Eastern Pennsylvania Freight Alliance

EASTERN PENNSYLVANIA FREIGHT INFRASTRUCTURE PLAN

FINAL REPORT

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Lackawanna Luzerne MPO

https://www.lltsmpo.com/wp-content/uploads/2024/06/LLTS-Title-VI-Plan_FINAL-v2.pdf

Lebanon County MPO

https://www.lebanoncountypa.gov/getmedia/582609be-8e21-4f85-994f-c5bfe9ea26b9/LEBCO-MPO-Title-VI-Policy-Statement-5-1-24.pdf

Lehigh Valley Transportation Study

https://www.flipsnack.com/9A575F88B7A/draft-2023-public-participation-plan/full-view.html

Northeastern Pennsylvania Alliance

https://www.nepa-alliance.org/wp-content/uploads/2024/04/NEPA-MPO-Public-Participation-Plan_FINAL.pdf

Reading Area Transportation Study

https://www.berkspa.gov/getmedia/44e3001f-61d6-4980-8d2b-cce0676d1097/TITLE_VI_PROGRAM-July2024Updates.pdf

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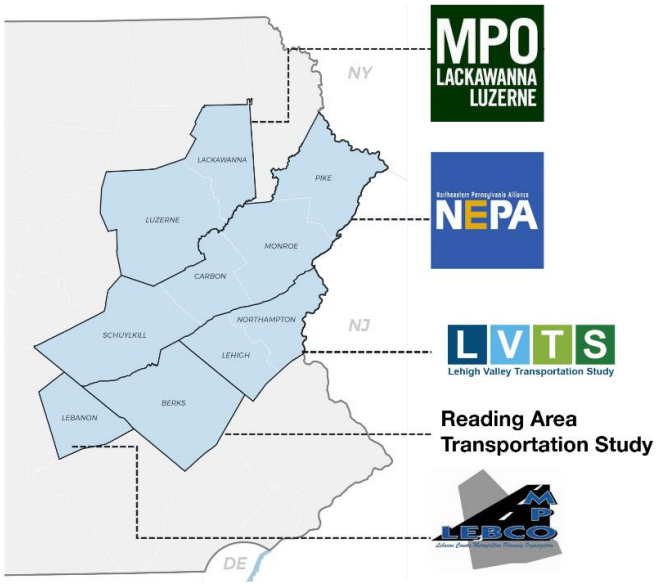
AADTT – Annual Average Daily Truck Traffic
AAR – Allentown and Auburn Railway
AASHTO – American Association of State Highway and Transportation Officials
ABE – Lehigh Valley International Airport
ACE – Alternative and Clean Energy
ADAS – Advanced Driver Assistance Systems
AEB – Autonomous Emergency Braking
AFIG – Alternative Fuels Incentive Grant
AFV – Alternative Fuel Vehicle
AFW – Perot Field Fort Worth Alliance Airport
AI – Artificial Intelligence
AID – Accelerated Innovation Deployment
ALO – Waterloo Regional Airport
ASRS – Automated Storage and Retrieval Systems
ATTIMD – Advanced Transportation Technologies and Innovative Mobility Deployment
AVP – Wilkes Barre–Scranton International Airport
BMS – Bridge Management System
BOMO – Bureau of Maintenance and Operations
BOPAC – Buy Online, Pickup at Curb
BOPIS – Buy Online, Pay in Store
BTS – Bureau of Transportation Statistics
CAGR – Compound Annual Growth Rate
CCRC - Carbon County Railroad Commission
CCS – Combined Charging System
CFI - Charging and Fueling Infrastructure
CLE - Cleveland Hopkins International Airport
CLT – Charlotte Douglas International Airport
CMAQ – Congestion Mitigation and Air Quality
CMP – Congestion Management Process
CNG – Compressed Natural Gas
CO2 – Carbon Dioxide
COLTS – County of Lackawanna Transit System
CPRS – Canadian Pacific Railway
CV – Connected Vehicle
CVG – Cincinnati/Northern Kentucky International Airport
DC – Distribution Center
DCED – Pennsylvania Department of Community and Economic Development
DEP – Pennsylvania Department of Environmental Protection
DOE – US Department of Energy
DRJTBC – Delaware River Joint Toll Bridge Commission
DRT – Del Rio International Airport
DSM – Des Moines International Airport
DVMT – Daily Vehicle Miles Traveled
EBG – Eastern Berks Gateway
ECTX – Electric City Trolley Museum
ELP – El Paso International Airport
EOP – Emergency Operations Plan
EPFA – Eastern Pennsylvania Freight Alliance
ESC – Electronic Stability Control
EV – Electric Vehicle
EVSE – Electric Vehicle Supply Equipment
FAK – Freight of All Kinds
FAST – Fixing America's Surface Transportation
FCW – Forward Collision Warning
FDOT – Florida Department of Transportation
FHWA – Federal Highway Administration
FMCSA – Federal Motor Carrier Safety Administration
FRA – Federal Railroad Administration
FY – Fiscal Year
GHG – Greenhouse Gas
GIS – Geographic Information Systems
GPS – Global Positioning System
HOS – Hours of Service
IIJA – Infrastructure Investment and Jobs Act
ILN – Wilmington (Ohio) Air Park
INFRA – Nationally Significant Multimodal Freight & Highway Projects
IRI – International Roughness Index
ITS – Intelligent Transportation Systems

kW – Kilowatt
LANTA – Lehigh and Northampton Transportation Authority
LAX – Los Angeles International Airport
LCTA – Luzerne County Transportation Authority
LEBCO – Lebanon County Metropolitan Planning Organization
LLTS – Lackawanna/Luzerne Transportation Study
LNAA – Lehigh-Northampton Airport Authority
LNG – Liquified Natural Gas
LPG – Liquefied Petroleum Gas
LRTP – Long Range Transportation Plan
LVPC – Lehigh Valley Planning Commission
LVTS – Lehigh Valley Transportation Study
MDT – Harrisburg International Airport
MEGA – National Infrastructure Project Assistance Grant Program
MEM – Memphis International Airport
MIT – Massachusetts Institute of Technology
MLB – Melbourne Orlando International Airport
MOU – Memorandum of Understanding
MPDG – Multimodal Project Discretionary Grant
MPO – Metropolitan Planning Organization
MSP – Minneapolis–Saint Paul International Airport
NCHRP – National Cooperative Highway Research Program
NDCR – N.D.C. Railroad
NEPA – Northeastern Pennsylvania Alliance
NESCAUM – Northeast States for Coordinated Air Use Management
NEVI – National Electric Vehicle Infrastructure
NHFN – National Highway Freight Network
NHFP – National Highway Freight Program
NHS – National Highway System
NHTSA – National Highway Traffic Safety Administration
NLCC – Northside Logistics and Cargo Complex
NPMRDS – National Performance Management Research Data Set
NRF – National Response Framework
NS – Norfolk Southern
NYMTC – New York Metropolitan Transportation Council
OPI – Overall Pavement Index
ORD – Chicago O'Hare International Airport
ORF – Norfolk International Airport
PA – Pennsylvania
PASDA – Pennsylvania Spatial Data Access
PBOT – Portland Bureau of Transportation
PCIT – Pennsylvania Crash Information Tool
PEMA – Pennsylvania Emergency Management Agency
PennDOT – Pennsylvania Department of Transportation
PennTIME – Pennsylvania Traffic Incident Management Enhancement
PEV – Plug–in Electric Vehicle
PHL – Philadelphia International Airport
PIT – Pittsburgh International Airport
PPP – Power Projection Platform
PROTECT – Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation
RAISE – Rebuilding American Infrastructure with Sustainability and Equity
RATS – Reading Area Transportation Study
RBA – Rentable Building Area
RBMN – Reading Blue Mountain & Northern Railroad
RDG – Reading Regional Airport
RFD – Chicago Rockford International Airport
ROP – Regional Operations Plan
RPO – Rural Planning Organization
RSC – Roll Stability Control
RTMC – Regional Traffic Management Center
SAE – Society of Automobile Engineers
SBD – San Bernardino International Airport
SBRR – Stourbridge Railroad
SF – Square Feet
SKU – Stock Keeping Unit
SMART – Strengthening Mobility and Revolutionizing Transportation
SMF – Sacramento International Airport
SPW – Spencer Municipal Airport
SS4A – Safe Streets and Roads for All
STB – Surface Transportation Board

STBG – Surface Transportation Block Grants
STIP – PennDOT Statewide Transportation Improvement Program
STL – St. Louis Lambert International Airport
STRAHNET – Strategic Highway Network
TCI – Transportation and Climate Initiative
TCI–P – Transportation and Climate Initiative Program
TDM – Transportation Demand Management
TIM – Traffic Incident Management
TIP – Transportation Improvement Program
TMC – Traffic Message Channel
TPA – Tampa International Airport
TSMO – Transportation Systems Management and Operations
US – United States
USDOT – United States Department of Transportation
USG – United States Gypsum
USPS – United States Postal Service
V2I – Vehicle to Infrastructure
V2V – Vehicle to Vehicle
V2X – Vehicle to Everything
VHET – Vehicle Hours of Excess Travel
VHU – Vehicle Hours of Unreliability
VMT – Vehicle Miles Traveled
WKSR – Wanamaker, Kempton and Southern Railroad
ZEV – Zero-Emission Vehicles

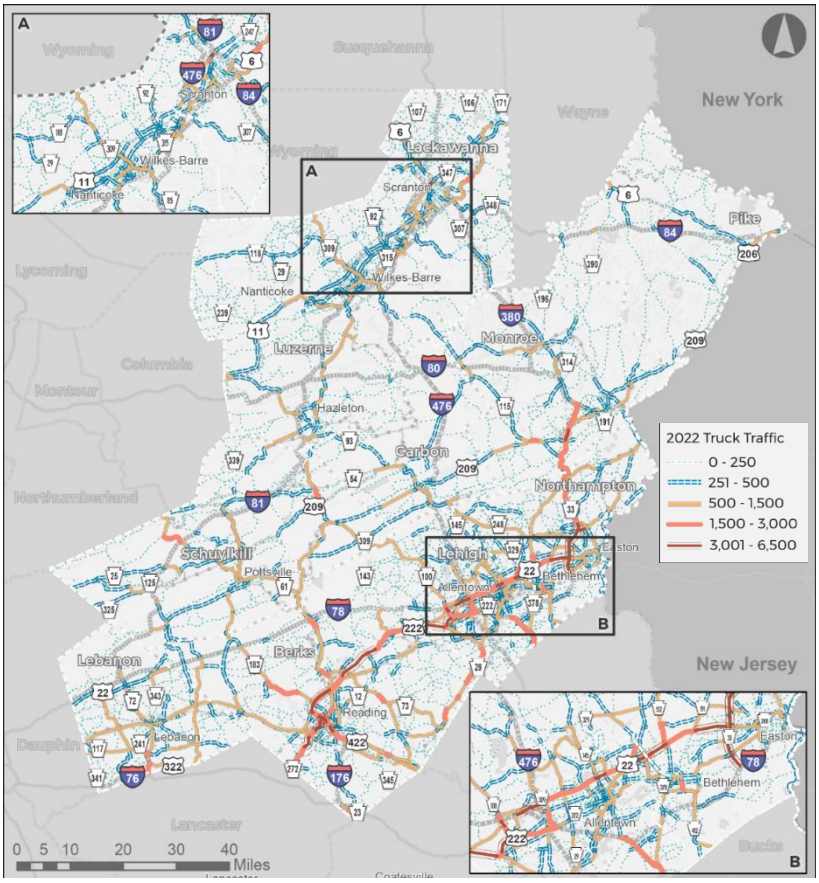
EXECUTIVE SUMMARY



The **Eastern Pennsylvania Freight Alliance** (EPFA) is a 10-County region, including members of 5 Metropolitan Planning Organizations that is among the largest and fastest-growing freight handling regions in the country, home to rapid development and redevelopment for warehouse and distribution functions. The **Eastern Pennsylvania Freight Infrastructure Plan** (the Plan) is a blueprint for future investments and policies aimed at mitigating the impacts of freight traffic within the region, while also managing the expected continued expansion of freight uses within Eastern Pennsylvania.

The Plan culminates in the **Regional Action Plan** (Section 5), which includes the identification of infrastructure improvement locations based on a review of quantitative (Regional Freight Profile) and qualitative (Outreach) inputs, and policy recommendations based on input received through stakeholder and public outreach, supported by current regional and national freight policy trends.

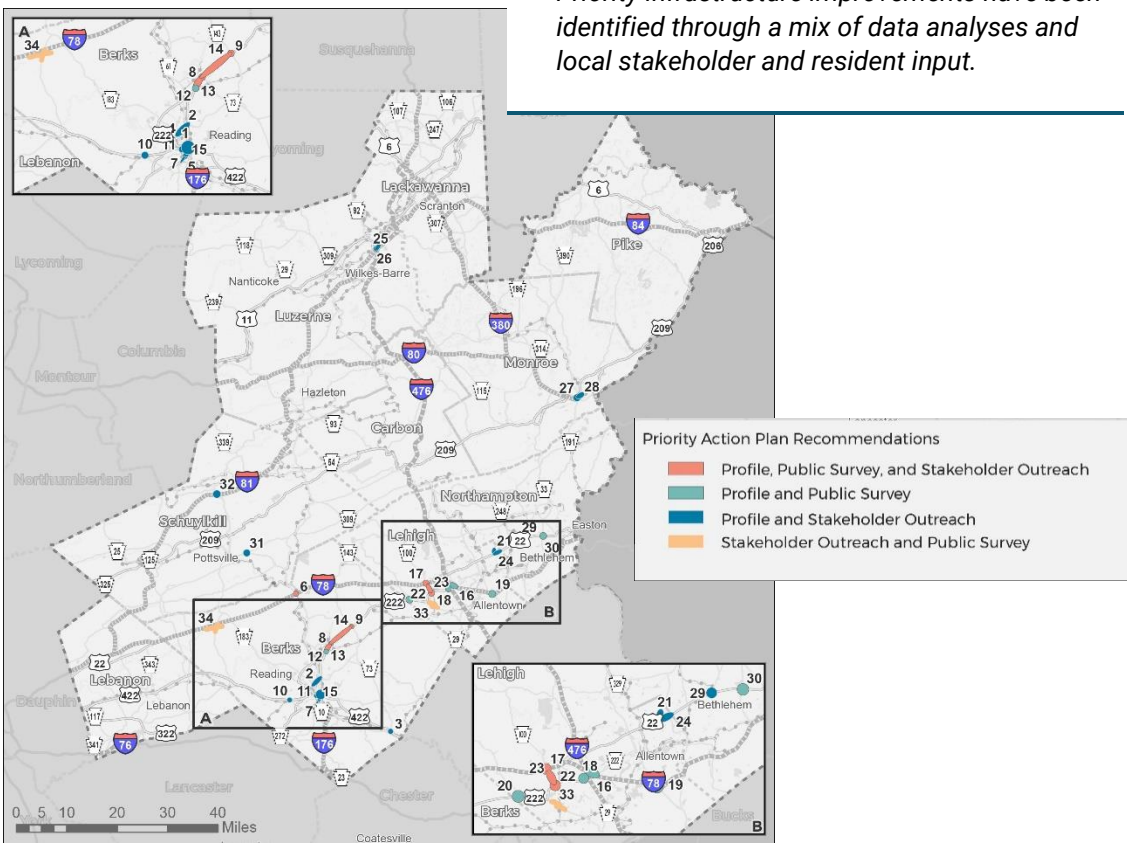
Key **infrastructure** needs have been identified through a review of where quantitative and qualitative priorities overlap. Several intersections, interchanges, and corridors have been identified within multiple realms (Freight Profile analysis, Stakeholder Outreach, or Public Outreach). 34 targeted projects have been identified, including eight highest



A review of truck traffic on non-Interstate roadways within the EPFA region illustrates a primary spine of freight activity along Routes 33, 22, and 222 in Northampton, Lehigh, and Berks Counties

priority projects (5 in Berks County, 3 in Lehigh County) that were highlighted within the Freight Profile analysis, through stakeholder outreach, as well as a frequently identified location from public survey respondents.

Priority infrastructure improvements have been identified through a mix of data analyses and local stakeholder and resident input.



Map ID	Location	County
6	I 78/PA 61	Berks
8	US 222 at PA 73	Berks
9	US 222/PA 662	Berks
12	U.S. 222 (Allentown Pike), US 222 BUS to PA 73	Berks
14	U.S. 222 (Kutztown Road), PA 73 to PA 662	Berks
17	I 78/PA 100	Lehigh
22	PA-100, at US 222	Lehigh
23	PA-100, US 222 to Penn Drive	Lehigh

Policy recommendations have been crafted as the result of a review of input received through stakeholder discussions or feedback highlighted repeatedly in public survey responses. This input was amplified by a review of current regional, statewide, and Federal planning best practices. These recommendations are generally focused around seven key themes, summarized below. Several recommendations will require substantial coordination amongst EPFA partners, highlighting a need to formalize regular meetings of the EPFA.

Regional Coordination

Elements that require buy-in from multiple or all EPFA members.

Land Use

Focused on a need to advance regional or multi-jurisdictional zoning, or the development of model ordinance support for EPFA municipalities.

Truck Operations

Local, county, or regional focused efforts to improve opportunities for truck parking, truck routes or wayfinding needs.

Air Cargo

Focus on maintaining and developing domestic air cargo operations within the region to best meet the needs of freight movement for the EPFA.

Rail

Recommendations that address land use, safety, or capacity issues associated with rail freight.

Freight Workplace Access

Recommendations that aim to address unmet transit demands associated with freight nodes.

Road Design and Maintenance

Elements associated with winter weather, storm events, or work zone impacts on key routes.

The Plan was supported through an **inclusive outreach** program (outlined in Section 2) that included input from agency partners, industry and economic development decisionmakers, as well as the public through a survey that received more than 4,200 responses.

An analysis of public survey responses (highlighted in Section 2.3) indicated several key themes and sub-themes that helped guide policy recommendations.

Warehouses
Halt or prevent the construction of new warehouses; Assess the status of current warehouses (empty/vacant vs. active).

Trucks
Develop dedicated truck lanes and routes. Prohibit or limit use of specific vehicle types. Improve training for drivers; Mandate use of truck GPS and improve wayfinding signage.

Enforcement
Increase enforcement of truck travel speeds and truck behaviors (local road use, undesignated parking, reckless driving); Increase monitoring of overweight trucks.

Policy
Prohibit or limit development through stronger zoning codes; Increase taxes/fees/permitting on truck traffic; Increase preservation of open space/farmland.

Improvements
Widen roadways (I-78, US 22, PA 33); Install additional sound barriers; Improve wayfinding/signage.

Rail
Expand/improve existing rail system to allow for shift of truck freight to rail; Increase use of rail freight.

Numerous **recently completed studies** and plans have been summarized in Section 3 - the policies and outcomes highlighted ultimately guide future freight infrastructure investments and policymaking decisions. This is followed by an outline of **national and regional policies** (Section 4) currently driving freight industry investments in response to how the region's residents consume goods and services. Additionally, a summary of land use and environmental/emission reduction trends illustrate how communities are planning for future needs.

Lastly, the **Regional Freight Profile** is a companion document that provides an encyclopedic summary of the existing conditions for transportation, land use, safety, and congestion, centered on how each relates to freight and goods movement. The profile illustrates each of the key datasets that outline and define the challenges and opportunities that inform and support many Plan outcomes.

1 Introduction

PURPOSE OF THE PLAN

WHAT IS THE EPFA REGION?

Eastern Pennsylvania has a documented history as a regional and national center of industrial and commercial activity. The region's strategic location is proximate to natural resources, with a robust transportation infrastructure system that provides connections to New York, New Jersey, and Philadelphia, as well as points west within the Commonwealth. Eastern Pennsylvania is attractive because of its legacy manufacturing industries, strategic position along major interstate trucking routes and rail routes, relative proximity to international ports and airports in Pennsylvania/New Jersey/New York, and affordable/available land compared to areas closer to the urban core of the New York/New Jersey region.

The Eastern Pennsylvania Freight Infrastructure Plan (the Plan) is a blueprint for future investments and policies aimed at mitigating the impacts of freight traffic within the region, while also managing the expected continued expansion of freight uses within Eastern Pennsylvania.

1.1 Purpose of the Plan

Eastern Pennsylvania is one of the fastest-growing freight handling regions in the country. Rapid growth in e-commerce and direct-to-consumer deliveries -- accelerated by the COVID-19 pandemic and reduced "brick and mortar" retail sales has necessitated the expansion of multi-stage warehouse/distribution systems to receive and deliver goods. This has led to rapid development and redevelopment for warehouse and distribution functions, both in and around major metropolitan areas. Within Eastern Pennsylvania, this growth is not limited to metropolitan areas, having expanded into historically rural areas, generating tangible community impacts including increased truck traffic, reduced land availability, equity issues, emergency services demand, and stresses on housing and workforce availability.

Eastern Pennsylvania will continue to be an attractive destination for the goods movement industry. This Plan identifies challenges and develops opportunities for infrastructure investments and policy guidance that address the challenges of continued expansion of freight in the region, including those focused on mobility and reliability, safety and security, or infrastructure condition.

> Growth within the freight sector in Eastern Pennsylvania is associated with the region's geographic advantage – it is not only a short drive to major freight centers in New Jersey and Central Pennsylvania, but the region is located a day's drive from nearly 40 percent of the nation's population.

THE PLAN FOCUSES ON THREE KEY ELEMENTS

1. **Infrastructure:** Roads, bridges, pavement, rail facilities, rest areas/parking facilities
2. **Activity:** Truck traffic, bottlenecks, crashes, commodities, truck parking
3. **Land Use:** Freight generators and development areas that are directly linked to infrastructure and activity.

The Regional Action Plan in Section 5 incudes prioritized infrastructure improvement locations based on a review of quantitative and qualitative inputs, as well as short, mid, and long-term

policy recommendations based on participating agencies, cost, and expected level of coordination or effort.

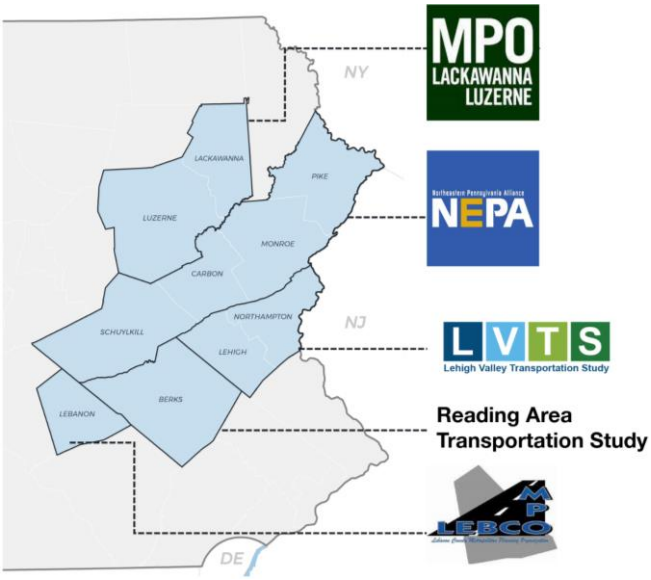
This list of recommendations has been curated based on the subsequent sections of the plan, including:

- **Section 2 (Outreach):** A summary of the inclusive engagement process by which the project team gathered input from agency partners, industry and economic development decisionmakers, as well as the public.
- **Section 3 (Current and Future Freight Planning Efforts):** This section also summarizes recently completed local, regional, statewide, or Federal projects and policies that guide future freight infrastructure investments.
- **Section 4 (Current Freight Trends):**This section outlines the key trends that directly impact the region's freight industry, its residents, and the built and natural environments.
- The **Regional Freight Profile** is a companion document that defines the study area and outlines the existing conditions for transportation, land use, safety, and congestion.

1.2 What is the EPFA Region?

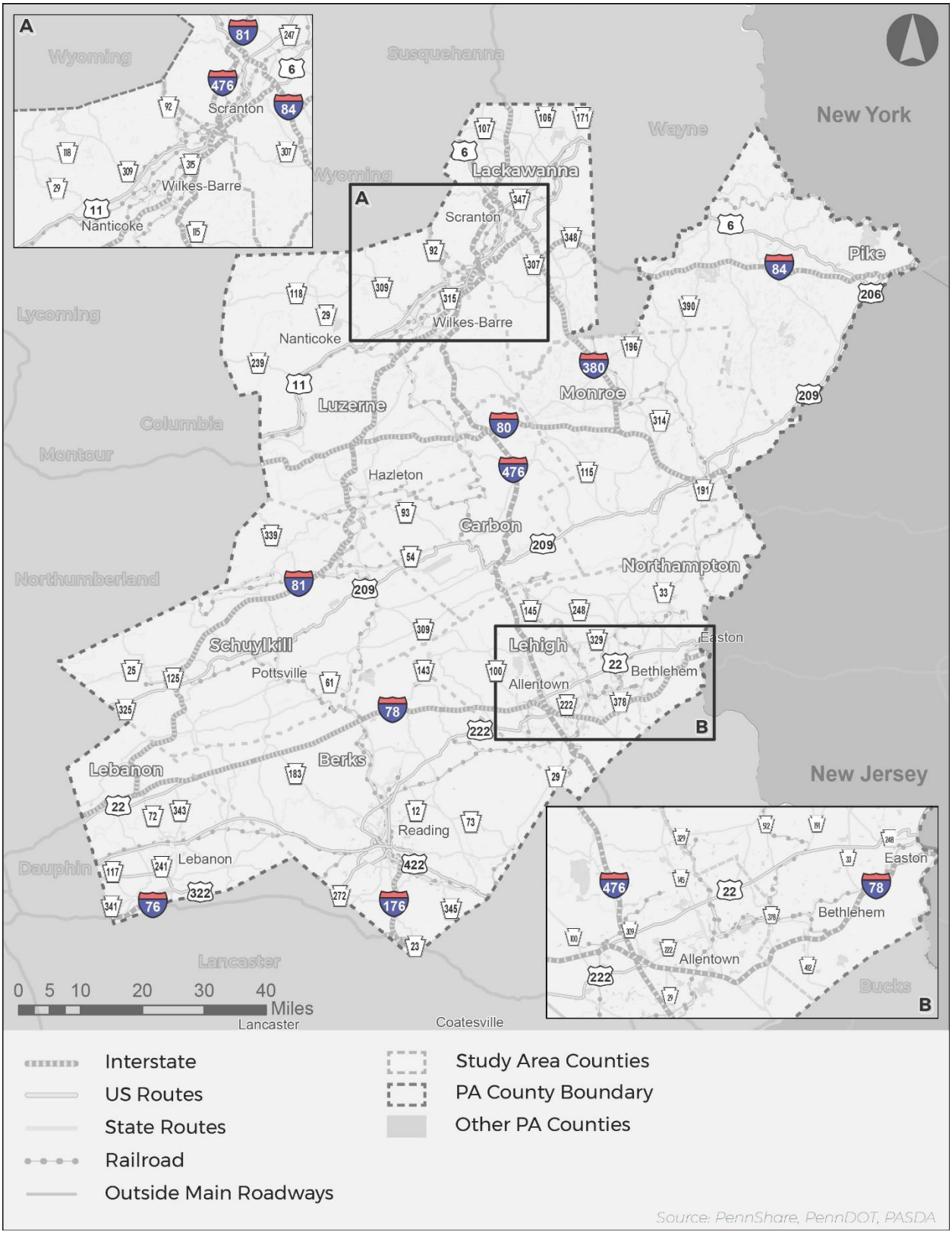
The Eastern Pennsylvania Freight Alliance (EPFA) is a consortium of five Metropolitan Planning Organizations (MPOs) including: Lackawanna/Luzerne Transportation Study (LLTS), Lebanon County Metropolitan Planning Organization (LEBCO), Lehigh Valley Transportation Study (LVTS), Northeastern Pennsylvania Alliance (NEPA), and Reading Area Transportation Study (RATS).

Figure 1: EPFA Region and Agency Membership



This region, illustrated in Figure 1, has joined to address the unique opportunities and challenges associated with freight industry growth, focused on impacts to mobility, safety, land uses, and overall state of good repair of the transportation infrastructure. The 10-County EPFA region (Berks, Carbon, Lackawanna. Lebanon, Lehigh, Luzerne, Monroe, Northampton, Pike, and Schuylkill Counties) is among the largest and fastest-growing freight handling regions in the country, with rapid development and redevelopment for warehouse and distribution functions. The existing freight transportation infrastructure within the EPFA region, including highways (Interstate, US and State routes) and rail lines, is illustrated in Figure 2.

Figure 2: EPFA Freight Transportation Infrastructure



2 Outreach

AGENCY COORDINATION

STAKEHOLDER SESSIONS

PUBLIC SURVEY

There are several elements that make up the Plan – the Regional Freight Profile, a companion document to this Plan, set the baseline for this effort, providing an understanding of the existing conditions for the transportation network and existing land uses within the region. Supporting this analysis is inclusive agency, stakeholder, and public outreach. These efforts, detailed in the following sections, amplify the data analysis with input and experiences provided from local residents, drivers, and decisionmakers. These forums connected the project team with those who travel the region every day, pinpointing several key needs and ultimately helping to frame the recommendations detailed in Section 5.

OUTREACH FOR THE PLAN FOCUSED ON THREE SPECIFIC ELEMENTS:

Agency Coordination: A group primarily comprised of EPFA members and representatives that met regularly throughout the project.

Stakeholder Sessions: These groups were comprised of industry and local representatives that provided targeted input on goods movement and infrastructure within a given business, municipality, county, or agency.

Public Survey: The public survey provided an opportunity for residents within and visitors to the EPFA region to provide insights on their interactions with an understanding of freight and goods movement within their communities.

2.1 Agency Coordination

EPFA partners met several times to discuss project progress, overall expectations, and to provide feedback to the project team. Each meeting was held virtually; a brief summary of each meeting is included below.

Kickoff Meeting (10/6/22): This meeting outlined the overall purpose of the plan and project scope, confirming these elements with EPFA members. Additionally, the project team outlined the initial schedule and data collection needs, including the role of EPFA members in supporting project data needs. Finally, initial outreach elements were discussed, including EPFA key contacts, industry, and stakeholder outreach, as well as public outreach efforts.

Interim Freight Profile Briefing (3/2/23): This meeting provided EPFA members with an update on project progress, including an overview of outreach efforts and project schedule. However, the primary focus of this briefing focused on a detailed summary of data analyses associated with the draft Freight Profile Technical Memorandum. This summary included discussion of each element, including the regional roadway network and performance (AADTT, bridges, pavement, crashes, cost of congestion, and bottlenecks), freight rail, freight generators, truck parking, and commodity flows.

Survey/Outreach Discussion (6/15/23): This discussion focused on draft public survey elements, reviewing proposed questions and opportunities to promote or advertise the survey.

Implementation/Actions Briefing (5/24/24): This meeting focused on a summary of several plan elements. First, the group discussed a summary of the stakeholder sessions (outlined in Section 2.2) and outcomes of the public survey (Section 2.3). The bulk of this meeting outlined the outcomes of the Regional Action Plan (Section 5),

including a summary of infrastructure and policy recommendations. This included a discussion of comments and suggestions from EPFA members, which were ultimately incorporated into the final plan document.

2.2 Stakeholder Sessions

> Feedback received from stakeholder sessions was used to confirm or enhance the analyses completed as part of the Regional Freight Profile, ultimately supporting the identification of key actions or infrastructure needs that ultimately became the Regional Action Plan.

The stakeholder sessions included selected development, industry, or local representatives to assist the project team in identifying critical land use and infrastructure challenges associated with the goods movement industry. These sessions allowed individuals whose daily travels and experiences within the region to provide a local perspective to the project team. Each meeting included a brief summary of the project and the role of meeting attendees, with the bulk of the session focused on an interactive discussion that included questions about challenges and successes associated with freight, bottlenecks, growth areas, freight rail, and air cargo.

Feedback received from these sessions was used to confirm or enhance the analyses completed as part of the Regional Freight Profile, ultimately supporting the identification of key actions or infrastructure needs, summarized in Figure 3 and Table 1. These locations are included as potential improvement locations within the Regional Action Plan (Section 5). Key themes from each session are included below, and a slide deck for each meeting is included in Appendix A.

Monroe/Pike County – 9/26/23 (East Stroudsburg University Innovation Center)

- Truck parking within the region is inadequate.
- Investments on Interstate 80 and US 209 are an improvement.
- GPS devices direct trucks onto non-suitable roadways.
- Pike County is an area where freight growth has been slow, but pace of growth is increasing.
- Mount Pocono facilities often have challenging infrastructure needs.
- A lack of system redundancy is a challenge during crash or weather events.

Schuylkill/Carbon County – 9/26/23 (Schuylkill Chamber of Commerce)

- Truck parking needs are substantial, particularly staging areas.
- Winter maintenance is difficult and general challenges during inclement weather.
- PA 61 investments are a critical need within the region.
- GPS devices direct trucks onto non-suitable roadways.
- Rail-served sites exist but often are developed by non-rail customers.
- Relationship between County and PennDOT has been a huge benefit for infrastructure investments.
- Schuylkill County used to chase development– that mentality is slowly changing.

Lehigh Valley Transportation Study – 12/12/23 (Lehigh Valley Planning Commission)

- Truck parking needs are substantial. Overnight parking enforcement is challenging.
- Consider a regional truck parking authority to fund improvements.
- Incident management is inadequate for trucking industry.
- There is a lack of understanding of how different facilities operate – each type (e.g., fulfillment center, distribution center, cross-dock) has different infrastructure needs.
- Many local roads serve trucks within the region.
- GPS devices direct trucks onto non-appropriate roadways.
- Hours of Service (HOS) regulations force bad decisions for drivers/parking.
- Speculative development often makes it challenging for local agencies/governments to adequately plan for transportation needs.
- Local manufacturing businesses, including Mack Trucks, identified a need for regional highway investments, particularly on PA 100
- There is growing support for multi-jurisdictional ordinances or model ordinances.
- Bethlehem Intermodal Terminal has challenging highway connections to the north.

Lackawanna/Luzerne MPO – 12/12/23 (Wilkes Barre/Scranton International Airport)

- Few rail-served locations within the region – there should be consideration for additional siding investments.
- Mount Pocono facilities often have challenging infrastructure needs.
- Three of the larger warehousing complexes in Luzerne County include Humboldt Industrial Park, Northpoint Development, and CenterPoint Commerce and Trade Park.
- Giants Despair is a safety challenge for trucks, including crashes resulting in injuries – need improved wayfinding/signage or GPS alerts for trucks.
- Interstate 81 needs more truck climbing lanes throughout this region.
- PennDOT has released plans to widen Interstate 81 through segments in Luzerne and Lackawanna Counties, including a segment between Ashley and Wilkes-Barre Township and another between Avoca and Scranton. Each of these projects are currently planned for completion by 2033.[1]
- GPS devices direct trucks onto non-appropriate roadways.
- A shortage of truck parking facilities, particularly for overnight parking, is evident in Luzerne County.
- The PA 424 Extension was completed in November 2023. This 1.1 mile roadway provides an alternate route to PA 924 for traffic between Interstate 81 and the Humboldt Industrial Park in Hazle Township.

[1] https://www.penndot.pa.gov/RegionalOffices/district-4/PublicMeetings/Luzerne%20County/Pages/Partnership81.aspx https://www.penndot.pa.gov/RegionalOffices/district-4/PublicMeetings/Lackawanna%20County/Pages/Interstate-81-Expansion-Project-Scranton-to-Avoca.aspx

- West Nanticoke Bridge is a critical asset for the region.
- US 6/Casey Highway is a primary growth area.

Lebanon County MPO – 12/13/23 (Lebanon County Chamber of Commerce – co-host with 2024 LRTP Update Freight Focus Group)

- The increase in trucks has added congestion on already clogged arteries.
- Interstate 81 is a military corridor – that should be a focus for opportunities to invest/improve within the region.
- DHL site is a visible truck generator in the region.
- Development of distribution centers has shifted away from Interstate 78 into interior of the county.
- PA 419 is experiencing significant freight traffic growth – this is particularly challenging as this is Lebanon County's only designated Pennsylvania Scenic Byway.

Reading Area Transportation Study – 1/4/24 (Virtual – Microsoft Teams)

- Congestion within the region is not sustainable – particularly on US 422.
- Lack of truck parking is a safety/security concern for many communities.
- Congestion on US 422 limits developer interest along that corridor.
- Stalled or slow travelling trains often block roadways – particularly within the City of Reading.
- Narrow roadways within the region were not built to support large trucks.

