

APPENDIX D

Technical Memorandum Land Use



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January 2022



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1. INTRODUCTION

Freight-generating industries provide many benefits to the local economy. As the Berkeley-Charleston-Dorchester regional population continues to grow, the greater the amount of goods and services are consumed. Freight intensive industry supports the economy in the BCD region by providing direct and indirect employment, increased tax revenue, and contribution to regional and state economic output. A well-functioning transportation infrastructure and network is crucial for the efficient movement of goods. The link between freight, multimodal transportation and land use is essential for supporting growth in the area.

This land use technical memorandum considers the importance of multimodal freight transportation to the region by identifying existing and future freight land use planning corridors and clusters. The intent of this document is to describe the methodology of data compilation and analysis, providing input to the larger freight mobility planning effort. This provides a summary of current state of land use data and what insight this provides for the current and forecast trends in freight mobility and freight related development in the region. The recommendations within this technical memorandum should be considered preliminary and will be evaluated further as part of the development and refinement of the comprehensive recommendations of the BCD Regional Freight Mobility Plan.



2. ECONOMIC CONTEXT

The BCD region of South Carolina is home to large manufacturing companies like Volvo, Boeing, Mercedes, and Nucor Steel. Freight demand is directly related to the amount of economic activity in a region and businesses and customers depend on all modes to connect them to markets and grow the regional economy.

Charleston's regional economy, from its beginning, has been dependent on freight and trade. With the Port of Charleston, access to two major Interstate highways (I-95 and I-26), two Class I railroads, an international airport, and a cluster of warehouses, distribution centers, and logistics companies, the tri-county region is a hub for trade. Trucks handle roughly 63 percent of all freight in North America¹ due to variable length truck trips, providing "last mile" connections and connecting commodities carried by other modes from intermediate destinations, such as airports, rail terminals, and other freight generators to their final destinations. The BCD region provides container transfers using Class 1 railroads to Inland Port Dillon (IPD) and to the Upstate region by Inland Port Greer (IPG). Forecasts suggest total Port container volumes could reach nearly 4 million TEU by 2038.² The Charleston International Airport (CHS) was the 78th busiest cargo³ airport in the United States in 2018, moving highly perishable and high value goods.

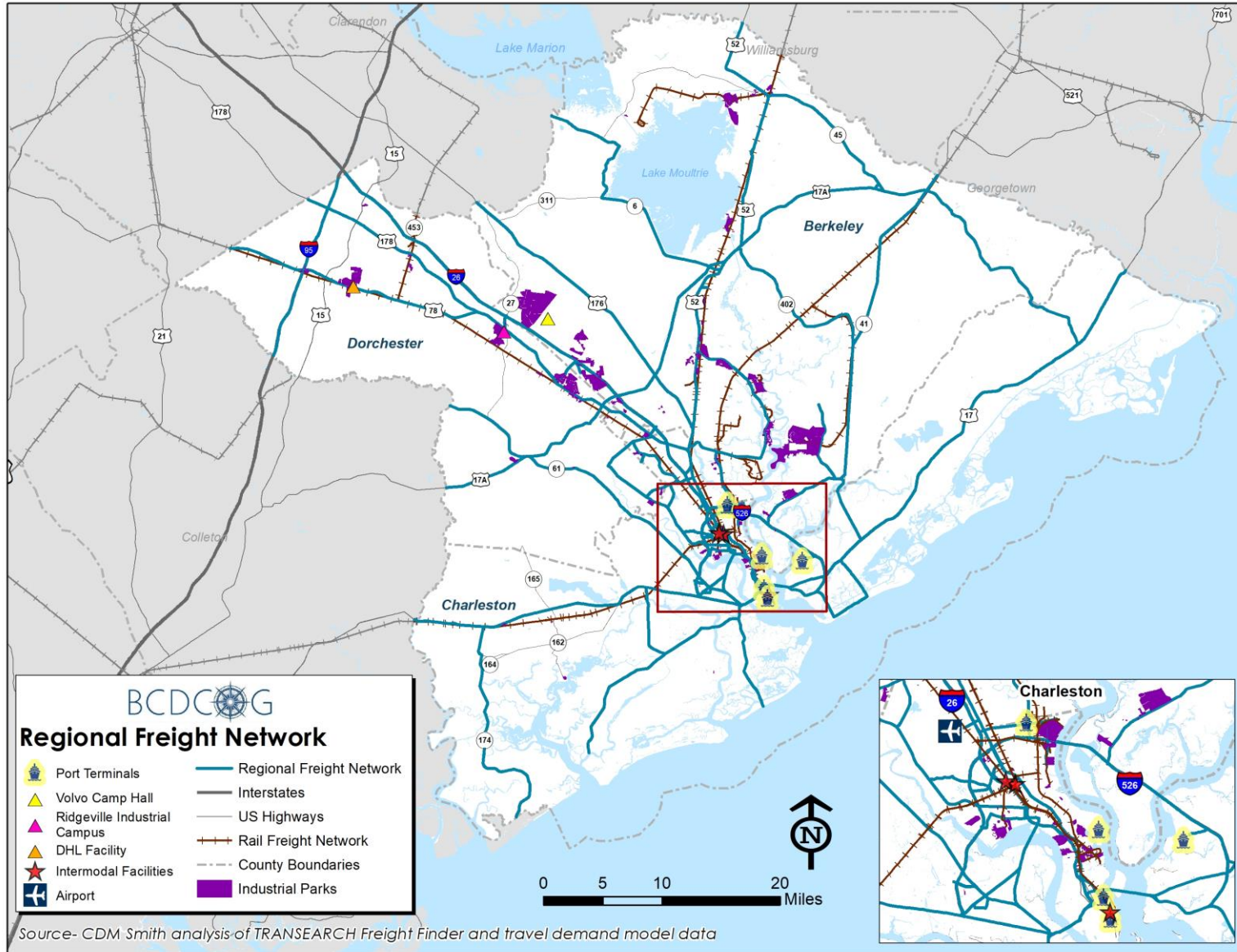
The base map for the land use analysis was comprised of the intermodal facilities, industrial parks and freight network is shown in **Figure 2.1**.

