

Memorandum

TO: Leslie Fordjour, NYMTC

FROM: Chris Lamm, Cambridge Systematics, Inc.

DATE: May 25, 2021

RE: Draft Final Clean Freight Corridors Planning Study Task 4 Freight Demand Trends Memorandum

INTRODUCTION

NYMTC has initiated a Clean Freight Corridors Planning Study to facilitate increased adoption of high-efficiency, low-emission alternative technologies for freight transportation in the New York metropolitan region. As a component of the Regional Freight Plan contained in NYMTC's *Plan 2045* Regional Transportation Plan, this study will support deployment of alternative fuel medium- and heavy-duty (M/HD) vehicles for goods movement by identifying roadway corridors best suited for designation as Clean Freight Corridors to guide future investment in alternative fueling/electric charging infrastructure.

This technical memorandum summarizes a scan of available freight and business establishment data and analysis. The objectives of the scan are to:

- Describe recent and projected future volumes of freight in the multi-state region;
- Describe freight demand on key corridors that carry freight into, out of, through, and within the multi-state MAP Forum region; and
- Identify current and emerging “hubs” (i.e., major freight terminals and/or clusters of freight-generating establishments that generate freight demand). This information can inform the gap analysis regarding potential emerging sources of freight travel demand, and potential freight-focused development

areas where fueling capacity could potentially be developed as well.

These analyses will help the Clean Freight Corridors Study to establish a current and future freight demand context for new clean freight corridor designations and, ultimately, investments in infrastructure to support clean freight in those corridors.

Information and data gathered and incorporated into this scan include the findings of recently-completed and some ongoing studies to describe recent and projected future volumes of freight, freight origins and destinations, and key corridors that convey freight. Business establishment data and qualitative information gathered from published plans and studies and interviews with NYMTC member agencies were used to identify existing and emerging clusters of freight-generating business establishments that are, or could become, major sources of freight travel demand across the multi-state region.

This memorandum is organized as follows:

- Regional Freight Commodity Flow Highlights, summarizes key findings of commodity flow data analysis that show truck freight to be the dominant mode of freight transportation in the region;
- Corridor-Level Freight Truck Flows, summarizes analysis of freight truck volumes, key commodities, travel distances, and top origins and destinations on each of the MAP Forum region's major interstate highway corridors.
- Corridor-Level Freight Generators, summarizes analysis of business establishment data, research on existing and emerging clusters of freight-generating businesses and terminals. These locations are sources of freight travel demand, and some could be potential partners to participate in fleet transition programs or developing fueling and/or charging infrastructure.

REGIONAL FREIGHT COMMODITY FLOW HIGHLIGHTS

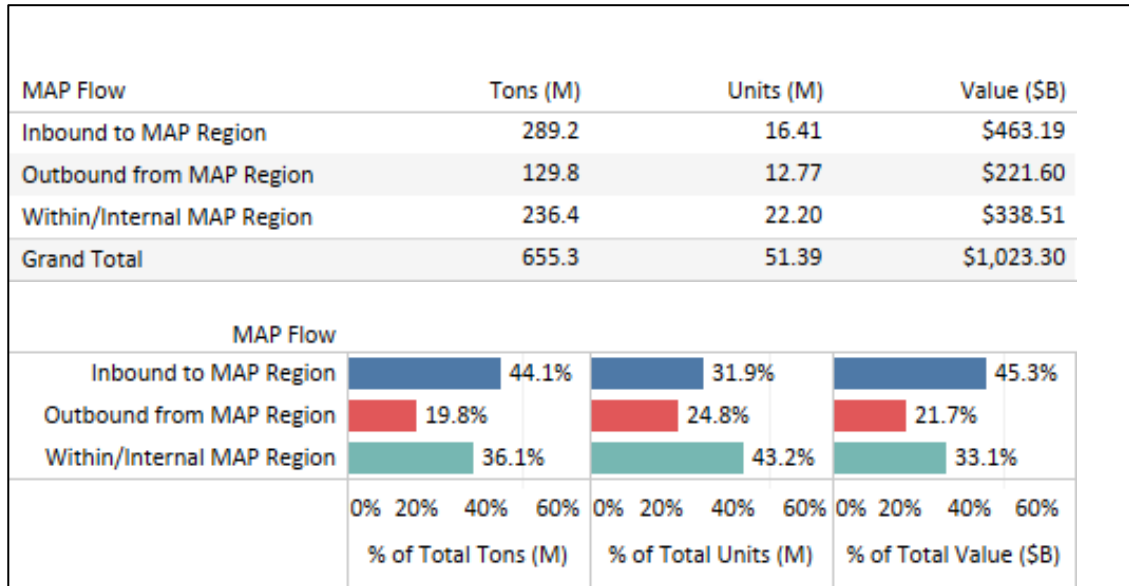
NYMTC has prepared a commodity flow analysis to support the development of the

Freight Element of *Moving Forward*, alternatively known as Plan 2050, its next Regional Transportation Plan. The geographic area covered in the commodity flow analysis includes the planning areas of metropolitan planning organizations and councils of government in the multi-state New York City metropolitan region which are members of the Metropolitan Area Planning (MAP) Forum. Using the 2018 Transearch commodity flow dataset acquired by the New York State Department of Transportation (NYSDOT), an analysis was performed with the following specifications:

- 2018 base year and 2045 forecast horizon year.
- Measures: tons, dollar value, units (trucks or railcars).
- Transportation modes: truck, rail, water, air, pipeline, or other/unknown. Freight trips via multiple modes (such as truck to rail or truck to water) are reported as separate modal trips. Truck volumes primarily reflect longer-distance moves by large trucks may not capture smaller local truck trips involved in redistributing goods for last-mile delivery.
- Commodity flows: inbound into the multi-state MAP Forum region, outbound from the region, or intra-regional flows between and counties. Directional attributes are not explicitly provided in Transearch but can be inferred through data analysis.

The Transearch analysis estimates a total of 655 million tons of domestic and North American trade freight, and 51 million units (trucks and railcars), with a value exceeding \$1 trillion dollars moving into, out of, and within the MAP Forum region in year 2018. The largest shares of tonnage and value moved inbound to the region, and the lowest are moving outbound from the region. The largest shares of units are moving within the region, reflecting the redistribution of goods between producers, warehouse/distribution facilities, and end users, with the inclusion of empty truck return moves reflected in the total. See Figure 1.

Figure 1: MAP Forum Domestic Freight Flows (2018)

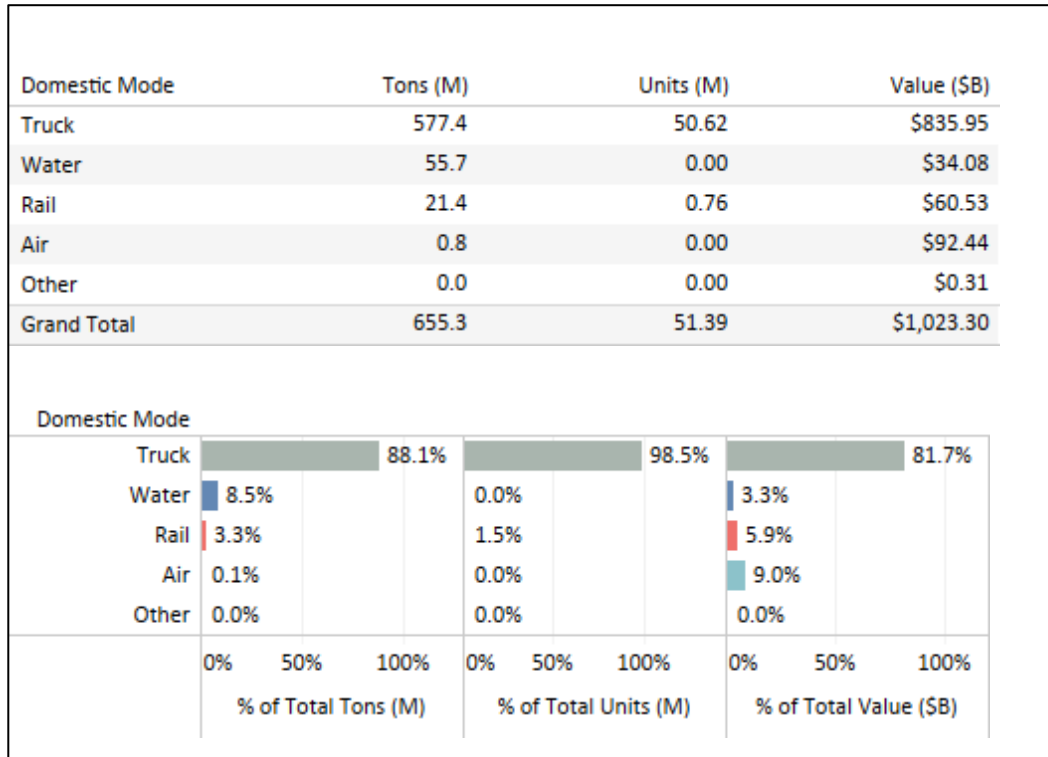


Source: Analysis of NYSDOT Transearch database performed by WSP for the NYMTC Regional Freight Plan Update component of Plan 2050.

As shown in

Figure 2, the vast majority of freight moving in the MAP Forum region (88 percent of freight tons) is carried by trucks. The region has a larger truck mode share than the nation due to a number of factors, including the large consumer market served by last-mile truck deliveries, intraregional interplant and distribution moves, and the under-developed freight rail network east of the Hudson. For these reasons, trucks and the roads and highways where trucks travel, are crucial elements of the region's freight transportation system.

Figure 2: MAP Forum Region Domestic Freight Flows by Mode (2018)

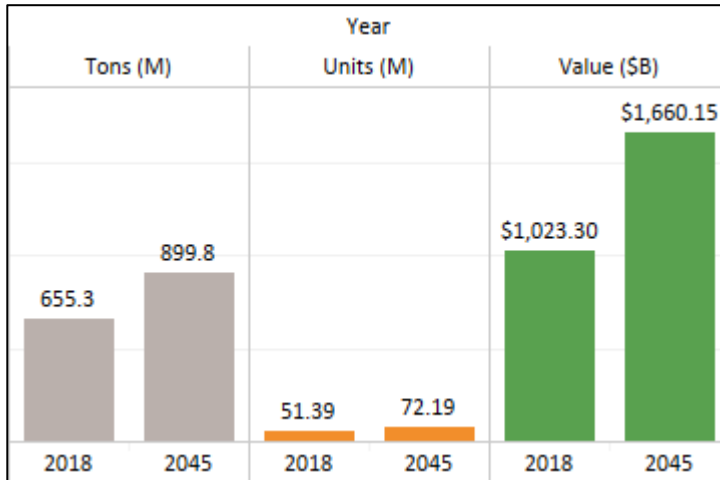


Source: Analysis of NYSDOT Transearch database performed by WSP for the NYMTC Regional Freight Plan Update component of Plan 2050.

According to the Transearch forecast, the volume of freight moved in the MAP Forum region, when measured by tonnage, is expected to increase by approximately 37 percent between 2018 and 2045, from 655 million tons to 900 million tons. See

Figure 3.

Figure 3: MAP Forum Region Domestic Freight Flows (2018 and 2045)



Source: Analysis of NYSDOT Transearch database performed by WSP for the NYMTC Regional Freight Plan Update component of Plan 2050.

The commodity flow analysis emphasizes the critical role trucks and highways play in conveying freight in the MAP Forum region, and suggests that the projected increase in freight demand through 2045 will lead to a greater number of trucks on the region's highways in the future. The next section of this memorandum explores truck trip characteristics on key highway corridors in the region.

The complete commodity flow analysis, which includes more detailed analysis of commodity groups, origin-destination pairs, and international import/export flows will be published as part of the freight element of *Plan 2050*.

CORRIDOR-LEVEL FREIGHT TRUCK FLOWS

The following material was prepared for the Freight Element of NYMTC's next Plan. Figure 6 through Figure 26 following provide information on truck volumes, commodity types, origin-destination patterns, travel distance characteristics, and trip relationship to the NYMTC planning area, at different points in the region's primary truck network. The data source is the Transearch database for year 2018.

Transearch is a commercial product of IHS Markit (now Standard & Poors), and provides modeled estimates of tonnage, value, and unit movements (trucks and railcars) by transportation mode, commodity type, and origin-destination routing.

NYSDOT acquired Transearch for use in state and regional planning and made it available to NYMTC and its consulting team for analysis. The analysis consists of a set of “dashboards” developed using Tableau software, and focuses on truck unit movements (not tonnage or value) occurring at specified locations, in both directions. Each dashboard provides the following information:

- **Truck Flow Summary.** This pie chart shows the distribution of truck trip purposes relative to the ten-county NYMTC planning area. On any given roadway segment, trucks may be: inbound to the NYMTC planning area; outbound from the NYMTC planning area; moving within the NYMTC planning area; or “other.” In cases where the roadway segment is in a NYMTC planning area county, “other” flows represent trucks passing through the NYMTC region. For other roadway segments, “other” flows are truck movements primarily unrelated to the NYMTC planning area, such as moves within or between New Jersey, Pennsylvania, Connecticut, and other states.
- **Truck Commodity Mix.** This bar chart shows the percentage share of different commodity groups, color-coded to show the Truck Flow type for each commodity group. Transearch includes empty trucks as a commodity group, so these moves are captured; MSW and waste moves are also captured.
- **Leading Truck Origins and Destinations.** These dot maps show the primary origins and destinations of truck trips . In many cases the two maps will be similar because empty truck return moves are included in the data.
- **Units and Shares by Distance.** These tables summarize the number of Transearch-reported truck unit units and how many are moving less than 100 miles, 100 to 400 miles, or over 400 miles. Note that Transearch estimates will not capture every truck, particularly for shorter-haul movements, so the reported units are likely to differ from HPMS or other available count data.