Figure 3: Identified Improvement Locations – Stakeholder Outreach

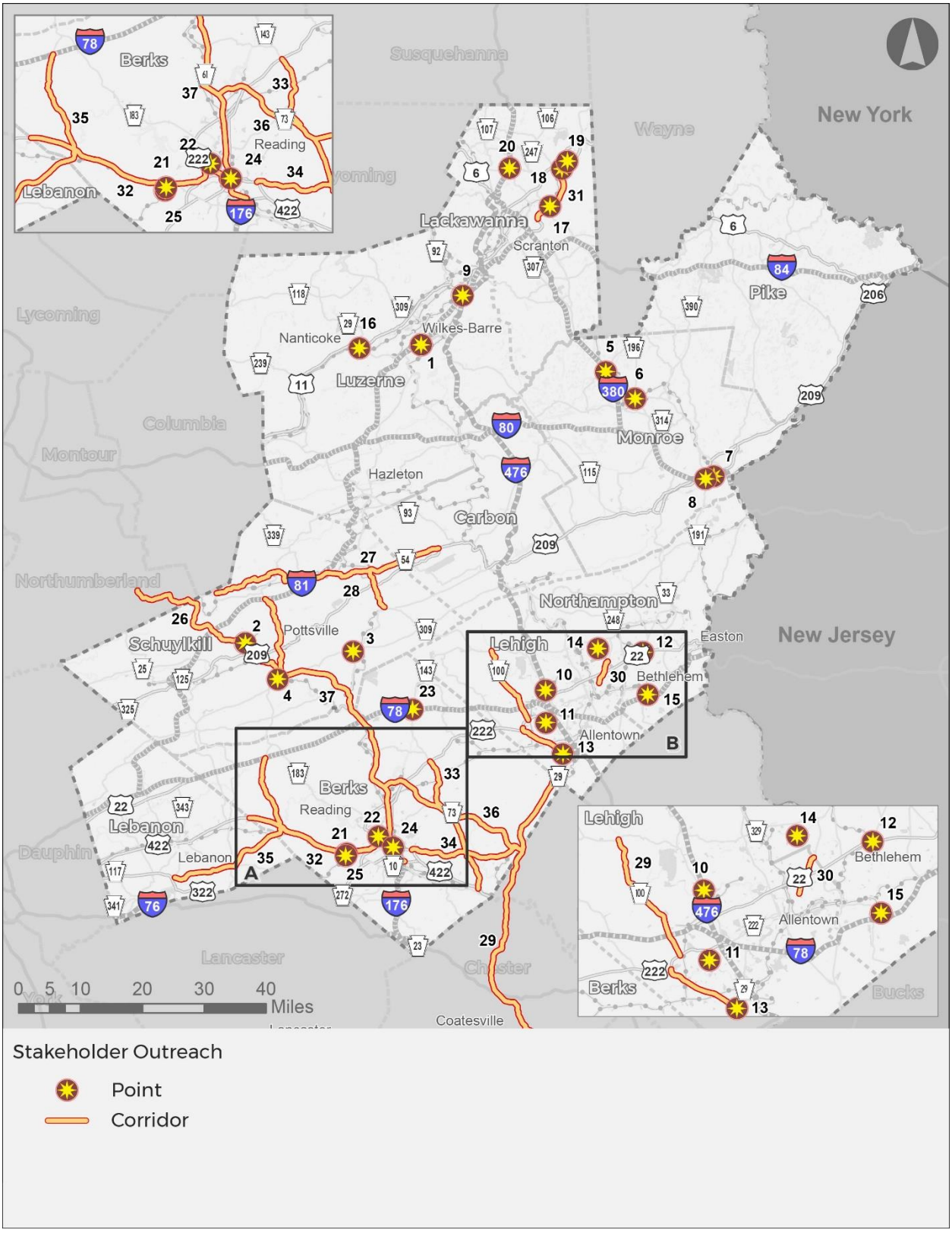


Table 1: Identified Deficient Locations – Stakeholder Outreach

Map ID	Agency	Location	Stakeholder Agencies
1	Lackawanna/ Luzerne	Giants Despair - Navigation	Luzerne County
9	Lackawanna/ Luzerne	I-81/I-476 Exit at PA 315	PennDOT D4-0, Luzerne County
16	Lackawanna/ Luzerne	West Nanticoke Bridge - Load Posted but critical link	PennDOT D4-0, Luzerne County
17	Lackawanna/ Luzerne	US 6 – Exit 3 - Jessup/Valley View facilities	PennDOT D4-0, Lackawanna County
19	Lackawanna/ Luzerne	US 6 - Casey Highway - Exits 5 and 6	PennDOT D4-0, Lackawanna County
20	Lackawanna/ Luzerne	Carbondale Road - onramp to I-81 south - needs acceleration lanes	PennDOT D4-0, Lackawanna County
31	Lackawanna/ Luzerne	US 6 - Casey Highway - grades - Marshwood Road to Meredith Street	PennDOT D4-0, Lackawanna County
35	LEBCO	PA 419, US 322 to US 422	LEBCO, RATS, PennDOT D5-0/D8-0
10	LVTS	PA 309 - Walbert Avenue Intersection	PennDOT D5-0, LVTS
11	LVTS	US 222 Bypass in Lower Macungie - Krocks Road	PennDOT D5-0, LVTS
12	LVTS	PA 191 at US 22 Eastbound onramp	PennDOT D5-0, LVTS
13	LVTS	PA 29/PA 100 Intersection	PennDOT D5-0, LVTS
14	LVTS	Weaversville Road Improvements	PennDOT D5-0, LVTS, Allen Township, East Allen Township
15	LVTS	Bethlehem Intermodal Terminal connections north	LVTS, City of Bethlehem, NS
29	LVTS	PA 100 Corridor	PennDOT D5-0, LVTS
30	LVTS	Airport Road - Union Blvd to Schoenersville Rd	PennDOT D5-0, LVTS
2	NEPA	PA 193/PA 901 Intersection - Minersville	PennDOT D5-0, Schuylkill County
3	NEPA	PA 895/PA 443 Intersection	PennDOT D5-0, Schuylkill County
4	NEPA	Cressona Railroad Bridge Clearance - PA 183	PennDOT D5-0, Schuylkill County, RBMN Railroad
5	NEPA	Ramp Improvements: I-380 at PA 423	PennDOT D5-0, NEPA, Monroe County,
6	NEPA	Mt Pocono Facilities – PA 940/PA 611 Access	PennDOT D5-0, NEPA, Monroe County

Map ID	Agency	Location	Stakeholder Agencies
7	NEPA	I-80 Exit 308 - East Stroudsburg	PennDOT D5-0, NEPA, Monroe County
8	NEPA	Downtown congestion - East Stroudsburg	NEPA, Monroe County, E. Stroudsburg
26	NEPA	PA 901 Truck Climbing Lanes - Shamokin to Cressona	PennDOT D5-0, Schuylkill County
27	NEPA	PA 54 - Ashland to US 209	PennDOT D5-0, Schuylkill County
28	NEPA	PA 309 - PA 54 to PA 443	PennDOT D5-0, Schuylkill County
21	RATS	Stalled railroads blocking roadways in downtown Reading – Penn Street south to Chestnut Street	RATS, City of Reading
22	RATS	US 222/US 422 Exit	PennDOT D5-0, RATS
23	RATS	I-78 Lenhartsville Exit (PA 143)	PennDOT D5-0, RATS
24	RATS	Stalled railroads at Petroleum Products block roadways	RATS, Sinking Spring Borough
25	RATS	US 422 - Sunoco Logistics Center/Sinking Spring	PennDOT D5-0, RATS
32	RATS	Congestion – US 422, west of I-176	PennDOT D5-0, RATS
33	RATS	Congestion – PA 662, US 422 to US 222	PennDOT D5-0, RATS
34	RATS	Congestion – PA 562, US 422 Business to PA 100	PennDOT D5-0, RATS
36	RATS	PA 73, PA 61 to PA 100	PennDOT D5-0, RATS
37	RATS	PA 61, I-81 to Reading	PennDOT D5-0, RATS, NEPA

2.3 Public Survey

A project-specific public survey was deployed to obtain input from local residents and visitors, who were asked to identify and provide known concerns and opinions regarding freight transportation within the EPFA region. Survey questions were developed through a collaborative process involving agency partners and project team members.

The survey was deployed in English and Spanish via surveymonkey.com in August 2023 and was closed to responses in January 2024. The survey link was primarily distributed and promoted via social media accounts associated with EPFA members. The survey was also promoted at the stakeholder discussion sessions detailed in Section 2.2, where participants were asked to share the survey link with colleagues, friends, family members, and neighbors. A total of 4,204 responses were received during the approximately six month period during which the survey was accessible.

The 14-question survey included four demographic questions and ten questions focused on understanding how and where local residents, drivers, or visitors interact with freight, as well as the degree to which freight impacts daily life. A summary of key themes identified from survey responses is below; a compilation of all survey responses is included in Appendix B.

Targeted demographic questions identified the age, household income, and ethnicity of respondents, outlined in Figure 4, Figure 5, and Figure 6, respectively. A demographic breakdown of respondents reflects the cross-section of the region that participated in the survey. Figure 7 illustrates the home zip code of respondents, with substantial clusters in Lehigh and Northampton Counties, and smaller clusters evident in Lebanon and Berks Counties.

The public survey was accessible for 5 months between August 2023 and January 2024 – it was widely publicized via MPO partner social media and through local media outlets like *LebTown*. Over 4,200 respondents provided critically important local insights about how and where freight transportation impacts the EPFA region.

Figure 4: Age of Public Survey Respondents

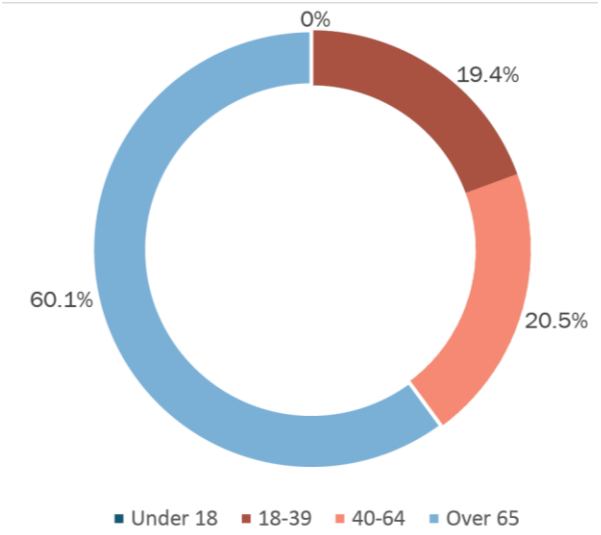


Figure 5: Household Income of Public Survey Respondents

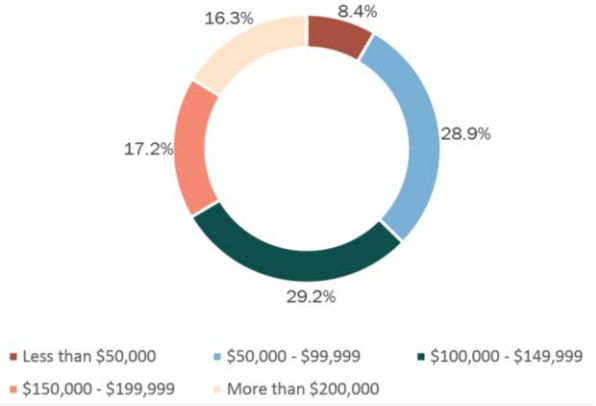


Figure 6: Ethnicity of Public Survey Respondents

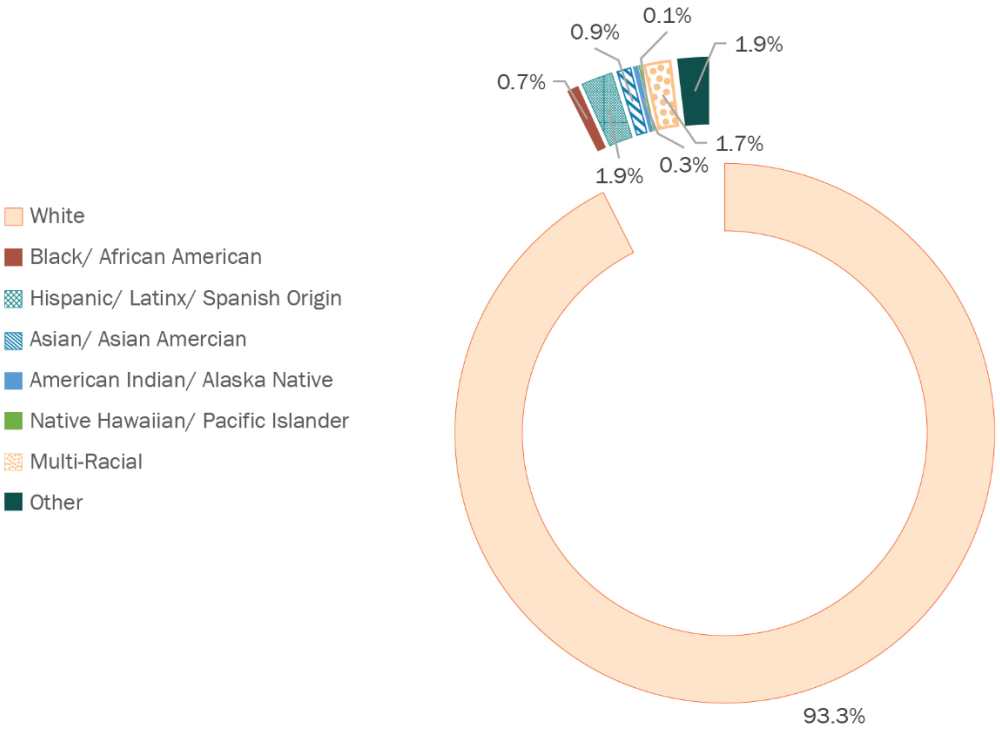
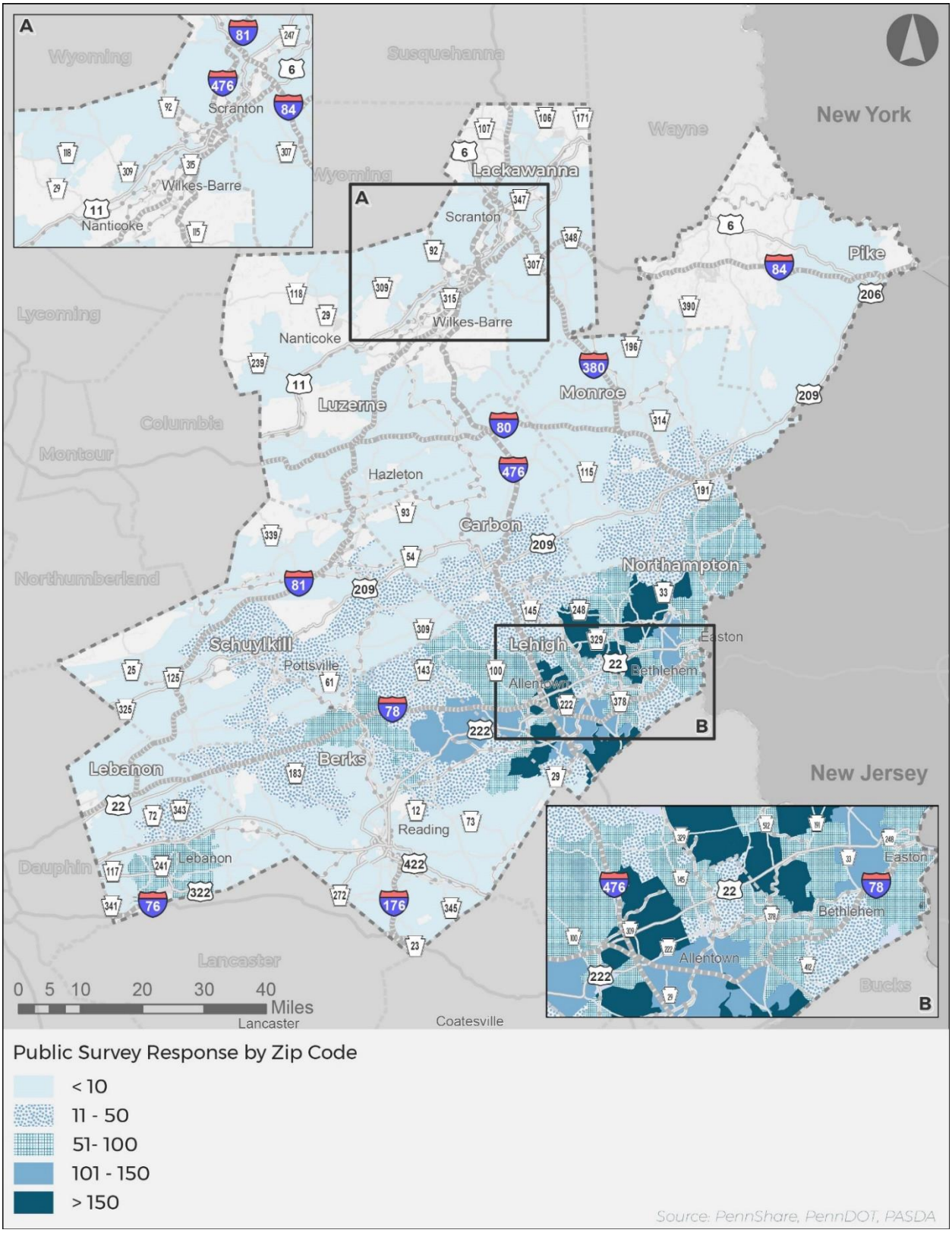


Figure 7: Location of Public Survey Respondents (zip code)



Freight transportation-focused questions included in the survey included:

Overall, to what degree are trucks or freight a concern in your community? (Scale of 1 – not a problem to 5 – a substantial problem)

Average rating 4.4 – this indicates that most respondents believe that trucks or freight are a significant concern in their community.

In your view, have impacts from trucks or freight gotten better or worse in your community since 2020?

90.7% of respondents indicated "trucks/freight are a more significant concern" in 2023 when compared with 2020."

In your view, over the next five years, do you expect impacts from trucks or freight to continue to increase in your community?

95% of respondents indicated "trucks/freight will become a bigger concern" during the forthcoming five years.

How important are the following freight movement issues to you? (rank from 1 to 8; 1 being the most important, 8 being the least important)

Respondents were asked to rank eight freight movement issues based on an outline of supporting topics within each. A compilation of responses indicated that the following four issues were prioritized most frequently:

A ranking of 8 freight movement issues provided a clear split between four prioritized issues and four that were perceived as less of a priority. The top four issues included Land Use, Environmental Impacts, Safety, and Traffic Operations

- **Environmental Impacts**: Air quality, noise, excessive vibration from large truck traffic, habitat loss, stormwater issues.
- **Land Uses**: Growth of warehouses, conversion of farmland or open space for freight developments, increased property values.
- **Safety**: Truck crashes or near misses, freight rail crashes or near misses, bicycle safety impacts, pedestrian safety impacts.
- **Traffic Operations**: Congestion/delays/bottlenecks, detours.

Thinking specifically about general freight issues, to what degree do trucks or freight impact your daily life? (Scale of 1 – no impact to 5 – massive impact):

Average rating 3.7 - this indicates that most respondents believe that trucks or freight have a substantial impact on their daily life.

Thinking specifically about transportation issues, to what degree do trucks or freight impact your daily travel? (Scale of 1 – no impact to 5 – massive impact):

Average rating 4.0 - this indicates that most respondents believe that trucks or freight have a substantial impact on their daily travel.

Thinking specifically about transportation issues, what is your top concern about trucks or freight traveling within your community?

Respondents were provided with five freight movement issues, as well as an "other" category. Approximately 80 percent of all respondents prioritized three concerns:

- Traveling on local or rural roadways (33.2%)
- Congestion (25.9%)
- Safety (23.2%)
- A review of "other" responses (5.1% of all respondents) indicated several themes, including "all of the above," the proliferation of warehouses, as well as damage to roadways caused by heavy vehicles.

In addition to the response trends above, three open-ended response questions provided several themes distilled by the project team. These responses were used in the development of infrastructure and policy recommendations outlined in Section 6.

Please list specific locations where your daily travel is impacted by trucks or freight.

A review of responses indicated numerous corridors identified by more than 100 individual responses. These routes are outlined in Table 2. More than 25 percent of all respondents highlighted I-78 or US 22 as a route where their daily travel is impacted by freight. Additional routes highlighted include Interstates (80, 81), US Routes (222), State Routes (309, 100, 33, 512, 248, 191, 329, 61) and Airport Road (connecting to Lehigh Valley International Airport).

Table 2: Routes Impacted by Freight – Public Survey Responses

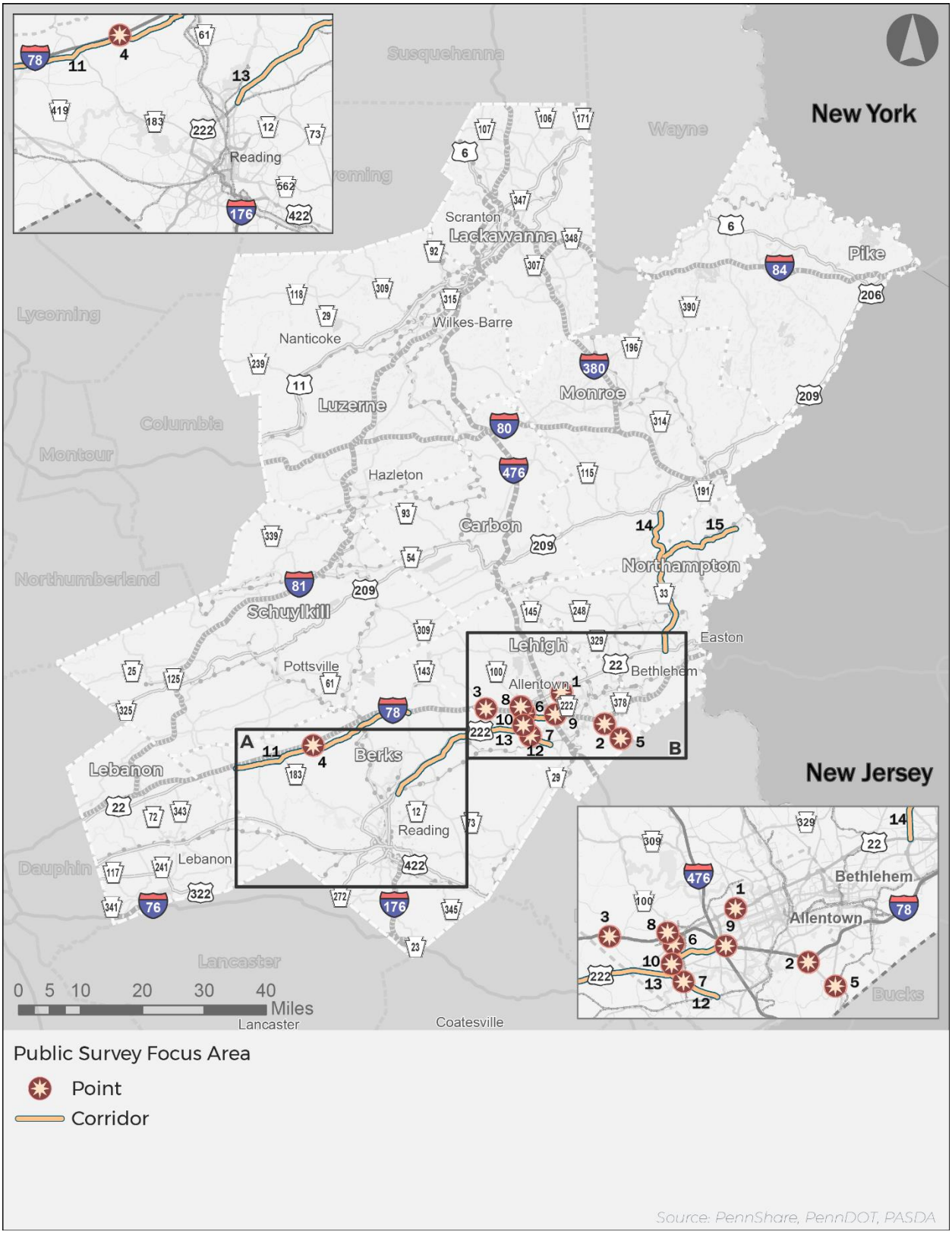
Route	Responses	Route	Responses	Route	Responses
I-78	1301	PA 33	394	PA 191	148
US 22	1081	PA 512	279	PA 329	119
PA 309	594	I-80	162	PA 61	103
PA 100	504	Airport Road	155	I-81	101
US 222	424	PA 248	151		

Key locations along these corridors that were identified most frequently are identified in Table 3 and Figure 8. These locations are summarized as potential improvement locations in Section 5.3.

Table 3: Identified Deficient Locations – Public Survey

Map ID	Recommendation	Stakeholder Agencies
11	SR 4028, SR 4040 – Old Route 22 – Lenhartsville to Bethel	PennDOT D5-0, RATS
1	US 22 at Cedar Crest Blvd	PennDOT D5-0, LVTS
2	I-78 at Center Valley/PA 309	PennDOT D5-0, LVTS
3	I-78 at PA 863	PennDOT D5-0, LVTS
4	I-78 – Exit 23 – Shartlesville	PennDOT D5-0, RATS
5	PA 309 at Center Valley/PA 378	PennDOT D5-0, LVTS
12	PA 100 – I-78 to US 222	PennDOT D5-0, LVTS
6	PA 100 at Schantz Road	PennDOT D5-0, LVTS
7	PA 100 at Spring Creek Road	PennDOT D5-0, LVTS
8	PA 100 at Tilghman Street	PennDOT D5-0, LVTS
13	US 222 – Bypass, Kutztown Road to I-78	PennDOT D5-0, LVTS, RATS
9	US 222 at Hamilton Blvd	PennDOT D5-0, LVTS
10	US 222 at Grim Road	PennDOT D5-0, LVTS
14	PA 33 – Tatamy – US 22 to US 209	PennDOT D5-0, LVTS, Monroe County
15	PA 512 – Mt Bethel – PA 611 to PA 33	PennDOT D5-0, LVTS

Figure 8: Identified Improvement Locations – Public Survey



Do you have any specific recommendations to reduce the impact of trucks or freight on your community?

An analysis of responses to this open-ended question identified six recurring themes, with sub-themes within each, as summarized below:

- **Warehouses**: Halt the construction of new warehouses; Prevent future development of warehouses near farmland/residential areas; Assess the status of current warehouses (empty/vacant vs. active).
- **Trucks**: Develop dedicated truck lanes; Identify truck routes (PA 33, I-78, PA 512); Prohibit tandem trailers; Increase use of overnight deliveries; Increase/implement fines for engine (jake) brakes; Improve training for drivers; Mandate use of truck GPS; Improve wayfinding signage; Require use of smaller trucks.
- **Enforcement**: Increase enforcement of truck travel speeds; Overall enforcement of truck behaviors (local road use, undesignated parking, reckless driving); Increased lane restrictions on trucks, Increase monitoring of overweight trucks.
- **Policy**: Increase taxes on warehouses; Prohibit development through stronger zoning codes; Increase taxes/fees/permitting on truck traffic; Increase preservation of open space/farmland; Legislate truck routes.
- **Improvements**: Widen roadways (I-78, US 22, PA 33); Install additional sound barriers; Improve wayfinding/signage; Increase weight restrictions; Force warehouse owners or operators to pay for road repairs.
- **Rail**: Expand/improve existing rail system to allow for shift of truck freight to rail; Increase use of rail freight. Additionally, while out of the scope of this project, many respondents noted an interest passenger rail service within the area.

How do other freight modes (rail or air freight) impact your daily travel or quality of life?

While most survey respondents (87.4%) skipped this question, those that did respond “yes” indicated concerns with rail freight, air freight, or truck movements associated with rail or air freight. Key themes within each of these categories included:

- **Rail freight**: Movements through Macungie, Emmaus, or general concerns with Norfolk Southern
- **Air freight**: Movements through Lehigh Valley International Airport, general concerns with Amazon air freight and FedEx.
- **Truck Freight**: Trucks associated with air cargo at Lehigh Valley International Airport

3 Current and Freight Planning Efforts

FEDERAL FREIGHT PLANNING

NATIONAL MULTIMODAL FREIGHT POLICY

STATE FREIGHT PLANNING

METROPOLITAN PLANNING ORGANIZATION FREIGHT PLANNING

CONGESTION MANAGEMENT STUDIES

COUNTY AND LOCAL PLANS

OPERATIONS PLANS

This section summarizes recently completed studies that include elements that directly inform or impact the region's freight industry. These studies and policies ultimately guide future freight infrastructure investments, including the priorities identified in the Regional Action Plan (Section 5). Where available, a link to each document has been provided for reference.

3.1 Federal Freight Planning

Federal legislative acts, policies, and research reports convey the current and anticipated state of freight nationally. Federal legislation sets forth the policies that state departments of transportation and metropolitan planning organizations must follow. Legislative updates also convey how federal agencies and industry partners prioritize needs and issues. Several federally funded studies illustrate design and engineering guidance and best practices. Common themes from these documents include considering ongoing trends, such as automation, electrification, or e-commerce, and placing additional consideration on resiliency, environmental impacts, and underserved communities.

3.1.1 Fixing America's Surface Transportation (FAST) Act

Passed in 2015, the FAST Act established a National Highway Freight Program (NHFP) to improve the efficient movement of freight on the National Highway Freight Network (NHFN). The NHFN includes roadways along the Interstate Highway System, Strategic Highway Network (STRAHNET), connectors to STRAHNET, and connectors to intermodal facilities.

Goals of the program include strengthening economic competitiveness, reducing congestion, improving state of good repair, and using innovation and advanced technologies to improve safety, efficiency, and reliability. Activities eligible for NHFP funds must be identified in a freight investment plan within a state's freight plan.

3.2 National Multimodal Freight Policy

The National Multimodal Freight Policy aims to maintain and improve the condition and performance of the National Multimodal Freight Network. Designation of a National Multimodal Freight Network aims to improve network and intermodal connectivity and use measurable data to assess the significance of freight movement. Factors for designating the National Multimodal Freight Network include origins and destinations, volume, value and tonnage, balance of trade, intermodal links, freight choke points, and major distribution centers, among others.

The policy includes ten goals, including identifying infrastructure improvements, policies, and operational innovations that reduce congestion, eliminate bottlenecks, increase productivity, achieve and maintain a state of good repair, and improve short and long-distance goods movement.

3.2.1 Infrastructure Investment and Jobs (IIJA) Act

Passed in 2021, the IIJA replaced the FAST Act, expanding provisions related to the National Multimodal Freight Policy and components of the national freight system. The act established an Office of Multimodal Freight Infrastructure and Policy within USDOT, expanded the National Freight Strategic Plan to consider environmental impacts, resilience, and rural and historically

disadvantaged communities, and established a Bridge Investment Program to reduce the number of bridges in poor condition. The newly created Office of Multimodal Freight Infrastructure and Policy will carry out the National Multimodal Freight Policy, administer and oversee certain multimodal freight grants, promote and facilitate information-sharing between the public and private sectors, conduct research on improving freight mobility, and oversee the development and updating of state freight plans.

IIJA Act:
https://www.congress.gov/bill/117th-congress/house-bill/3684

While several funding mechanisms associated with the IIJA are detailed in Section 5.5.2, this section summarizes the substantial freight elements associated with current federal legislation:

- Project selection considerations for Small Projects added the effects of the proposed freight corridor project on significant hazards, such as high winds, heavy snowfall, flooding, rockslides, mudslides, wildfires, wildlife crossings, and steep grades.
- The National Freight Plan will be updated to include:
    - best practices for reducing environmental impacts of freight movement, including reducing local air pollution from freight movement, stormwater runoff, and wildlife habitat loss resulting from freight.
    - strategies to increase the resilience of the freight system, including the ability to anticipate, prepare for, or adapt to conditions, or withstand, respond to, or recover rapidly from disruptions, including extreme weather and natural disasters.
    - strategies to promote United States economic growth and international competitiveness.
    - consideration of any potential unique impacts of the national freight system on rural and other underserved and historically disadvantaged communities.
    - strategies for decarbonizing freight movement.
    - consideration of impacts of e-commerce on the national multimodal freight system.
- In addition to guidance outlined through the FAST Act, State Freight Plans will also include:
    - the most recent commercial motor vehicle parking facilities assessment conducted by the State.
    - the most recent supply chain cargo flows in the State, categorized by mode.
    - an inventory of commercial ports.
    - consideration of the findings or recommendations made by any multi-state freight compact to which the State is a party.
    - impacts of e-commerce on freight infrastructure.

  - considerations of military freight.
  - strategies and goals to decrease impacts of extreme weather and natural disasters, impacts on local air pollution, impacts on flooding and stormwater runoff, and impacts on wildlife habitat loss.
  - assessment of parking facilities for commercial vehicles.
  - to facilitate the integration of ITS into the freight transportation network powered by electricity, shall conduct a study relating to preparing to supply power to applicable electrical freight infrastructure and safely integrating freight into ITS.

- Multi-State Freight Corridor Planning, including the ability to establish an advisory committee for such compacts; grants are made available for the operation costs of multi-state freight compacts.

> Funding for multi-state freight planning compacts indicates the importance of agency coordination to advance freight-centric improvements. The EPFA directly reflects this Federal goal for the advancement of freight planning.

- Representation on State Freight Advisory Committees is expanded to include ports, freight railroads, shippers, carriers, freight-related associations, third-party logistics providers, freight industry workforce, the State transportation department, MPOs, local governments, the State environmental protection agency, the State air resource board, State economic development agencies, and not-for-profit and community organizations.
- The establishment of a National Multimodal Cooperative Freight Research Program. Areas for research include improving connections between rural areas and domestic/foreign markets, quantifying the national impact of blocked railroad crossings, low-cost methods to reduce congestion at bottlenecks, and considering e-commerce, automation, zero-emissions transportation, and diversifying the freight transportation industry workforce.

3.2.2 National Cooperative Highway Research Program (NCHRP) Studies

The NCHRP, through the National Academies of Sciences, Engineering, and Medicine, conducts research on transportation issues identified by highway and transportation departments, committees of the American Association of State Highway and Transportation Officials (AASHTO), and FHWA. Numerous NCHRP reports investigate matters and standards relevant to freight. The most relevant reports for the EPFA Region are summarized below.

3.2.2.1 Integrating Freight Movement into Twenty-First-Century Communities' Land Use, Design, and Transportation Systems (2023)

Integrating Freight Movement into Twenty-First-Century Communities' Land Use, Design, and Transportation Systems aims to develop a planning toolkit for public sector decision-makers to better integrate freight and goods movement into the planning process for land use, design, and multimodal transportation systems. The resource includes several Reference Guides, including

those concerning 1) Stakeholder Engagement and Involvement Guidelines, 2) Freight Livability, 3) Emerging Trends, and 4) Freight Data and Applications, among others. These four applicable resources are briefly described below.

Integrating Freight Movement into Twenty-First-Century Communities' Land Use, Design, and Transportation Systems
https://nap.nationalacademies.org/read/27228/chapter/1

Stakeholder Engagement and Involvement Guidelines: This resource details the types of freight stakeholders who should be involved in various parts of the process, the steps needed to develop and implement an engagement strategy, and how to update the strategy during engagement. Outreach for freight projects should consider the unique needs of freight stakeholders, including the difficulty for truck operators to attend in-person public meetings.

Freight Livability: Key best practices from this document concerning freight livability include ensuring freight is considered and discussed at every level of transportation and land use planning. This acknowledges that freight is a vital part of daily life and that not all negative externalities can be eliminated. It also focuses on proactively managing land uses to minimize conflicts between residential land uses and freight facilities and evaluating freight decisions holistically, considering changes that may occur during the lifespan of the facility into account.

Emerging Trends: Several trends have the potential to radically restructure the relationship between goods movement, transportation, and communities. Some of these trends uniquely affect freight (such as less-than-truckload shipping), while others affect the larger transportation and land use realms (such as autonomous and electric vehicles). Identified emerging trends that may be particularly impactful for decision-making within the EPFA region include the following:

- Operational and safety implications of autonomous trucking
- Automated warehouses
- Drone deliveries
- Impacts of e-commerce on warehouse siting and facility requirements

Freight Data and Applications: Various data sources are available from public agencies and private vendors that can help decision-makers understand freight movement. Each has unique uses and limitations. Identified data sources include the following:

- **Freight Analysis Framework**: Estimates for commodity tonnage and value by regions of origin and destination, commodity type, and mode
- **Commodity Flow Survey**: Information on the type, origin and destination, value, weight, mode, distance shipped, and ton-miles of commodities shipped between origin-destination zones
- **Transearch**: Annual commodity flows between counties by type and mode
- **Surface Transportation Board Waybill Sample**: Rail traffic information including origin and destination, number of carloads, car type, commodity type, tonnage, revenue, charges, line miles, number of interchanges, and intermodal flag
- **BTS Air Carrier Data (T-100 data)**: Segment and market data of international and domestic air carriers; includes monthly records of air traffic patterns, carrier market shares, and freight and mail cargo flow

- **Waterway Data**: Capacity, throughput, and top commodities at the United States' top ports

3.2.2.2 Metropolitan Planning Organizations: Strategies for Future Success (2022)

This resource provides strategies for MPOs to adapt and improve their operations. Identified freight topic area considerations for MPOs include shifts presented by technology, changing demographics and travel patterns, e-commerce, resiliency planning, the MPO's role in financing projects, emerging MPO roles in transit, staff capacity, and collaboration between MPOs. Brief toolkits are provided for several identified challenges, including potential solutions. Three of these example challenges are introduced below:

Metropolitan Planning Organizations: Strategies for Future Success
https://nap.nationalacademies.org/read/26555/chapter/1

- **Employing Engagement Tools to Reach an Audience**: Non-internet-based outreach strategies can cast a wider net of stakeholders and take the form of pop-up events, outdoor events, street teams, and bus stop surveys.
- **Preparing for New and Emerging Technologies in the Transportation System**: MPOs can identify key corridors to implement technologies. This can include an inventory analysis of fiber, broadband, software, and service gaps. This can expedite the decision-making process for where technologies should be placed.
- **Changes in Travel Patterns and Accommodating New Modes of Transportatio**n: MPOs can sponsor regional TDM programs encouraging telework or public transit use.

3.2.2.3 Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments (2016)

This study describes practices that effectively and efficiently consider goods movement in urban and suburban environments utilizing smart growth techniques. The tenets of smart growth include mixing land uses, preserving open space and farmland, and targeting growth into walkable and transit-friendly areas. The document identifies four common conflict points between smart growth and freight:

- **Stage Setting**: In older communities with established infrastructure and legacy zoning ordinances, revitalization can introduce new uses or intensities and associated conflicts without opportunities to include appropriate buffers.
- **Creating Places and Streets**: Conflicts can include noise from trucks, on-street loading, and roadway design. Each of these should be considered when planning for trucks.
- **Operation with Minimal Impacts**: Trade-offs must be balanced when considering the timing of deliveries, emissions, and how to consider freight and Complete Streets together.
- **Ongoing Monitoring**: Transportation and land use agencies should routinely monitor complaints and issues from stakeholders concerning freight.

Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments
https://nap.nationalacademies.org/read/24658/chapter/1

3.2.3 FDOT Freight Roadway Design Considerations (2015)

The Florida Department of Transportation developed this document of principles and strategies to integrate freight mobility needs into the roadway and design process. Useful elements for the EPFA region include sections on design and control vehicles, cross-sections based on freight activity, and various truck-accommodating engineering measures, such as median noses.

FDOT Freight Roadway Design Considerations
https://tampabayfreight.com/wp-content/uploads/FRDC_Complete_DRAFT.pdf

3.2.4 FHWA Freight and Land Use Handbook (2012)

Though published more than a decade ago, this handbook provides tools and resources to assess the impacts of land use decisions on freight movements. The document identifies key private sector freight stakeholders who should be included in transportation and land use planning processes. Recommended tools to accommodate freight and other land uses include utilizing zoning overlay districts, promoting context-sensitive solutions, and incentivizing off-peak delivery.

FHWA Freight and Land Use Handbook
https://ops.fhwa.dot.gov/publications/fhwahop12006/

3.2.5 Guidebook for Freight Policy, Planning, and Programming in Small and Medium-Sized Metropolitan Areas (2007)

This document provides a guide to integrating freight into MPO activities. This includes developing a freight element into long-range transportation plans, developing a regional freight profile, and establishing freight project evaluation criteria.

