

REGIONAL FREIGHT COMMODITY PROFILE

Construction Materials

COMMODITY BUNDLE OVERVIEW

This bundle consists of base materials and products used to construct buildings and other infrastructure. Commodities in this bundle include stone, gravel, natural sands, nonmetallic minerals, nonmetallic mineral products, metallic ores, base metals, base metal articles, and logs.

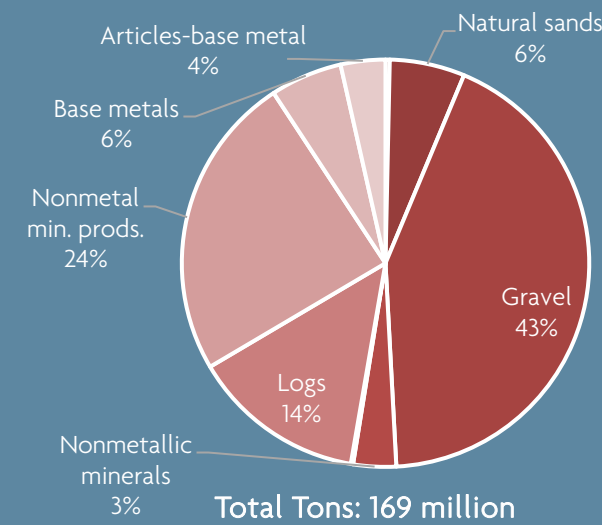
The primary data source for commodity flows reported in this profile is NJTPA's Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2020 base year and 2050 forecast year. This profile describes freight flows between domestic origins and destinations.

- 117 million tons in 2020, increasing 10 percent to 129 million tons in 2050.
- Represents 32 percent of the goods moved in the region by weight and 7 percent by value.
- More than 11 million square feet of warehousing/distribution center space dedicated to this bundle.
- 96 percent moves by truck, 1 percent by rail, and 3 percent moves by other modes

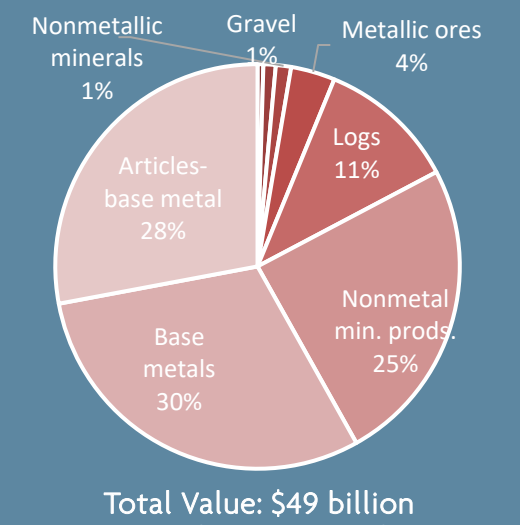
Highlights

Composition

Domestic Tons in 2020



Domestic Value in 2020



Gravel accounts for 43 percent of construction materials by weight, yet only 1 percent by value. Base metals and base metal articles together represent 10 percent of construction materials by weight but 58 percent by value.