Figure 4. Analysis Locations, Part 1 of 2

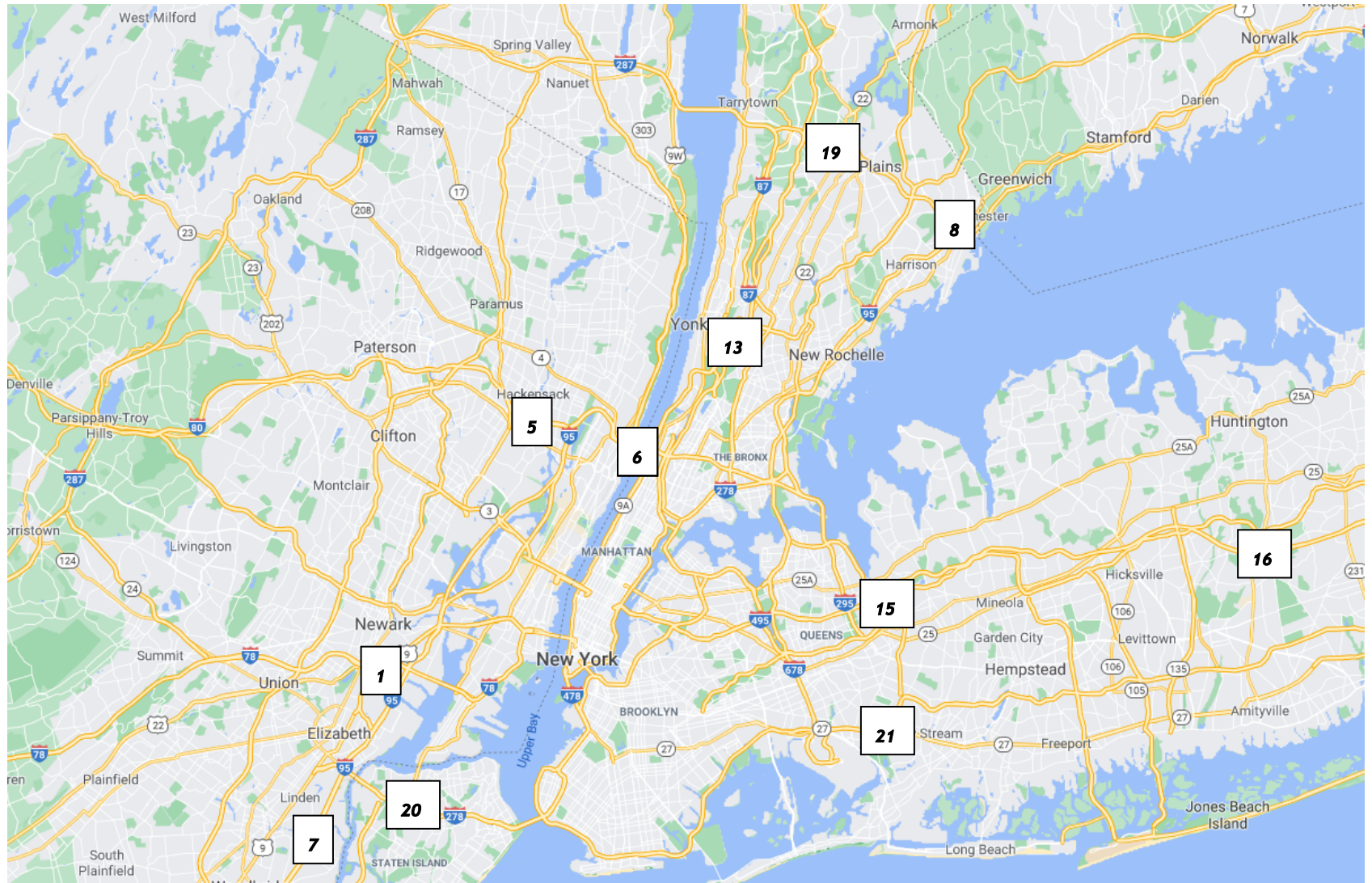


Figure 5. Analysis Locations, Part 2 of 2

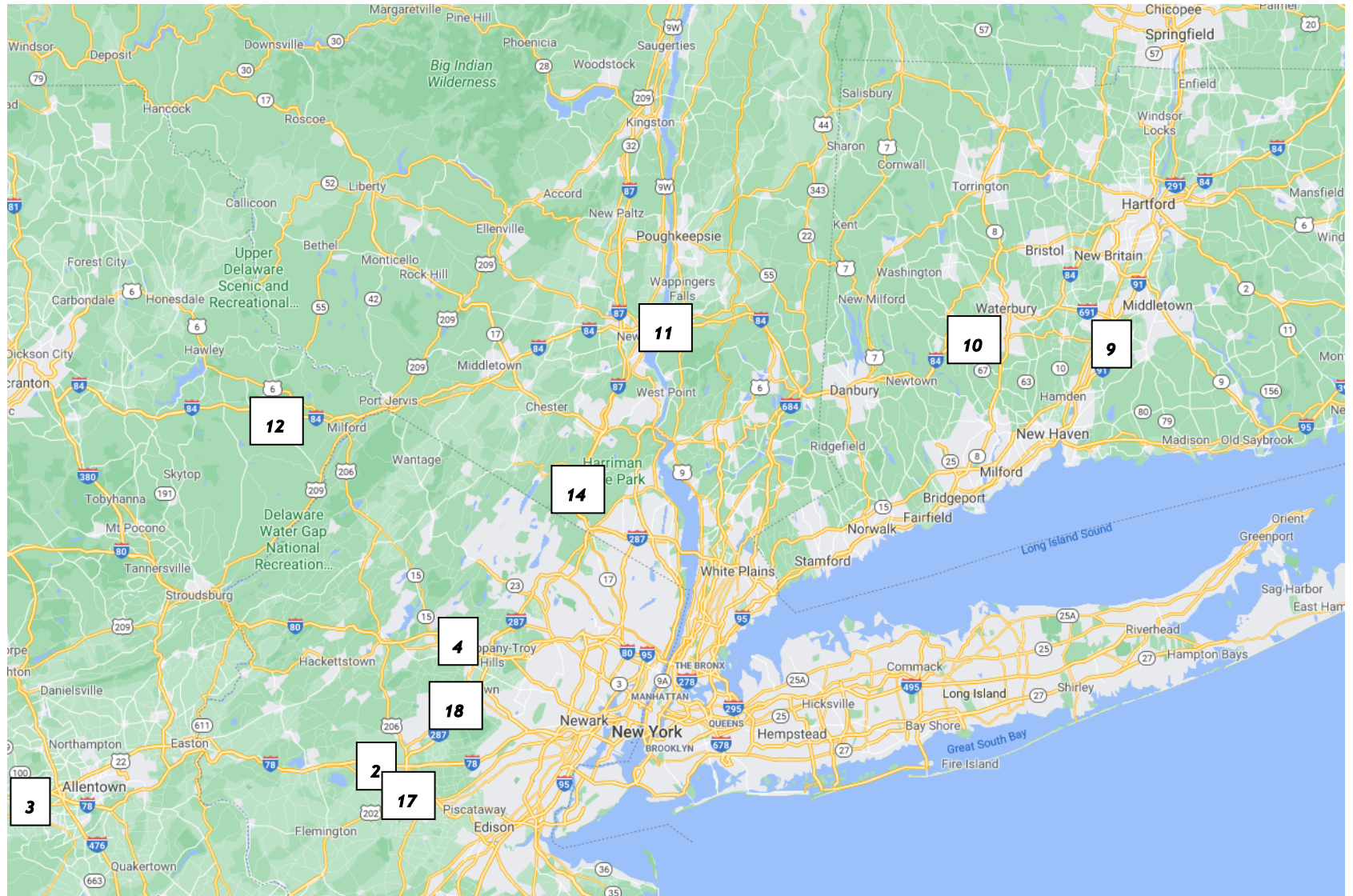


Figure 6. Analysis Location 1: I-78 west of US 1/9, Essex County, NJ

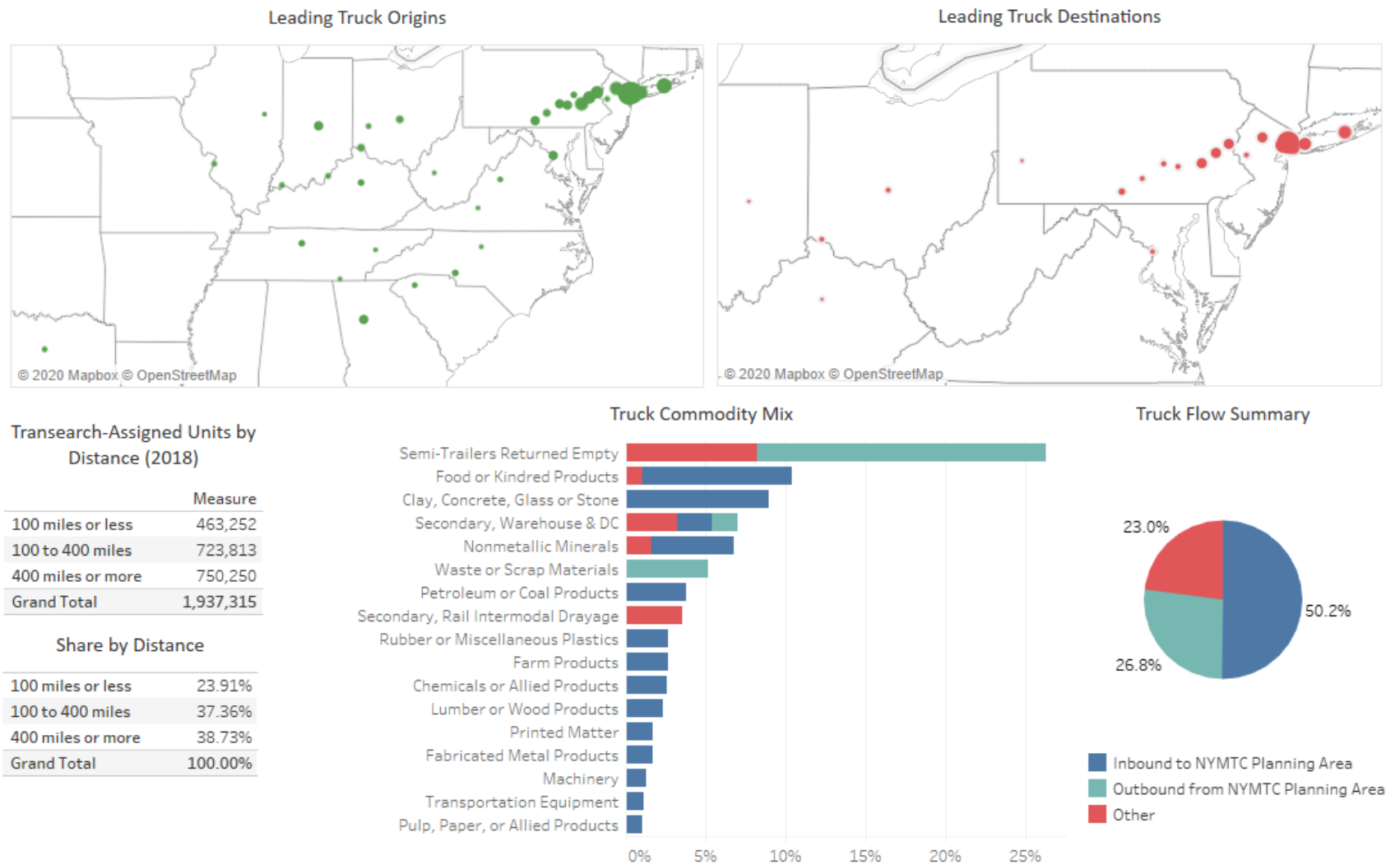


Figure 7. Analysis Location 2: I-78 west of I-287, Somerset County, NJ

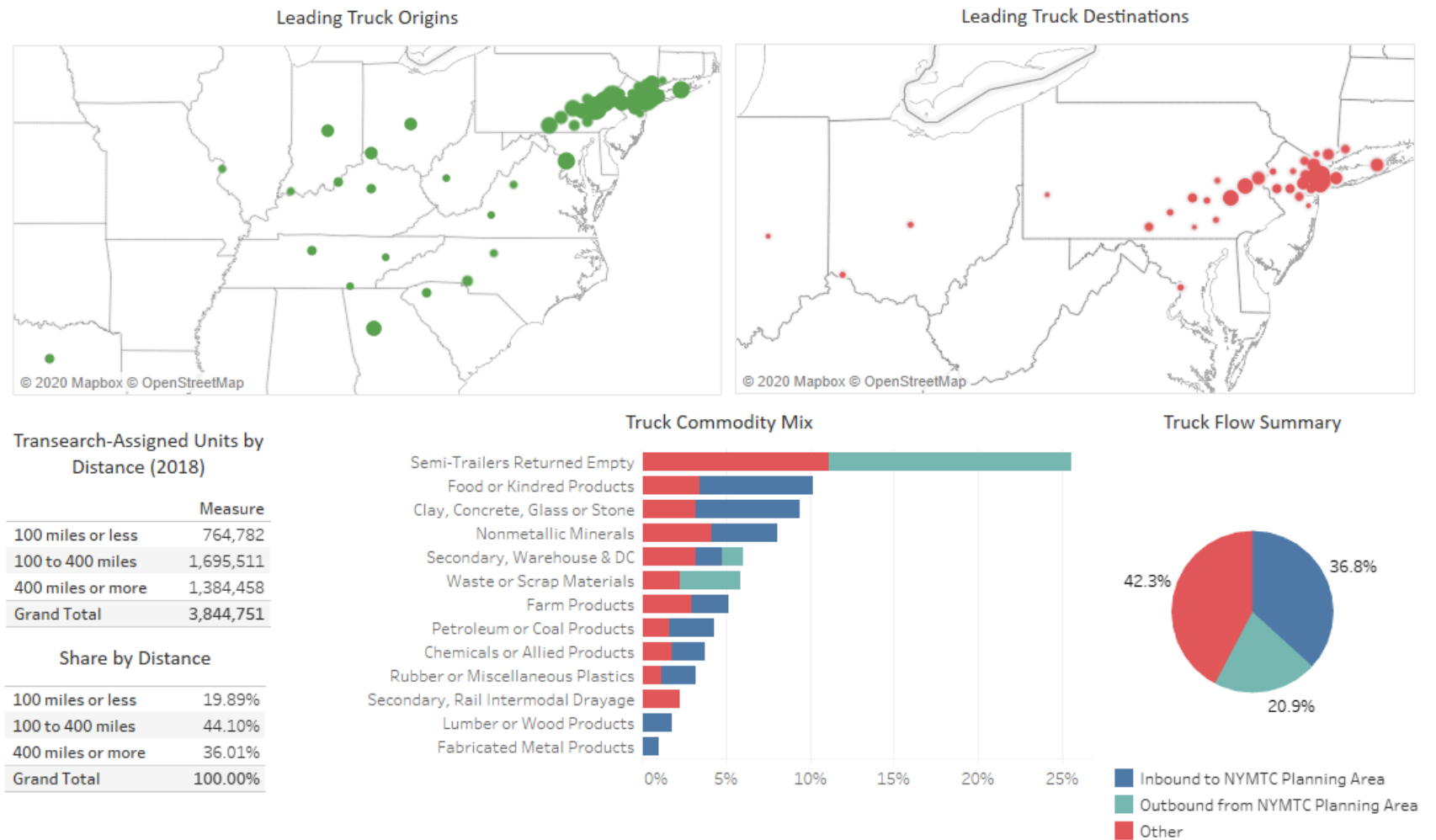


Figure 8. Analysis Location 3: I-78 west of I-476/US-22, Lehigh County, PA