Guidebook for Freight Policy, Planning, and Programming in Small and Medium-Sized Metropolitan Areas
https://nap.nationalacademies.org/read/14036/chapter/1

3.3 State Freight Planning

Two recently completed statewide planning efforts focused on existing conditions for freight in the Commonwealth. This includes detailed statewide initiatives concerning freight, new metrics, and the EPFA region's importance to freight. Common themes from these documents include supporting regional cooperation and solutions and expanding data gathering and sharing.

3.3.1 Pennsylvania's 2045 Freight Movement Plan (2023)

Pennsylvania's 2045 Freight Movement Plan (published in 2023) puts forward five goals with various objectives for defining and reaching a desired future. The plan highlights two particular challenges for Pennsylvania that are also of paramount concern in the EPFA region: improving collaboration in the freight transportation/land use planning processes and the shortage of truck parking. The need for off-

Pennsylvania's current Statewide Freight Plan documents the growth of freight throughout the Commonwealth, but notably within the EPFA region.

road truck parking was considered, as well as existing usage of on-ramps and off-ramps for truck parking.

Goals and objectives identified in the plan include establishing statewide standards to measure benefits and costs of freight-oriented industrial development, pursuing public-private partnerships to expand truck parking, and adapting to advances in truck automation, electrification, and other technologies.

Pennsylvania's 2045 Freight Movement Plan
https://www.penndot.pa.gov/ProjectAndPrograms/Planning/Documents/FMP/FMP-Pub%20791_WEB_05.01.2023-compressed.pdf

USDOT projects long-term (2018-2045) growth in rail freight in Pennsylvania of 36 percent in tonnage, 23 percent in ton-miles, and 129 percent in value. These figures indicate a long-term pattern of growth in activity on Pennsylvania's freight rail system. However, except for the increase in the value of commodities moved by rail, the growth pattern reflected by these USDOT projections indicates slower growth in rail freight volumes than in trucking activity.

Statewide PennDOT freight efforts relevant to the EPFA region include the following:

- **Railway-Highway Grade Crossing Program:** The 2019-2022 State Transportation Improvement Program funded more than 80 grade crossing projects at locations with high FRA hazard ratings.
- **Partnering with MPOs/RPOs for Data Forecasts:** PennDOT is developing a data repository to routinely update data and provide an evolving resource to address new data sources and changes to transportation planning needs and questions. The tool was expected to become available to MPOs/RPOs in 2023.
- **Biennial Transportation Performance Report:** The biennial Transportation Performance Report is developed through the State Transportation Commission. This report card assesses performance ratings and trends for each identified measure. A recent Transportation Performance Report identified the following new performance measures:
    - Measure long haul truck tonnage as a mode share relative to railroads and waterways and measure positive trends based on a reduction in this mode share
    - Develop air cargo performance measures based on tonnage and market coverage for small airports and air cargo facilities
    - Report truck-related crashes as a separate safety measure
    - Measure truck congestion and truck miles traveled separately in Mobility/Congestion and Mobility/Highway Congestion sections of the Transportation Performance Report, respectively

In addition to the above statewide efforts and trends, Pennsylvania's 2045 Freight Movement Plan identifies numerous data points related to the EPFA region, including the following:

- Berks and Lehigh counties rank among the State's top eight counties for freight-intensive industry employment (based on number of employees). Berks has 46,100 employees in freight-intensive industries and Lehigh has 44,100.
- Two of the top ten highway bottlenecks for trucks in the State (2020) are I-81 in Luzerne County and US 222 in Berks County. Additional congested segments for trucks include

parts of I-78 in Berks, Lebanon, and Northampton counties, I-81 in Lackawanna and Luzerne counties, US 222 in Lehigh and Northampton counties, and I-80 in Monroe County.

- Existing truck parking sites with the highest utilization include those in Berks, Carbon, Lackawanna, Lebanon, Lehigh, Luzerne, and Northampton counties.
- Roadway segments with some of the highest rates of trucks parked on shoulders (per mile) are in Berks, Lebanon, Lehigh, Northampton, and Schuylkill counties.
- The United States Military's Strategic Highway Network (STRAHNET) includes I-76, I-80, I-84, and I-380. STRAHNET provides a roadway system necessary for emergency mobilization and commodities supporting US military operations. Additionally, I-476 is designated a Power Projection Platform (PPP) route, meaning it connects PPP installations, designated airfields, and marine ports of demarcation. Of five Pennsylvania military installations identified by the US Department of Defense, two are in the EPFA region: Tobyhanna Army Depot in Monroe County and Fort Indiantown Gap in Dauphin and Lebanon counties.
- Several portions of Norfolk Southern rail in Berks, Carbon, Lebanon, Lackawanna, Lehigh, Luzerne, and Northampton counties are also part of the Strategic Rail Corridor Network that connects military installations.
- Municipalities with the highest e-commerce employment (based on number of employees) in Pennsylvania include those in Carbon, Lackawanna, Lehigh, Monroe, and Northampton counties.

3.3.2 Expanding Truck Parking in Pennsylvania

The Pennsylvania Transportation Advisory Committee (TAC) released *Expanding Truck Parking in Pennsylvania* in 2023 to organize and recommend priority corridors across Pennsylvania, establish a framework for evaluating potential locations for truck parking, and recommend collaborative actions to address barriers that limit truck parking expansion. The study reviews several truck parking studies conducted by other agencies. Recommendations and actions from these studies include identifying a champion for truck parking, integrating truck parking into the statewide capital project planning and development, identifying, and signing areas for truck parking during emergency winter weather conditions, and addressing neighboring state and region coordination. One of the studies reviewed as part of *Expanding Truck Parking in Pennsylvania* is LVTS's 2020 *Lehigh Valley Truck Parking Action Plan.*

> The TAC truck parking study identified several key corridors and redevelopment sites within the EPFA region

PennDOT has collected detailed data about truck parking facilities and activity along major highways that were used in prioritizing the need for truck parking. Sites were scored based on truck route designation, truck volumes, proximity to major freight hubs, and other factors. This

methodology categorized corridors into Tier 1 (highest priority) and Tier 2 (high priority). Tier 1 corridors include I-78 east of Exit 49 (PA 100). Tier II corridors include the following:

Expanding Truck Parking in Pennsylvania
https://talkpatransportation.com/perch/resources/documents/tac-truck-parking-12-14-2023-compressed.pdf

- I-78 from I-81 to Exit 49 (PA 100)
- I-81 from Exit 164 (Sugar Notch) to Exit 194 (I-476)
- I-84 from I-81 (Dunmore) to I-380
- Pennsylvania Turnpike Northeast Extension (I-476) from I-276 (Norristown) to U.S. 22 (Lehigh Valley)

Several potential truck parking locations were identified for I-78 east of Exit 49 (PA 100), including the following:

- Redevelopment opportunities for older industrial sites along the PA 100 corridor, primarily south of I-78
- Agricultural lands along Old US 22 between Adams Road and PA 100 in Fogelsville
- Located west of Exit 49, the area in the vicinity of Arcadia West and Arcadia East Industrial Parks (Exit 45) was identified as a potential location along I-78 as well.

The study also puts forward several municipal, regulatory, and state/federal policy recommendations to advance truck parking, including the following:

- Update land use regulations to include truck parking
- Address truck parking in county and local comprehensive plans
- Promote truck parking in national and regional forums
- Develop a Pennsylvania Truck Parking Handbook
- Integrate truck parking into regional planning

3.4 Metropolitan Planning Organization Freight Planning

MPOs within the EPFA region have completed several freight-focused studies in recent years. These efforts are briefly summarized below.

3.4.1 Lehigh Valley Truck Parking Action Plan

The *Lehigh Valley Truck Parking Action Plan*, released in 2020, developed out of the necessity to keep supply lines moving, the increased demand for online shopping, warehouse development within facility's operational hours, and federal driving hour regulations. As part of the truck parking strategy, opportunities are identified for new travel centers, real-time parking availability, coordination among government, industry, public and private stakeholders, and training and awareness campaigns. The Action Plan was developed following a virtual event hosted by the Federal Highway Administration, Pennsylvania Department of Transportation, and the Lehigh Valley Transportation Study.

The *Lehigh Valley Truck Parking Action Plan* was a precursor for the creation of the EPFA and formulation of this Plan effort

Short-term recommendations include continuing to coordinate and share data with neighboring and transportation network-linked MPOs, compiling a depository of truck parking best practices, and engaging elected officials to support funding to create a long-term truck parking strategy. Mid-term opportunities focus on the location of new and underused parking facilities, partnerships for funding, data, and best practices sharing. Long-term opportunities include lobbying federal and Commonwealth elected officials about the role of freight industries in the economy to support funding to create new facilities, programs, and planning efforts, such as including emergency truck parking scenarios in hazard mitigation planning.

3.4.2 Northampton County Freight-Based Land Use Management Guide

The *Northampton County Freight-Based Land Use Management Guide* was completed in 2022 by Northampton County. The guide outlines the many variables that municipalities may consider in their ordinances in relation to freight-generating developments. The guide includes model ordinance language to design their own regulations and prevent unsupportable freight development. Example language is taken from communities within Northampton County and beyond. Freight-generating developments have grown in Northampton County, particularly in the e-commerce sector. More than 35 million square feet of warehousing and distribution centers have been proposed since 2020.

Northampton County Freight-Based Land Use Management Guide
https://www.flipsnack.com/9A575F88B7A/northampton-county-freight-based-land-use-management-guide/full-view.html

The guide reviews numerous freight topics to be considered in land use codes, including the most appropriate locations for developments, activities and operations, setbacks, buffer areas, landscaping and screening, multimodal access, on-site parking and circulation, height and bulk requirements, and transportation impact fees. Each of these variables can be tailored to municipal ordinances and zoning, depending on the vision and needs of a municipality.

A GIS mapping tool is also available to assess zoning and land uses for Northampton County's 38 local governments to determine vulnerabilities that may lead to unsupportable freight development. The guide suggests municipalities take proactive measures to keep up with the

ever-evolving nature of the warehousing and logistics sector. Municipalities can take planning and regulatory efforts consistent with their long-term land use goals.

3.4.3 Case Study - Allentown-Lehigh Valley Airport's Cargo Operations

The Allentown-Bethlehem-Easton Metropolitan Statistical Area and Lehigh Valley International Airport (ABE) were used as a case study in 2022 by the Transportation Research Board of the National Academy of Sciences, Engineering, and Medicine to highlight the relationships between air service and regional economic activity. The area has become a logistics hub, with year over year logistics employment growth of 9.4% between 2016 and 2020. Employment in Transportation and Warehousing grew 113% from 2008 to 2019. ABE has become a major airport for handling air cargo, handling 100,000 tons annually in 2020; an increase from 63,000 tons in 2016. The majority of this tonnage is served by Amazon Air, which selected ABE as one of its first three airports to operate from in 2015. Key to Amazon Air's operations at ABE are the presence of Amazon fulfillment centers nearby. In 2016, there were three Amazon fulfillment centers within 15 miles of the airport. In addition to the airport's presence, the area's freight operations have grown due to its proximity to major population centers, being within a day's drive of one-third of the country's population.

Case Study - Allentown-Lehigh Valley Airport's Cargo Operations and Contributions to Regional Economic Development
https://crp.trb.org/acrpwebresource12/wp-content/uploads/sites/25/2021/09/ABE-Case-Study-Full-Report.pdf

3.4.4 Lehigh Valley International Airport Area Freight Study

The *Lehigh Valley International Airport Area Freight Study* was completed by the Lehigh Valley Transportation Study and Pennsylvania Department of Transportation. The study developed strategies for shifting traffic, identifying needed roadway and bridge improvements, and recommending local land use policy changes to prevent future freight-related land developments from overburdening the area's highway network.

The study area includes 45 square miles and portions of 13 municipalities in Lehigh and Northampton counties. The area includes 19,000 freight-related jobs, 4.1 million square feet of approved warehouses, and three million square feet of proposed warehouses at the time of publication. While centered on ABE, an Amazon Air hub, the area is also home to a portion of US 22 that is part of the National Highway Freight Network and one of the Commonwealth's top truck bottlenecks, as well as FedEx Ground's largest distribution center in the country. The study was conducted with the expectation of continued development of freight-generating land uses and the further importance of freight at ABE. Goods movement across the Lehigh Valley is expected to nearly double from 39 million tons in 2011 to 75 million tons in 2040.

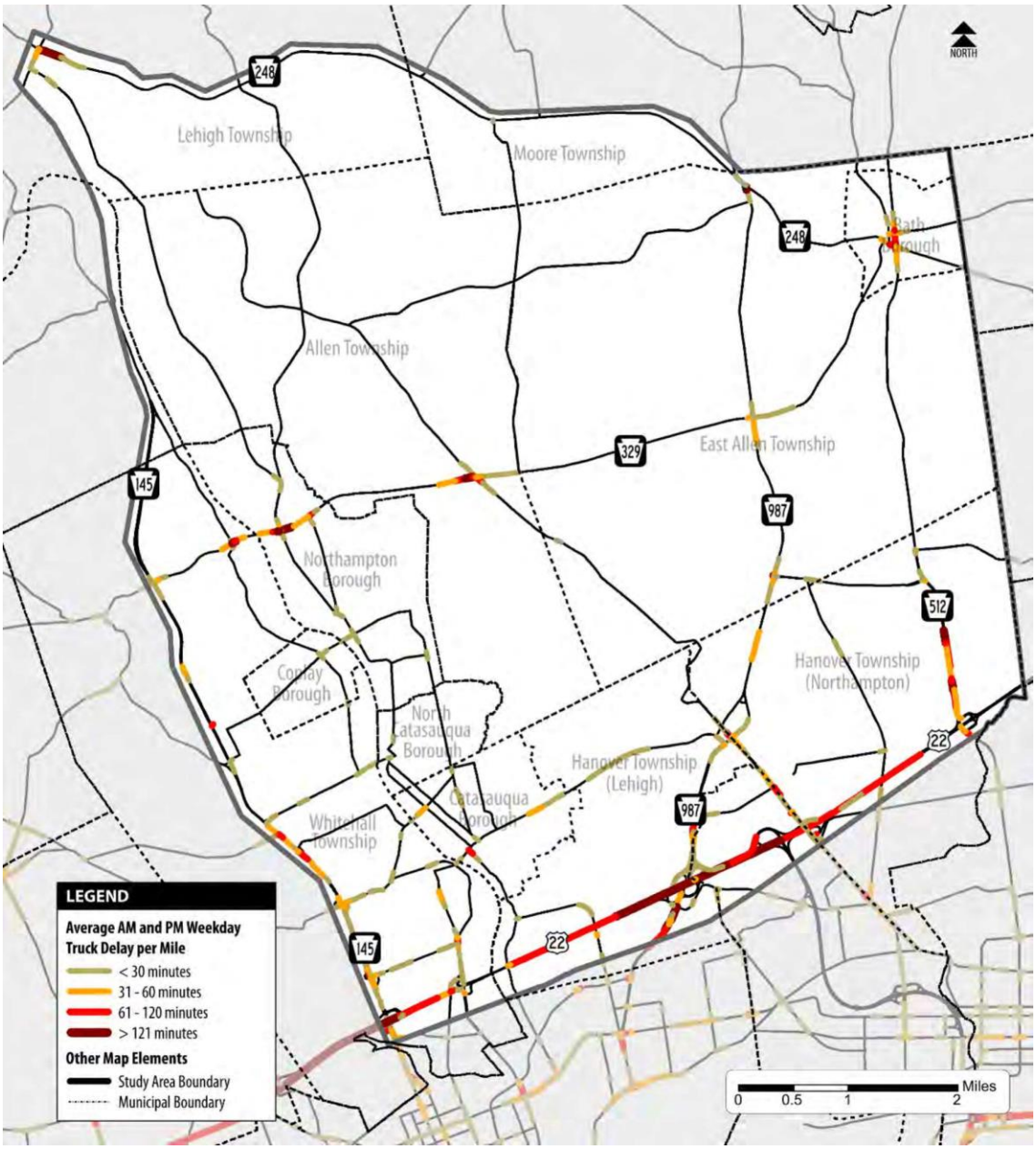
While some incoming companies have financially contributed to improving roadways adjacent to their properties, other roadways "downstream" from these developments are not being improved and are expected to experience increases in truck volumes. The study recognizes that for the region to be successful, transportation planning must be performed in tandem with land use planning.

The study presents data on existing conditions, including vehicle delay (illustrated in Figure 9), origins and destinations, public transit, demographics and socioeconomics, and land use.

Projected future conditions include data concerning approved warehouses and distribution centers, as well as additional vehicle trips generated from new developments, based on existing municipal zoning.

Area-wide recommendations from the study include adding several roadways expected to experience decline in level of service to the region's LRTP, expanding fixed-route and deviated public transportation service, adjusting performance standards in municipal zoning ordinances, and addressing noise pollution.

Figure 9: LVIA Area Freight Study - Average Weekday Truck Delay Per Mile (2014-2016)



Source: LVTS

3.5 Congestion Management Studies

As defined by the Federal Highway Administration, a congestion management process is "a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet State and local needs."[2]

The congestion management process was introduced in the 1991 ISTEA federal legislation and intended to provide various systems as inputs into regional transportation plans and programs. MPOs that serve a transportation management association (TMA) must maintain a congestion management process (CMP) that provides for safe and effective integrated management and operation of the multimodal transportation system. Strategies supporting the congestion management process include decreasing single-occupancy vehicle use, increasing transit ridership, and improving systems management and operations. CMP strategies prioritize maximizing travel capacity on existing infrastructure through demand reduction and operational management instead of focusing on expanding roadway capacity. CMPs recognize the significance of managing roadway congestion to facilitate efficient goods movement and support economic development. These documents tend to not specifically refer to freight though their methods and recommendations to reduce congestion improve travel time reliability for trucks.

3.5.1 Lackawanna/Luzerne Metropolitan Planning Organization Congestion Management Process

The Lackawanna/Luzerne Metropolitan Planning Organization released the Lackawanna Luzerne MPO Congestion Management Process in 2024. The document was developed through a series of steps that included stakeholder coordination, public outreach, data analysis, and location prioritization. The study process included a public congestion survey that received 622 responses.

Lackawanna/Luzerne Metropolitan Planning Organization Congestion Management Process
https://www.lltsmpo.com/wp-content/uploads/2024/04/Final-2024-LLTS-CMP-Report_wPDFcover.pdf

Priority congestion locations within the region were identified based on the available data and public comments. Variables used to select these corridors include Truck Volume, Truck Travel Time Reliability, and the number of heavy vehicle crashes. The document includes a list of programmed projects along each of the 45 priority congestion locations.

3.5.2 MoveLV: Congestion Management Process

MoveLV: Congestion Management Process, released in 2016, is a critical component within the Lehigh Valley Planning Commission's (LVPC) transportation planning and investment programming efforts. The study identified priority roadway corridors for assessment and proposed recommendations to alleviate congestion. These recommendations concentrate on demand

MoveLV: Congestion Management Process
https://drive.google.com/file/d/1U-FJ_PaHhJvKlOhXZqpxl4rXsY4sr6Cg/view

[2] https://ops.fhwa.dot.gov/plan4ops/focus_areas/cmp.htm

management, operational enhancements, and multi-modal improvements.

This plan integrates findings and recommendations from LVPC's Freight Plan. The strategy uses congestion management planning to effectively manage the growing volume of truck traffic in the region. This CMP focuses on identifying corridors with significant freight flows and developing recommendations to enhance goods movement. Corridors were prioritized based on criteria such as proximity to freight generators (mapped in Figure 10), inclusion in the National Highway System, truck traffic volumes, and alignment with future development areas per LVPC's comprehensive plan (FutureLV).

Figure 10: MoveLV: Freight Generators

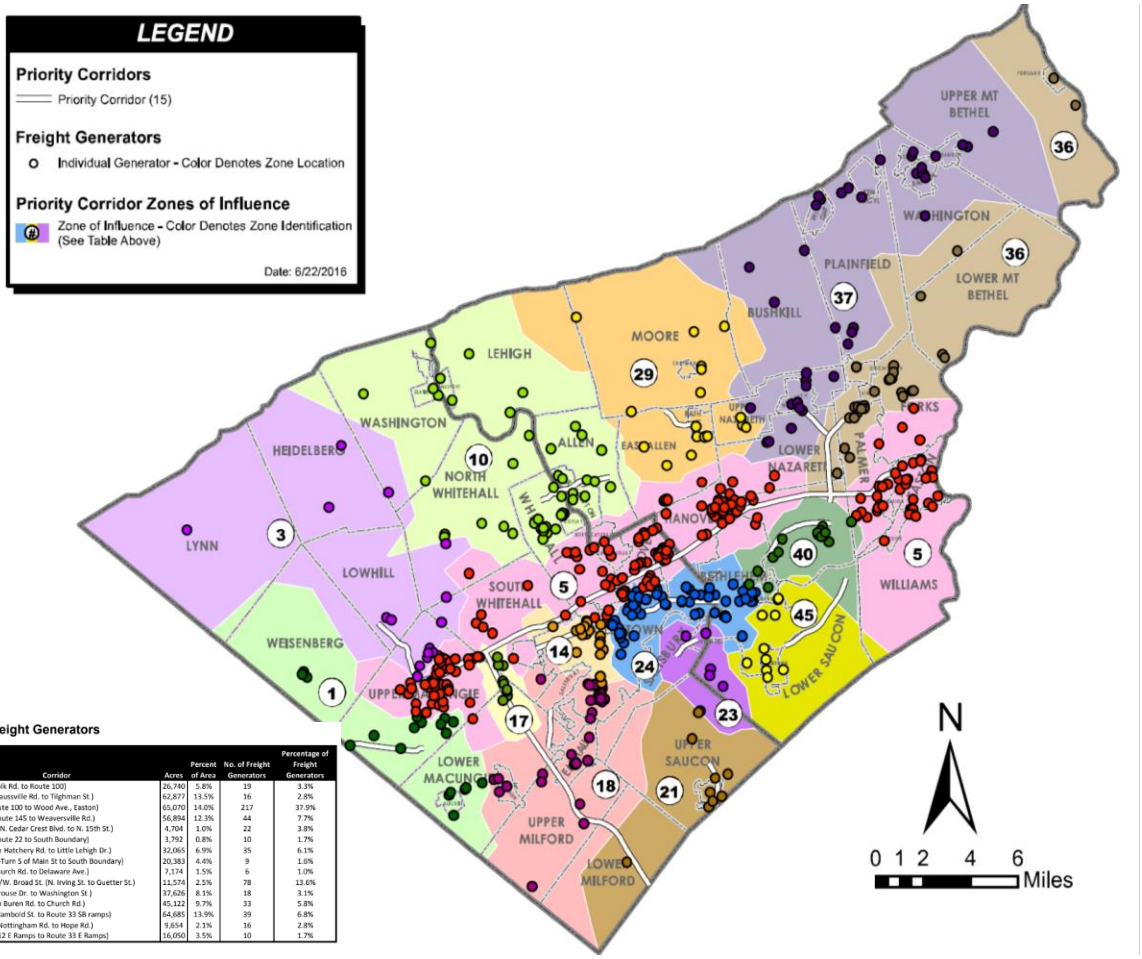


Table 5 – Freight Generators

Zone	Corridor	Acres	Percent of Area	No. of Freight Generators	Percentage of Freight Generators
1	Route 222 (Folk Rd. to Route 100)	26,740	5.8%	19	3.3%
3	Route 100 (Claussville Rd. to Tilghman St.)	62,877	13.5%	16	2.8%
5	Route 22 (Route 100 to Wood Ave., Easton)	65,070	14.0%	217	37.9%
10	Route 329 (Route 145 to Weaversville Rd.)	56,854	12.3%	44	7.7%
14	Tilghman St. (N. Cedar Crest Blvd. to N. 15th St.)	4,704	1.0%	22	3.8%
17	Route 476 (Route 22 to South Boundary)	3,792	0.8%	10	1.7%
18	Route 29 (Fish Hatchery Rd. to Little Lehigh Dr.)	32,065	6.9%	35	6.1%
21	Route 309 (U-Turn S of Main St to South Boundary)	20,383	4.4%	9	1.6%
23	Broadway (Church Rd. to Delaware Ave.)	7,174	1.5%	6	1.0%
24	Hanover Ave./W. Broad St. (N. Irving St. to Guetter St.)	11,574	2.5%	78	13.6%
29	Route 248 (Grouse Dr. to Washington St.)	37,626	8.1%	18	3.1%
36	Route 33 (Van Buren Rd. to Church Rd.)	45,122	9.7%	33	5.8%
37	Route 248 (Wambold St. to Route 33 SB ramps)	64,685	13.9%	39	6.8%
40	Easton Ave. (Nottingham Rd. to Hope Rd.)	9,654	2.1%	16	2.8%
45	I-78 (Route 412 E Ramps to Route 33 E Ramps)	16,050	3.5%	10	1.7%

Source: MoveLV

3.5.3 Reading Area Transportation Study Congestion Management Process

The *Reading Area Transportation Study's Congestion Management Process* was completed in 2023 by the Reading Area Transportation Study (RATS). RATS' last full CMP was completed in 2016, and an interim review was conducted in 2020. Recommendations of the 2020 review included establishing a freight and operations subcommittee to cooperatively work on

Reading Area Transportation Study Congestion Management Process
https://www.berkspa.gov/getmedia/77e28338-7c25-4476-ae6c-fce1425d6a13/12b-DRAFT-CMP-October-2023.pdf

strengthening the linkage and use of performance measures between the CMP and LRTP. This is further reinforced with a recommendation to align and incorporate PM3 data sources into their LRTP and CMP for identifying travel time reliability in congested corridors and freight bottlenecks.

The broad goals of the CMP consider safety, maintenance, economic development, mobility, and environmental sustainability. Proposed actions to remove barriers to freight movement include 1) alleviating traffic bottlenecks on freight routes, 2) using economic development agencies and local/regional planning to promote freight access to rail, and 3) improving freight access to the regional roadway network. Congestion mitigation strategies were divided into several categories, including land use-based, alternative mode options, and new construction. New construction was identified as a last resort for congestion mitigation.

Each of the region's 33 corridors that comprise the CMP network were reviewed for traffic volumes, truck percent, peak hour speeds, travel time index, planning time index, crashes, bottlenecks, vehicle-to-capacity ratio, and inclusion on the National Highway System and as a critical freight corridor. Specific recommendations to preserve capacity are identified for each corridor.

3.6 County and Local Plans

This section focuses on additional transportation planning studies completed within the last decade within the EPFA region. Each summary identifies how each may be linked to freight or goods movement. This includes efforts completed by EPFA member counties, MPOs, and PennDOT.

Long-range transportation plans (LRTP) and comprehensive plans lay out a vision for the county or region. These federally mandated documents review existing transportation infrastructure, traffic patterns, and demographics, while identifying infrastructure and policy recommendations to address problem areas. These documents typically include a section devoted to freight, but recommendations from these studies may or may not identify recommendations specifically beneficial to freight.

> An LRTP inventories and assesses current land uses, transportation patterns, community development, and the facilities and operations of each transportation mode in the county. To achieve an MPO's long-term goals, the LRTP identifies needed improvements to the multimodal transportation system.

3.6.1 Monroe County Comprehensive Plan Update (2014)

Monroe County's *Comprehensive Plan Update* was completed in 2014 and updates the County's 1999 plan. This document recognizes that the goals, objectives, and recommendations of the original plan remain viable. Overarching goals of the plan include providing efficient infrastructure that allows for transportation choice, supporting infill development, increasing job opportunities by integrating education and job training opportunities, and protecting and conserving land, air, and water.

Several regionally significant projects in the County were identified. These include existing employment and strategic assets, such as Tobyhanna Army Depot, as well as expanding sites, including St. Luke's Hospital and Northampton Community College.

A significant theme of the plan is to focus growth in identified centers, villages, and hamlets to promote more efficient development and preserve natural spaces. While the plan was developed prior to the current proliferation of warehousing and distribution in Eastern Pennsylvania, one recommended economic development policy encouraged manufacturing and distribution operations for which Monroe County's location has distinct transportation advantages. These advantages include proximity to I-80 and I-380. The plan states that further opportunities for manufacturing/distribution facilities exist in the Corporate Centers and should be encouraged. Reuse of existing buildings should also be encouraged and supported.

Monroe County Comprehensive Plan Update
https://www.monroecountypa.gov/getmedia/61f8a840-961c-42bd-be05-09df78f2d01a/20230119_ComprehensivePlan.pdf

Freight rail is also recognized as growing in the County. The Plan recognizes that interchanges with Canadian Pacific and Norfolk Southern facilitate national freight connections, and expanding freight rail service should be encouraged.

3.6.2 FutureLV: The Regional Plan

LVPC's 2023 Regional Plan *FutureLV* includes a goal to strengthen freight mobility to minimize quality of life impacts to residents, including by locating freight facilities in areas with available and planned transportation capacity, expanding truck parking options, supporting rail and air freight, and encouraging municipalities to consider the larger effects of new and expanded freight businesses. Additional key considerations identified in the plan include monitoring truck traffic pattern changes, designating alternative freight routes, and deploying autonomous freight vehicles. Recent freight reports include the 2022 Northampton County *Freight-Based Land Use Management Guide* (see Section 3.4.2) and 2015 *Lehigh Valley Regional Freight Plan*. LVPC also released a *High Cube and Automated Warehousing Community Guide* in 2021. This document elaborates on municipal considerations, land use, and zoning implications for high cube and automated warehouses. These warehouses are built for specific uses utilizing rack systems that also serve as the building's structure. These systems can lead to improved efficiency of goods movement.

FutureLV: The Regional Plan
https://lvpc.org/futurelv

Existing conditions data reviewed in the document focused on growth, equity, employment, demographics, and technological and innovative trends. The study's five main goals concern 1) efficient development, 2) multimodal transportation, 3) environmental protection, 4) supporting the economy, and 5) promoting healthy communities. The region is expected to experience a 96% increase in freight tonnage by 2040. Between 2016 and 2023, thirty million square feet of warehousing and distribution facilities were approved, and the value of freight moving through the region is expected to surpass 129 billion dollars by 2050.

One of the many policies of *FutureLV* is to strengthen freight mobility to minimize quality of life impacts on residents. Opportunities to achieve this include locating freight facilities in areas with available and planned transportation capacity, expanding truck parking options and

amenities, and supporting increased use of rail and air freight. The LRTP identified several key planning initiatives. These include truck parking location monitoring and expansion planning, a freight facilities and impact guide, completing the EPFA regional freight plan, and prioritizing or designating regionally significant freight routes.

Freight-related recommendations include repaving to accommodate anticipated truck traffic, considering truck impacts in intersection redesign, critical bridge repairs at freight-impacted bridges, and widening roadways to improve freight mobility.

3.6.3 2045 Long-Range Transportation Plan for Lackawanna and Luzerne Counties

The *2045 Long-Range Transportation Plan for Lackawanna and Luzerne Counties* was released in 2021 by the Lackawanna-Luzerne Metropolitan Planning Organization. The document guides the MPO's overall transportation planning process and decision-makers by examining the region's existing transportation system, the driving forces affecting its long-term performance, and the strategic directions and investments needed. The MPO has taken a more performance-based approach to planning in recent years, providing preventive maintenance at appropriate intervals to extend the useful life of assets.

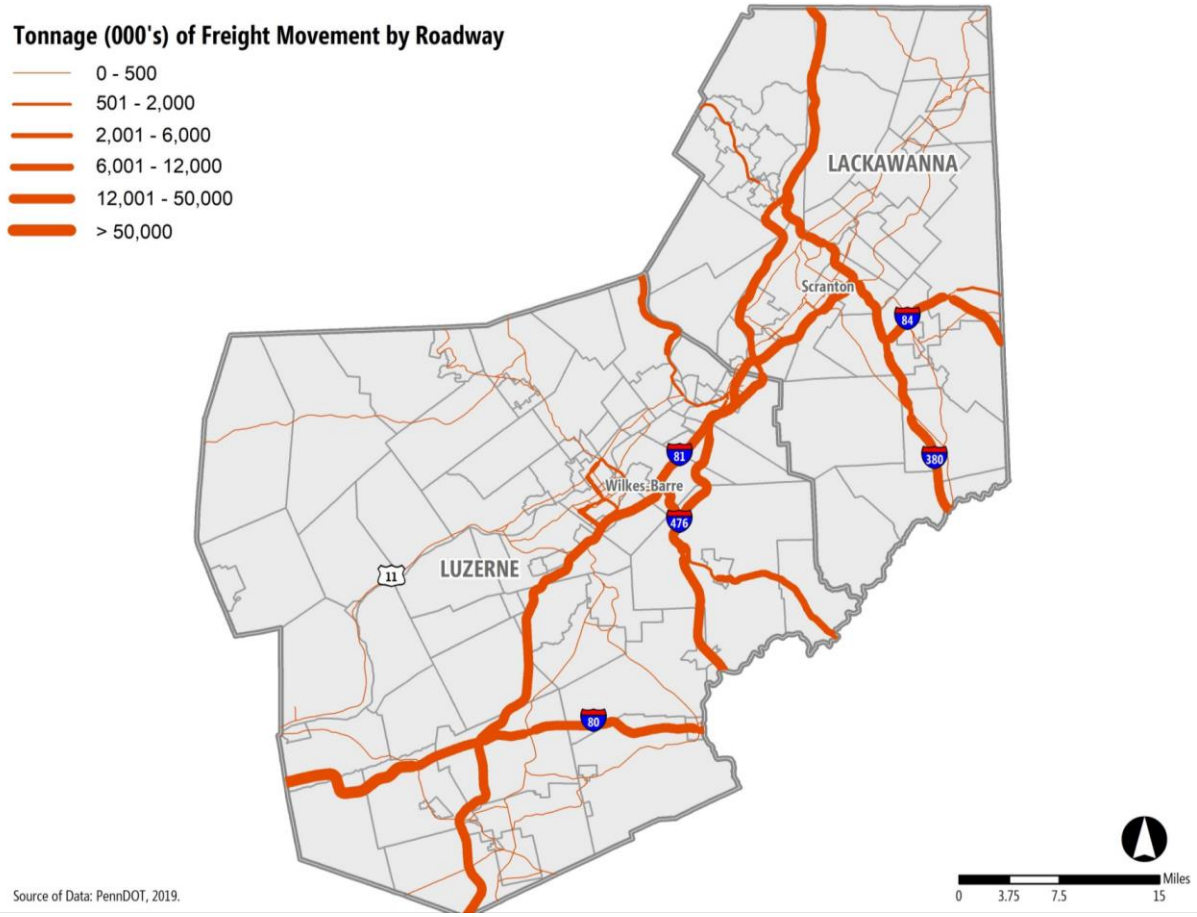
The document recognizes that the region is a gateway for goods movement from the Atlantic Seaboard to and from destinations in New England via I-80 and I-84. Due to this, the area is favorable for warehousing.

2045 Long-Range Transportation Plan for Lackawanna and Luzerne Counties
https://www.lltsmpo.com/wp-content/uploads/2021/02/FINAL-Lackawanna-Luzerne-LRTP_02-16-21.pdf

Existing conditions data reviewed in the document include demographics, socioeconomics, environmental justice, roadway infrastructure, safety, bridges, and public transportation. Rail freight in the County is provided by Canadian Pacific, Norfolk Southern, and four regional and short-line operators. The region is anticipated to experience a growth in intermodal traffic as volume continues to shift to the East Coast. Goods movement within the region is primarily (92%) by truck, with the highest volumes on I-80 and I-81 (Figure 11). E-commerce has grown around Scranton and Wilkes-Barre as online retailers strive to shorten delivery times. The region's two counties have each reviewed plans for multiple developments of more than one million square feet for warehousing and distribution along the I-81/US 6 corridor. The region currently moves 25 million tons valued at 24 billion dollars annually. These figures are projected to increase to 43.5 million tons and 51.3 billion dollars by 2040.

"Strategic directions" recommended in the document include developing a regional freight plan to address improving rail access to industrial parks and identifying solutions to address truck parking needs, implementing congestion mitigation measures where traffic is impeding freight flow, continuing to pursue funding for roadways designated as Critical Urban Freight Corridors and Critical Rural Freight Corridors and supporting freight corridor improvements and intermodal connections at Wilkes-Barre/Scranton International Airport.

Figure 11: Lackawanna/Luzerne LRTP - Tonnage of Freight Movement by Roadway, 2012



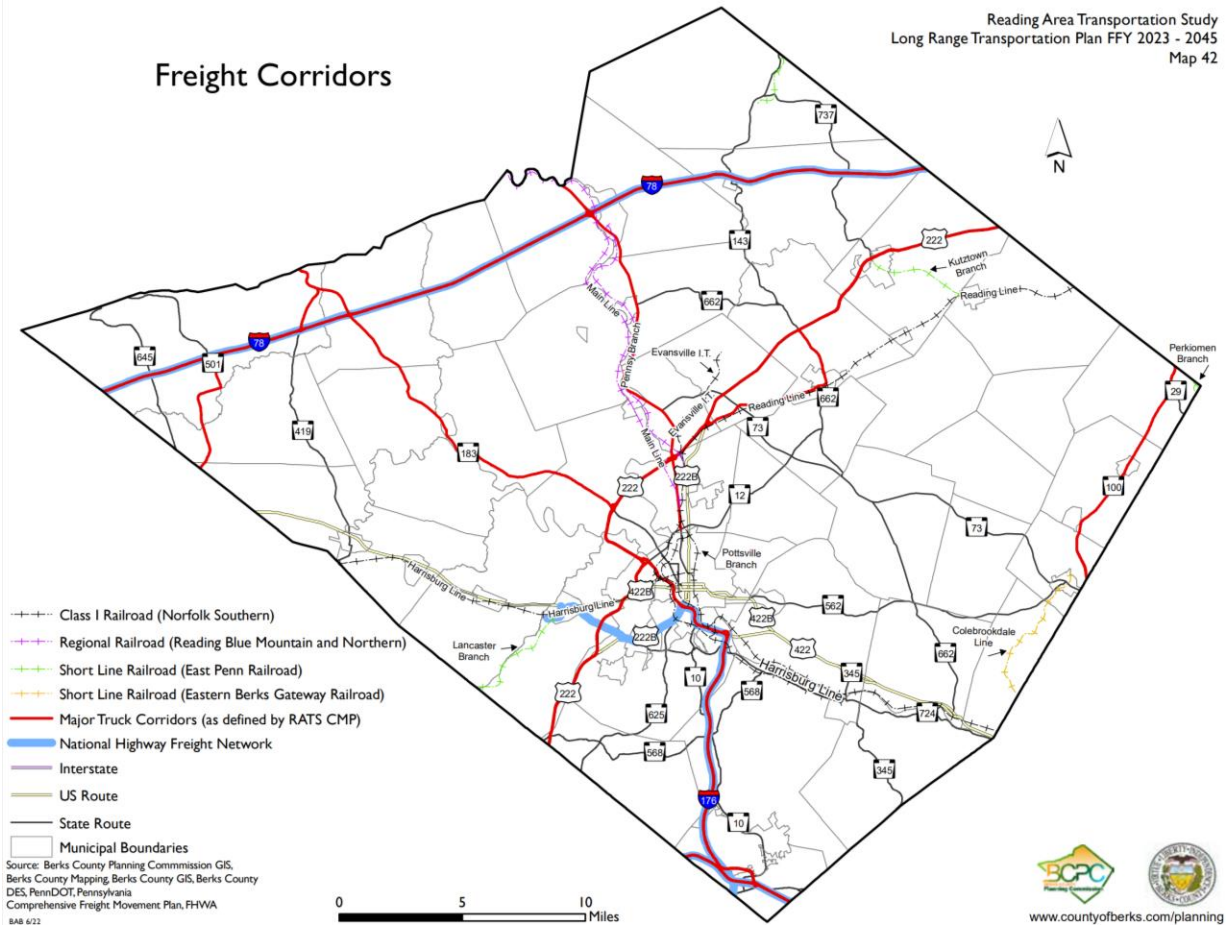
Source: Lackawanna/Luzerne LRTP

3.6.4 Reading Area Transportation Study Long Range Transportation Plan

The *Reading Area Transportation Study's RATS 2023-2045 Long-Range Transportation Plan* was adopted in 2022 and provides context and detail to support future transportation funding and projects in Berks County. The plan's primary focus is on maintenance and safety rather than capacity-building. The plan calls for nearly $2 billion in transportation projects through 2045. The plan's vision statement considers freight, stating "RATS will provide and maintain a balanced, multimodal transportation system that will safely and efficiently move people and goods.