¹ [https://www.bts.gov/newsroom/2017-north-american-freight-numbers#:~:text=Trucks%20carried%2057.7%20percent%20of,the%20value%20\(Table%202\)](https://www.bts.gov/newsroom/2017-north-american-freight-numbers#:~:text=Trucks%20carried%2057.7%20percent%20of,the%20value%20(Table%202))

² Palmetto Railways, *Final Environmental Impact Statement for the Proposed Navy Base Intermodal Container Transfer Facility*, retrieved July 31, 2020 from <http://palmettorailways.com/intermodal/eis/>

³ <https://www.ftnews.com/top100/airports/2019>

Figure 2.1: BCD Regional Freight Network



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3. METHODOLOGY

This section provides a summary of the methodology used in the freight land use analysis. Data was collected and used to understand the connection between freight mobility and freight generating land use by analyzing industrial parks, available land use classifications, population, employment, and existing and future freight corridors and clusters of freight intensive development. The regional freight network was used to complete this land use analysis in an iterative fashion. First, roadways were identified based on current freight activity illustrated by traffic counts. Second, land uses were examined to locate where freight intensive activities were identified. Where gaps existed in the freight network, additional connections were included in the freight network to provide continuity between freight generating land uses and the remainder of the freight network. Feedback from the Freight Advisory Committee (FAC) was also used to identify any roadway additions to the network, as well as any additional freight intensive land use clusters not captured by available data from this analysis.

3.1 DATA COLLECTION

To identify the freight-related land uses within the BCD region, land use data compiled from counties in the study area were used for geospatial analysis using ArcGIS. CommunityViz, a land use modeling dataset showing future land use suitability, was extracted from the BCDCOG Travel Demand Model. The list below shows the data that was collected for the analysis:

- County Current Zoning Classifications as of May 2020 (Berkeley, Charleston, and Dorchester)
- Municipal Zoning Classifications as of May 2020 (Awendaw, Folly Beach, Goose Creek, Hanahan, Isle of Palms, Lincolnville, McClellanville, Moncks Corner, Mount Pleasant, North Charleston, Ravenel, Seabrook Island, Sullivan's Island, and Summerville)
- County Future Land Use Map Classifications as of May 14, 2020 (Berkeley, Charleston, and Dorchester)
- BCDCOG CommunityViz 2020 and 2040 datasets (extension of ArcGIS that facilitates the visualization and comparison of alternative growth scenarios)
- Department of Commerce Industrial Parks inventory (May 2020)
- BCDCOG Travel Demand Model Transportation Analysis Zone (TAZ) level population and employment projections from 2015-2040
- Transearch© Freight Finder database (2016)



4. FREIGHT LAND USE ANALYSIS

Successful freight planning balances the needs of freight generating land uses with the sustainable development of freight corridors and clusters. The freight land use analysis is presented to provide an inventory of land use patterns and accessibility to transportation infrastructure and propose planning and economic development applications that support efficient and safe freight mobility to the BCD region. This means that the goal of this document is to provide land use and transportation planners the data and information to apply to local planning needs that address the mobility needs of perspective developments.