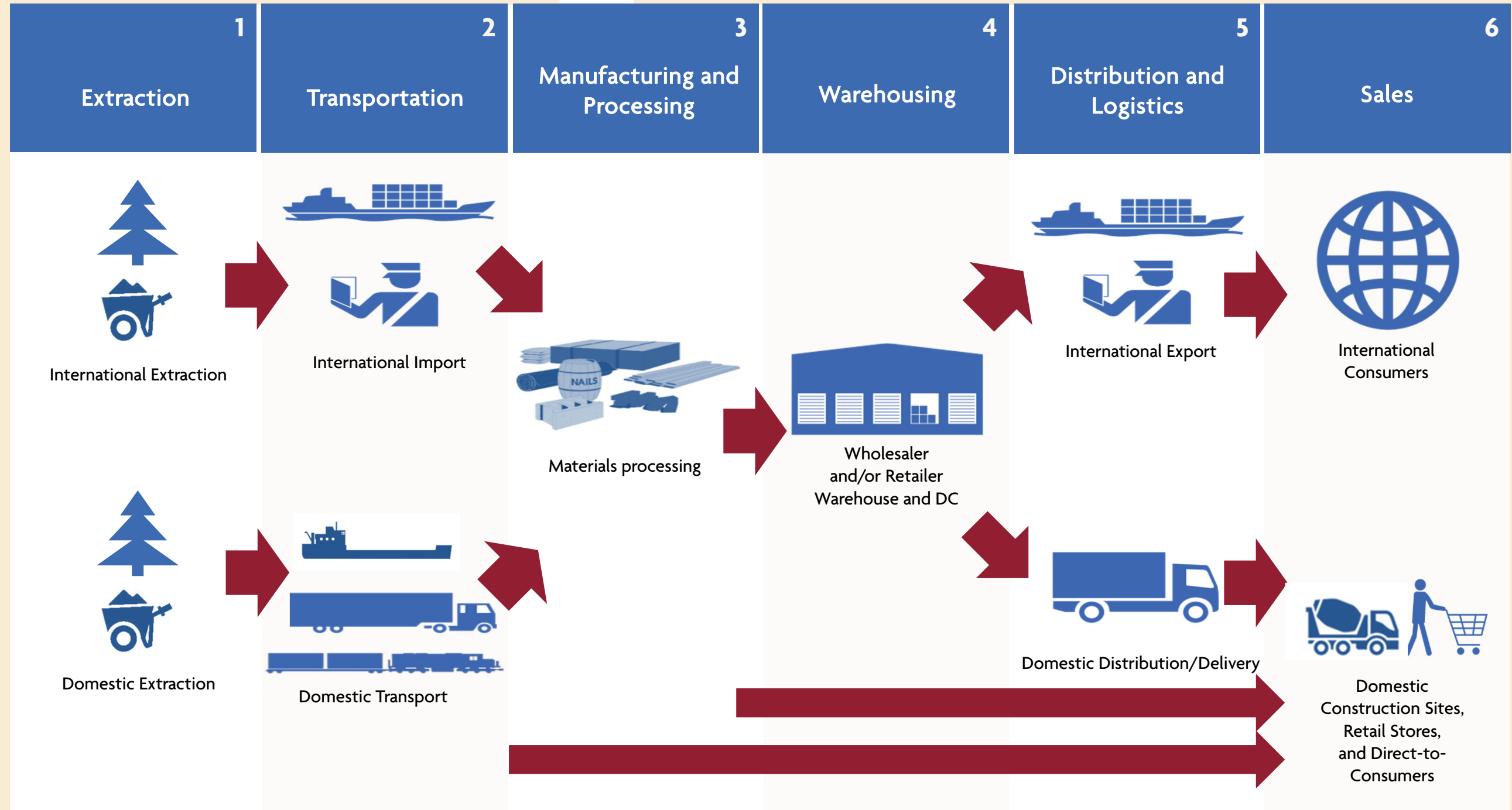
LOGISTICS SUMMARY

The graphic to the right represents the supply chain for the construction material commodity bundle, illustrating the process of collecting raw material from international and domestic sources through distribution of finished product to consumers.

This supply chain consists of six steps:

1. International and domestic raw material is extracted and collected.
2. International goods are transported by ocean vessel to U.S. Ports-of-Entry where they are inspected by U.S. Customs and transloaded to truck or rail carload. Domestically produced goods are transported by truck, rail intermodal, and barge.
3. Raw products are processed in a manufacturing facility to produce finished goods.
4. Finished goods move to a wholesaler or retailer distribution center or warehouse for sorting and storage.
5. Products are distributed via one of two routes:
 - A. By truck to an export distributor or freight forwarder for export to international customers via ocean vessel.
 - B. By truck for domestic delivery to retail establishments and to fulfill direct-to-customer orders.
6. Shipments are delivered to international and domestic customers and construction sites according to customers' specification.

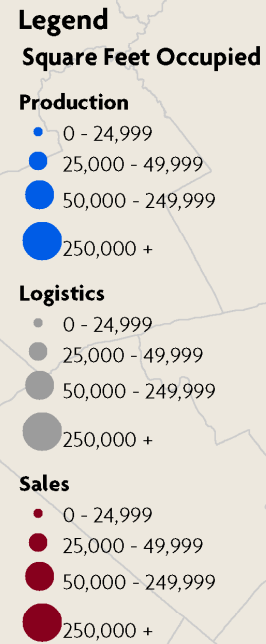
Note that some products skip the processing and warehouse steps and are delivered directly to domestic customers. Other products are distributed directly to customers without moving through a wholesaler or retailer warehouse or distribution center.