Reading Area Transportation Study Long Range Transportation Plan
https://www.berkspa.gov/departments/planning-commission/transportation-reading-mpo/plans-and-programs/2045-long-range-transportation-plan

Figure 12: RATS LRTP - Freight Corridors



Source: RATS LRTP

Note: The NHFN network displayed in this map is not currently correct – it will be updated as part of the next LRTP update.

The Freight section acknowledges the growth in logistics and warehousing experienced in Berks County. The top inbound and outbound freight commodities in Berks County include broken stone or riprap and goods associated with warehouse and distribution centers. The County has several identified truck routes, including I-78, I-176, US 222, PA 100, and PA 183. Freight corridors are mapped in Figure 12. I-78 was recognized as not only an important freight-generating and freight-accommodating corridor for Berks County but for the region as well.

The I-78/I-81 corridor is experiencing a historic low in warehouse vacancy while growth in warehousing and logistics centers is expected to continue to increase in Berks County, particularly considering decreased availability of land and facilities in Lehigh County, Northampton County, and in New Jersey. This growth in freight-generating businesses has led to increased demand for truck parking, particularly in northern Berks County. The shortage of truck parking often results in many trucks parking on highway ramp shoulders or in other non-designated places. While new freight-generating facilities are initially expected for the I-78 corridor, additional facilities are also expected along PA 61, PA 183, PA 645, and US 222, routes that are currently less conducive to accommodating large volumes of truck traffic. These locations are also distant from existing public transit service, creating difficulties for those

unable or uninterested in driving to work. Future planning is expected to focus on safely and efficiently accommodating truck traffic and addressing the resulting wear on highway infrastructure.

Rail freight in the County is provided by four railroad companies conducting business on 125 linear miles of operational railroad lines. The principal activity center for rail in Berks County is the Spring Street Yard in Reading. Within Berks County, the Reading Line connects the Lehigh Line in the Lehigh Valley and the Harrisburg Line in Dauphin County. The Reading Line is the most heavily used rail freight route in Pennsylvania in terms of carloads and ton-miles of cargo moved.

Recommendations include several major corridor initiatives along US 222 and US 422 that would enhance capacity and safety. Recommendations are not made specifically for freight, but the recommendations to truck routes, performance measures, and policies would improve the overall roadway infrastructure, including for trucks.

3.6.5 Northeastern Pennsylvania Alliance (NEPA) LRTP (2024)

The NEPA *2050 Long-Range Transportation Plan* was adopted in January 2024. The document establishes goals and potential projects to improve the transportation system in the four-county region that includes Carbon, Monroe, Pike, and Schuylkill counties. The plan provides a framework for making transportation decisions through 2050 that will support the region's desired future.

Northeastern Pennsylvania Alliance (NEPA) LRTP
https://www.nepa-alliance.org/wp-content/uploads/2022/04/NEPA-LRTP-FINAL-5-4-2020.pdf

The plan identifies several strategic directions and goals. These include prioritizing funding for burgeoning freight corridors (PA 33, PA 61, PA 611, US 309, I-80, I-81, and I-380) and addressing truck parking needs. Several million square feet of additional warehousing in Monroe County are planned near PA 33, PA 611, and PA 715. This will worsen truck parking conditions. A regional increase in truck traffic has been spurred, in part, by an exponential increase in regional transportation and warehousing employment.

The document discusses existing conditions and recent trends in rail freight. This includes the presence of a Class I freight rail carrier: Norfolk Southern, as well as several shortline railroads, including the Reading Blue Mountain & Northern Railroad and Delaware-Lackawanna Railroad. The region has experienced an increase in freight rail movements with the implementation of centralized traffic control. Movement of coal has decreased which will force rail carriers to diversify their freight mix although this is not viewed as an existential threat by the region's rail operators.

The document identifies numerous specific unfunded projects that may be considered for future programming. These include a Truck Traffic Detour (PA 93, PA 54), PA 901 Truck Route Installation, US 6 Truck Lane, Widening PA 739 near PA 434, and numerous other projects that intend to accommodate truck volumes.

The LRTP also references a 2022 study that assessed the feasibility of the nearby Wilkes-Barre/Scranton International Airport handling freight.

Looking into future trends, the prospect of autonomous trucks presents a design challenge as platooning may become commonplace. The current and anticipated increase in truck traffic will also present additional challenges for maintaining bridges.

Finally, the Plan includes a recommendation to "give funding priority to burgeoning freight corridors" identified through the Eastern Pennsylvania Freight Infrastructure Plan.

3.6.6 2019-2024 Comprehensive Economic Development Strategy Five-Year Plan for NE Pennsylvania

2019-2024 Comprehensive Economic Development Strategy Five-Year Plan for NE Pennsylvania
https://www.nepa-alliance.org/wp-content/uploads/2019-2024-CEDS-Five-Year-Plan-Draft.pdf

The Northeastern Pennsylvania Alliance's (NEPA) *2019-2024 Comprehensive Economic Development Strategy Five-Year Plan for Northeastern Pennsylvania* was completed in 2020. Development of a plan is required to leverage Economic Development Agency funding for the seven-county NEPA region. The region has experienced declines in population and manufacturing employment and development as a warehousing and distribution hub. For each County, existing conditions data reviewed include demographics, industry clusters, housing, and the top industries by employment.

The document's action plan includes five goals: 1) business retention, expansion, and attraction, 2) small business and entrepreneurship, 3) ready workforce, 4) critical infrastructure, and 5) community placemaking, development, and sustainability. Sub-strategies concerning freight include developing creative solutions to provide truck parking areas along interstate highways, enhancing freight rail systems throughout the region, and easing the movement of goods, services, and people between origins and destinations.

3.7 Operations Plans

This section summarizes local plans that address hazard mitigation, emergency operations, and regional operations. While some of these documents share similar goals or objectives, their specific focus and methods vary.

3.7.1 Carbon County 2021 Hazard Mitigation Plan Update

The *Carbon County 2021 Hazard Mitigation Plan Update* was released in 2021. This reflects an update of the County's 2015 Hazard Mitigation Plan and is intended to enable the County and its municipalities to effectively reduce the potential risks of identified hazards to the health, safety, and property of residents. The Update involves a review of data on potential hazards and reprioritization of these hazards in terms of frequency and severity. Mitigation actions were revised, and a Plan Maintenance section added.

Carbon County 2021 Hazard Mitigation Plan Update
https://cms5.revize.com/revize/carboncounty/Document%20Center/Important%20Links/Carbon-County-2021-HMP_Jan%202022.pdf

The hazard mitigation plan and its Update outlines a comprehensive process for hazard identification, risk assessment, vulnerability analysis, prioritization of mitigation strategies, and development of implementation schedules for both the County and its municipalities. This Update, aligned with FEMA and Pennsylvania Emergency Management Agency (PEMA) requirements, ensures Carbon County's eligibility for funding and technical assistance from state and federal hazard mitigation programs.

This Update acts as a blueprint, outlining strategies to minimize property damage and preserve lives in the face of both natural and human-made disasters. The document acknowledges the significance of freight transportation and the growing presence of the trucking industry in the County within its vulnerability assessment, particularly highlighting main roadways prone to crashes and areas of rail vulnerability, such as Penn Forest and Lehigh Townships. Specifically, the plan underscores the risks associated with railroads carrying hazardous materials, including potential incidents around Penn Haven Junction and tunnels. The plan categorizes transportation accidents as moderate risk. Several mitigation actions were developed to address them, including identifying critical transportation arteries and evaluating means to open roads for emergency access, installing traffic signals at high-crash locations, and resurfacing roads.

3.7.2 Lehigh Valley Hazard Mitigation Plan

The 2024 Lehigh Valley Hazard Mitigation Plan is currently being drafted (as of Fall 2024). The document is a bi-county plan (Lehigh and Northampton counties) aimed at reducing the risks associated with natural and human-caused disasters and reducing the effort necessary to "return to normal" following a disaster. The plan is being developed by a multi-jurisdictional planning team that includes a diverse group of 66 representatives.

Lehigh Valley Hazard Mitigation Plan
https://ncem-pa.org/2024-mitigation-plan/

The plan analyzed 27 types of hazards, combining variables such as probability, extent, and duration, resulting in the development of a risk factor for each hazard. The hazards with the highest risk factors in the two counties are pandemic & infectious disease, cyber-terrorism,

terrorism, and drug overdose crisis. Related to freight, environmental hazards/explosions was deemed as high risk and transportation crashes were deemed moderate risk. The plan documents previous disaster incidences, including a spill of hydrogen fluoride following a motor vehicle crash on PA 33 south of Wind Gap Borough. This incident involved a truck carrying 33,000 pounds of chemical products rolling on its side and resulted in 5,000 residents being forced to evacuate.

Existing conditions documented by the plan related to freight include identifying Norfolk Southern as the dominant Class 1 freight carrier in the Lehigh Valley and identifying I-476 from US 22 north to Route 209 (Carbon County) as being on the National Hazardous Materials Route Registry which prohibits passage of any explosives, poisonous substances, organic peroxides, and radioactive materials. Additionally, the plan recognizes that Lehigh Valley International Airport is one of 11 locations in the United States that supports Amazon Air and that FedEx Ground recently built its largest U.S. terminal adjacent to the airport.

3.7.3 Schuylkill County Emergency Operations Plan

The Schuylkill County Emergency Operations Plan, released in 2020, addresses key planning considerations, responding to and recovering from a pandemic event. It emphasizes the importance of collaboration among various sectors, including rail, aviation, highway, and mass transit, to develop individual plans, ensuring comprehensive identification of potential actions and alignment of efforts.

Schuylkill County Emergency Operations Plan
https://www.scema.org/wp-content/uploads/2017/02/County-and-Muncipal-EOP-11-22-11.pdf

The plan addresses the prioritization of essential goods and products for transport, suggesting methods to ensure their timely delivery. Additionally, the plan advocates for collaboration between transportation entities and agencies like fuel distributors and warehouses to enhance coordination and streamline logistical operations.

3.7.4 Eastern Regional Transportation Management Center (RTMC) Regional Operations Plan – 2023 Interim Update

PennDOT's Eastern Regional Traffic Management Center (RTMC) Region released the *Eastern RTMC Regional Operations Plan* in 2020 and an Interim Update in 2023. These documents outline the Regional Operations Plan (ROP) for PennDOT's Eastern Region. RTMC refers to the Regional Traffic Management Center located in Harrisburg. The region spans 20 counties, which include 12 regional planning partners and Engineering Districts 4-0, 5-0, and 8-0. The 2020 Plan identified 85 projects and four studies to maximize existing capacity of parallel routes and emphasize multimodal approaches to congestion management.

Eastern Regional Transportation Management Center (RTMC) Regional Operations Plan – 2023 Interim Update
https://www.penndot.pa.gov/ProjectAndPrograms/operations/Documents/Eastern%20Region%20RTMC%20ROP%202023%20Update%20FINAL%20corrected.pdf

The Plan supplemented the statewide Transportation Systems Management and Operations (TSMO) Program Plan by detailing regional traffic operations strategies. The document aimed to assist the Eastern Region in meeting federal Intelligent Transportation System (ITS) planning requirements, integrating operations and congestion management planning into transportation

planning, and prioritizing TSMO capital projects for inclusion in the Transportation Improvement Program (TIP).

Related to freight, the Plan acknowledged the rise in freight traffic, especially along the I-81 corridor and within the Lehigh Valley. The growth is attributed to new distribution centers and federal hours-of-service regulations. The Plan references the 2016 Pennsylvania Comprehensive Freight Movement Plan, which highlights key truck bottlenecks, including the Capital Beltway, I-83, I-78/US 22, and I-81, and pinpoints Critical Rural and Urban Freight Corridors, along with seven freight railroad lines and operators, as well as the statewide importance of air freight to the region.

The Plan identified numerous recommended projects prioritized based on stakeholder input. Recommendations include further study and evaluation concerning truck parking and winter truck restrictions. The Plan suggested freight improvement initiatives prioritize accommodating demand while minimizing conflicts with other traffic. Additionally, the Plan recommended conducting an Eastern RTMC Truck Parking Study to identify areas for potential truck parking expansion and the implementation of a Truck Parking Management System. As of the Update, this plan is underway.

Several new issues and needs were discussed during the Update's stakeholder engagement process. As a result, new ROP projects were drafted for consideration but have not yet undergone the data-heavy prioritization process used in the 2020 Plan. New projects include installing a Weight-in-Motion System along I-81 in Lackawanna County and investigating freight improvement options along PA 611

3.7.5 Berks County Emergency Operations Plan

The *Berks County Emergency Operations Plan* (EOP), produced by the Berks County Department of Emergency Services in 2023, supports the county government's adherence to and implementation of the Pennsylvania Emergency Management Services Code and the Counterterrorism Preparedness, Planning, and Response Act. Addressing various emergency scenarios, including both human-made and natural disasters, the plan encompasses the responsibilities of county government departments, public officials, and other relevant entities. Acting as a liaison between municipal emergency management agencies and PEMA, it delineates the coordination among state, county, and local government agencies. Intended as a comprehensive framework for countywide emergency activities, the EOP aligns with both the Pennsylvania Comprehensive Emergency Operations Plan and the National Response Framework (NRF), ensuring a coordinated and effective response to emergencies.

Berks County Emergency Operations Plan
https://www.berkspa.gov/getmedia/19653e38-d71f-422c-a6c3-cc561ad9cc69/Basic-EOP-3-28-2023.pdf

The EOP acknowledges the authority of the Governor to adjust travel provisions on any or all highways in the Commonwealth during declared emergencies, acknowledging the risk of transporting hazardous materials in Berks County. The document identifies key infrastructure elements such as highways, airports, and railroads, underlining the necessity of collaboration between public and private sectors to safeguard critical infrastructure. The plan refers to the Berks County Commodity Flow Study for information on the routes utilized and the commodities transported. Annually, the Berks County Department of Emergency Services participates in the

Department of Homeland Security's Data Call, contributing to the identification of critical infrastructure and key resources vital for emergency preparedness and response efforts.

The EOP prioritizes resource requests from municipalities, primarily focusing on actions geared toward saving lives. Following this, efforts are directed toward protecting property and the environment, stabilizing the economy, and ultimately, restoring the community.

3.7.6 Emergency Operations Plan for Lehigh County

The *Emergency Operations Plan for Lehigh County* aims to provide a framework for municipal and community officials to safeguard the lives and property of citizens during emergencies, whether natural or human-caused, including terrorism. It fulfills the requirements outlined in the Pennsylvania Emergency Management Services Code and encompasses all phases of the emergency management cycle: prevention, preparedness, response, and recovery. Additionally, the plan delineates the roles and responsibilities of authorities and committees and comprises a Basic Plan along with a Notification and Resource Manual. It relies on various sources, including the Pennsylvania Emergency Management Services Code, Commonwealth Multi-Hazard Identification and Risk Assessment, Emergency Management Directive 2002-5, County Emergency Operations Plan, County Hazard Vulnerability Analysis, and County Hazard Mitigation Plan.

Emergency Operations Plan for Lehigh County
https://www.lehighcounty.org/DesktopModules/Expasys/Documents/Download.aspx?ID=6629

3.7.7 Pennsylvania Traffic Incident Management Enhancement (PennTIME) Joint Operational Policy

The Commonwealth of Pennsylvania released a *Traffic Incident Management Enhancement (PennTIME) Joint Operational Policy* in 2018, supported by the Pennsylvania Transportation Advisory Committee. The policy concerns Traffic Incident Management (TIM), a "planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible."[3] Benefits of TIM include a reduction in traffic incident duration and impact, improved safety for motorists and first responders, and a reduction in traffic congestion.

Pennsylvania Traffic Incident Management Enhancement (PennTIME) Joint Operational Policy
https://www.penndot.pa.gov/ProjectAndPrograms/operations/Pages/TSMO-Eastern-Region.aspx

PennTIME targets several specific goals to improve TIM practices and policies statewide. These include training, public education and outreach, quick clearance, technology, and maintenance of a PennTIME website. While these methods do not uniquely benefit freight, their implementation will reduce congestion caused by roadway incidents, improving travel time reliability for trucks, and reducing the need for costly detours.

[3] https://ops.fhwa.dot.gov/tim/#:~:text=Traffic%20Incident%20Management%20(TIM)%20consists,safely%20and%20quickly%20as%20possible

4 Current Freight Trends

TECHNOLOGY TRENDS

LAND DEVELOPMENT TRENDS

TRANSPORTATION AND CLIMATE INITIATIVE

MULTI-STATE ZERO-EMISSION VEHICLES TASK FORCE

This section outlines the national and regional policies currently driving freight industry investments and how the region's residents consume goods and services. Additionally, this section includes an understanding of land use and environmental/emission reduction trends that can support how communities plan for future needs.

4.1 Technology Trends

Emerging freight technology trends are constantly shifting to meet or prepare for the demand for increased volumes of goods that consumers want to be delivered in shorter timeframes. Additionally, freight operators continue to identify improvements to delivery vehicles and alternative fuels. The following sections outline several current trends and, in many cases, linkages to the EPFA Region.

4.1.1 E- Commerce Demand

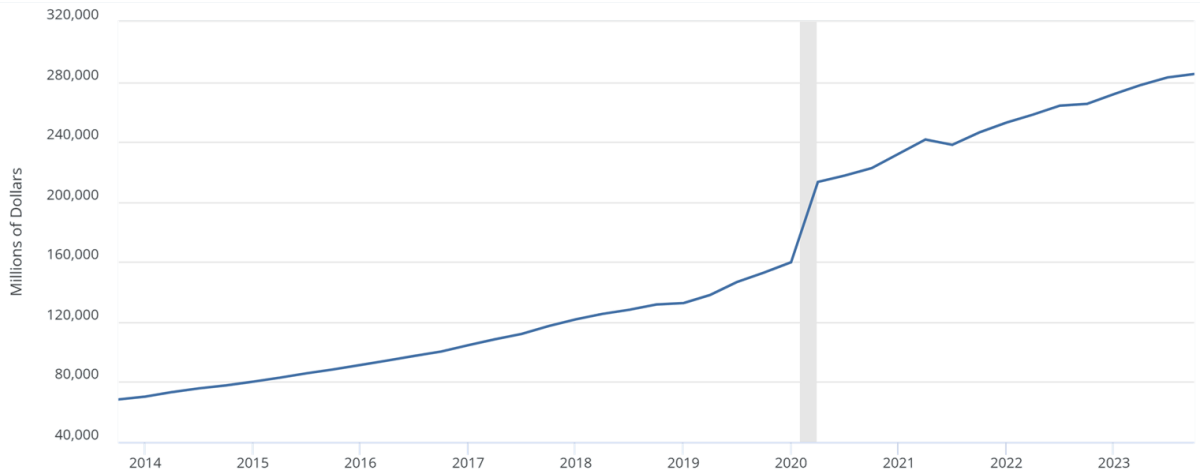
E-commerce has become a mainstream channel for consumers across the nation to shop for various consumer goods—including home furnishings, appliances, clothing and accessories, and food, among others. The COVID-19 pandemic rapidly accelerated the volume of e-commerce sales made in the United States. In late 2011, e-commerce sales in the United States totaled approximately $50.2 billion, representing approximately 4.9% of total retail sales in the US By the 1st quarter of 2020, on the eve of the COVID-19 pandemic's spread through the US, e-commerce sales totaled $159.8 billion and represented 11.9% of total retail sales. As Figure 13 and Figure 14 show, e-commerce sales spiked by 33.5% (to $213.3 billion, and 16.5% of total retail sales) in the second quarter of 2020 (illustrated in grey), when the pandemic was spreading across the US, as stay-at-home orders and social distancing was the recommendation from federal, state, and local authorities.

> The expansion of e-commerce can be correlated with increasing industrial and warehousing growth in the EPFA region.

Since the spike in demand in the second quarter of 2020, e-commerce sales have continued to increase, averaging 2.2% growth quarter over quarter between late 2020 and the end of 2023. This is a lower rate of growth than observed between 2011-2019 (3.6% per quarter, on average).This slowed rate of growth can be attributed to several factors, including a logical deceleration after the 2020 spike, supply shortages, price inflation of consumer goods, and changes in consumer spending in anticipation of an economic slowdown in the near future.[4]

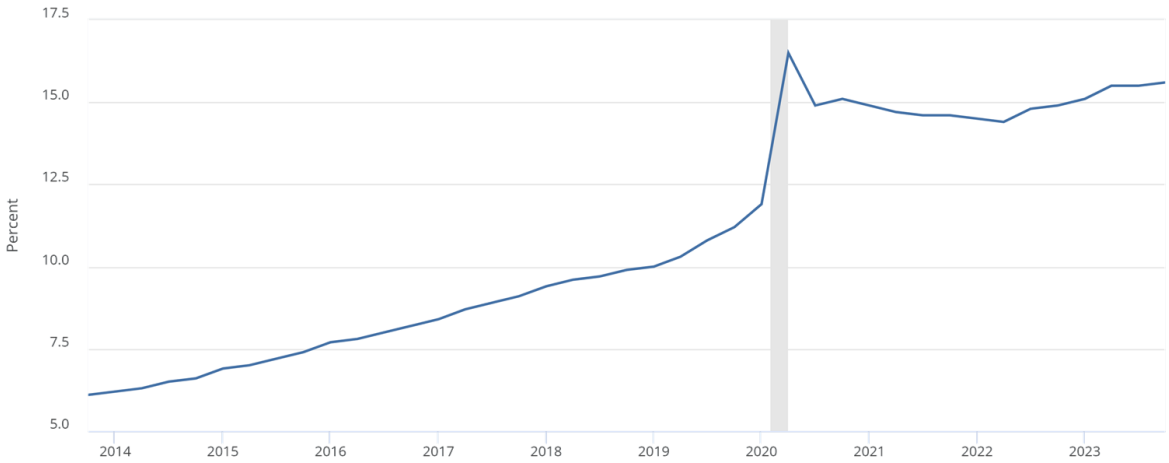
[4] https://www.wsj.com/articles/consumer-spending-personal-income-inflation-november-2022-11671750930; https://www.bea.gov/data/consumer-spending/main ; https://www.nytimes.com/2022/12/23/business/economy/consumer-spending-inflation-november.html

Figure 13: US E-Commerce Retail Sales by Quarter, Q1 2015-Q3 2023



Source: US Census Bureau

Figure 14: E-Commerce as a Percent of Total US Retail Sales by Quarter, Q1 2015-Q3 2023



Source: US Census Bureau

The combination of increasing consumer demand and retail sales, with supply chain stresses and capacity constraints led to challenges for many retailers to maintain sufficient levels of inventory to meet their consumers' demands. Decades of keeping inventory levels (and costs) low and meeting customer demand "just in time" left supply chains especially vulnerable to the quick changes in consumer demands that came during the pandemic era. At various times through 2020 and 2021, some products were unavailable on store shelves and/or e-commerce retail sites, and "shortages" of various goods were reported during this period.[5]

Figure 15 shows the inventories to sales ratio in the United States over the past 8 years. After an initial spike in inventory-to-sales ratio in early 2020 (shown in grey), which is attributable in part to closed retail stores, and receipt of orders placed prior to the effects of the pandemic on daily life, inventories did not keep pace with sales during the 2020-2021 COVID-19 crisis.

[5] https://www.wsj.com/articles/why-arent-there-enough-paper-towels-11598020793; https://www.mckinsey.com/mgi/overview/in-the-news/shortages-of-everyday-products-have-become-the-new-normal-why-they-wont-end-soon; https://www.nytimes.com/2021/06/01/business/coronavirus-global-shortages.html;

Figure 15: Inventory-to-Sales Ratio, US Businesses, Q1 2015-Q3 2023

Source: US Census Bureau

The value of that proximity to customers, particularly noteworthy within the EPFA region, where nearly 40 percent of US residents live within a single day drive from the region, makes the higher costs of acquiring and developing land in major metropolitan areas worthwhile for many companies that sell and distribute goods via e-commerce channels, where customers expect quick fulfillment and delivery of orders. E-commerce delivery operational needs, including additional space for the storage, sorting, and packing of individual customer orders; and the processing of a large number of e-commerce related returns (return rates fluctuate between 16% to more than 20%)[6] contribute to a requirement of more warehousing and distribution center space per volume of goods than traditional brick-and-mortar retail. A 2021 report by ProLogis estimated that e-commerce requires three times as much logistics space as brick-and-mortar retail due to the need to accommodate order fulfillment and processing returns.

The growth of e-commerce has significant implications for planners at the federal, state, regional, and local levels. E-commerce can only function successfully- and the industry can only achieve its ambitious goals- if the public sector keeps pace with the private sector in making investments to accommodate the expected volumes. Many of these investments have already been planned and delivered in the form of port expansions, highway developments, rail improvements, customs enhancements, distribution center developments, or industrial real estate market growth. Many of those enhancements are facilitating the movement of goods through international ports of entry and to warehouses, distribution, and fulfillment centers. However, there are considerations that the public sector has begun making to address real or potential traffic generation, parking and curbside management (e.g., right-sizing loading zones, pricing policies, curbside reservation systems, etc.), emissions, land use, and economic implications associated with e-commerce and the last-mile delivery moves attributable to e-commerce.

[6] https://nrf.com/media-center/press-releases/2022-retail-returns-rate-remains-flat-816-billion

4.1.2 Warehouse Automation

Warehouse automation refers to the process of mechanizing the movement of inventory into, within, and out of warehouses to customers with minimal human assistance. Warehouse automation works by using software and technology like robotics and sensors to automate tasks. These products work in concert with existing tools like inventory management software to streamline inventory movements.

Automated warehouses can increase throughput per square foot by as much as three times. Aisles between storage racks can be narrower and the height of the racks can be taller, since robotics replace forklifts. This allows more products to be handled and stored horizontally and vertically, and it pushes warehouse ceiling heights well above 40 feet. Combinations of material handling and optical equipment enable greater precision in picking and packing of inventory, which enables the management of larger volumes and greater varieties of products (called stock-keeping units, or SKUs). Companies interested in warehouse automation must weigh the high initial costs of acquiring the equipment and management systems, relative to the reductions in operating costs over time. As more companies adopt automation and the technology becomes ubiquitous, the barrier to entry into automation will likely continue to decline.

Figure 16: Automated Warehouse Robots

Source: JD.com

Warehouse automation has become an increasing area of focus, as employment levels across distribution centers are at all-time highs. Warehouse worker wages in Pennsylvania average about $17 an hour as of May 2024[7], and unemployment in Pennsylvania (3.4%) is below the national average (3.9%).[8] Attracting and retaining warehouse employees can, therefore, be challenging. In the short term, companies are using strategies such as bonuses, accelerated pay raises, and tuition reimbursement to attract or retain staff. However, warehousing industry experts believe that, over the long term, increasing automation of warehouses will be imperative to sustainable growth.[9] Conversely, a 2019 report published by the UC Berkeley Center for Labor Research and Education suggested that technological innovations are unlikely to substantially impact the number of warehousing jobs over the next decade.[10] Warehousing is characterized by slim profit margins and cost-sensitive competition, which has limited experimentation with robotics or other forms of job automation.

[7] ZipRecruiter, available from: https://www.ziprecruiter.com/Salaries/Warehouse-Worker-Salary--in-Pennsylvania (accessed January 8, 2024).
[8] U.S. Bureau of Labor Statistics, April 2024, available from: https://www.bls.gov/news.release/laus.nr0.htm.
[9] Optimizing Warehouse Automation for Retailers." McKinsey, December 27, 2021. https://www.mckinsey.com/industries/retail/our-insights/automation-has-reached-its-tipping-point-for-omnichannel-warehouses.
[10] Gutelius, Beth, and Nik Theodore. "The Future of Warehouse Work: Technological Change in the US Logistics Industry." UC Berkeley Center for Labor Research and Education, October 2019.

E-commerce fulfillment centers differ from traditional DCs in their requirement for greater labor input. This results from the small order sizes and varied SKU content typical of online consumer purchases. However, there is significant use of automated equipment for material handling and to direct workflow, divert pass-through orders (where inbound products can be repackaged for outbound without further handling), and limit labor involvement where possible.

High cube and automated warehouses have already been proposed within the EPFA Study Area. These warehouses are over 100 feet tall and utilize highly automated rack systems that also serve as the building's structure. These tall warehouses integrate Automated Storage and Retrieval Systems (ASRS) to maximize storage, processing, and retrieval of goods allowing for more efficiency and faster turnaround times. These automated warehouses can be eight times the height of traditional warehouses, requiring less physical land to develop. This could make some smaller industrial parcels more attractive for development or redevelopment.[11]

4.1.3 Advanced Trucking

Connected vehicle (CV) technology utilizes short-range communications (commonly referred to as V2X/vehicle-to-everything) to sense what other travelers are doing and to identify potential hazards. Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technologies allow vehicles to be aware of each other's location. An increasing number of trucks use connected and autonomous technologies, including sensors, communications, and/or processing software for steering and braking assistance. Due to ongoing industry challenges to attract new drivers and the continued need to improve safety, the benefits of greater vehicle automation to the trucking industry are substantial. The Society of Automation Engineers' automation levels classification scheme is the industry standard for measuring the degree of automation in a vehicle (Table 4).

Table 4: Society of Automobile Engineers (SAE) Automation Levels

	Level	Description
0	No Automation	Zero autonomy: the driver performs all driving tasks.
1	Driver Assistance	The driver controls the vehicle, but the vehicle design may include some driving assist features.
2	Partial Automation	The vehicle has combined automated functions, like acceleration and steering, but the driver must be ready to take control of the vehicle at all times with notice.
3	Conditional Automation	Driver is a necessity but not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.
4	High Automation	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.
5	Full Automation	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Source: Society of Automotive Engineers.

[11] https://www.lvpc.org/high-cube-introduction.html; Search terms: Lehigh Valley ; Automated warehouse ; High cube.

Currently, there are no viable commercial systems for fully autonomous trucks. The highest level of truck automation commercially available is "advanced driver assistance" (Level 1). Partial and conditional automation are in the pre-commercial stage, and high and full automation are in research and development and are not likely to be available over the medium term. Advanced driver assistance systems (ADAS) are commercially available for trucks. ADAS enhances the safety, efficiency, or experience of driving by assisting in or automating real-time functions traditionally performed by the driver. They use a variety of internal and external sensors (such as GPS, video, radar, and lidar) to inform drivers about navigation and potential conflicts. Examples of ADAS include electronic stability control (ESC) and roll stability control (RSC), which use real-time information such as weight, speed, acceleration, and steering to detect the potential for a vehicle rollover or loss of steering control; forward collision warning (FCW) systems which provide a warning to the driver if the distance or time to the lead vehicle falls below a certain threshold; and autonomous emergency braking (AEB) which allows the vehicle to brake independently of the driver to avoid or mitigate an imminent rear-end collision. ADAS forms the foundation of autonomy and represents a significant advance in vehicle safety even without full autonomy. Multiple studies have found these technologies to be effective at reducing truck crashes. [12,13,14,15]

Though fully connected and automated trucks may not be considered an emerging trend, the enabling technologies are an emerging trend that will impact how goods are moved into, out of, and within Pennsylvania and throughout the nation.

Besides safety, fuel cost savings and greater operational efficiencies are primary motivating factors for equipping trucks with connected and automated technologies. In particular, fleet operators that can deploy trucks in platoons can potentially realize these benefits. Truck platoons use V2V communications and autonomous vehicle control technology to electronically "tether" tractor-trailers together in a convoy formation.[16] These vehicles automatically maintain a set, close distance between each other while connected (about 20 to 75 feet[17]). The truck at the head of the platoon acts as the leader, with the trailing vehicles reacting to its movement. Platooning can decrease the aerodynamic drag on the following vehicle(s), generating estimated fuel savings of up to nearly 5 percent for the lead truck and almost 10 percent for trailing trucks.[18] It can yield labor cost savings if humans do not operate the following trucks in the convoy but are tethered to a lead truck with a human driver.

4.1.4 Advanced Delivery Methods

Last-mile deliveries represent a substantial share of the overall logistics costs associated with transporting consumer products from their points of origin to consumers' doorsteps. A 2022 retailers' survey conducted by FarEye found that the last-mile move from the final sorting center

[12] Hickman, J. et al., "Onboard Safety Systems Effectiveness Evaluation Final Report," Federal Motor Carrier Safety Administration, FMCSA-RRT-12-012, 2013, https://rosap.ntl.bts.gov/view/dot/10
[13] Woodroofe, J. et al., "Safety Benefits of Stability Control Systems for Tractor-Semitrailers," National Highway Traffic Safety Administration, DOT HS 811 205, 2009, https://deepblue.lib.umich.edu/handle/2027.42/64283
[14] Federal Motor Carrier Safety Administration, "Benefit-Cost Analyses of Onboard Safety Systems," Tech Brief, FMCSA-RRT-09-023, February 2009
[15] National Transportation Safety Board, "The Use of Forward Collision Avoidance Systems to Prevent and Mitigate Rear-End Crashes," 2015, https://www.ntsb.gov/safety/safety-studies/Documents/SIR1501.pdf
[16] European Automobile Manufacturers Association, https://www.acea.be/uploads/publications/Platooning_roadmap.pdf
[17] Lammert, M., Duran, A., Diez, J., Burton, K. et al., "Effect of Platooning on Fuel Consumption of Class 8 Vehicles Over a Range of Speeds, Following Distances, and Mass," SAE Int. J. Commer. Veh. 7(2):2014, doi:10.4271/2014-01-2438
[18] Ibid.

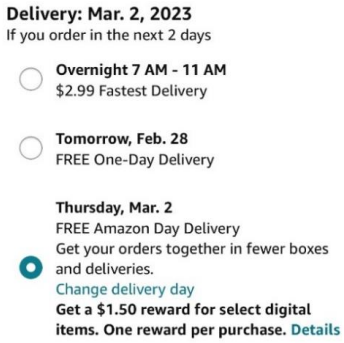
to the customer represents 53% of the total logistics cost for e-commerce shipments.[19] Fuel and labor costs, remote customer locations, and unsuccessful delivery attempts are key drivers of the high cost associated with the last mile. Over the past several years, many retailers have outsourced deliveries to parcel delivery companies and gig workers in an effort to reduce costs and effectively meet rapid delivery timeframes. This outsourcing means that retailers have less visibility into and control over the delivery - any delivery mishaps, while not the direct fault of the retailer, can give customers a poor experience that they may hold against the retailer.

Among the many strategies that retailers and parcel delivery companies are taking to make deliveries cheaper and more efficient are two that appear to be major current industry themes—managing demand for deliveries by shifting consumers' shopping behaviors and using artificial intelligence (AI) technology to optimize delivery tours. A focus on each of these themes follows this section.

4.1.5 Managing Demand

One strategy retailers have adopted in order to reduce delivery costs is to promote changes in consumers' demand for deliveries to their doorsteps. For more than seven years, Amazon has offered incentives to consumers, in the form of digital media credits and other rewards, to consolidate multiple items or orders to be delivered in one visit. At checkout, consumers are offered the option of having items delivered as soon as possible, which may involve separate shipments delivered on different days for orders containing more than one item. Alternatively, consumers may choose a "No-Rush Shipping" option to have all items delivered on the same day of the week, perhaps in fewer boxes, in exchange for an incentive. Figure 17 shows an example of an available reward for choosing no-rush shipping.

Figure 17: No-Rush Shipping Option, Amazon.com



Source: Amazon.com

Amazon is not the only retailer that offers incentives to consolidate deliveries. Macy's, Target, and other retailers have adopted similar strategies. While the rate of participation and realized cost savings associated with no-rush shipping options are not published, a research study produced by Massachusetts Institute of Technology (MIT) in 2019 estimated that this strategy could save retailers between 3% and 32% of their logistics costs, depending upon the level of consumer participation.[20]

Incentives do not have to be limited to monetary rewards. During the COVID-19 pandemic, Amazon encouraged consumers to delay delivery of non-essential items to "assist others" who may need the delivery of essential items sooner. Some researchers have suggested sharing the

[19] "Retailers lose visibility as they outsource last-mile delivery, FarEye says," Supply Chain Quarterly, January 26, 2023, available from: https://www.supplychainquarterly.com/articles/7599-retailers-lose-visibility-as-they-outsource-last-mile-delivery-fareye-says (accessed February 24, 2023).

