the design and operation of Complete Streets.
- **Freight Roadway Design Considerations:** <http://bit.ly/frdc-guide>
This document identifies considerations for selecting appropriate design strategies relative to the function, multimodal characteristics, and land use context of roadway corridors.

Kennett Area Freight Transportation Study

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Geographic Area Covered:

Chester County, Kennett Square Borough, Avondale Borough, Kennett Township, East Marlborough Township, London Grove Township, New Garden Township

Key Words:

Freight, Trucks, Truck Route, Primary Truck Route, Secondary Truck Route, Wayfinding, Pedestrians, Cyclists, Traffic Calming, Truck Restrictions, Safety, Design Vehicle, Control Vehicle

Abstract:

In response to local initiative and at the request of the Chester County Planning Commission, the Kennett Area Freight Transportation Study was undertaken to explore freight conflicts in more detail to support economic growth and strengthen livable communities by ensuring safe, efficient movement of goods and people. This study explores strategies to address existing geometric constraints, bridge restrictions, truck movement and routing issues, and to protect or enhance historic and commercial boroughs. This report is divided into five chapters: an introduction, background, existing conditions, recommendations, and next steps.

Staff Contacts:

Kristen Scudder

Transportation Planner, Freight and Aviation Programs

Phone: 215.238.2939

Email: kscudder@dvrpc.org

Michael Ruane

Manager, Freight and Aviation Programs

Phone: 215.238.2888

Email: mruane@dvrpc.org



190 N Independence Mall West

8th Floor

Philadelphia, PA 19106-1520

215.592.1800 | fax: 215.592.9125

www.dvrpc.org



190 N Independence Mall West
8th Floor
Philadelphia, PA 19106-1520
215.592.1800 | fax: 215.592.9125
www.dvrpc.org

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