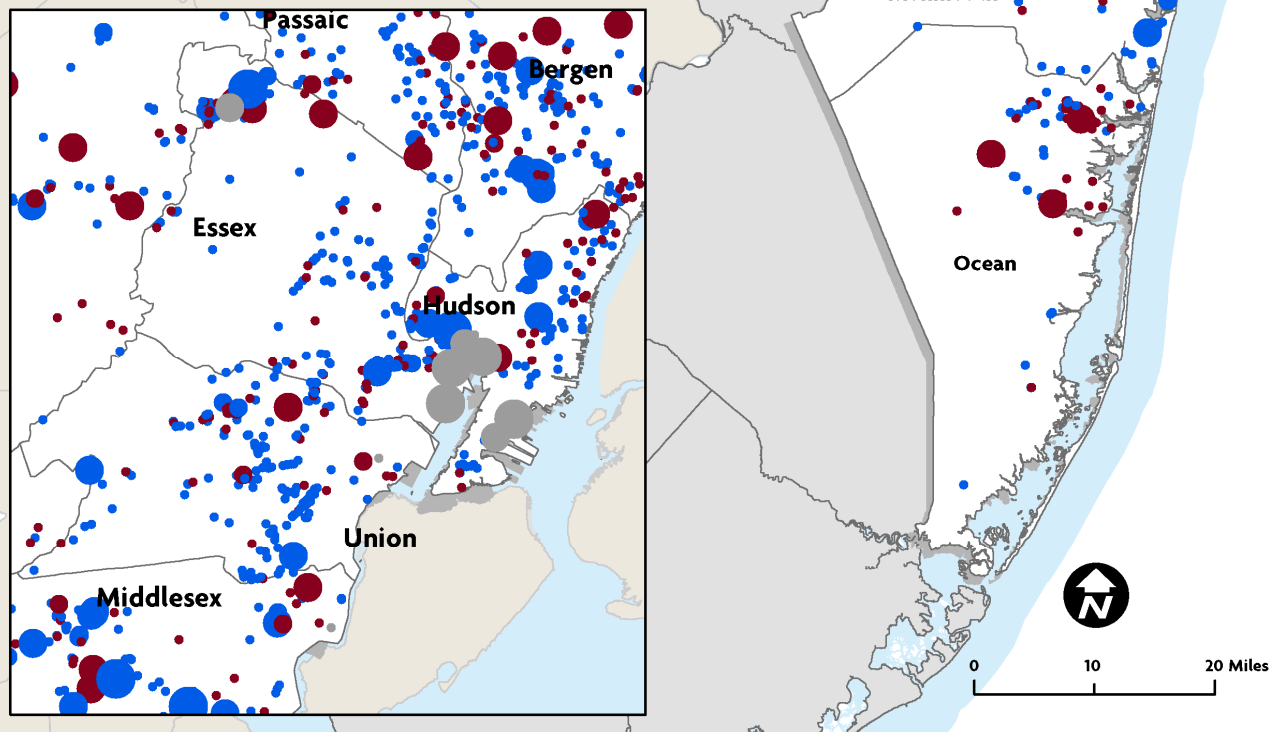
Business Locations by Industry Type

Business Square Footage by Industry Type

Construction Materials



Source: Source: CoStar, 2015; InfoGroup, 2019; Cambridge Systematics, 2020; NJOIT, 2008; Esri, 2014
Note:
"Production" includes Manufacturing, Utilities, Mining, & Agriculture
"Logistics" includes Transportation and Distribution
"Sales" includes all other categories



BUSINESS LOCATIONS SUMMARY

The map on the previous page illustrates the locations of facilities that ship, handle, or receive commodities in this bundle, including:

- Production facilities such as manufacturing businesses where goods are produced, and correspond to steps 1 and 3 in the logistics summary chart on pages 2 and 3.
- Logistics facilities, including warehousing and transportation facilities through which goods are distributed, and correspond to steps 4 and 5 on the logistics summary chart.
- Sales, represented in Step 6 on the logistics summary chart, including retail, services, and institutional establishments where goods are sold.

Clusters of large production and logistics facilities are aligned parallel to the Interstate 80 corridor between southern Bergen County and central Morris County, and in northern Middlesex County and eastern Somerset County near Interstate 287 and Route 22. Hudson, eastern Essex, and eastern Union counties contain a large number of smaller-sized facilities.

KEY INDUSTRY TRENDS

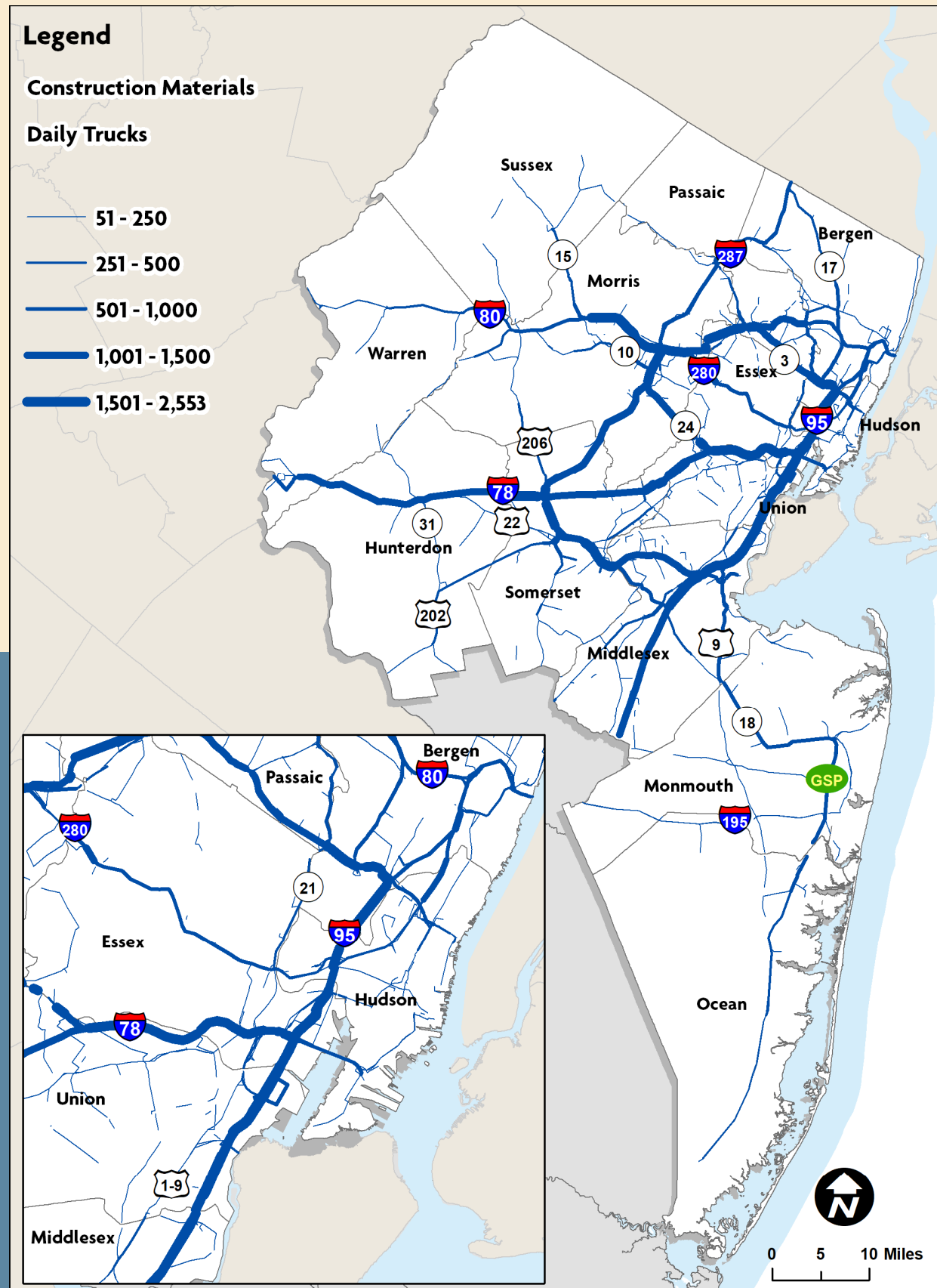
The following trends are shaping demand for construction materials today, and projected demand in the future:

- Modular construction, 3D printing, and prefabrication off-site are a growing trends. Both methods allow for a compressed construction timeline.
- Demand for reclaimed or recycled building materials continues to grow.
- Rapid urbanization and high-rise construction around the world is placing strains on the supply of sand used to make concrete. The cost of concrete could rise substantially, leading to development of alternative additives and/or increased demand for substitute materials.
- Timber frame construction is gaining popularity in urban mid-rise projects.
- The short-term and potential long-term effects of COVID-19 on population growth and development patterns in this region are uncertain.

Residential and Commercial Construction Sites in the NJTPA Region



Highway Network Utilization, 2020



Source: NJTPA Freight Forecasting Tool, 2020; NJRTM-E, 2019; NJOIT, 2008; Esri, 2014.

HIGHWAY NETWORK FLOWS OF CONSTRUCTION MATERIALS

The map on the previous page shows the volume of truckloads of goods in this bundle traveling on highway segments in the NJTPA region every day.

The New Jersey Turnpike/Interstate 95 between Exit 9 in Middlesex County and Exit 16W in Bergen County, portions of Interstate 80 in Morris County, Interstate 78 in Union and Essex counties carry the greatest volume of truckloads of construction materials, up to 2,500 per day in each direction.

Portions of Interstate 80 in Essex and Passaic counties, the New Jersey Turnpike south of Exit 9, and much of interstates 78 and 287 (south of Interstate 80) carry between 1,000 and 1,500 trucks loaded with construction materials every day in each direction.

COMMODITY FLOW SUMMARY

Collectively, nearly 117 million tons of construction materials, worth \$50 billion, moved in the NJTPA region in 2020. By 2050, 129 million tons worth nearly \$55 billion will move in the region. These projections represent 10 percent growth by tons and 9 percent growth by value.

Construction materials represented 32 percent of the goods moved in the region by weight and 7 percent by value in 2020. This bundle is expected to grow more slowly than others, composing 30 percent of freight by weight and 7 percent by value in 2050.

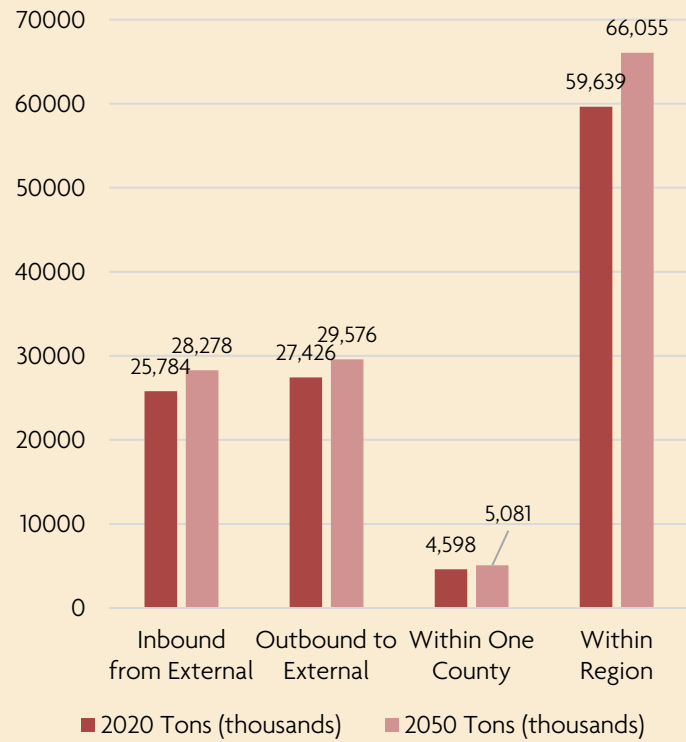
As the table below shows, building stone, gravel, and metallic ores are expected to be the fastest-growing commodities by weight. By value, the fastest-growing commodities are expected to be gravel, building stone, and natural sands.