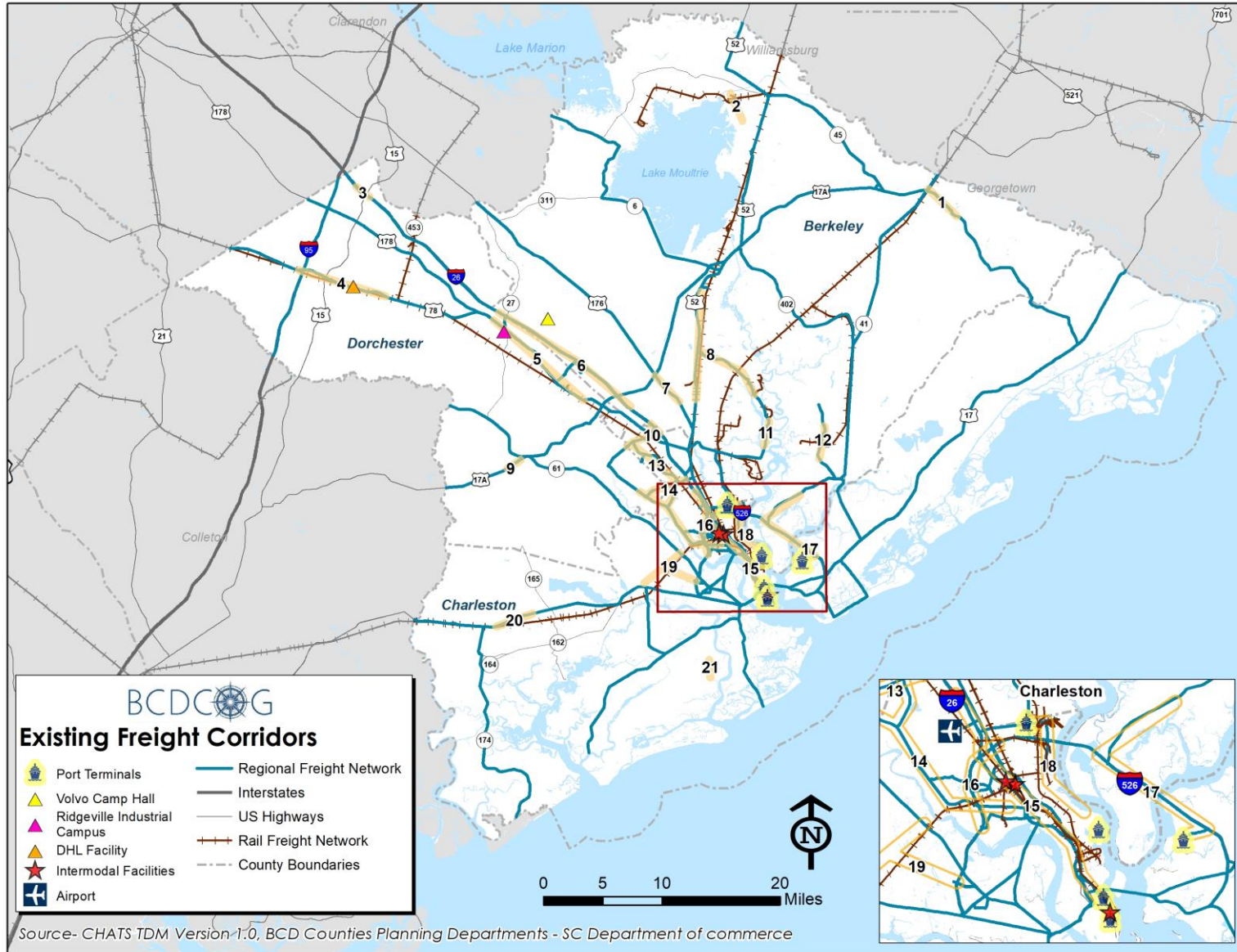
4.1 EXISTING AND FUTURE FREIGHT CORRIDORS

For this analysis it is important to understand the definition of a freight corridor as a corridor of land influenced freight intensive land uses.

The first step in determining the existing freight corridors was to conduct a geospatial analysis of the existing land uses within the BCD regional freight network. Areas of concentration for industrial parks, both with existing facilities and with speculative build-to-suit sites, were highlighted on the freight highway network and buffered two miles to create the existing land use corridors. The two-mile buffer was used to include any first or last-mile connections to freight related land uses. Speculative sites were included as a part of the existing freight corridor identification, as some current planning activities have already taken place to accommodate for their future transition from vacant land to industrial site. This buffer served as a catchment area for capturing concentrations of existing freight intensive development. CommunityViz data for 2020 was used to assist in identifying areas of industrial development. The identified freight corridors are shown in **Figure 4.1** and **Table 4.1**.

The future land use corridors were created by applying a desktop survey of future land use maps from the counties in the region, as well as the 2040 CommunityViz land suitability dataset extracted from the BCDCOG travel demand model. Again, a two-mile buffer was created from the freight network to identify future land use corridors or catchment areas for planned future freight intensive development. The future freight corridors are shown in **Figure 4.2** and **Table 4.2**. The results of this analysis showed that current and long-range planning efforts should be focused on addressing mobility needs and concentrated, or clustered, freight related land uses along the freight network. In each table, the corridors are described with their major freight generators as well as vacant or undeveloped/speculative industrial land, illustrating potential areas for freight related development. The properties identified as Potential Freight Development Sites are either available industrial sites or those identified as such by the South Carolina Department of Commerce (DOC).