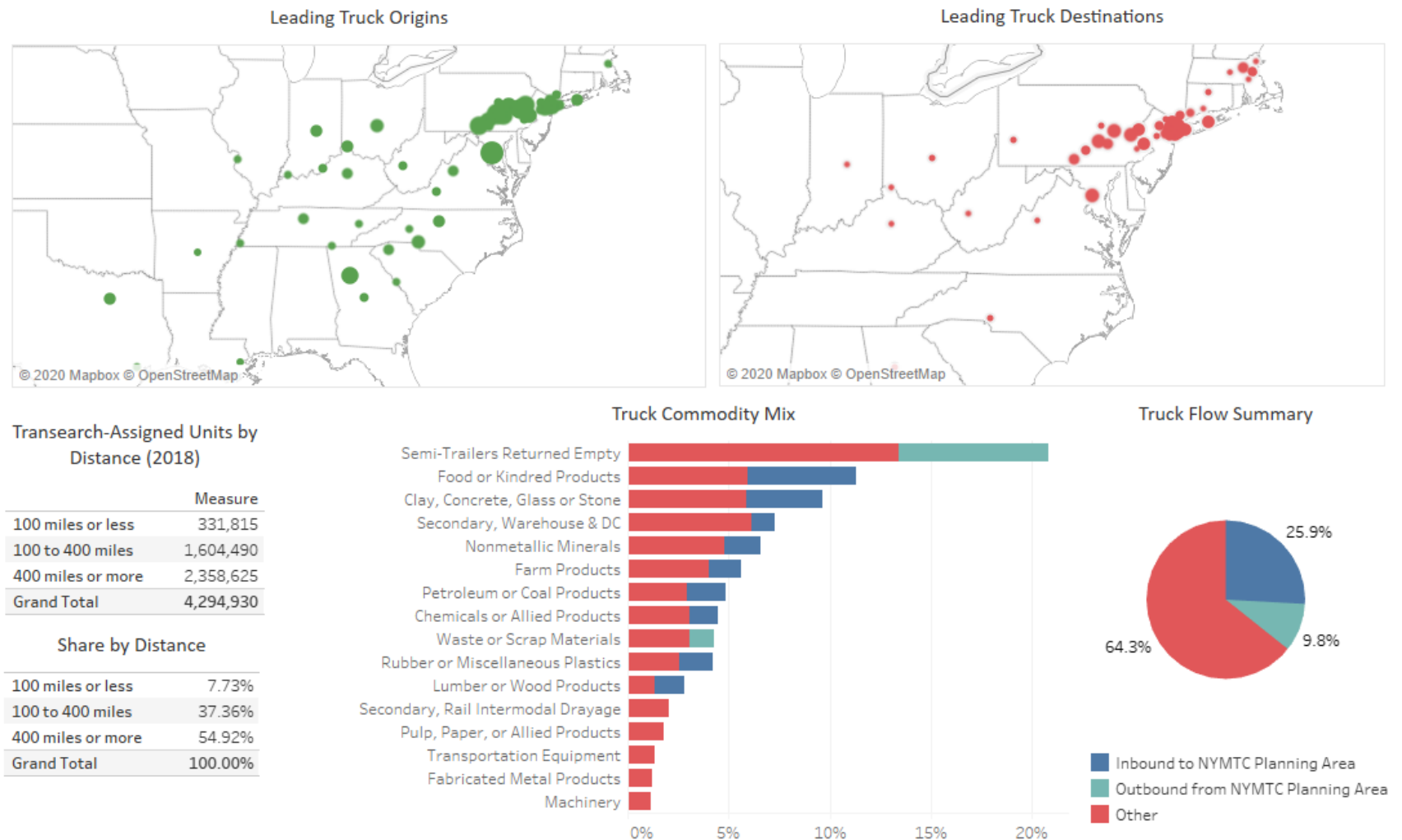


Figure 9. Analysis Location 4: I-80 west of I-287, Morris County, NJ

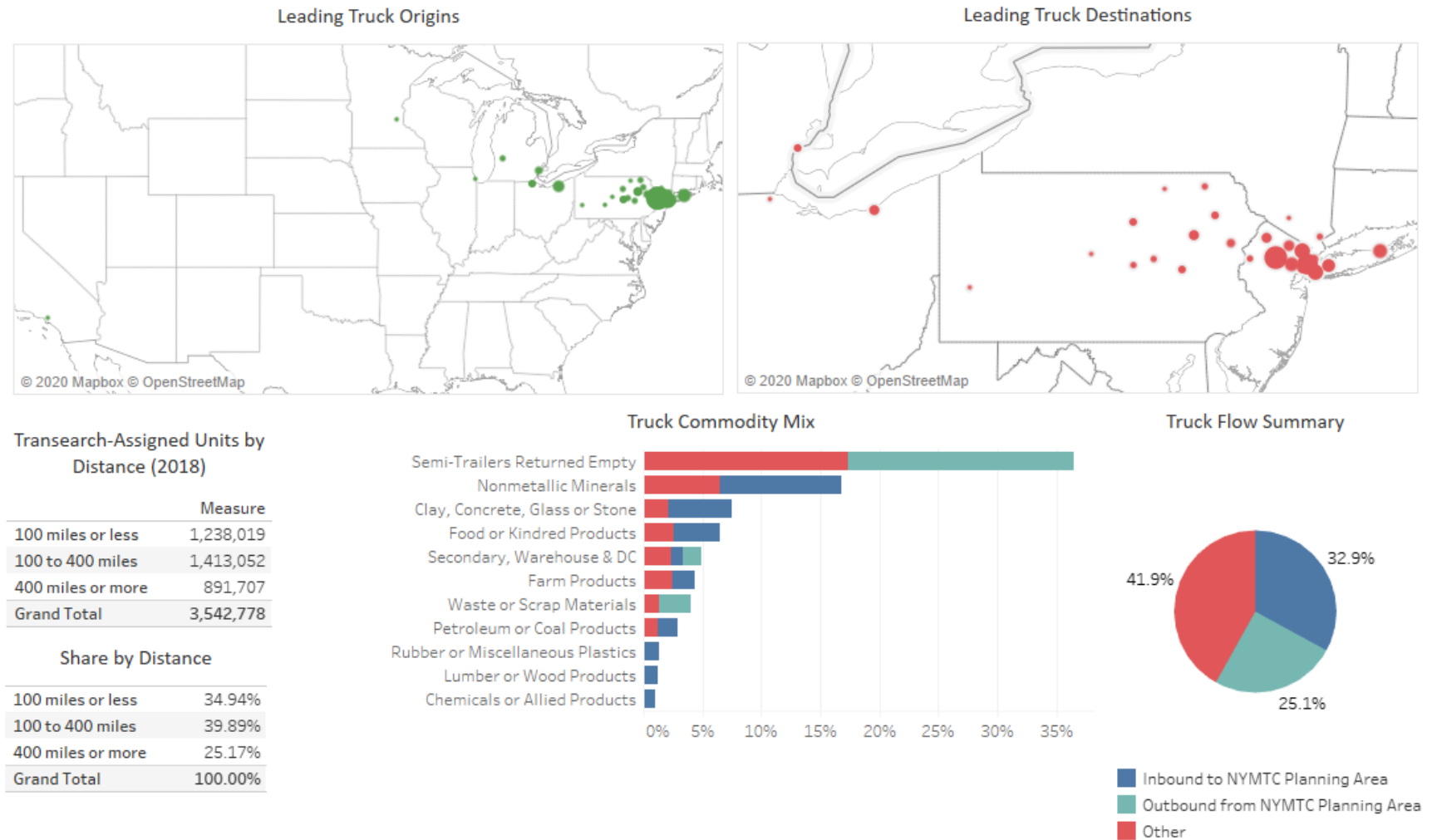


Figure 10. Analysis Location 5: I-80 west of I-95, Bergen County, NJ

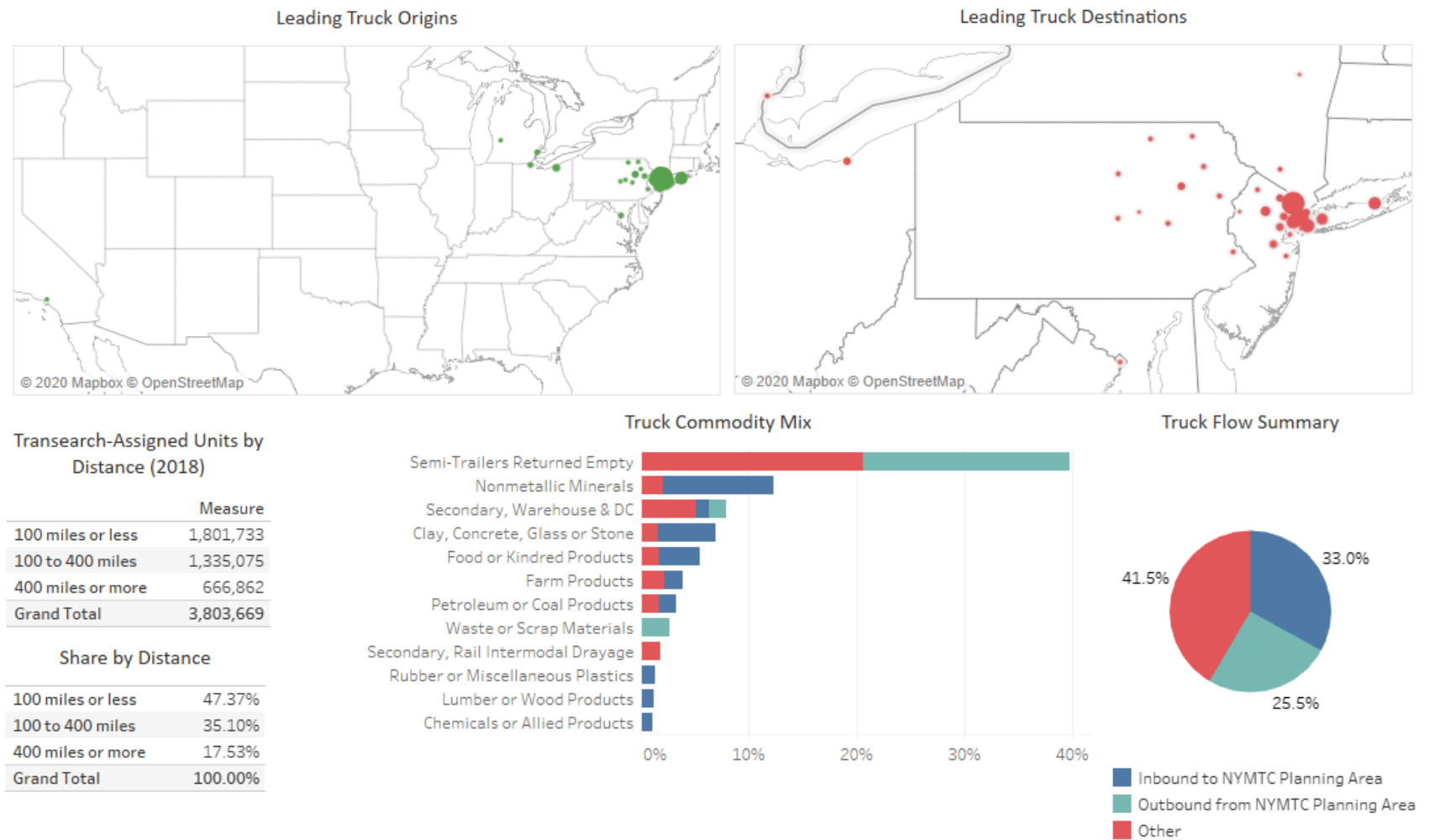


Figure 11. Analysis Location 6: I-95 at the George Washington Bridge

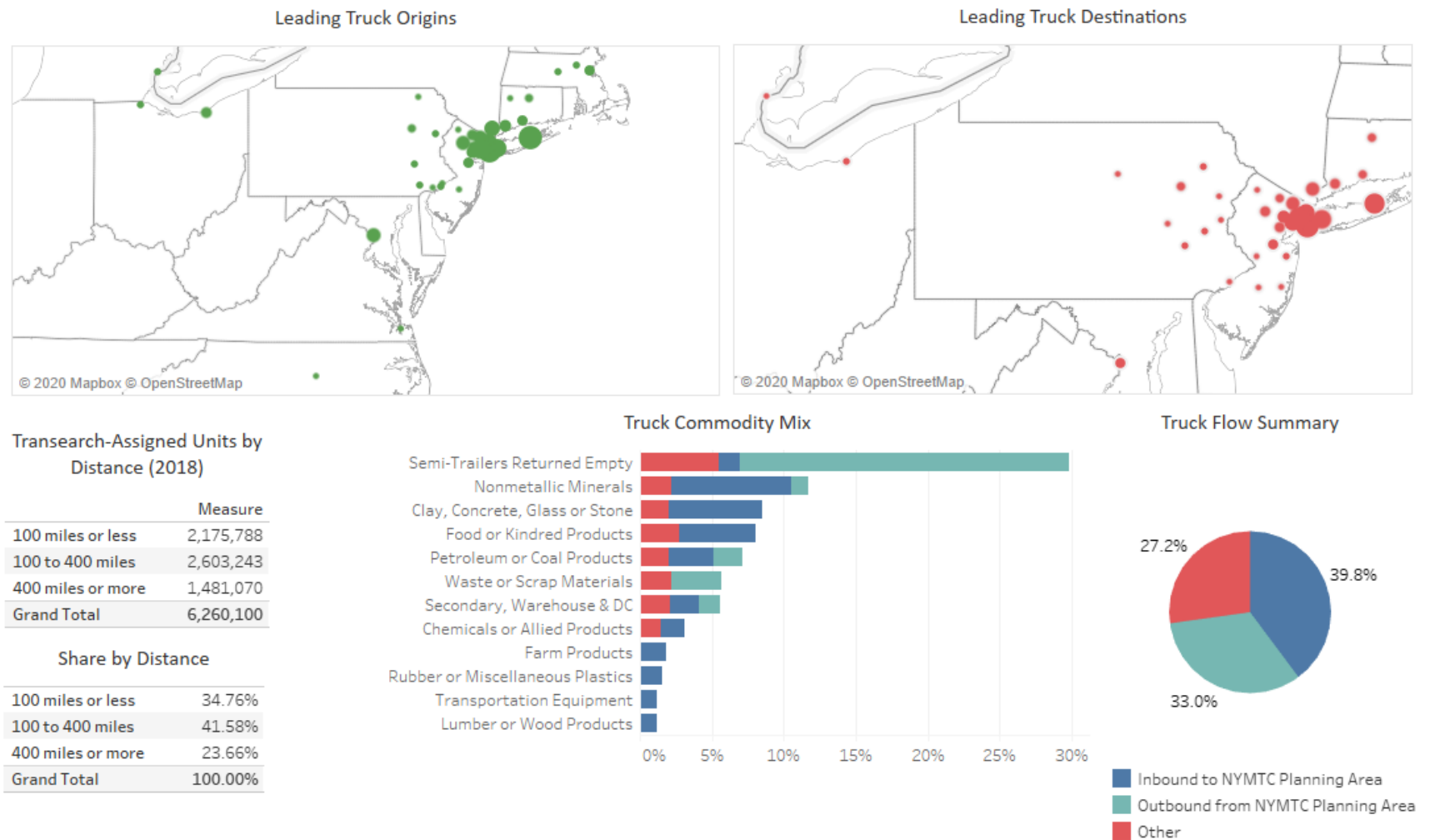