Forecasted Change in Commodity Flows in the Construction Materials Bundle by Weight and Value, 2020 and 2050

Commodity	2020 Tons (thousands)	2050 Tons (thousands)	2020 Value (millions \$)	2050 Value (millions \$)	Change in Tons, Value, 2020-2050	Change in 2050
Building stone	391	437	82	91	12%	11%
Natural sands	7,003	7,727	234	260	10%	11%
Gravel	50,339	56,065	491	549	11%	12%
Nonmetallic minerals	3,987	4,308	605	646	8%	7%
Metallic ores	205	228	1,765	1,942	11%	10%
Logs	16,189	17,662	5,519	6,054	9%	10%
Nonmetal min. prods.	28,471	30,714	12,276	13,321	8%	9%
Base metals	6,708	7,287	15,050	16,327	9%	8%
Articles-base metal	4,156	4,563	13,946	15,338	10%	10%
Grand Total	117,447	128,991	49,968	54,528	10%	9%

Source: NJTPA Freight Forecasting Tool, 2020

Domestic Tons by Direction, 2020 and 2050



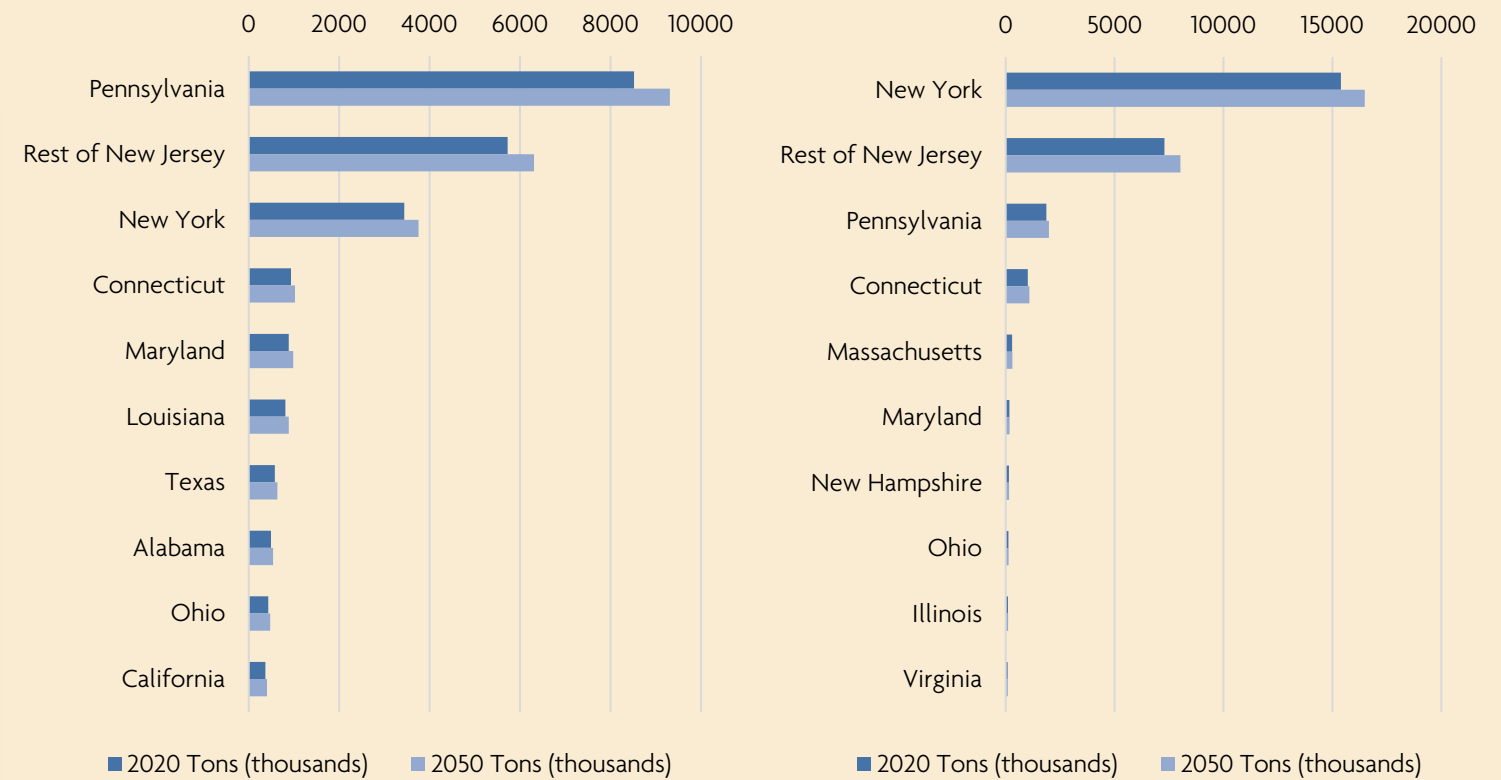
About 66 million tons of construction materials (51 percent of all tons in this bundle) traveled within the region, between NJTPA counties. Outbound and inbound moves represented 23 and 22 percent of construction material moves, respectively. Four percent moved within a single NJTPA county.