[20] Waters, Michael, "Why retailers like Amazon and Target are embracing no-rush delivery," Modern Retail, December 4, 2020, available from: https://www.modernretail.co/retailers/why-retailers-like-amazon-and-target-are-embracing-no-rush-delivery/; (accessed January 25, 2023).

expected sustainability benefits of consolidated deliveries with consumers as a way to convince more of them to select the more sustainable delivery option.[21]

Another demand management strategy that has been offered by an increasing number of retailers, particularly those with brick-and-mortar and online presence, is the offering of "buy online, pick-up in store" or BOPIS, and "buy online, pick-up at curb" or BOPAC. The orders may be sent from a fulfillment center to the retail store for pickup, or fulfilled in-store using items that are in the store's inventory. These options gained popularity during the COVID-19 pandemic, as consumers were able to shop online from the safety of their own homes and appear in a store or curbside for only a few moments to pick up their orders. In 2020, BOPIS/BOPAC sales increased nearly 107% from the previous year (representing about 10% of all e-commerce sales), and projections anticipate 15% growth for each of the next several years. Consumers cite convenience and time savings as top reasons for using this retail model.[22]

4.1.6 Tour Optimization Using Artificial Intelligence

Many carriers, or companies that deliver e-commerce shipments to consumers' doorsteps, are developing and applying technological solutions in order to improve efficiency and reduce the cost of performing last-mile deliveries. For many years, carriers have used various software packages to help them plan delivery routes and tours to minimize trip miles and/or planned travel times. However, conditions on the ground can lead to travel times that vary from static planned estimates. If a specific tour can take 50% longer to complete on a "bad day" of congestion, the carrier may have to budget a buffer of an extra 50% when assigning resources (drivers, vehicles, etc.) to routes. This buffer is an inefficiency. For example, carriers may have to budget more time and/or hire additional drivers so that deliveries are made on schedule on days when delays are significant. However, this may be too much labor capacity on average days.

Using artificial intelligence (AI) for the purpose of managing drivers' tours and routes is an emerging trend in the logistics industry. Some companies are using or experimenting with AI that can better optimize delivery route options. Standard routing systems and applications use mathematics to analyze all potential routes and select a best route based upon shortest estimated travel time and/or distance. Commercial routing applications, such as Google, bring in historic and real-time operations data to adjust route estimations. AI pushes the envelope further by predicting the best route over time, using a combination of traffic information, load and customer information, and driver behaviors. AI also "learns" from observations over time and can adjust predictions accordingly.[23] Some providers of AI-supported route optimization software claim that the AI can also incorporate drivers' needs for rest stops, refueling, and other activities into the routing and navigation calculations, and adjust estimated delivery times accordingly. The estimated delivery times can be shared with the customer in real time.[24]

In addition, AI-enabled information systems are linking delivery performance with inventory management systems in order to manage distribution center operations, i.e., managing loading

[21] Thomas, Rodney A.; Monique L. Ueltschy Murfield; Lisa M. Ellram, "Leveraging sustainable supply chain information to alter last-mile delivery consumption: A social exchange perspective," Sustainable Production and Consumption, vol. 34, November 2022, pp 285-299, available from: https://www.sciencedirect.com/science/article/abs/pii/S2352550922002548 (accessed January 25, 2023).
[22] Owens, Beth, "BOPIS: What it is and why it's so popular with consumers," Ryder Ecommerce, February 16, 2022, available from: https://whiplash.com/blog/buy-online-pickup-in-store/, (accessed January 25, 2023); Rosencrance, Linda, "Top 7 ways to improve last-mile delivery," Tech Target, June 9, 2021, available from: https://www.techtarget.com/searcherp/feature/Top-7-ways-to-improve-last-mile-delivery, (accessed January 25, 2023).
[23] https://nexocode.com/blog/posts/ai-in-last-mile-delivery-optimization-vehicle-routing-problem/
[24] https://www.dispatchtrack.com/blog/ai-powered-routing?hs_amp=true

dock capacity for inbound and outbound shipments, determining the rates certain products go from arrival at the distribution center to out for delivery, etc.[25] The "big three" private delivery companies—UPS, FedEx, and Amazon—are using or are experimenting with AI-enabled route optimization and navigation systems. The delivery robots briefly piloted by FedEx and Amazon also used AI and machine learning to optimize routes and to help the robots identify and avoid hazards and obstacles. While both FedEx's Roxo and Amazon's Scout robot programs have been discontinued, AI appears to be in the future of delivery planning and operations for human-performed and autonomous deliveries.

4.1.7 Alternative Delivery Vehicles

Alternative modes of transportation, including cargo bicycles and delivery robots, have been deployed to facilitate last-mile deliveries, with varying degrees of success. Deployments have typically been in urban environments or college campuses where consumer density can support these emerging delivery vehicle types.

- **Cargo bicycles.** In recent years, companies using electric cargo bicycles to perform short-distance delivery trips have emerged in many major cities. B-line Sustainable Urban Delivery is one such company based in Portland. B-line has partnered with the Portland Bureau of Transportation (PBOT) to promote more sustainable urban freight and delivery practices in order to reduce carbon emissions. [26] Urban areas such as Center City Allentown, Scranton, Bethlehem, and others in the EPFA Study Area may have the density of customer locations to support such services.

Figure 18: B-Line Cargo Bicycle in Portland, Oregon

Source: Portland Bureau of Transportation,

- **Delivery robots.** Using autonomous robots to deliver parcels and other small shipments has been piloted by several companies since Starship Technologies began deploying them in 2014. Since then, Starship Technologies has expanded to more than 100 test locations, many of which are on college campuses where density of demand for goods is substantial. In 2019, Amazon piloted "Scout," a similar autonomous delivery robot, though the Scout program was largely rolled back in late 2022 due to operational issues

Figure 19: Starship Technologies Delivery Robots

Source: Starship Technologies

[25] https://www.infosys.com/insights/ai-automation/documents/moving-goalposts.pdf
[26] https://www.portland.gov/transportation/news/2022/1/26/bicycle-delivery-company-featured-first-video-series-showcase-unique

and cost considerations.[27] In Pennsylvania, a 2020 law allowed for the operation of autonomous "Personal Delivery Devices" (PDD) in pedestrian areas, on select shoulders or berms of roadways, and on select roadways. Further, all roadways and shoulders and berms on a roadway with posted speed limits at or below 25 miles per hour are eligible for PDD operations.[28] The delivery robots represent an opportunity to deliver small shipments using a small electric-powered vehicle. This saves fuel, reduces emissions, and can avoid parking/loading conflicts that trucks and vans encounter in dense urban and mixed-use districts.

4.1.8 Clean Freight Corridors in Eastern Pennsylvania

Freight vehicles have run predominantly on petroleum diesel for decades and have therefore contributed to pockets of high pollution exposure in communities near major freight corridors. Facilitating a transition of some of the freight transportation fleet from diesel to alternative fuels or electric power, through strategic investments in alternative fuel infrastructure, presents an exciting opportunity to improve air quality and, potentially, spin off other categories of public benefits. While there is significant policy support for diesel alternatives within the study region, Pennsylvania as a whole, and the Northeastern US, additional actions must be taken in order to facilitate the transition of trucking fleets away from diesel fuels. Scaling up adoption of diesel alternatives requires a robust and holistic policy environment that supports fleet procurement (e.g., through purchase incentives) and operation (e.g., through utility investments and accommodating rate design) to enable all-electric and alternative fuel technologies to better compete with diesel technology on a total cost of ownership basis. It also requires the development of a robust network of fueling and charging stations to allow vehicles to refuel or recharge while in transit between their origins and destinations.

The following sections review the current state of alternative fueling and charging in the EPFA region, reviews the policy environment, explores challenges associated with transitioning fleets, and notes some opportunities for local governments in the region to play a role in facilitating zero-emission trucking.

4.1.8.1 Federal Highway Administration Corridor Designations

This section is an assessment of potential clean freight roadway corridors within the EPFA region. The assessment is comprised of an inventory of existing locations of alternative fuel/electric charging infrastructure and the designation status of alternative fuel corridors by the FHWA. The fuel types and energy sources assessed herein are those supported under Section 1413 of the federal FAST Act: electricity, hydrogen, liquefied petroleum gas (LPG or propane), compressed natural gas (CNG), and liquefied natural gas (LNG).

This assessment leveraged planning tools developed by the US Department of Energy (DOE) and FHWA to identify existing alternative fuel/electric charging infrastructure and the current designation status of roadway corridors, respectively. This assessment within the study area will lay the foundation for subsequent tasks intended to identify opportunities to strategically expand alternative fuel/electric charging infrastructure to support the integration of lower-pollution emitting technologies to power on-road goods movement.

[27] https://www.freightwaves.com/news/amazon-scraps-scout-home-delivery-robot
[28] "Personal Delivery Device (PDD) Operations Policy," Pennsylvania Department of Transportation, Publication 955 (2020), available from: https://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20955.pdf.

Under Section 1413 of the FAST Act, FHWA is responsible for designating roadway corridors as either "Signage Ready" or "Signage Pending" for alternative fuels/electric charging based on the availability of publicly accessible fueling/charging infrastructure along those routes. The mileage parameters for corridor designation are as follows: 50 miles or less between stations for electric, 100 miles or less between stations for hydrogen, 150 miles between stations or less for propane and compressed natural gas, and 200 miles or less between stations for liquefied natural gas. For all energy sources, only stations located within five miles of the nominated roadway may be considered for purposes of FHWA's designation evaluation. Corridors designated as "Signage Ready" are deemed to have met or exceeded these parameters, while corridors designated as "Signage Pending" are deemed not to have sufficiently frequent infrastructure to meet the parameters.

> The BIL established the Charging and Fueling Infrastructure Discretionary Grant Program for the strategic deployment of publicly accessible infrastructure along designated alternative fuel corridors

It is important to note that the FHWA's alternative fuel corridor designation program evaluates fueling/charging stations without regard to which vehicle types they can accommodate, as long as the stations are not for private use (e.g., exclusively for a particular vehicle fleet). Therefore, the designations presented below incorporate fueling/charging stations that may service light-duty, medium-duty, and/or heavy-duty vehicles.

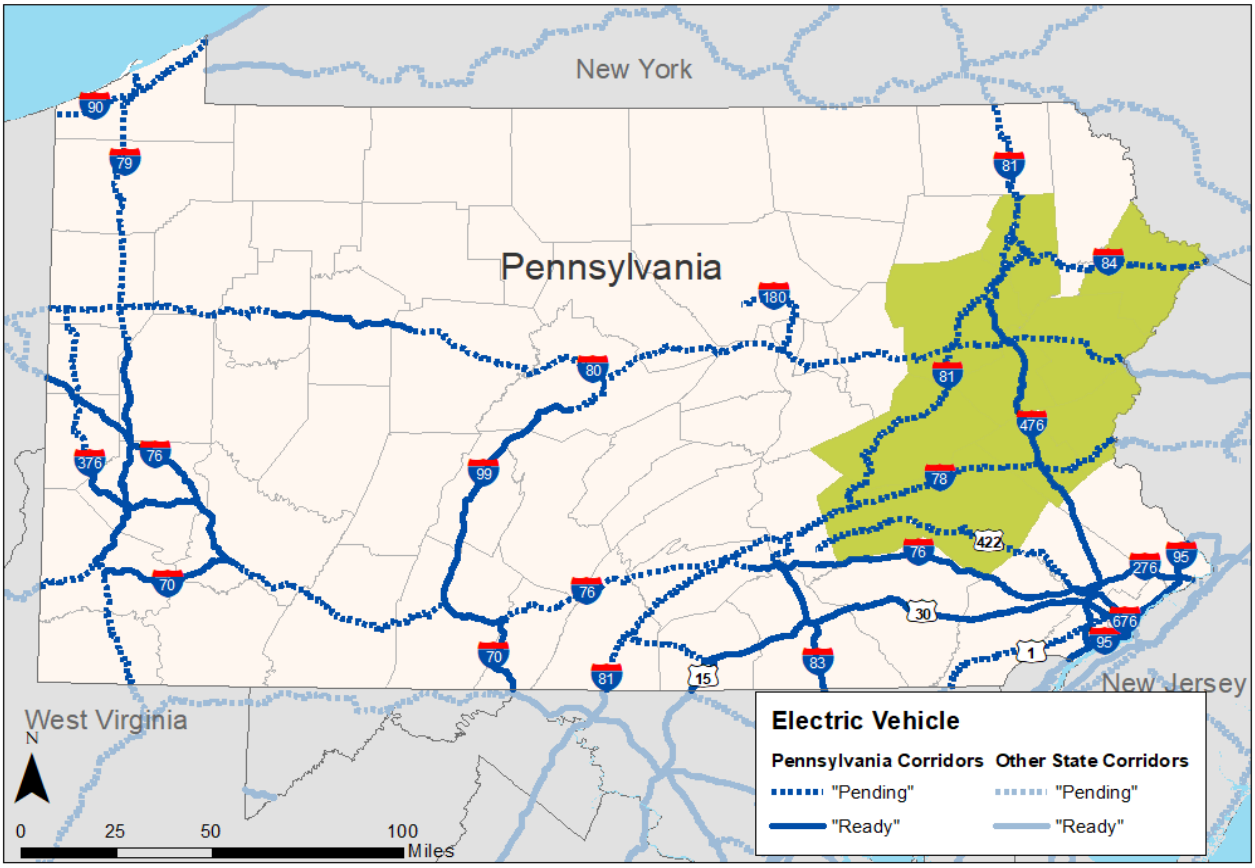
The latest corridor designations, updated in October 2023, include the highway facilities listed in Table 5. Corridors considered "**Ready**" include Signage Ready corridors and corridors labeled "**Pending**" include Signage Pending corridors. Figure 20 through Figure 24 are maps produced by PennDOT that illustrate the alternative fuel corridor designations as of October 2023. Each figure has been modified for the purpose of this Plan; the EPFA region is highlighted in green.

Table 5: FHWA Alternative Fuel Corridor Designations within EPFA Study Area

Route	Electric	LNG	Propane	Hydrogen	CNG
I-76	Ready			Pending	Ready
I-78 (east of Interchange 53)	Pending			Pending	Pending
I-78 (west of Interchange 53)	Pending			Pending	Ready
I-80	Pending	Pending	Pending	Pending	Pending
I-81	Pending			Pending	Ready
I-84	Pending				
I-176					
I-380					
I-476 (south of Wilkes-Barre)	Ready				Ready
I-476 (north of Wilkes-Barre)	Pending				Ready
US 422	Pending				

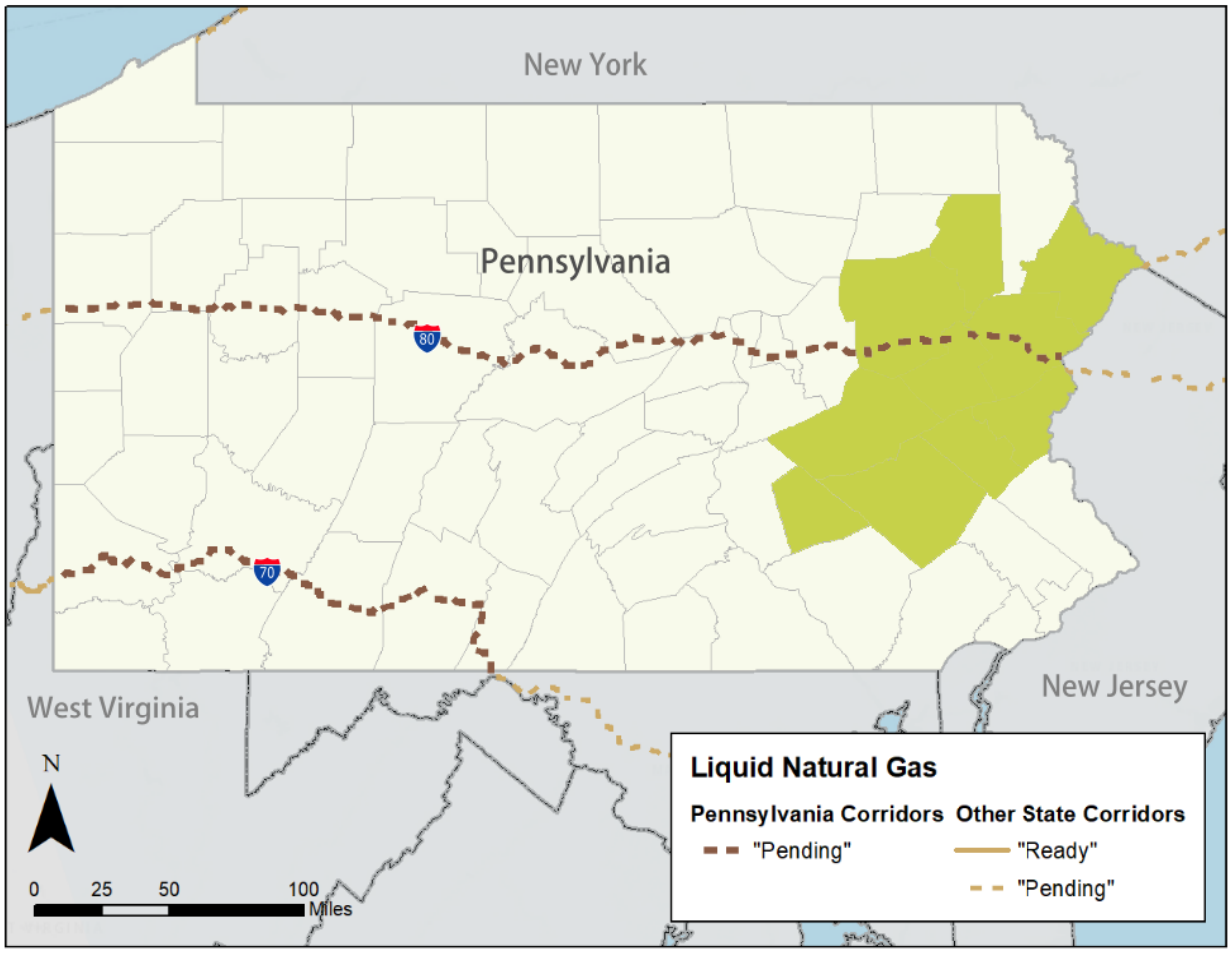
Source: https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/Alternative-Fuel-Corridors.aspx

Figure 20: FHWA-Designated Electric Vehicle Corridors in Pennsylvania



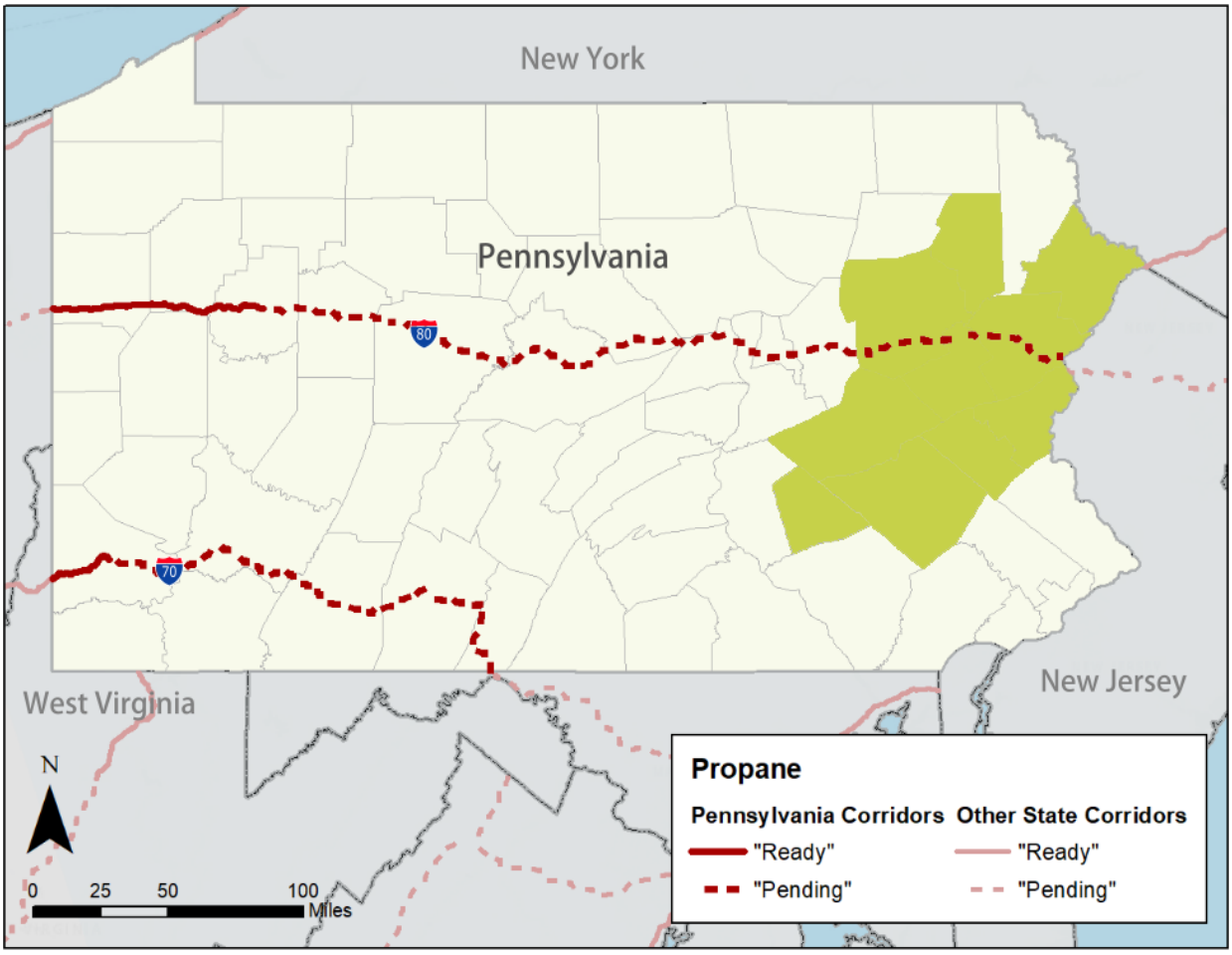
Source: https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/Alternative-Fuel-Corridors.aspx

Figure 21: FHWA-Designated Liquid Natural Gas (LNG) Corridors in Pennsylvania



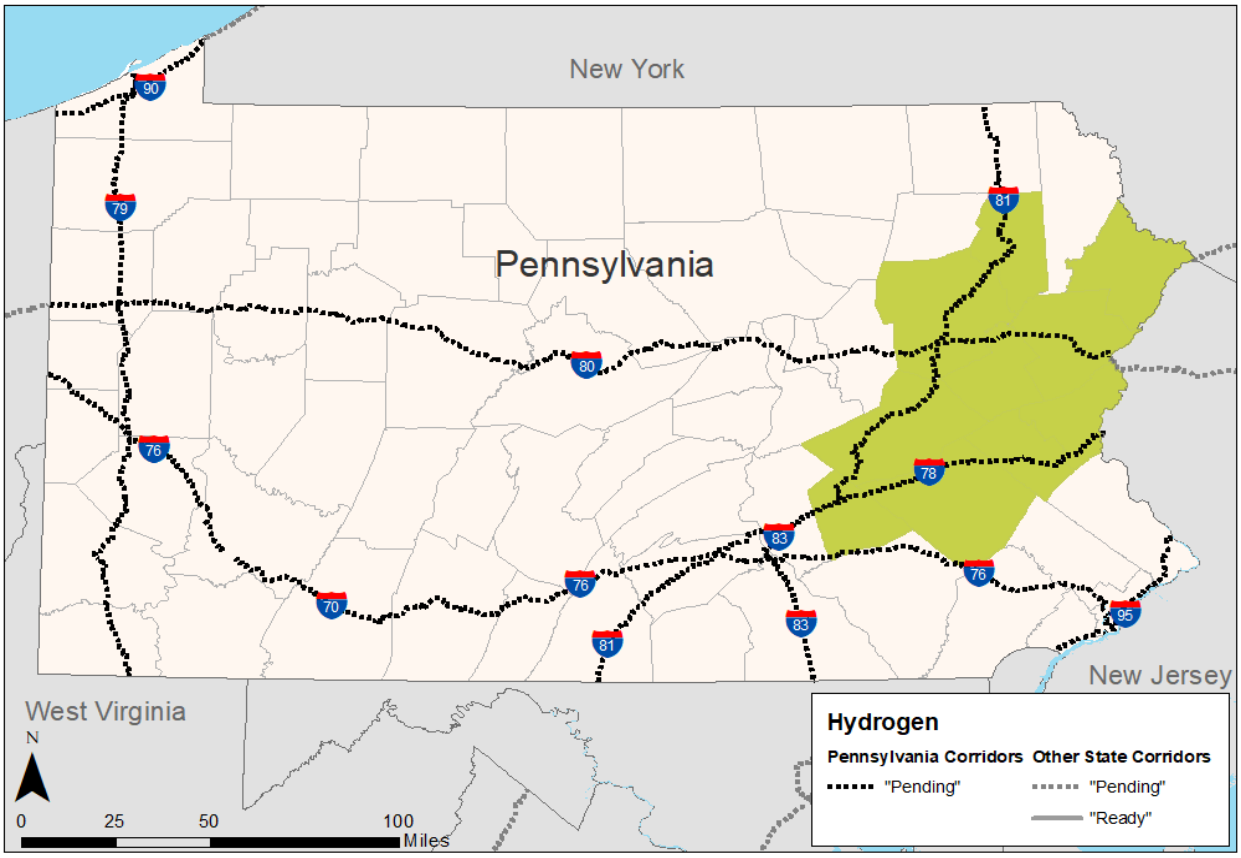
Source: https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/Alternative-Fuel-Corridors.aspx

Figure 22: FHWA-Designated Propane Corridors in Pennsylvania



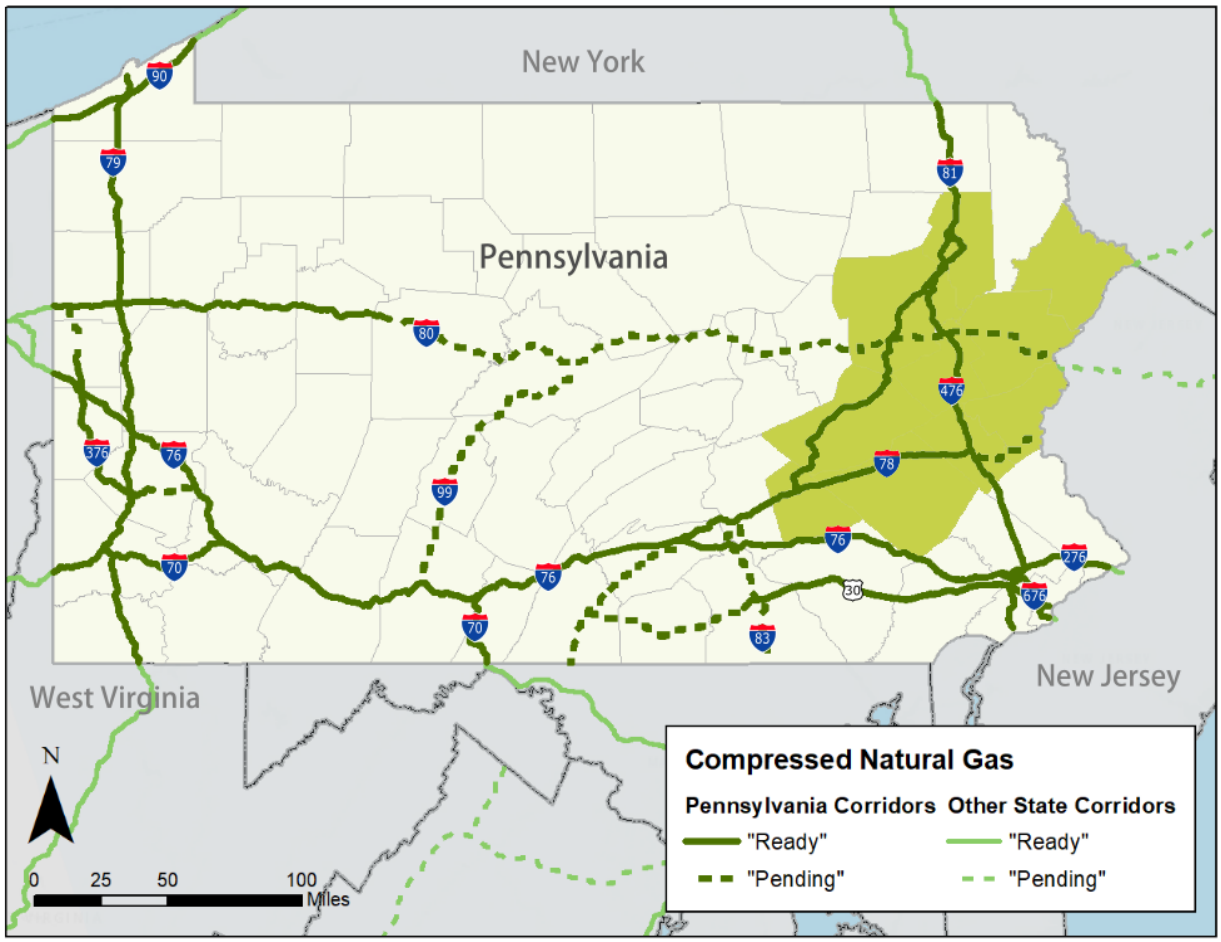
Source: https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/Alternative-Fuel-Corridors.aspx

Figure 23: FHWA-Designated Hydrogen Corridors in Pennsylvania



Source: https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/Alternative-Fuel-Corridors.aspx

Figure 24: FHWA-Designated Compressed Natural Gas (CNG) Corridors in Pennsylvania



Source: https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/Alternative-Fuel-Corridors.aspx

4.1.8.2 Fueling Station Locations

According to the US Department of Energy's Alternative Fuels Data Center, 23 alternative fueling and electric charging stations in the EPFA region are accessible to medium-duty (class 3-5) or heavy-duty (class 6-8) trucks and meet the following criteria:

EV charging: DC fast electric vehicle (EV) charging stations that have at least four EVSE ports (also called chargers) with CCS connectors and each supporting a power output of at least 150 kW

Hydrogen: Retail stations[29]

Propane (LPG): "Primary" LPG stations, which have fuel for vehicles and vehicle-specific fueling services that are consistently offered during business hours

CNG: Fast-fill compressed natural gas CNG stations that offer a fill pressure of 3,600 psi

LNG: All liquefied natural gas LNG stations[30]

The EPFA region includes seven (7) electric vehicle charging stations, six (6) CNG fueling stations, and ten (10) LPG fueling stations that medium-duty trucks can access. While all six of the CNG and all 10 of the LPG stations can also accommodate heavy duty vehicles, only one of the seven electric stations (Best Western in Blakeslee) is accessible to large vehicles. There are no hydrogen or LNG fueling stations located in the study area. It is important to note that some of the stations located in the study area may not be accessible to medium-duty or heavy-duty trucks due to geometric constraints (e.g., charging stations located inside parking decks or parking lots that large trucks cannot get into). The alternative fuel and electric charging stations (current as of summer 2024) located in the EPFA region are listed in Table 6 and shown on the map in Figure 25.

In order to facilitate a large-scale transition from diesel to alternative fuel types, fueling or charging stations would have to be developed in locations where trucks can and need to access them. Targeted locations should include at or near Interstate or other limited access highway interchanges or along major state highway corridors. Alternative fuels and/or electric charging could potentially be offered at existing fueling and/or truck stop locations, if and when the owners of such facilities recognize opportunities to generate revenue from such offerings.

4.1.8.3 Regulatory and Incentive Framework

The Commonwealth of Pennsylvania, through state-specific policies and multi-state compacts, has, to varying extents, pursued emissions reduction opportunities in the transportation sector to slow climate change and improve air quality. This has led to the enactment of numerous legislative, regulatory, and administrative actions intended to increase the use of all-electric technology and/or alternative fuels such as hydrogen, natural gas, and propane. The states in the northeastern US region are also active participants in regional efforts aimed at curbing transportation sector emissions or explicitly catalyzing markets for zero-emission technologies. This section outlines the current policy environments in Pennsylvania and the northeastern US for various alternative fuel and zero-emission technologies for use by on-road medium/heavy-duty vehicles.

[29] Non-retail stations may qualify for corridors if the stations are compliant with SAE J2601 standards and meet all of the criteria for a hydrogen corridor.
[30] Alternative Fuels Data Center: Station Data for Alternative Fuel Corridors (energy.gov) (accessed November 28, 2023).

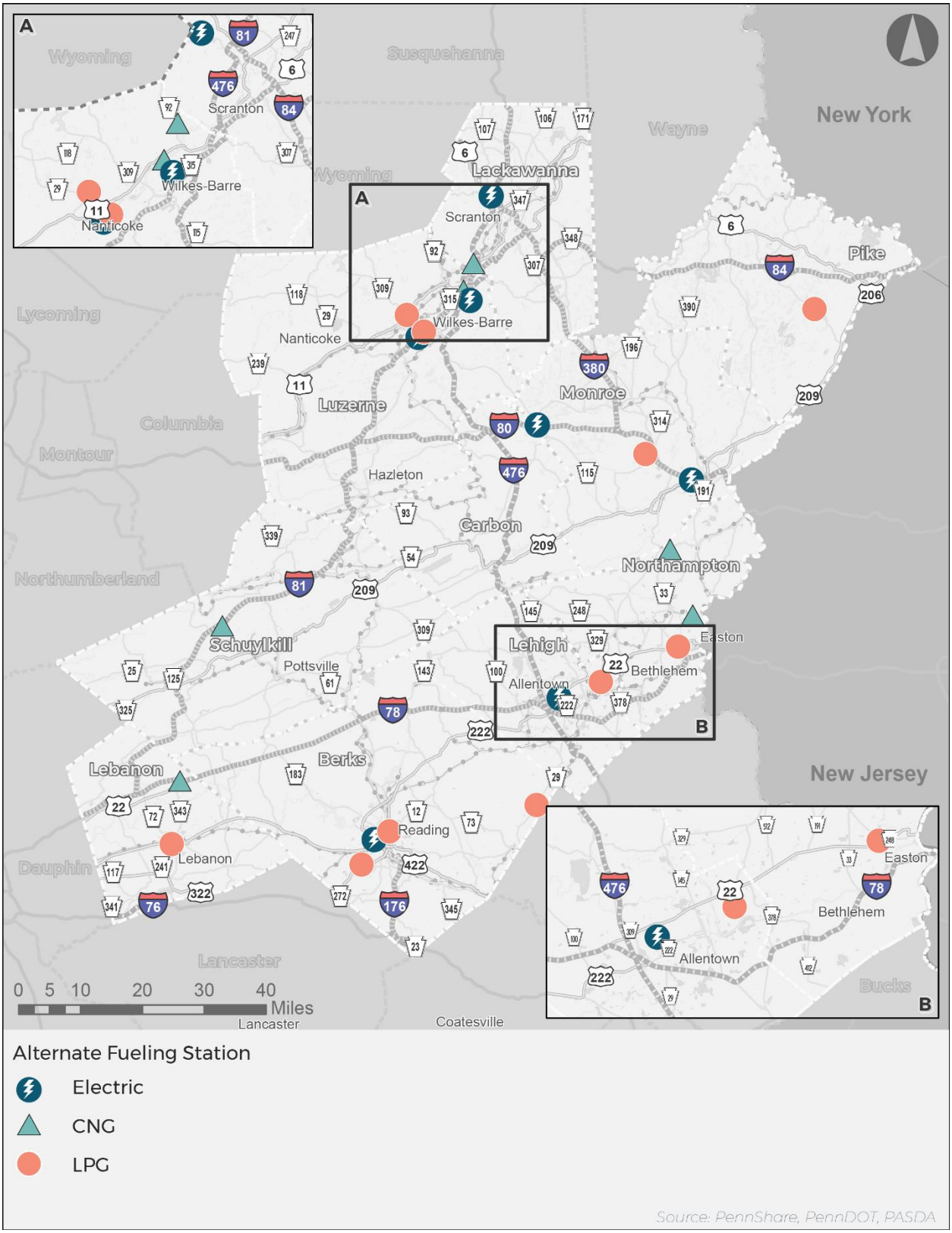
Table 6: Alternative Fuel and Electric Charging Stations in the EPFA Region (as of summer 2024)

Fuel Type	Med. Duty	Heavy Duty	Location Name	Address	Municipality	County
CNG	•	•	L T Verrastro Inc	700 Moosic Rd	Old Forge	Lackawanna
CNG	•	•	GAIN Clean Fuel	725 Legionnaire Dr	Fredericksburg	Lebanon
CNG	•	•	GAIN Clean Fuel - Scranton	429 Highway 315	Pittston	Luzerne
CNG	•	•	GAIN Clean Fuel - Keystone CNG	3601 Glover Rd	Easton	Northampton
CNG	•	•	Clean N' Green	910 W Pennsylvania Ave	Pen Argyl	Northampton
CNG	•	•	Trillium	975 Keystone Blvd	Pottsville	Schuylkill
Electric	•		Comfort Inn & Suites Wyomissing/Reading	635 Spring St	Wyomissing	Berks
Electric	•		Comfort Inn	811 Northern Blvd	Clarks Summit	Lackawanna
Electric	•		Holiday Inn Exp - Allentown West	5630 Tilghman St	Allentown	Lehigh
Electric	•		Holiday Inn Exp - Scranton Airport	400 PA-315	Pittston	Luzerne
Electric	•		Home2 Suites by Hilton - Wilkes-Barre	872 Schechter Dr	Wilkes-Barre	Luzerne
Electric	•	•	Best Western Inn at Blakeslee-Pocono	107 Parkside Ave	Blakeslee	Monroe
Electric	•		Holiday Inn Exp - Stroudsburg	1863 W Main St	Stroudsburg	Monroe
LPG	•	•	Eddinger Propane	1619 Route 100	Bally	Berks
LPG	•	•	U-Haul	1647 N 5th St	Reading	Berks
LPG	•	•	U-Haul	2398 Lancaster Pike	Shillington	Berks
LPG	•	•	U-Haul	1440 Cumberland St	Lebanon	Lebanon
LPG	•	•	U-Haul	1428 E Livingston St	Allentown	Lehigh
LPG	•	•	U-Haul	714 Wyoming Ave	Kingston	Luzerne
LPG	•	•	U-Haul	231 Mundy St	Wilkes-Barre	Luzerne
LPG	•	•	Modern Gas Sales Inc	PA 715 & Possinger Rd	Reeders	Monroe
LPG	•	•	U-Haul	2413 Nazareth Rd	Easton	Northampton
LPG	•	•	Combined Energy Services	1483 Route 739	Dingmans Ferry	Pike

Source: US Department of Energy Alternative Fuels Data Center, April 2024

Note: Medium Duty trucks are those in classes 3-5; Heavy Duty trucks are those in classes 6-8

Figure 25: Alternative Fuel and Electric Charging Stations in the EPFA Region, by Fuel Type (as of summer 2024)



4.2 Land Development Trends

Industrial real estate users have experienced growth and an expansion of existing uses with improved technologies and features over the past decade. One of the most consistent themes is the need for more space that benefits e-commerce uses. During the pandemic, online shopping increased and companies saw a need to expand distribution center investment.[31] The main company that is driving competition is Amazon, whose Amazon Prime subscription service has created an environment where consumers expect faster deliveries for an expanded inventory of goods. This has led companies like Target to invest $100 million to expand e-commerce services to keep up with faster delivery times.[32] [33] Globally, online shopping is expected to increase by over $1 trillion by 2025, with China and the US accounting for 55% of growth.[34]

The e-commerce delivery system has multiple steps, each occurring at different real estate properties. Once an order is placed, packages first generally go to a fulfillment center, where they are then transported to distribution centers by third-party delivery services or company-owned delivery services. The final stop in the e-commerce system is the last-mile facility, after which deliveries are made from last-mile centers to consumers.