Figure 12. Analysis Location 7: I-95 between NJ-35 and I-278, Union County, NJ

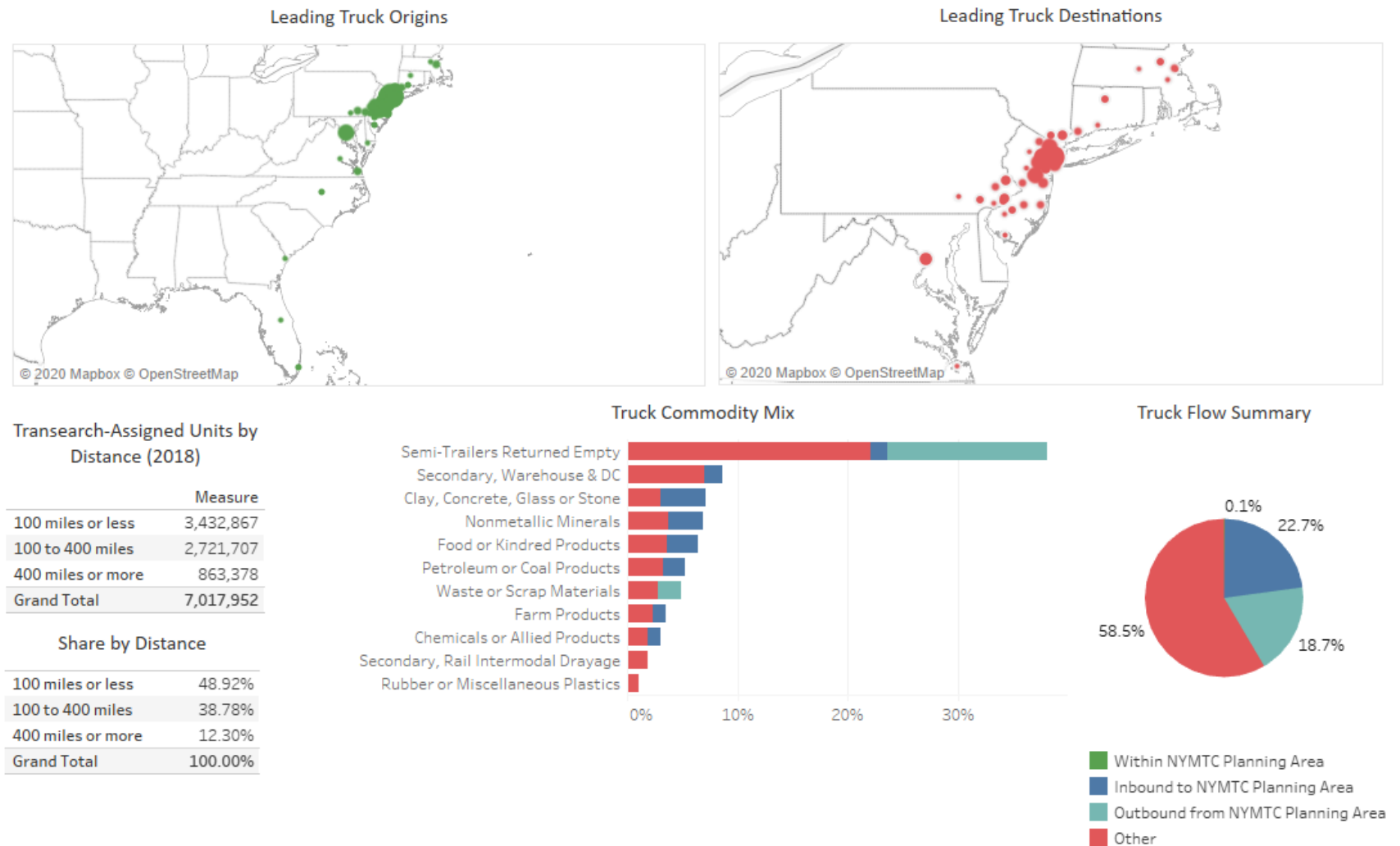


Figure 13. Analysis Location 8: I-95 at the New York/Connecticut State Line

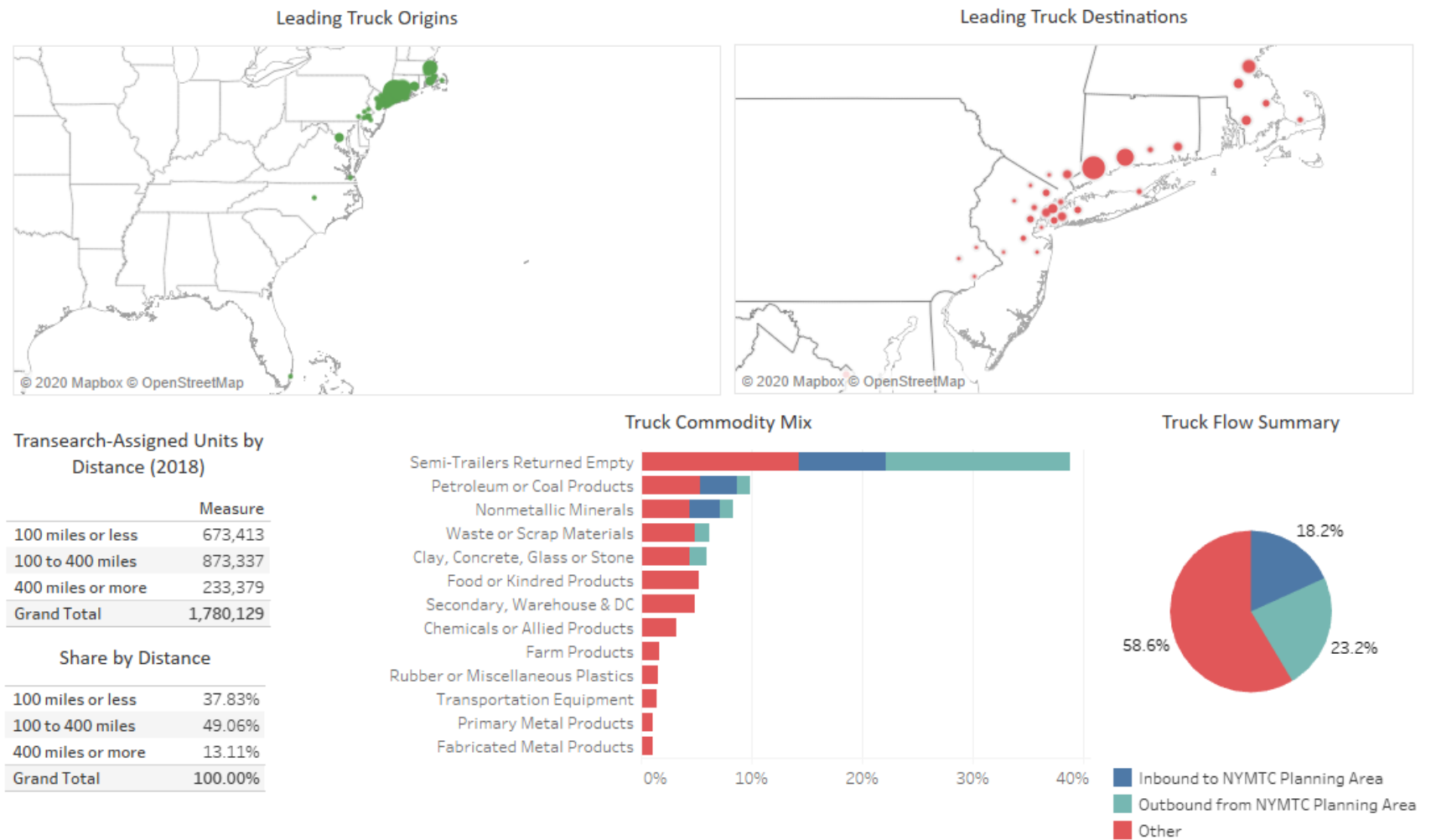


Figure 14. Analysis Location 9: I-91 south of I-691, New Haven County, CT

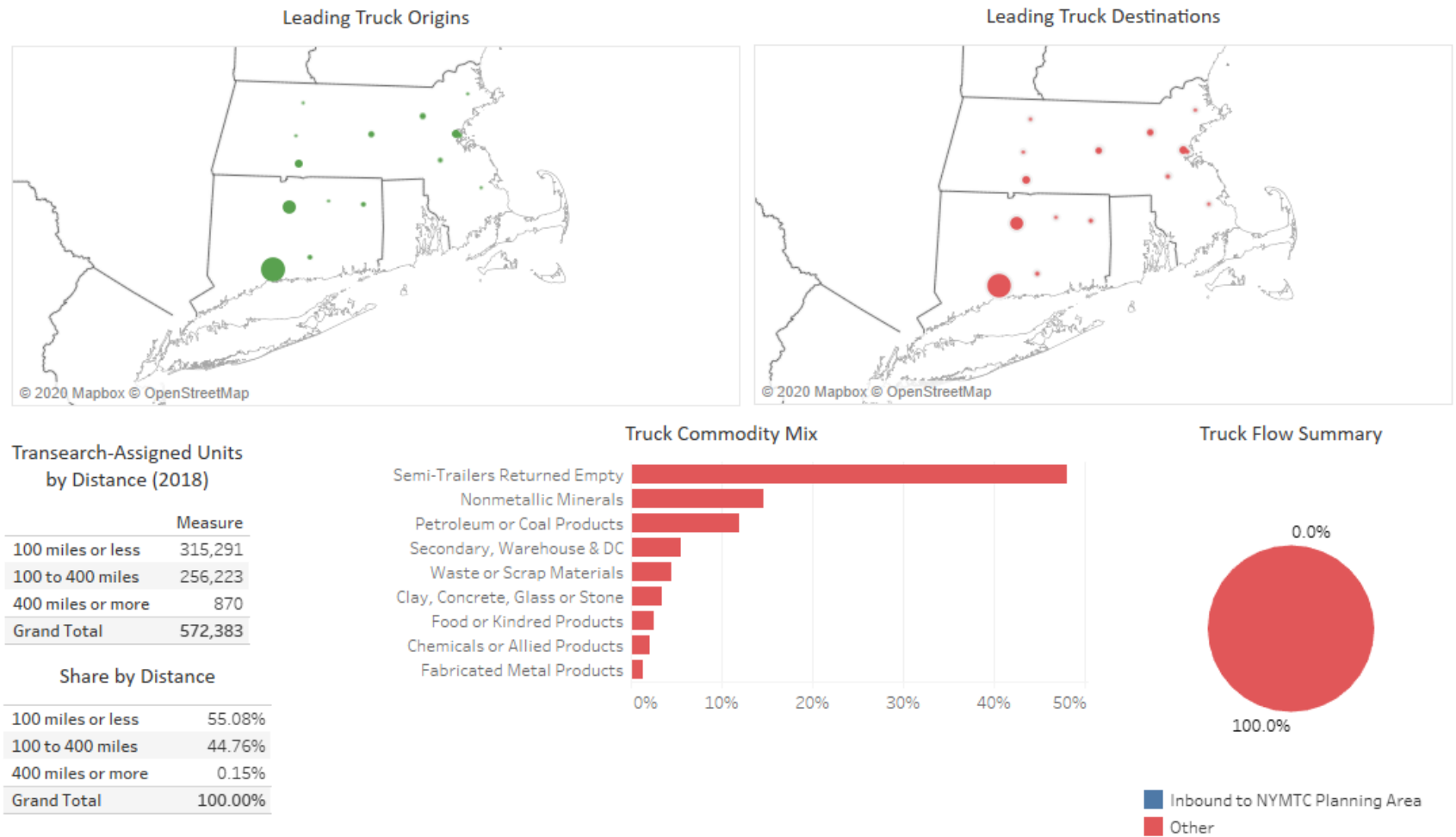


Figure 15. Analysis Location 10: I-84 east of CT-63, New Haven County, CT

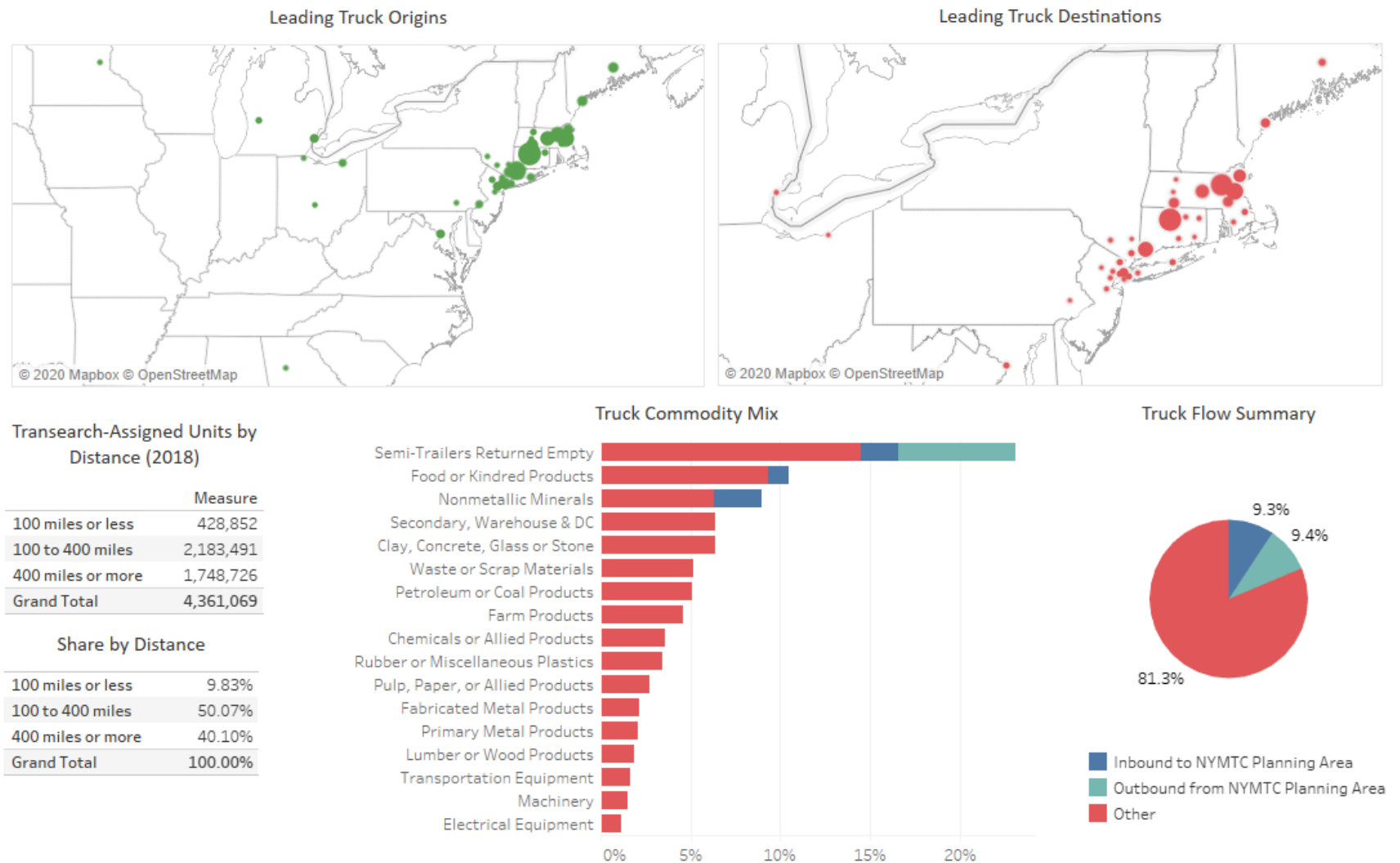