About 86 percent of the construction materials imported to the NJTPA region originate in one of the locations shown in the graph on the next page. More than 8.5 million tons originated in Pennsylvania. Among the top origins of inbound flows, Maryland is expected to grow by the greatest rate (11 percent) between 2020 and 2050.

The graph on the next page also shows the destinations of 97 percent of the goods in this commodity bundle that leave the NJTPA region. Among the top destinations, flows to portions of New Jersey outside the NJTPA region are expected to grow fastest (10 percent) and flows to New Hampshire are expected to grow slowest (5 percent) through 2050.

Source: NJTPA Freight Forecasting Tool, 2020

Top Origins of Inbound Commodities (Left) and Top Destinations of Outbound Commodities (Right), 2020 and 2050



Source: NJTPA Freight Forecasting Tool, 2020

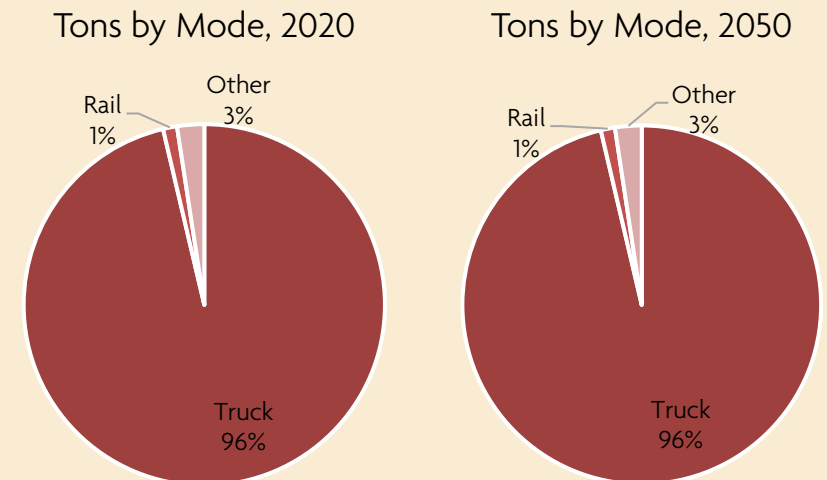
Source: NJTPA Freight Forecasting Tool, 2020

Nearly All Construction Materials in the NJTPA Region are Transported by Truck or Rail



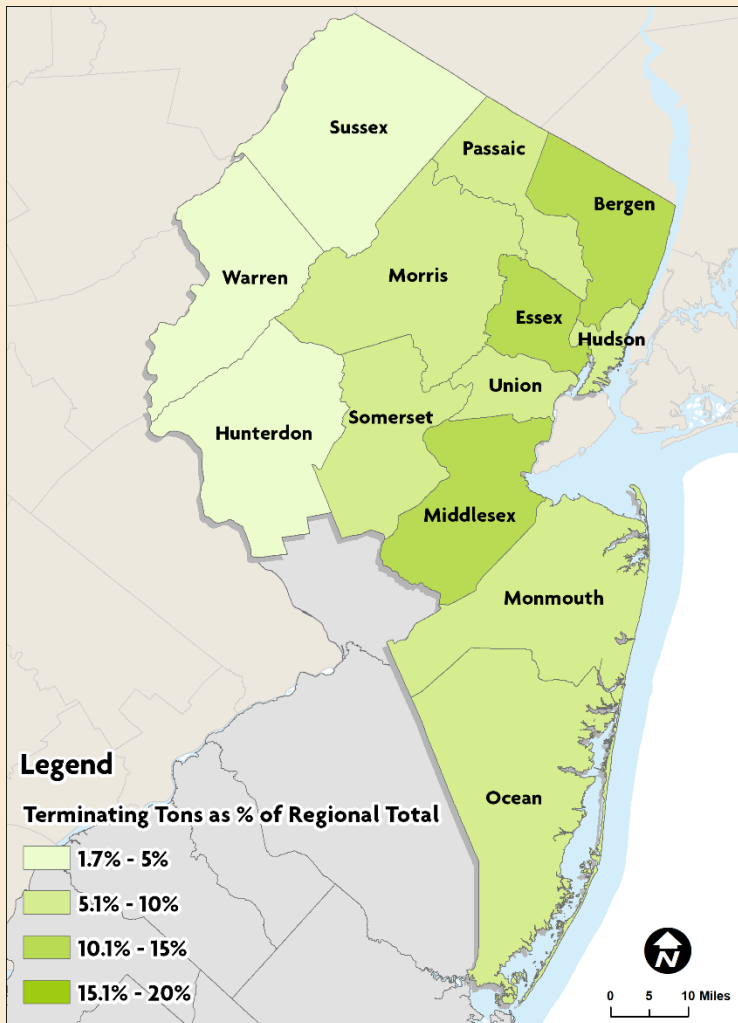
Mode Splits, 2020 and 2050

In 2020, about 96 percent of the construction material commodities moving in the NJTPA region traveled by truck. Rail carried about 1 percent, and 3 percent moved by other modes. By 2050, the share of tons moving by each mode is expected to remain similar.