Figure 4.1: Existing Freight Corridors



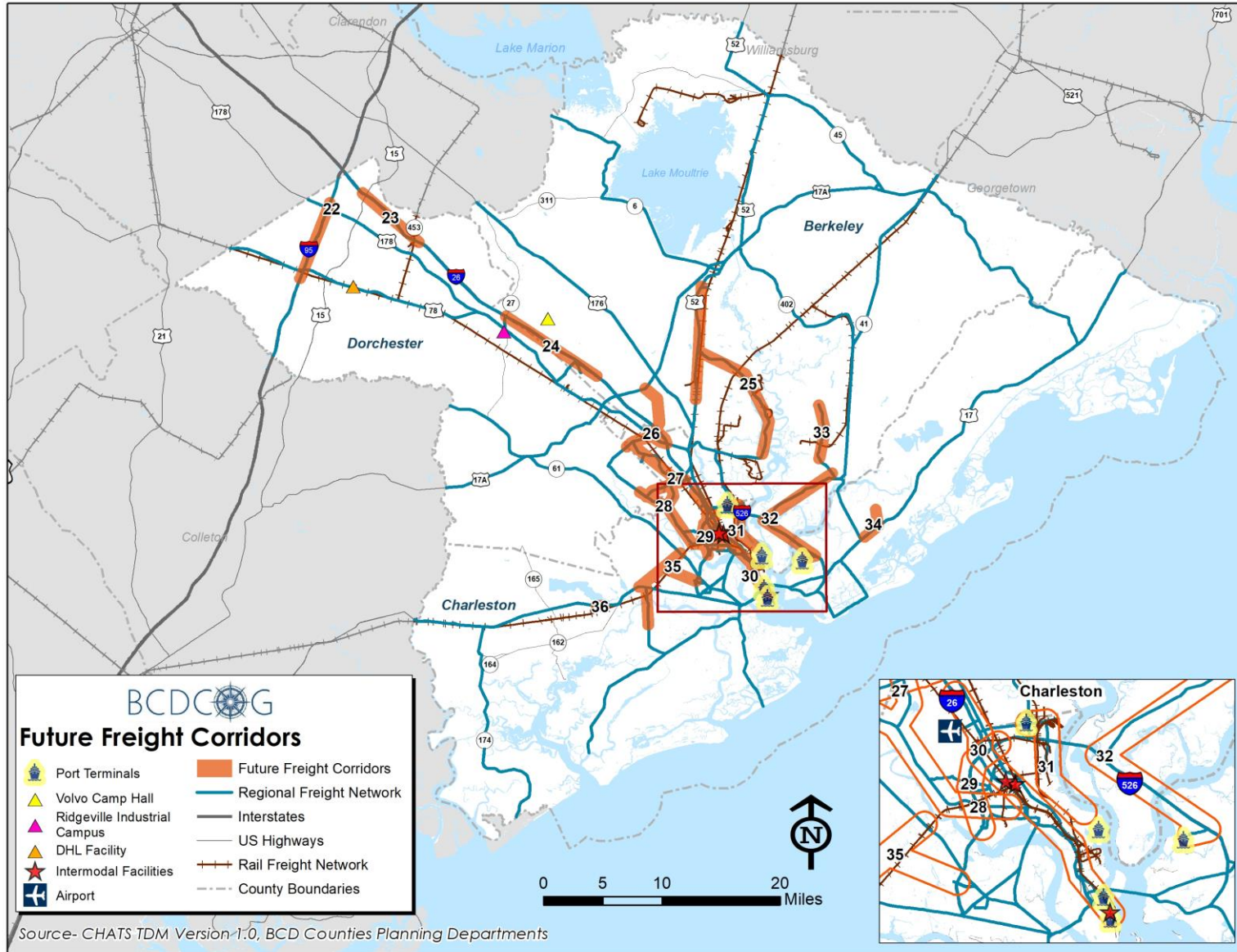
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Table 4.1: Existing Freight Corridors