Figure 16. Analysis Location 11: I-84 at the Newburgh-Beacon Bridge

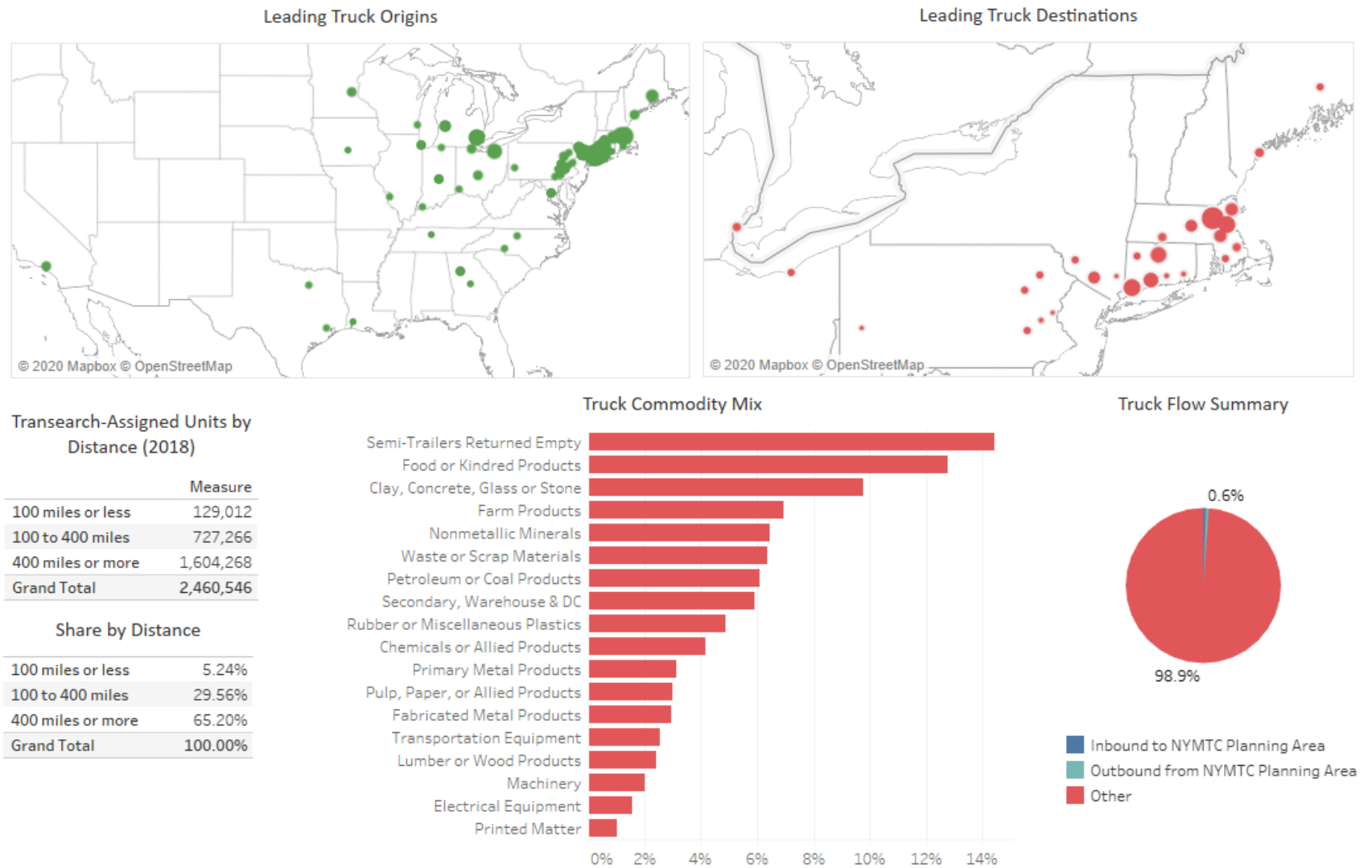


Figure 17. Analysis Location 12: I-84 west of US-6, Orange County, NY

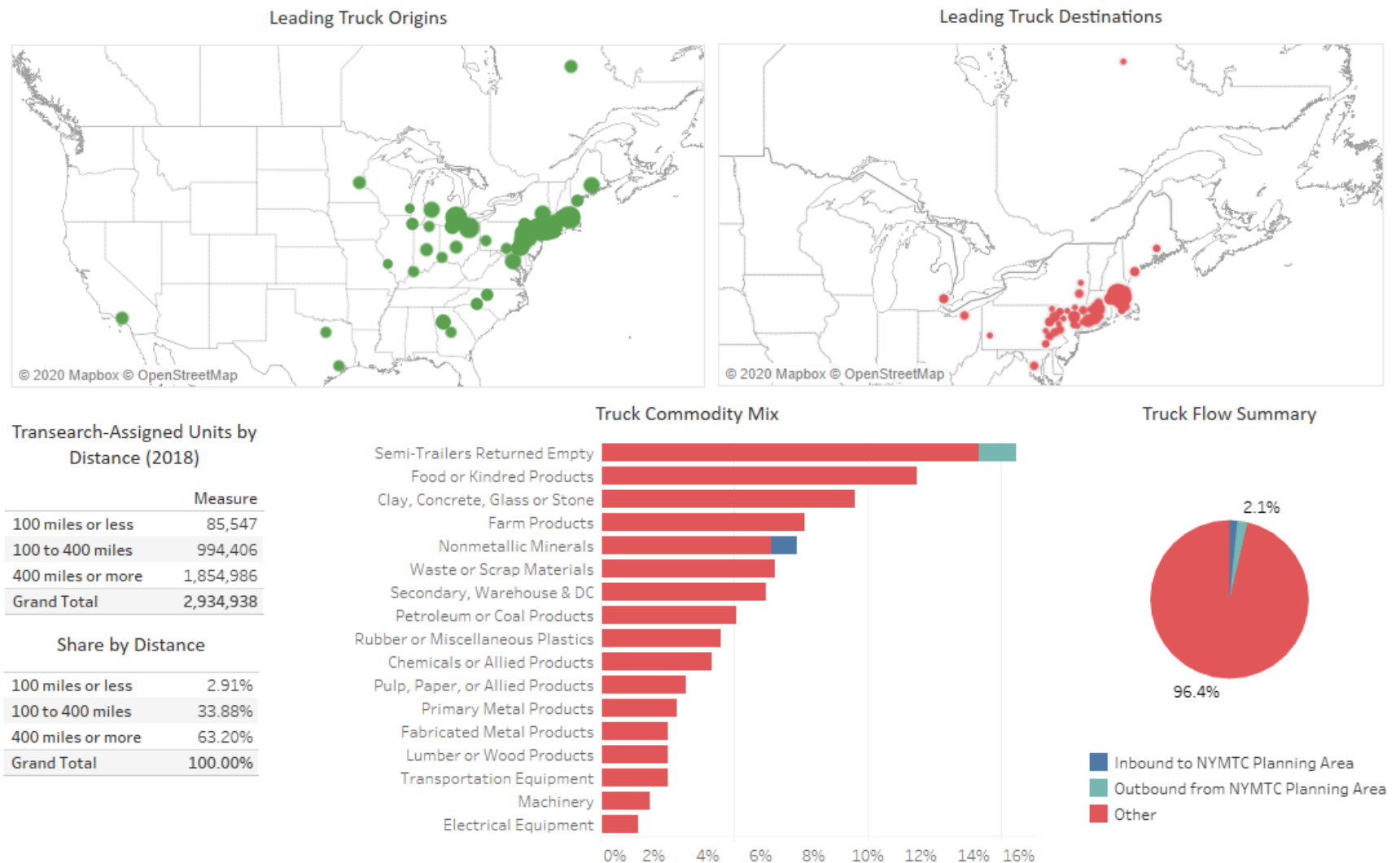


Figure 18. Analysis Location 13: I-87 north of Bronx, Westchester County, NY

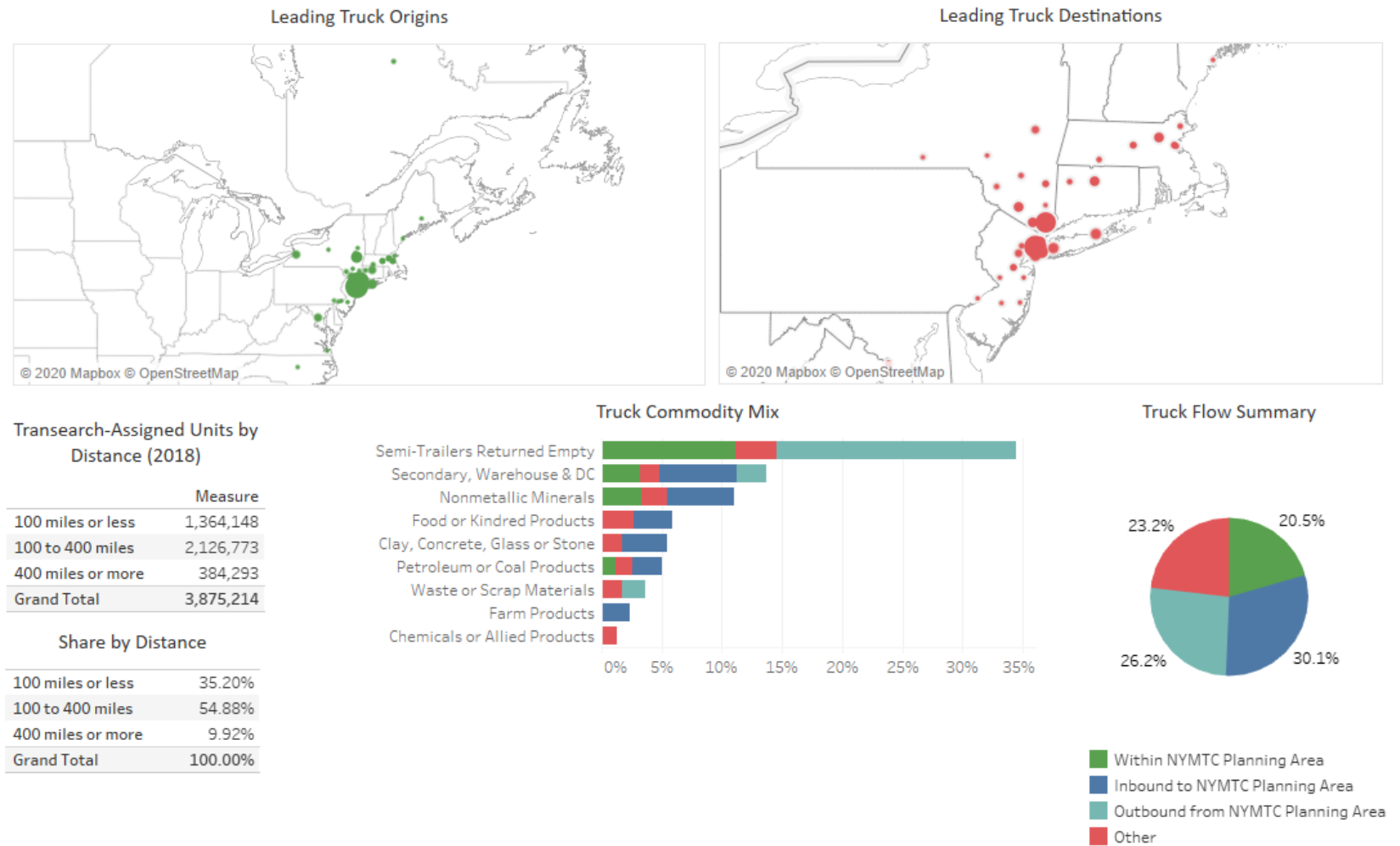


Figure 19. Analysis Location 14: I-87 at the Rockland Co. NY / Orange Co. NY line