With public increases in e-commerce spending, industrial real estate demand has also increased for several types of manufacturing, storage, and distribution centers. The advancement of technology has resulted in a need for more facilities with less square footage and higher ceilings – as noted in Section 4.2.2. The types of facilities in demand are high-cube storage, multi-story warehousing, and last-mile delivery centers, all of which contribute to improving e-commerce delivery time.

This section describes specific categories of in-demand industrial real estate - multistory warehouses, high cube storage, and last-mile delivery centers. These are all ideally connected by a robust multimodal transportation network, combining air, rail, road, and sea to move goods from point A to point B. Most of the goods that come from the multistory warehouse, logistics, or other distribution centers are transported by multimodal transportation to last-mile centers. One of the benefits of multimodal transportation is the connectivity it brings to various aspects of the e-commerce delivery process. E-commerce facility developers typically look at locations that are proximate to major highways and interchanges for easier transport to end consumers.

4.2.1 Growing Industrial Real Estate Typologies

Multistory warehouses, high-cube storage facilities, and last-mile centers are all connected in the e-commerce process but are different in terms of what they provide:

Multistory warehouses are warehouses that are used for the storage of larger products that are transported to distribution centers or last-mile centers.

High cube storage facilities are similar to a multistory warehouse but stores smaller products for a shorter time than multistory warehouses.

Last-mile delivery centers are the final step in the e-commerce chain.

[31] https://www.census.gov/retail/ecommerce.html
[32] https://corporate.target.com/news-features/article/2023/02/sortation-centers
[33] https://prologis.getbynder.com/m/39fa97cd170a97a8/original/Prologis-Special-Report-Demand-Drivers-September-2023.pdf
[34] https://www.forbes.com/sites/michelleevans1/2021/03/25/global-e-commerce-market-to-expand-by-us1-trillion-by-2025/?sh=2069a93f6cc0

Multistory warehouses are traditional warehouses with smaller footprints. Often, they are developed in areas where available land is less available, so developers build taller warehouses. These warehouses allow for efficient work, with advanced technologies to streamline productivity. Since these warehouses are often newer development projects, they have modern requirements like multi-floor docks for trucks to reload and offload, parking available for electric vehicle charging, and vertical clearances are generally a minimum of 28 feet. Multistory warehouses are often more prevalent in urban markets to help meet the demands of e-commerce growth in dense areas.[35] Although multistory warehouses were built as an alternative to warehouses in areas with limited land space, some areas face challenges with zoning laws limiting the construction of taller industrial buildings. Interestingly, Amazon occupies 92% or 75 million square feet of warehouses with three or more floors and class-A properties.[36]

Another development typology that has become more popular during a time when retailers want to get consumer products faster is the high-cube storage facility. High cube storage is used to store goods for local retailers and smaller warehouses. These buildings tend to be large buildings with a minimum floor area of 200,000 square feet and a minimum ceiling height of 24 feet.[37] They are larger than other warehouses and can be easily automated for robots to do the job that people will normally do.[38] However, with automated systems, efficiency can increase, and moving goods out of the warehouse for truck pick-up can be done faster.[39]

One of the most important types of facilities in e-commerce are last-mile delivery centers. Last-mile centers are distribution centers built as the final destination in the e-commerce chain and help with deliveries to brick-and-mortar businesses and homes. Last-mile facilities are usually located outside of urban areas but close to population centers and the end consumer to allow for faster delivery times. One benefit of having last-mile centers near urban areas is the number of jobs that are created from the increasing volume of orders received from online shopping. Last-mile facilities tend to be smaller than general distribution centers, typically under 100,000 SF, but have more loading doors and large spaces outside of the building for trucks to load and unload.[40]

4.2.2 Land Development Case Studies

With the rapid expansion of e-commerce demand, new industrial development is occurring across the country and notably, within the EPFA region. Three case studies within the EPFA region illustrate the variety of these new developments, including a transportation infrastructure project and its linked e-commerce expansion project.

4.2.2.1 PA 33 Interchange Project – Nazareth Area, PA

The Charles Chrin Interchange is located on PA 33 between Interstates 78 and 80 in Palmer Township, Northampton County. The $40 million dollar project mitigated traffic congestion and stimulated significant economic growth for area employers (as described within the subsequent case study). Construction started in November 2013 and the interchange opened in July 2015. The project connects municipalities in Northampton County from Palmer, Lower Nazareth,

[35] https://www.marineinsight.com/maritime-law/multi-storey-warehousing/
[36] https://www.globest.com/2024/01/16/more-multistory-industrial-buildings-are-coming-what-will-that-mean/#:~:text=Amazon%20dominates%20the%20space.,locations%20near%20dense%20population%20centers
[37] https://www.suffolkva.us/DocumentCenter/View/757/High-Cube-Warehousing-and-Distribution-Center-Trip-Generation-PDF
[38] https://theclick.news/jaindl-warehouses-white-township-new-jersey-debate/
[39] https://www.lehighvalleylive.com/news/2021/08/whats-a-high-cube-warehouse-lehigh-valley-residents-will-find-out-soon.html
[40] https://www.cbre.co.uk/insights/articles/last-mile-urban-logistics-what-is-it

Upper Nazareth, and Forks townships.[41] As with any development of this scale, the dispersion of traffic (motor vehicle and truck) associated with many of the developments in this area remains a challenge for several communities.

A substantial portion of the project cost was dedicated to the replacement of a structurally deficient bridge before the interchange on Main Street near PA 33. The project also widened Main Street and included site improvements including storm water management systems, utility pole relocations, and highway lighting. It also provided for improved bicycle, pedestrian, and public transportation access.

A development agreement between the land owner and the Northampton County Industrial Development Authority, which provides nonprofit and manufacturing companies access to tax-exempt financing, set out responsibilities for payment of the infrastructure improvements: approximately $13.6 million of improvements paid for by the developer and $27.4 million in public improvements, including the interchange design, acquisition, and construction, the widening of Main Street, and replacement of the existing bridge over Main Street. The public improvements were financed in part by bonds issued against a tax increment levied on the properties within the improvement district (Route 33 Neighborhood Improvement District) where the development is taking place. An agreement between the Authority and the relevant taxing bodies (Northampton County, Palmer Township, and the Easton Area School District) allows the use of the tax increment to repay the bonds.[42]

The Interchange facilitates access to the surrounding 628-acre site with a single owner, Charles Chrin Companies (Chrin). Chrin is developing the site as the Chrin Commerce Centre, a mixed-use development with industrial, distribution, office, and retail components, with individual parcels being sold to third-party developers. Upon completion of the interchange, Chrin donated approximately 23 acres to PennDOT for the interchange right-of-way.

4.2.2.2 Chrin Commerce Centre and Logistics Park 33 – Palmer Township/Nazareth Area, PA

In conjunction with the interchange improvement project detailed in the previous case study, Charles Chrin Companies is developing the Chrin Commerce Centre, which offers retail, office, and industrial lots. Located adjacent to PA 33 in the Lehigh Valley, the 800-acre property is a short drive to I-78 and I-80. This strategic location is a principal factor in attracting high visibility projects, which now include Amazon, Mondelez, Porsche, FedEx and others.

Logistics Park 33 is a separate complex located in close proximity to the Chrin Commerce Centre. It is an industrial area that features three distribution center buildings ranging between 630,000 and more than 1,100,000 square feet. The first building was opened in 2016 and is the largest (1,106,442 SF), currently occupied by Amazon. Amazon currently employs approximately 3,400 people and uses this location to help ship to other smaller locations.[43] The second building, opened in 2017, is the smallest (630,000 SF) and is occupied by XPO Logistics, a provider of asset-based LTL (less than truckload) freight transportation in North America. The third building, opened in 2018, is more than 1,000,000 SF and is currently occupied by UPS, who currently employ approximately 900 people at this site, including both full-time and part-time employees.[44].

[41] http://www.chrincommercecentre.com/rt33.html
[42] https://www.fhwa.dot.gov/ipd/project_profiles/pa_route33interchange.aspx
[43] https://www.lehighvalleylive.com/news/2020/08/massive-amazon-warehouse-targeted-for-site-off-i-78-near-lehigh-valley.html
[44] https://www.lehighvalleylive.com/easton/2018/07/is_ups_moving_to_palmer_townsh.html

Figure 26: Charles Chrin Interchange and Chrin Commerce Center

Source: Palmer Township, Chrin Commerce Centre, and CoStar

4.2.2.3 3100 State Drive – Lebanon, PA

3100 State Drive is a manufacturing, warehouse, and distribution facility located in South Lebanon Township, Lebanon County. 3100 State Drive includes approximately 970,000 SF of development located on a 65 acre parcel. Property development started in 2021 and was completed in 2022. The property includes a one story building with 40-foot clear heights and four drive-in ramps. The site was developed by DHL Supply Chain to be used as a Life Sciences and Healthcare facility, part of DHL's $400 million plan to grow its pharmaceutical and medical devices distribution network across the United States.[45] In 2022, DHL sold the site to CBRE Investment Management for $167 million[46] but continues to occupy their space as a tenant. Within this facility, DHL is expected to create at least 200 jobs in Lebanon County.

In addition to DHL, Menasha Packaging is a tenant at 3100 State Drive, with each tenant occupying approxiamtely 485,000 SF. Menasha Packaging is a packaging company for high-end packages, focused on unique displays, point-of-sale materials, and other services.[47]

Figure 27: 3100 State Drive Development

Source: CoStar

[45] https://www.dhl.com/us-en/home/press/press-archive/2022/dhl-supply-chain-investing-400-million-to-grow-its-u-s-pharmaceutical-and-medical-device-distribution-network.html
[46] https://www.eastdilsecured.com/wp-content/uploads/2023/01/rea013123.pdf
[47] https://www.menashacorporation.com/

4.3 Transportation and Climate Initiative

The Transportation and Climate Initiative (TCI) of the Northeast and Mid-Atlantic States is an agreement among 13 states in the eastern US to research and commit to policies to reduce the region's greenhouse gas (GHG) emissions in order to avoid the worst effects of climate change. Participating states include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, and Virginia, as well as the District of Columbia.[48]

The TCI Program (TCI-P) is a first-of-its-kind multi-jurisdictional program to reduce carbon emissions from cars, trucks, and other on-road motor vehicles and increase investments in an equitable, cleaner, and more resilient transportation system. TCI-P will "cap" or limit carbon dioxide (CO2) emissions from gasoline and on-road diesel fuel and require fuel suppliers to purchase "allowances" for the amount of carbon emissions produced by fuel covered under the cap. Each jurisdiction will invest the proceeds from allowance auctions into cleaner, more resilient transportation projects and programs to further reduce emissions and provide communities, workers, and businesses with equitable, clean, safe, and affordable low-carbon transportation choices. Connecticut, Massachusetts, Rhode Island, and the District of Columbia were the first jurisdictions to sign a Memorandum of Understanding (MOU) committing to work toward implementing TCI-P in 2020. Other TCI jurisdictions, including Pennsylvania, are participating actively in developing the program and have the opportunity to join the TCI-P at any time in the future. If all of the TCI jurisdictions eventually choose to participate in TCI-P, the total proceeds available for investment could exceed $2 billion annually, and the program could reduce total CO2 emissions by 5 million metric tons in 2032.[49]

4.4 Multi-State Zero-Emission Vehicles Task Force

In 2013, a group of states signed a memorandum of understanding (MOU) to form a Zero-Emission Vehicles (ZEV) Program Implementation Task Force. Today, 17 states, including Pennsylvania, the District of Columbia, and the Canadian province of Quebec, participate in the Task Force. The Northeast States for Coordinated Air Use Management (NESCAUM) administers the Task Force and works with member states to publish periodic Action Plans (most recently in 2022) recommending the implementation of national and global best practices for encouraging the adoption of zero-emission passenger cars. These best practices, including investments in public and multi-user charging infrastructure such as at retail and workplace locations, utility programs and rate designs specific to electric vehicle (EV) users, increasing consumer awareness, and adopting public fleet ZEV procurement requirements.[50]

In 2022, the ZEV Task Force produced the Multi-State Medium- and Heavy-Duty ZEV Action Plan. Participating jurisdictions committed to strive to make at least 30 percent of sales of new medium/heavy-duty vehicles ZEVs by 2030, and 100 percent of sales ZEVs by no later than 2050. Strategies listed in the Action Plan could help to accelerate that timeline. Recommended strategies include:

- Setting ZEV sales and purchase requirements modeled after similar requirements enacted in California;

[48] https://www.transportationandclimate.org/content/about-us.
[49] https://www.transportationandclimate.org/TCIP-FAQ
[50] https://www-f.nescaum.org/documents/multi-state-medium-and-heavy-duty-zero-emission-vehicle-action-plan/

- Offering incentives to help medium- and heavy-duty fleets to purchase ZEVs;
- Managing and expanding the capacity of the electric grid and utility companies to provide energy to support electric vehicle charging for medium- and heavy-duty vehicles;
- Mobilizing private sector capital to invest in fleet conversions to ZEVs;
- Expanding outreach and education opportunities;
- Ensuring economic equity in the energy workforce;
- Monitoring community air quality;
- Systematically planning for and deploying electric charging infrastructure at a corridor level; and
- Continuing a program of ongoing multi-state research and policy evaluation.[51]

4.4.1 State Framework and Incentives

In 2019, Executive Order 2019-01 set ambitious goals for Pennsylvania's state agencies to replace 25% of their passenger car fleets with PEVs by 2025 and make evaluations about fleet composition to reduce vehicle miles traveled. This executive order also required the Governor's Green Government Council to help oversee the actions and procedures required of state agencies. Pennsylvania, as such, is embracing electrification in the near-term future with the goal of reducing emissions and energy usage (PA Executive Order 2019-01, 2019).

Driving Pennsylvania Forward offers competitive reimbursement grants for heavy-duty trucks and transit buses, for both replacements and repowers. In addition, the program offers competitive grants for EVSE and hydrogen fuel cell infrastructure along transportation corridors, at destination locations, and at community charging/fueling hub locations (Driving Pennsylvania Forward, n.d.). The Alternative Fuels Incentive Grant (AFIG) Program offers grants for various relevant causes. One of these, which closed to new applications in March 2020, was the Pennsylvania FAST Act Corridor Infrastructure Grant, which sought to reimburse the installation of public electric, hydrogen, propane, and CNG fueling infrastructure along "Signage Ready" and "Signage Pending" highway corridors. Municipal authorities, political subdivisions, non-profits, corporations, and limited-liability companies or partnerships all qualify for the application (PA DEP AFIG Program, n.d.). AFIG also offers grants aimed at incentivizing the expansion of AFV technology usage for those same entities. Finally, the Alternative and Clean Energy (ACE) Program, sponsored by the Pennsylvania Department of Community and Economic Development (DCED), provides both grants and loans to applicants involved in the utilization, development, and construction of compressed and liquefied natural gas fueling stations (DCED, n.d.).

In addition to setting benchmarks for electrification success for state agencies, Pennsylvania administers and offers various financial incentive programs intended to facilitate the transition to cleaner vehicles, including medium/heavy-duty vehicles. One such example is the Driving Pennsylvania Forward program, sponsored by the Pennsylvania Department of Environmental Protection (DEP) funded by the state's portion of the settlement from the Volkswagen Environmental Mitigation Trust (Driving Pennsylvania Forward, n.d.). This program includes rebates for medium/heavy-duty vehicle replacement or repower projects using all-electric, alternative fuel (natural gas, propane, or hydrogen), or cleaner diesel technologies, and includes a scrappage requirement. In addition to the rebates for vehicle replacement, the program also

[51] https://www.nescaum.org/documents/multi-state-medium-and-heavy-duty-zev-action-plan-dual-page.pdf

offers rebates for the purchase, installation, operation, and maintenance of electric vehicle supply equipment (Level 2) for publicly accessible government- or privately-owned land, workplaces, or private multi-unit dwellings. Other opportunities include Pennsylvania's Alternative Fuel Vehicle Rebate Program, which reduces the incremental cost of such vehicles for eligible state residents. This program includes an additional rebate if the recipient qualifies as low-income.[52]

4.4.2 Challenges

Transitioning medium- and heavy-duty vehicle fleets from diesel to electric or other ZEV technology would have a substantial impact on the greenhouse gas emissions attributable to goods movement. Some vehicle manufacturers have developed, tested, and are manufacturing medium- and heavy-duty vehicles that are powered using electric batteries. Municipal vehicle fleets, such as school buses, waste collection trucks, etc., are among the fleets being targeted for transition at the moment. The fact that these fleets are mostly under public control (or public contract), and travel relatively short distances in a localized area means that so long as the home garage is equipped with charging infrastructure, those vehicles can have their batteries replenished while they are not in use.

For heavy-duty trucks, many of which travel long distances, the challenges are a bit more complex.

- There is little electric fast-charging infrastructure available along highway corridors that trucks travel along, and most utilities do not have the capacity to provide the power needed to charge large volumes of heavy-duty vehicles. In order to transition heavy-duty fleets that travel long distances, fast-charging stations would have to be nearly as common as diesel fueling stations along major highway corridors.
- There are few manufacturers building electric trucks, the production lead times are long, and the costs are substantial. Further, state and federal incentives are insufficient, from the perspective of the industry, and do not offset the higher costs of acquiring, operating, and maintaining heavy-duty electric vehicles.
- Related to cost, it is unlikely that smaller trucking companies and owner-operators could purchase electric vehicles as readily as large fleets could, thus introducing industry equity considerations.
- The weight of a battery cuts into the payload a truck can carry. even with the 2,000 pound allowance provided by the FAST Act. This brings safety and roadway wear-and-tear impact considerations to the fore.

These challenges are why heavy-duty freight vehicles are likely to transition to electric at a much slower rate than personal automobiles in the US. Some motor carriers suggest that hydrogen fuel cells may be a more practical solution from the industry's perspective.[53] However, there are challenges to overcome before hydrogen fuel cell trucks are produced on a large scale, and the development of fueling station capacity would be necessary to support long-distance trips.

[52] https://www.dep.pa.gov/Citizens/GrantsLoansRebates/Alternative-Fuels-Incentive-Grant/pages/alternative-fuel-vehicles.aspx
[53] https://www.catf.us/2023/03/why-the-future-of-long-haul-heavy-trucking-probably-includes-a-lot-of-hydrogen/ ; https://www.nrel.gov/news/program/2022/fast-flow-future-heavy-duty-hydrogen-trucks.html

Also important to note, while electrification would help to significantly reduce the greenhouse gas emissions attributable to goods movement, trucks produce particulate matter emissions from brake dust and tire wear that can have impacts on human health, particularly in communities adjacent to routes with high volumes of truck traffic. Strategies to reduce non-exhaust particulate emissions include manufacturing practices, such as equipping electric trucks with regenerative braking or using aluminum disc brake coatings. Also, safety strategies such as infrastructure improvements and driver training to promote safer driving behaviors can reduce instances of hard-braking and the associated non-exhaust emissions.

Figure 28: Heavy-Duty Electric Charging Station in Portland, OR

Source: Daimler Trucks North America

4.4.3 Opportunities

Despite the challenges associated with widespread fleet transitions to electric vehicles, there are opportunities for public agencies to take supportive policy and investment actions. The Multi-State Task Force Action Plan includes several public policy and incentive recommendations that could lower some of the hurdles fleets face when considering investments in electric and non-diesel fueled trucks.

Electric and alternative fuel trucks will need to be supported by a robust network of charging and fueling stations—far more robust than the patchwork of fueling and charging stations shown in Figure 6—in order to facilitate a widespread transition in the composition of trucking fleets. Within the EPFA Study Area, investments should be prioritized along the Interstate highway corridors due to the signage-ready and signage-pending status of several of these corridors and the volume of freight traffic moving along those corridors—I-80, I-78, and I-81, in particular.

While some existing truck stops and diesel fueling stations may be able to invest in and provide charging capacity for medium- and heavy-duty vehicles, there may be utility capacity or other issues that would lead to a need for new publicly-owned or privately-owned charging facilities to be developed. Local governments could help to facilitate the development of charging infrastructure by assessing and adjusting, if necessary, land use regulations in order to promote (or at least not prohibit) the development of such facilities near interstate highway interchanges.

The Multi-State ZEV Task Force, which is facilitated by NESCAUM, in the Action Plan developed in 2022, included several policy recommendations for local and regional governments to facilitate the transition to zero-emission trucks and buses. Within the EPFA region, municipal, county, and metropolitan regional agencies could consider:

- Incorporating the charging and refueling needs of zero-emissions heavy-duty vehicles in their transportation, climate, and/or energy plans, as appropriate;
- Establishing non-monetary incentives, such as off-peak delivery hours for zero-emission trucks or giving priority or exclusive access to curbside loading zones, and monetary incentives, such as rebates or fee exemptions or discounts;
- Offering property tax credits to incentivize businesses without fleets to install charging infrastructure for trucks that serve their businesses;
- Establishing near-term and long-term targets and plans for electrifying municipal and transit fleets; take immediate steps to make progress toward targets.
- Amending land use regulations and/or building codes to minimize the administrative burdens for charging infrastructure planning, permitting, and construction. Guidance documents and fact sheets on relevant ordinances and application processes could also be part of this recommendation;
- Coordinating with utilities, charging providers, and states to plan for public medium/heavy duty vehicle charging facilities for small fleets and independent owner/operators and to identify opportunities to site stations at publicly- and privately-owned parking lots and other properties located along commercial truck routes and at convenient overnight parking locations.

The Action Plan also listed several recommended actions for the Federal Government, including tax incentives, funding programs, and guidance for and coordination with state and local governments.

5 Regional Action Plan

SUMMARY OF RECOMMENDATIONS

SHARED VISION AND GOALS

INFRASTRUCTURE RECOMMENDATIONS

POLICY RECOMMENDATIONS

IMPLEMENTATION OF RECOMMENDATIONS

Freight, goods movement, and trucks are visible elements of daily life in the EPFA region, not only serving the needs of local and regional residents, but consumers throughout the northeastern United States and beyond. The region's geographic location uniquely positions it as a critical link in the regional and national freight network, strengthening the region's importance as a hub of freight-focused employment. Continued regional growth in the freight and goods movement sector creates challenges for infrastructure, land use, and the safety of all roadway users. This section of the plan outlines actions that, when implemented incrementally, will allow for local or regional investments that address existing challenges and the adoption of policies that will better plan for future challenges.

5.1 Summary of Recommendations

The Regional Action Plan is focused on two elements:

> **Infrastructure** recommendations are physical locations in need of improvements or further study that have been identified based on input from the analysis of the Regional Freight Profile companion document, Stakeholder Input (Section 2.2), and results of the Public Survey (Section 2.3).
>
> **Policy** recommendations are local or regional policy guidelines identified based on input received from Agency Partners and Stakeholders, as well as those that reflect current regional or statewide planning best practices.

For each recommended infrastructure or policy improvement, key stakeholder agencies have been identified. These agencies should be considered as the potential lead agency or agencies for each potential effort; additional agency partners should be considered to support the advancement of any recommendation.

Prioritizing the actions outlined in this section and assigning sponsor agencies to high-priority actions are key next steps to enable the Alliance to match high-priority actions to the appropriate funding sources and begin inter-agency conversations and coordination. More sources of funding are available than before: the IIJA, passed in 2021, replaced the FAST Act and reauthorized Federal surface transportation programs through 2026. The IIJA is not limited to transportation needs, but addresses a variety of infrastructure needs as well, authorizing $550 billion in new funding in addition to the $650 billion in current funding programs. There are three types of programs funding freight-centric projects in the IIJA:

- Authorization of existing programs with freight eligibility
- Authorization of previously appropriated discretionary grant programs
- New freight-related funding program

Ultimately, this Plan provides EPFA members with access to freight-specific federal funding opportunities, enhancing the ability for those members to seek and acquire competitive grant resources.

5.2 Shared Vision and Goals

The EPFA region is comprised of independent regional planning agencies with individually adopted visions, goals, and/or strategic directions. Nearly all of the statewide transportation goals (shown in Table 7) are mirrored in EFPA member LRTP goals, with the exception of

funding, which is primarily a statewide responsibility. Additionally, each MPO has individually specific goals identified in their current LRTPs, which address issues of specific interest, as identified in Table 8.

Table 7: Alignment of EPFA Member Freight Goals – Statewide Goals

MPO	Safety	Mobility - People	Equity	Resilience	Performance	Resources/ Funding
LVTS	•	•	•	•	•	
NEPA	•	•	•	•	•	
RATS	•	•	•	•	•	
Lackawanna & Luzerne	•	•		•	•	
Lebanon	•	•	•	•	•	•

Source: WSP

Table 8: Alignment of EPFA Member Freight Goals – MPO-Specific Goals

MPO	Freight Mobility	Economic Growth/ Development	Growth Management	Land Use & Environment	Transit/ Multimodal	Highway/ Bridge	Travel & Tourism	Bicycle - Pedestrian
LVTS	•	•	•	•	•	•		•
NEPA	•	•			•	•	•	•
RATS	•	•		•	•		•	
Lackawanna & Luzerne	•			•	•	•		•
Lebanon	•	•	•	•				

Source: WSP

Should EPFA members elect to move forward on freight issues in a collaborative and structured way, it will be useful for them to be guided by a common set of goals. Based on current goals, such a framework could address:

- **Safety (S)**
- **Multi-Modal Mobility of Goods and People (MMM)**
- **System Condition and Performance (C&P)**
- **Resiliency and Environment (R&E)**
- **Economic Development and Growth Management (ED &GM)**
- **Community and Equity (C&E)**

While the language of specific goals will need to be determined collaboratively by EPFA members, this framework should capture and organize the most important considerations. This framework can also be used as a way to characterize potential benefits of recommendations developed in this plan, in terms of how each recommendation advances one or more goal areas.

Further discussion of how these goals align with the Plan's policy recommendations are included in Section 5.2.1

5.2.1 Linking Policy Recommendations with EPFA Goals

Each of the recommendations identified in the following sections can be linked with at least one (and in many cases, several) of the goals outlined in Section 5.2.

Table 9 summarizes how each **infrastructure** recommendation, detailed further in Section 5.3, addresses these goal framework areas. While each recommended location or corridor will require additional study to determine specific needs, focus improvement areas for each have been identified.

Similarly, Table 10 summarizes how each **policy** recommendation, detailed in Section 5.4, addresses these goal framework areas. Key goal areas for each EPFA member and the EPFA as a whole can be identified to prioritize the incremental implementation of specific recommendations.

Table 9: Alignment of Infrastructure Recommendations with EPFA Goal Framework Areas

		How Identified			Goal Framework Area Addressed					
Location	County	Data	Stakeholders	Survey	S	MMM	C&P	R&E	ED & GM	C & E
I 78/PA 61	Berks	•	•	•	•					
US 222 at PA 73	Berks	•	•	•	•					
US 222/PA 662	Berks	•	•	•	•					
U.S. 222 (Allentown Pike), US 222 BUS to PA 73	Berks	•	•	•	•	•				
U.S. 222 (Kutztown Road), PA 73 to PA 662	Berks	•	•	•	•	•				
I 78/PA 100	Lehigh	•	•	•	•	•	•			
PA-100, At US 222	Lehigh	•	•	•	•	•	•			
PA-100, US 222 to Penn Drive	Lehigh	•	•	•	•	•	•			
Downtown Reading	Berks	•	•		•		•	•		•
PA 12 near US 222/ PA 183 and PA 61	Berks	•	•		•					
US 422 at PA 662	Berks	•	•		•					

Location	County	How Identified			Goal Framework Area Addressed					
		Data	Stakeholders	Survey	S	MMM	C&P	R&E	ED & GM	C & E
US 422 at US 222	Berks	•	•		•					
US-222-BR,at US 422 Interchange	Berks	•	•		•	•	•			
US 422 BR (Lancaster Ave), PA 625 to US 422	Berks	•	•			•	•			
US 422 at PA 724	Berks	•	•		•					
US 422 at US 422 Bus/US 222 Bus	Berks	•	•		•	•	•			
US 422 BR (S 4th St), US 422 to Pine Street	Berks	•	•			•				
Airport Road, City Line Road to US 22	Lehigh	•	•			•	•			
US 22 at PA 378/ Schoenersville Road (PA 1009)	Lehigh, Northampton	•	•		•	•	•			
I 81/PA 315	Luzerne	•	•		•		•			
PA-315 N,I-81 to I-476	Luzerne	•	•				•			
I 80 near PA 611	Monroe	•	•		•		•			
I 80 between PA 191 and Prospect Street (PA 2017)	Monroe	•	•		•					
US 22/PA 191	Northampton	•	•		•					
PA 443 near PA 61 North Manheim, Schuylkill Haven	Schuylkill	•	•		•					
I-81 near PA 61 Ryan	Schuylkill	•	•		•	•				
I 78 from PA 309 to US 222	Lehigh	•		•	•	•				•
US 222 at Krocks Road and US 222 at I-476	Lehigh	•		•	•		•			•
I-78 E, At PA 309 Interchange	Lehigh	•		•	•	•				•
US 222/PA 863	Lehigh	•		•	•					•
US 222 (Allentown Pike) at US 222 BUS Interchange	Berks	•		•	•					•
US 22/PA 33	Northampton	•		•	•					•
Route 100 at Spring Creek Road	Lehigh		•	•	•					•
Old U.S. 22 at Route 419	Berks		•	•	•					•

Table 10: Alignment of Policy Recommendations with EPFA Goal Framework Areas

Action Area	Recommendation	Goal Framework Area Addressed					
		S	MMM	C&P	R&E	ED & GM	C & E
Regional Coordination	Develop EPFA common goals and objectives.	•	•	•	•	•	•
	Standardize formal meetings of the EPFA to advance outcomes of the Plan and support future needs associated with freight development.	•	•	•	•	•	•
	Proactively track approved or proposed freight or logistics-focused developments to identify roadway connections that may need future investments.	•	•	•		•	•
	Track AADTT annually to identify locations where growth in truck use may warrant a focused study or analysis	•	•	•	•	•	•
	Track industrial real estate market trends to identify new and emerging industrial clusters, types of facilities being developed, etc.	•	•	•	•	•	•
	Develop a work program of studies, data, and other services that require investments from the Alliance members, the State, Federal funding and grants, etc.	•	•	•	•	•	•
Land Use	Develop regional land use guidance document for EPFA member municipalities, including best practices guidance - especially in rural agricultural areas susceptible to change				•	•	•
	Develop public information materials (documents, videos, etc.) to educate the public, elected officials, etc. on land use trends, impacts of certain development types in response to or anticipation of public concerns. Leverage TRB guidance and other existing materials as much as possible.				•	•	•
	Perform an assessment of developable land, identifying potential conflicts, more/less desirable areas to focus development, etc.					•	•
	Advance development of regional zoning guidance for industrial and warehousing uses.					•	•
	Consider opportunities for multi-jurisdictional land use planning, focused on industrial or warehousing uses.					•	•
	Advance development of regional zoning language that support truck parking on-site at industrial, distribution, or warehouse sites.					•	•
	Advance County Airport study to identify potential market for cargo or to support regional truck parking.		•			•	
Road Design & Maintenance	Focus on improving winter maintenance along key truck routes (Berks).	•	•	•			
	Focus on improving winter maintenance along key truck routes (Schuylkill).	•	•	•			

Action Area	Recommendation	Goal Framework Area Addressed					
		S	MMM	C&P	R&E	ED & GM	C & E
	Develop resilient road design guidelines to avoid or mitigate flooding and other risks.	•	•		•		•
Truck Operations	Identify local or regional ordinances that allow for or support development of truck parking opportunities within the County.	•	•				•
	Advance local freight studies for urban areas identified as needing infrastructure improvements (Table 12), including Allentown, Reading, Scranton, and Lebanon	•	•	•			•
	Advance County-wide study to Identify locations that may support truck parking within Berks County.	•	•				•
	Advance regional Truck Route study.	•	•	•			•
	Develop Regional Routing Study focused on need for wayfinding signage to avoid bridge strikes, etc.	•	•				•
	Focus on development of truck parking opportunities located between PA 100 and PA 33.	•	•				•
	Anticipate the potential for new technologies (autonomous vehicles, AI routing, alternative delivery technologies) to change how trucks move to, from, through, and within the region. Assess readiness, opportunities to lead demonstration projects, etc.		•	•	•		
	Assess corridor-level demand for alternative fuels (e.g., hydrogen) and electric charging		•		•		•
Rail	Coordinate with passenger rail studies in Reading, Wilkes-Barre, Allentown		•				•
	Coordinate with upcoming State Rail Plan effort	•	•				•
	Work with existing rail operators and rail-served businesses to develop strategy aimed at limiting traffic impacts from stalled/idling trains.		•			•	•
	Support oversight of development of rail-served sites for customers that need rail access, limiting development of these sites for non-rail customers.		•			•	
	Perform a regional analysis of grade crossing safety	•	•				
Air Cargo	Continue the advancement of the NLCC to meet the growing demand for direct air cargo service in the region		•			•	
Freight Workplace Access	Identify underserved transit corridors and consider an expansion of service for major freight generating nodes		•				•

5.3 Infrastructure Recommendations

Infrastructure recommendations were developed from three sources: analyses conducted for the Regional Freight Profile companion document, stakeholder-identified concerns (Section 2.2), and public survey responses (Section 2.3). These inputs were integrated to develop a set of Priority Infrastructure Recommendations.

> Infrastructure improvement locations were generated from three elements: those identified through the data analyzed as part of the development of the regional freight profile, as well as those identified from stakeholder session feedback, or through the public survey.

5.3.1 Regional Freight Profile

Many infrastructure improvement locations have been identified based on a review of data included in the Regional Freight Profile companion document. The list of locations, shown in Table 12, includes those areas where one or more deficiencies was identified. Deficiencies include a history of crashes—particularly truck-involved crash hotspots that include fatalities and/or non-motorized users – identified truck bottlenecks, geometric constraints, substandard bridge conditions, or pavement condition.

A location with only a single deficiency could be a potential candidate for a project aimed at fixing the issue at hand. However, many intersections, interchanges, and highway segments in the EPFA region exhibit two or more of these deficiencies. Locations where multiple deficiencies exist should be elevated to a higher priority for project identification and development, especially if safety hotspots and/or congestion bottlenecks are compounded by other issues such as pavement or substandard bridge conditions. To identify locations where the greatest needs exist, the deficiencies were mapped and overlaid, with the resultant locations summarized below.

This analysis initially focused on the identification of locations where there are truck-involved crash hotspots and/or urban truck bottlenecks. These are locations where there are quantifiable human and economic costs. Next, a review of co-located infrastructure issues, such as geometric constraints, bridge conditions, pavement conditions, and/or other issues were noted and associated with the list of crash hot spots and bottlenecks.

A point system was created to prioritize highway segments and interchanges, associated with the presence of various deficiencies. Fatal crashes, being the least-desired outcome on the region's highways, were assigned the highest value in this evaluation. For each fatal crash involving truck(s) that occurred at an interchange, intersection, or highway segment, 3 points were assigned. Crashes involving a truck and non-motorized users were assigned a value of 1 point per occurrence, to a maximum of 2 points at any given location. Locations designated as a "truck crash hotspot" were assigned two points, unless the location included a fatal crash. In those cases, the fatal crash value was used in lieu of the hotspot point value. For all other issues and deficiencies, 1 point was awarded. A summary of the point values is provided in Table 11.

Table 11: Needs Assessment Deficiency Methodology

Issue/Observation	Points Assigned
Safety: Fatal crash involving a truck	3 points per occurrence
Safety: Crash involving truck and non-motorized user	1 point per occurrence, up to a maximum of 2 points
Safety: "Truck crash hotspot" but without fatalities or crashes involving non-motorized users	2 points, except where fatalities have occurred, in which case the points awarded for fatal crash(es) are assigned
Bottleneck: Urban truck bottleneck	1 point
Bridge Condition: Structure "needing replacement"	1 point
Bridge Geometry: Structure designated "basically intolerable"	1 point
Pavement condition: Facility designated as poor condition	1 point

The sum of the points assigned to each location produced a "Needs Assessment Score." Higher scores indicate potential priority locations where multiple issues or needs exist. Figure 29 illustrates the top 50 locations, based on Needs Assessment Score (listed in Table 12) throughout the EPFA region. Improvements at these locations should be prioritized based on the identified needs and importance for local or regional freight movement.