Number	Description	Potential Freight Development Sites
1	SC 45 from SC 41 to Guilliard Lake Rd	Martin Marietta Aggregates, Chargeurs Wool, USA
2	Highway 35 near CSX Spur in St. Stephen	(old) Russellville Plywood Plant
3	I-26 from US 15 Interchange to Exit 172 at US 15	~200 acres of speculative industrial land identified by DOC
4	US 78 from I-95 to Short Cut Rd (SC 89)	~2,000 acres of speculative industrial land identified by DOC
5	US 78 from Summerville to NW of Ridgeville Rd	~1,300 acres of speculative industrial land identified by DOC
6	I-26 from Pringletown (Exit 187) to SE of I-26/US 17 Alt Interchange	Fruit of the Loom, TBC Corporation and ~1,000 acres of speculative industrial land identified by DOC
7	US 176 from US 17 Alt to Old Mt. Holly Rd	Century Aluminum Company
8	US 52 Moncks Corner to Goose Creek, Cypress Gardens Rd from US 52 Bushy Park Rd	Charleston Sheet and Metal, Viva Recycling and ~1,150 acres of speculative industrial land identified by DOC
9	US 17 Alt from SC 61 to SC 642	SuperTree Seedlings and ~375 acres of speculative industrial sites
10	Ladson Rd from I-26 to Palmetto Commerce Pkwy	Brown Distribution Center, Port City Concrete
11	Bushy Park Rd from Bushy Park Boat Landing to W International	Symrise Inc and Sun Chemical Corp.
12	Cainhoy Rd from Brick Church Rd to Hagan Ave	Nucor Steel, Smalls Loading LTD Inc
13	Palmetto Commerce Pkwy from Ladson Rd to Ashley Phosphate Rd, Ashley Phosphate Rd from I-26 to SC 642	Coastal Glass Distributors, Republic Services, Ferguson Waterworks, Soft-Tex and ~375 acres of speculative industrial sites
14	Dorchester Rd from I-26 to Ashley Phosphate Rd, including Cross County Rd	USPS, Bosch Charleston Plant, Dilmar Oil Co, AGM Imports and ~125 acres of speculative industrial sites
15	I-26 from of Aviation Ave (Exit 211A) to US 17/I-26 Interchange, including Morrison Dr to Port of Charleston - Columbus Street Terminal	Port of Charleston Columbus Street Terminal, Rhodia, Van-Smith Concrete Co and ~5 acres of speculative industrial sites
16	I-526 from Rivers Ave (Exit 18A) to Ashley River	Boeing, Cel Oil Products
17	I-526 from Port of Charleston - Wando Welch Terminal to Clements Ferry Rd (Exit 23), including Clements Ferry to Jack Primus Rd	Port of Charleston Wando Terminal, Kontane Logistics, Gildan Charleston and ~40 acres of speculative industrial sites
18	Virginia Ave/Noisette Blvd/N Hobson Ave from Port of Charleston-North Charleston to North Charleston Coast Guard Port	Kinder Morgan Bulk Terminals, Southeast Bio Diesel, Delfin Group USA, Port of Charleston Veterans Terminal
19	Glenn McConnell Pkwy from I-526 to Bees Ferry Rd, including Bees Ferry Rd from SC 61 to US 17	Charleston County Landfill
20	US 17 from New Rd to SC 174	Steen Enterprises and ~1,050 acres of speculative industrial sites
21	River Rd from Burden Creek Rd to Hut Rd on Johns Island near Charleston Executive Airport	Royal Labs Cosmetics, Charleston Executive Airport

Source: South Carolina Department of Commerce Industrial Park Inventory and Google Earth

Figure 4.2: Future Freight Corridors 2040



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Table 4.2: Future Freight Corridors (2040)

Number	Description	Potential Freight Development Sites
22	I-95 from US 78 (Exit 77) to US 178 (Exit 82)	I-95 Corridor, vacant land
23	I-26 from US 15 (Exit 172B) to SC 453 (Exit 177)	Argos USA and ~200 acres of speculative industrial sites
24	I-26 from SC 27 (Exit 187) to Trade Zone Blvd	Fruit of the Loom, TBC Corporation and ~1000 acres of speculative industrial sites
25	US 52 from Moncks Corner to Goose Creek, Cypress Gardens Rd from US 52 to Dak Americas Plant, including Bushy Park Rd to Naval Weapons Station Joint Base Charleston	Symrise Inc, Sun Chemical Corp., Charleston Sheet and Metal and ~1150 acres of speculative industrial sites
26	College Park Rd/Ladson Rd from US 17A to Miles Jamison Rd	Quoizel Inc, Pegasus Steel and ~50 acres of speculative industrial sites
27	Palmetto Commerce Pkwy from Ladson Rd to Ashley Phosphate Rd, including Ashley Phosphate Rd from I-26 to SC 642	Coastal Glass Distributors, Republic Services, Ferguson Waterworks, Soft-Tex and ~375 acres of speculative industrial sites
28	Dorchester Rd from I-26 to Ashley Phosphate Rd, including Cross County Rd	USPS, Bosch Charleston Plant, Dilmar Oil Co, AGM Imports and ~125 acres of speculative industrial sites
29	I-526 from Rivers Ave (Exit 18A) to Ashley River	Boeing, Cel Oil Products
30	I-26 from NW of Aviation Ave (Exit 211A) to US 17/I-26 Interchange, including Morrison Dr to Port of Charleston-Columbus St	Rhodia, Van-Smith Concrete Co and ~5 acres of speculative industrial sites
31	Virginia Ave/Noisette Blvd/N Hobson Ave from Port of Charleston-North Charleston Terminal to North Charleston Coast Guard Port	Kinder Morgan Bulk Terminals, Southeast Bio Diesel, Delfin Group USA, Veterans Terminal, Palmetto Railways Naval Base Intermodal Facility and Hugh Leatherman Terminal
32	I-526 from Port of Charleston-Wando Welch to Clements Ferry Rd (Exit 23), including Clements Ferry to Wando	Kontane Logistics, Gildan Charleston and ~40 acres of speculative industrial sites
33	Cainhoy Rd from Brick Church Rd to French Quarter Creek Rd	Nucor Steel, Smalls Loading LTD Inc
34	US 17 from SC 41 to Faison Rd, including Faison Rd to Mount Pleasant Regional Airport	Mt Pleasant Regional Airport Area
35	Glenn McConnell Pkwy from I-526 to Bees Ferry Rd, including Bees Ferry Rd from SC 61 to US 17 and Main Rd from Bees Ferry Rd to Humbert Rd	Charleston County Landfill, vacant land
36	US 17 from Caw Caw Interpretive Center to SC 162	Martol Marble and Granite