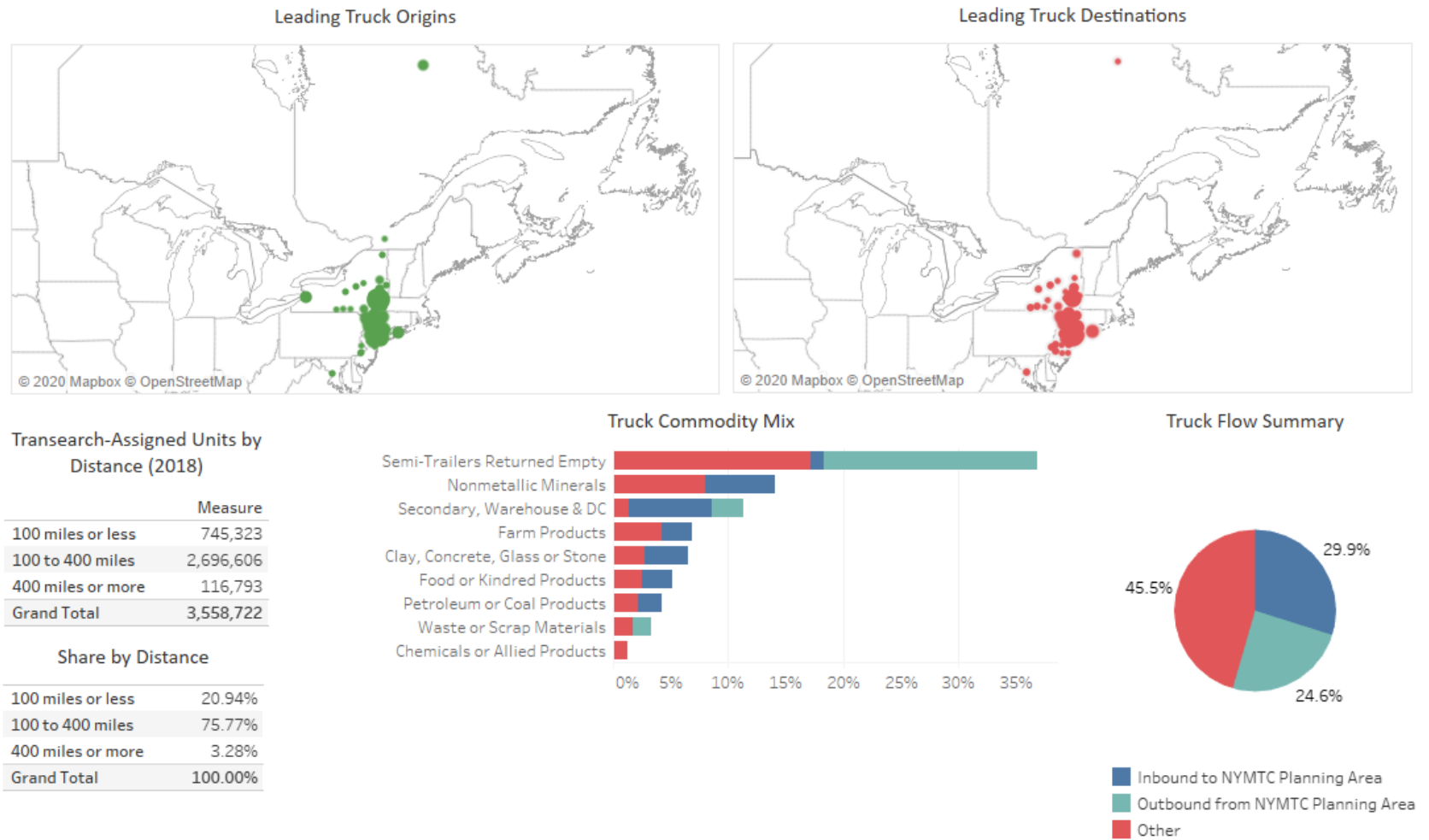


Figure 20. Analysis Location 15: I-495 east of I-295, Queens County, NY

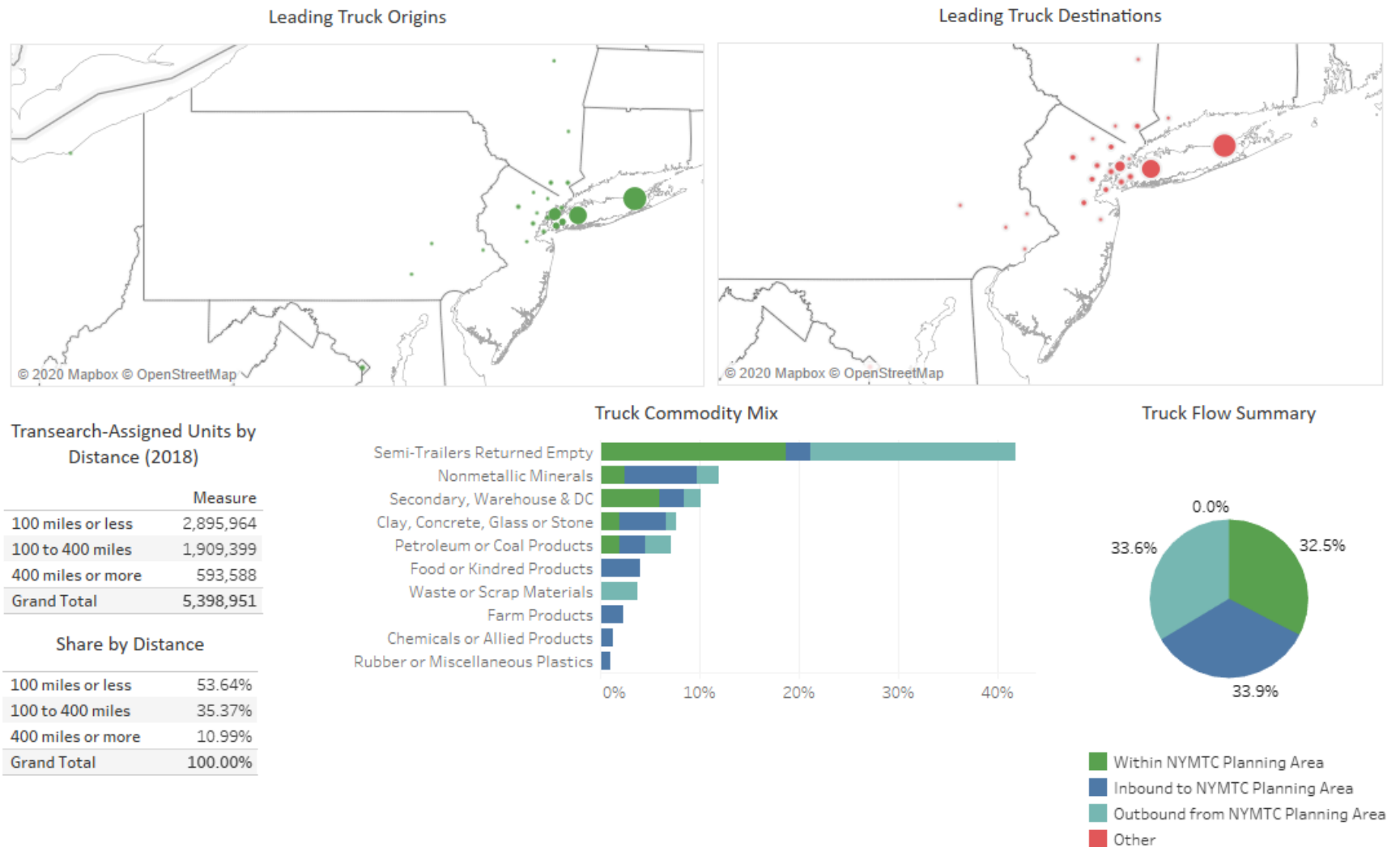


Figure 21. Analysis Location 16: I-495 at the Nassau Co. NY / Suffolk Co. NY Line

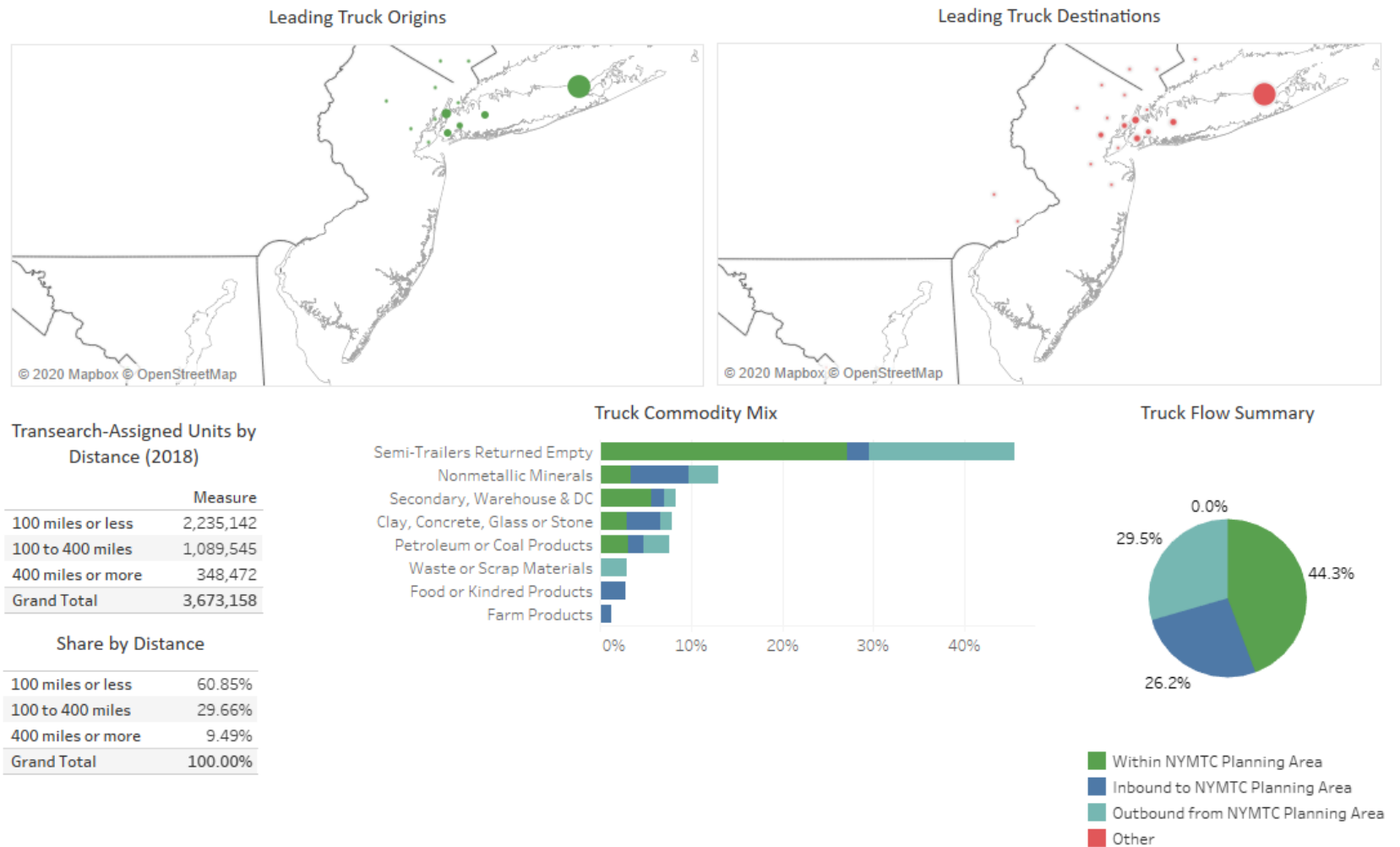


Figure 22. Analysis Location 17: I-287 between I-78 and US-202, Somerset County, NJ

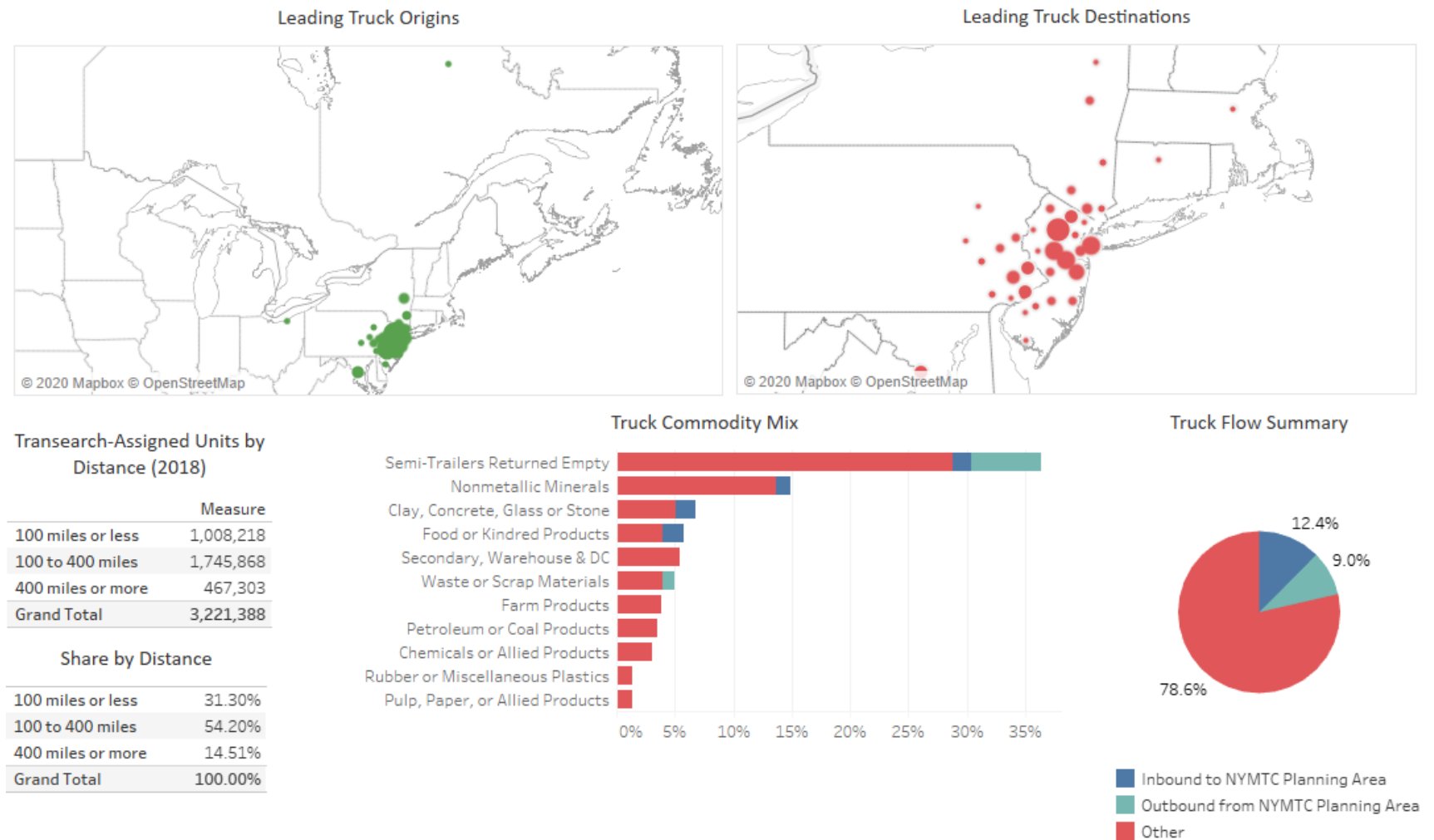


Figure 23. Analysis Location 18: I-287 north of US-202/US-206, Somerset County, NJ