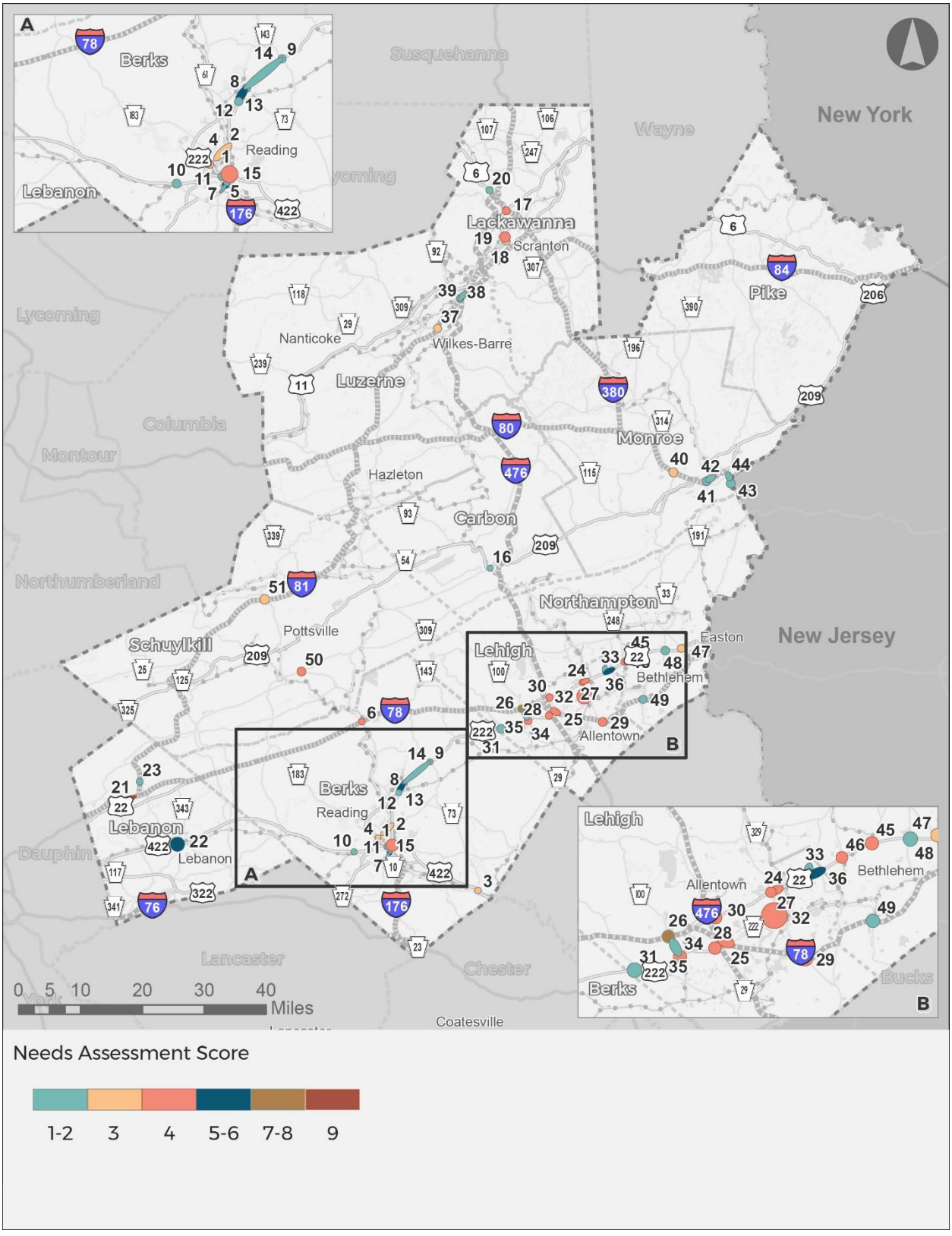
Table 12: Infrastructure Needs – Regional Freight Profile

Map ID	Location	County	Needs Assessment - Total Score	Safety	Bottleneck	Bridge Condition	Bridge Geometry	Pavement Condition	Stakeholder Agencies
21	I 78 near I -81	Lebanon	9	9					PennDOT D8-0, LEBCO
26	I 78/PA 100	Lehigh	8	4	2		1	1	PennDOT D5-0, LVTS
12	US 222 (Allentown Pike), US 222 BUS to PA 73	Berks	7	6	1				PennDOT D5-0, RATS
5	US 222-BUS at US 422 Interchange	Berks	6	3	1		1	1	PennDOT D5-0, RATS
22	Downtown Lebanon	Lebanon	6	6					LEBCO, City of Lebanon
36	US 22 at PA 378/Schoenersville Road (PA 1009)	Lehigh, Northampton	6	3	2		1		PennDOT D5-0, LVTS
1	Downtown Reading	Berks	5	3		1		1	RATS, PennDOT D5-0, City of Reading, Berks County Planning
6	I-78/PA 61	Berks	5	3	2				PennDOT D5-0, RATS
34	PA 100 at US 222	Lehigh	5	3	1			1	PennDOT D5-0, LVTS
45	US 22/PA 191	Northampton	5	3			1	1	PennDOT D5-0, LVTS
17	I 81/US 11/US 6B	Lackawanna	4	3			1		PennDOT D4-0, Lackawanna County
19	Downtown Scranton	Lackawanna	4	3			1		PennDOT D4-0, Lackawanna County, City of Scranton
24	US 22, vicinity of PA 145 and 15th Street (PA A021)	Lehigh	4	2	1		1		PennDOT D5-0, LVTS
25	I-78 from PA 309 to US 222	Lehigh	4	2	1		1		PennDOT D5-0, LVTS
27	US 22 WB, Fullerton Avenue to PA 145	Lehigh	4	2	1		1		PennDOT D5-0, LVTS
28	US 222 at Krocks Road and US 222 at I-78	Lehigh	4	3			1		PennDOT D5-0, LVTS
29	I-78 EB at PA 309 Interchange	Lehigh	4	3	1				PennDOT D5-0, LVTS
30	US 22/PA 309/Tilghman Street (PA 1002) area	Lehigh	4	4					PennDOT D5-0, LVTS
32	Downtown Allentown	Lehigh	4	4					LVTS, PennDOT D5-0, City of Allentown

Map ID	Location	County	Needs Assessment - Total Score	Safety	Bottleneck	Bridge Condition	Bridge Geometry	Pavement Condition	Stakeholder Agencies
46	US 22/PA 512	Northampton	4	3			1		PennDOT D5-0, LVTS
50	PA 443 near PA 61 North Manheim, Schuylkill Haven	Schuylkill	4	3				1	PennDOT D5-0, NEPA, Schuylkill County
2	PA 12 near US 222/PA 183 and PA 61	Berks	3	2			1		PennDOT D5-0, RATS
3	US 422 at PA 662	Berks	3	2			1		PennDOT D5-0, RATS
4	US 422 at US 222	Berks	3	2			1		PennDOT D5-0, RATS
18	US 11/PA 307/Keyser Ave (PA 3011)	Lackawanna	3	2			1		PennDOT D4-0, Lackawanna County
37	I -81/PA 309/PA 115	Luzerne	3	2			1		PennDOT D4-0, Luzerne County
40	I-80 W at PA 33 Interchange	Monroe	3	1	1		1		PennDOT D5-0, NEPA, Monroe County
47	US 22/PA 248	Northampton	3	2			1		PennDOT D5-0, LVTS
51	I-81 near PA 61 Ryan	Schuylkill	3	3					PennDOT D5-0, NEPA, Schuylkill County
7	US 222 BUS (Lancaster Ave), PA 625 to US 422	Berks	2		1		1		PennDOT D5-0, RATS
8	US 222 at PA 73	Berks	2	2					PennDOT D5-0, RATS
9	US 222/PA 662	Berks	2	2					PennDOT D5-0, RATS
10	US 422 at PA 724	Berks	2	2					PennDOT D5-0, RATS
11	US 422 at US 422 Bus and US 422 at US 222 Bus	Berks	2	2					PennDOT D5-0, RATS
16	PA 248 (State Rd) at US 209	Carbon	2		1			1	PennDOT D5-0, NEPA, Carbon County
20	US 6/Grove Street (PA 4026)	Lackawanna	2	2					PennDOT D4-0, LVTS
31	US 222/PA 863	Lehigh	2	2					PennDOT D5-0, LVTS
33	PA 987 (Airport Road), City Line Road to US 22	Lehigh	2		1			1	PennDOT D5-0, LVTS
35	PA 100, US 222 to Penn Drive	Lehigh	2		1			1	PennDOT D5-0, LVTS
38	I-81/PA 315	Luzerne	2	2					PennDOT D4-0, Luzerne County

Map ID	Location	County	Needs Assessment - Total Score	Safety	Bottleneck	Bridge Condition	Bridge Geometry	Pavement Condition	Stakeholder Agencies
41	I-80 near PA 611	Monroe	2	2					PennDOT D5-0, NEPA, Monroe County
42	I-80 between PA 191 and Prospect Street (PA 2017)	Monroe	2	2					PennDOT D5-0, NEPA, Monroe County
48	US 22/PA 33	Northampton	2	2					PennDOT D5-0, LVTS
13	US 222 (Allentown Pike), at US 222 BUS Interchange	Berks	1		1				PennDOT D5-0, RATS
14	US 222, PA 73 to PA 662	Berks	1		1				PennDOT D5-0, RATS
15	US 222 BUS - S 4TH St, Pine Street to Laurel Street	Berks	1		1				PennDOT D5-0, RATS, City of Reading
23	Fisher Ave at I-81 Interchange	Lebanon	1		1				PennDOT D8-0, LEBCO
39	PA-315 N, I-81 to I-476	Luzerne	1		1				PennDOT D4-0, Luzerne County
43	Del. Water Gap Toll Bridge, I-80 Bridge	Monroe	1		1				NEPA, Monroe County, DRJTBC
44	I-80 E, Approaching I-80 Bridge	Monroe	1		1				PennDOT D5-0, NEPA, Monroe County, DRJTBC
49	I-78 W at PA 412 Interchange	Northampton	1		1				PennDOT D5-0, LVTS

Figure 29: Infrastructure Needs – Regional Freight Profile



5.3.2 Stakeholder and Public Input

In addition to projects identified through the quantitative analyses summarized in the Regional Freight Profile (Section 5.3.1), numerous intersection or corridor locations were identified through stakeholder or public outreach, detailed in Section 2 and summarized in Figure 30 and Table 13 (stakeholder outreach) and Figure 31 and Table 14 (public survey). As noted in Section 2, the process to prioritize these improvements focused on locations that were consistently identified by multiple stakeholders or repeatedly through public survey responses.

Table 13: Infrastructure Needs – Stakeholder Outreach

Map ID	Agency	Location	Stakeholder Agencies	TIP Project?
1	Lackawanna/ Luzerne	Giants Despair - Navigation	Luzerne County	
9	Lackawanna/ Luzerne	I-81/I-476 Exit at PA 315	PennDOT D4-0, Luzerne County	
16	Lackawanna/ Luzerne	West Nanticoke Bridge - Load Posted but critical link	PennDOT D4-0, Luzerne County	
17	Lackawanna/ Luzerne	US 6 – Exit 3 - Jessup/Valley View facilities	PennDOT D4-0, Lackawanna County	
19	Lackawanna/ Luzerne	US 6 - Casey Highway - Exits 5 and 6	PennDOT D4-0, Lackawanna County	
20	Lackawanna/ Luzerne	Carbondale Road - onramp to I-81 south - needs acceleration lanes	PennDOT D4-0, Lackawanna County	
31	Lackawanna/ Luzerne	US 6 - Casey Highway - grades - Marshwood Road to Meredith Street	PennDOT D4-0, Lackawanna County	
35	LEBCO	PA 419, US 322 to US 422	LEBCO, RATS, PennDOT D5-0/D8-0	
10	LVTS	PA 309 - Walbert Avenue Intersection	PennDOT D5-0, LVTS	
11	LVTS	US 222 Bypass in Lower Macungie - Krocks Road	PennDOT D5-0, LVTS	
12	LVTS	PA 191 at US 22 Eastbound onramp	PennDOT D5-0, LVTS	•
13	LVTS	PA 29/PA 100 Intersection	PennDOT D5-0, LVTS	•
14	LVTS	Weaversville Road Improvements	PennDOT D5-0, LVTS, Allen Township, East Allen Township	
15	LVTS	Bethlehem Intermodal Terminal connections north	LVTS, City of Bethlehem, NS	
29	LVTS	PA 100 Corridor	PennDOT D5-0, LVTS	
30	LVTS	Airport Road - Union Blvd to Schoenersville Rd	PennDOT D5-0, LVTS	
2	NEPA	PA 193/PA 901 Intersection - Minersville	PennDOT D5-0, Schuylkill County	

Map ID	Agency	Location	Stakeholder Agencies	TIP Project?
3	NEPA	PA 895/PA 443 Intersection	PennDOT D5-0, Schuylkill County	
4	NEPA	Cressona Railroad Bridge Clearance - PA 183	PennDOT D5-0, Schuylkill County, RBMN Railroad	
5	NEPA	Ramp Improvements: I-380 at PA 423	PennDOT D5-0, NEPA, Monroe County,	
6	NEPA	Mt Pocono Facilities – PA 940/PA 611 Access	PennDOT D5-0, NEPA, Monroe County	•
7	NEPA	I-80 Exit 308 - East Stroudsburg	PennDOT D5-0, NEPA, Monroe County	•
8	NEPA	Downtown congestion - East Stroudsburg	NEPA, Monroe County, E. Stroudsburg	
26	NEPA	PA 901 Truck Climbing Lanes - Shamokin to Cressona	PennDOT D5-0, Schuylkill County	
27	NEPA	PA 54 - Ashland to US 209	PennDOT D5-0, Schuylkill County	
28	NEPA	PA 309 - PA 54 to PA 443	PennDOT D5-0, Schuylkill County	
21	RATS	Stalled railroads blocking roadways in downtown Reading – Penn Street south to Chestnut Street	RATS, City of Reading	
22	RATS	US 222/US 422 Exit	PennDOT D5-0, RATS	•
23	RATS	I-78 Lenhartsville Exit (PA 143)	PennDOT D5-0, RATS	•
24	RATS	Stalled railroads at Petroleum Products block roadways	RATS, Sinking Spring Borough	
25	RATS	US 422 - Sunoco Logistics Center/Sinking Spring	PennDOT D5-0, RATS	
32	RATS	Congestion – US 422, west of I-176	PennDOT D5-0, RATS	•*
33	RATS	Congestion – PA 662, US 422 to US 222	PennDOT D5-0, RATS	
34	RATS	Congestion – PA 562, US 422 Business to PA 100	PennDOT D5-0, RATS	
36	RATS	PA 73, PA 61 to PA 100	PennDOT D5-0, RATS	
37	RATS	PA 61, I-81 to Reading	PennDOT D5-0, RATS, NEPA	

** - Note that the West Shore Bypass Reconstruction is an existing TIP project, but an additional section of US 422 (west to the Berks County Line) is not.*

Figure 30: Infrastructure Needs – Stakeholder Outreach

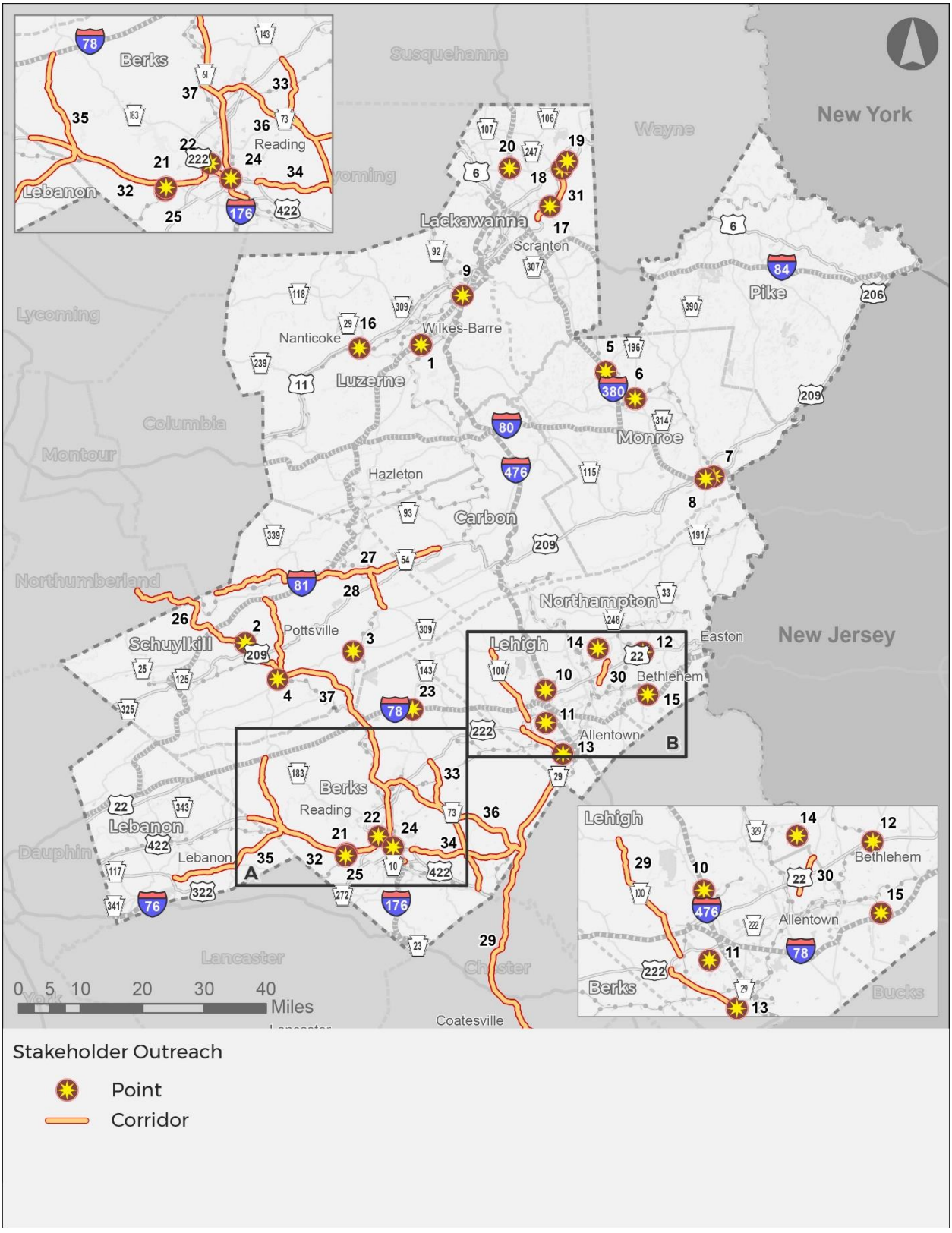
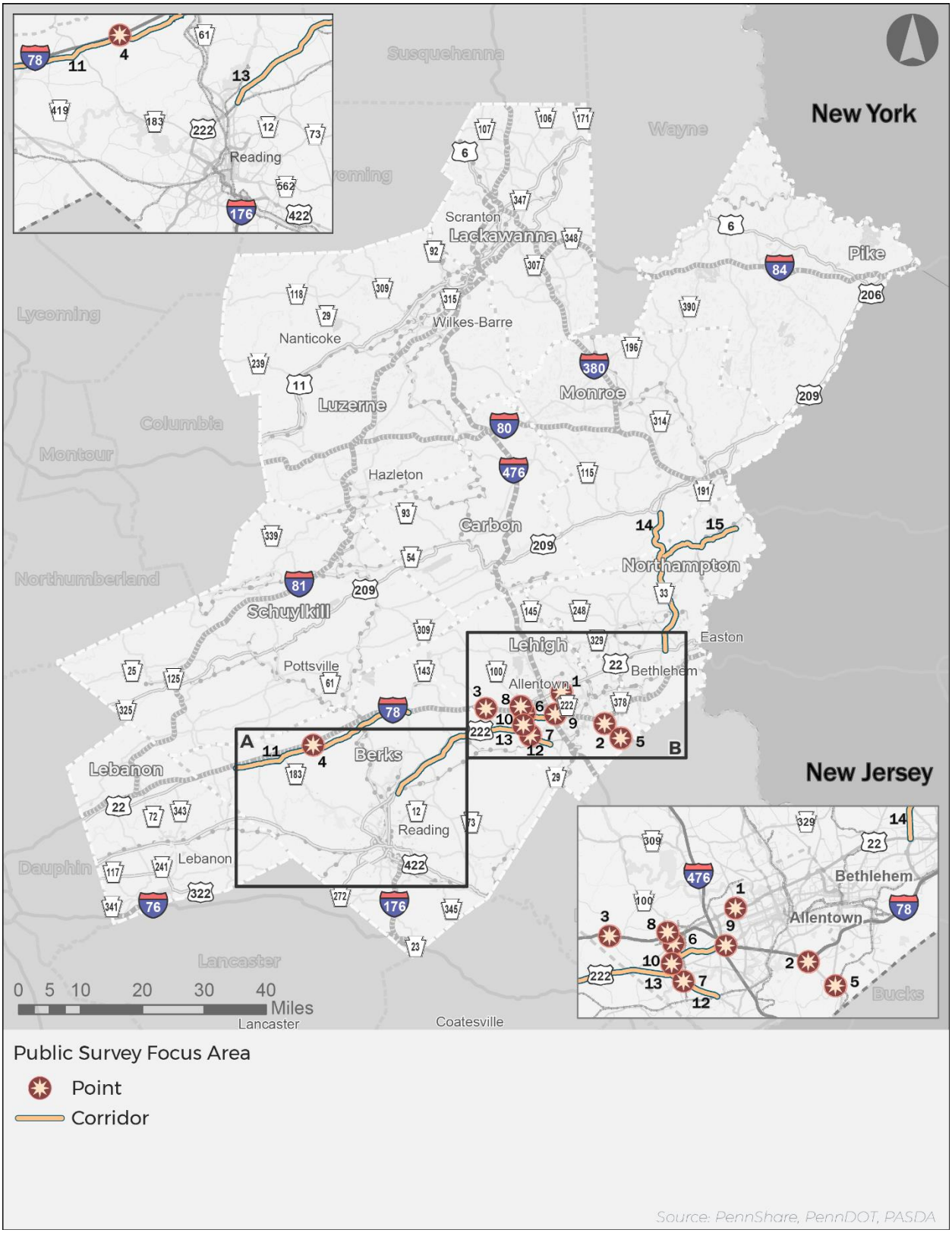


Table 14: Infrastructure Needs – Public Survey

Map ID	Recommendation	Stakeholder Agencies	Existing TIP Project
11	US 22 - Old Route 22 - Lenhartsville to Bethel	PennDOT D5-0, RATS	
1	US 22 at Cedar Crest Blvd	PennDOT D5-0, LVTS	
2	I-78 at PA 309	PennDOT D5-0, LVTS	•
3	I-78 at PA 863	PennDOT D5-0, LVTS	
4	I-78 - Exit 23 - Shartlesville	PennDOT D5-0, RATS	
5	PA 309 at Center Valley/PA 378	PennDOT D5-0, LVTS	
12	PA 100 - I-78 to US 222	PennDOT D5-0, LVTS	
6	PA 100 at Schantz Road	PennDOT D5-0, LVTS	
7	PA 100 at Spring Creek Road	PennDOT D5-0, LVTS	
8	PA 100 at Tilghman Street	PennDOT D5-0, LVTS	
13	US 222 - Kutztown Road to I-78	PennDOT D5-0, LVTS, RATS	•*
9	US 222 at Hamilton Blvd	PennDOT D5-0, LVTS	
10	US 222 at Grim Road	PennDOT D5-0, LVTS	
14	PA 33 - Tatamy - US 22 to US 209	PennDOT D5-0, LVTS, Monroe County	•
15	PA 512 - Mt Bethel - PA 611 to PA 33	PennDOT D5-0, LVTS	

** - Note that US 222 improvements between US 222 BR and Schaeffer Road are complete. Additional improvements to US 222 between Schaeffer Road and the Kutztown Bypass as well as at Long Lane are currently programmed on the TIP.*

Figure 31: Infrastructure Needs – Public Survey



5.3.3 Priority Infrastructure Improvements

While infrastructure needs identified through the Freight Profile analyses are prioritized based on the methodology outlined in Section 5.3, several areas were identified as improvement locations within multiple realms (Freight Profile analysis, Stakeholder Outreach, or Public Outreach). **These locations should be considered the most critical priority projects given that each was highlighted through both quantitative and qualitative efforts.**

The three infrastructure improvement sources (freight profile, stakeholder feedback, or public survey responses), supported the identification of priority project locations.

Locations in Table 15 and Figure 32 highlighted in pink are locations or corridors that were identified through the data analysis within the Regional Freight Profile, through stakeholder outreach, as well as a frequently identified location from public survey respondents. These eight locations are located in Berks or Lehigh County and many of these locations are on key local and regional freight routes.

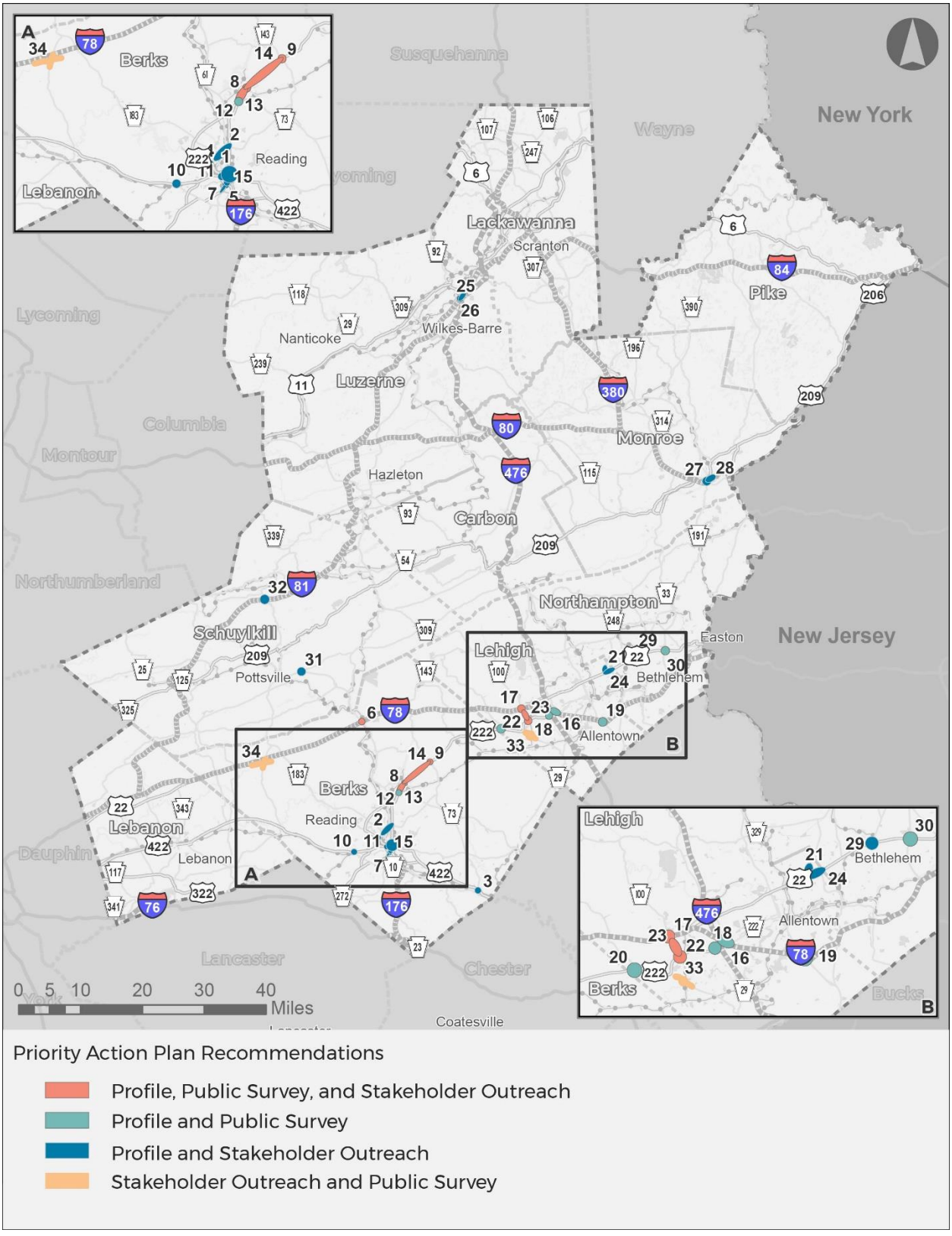
Locations in Table 15 and Figure 32 highlighted in aqua were identified through Regional Freight Profile data, as well as through stakeholder outreach. These eighteen corridors or intersections/interchanges are located throughout the region, within 7 of 10 EPFA Region counties. Six locations, highlighted in turquoise, were identified through Regional Freight Profile data and were frequently identified by survey respondents. These locations are concentrated within Lehigh, Northampton, and Berks Counties. Finally, two locations (one each in Lehigh and Berks Counties) highlighted in orange were identified through stakeholder outreach and were frequently highlighted by survey respondents.

Table 15: Priority Infrastructure Needs

Map ID	Location	County	Data	Stakeholders	Survey
6	I 78/PA 61	Berks	•	•	•
8	US 222 at PA 73	Berks	•	•	•
9	US 222/PA 662	Berks	•	•	•
12	U.S. 222 (Allentown Pike), US 222 BUS to PA 73	Berks	•	•	•
14	U.S. 222 (Kutztown Road), PA 73 to PA 662	Berks	•	•	•
17	I 78/PA 100	Lehigh	•	•	•
22	PA-100, At US 222	Lehigh	•	•	•
23	PA-100, US 222 to Penn Drive	Lehigh	•	•	•

Map ID	Location	County	Data	Stakeholders	Survey
1	Downtown Reading	Berks	•	•	
2	PA 12 near US 222/PA 183 and PA 61	Berks	•	•	
3	US 422 at PA 662	Berks	•	•	
4	US 422 at US 222	Berks	•	•	
5	US-222-BR,at US 422 Interchange	Berks	•	•	
7	Lancaster Ave, PA 625 to US 422	Berks	•	•	
10	US 422 at PA 724	Berks	•	•	
11	US 422 at US 422 Bus/US 222 Bus	Berks	•	•	
15	S 4th St, US 422 to Pine Street	Berks	•	•	
21	Airport Road, City Line Road to US 22	Lehigh	•	•	
24	US 22 at PA 378/Schoenersville Road (PA 1009)	Lehigh, Northampton	•	•	
25	I 81/PA 315	Luzerne	•	•	
26	PA-315 N,I-81 to I-476	Luzerne	•	•	
27	I 80 near PA 611	Monroe	•	•	
28	I 80 between PA 191 and Prospect Street (PA 2017)	Monroe	•	•	
29	US 22/PA 191	Northampton	•	•	
31	PA 443 near PA 61 North Manheim, Schuylkill Haven	Schuylkill	•	•	
32	I-81 near PA 61 Ryan	Schuylkill	•	•	
16	I 78 from PA 309 to US 222	Lehigh	•		•
18	US 222 at Krocks Road and US 222 at I-476	Lehigh	•		•
19	I-78 E, At PA 309 Interchange	Lehigh	•		•
20	US 222/PA 863	Lehigh	•		•
13	US 222 (Allentown Pike) at US 222 BUS Interchange	Berks	•		•
30	US 22/PA 33	Northampton	•		•
33	Route 100, Spring Creek Road to PA 29	Lehigh		•	•
34	Old U.S. 22 at Route 419	Berks		•	•

Figure 32: Priority Infrastructure Needs



5.4 Policy Recommendations

The stakeholder outreach sessions reviewed in Section 2.2 resulted in several policy recommendations highlighted within those discussions. The public survey responses summarized in Section 2.3 also include several repeated themes. Many of these themes are supported by the data analysis summarized in the Regional Freight Profile companion document.

> Policy recommendations have been developed through input received from EPFA members, stakeholder session feedback, and comments received from the public survey.

Key suggestions identified through the existing conditions analysis that garnered significant support during stakeholder discussions or were highlighted repeatedly in public survey responses are summarized in Table 16. These recommendations can be generally focused around key action areas and associated timeframes. Short-term (less than one year) recommendations are those that can be implemented quickly or require limited coordination amongst MPO, County, or municipal partners. Mid-term (1-2 years) recommendations are guidance documents or focused transportation studies requiring substantial analyses or coordination amongst EPFA members. Finally, Long-term (more than 2 years) recommendations are those that require the most substantial amount of further study or coordination.

Policy recommendations were developed around different action areas; each is discussed separately below. These key action areas include:

- Regional Coordination
- Land Use
- Road Design and Maintenance
- Truck Operations
- Rail
- Air
- Freight Workforce Access

Subsequent sections summarize the rationale for each action area, followed by recommendations and proposed actions to support the incremental implementation of the outlined policies, studies, or efforts.

Table 16: Policy Recommendations

Action Area	Recommendation	Sponsor	Time Frame
Regional Coordination	Develop EPFA common goals and objectives.	EPFA	Short-Term
	Standardize formal meetings of the EPFA to advance outcomes of the Plan and support future needs associated with freight development.	EPFA	Short-Term
	Proactively track approved or proposed freight or logistics-focused developments to identify roadway connections that may need future investments.	EPFA	Short-Term
	Track AADTT annually to identify locations where growth in truck use may warrant a focused study or analysis	EPFA	Short-Term
	Track industrial real estate market trends to identify new and emerging industrial clusters, types of facilities being developed, etc.	EPFA	Mid-Term
	Develop a work program of studies, data, and other services that require investments from the Alliance members, the State, Federal funding and grants, etc.	EPFA	Mid-Term
Land Use	Develop regional land use guidance document for EPFA member municipalities, including best practices guidance - especially in rural agricultural areas susceptible to change	EPFA	Mid-Term
	Develop public information materials (documents, videos, etc.) to educate the public, elected officials, etc. on land use trends, impacts of certain development types in response to or anticipation of public concerns. Leverage TRB guidance and other existing materials as much as possible.	EPFA	Mid-Term
	Perform an assessment of developable land, identifying potential conflicts, more/less desirable areas to focus development, etc.	EPFA	Mid-Term
	Advance County Airport study to identify potential market for cargo or to support regional truck parking.	Schuylkill County	Mid-Term
	Advance development of regional zoning guidance for industrial and warehousing uses.	EPFA	Long-Term
	Consider opportunities for multi-jurisdictional land use planning, focused on industrial or warehousing uses.	EPFA	Long-Term
	Advance development of regional zoning language that support truck parking on-site at industrial, distribution, or warehouse sites.	EPFA	Long-Term
Road Design & Maintenance	Focus on improving winter maintenance along key truck routes.	PennDOT D5-0, Schuylkill County	Short-Term
	Focus on improving winter maintenance along key truck routes.	PennDOT D5-0, Berks County	Short-Term
	Develop resilient road design guidelines to avoid or mitigate flooding and other risks.	EPFA and/or PennDOT	Mid-Term

Action Area	Recommendation	Sponsor	Time Frame
Truck Operations	Identify local or regional ordinances that allow for or support development of truck parking opportunities within the County.	EPFA	Mid-Term
	Advance local freight studies for urban areas identified as needing infrastructure improvements (Table 12), including Allentown, Reading, Scranton, and Lebanon	MPO and/or Municipal Partner	Mid-Term
	Advance County-wide study to Identify locations that may support truck parking within Berks County.	Berks County	Mid-Term
	Advance regional Truck Route study.	EPFA	Mid-Term
	Develop Regional Routing Study focused on need for wayfinding signage to avoid bridge strikes, etc.	EPFA	Mid-Term
	Focus on development of truck parking opportunities located between PA 100 and PA 33.	LVPC	Long-Term
	Anticipate the potential for new technologies (autonomous vehicles, AI routing, alternative delivery technologies) to change how trucks move to, from, through, and within the region. Assess readiness, opportunities to lead demonstration projects, etc.	EPFA, Pennsylvania TAC	Long-Term
	Assess corridor-level demand for alternative fuels (e.g., hydrogen) and electric charging	EPFA	Long-Term
Rail	Coordinate with passenger rail studies in Reading, Wilkes-Barre, Allentown	EPFA	Short-Term
	Coordinate with upcoming State Rail Plan effort	EPFA	Short-Term
	Work with existing rail operators and rail-served businesses to develop strategy aimed at limiting traffic impacts from stalled/idling trains.	Berks County	Short-Term
	Support oversight of development of rail-served sites for customers that need rail access, limiting development of these sites for non-rail customers.	SEDCO, Schuylkill County	Short-Term
	Perform a regional analysis of grade crossing safety	EPFA	Mid-Term
Air Cargo	Continue the advancement of the NLCC to meet the growing demand for direct air cargo service in the region	LNAA, LVPC	Mid-Term
Freight Workplace Access	Identify underserved transit corridors and consider an expansion of service for major freight generating nodes	EPFA, Transit Operators	Mid-Term

5.4.1 Regional Coordination Recommendations

Regional coordination is a prerequisite for regional policy. Given that the EPFA region includes 5 MPOs, 10 counties, and 400 municipalities, if coordinated policies are to be developed and advanced, a sustainable mechanism for that coordination must be put in place. Initial actions noted below are focused on formalizing the EPFA as a multi-jurisdictional organization, using the MAP Forum[54] as a framework for how to manage a multi-MPO regional planning consortium.

Action Area	Recommendation	Sponsor	Time Frame
Regional Coordination	Develop EPFA common goals and objectives.	EPFA	Short-Term
Regional Coordination	Standardize formal meetings of the EPFA to advance outcomes of the Plan and support future needs associated with freight development.	EPFA	Short-Term
Regional Coordination	Proactively track approved or proposed freight or logistics-focused developments to identify roadway connections that may need future investments.	EPFA	Short-Term
Regional Coordination	Track AADTT annually to identify locations where growth in truck use may warrant a focused study or analysis	EPFA	Short-Term
Regional Coordination	Track industrial real estate market trends to identify new and emerging industrial clusters, types of facilities being developed, etc.	EPFA	Mid-Term

Regional Coordination Actions

- Initial EPFA contacts should coordinate a meeting, workshop, or virtual focus group to identify common goals and objectives that EPFA will aim to achieve.
- EPFA members should Initiate the development of a Memorandum of Understanding (MOU) to formalize the EPFA as an entity focused on the unique transportation and land use needs of freight within the region.
- Establish regular monthly or quarterly EPFA meeting schedules. Ensure each member has an identified responsible point of contact. Appoint secretary to maintain roster of current contacts, and to create and maintain a shared file location (Dropbox, SharePoint, or similar) for EPFA information and materials.
- EFPA membership should prepare a database of approved or proposed developments to identify roadways in need of future investments, particularly those that may not be currently used by freight traffic.
- Additionally, EPFA members should actively track AADTT annually to determine roadways within the region where expanded truck use may need further study. Identify trends and areas where there are significant changes that need further investigation.

[54] The Metropolitan Area Planning Forum, commonly referred to as the MAP Forum, is a consortium of metropolitan planning organizations (MPOs) and councils of government in New York, New Jersey, Connecticut and Pennsylvania that have voluntarily agreed to coordinate and collaborate on transportation planning activities in the multi-state metropolitan area.

- EPFA core members should review industrial real estate data and trends on an annual or triennial basis. This analysis should focus on clusters where development activity is growing or emerging, identify the types of industrial buildings being developed, and consider impacts and needs. This may require the identification of MPO resources to pay for data and analysis.
- In developing a work program, each EPFA member should consider the feasibility of expanding the geographic scopes of transportation or freight-focused studies to include multiple EPFA member geographies. As an example, NYMTC often incorporates MAP Forum members into the study area of its freight studies.

5.4.2 Land Use Policy Recommendations

Land use recommendations are primarily centered on a need to advance regional or multi-jurisdictional zoning, or the development of model ordinance support for EPFA municipalities. As a matter of practice, few freight plans – whether modal, statewide, or regional in nature – attempt to address the critical relationships between freight transportation and the freight land uses that generate the underlying demand, primarily because transportation agencies preparing the plans have jurisdiction over transportation assets but not land use decisions, which are made locally.