Source: South Carolina Department of Commerce Industrial Park Inventory and Google Earth

4.2 LAND USE CLUSTERS

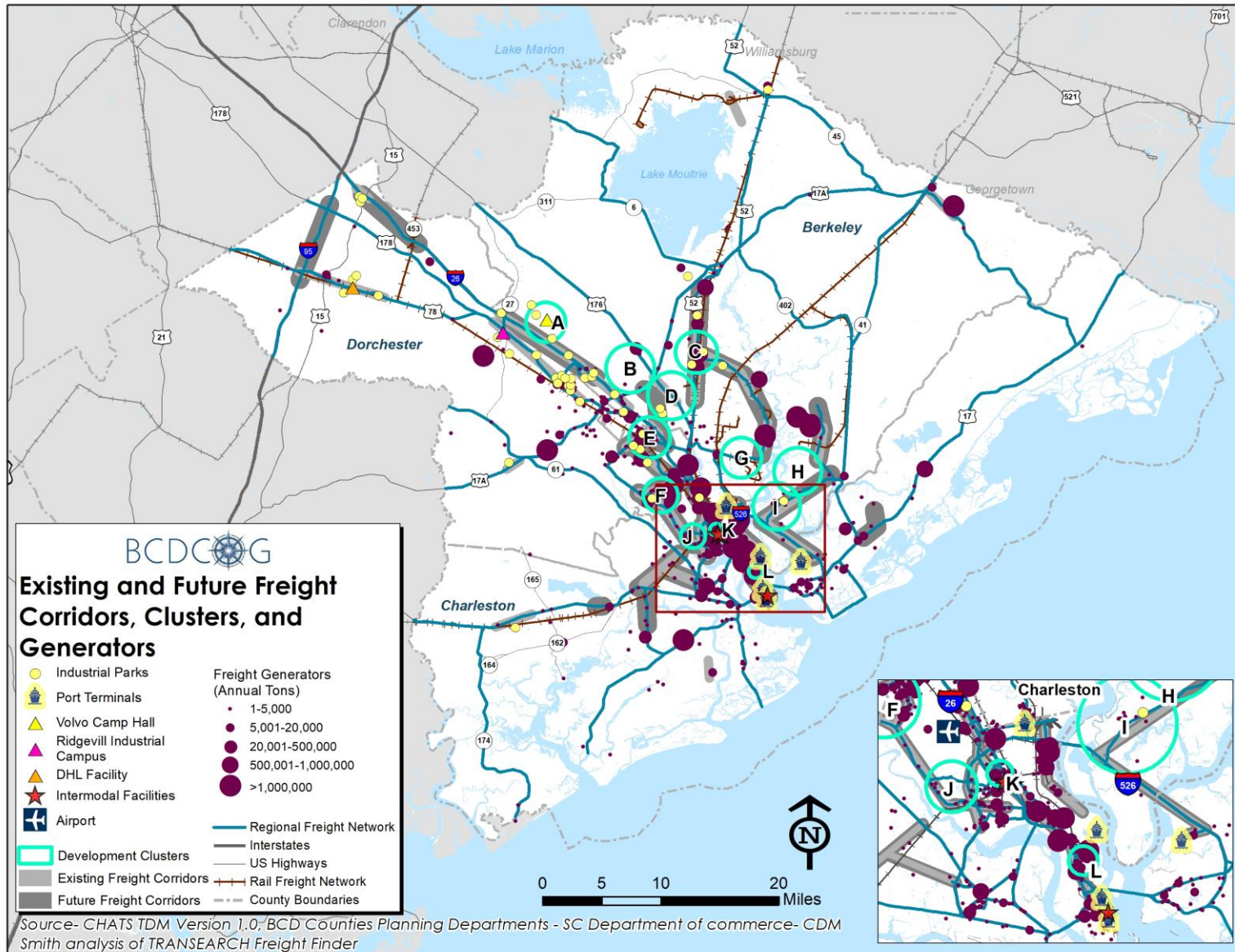
These clusters of freight intensive land use concentrations were identified using data from the industrial parks inventory, Transearch data, population, and employment growth data from the BCDCOG travel demand model and land use datasets from the tri-county region. Employment was forecast from 2015 to 2040 to give employment growth at the Transportation Analysis Zone (TAZ) level. This data was compared to employment forecasts and CommunityViz land use data. Manufacturing, wholesale distribution, warehousing and mining were the key employment sectors for employment used in the evaluation. Job growth of greater than 50 jobs was used as the threshold for indicating significant employment growth in the combined employment sectors by TAZ. There is positive employment growth anticipated for all TAZ model outputs for these employment sectors within the region; however, 50 jobs was used as a natural break for locating focused growth, or clustering, is expected to occur within the study area. The resulting analysis concluded with the identification of three types of land use clusters:

Development Clusters. Areas where job growth is projected to increase by more than 50 jobs from 2015-2040 within the TAZ on the identified freight network and within the existing and future freight corridors, i.e., job growth experienced within planned freight land use areas. These clusters are shown in **Figure 4.3** and in **Table 4.3**. There are twelve identified development clusters of freight intensive activity in the study area. Seven out of the 12 development clusters have rail access, and five of the 12 development clusters are located on the interstate system.

Planning Gaps. Areas where freight generating land uses (industrial parks, truck parking, commercial freight generators) are present where existing or future freight corridors do not exist, i.e., locations of existing freight land use does not appear. These are areas where either land uses are not freight intensive or where the planning team lacked sufficient available data for to identify industrial freight related land use clusters. Three planning gap clusters are shown in **Figure 4.3** and detailed in **Table 4.4**.

Employment Growth Gaps. Areas where job growth is projected to increase over 50 jobs from 2015-2040 within the TAZ off the identified freight network and outside of existing and future freight corridors, i.e., job growth experienced outside of planned freight land use areas. There were no employment growth gaps identified as a part of this analysis.

Figure 4.3: Existing and Future Land Use Clusters (2015-2040)



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Table 4.3: Development Clusters

Letter	Description	Forecast Growth in Employment by TAZ	Freight Development Sites
A	Volvo Camp Hall	5000	~4625 acres of undeveloped industrial sites
B	US 17A/US 176 near Wide Awake	633	Charleston Steel and Metal, Morco Refrigeration Services
C	US 52 near Strawberry	159	Charleston Sheet and Metal CO, Viva Recycling and ~375 acres of undeveloped industrial sites
D	US 176 near Century Aluminum	722	Pegasus Steel, Quoizel Inc and ~50 acres of undeveloped industrial sites
E	US 78/Ladson Rd near Ladson	689	Ford's Redi Mix Concrete, Port City Concrete and ~350 acres of undeveloped industrial sites
F	Whitfield Corporate Park/Peppermill Pkwy	916	Coastal Glass Distributors, Bosch Charleston Plant and ~125 acres of undeveloped industrial sites
G	Joint Base Charleston	900	Vacant Joint Base land
H	Clements Ferry Rd near Wando	328	Vacant Land (Water Access)
I	Clements Ferry Rd near I-526	371	Kontane Logistics, Gildan Charleston and ~40 acres of undeveloped industrial sites
J	Boeing	2288	Vacant land near Boeing site
K	Norfolk Southern Rail Yard/US 78	951	Fisherman Flooring Solutions, NS Rail Yard
L	Chem Marine Corporation/Odfjell Terminals	281	Kinder Morgan Terminals, Chevron, G S Carter and Son Lumber Co

Source: CHATS TDM Version 1.0 - TAZ Employment Growth for Manufacturing, Wholesale Distribution, Warehousing and Mining; South Carolina Department of Commerce Industrial Park Inventory and Google Earth

Table 4.4: Planning Gaps

Letter	Description	Freight Development Sites
M	SC 27 near Ridgeville	Showa Denko Carbon and ~1125 acres of undeveloped industrial sites
N	US 17 near Summerville	SuperTree Seedling, vacant land
O	US 17 near Jamestown	Martin Marietta-Georgetown II Quarry