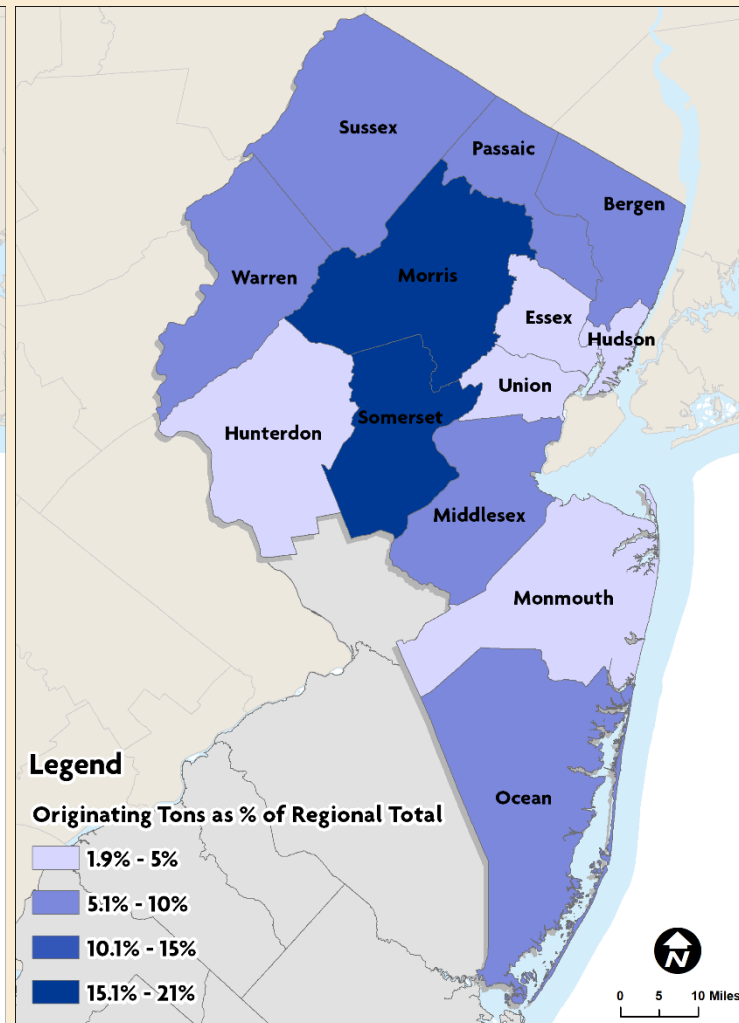
Source: NJTPA Freight Forecasting Tool, 2020

Inbound Domestic Tons by County, 2020



Source: NJTPA Freight Forecasting Tool, 2020; NJRTM-E, 2019; NJOIT, 2008; Esri, 2014.

Outbound Domestic Tons by County, 2020



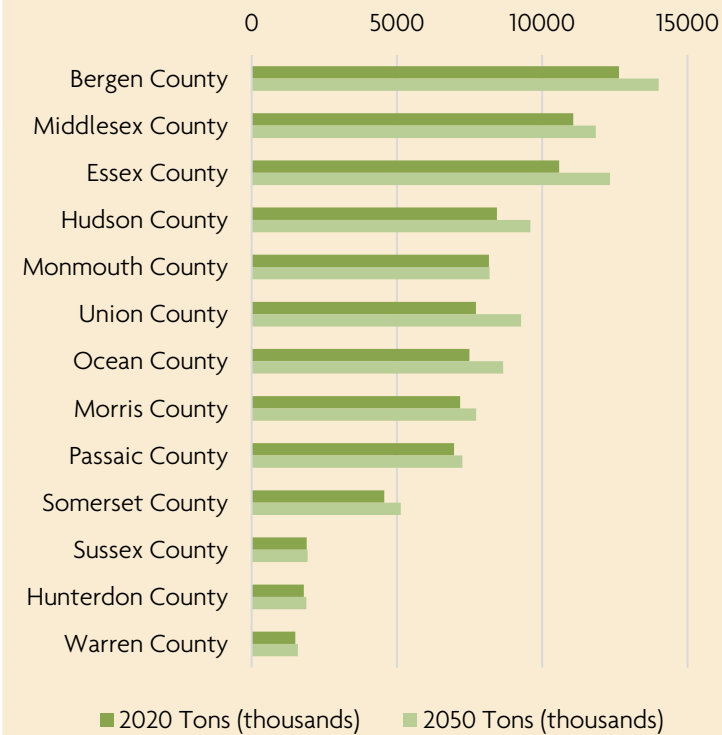
Source: NJTPA Freight Forecasting Tool, 2020; NJRTM-E, 2019; NJOIT, 2008; Esri, 2014.

The maps above and the graphs on the next page show the top counties of origin and top counties of destination for goods in this commodity bundle traveling to or from the NJTPA region.