Pennsylvania has 67 counties, 56 cities, 959 boroughs, and 1,546 townships. Each of these entities has its own laws, ordinances, and policies that define how it manages and makes decisions related to the infrastructure within its jurisdiction. As may be expected, each entity has its own operating procedures and priorities for planning and future growth. The “first and last mile” of freight delivery frequently occur on roads owned by local municipalities. Municipalities in Pennsylvania own almost twice as many roadway miles as PennDOT does and local governments control all land use and zoning ordinances. Therefore, freight mobility is highly influenced by the local governance of roads and land use. The laws and regulations in Pennsylvania were intentionally designed to empower local communities with this authority.

The disconnect between land use and transportation, while fully intentional, creates significant challenges to effective planning, and EPFA members have already recognized that improved coordination of local land use and regional transportation is of paramount importance. Goals for an effective regional freight land use policy have been outlined in the recommendations detailed in Table 16.

Two examples of potential zoning code updates/improvements already provided within the EPFA region include those in Upper Macungie Township and Forks Township.

Upper Macungie Township updated their municipal zoning code to include design elements for amenities and parking.[55] While these updates do not address challenges associated with the proliferation of warehouses and distribution centers within the region, they do focus on elements that improve conditions for users of those sites.

Requirements for driver amenities at warehouse structures include the following (§ 27-603: 1-F-3):

> *Provide amenities within the warehouse structures, such as, but not limited to, a lounge for the operators of tractor/trailer motor vehicles, rest room facilities and the dispensing of food and beverages. The size of the lounge shall have a proportionate relationship with the number of loading docks provided for the warehouse operation which shall equate to 10% of the number of loading docks but, in any event, no less of an area needed to accommodate five seats. This lounge area facility shall be in addition to similar facilities provided for on-site employees.*

Off-street parking requirements for industrial uses include the following (§ 27-601: 2-B-3-c):

> *(E) Industrial Uses: All industrial uses (including warehousing, distribution, truck terminals and manufacturing).*
>
> ***Number of Off-Street Parking Spaces Required:** In addition to parking or storage needed for maximum number of vehicles stored, displayed, or based at the lot at any point in time, which spaces are not required to meet the stall size and aisle width requirements of this Chapter:*
>
> *1 per 1.2 employee, based upon the maximum number of employees on site at peak period of times (including any overlapping shifts) plus one (1) ten-foot by eighty-foot (10' x 80') truck staging parking space for every two (2) loading docks.*
>
> ***Plus 1 Off-Street Parking Space for Each:** 1 visitor space for every 10 managers on the site.*

Township of Upper Macungie, PA – Municipal Code

[55] Township of Upper Macungie, PA – Municipal Code: https://ecode360.com/14517379#14517379

Forks Township amended their zoning code in 2021 to include several site requirements for wholesale/warehouse uses.[56] The requirements cited within Forks Township set forth many specific elements associated with the design of industrial or warehousing sites, including amenities, truck parking, and circulation. Specific elements from this update may be particularly useful when considering model ordinances to be deployed in other communities.

Requirements for driver amenities (§ 200-28: G-17-a):

> *Each and every building containing this use shall have amenities for the truck drivers/operators of the vehicles using the facility in addition to any similar amenities provided to on-site warehouse/distribution employees.*
>
> *[1] The amenities shall include, at a minimum, a suitable lounge for drivers/operators, with restroom facilities, including at least three sinks, stalls, etc., per restroom, and dispensing machines or other facilities to provide food and beverages.*
>
> *[2] At least one amenity shall be provided for every thirty-truck loading/unloading docks/doorways of the use.*
>
> *[3] The size of each such amenity shall be proportionate to the number of loading/unloading docks/doorways of the use. Each amenity shall contain not less than one seat per 10 docks/doorways, with a minimum area to accommodate six seats and one four-person table.*
>
> *[4] Parking for the amenity shall be provided in close proximity to the amenity and in a suitable, safe, and separately defined location. There shall be provided at least one twelve-foot-by-eighty-foot truck parking space per each required lounge seat of the amenity.*
>
> *[5] Trucks parked in amenity parking spaces shall not leave engines idling unless required for safety or weather-related reasons. Electrical outlets shall be included in parking areas for trucks to utilize.*
>
> *[6] All trucks awaiting access to a loading/unloading dock/doorway shall park in the designated amenity parking spaces unless all such spaces are already occupied.*

Requirements for on-site parking (§ 200-28: G-17-c):

> *This use shall reserve a minimum of 5% of the proposed total tractor-trailer parking spaces for trucks which are required to arrive early or required to layover or rest due to hours of service regulations. Such spaces must be made available to tractor-trailers 24 hours a day/seven days a week.*

Guidance on permissible routes connecting a facility with the regional highway network (§ 200-28: G-17-f)

> *Truck drivers shall be instructed regarding acceptable routes between the facility and the nearest expressway with respect to the class of vehicle accessing the facility.*

Township of Forks, PA – Municipal Code

[56] Township of Forks, PA – Municipal Code: https://ecode360.com/FO1696

Improved freight land use/transportation coordination will require agreement on, and sustained implementation of, a region-wide approach. As part of the formalization of the EPFA noted in the Regional Coordination Action Area discussion, members will need to actively champion any regional land use initiatives or actions noted below.

Action Area	Recommendation	Sponsor	Time Frame
Land Use	Develop regional land use guidance document for EPFA member municipalities, including best practices guidance - especially in rural agricultural areas susceptible to change	EPFA	Mid-Term
Land Use	Develop public information materials (documents, videos, etc.) to educate the public, elected officials, etc. on land use trends, impacts of certain development types in response to or anticipation of public concerns. Leverage TRB guidance and other existing materials as much as possible.	EPFA	Mid-Term
Land Use	Perform an assessment of developable land, identifying potential conflicts, more/less desirable areas to focus development, etc.	EPFA	Mid-Term
Land Use	Advance County Airport study to identify potential market for cargo or to support regional truck parking.	Schuylkill County	Mid-Term
Land Use	Advance development of regional zoning guidance for industrial and warehousing uses.	EPFA	Long-Term
Land Use	Consider opportunities for multi-jurisdictional land use planning, focused on industrial or warehousing uses.	EPFA	Long-Term
Land Use	Advance development of regional zoning language that support truck parking on-site at industrial, distribution, or warehouse sites.	EPFA	Long-Term

Land Use Policy Actions:

- The EPFA should establish a standing working group representing interested regional planning agencies, counties, and municipalities, and subsequently charge the working group to implement the following:
    - Create a library of potentially applicable land use and zoning texts from regional, state, and national best practice, tapping resources such as TRB, APA, and USDOT.
    - Agree on recommended regional ordinance language guidance for use by counties or municipalities.
    - Perform consistency reviews with LRTPs and other governing policies to ensure any guidance documents align with local goals, objectives, or outcomes.
    - Perform outreach to and inform municipalities about the availability of the regional guidance and benefits of their use; promote dialogue and coordination between adjacent or interdependent municipalities.
    - Track and monitor the deployment of language guidance across the region.

- Additionally, EPFA members should track available or developable land at a regional level to identify where growth in existing or the development of future industrial clusters may be most likely. This may also provide opportunities to focus development in more desirable areas by local or regional stakeholders.
- Schuylkill County officials should consider funding opportunities (including PennDOT Special Studies funding) to advance location-specific development or redevelopment plans.

5.4.3 Road Design and Maintenance Policy Recommendations

Winter weather, storm events, and work zone activities can create temporary disruptions in the availability and use of key truck routes, ranging from reduced capacity and performance to full unavailability for periods of time. Truck routes within the EPFA region should be actively managed to reduce the frequency and severity of disruption to the extent practical.

Action Area	Recommendation	Sponsor	Time Frame
Road Design and Maintenance	Focus on improving winter maintenance along key truck routes.	PennDOT D5-0, Schuylkill County	Short-Term
Road Design and Maintenance	Focus on improving winter maintenance along key truck routes.	PennDOT D5-0, Berks County	Short-Term
Road Design and Maintenance	Develop resilient road design guidelines to avoid or mitigate flooding and other risks.	EPFA and/or PennDOT	Mid-Term

Road Design and Maintenance Policy Actions

- County agencies should work with PennDOT district offices to establish or reinforce coordinated plans across responsible jurisdictions for priority snow removal on key truck routes.
- EPFA members should share information and manage work zone activities related to municipal or county projects to minimize impacts to freight operations and particularly to communities where trucks might seek to re-route.
- County officials should collaborate with PennDOT district officials on the investigation of weather vulnerabilities on key truck routes and develop plan to prioritize improvements and actions to reduce those vulnerabilities.
- EFPA members, in partnership with local officials and PennDOT, should identify and resilient road design guidelines. EFPA members should advocate for federal or state funding for resilience projects, and apply for grants (or advise applicants in the region) as appropriate.

5.4.4 Truck Operations Recommendations

Policy recommendations within the truck operations action area include addressing challenging issues associated with safe truck parking and the routing and operations of trucks on highways and in communities.

5.4.4.1 Truck Parking

Truck parking is a challenging issue for communities across the country. The causes are simple: trucks have a target time to pick up a load, a target time to deliver a load, an uncertain amount of travel time in between, and a fixed number of hours per day in which to operate. Unfortunately, truck drivers who guess wrong about their trip duration may arrive at destinations too early for their appointments and be denied entry to facilities, or they may expect to run out of operating hours before reaching their destination. In both cases, they need a place to park until facility entry is permitted and/or their daily hours of service are reset. In the best case, trucks can park at designated public or private truck stops, but in the worst case they park in undesignated locations within communities or along highways. This situation is particularly challenging, with negative community impacts, challenging or unsafe conditions for truckers and the industries they serve, and elevated safety risks for all roadway users.

There are multiple types of incremental solutions, none of them complete by themselves, but each contributes to the overall goal of reducing the need for and occurrence of unauthorized truck parking. Potential solutions include:

- Increasing authorized public or private parking on major state and national routes, primarily to accommodate long-haul trips facing expiring hours-of-service. This approach is the responsibility largely of private for-profit truck stop operators in response to market demand, and to a lesser extent state toll road authorities or Departments of Transportation.
- Increasing parking within freight shipping/receiving facilities to accommodate early arrivals and late departures. This approach is the responsibility of the facility operators themselves, who might do it voluntarily or as a matter of zoning compliance.
- Creating authorized public or private parking outside of but near freight shipping/receiving facilities, primarily to accommodate short-haul trips arriving early or with hours of service near expiration. This approach is the responsibility of local municipalities, few of whom are eager to invite and sanction the activity even when potentially beneficial.

Getting agreement on the best approach within municipalities and communities – let alone across municipal boundaries – is extremely challenging, but critically important to taking positive action at the regional level.

5.4.4.2 Truck Routing

Prior to the reliance on GPS and cell phones for trip routing, truck routes were designated on maps and signs, and drivers (apart from locals familiar with short cuts) relied on the information given to them. Today, truck routes are either given to truckers by dispatchers based on routing software or determined by truckers themselves based on local knowledge or in-cab routing software. Unfortunately, routing software will consistently attempt to maximize trip efficiency, seeking to save a minute or two of driving time, including sending truck drivers through neighborhoods or over roads poorly suited to that type of vehicle. If a dispatcher or trucker is unfamiliar with the area, he or she will not know that the software is giving poor guidance. At the same time, routing decisions have become more complex, because freight shipper/receiver locations have become more dispersed into outlying and formerly underdeveloped areas with limited road access. Layered on top of these factors is another change: the emergence of

alternative fuel vehicle technology, which is likely to see meaningful penetration into shorter-haul truck fleets in the near term, and possibly longer-haul truck fleets over time.

The three-fold challenge for public agencies is to: 1) identify the most appropriate truck routes to serve emerging patterns of freight land use development, and then (2) effectively communicate the preferred routes to truckers, minimizing reliance on poor route guidance, while also (3) anticipating needs and planning for alternative fuel capability on key routes and heavy-use corridors to reduce truck emissions impacts.

Action Area	Recommendation	Sponsor	Time Frame
Truck Operations	Identify local or regional ordinances that allow for or support development of truck parking opportunities within the County.	EPFA	Mid-Term
Truck Operations	Advance local freight studies for urban areas identified as needing infrastructure improvements (Table 12), including Allentown, Reading, Scranton, and Lebanon	MPO and/or Municipal Partner	Mid-Term
Truck Operations	Advance County-wide study to Identify locations that may support truck parking within Berks County.	Berks County	Mid-Term
Truck Operations	Focus on development of truck parking opportunities located between PA 100 and PA 33.	LVPC	Long-Term
Truck Operations	Advance regional Truck Route study.	EPFA	Mid-Term
Truck Operations	Develop Regional Routing Study focused on need for wayfinding signage to avoid bridge strikes, etc.	EPFA	Mid-Term
Truck Operations	Anticipate the potential for new technologies (autonomous vehicles, AI routing, alternative delivery technologies) to change how trucks move to, from, through, and within the region. Assess readiness, opportunities to lead demonstration projects, etc.	EPFA, Pennsylvania Transportation Advisory Committee (TAC)	Long-Term
Truck Operations	Assess corridor-level demand for alternative fuels (e.g., hydrogen) and electric charging	EPFA	Long-Term

Truck Operations Policy Actions

- Establish core working group of EPFA representatives to:
  - Compile reports of unauthorized parking activities and related incidents, and regularly develop and update data on authorized and unauthorized truck parking activities;
  - Work in a coordinated manner with state agencies and private sector developers on increasing the inventory of “mainline” (Interstate or highway-based) parking;

    - Research, as part of the Land Use/Transportation coordination, the application of zoning to increase the inventory of on-site parking within-facilities;
    - Perform and support county/subregion feasibility evaluations on the potential for (and acceptability of) managed local truck parking facilities.
- For urban areas identified in Table 12 as infrastructure priorities, individual MPOs should work with the associated municipality to advance city-specific truck studies, including a review of where and how trucks interact with cyclists or pedestrians.
- Advance EPFA regional truck route study. This includes compiling potential routes or restrictions, as appropriate, as well as necessary traffic or infrastructure data to support this effort.;
- Develop a coordinated EPFA strategy to develop, distribute, and promote preferred route information to regional truck operators and dispatchers;
- Stay apprised of new and emerging technologies and their applications. These could be topics at future EPFA meetings. EPFA members should collaborate with the TAC, private companies, and/or academic institutions that may be looking for opportunities to deploy or pilot new technology.
- Collaborate with PennDOT and USDOT partners to advance improvements associated with alternative fuel corridors within the EPFA region.

5.4.5 Rail Policy Recommendations

Rail freight has positive and negative effects in the EPFA region. It offers an alternative to truck transportation over longer distances for regional freight shippers and receivers. But rail service also generates and concentrates truck trips at rail/truck transfer points, creating community impacts as well as development pressures. Increasingly, as the length of trains increase, at-grade crossings experience blockages while trains are switched in and out of railyards and customer facilities. Railroads are a critical part of a balanced freight ecosystem, and while they receive attention and planning through federally-mandated state rail plans and other programs, it is also important to address local benefits and impacts.

Action Area	Recommendation	Sponsor	Time Frame
Rail	Coordinate with passenger rail studies in Reading, Wilkes-Barre, Allentown	EPFA	Short-Term
Rail	Coordinate with upcoming State Rail Plan effort	EPFA	Short-Term
Rail	Work with existing rail operators and rail-served businesses to develop strategy aimed at limiting traffic impacts from stalled/idling/slow trains.	Berks County	Short-Term
Rail	Support oversight of development of rail-served sites for customers that need rail access, limiting development of these sites for non-rail customers.	SEDCO, Schuylkill County	Short-Term

Action Area	Recommendation	Sponsor	Time Frame
Rail	Perform a regional analysis of grade crossing safety aimed at identifying and prioritizing crossings in need of safety improvements.	EPFA	Mid-Term

Rail Policy Actions

- Establish core working group of EPFA representatives to:
  - Identify and, to the extent practical, protect rail-adjacent development sites for use by rail-served industries (possibly following the model of NJTPA's Freight Rail Industrial Opportunities study);
  - Perform regional analysis of rail grade crossing safety, blockages, and other impacts;
  - Work with railroads and rail-served facilities to reduce the duration/frequency of grade crossing blockage events;
- Identify an EPFA member to proactively represent the alliance as a steering committee member for the Pennsylvania State Rail Plan
- Actively coordinate and collaborate with development and deployment of passenger rail studies throughout the region.

5.4.6 *Air Cargo Policy Recommendations*

Air cargo is important for EPFA shippers and receivers, particularly given the expansion of ABE as a cargo hub. Additional air cargo needs are met by large national and international airports such as Philadelphia and Newark-Liberty/JFK, with air freight being trucked to and from these and other airports. This action area is focused on air-side facility recommendations, with land-side recommendations generally associated with specific infrastructure improvements (Section 5.3) or those found in the Truck Operations action area (Section 5.4.4).

The airside facilities at ABE lack the capacity to serve existing and future cargo needs associated with the rapid growth of freight within the EPFA region. Investments in air cargo within the region should focus on the development of dedicated airside cargo (including cross-dock) facilities at ABE that increase efficiencies and reduce truck demand within the region.

In January 2024, the Lehigh-Northampton Airport Authority (LNAA) was awarded a $40.8M federal grant to fund the construction of the Northside Logistics and Cargo Complex (NLCC), a consolidated multimodal cargo facility at Lehigh Valley International Airport (ABE) in Lehigh County, Pennsylvania with connectivity to the National Highway System via designated truck routes and critical urban freight corridors. This initiative continues to utilize the regional freight corridors and utilizes available FHWA and Federal Aviation Administration (FAA) funding currently in place to develop additional air cargo capacity for the region.

Action Area	Recommendation	Sponsor	Time Frame
Air Cargo	Continue the advancement of the NLCC to meet the growing demand for direct air cargo service in the region	LNAA, LVPC	Mid-Term

Air Cargo Policy Actions

- Actively track monthly/yearly air cargo data to identify market trends or growth areas
- EPFA members should coordinate with LNAA to identify potential grant opportunities that strengthen air cargo capacity and/or reduce highway demands associated with air cargo.

5.4.7 *Freight Workplace Access Recommendations*

Freight generating and receiving facilities depend on workers, and those workers depend on reliable transportation options to and from the workplace. For those without a personal automobile or regular shared ride, active transportation and public transit are the primary options for workplace access. However, as freight facilities continue to develop outside of established clusters and regional transportation routes, they become increasingly difficult to reach. Providing workplace access options supports opportunities for the economically disadvantaged, while also expanding the pool of potential workers for freight facility operators and helping fill labor pool shortfalls. In other regions, major employers have established their own van and private transit services to fill gaps in the public transportation system.

Action Area	Recommendation	Sponsor	Time Frame
Freight Workplace Access	Identify underserved transit corridors and consider an expansion of service for major freight generating nodes	EPFA, Transit Operators	Mid-Term

Freight Workplace Access Policy Actions

- Establish core working group of EPFA representatives to identify underserved transit corridors
- Partner with transit operators to identify opportunities to expand workforce access options, including: active transportation improvements; public transit service expansion; and private or public-private partnership van services.
- Partner with ridesharing or Transportation Management Associations (such as Commute PA or TMA Bucks) to link employees in need with industrial activity nodes.

5.4.8 Other Policy Opportunities

While not explicitly suggested by EPFA members, nor identified through stakeholder or public outreach, other policy recommendations may be worth consideration the EPFA as part of an ongoing collaborative process.

Other Policy Actions

- Develop a shared data library and resource set, with plans to maintain currency and accessibility for EPFA members;
- In a similar fashion to performance measure tracking for LRTPs, establish a set of quantifiable region-wide freight performance metrics. Track performance of

metrics at regular intervals, using the results to evaluate the effectiveness of improvements and policies;

- Develop a coordinated, complementary approach to federal discretionary grant applications, reducing competition among EPFA members for limited federal dollars and making the strongest case for region-wide benefit from federal investments.

5.5 Implementation of Recommendations

The implementation pathway for these infrastructure and policy recommendations requires an innovative focus on organizational structure and funding. Approaches to each are discussed below.

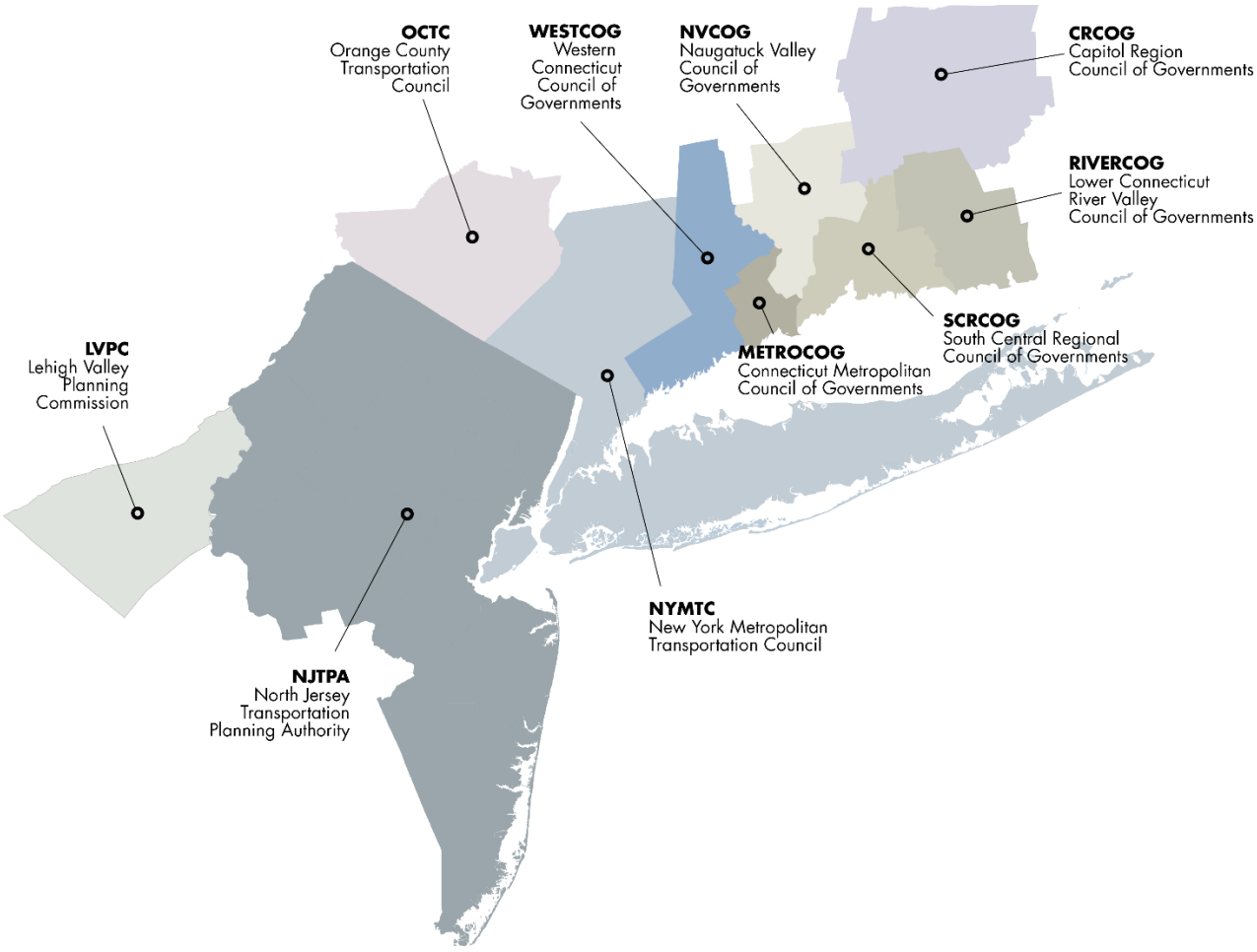
5.5.1 *Organizational Approaches*

There are useful precedents for creating multi-MPO (and multi-state) organizational frameworks to accomplish freight planning, including but not limited to:

- The Metropolitan Area Planning (MAP) Forum.
- The Eastern Transportation Coalition (formerly the I-95 Corridor Coalition);
- The Institute for Trade and Transportation Studies;
- I-81 Corridor Coalition

LVPC is a current member of the MAP Forum, which includes ten regional planning agencies (MPOs and COGs), illustrated in Figure 33. The MAP Forum was created to facilitate and coordinate transportation planning activities across a four-state NY-NJ-CT-PA geography.

Figure 33: MAP Forum Member Agencies



Source: NYMTC

MAP Forum activities are governed by a Memorandum of Understanding (MOU), originally executed in 2008 and subsequently amended, which calls for:

- Sharing of UPWP documents and products at the development stage
- Exchanging data and modeling information
- Consulting on LRTP and TIP development, and specifically addressing "boundary" projects between jurisdictional areas
- Consulting and exchanging data and information related to regional emissions and transportation conformity analysis

The MAP Forum meets on a scheduled basis to share information and discuss issues of interest. Going forward, a similar model may be suitable for EPFA members. As part of this effort, EPFA members consulted with MAP Forum leadership to discuss best practices or lessons learned associated with that group. Key discussion elements included MOU negotiations, meeting formats, data sharing, grant requests, and staffing needs. The EPFA will continue to leverage its existing relationship with the MAP Forum as a sounding board, particularly given overlap (LVPC) between the two entities.

5.5.2 *Funding Opportunities*

This section outlines funding sources that could be used to support many of the priority infrastructure and policy needs outlined in the Regional Action Plan in Section 5.3 and 5.4, respectively. These actions include prioritized infrastructure improvement locations based on a review of quantitative and qualitative inputs, as well as short, mid, and long-term policy recommendations based on participating agencies, cost, and expected level of coordination or effort.

The focus of this section is on more recently adopted funding sources, including those authorized in the IIJA. There are many long-standing funding programs, including Congestion Mitigation and Air Quality (CMAQ), Surface Transportation Block Grants (STBG), and others that are well-tread territory for EPFA members. Funding sources including within this section are categorized as formula or discretionary. It is important to note that the ownership of the infrastructure asset helps to determine its eligibility for certain funding programs. Given that PennDOT is the lead agency for the majority of the identified infrastructure improvement locations, that agency's coordination will be required for seeking many of the below funding sources.

5.5.2.1 Federal Formula Funding Options

This section outlines formula funding programs, administered by FHWA, that distribute funding to state DOTs and MPOs on an annual basis. This section primarily focuses on capital funding, however, a limited number of federal funding programs support operations and maintenance costs of transportation systems, such as the CMAQ program.

5.5.2.2 Carbon Reduction Program

The Carbon Reduction Program will provide formula grants to States to reduce transportation emissions or aid in the development of carbon reduction strategies. This is a new program that was enacted as part of the IIJA. USDOT announced that $6.4 billion will be made available from FY22 – FY26. Pennsylvania is estimated to receive nearly $265 million over the 5-year program.

Eligible projects include on- and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation and projects that support the deployment of alternative fuel vehicles. These types of projects, which are determined at the state and local level but could be supported with federal funding, include zero emission vehicles and facilities, projects that support congestion pricing and travel demand strategies, and truck stop and port electrification systems to reduce the environmental impacts of freight movement and carbon dioxide emissions at port facilities.

5.5.2.3 National Electric Vehicle Infrastructure Formula Program/CFI Discretionary Program

The National Electric Vehicle Infrastructure (NEVI) Formula Program will provide formula grants to States to strategically deploy electric vehicle (EV) charging infrastructure and to establish an interconnected network to facilitate data collection, access, and reliability. This is a new program that was enacted as part of the IIJA. USDOT announced that $5 billion will be made available from FY22 – FY26. While the program is primarily formula, it sets aside 10% of funding for discretionary grants to assist state and local governments in strategically deploying electric vehicle charging infrastructure. Following approval of its NEVI state plan, Pennsylvania will receive $171.5 million in funding through FY26.

PennDOT administers a grant program that offers competitive funding to entities throughout the state to implement electric vehicle activities. In February 2024, PennDOT announced the first round of conditional awards, totaling $34.1 million, for NEVI funding. Fifty-five projects in 36 counties were selected to expand access to and reliability of electric vehicle charging in Pennsylvania.

The Charging and Fueling Infrastructure (CFI) Discretionary Program is a new competitive grant program to build on the NEVI formula program. The grant program strategically deploys publicly accessible electric vehicle charging and alternative fueling infrastructure to fill gaps in urban and rural communities, downtown areas and local communities. The program provides funding categories of grants: Community Charging and Fueling Grants (Community Program); and (2) Alternative Fuel Corridor Grants (Corridor Program). $2.5 billion over 5 years is available for this program.

Eligible projects under both grant programs include:

- The acquisition and installation of EV charging infrastructure;
- Assistance with operations and maintenance of infrastructure previously acquired through the NEVI program (for up to 5 years);
- Traffic control devices to provide directions to acquired EV charging infrastructure;
- Analysis activities to evaluate the demand for EV charging infrastructure; and
- Data sharing about EV charging infrastructure.

5.5.2.4 Federal Competitive Grant Funding Opportunities

The purpose of this section is to document and describe competitive federal funding sources for which the recommendations of this study could be eligible. Funding programs covered in this section include discretionary grant opportunities administered by the USDOT and FHWA.

5.5.2.5 National Infrastructure Project Assistance Program (MEGA)

The National Infrastructure Project Assistance Grant Program, also commonly referred to as MEGA, was created to support large projects that are difficult to fund even though they provide national or regional economic, mobility, or safety benefits. This is a new program that was enacted as part of the IIJA. USDOT announced that $5 billion will be made available from FY22 – FY26; over $2 billion was made available in FY23-24 awards. Fifty percent of funds are made available for projects greater than $500 million and 50% for projects between $100 million and $500 million in cost. Examples of MEGA grant eligible projects include:

- Highway or bridge project on the National Multimodal Freight Network, National Highway Freight Network, or National Highway System;
- A freight rail project that provides public benefit;
- Railway highway grade separation or elimination project;
- An intercity passenger rail; or
- A public transportation project included in the scope of any of the other project types listed above.

MEGA is now part of the Multimodal Project Discretionary Grant (MPDG) Opportunity which is a combined solicitation. The other grant programs included in the MPDG are the Nationally Significant Multimodal Freight and Highway Projects grant program (INFRA) and the Rural Surface Transportation Grant program. MPDG allows applicants to apply to one, two, or all three of these funding opportunities by submitting only one application.

To be applicable for a MEGA grant, EPFA members will have to determine if the project will meet the following project requirements. Projects must:

1. Generate national or regional economic, mobility, or safety benefits,
2. Demonstrate significant need of Federal funding,
3. Be cost-effective,
4. Have a stable and dependable funding or financing source available to pay for Operations and Maintenance through the project life, and
5. Show that the applicant has sufficient legal, financial, and technical capacity to carry out the project.

5.5.2.6 Strengthening Mobility and Revolutionizing Transportation (SMART) Grant Program

The Strengthening Mobility and Revolutionizing Transportation (SMART) Grant Program is a discretionary grant program that helps drive technology innovations in transportation. This is a new program that was enacted as part of the IIJA, which authorized $500 million in competitive grants over the next five years.

Eligible projects include coordinated automation, connected vehicles, intelligent sensor-based infrastructure, systems integration, fare system apps, commerce delivery and logistics, innovative aviation technology, smart grid, and/or smart technology traffic signals. USDOT notes priority will be given to projects focused on advanced smart city or community technologies and systems to improve transportation efficiency and safety.

EPFA members could utilize SMART funding towards updating existing technologies utilized in the communities for transportation efficiency and safety. Eligible uses include development and construction.

5.5.2.7 Safe Streets and Roads for All (SS4A)

The Safe Streets and Roads for All Grant (SS4A) Program is a discretionary grant program to improve roadway safety by significantly reducing or eliminating roadway fatalities and serious injuries through safety action plan development and implementation focused on all users, including pedestrians, bicyclists, public transportation users, motorists, personal conveyance and micromobility users, and commercial vehicle operators. This is a new program that was enacted as part of the IIJA, which authorized $5 billion in competitive grants per year over the next five years in advanced appropriations.

The SS4A program provides funding for two types of grants:

- Action Plan Grants (for comprehensive safety action plans)
  - Used to develop, complete, or supplement a comprehensive safety action plan
- Implementation Grants
  - Used to implement strategies or projects that are consistent with an existing action plan
  - Implementation activities could include:
    - Applying low-cost roadway safety treatments system-wide
    - Identifying and correcting common risks across a network
    - Carrying out speed management strategies such as implementing traffic calming road design changes
    - Promoting the adoption of innovative technologies or strategies to promote safety
    - Conducting education campaigns
    - Implementing standard and novel data collection and analysis technologies
    - Deploying advanced transportation technologies
    - Combating roadway departure crashes
    - Improving first responder services
    - Unifying and integrating safety data

The priorities of the program are:

- Promote safety;
- Employ low-cost, high-impact strategies that can improve safety over a wider geographic area;
- Ensure equitable investment in the safety needs of underserved communities, which includes both underserved urban and rural communities;
- Incorporate evidence-based projects and strategies; and
- Align with the USDOT's mission and with priorities such as equity, climate and sustainability, quality job creation, economic strength, and global competitiveness.

5.5.2.8 Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT)

The Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Grant Program is a formula and discretionary grant program that helps support resilience improvements. This is a new program that was enacted as part of the IIJA, which authorized a total of $8.7 billion for this program over the next five years. The program includes $7.3 billion in formula funding that will be distributed to States while $1.4 billion will be available in competitive grants. Pennsylvania is estimated to receive over $301 million in formula funding over the five years. The IIJA authorizes $250 million in competitive grants annually.

Eligible projects include the use of natural infrastructure or construction, or modification of storm surge, flood protection, or aquatic ecosystem restoration elements related to highway projects, public transportation facilities, intercity rail facilities or service, or port facilities. The federal share is 80% but can be modified based on certain criteria.

Federal share can be increased by 7% if the recipient state or MPO has developed a resilience improvement plan and prioritized the funded project on that plan. Federal share can be increased by 3% for MPOs that have incorporated their resilience improvement plan into the metropolitan transportation plan. States may not use more than 40% for new capacity and not more than 10% for development phase activities. These limits apply to both the formula program and discretionary grant program.

Both the formula program and discretionary grant program can be utilized to increase resilience of existing infrastructure from the impacts of changing weather conditions, such as flooding, extreme weather events, and other natural disasters.

5.5.2.9 Railroad Crossing Elimination Grant Program

The Railroad Crossing Elimination Grant Program is a discretionary grant program to fund highway-rail or pathway-rail grade crossing improvement projects that focus on improving the safety and mobility of people and goods. This is a new program that was enacted as part of the IIJA, which authorized $600 million in competitive grants per year over the next five years in advance appropriations for this program. Congress may also choose to authorize up to an additional $500 million per year over the next five years.

Eligible projects include:

- A grade separation or closure;
- Track relocation;
- The improvement or installation of protective traffic control devices to increase safety; or
- Other safety improvements

5.5.2.10 Infrastructure for Rebuilding America (INFRA)

The Nationally Significant Multimodal Freight & Highway Projects grant program (also known as "INFRA") is dedicated to rebuilding the nation's aging infrastructure. INFRA utilizes selection criteria that promote projects with national and regional economic vitality as well as environmental justice goals towards highway and intercity/freight rail projects. The program also incentivizes project sponsors to pursue innovative delivery strategies, including public-private partnerships.

In March 2022, USDOT announced up to $8 billion in funds available for awards from FY22 – FY26, of which approximately $2.85 billion was made available in FY23-24.

INFRA is now part of the Multimodal Project Discretionary Grant (MPDG) Opportunity which is a combined solicitation. The other grant programs included in the MPDG are the National Infrastructure Project Assistance grants program (MEGA) and the Rural Surface Transportation Grant program. MPDG allows applicants to apply to one, two, or all three of these funding opportunities by submitting only one application.

EPFA members would need to determine whether selected projects meet the following goals for the grant:

- Support national and regional activity;
- Focus on climate change and environmental justice impacts;
- Advance racial equity;
- Engage more non-Federal sources of infrastructure investment; and
- Use innovative solutions for all aspects of the project.

Eligible projects include highway freight projects, bridge projects, intermodal rail projects, and port projects. Fifty percent of funding will go to projects greater than $500 million in cost, while the other 50% will go to projects greater than $100 million but less than $500 million in cost. INFRA grants can cover up to 60% of future eligible project costs. While INFRA grants are intended to provide funding to projects that are "shovel ready" and result in construction, eligible activities include planning, feasibility analysis, and revenue forecasting.

5.5.2.11 Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program (formerly known as BUILD or TIGER) is a highly competitive USDOT grant program that supports the capital costs of road, rail, transit, and multimodal projects that have a significant impact on the nation, a region, or a metropolitan area. The FY23 round of RAISE grants funded 162 projects in 50 states. In 2024, $1.5 billion will be made available.

5.5.2.12 Advanced Transportation Technologies and Innovative Mobility Deployment (ATTIMD)

The FHWA uses the Advanced Transportation Technologies & Innovative Mobility Deployment (ATTIMD) program to provide funding for the deployment, installation, and implementation of advanced transportation technologies. Up to $60 million per year in federal funding is available; up to a total of $900 million in funds is available until fully expended.

Projects rewarded with ATTIMD funds should improve safety, mobility, efficiency, system performance, and intermodal connectivity.

5.5.2.13 Accelerated Innovation Deployment (AID)

The FHWA uses the Accelerated Innovation Deployment (AID) program to provide funding to accelerate the deployment and adoption of proven innovative practices and technologies in highway transportation projects.

5.6 Conclusions and Next Steps

The Eastern Pennsylvania Freight Infrastructure Plan outlines numerous elements that, incrementally, aim to address existing and future transportation and land use challenges within the EPFA region. A critical first step towards the successful implementation of any initiatives outlined within the Plan is formalizing the EPFA membership through an MOU, followed by the scheduling of formal and regular meetings of the EPFA. These meetings should be structured to help the group prioritize investments, track project progress, and plan for Federal or state funding requests. Where necessary, EPFA members will also have to coordinate with local or county agencies or other stakeholder partners to initiate or carry forward many elements laid forth in this Plan. Additionally, outreach to stakeholders within the region should include municipal or industry partners, including summary "road show" discussions focused on the outcomes of this Plan. The successful advancement of many longer-term actions will require active participation from those additional partners, alongside a unified EPFA membership.

> A key next step to advance the actions outlined within the Plan is to formalize the EPFA membership.

The EPFA partners play an important role in national and global supply chains. As the global supply chain grows and evolves, innovations and new technologies will continue to shift the landscape of how goods are moved across the world and delivered to a consumer's doorstep. While national and state level freight planning efforts are critical at a global and national level, regional freight planning efforts like those championed by the EPFA are vital and better aligned to the context of local communities. This Plan sets forth numerous locally and regionally focused recommendations that can fulfill this vision - supporting the EPFA region's position as a growing national freight node, while addressing the visible and tangible transportation and land use challenges that come with that growth.