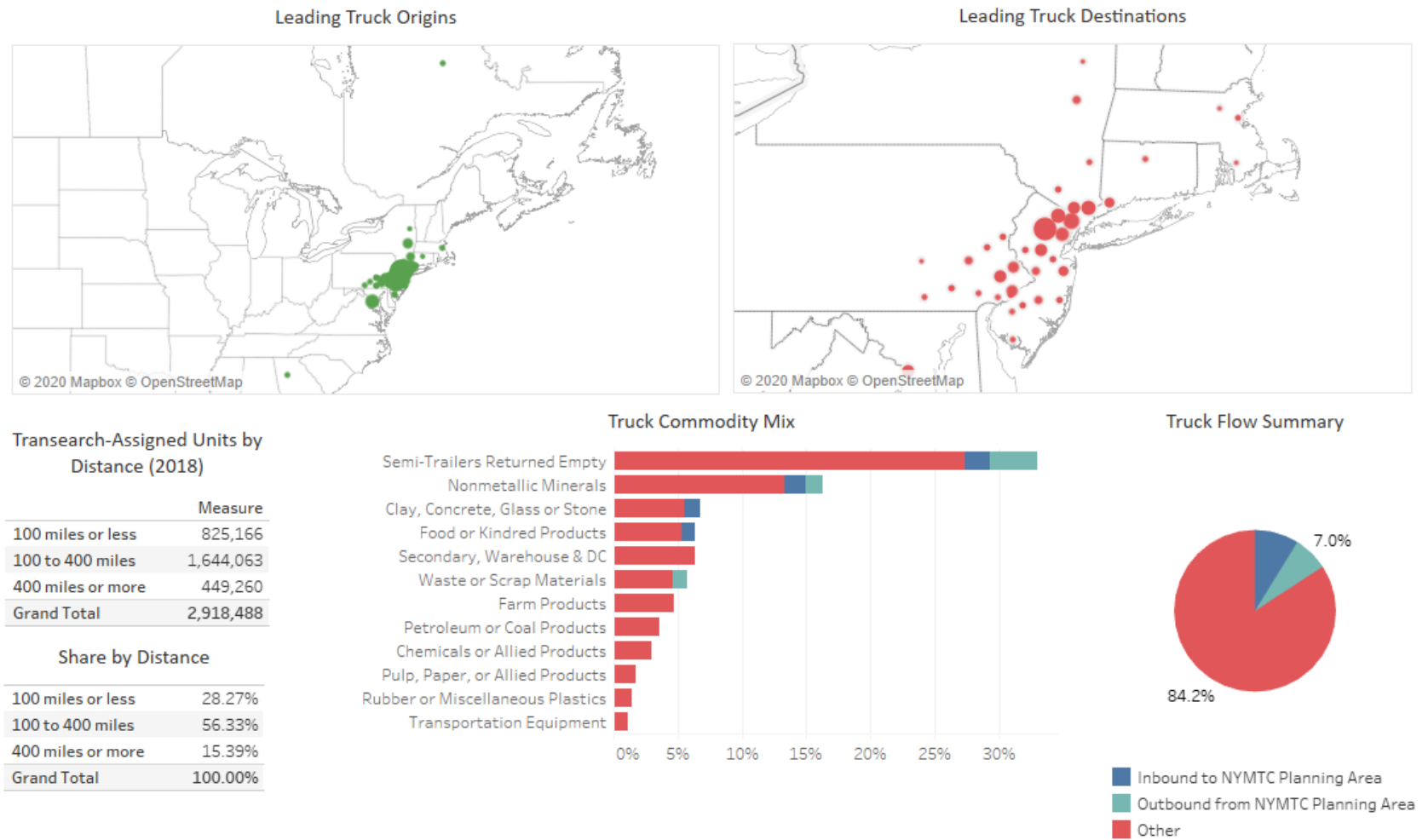


Figure 24. Analysis Location 19: I-287 east of NY-100, Westchester County, NY

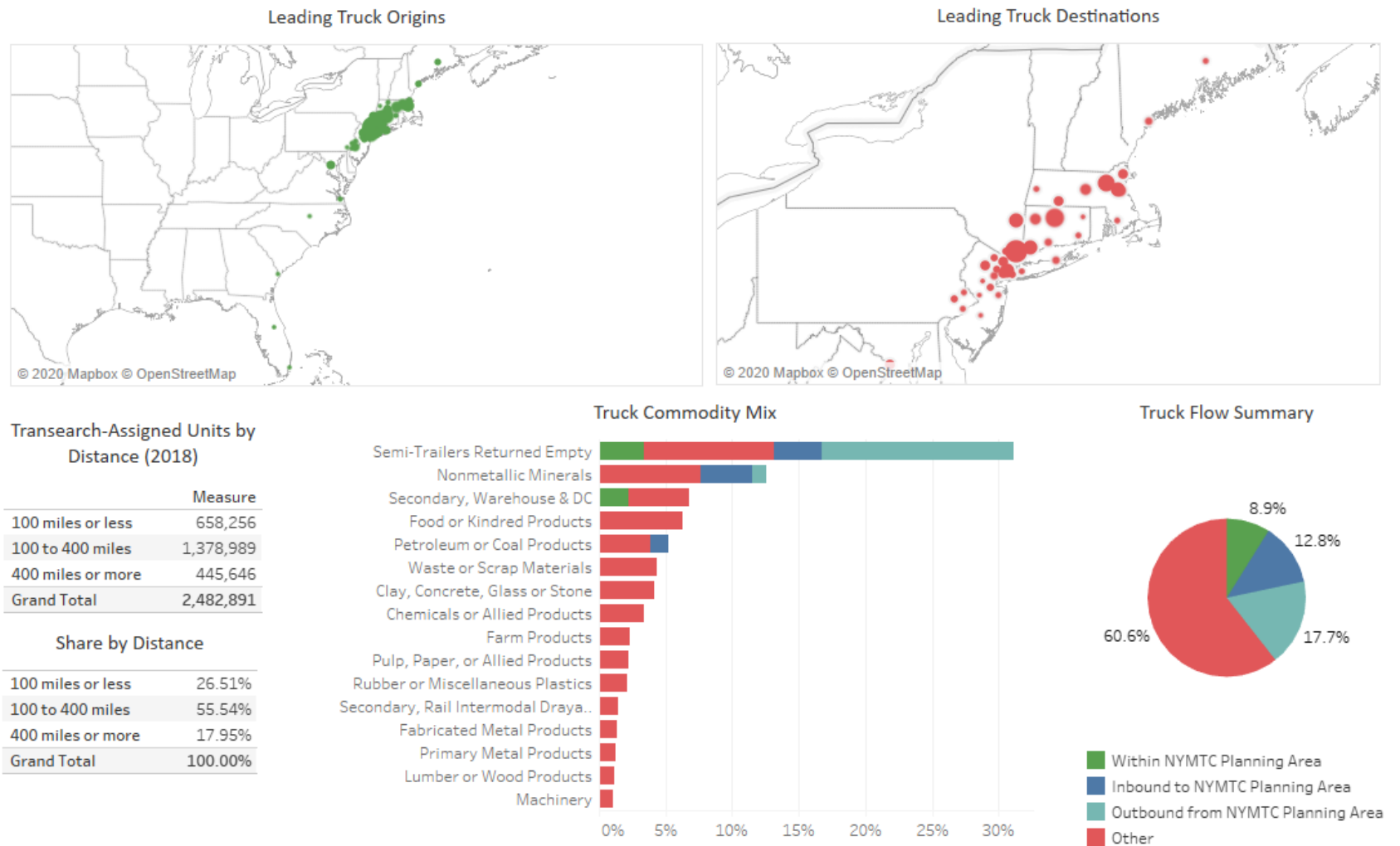


Figure 25. Analysis Location 20: I-278 east of Goethals Bridge and NY-440, Richmond County, NY

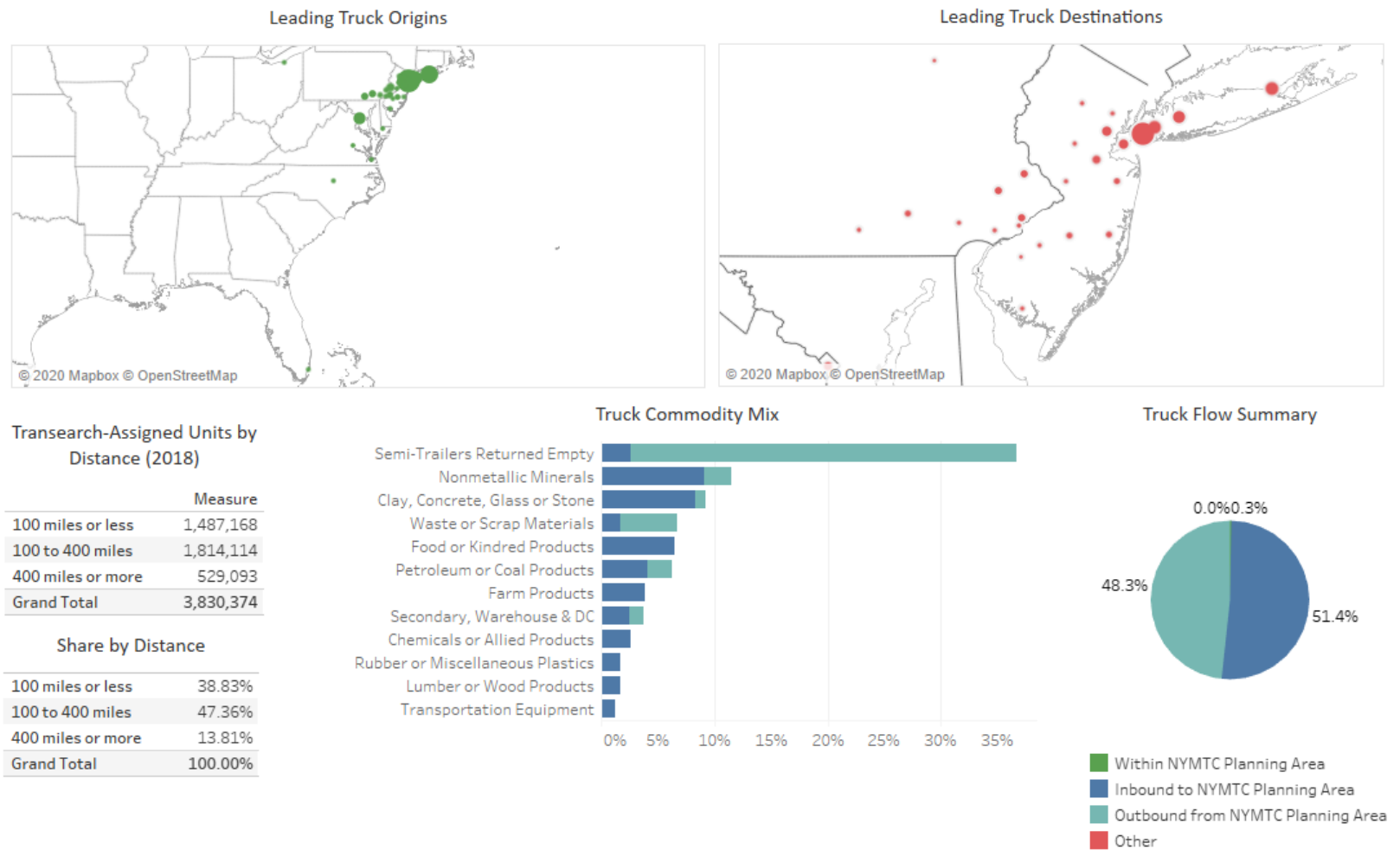
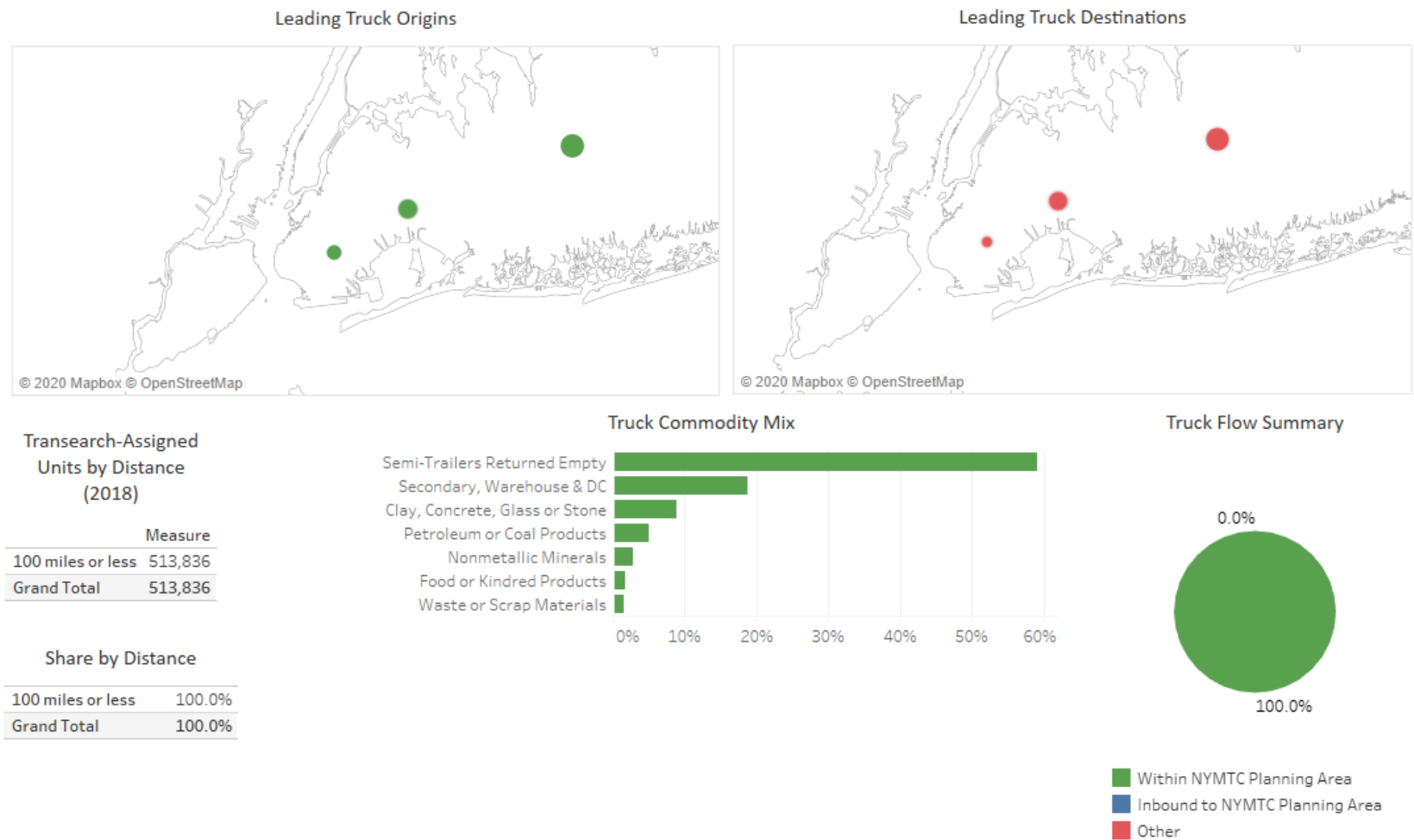


Figure 26. Analysis Location 21: NY-27 at Queens/Nassau County Line, NY



Key findings of this analysis relevant to the Clean Freight Corridors Study include:

- Highway corridor segments carrying the greatest volume of commodity truck flows include:
 - I-95 in Union County, NJ (7 million truck units in 2018);
 - I-95 at George Washington Bridge, NY/NJ (6.8 million truck units in 2018);
 - I-495 east of I-295 in Queens, NY (5.4 million truck units in 2018);
 - I-84 in New Haven County, CT (4.4 million truck units in 2018); and
 - I-78 in Lehigh County, PA (4.3 million truck units in 2018).
- Short-distance commodity truck trips could be supported with alternative fueling and charging infrastructure within the MAP Forum region. The highway segments that carry the largest proportions of short-distance (less than 100 miles) commodity truck trips include:
 - NY Route 27 at the Queens-Nassau line (100%);
 - I-91 in New Haven County (55%);
 - I-287 in Somerset and Westchester counties (54-56%); and
 - I-495 in eastern Queens and Nassau counties (54-61%).
- To support longer-distance commodity truck trips, clean fueling and charging infrastructure investments may have to be coordinated with, or planned in a manner that considers, investments to be made in states outside the MAP Forum region. The highway segments that carry the largest proportions of long-distance (more than 400 miles) commodity truck trips include:
 - I-84 in Dutchess and Orange counties (63-65%); and
 - I-78 in Lehigh County (55%);

- I-84 in New Haven County (40%); and
- I-78 in Hudson and Somerset counties (36-39%).