More than 10 million tons of construction materials terminate in each of Bergen, Middlesex, and Essex counties. Together these three counties receive 38 percent of the tons terminating in the region. Projected growth rates in inbound construction materials tonnage between 2020 and 2050 range from less than 1 percent (Monmouth County) to 20 percent (Union County).

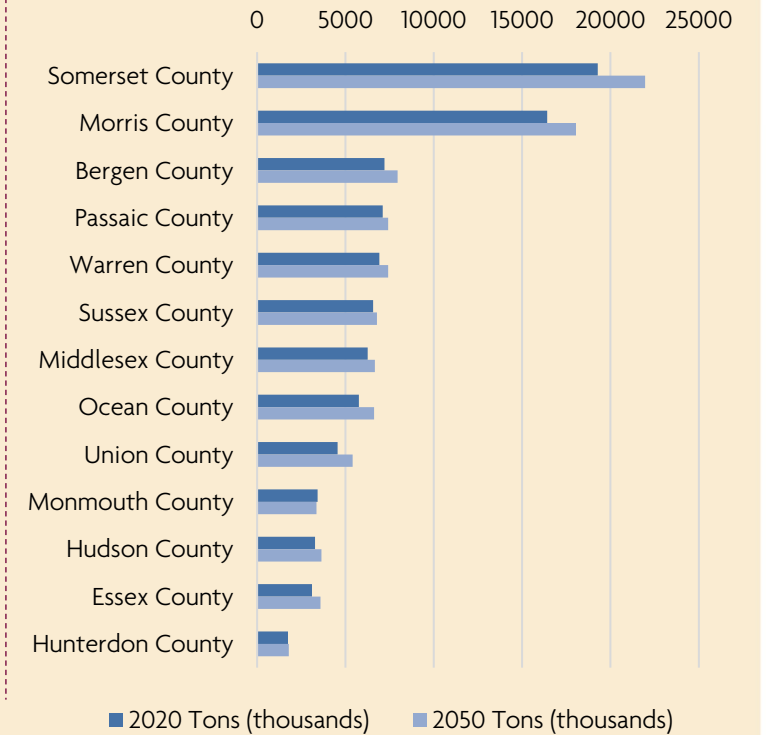
Close to 20 million tons of construction materials originated in Somerset County, and more than 16 million tons originated in Morris County in 2020. Projected growth rates in outbound tonnage between 2020 and 2050 range from -2 percent (Monmouth County) to 19 percent (Union County).

Inbound Domestic Tons by County, 2020 and 2050



Source: NJTPA Freight Forecasting Tool, 2020

Outbound Domestic Tons by County, 2020 and 2050



Source: NJTPA Freight Forecasting Tool, 2020

References

For more information on construction materials commodity flows and logistics in the North Jersey region and elsewhere, consult the following sources:

- New Jersey Builders Association, www.njba.org
- New Jersey Building and Construction Trades Council, www.njbctc.org
- Construction Round Table of New Jersey, www.crtnj.org
- Associated Construction Contractors of New Jersey, www.accnj.org
- Bureau of Labor Statistics, U.S. Department of Labor, www.bls.gov

ABOUT THE NJTPA

The North Jersey Transportation Planning Authority (NJTPA) is the federally authorized Metropolitan Planning Organization for 6.7 million people in the 13-county northern New Jersey region. Each year, the NJTPA oversees the investment of more than \$1 billion in federal funding for transportation projects and provides a forum for interagency cooperation and public input into funding decisions. It also sponsors and conducts studies, assists county planning agencies and monitors compliance with national air quality goals.

The NJTPA Board of Trustees includes 15 local elected officials, including one representative from each of the 13 northern New Jersey counties – Bergen, Essex, Hudson, Hunterdon, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren – as well as from the cities of Newark and Jersey City. The Board also includes the Commissioner of the New Jersey Department of Transportation (NJDOT), the Executive Director of NJ TRANSIT, the Chairman of the Port Authority of New York and New Jersey, a Governor's Representative and a Citizens' Representative appointed by the Governor.

ABOUT THE STUDY

Conditions in the goods movement industry have changed over the last several years. The 2050 Freight Industry Level Forecasts Study developed updated information on current and projected freight demand through 2050 for the NJTPA to use in its freight planning activities. This effort built on two previous NJTPA freight planning studies: the 2040 Freight Industry Level Forecasts Study (completed in 2012) and the Regional Freight Commodity Profiles Study (completed in 2015).

This study helps identify locations with concentrations of goods movement activity and where they will occur in the future; the types of commodities that are and will be moving through the region; and where strategic investments should be considered to support economic growth and enhance regional resiliency. The results of this work will serve as background for the NJTPA's next Long Range Transportation Plan as well as freight planning and subregional planning studies.

For further information, please contact Jakub Rowinski, NJTPA Project Manager, at jrowinski@njtpa.org.

This Freight Profile is one of a series of profiles, representing 12 freight commodity bundles in the 13-county NJTPA region.

This document was prepared by the NJTPA with funding from the Federal Transit Administration and the Federal Highway Administration. The NJTPA is solely responsible for its contents.