FREIGHT GENERATORS BY CORRIDOR

Analyzing the distribution of existing and potential future major generators of freight demand within the four-state MAP Forum region is relevant to the Clean Freight Corridors Study for several reasons, including:

- Origins and destinations of substantial numbers of freight shipments, contributing to the region's observed and projected freight travel demand, and to freight travel demand in key corridors;
- Emerging clusters of freight-generating establishments, such as new or expanding industrial parks, newly constructed or re-developing warehousing or distribution center facilities, and/or non-industrial buildings being redeveloped or repurposed for distribution represent potential growth and/or shifts in sources of freight travel demand; and
- Businesses and facilities that generate freight volumes, including motor carriers, warehousing and distribution facilities, and public terminals, are potential actors in implementing clean freight strategies, including transitioning fleets and/or developing charging and fueling infrastructure.

The primary source of business establishment data used for this analysis was a package of 2019 data produced by InfoUSA and acquired via NYSDOT, with permission from the data vendor. The InfoUSA data includes records on tens of thousands of business establishments in New York State and portions of northern New Jersey, northern Pennsylvania, western Connecticut, and other areas adjacent to New York State's boundaries. Key attributes include business name, industry classification code, number of on-site employees, geographic coordinates, and contact information.

The InfoUSA data package acquired via NYSDOT did not cover the Lehigh Valley in eastern Pennsylvania or portions of Connecticut outside of Fairfield or Litchfield counties. Zip Code Business Patterns data, acquired from the U.S. Census Bureau, was used to cover these parts of the study area. The Zip Code Business Patterns data includes the number of business establishments by industry sector and employment, expressed in ranges. Data for 2018 was acquired and used for this study.¹ There are no geographic coordinates or attributes that allow users to identify specific establishments, and where there are fewer than three businesses in a given zip code that meet the user's query criteria, the data are masked.

The InfoUSA and Zip Code Business Patterns data were queried in order to produce a list of “major freight generators” that are located within major freight highway corridors across the four-state MAP Forum region. The queries selected establishments in North American Industry Classification System (NAICS) codes 11-49, which represent “freight-intensive” industry sectors. A list of NAICS codes included in this query is provided in Table 1. These establishments were also filtered to select establishments with 100 or more employees and within five-mile buffers of the highway corridors reviewed in the Task 2 Technical Memorandum.

Table 1. “Freight-Intensive Industry Sectors” by NAICS Code

2-Digit NAICS Code	Description
11	Agriculture, Forestry, Fishing, and Hunting
21	Mining, Quarrying, and Oil and Gas Extraction
22	Utilities
23	Construction
31-33	Manufacturing
42	Wholesale Trade
44-45	Retail Trade

¹ *Zip Code Business Patterns 2018, U.S. Census Bureau, available from: <https://www.census.gov/data/developers/data-sets/cbp-nonemp-zbp/zbp-api.html> (accessed December 17, 2020).*

48-49	Transportation and Warehousing
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Figure 28 shows the locations of business establishments that represent “major freight generators” near key freight highway corridors across the four-state MAP Forum region.

Table 2 is a companion to the map. It identifies the number of establishments, and identifies and describes key existing and emerging freight clusters, in each highway corridor. Additional information sources, including recently-completed freight and economic development plans and studies, internet research, and interviews completed with NYMTC member agencies during the Summer and Fall of 2020, were used to identify existing and emerging clusters, or activity centers, that generate substantial volumes of freight, or that are expected to generate substantial volumes of freight in the future, once they are further (re)developed.

Figure 27. Business Establishments in Key Freight-Generating Industry Sectors, with 100 or More Employees, and Within 5 Miles of a Major Freight Highway

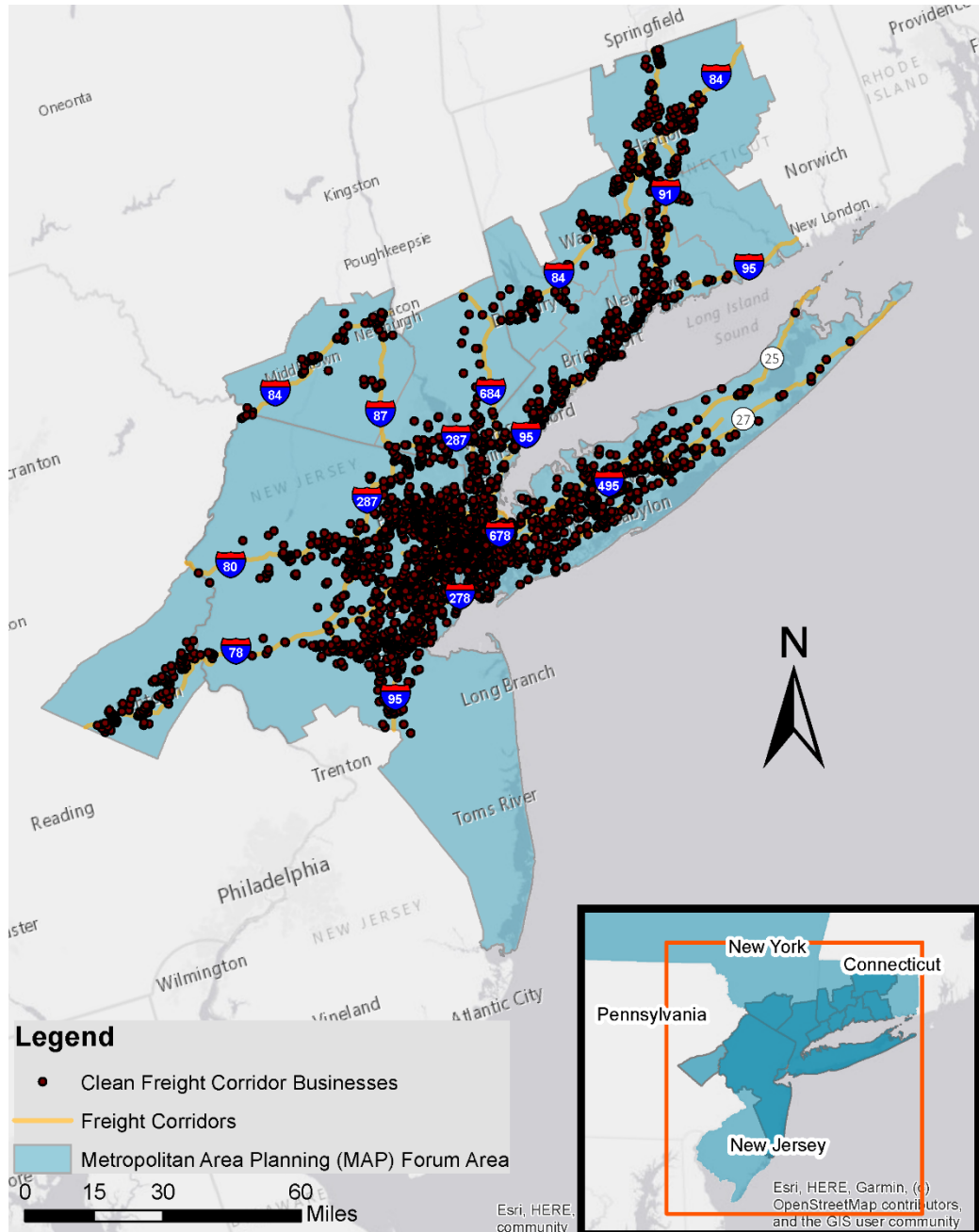


Table 2. Corridor-Level Freight-Generating Business Establishments and Existing and Emerging Freight Clusters

Corr-IDOR	Length (Miles)	Number of Freight Establishments (5 Mile Buffer)	Significant Freight Cluster (Listed as West-East/North-South)	Cluster Type	Cluster Description
I-78	102	557	(PA) Exit 45 - Kutztown / Weisenberg Township	Growing	Westward expansion of warehousing facilities along I-78 beyond urbanized portions of Lehigh County.
			Exit 49 - Upper / Lower Macungie Townships	Established/Growing	Large warehousing area situated to the west of Allentown and the I-476 interchange.
			(NJ) Exit 3 - Phillipsburg / Lopatcong Township	New	Development of Phillipsburg Logistics Center and additional planned rezonings along US-22.
			Union / Hillside / Newark (West Side)	Established	Retail clusters along US-22 and multiple industrial clusters adjacent to I-78.
			Port Jersey / Jersey City	Established	Established industrial clusters in Jersey City along Upper Bay.
I-80	68	552	(NJ) International Trade Center / Mount Olive Township	Growing	Free-trade zone & office park gradually transitioning into more of a freight center.
			Parsippany	Established	Mix of commercial and industrial sites within proximity to the I-80/I-287 junction.

I-84	150	300	Fairfield - Wayne	Established	Mix of commercial and industrial sites in portions of Fairfield and Wayne, especially near US-46 and Route 23.
			Paterson - Clifton	Established	Mix of commercial and industrial sites in portions of Clifton and Paterson.
			North Hudson / Bergen County South	Established	Large warehousing and industrial area covering portions of North Bergen, East Rutherford, Carlstadt, Teterboro, and Moonachie.
			(NY) Middletown / Wallkill	Established	Commercial, medical, and industrial cluster centered around the I-84 / NY Route 17 interchange.
			Exit 5 - Montgomery	Growing	Industrial clusters situated adjacent to Exit 5, between Middletown and Newburgh.
			Newburgh / Stewart Airport	Growing	Large commercial and warehousing area situated around the I-87 interchange and Stewart International Airport.
			(CT) Danbury	Established	Mix of commercial and industrial sites, especially to the west of Danbury's central business district.
			Waterbury	Established	Mix of commercial and industrial sites, especially to the south of Danbury's central business district.
			Hartford / East Hartford / Manchester	Established	Mix of commercial and industrial sites around the Hartford and Manchester areas to the east.
I-87	60	505	(NY) Exit 17 - Newburgh / Stewart Airport	Growing	Large commercial and warehousing cluster situated around the I-84 interchange and Stewart International Airport.
			Bronx - Mott Haven	Established	Industrial cluster across the southern end of the Bronx in and around the Mott Haven neighborhood.
I-91	58	232	(CT) Windsor Locks / Bradley Int'l Airport	Growing	Growing industrial cluster in the areas around Windsor Locks and Bradley International Airport, between Hartford and Springfield.

I-95	161	1,253	Hartford / East Hartford / Manchester	Established	Mix of commercial and industrial sites around the Hartford and Manchester areas to the east.
			New Haven	Established	Mix of commercial and industrial sites in and around New Haven.
			(CT) New Haven	Established	Mix of commercial and industrial sites in and around New Haven.
			Bridgeport	Established	Mix of commercial and industrial sites in and around Bridgeport.
			Stamford	Established	Mix of commercial and industrial sites in and around Stamford.
			(NY) Bronx - Hunts Point	Established	Industrial cluster across the Hunts Point section of the Bronx.
			(NJ) North Hudson / Bergen County South	Established	Large warehousing and industrial area covering portions of North Bergen, East Rutherford, Carlstadt, Teterboro, and Moonachie.
			Exit 15X - Secaucus	Established	Large warehousing cluster comprising the southern portion of Secaucus.
			South Kearny	Established	Industrial and warehousing cluster comprising South Kearny and the CSX South Kearny Intermodal Terminal.
			Port Newark / Elizabeth	Established	Very large industrial / energy cluster surrounding Port Newark and points south in Elizabeth.
			Exit 12 - Linden / Carteret	Established	Very large industrial / energy cluster to the south of Newark and Elizabeth.
			Exit 10 - Raritan Center	Established	Very large industrial cluster comprising the Raritan Center of Edison Township.
			Exit 8A - Monroe / Cranbury Townships	Established/Growing	Very large warehousing cluster situated around Exit 8A, with continued expansion and development.
I-278	35	439	(NY) Bronx - Hunts Point	Established	Industrial cluster across the Hunts Point section of the Bronx.

I-287	99	631	Queens - Maspeth	Established	Large industrial cluster in the Maspeth section of Queens.
			Brooklyn - Sunset Park / Red Hook / Gowanus	Established	Cluster of industrial sites, especially along Upper New York Bay.
			Staten Island - Old Place / Mariners Harbor	Growing	Growing industrial cluster at the western edge of Staten Island, in proximity to the Goethals Bridge.
			(NJ) Bayway Elizabeth	Established	Cluster of industrial sites, including energy producers, in and around Elizabeth,
			(NY) Elmsford - White Plains	Established/Growing	Mix of commercial and industrial sites between Elmsford and White Plains, including conversions of some office buildings to industrial use.
			(NJ) Mahwah	Established	Mix of commercial and industrial sites on and around Route 17 in Mahwah near I-287.
			Parsippany	Established	Mix of commercial and industrial sites within proximity to the I-80/I-287 junction.
			Franklin Township (Somerset County)	Established/Growing	Large industrial cluster, including conversions of some office buildings to industrial use.
			Piscataway / South Plainfield	Established	Large industrial cluster comprising portions of Piscataway and South Plainfield, adjacent to I-287.
			Raritan Center	Established	Very large industrial cluster comprising Raritan Center of Edison Township.
I-495	71	940	(NY) Midtown Manhattan	Established	Multiple commercial and warehouse facilities scattered throughout Manhattan.
			Queens - Hunters Point	Established	Mix of industrial sites scattered throughout the Hunters Point section of Queens
			Queens - Maspeth	Established	Large industrial cluster in the Maspeth section of Queens.
			Hicksville	Established	Multiple industrial clusters around Hicksville.

			Melville / Route 110 / Republic Airport	Established	Cluster of commercial and industrial sites scattered around Route 110 and Republic Airport.
			Bayville / Hauppauge	Established	Mix of commercial and warehouse facilities around Bayville and Hauppauge.
			Bohemia - MacArthur Airport	Established	Large cluster of commercial and industrial sites scattered around Bohemia and the MacArthur Airport areas.
I-678	14	241	(NY) Bronx - Soundview	Established	Industrial cluster across the Soundview section of the Bronx.
			Queens - Willets Point / College Point	Established	Industrial and commercial cluster stretching from Willets Point to College Point in Queens.
			East New York / JFK Int'l Airport	Established	Multiple industrial areas around East New York and JFK International Airport
I-684	29	102	No Significant Freight Clusters	N/A	N/A
NY-25	105	906	(NY) Midtown Manhattan	Established	Multiple commercial and warehouse facilities scattered throughout Manhattan.
			Queens - Hunters Point	Established	Mix of industrial sites scattered throughout the Hunters Point section of Queens
			East New York / JFK Int'l Airport	Established	Multiple industrial areas around East New York and JFK International Airport
			Hicksville	Established	Multiple industrial clusters around Hicksville.
			Hauppauge	Established	Mix of commercial and warehouse facilities around Hauppauge.
NY-27	121	590	(NY) Brooklyn - Sunset Park / Red Hook / Gowanus	Established	Cluster of industrial sites, especially along Upper New York Bay.
			East New York / JFK Int'l Airport	Established	Multiple industrial areas around East New York and JFK International Airport

Freeport	Established	Cluster of commercial and industrial sites in the area of Freeport.
Amityville - Copiague	Established	Cluster of commercial and industrial sites scattered around the Amityville and Copiague areas, to the south of Republic Airport.
Bohemia - MacArthur Airport	Established	Large cluster of commercial and industrial sites scattered around Bohemia and the MacArthur Airport areas.