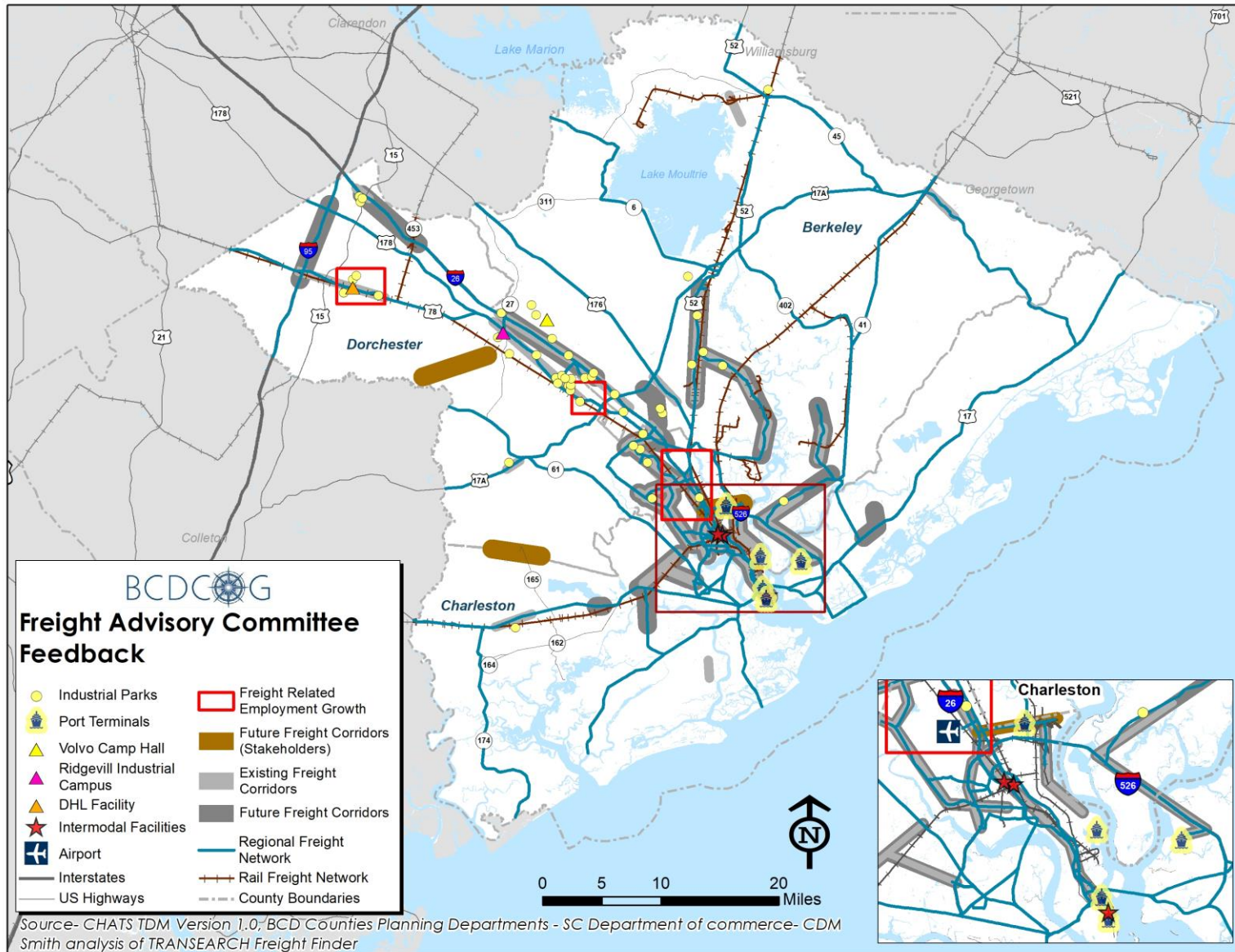
Source: South Carolina Department of Commerce Industrial Park Inventory and Google Earth



5. FREIGHT ADVISORY COMMITTEE FEEDBACK

The FAC was presented with the draft land use analysis in the form of a briefing deck presentation and work session. Feedback was gathered from the FAC on both the methodology of this analysis and the results of the analyses of existing freight related land uses and future developments within the BCD Region. The FAC was presented a series of three maps and asked to validate findings, bridge data gaps, and incorporate additional known freight intensive land use corridors, clusters, and freight dependent infrastructure, based upon local field knowledge, industry experience, and approved or speculative permitting and siting information. The stakeholders provided feedback for two future freight corridors, one located on County Line Road near SC 165 and the other on State Road S-18-19 in Dorchester County from the sand mines east. Additional mapping and recommendations related to the mining operations in the region were include in the final Regional Freight Mobility Plan. The corridors provided by stakeholders can be seen in **Figure 5.1**. The freight advisory committee also provided feedback on locations of freight related employment growth which are also illustrated in **Figure 5.1**. The location near St. George, SC is where the future DHL facility will be located. Comments also incorporated the location of the recently announced Wal-Mart distribution center at the Ridgeville Industrial Campus. The location near the Jedburg exit off I-26 has several undeveloped industrial sites and the Palmetto Commerce Parkway location has several other major generators.

Figure 5.1: Final Freight Committee Feedback



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6. LAND USE OBSERVATIONS AND OPPORTUNITIES

Current and long-range planning activities have impacts on freight mobility and freight dependent land use development patterns. The connection between freight mobility and land use planning is visualized throughout this technical memorandum by linking the freight network with the identification of existing and future freight land use corridors and freight intensive land development clusters within the region. Without integrated planning, the potential negative impacts of freight generating land uses may include air quality impacts, greenhouse gas emissions, environmental justice impacts, traffic congestion or other safety and mobility challenges resulting from increased freight volume.⁴ Based upon the subsequent freight land use analysis, the observations from this land use analysis have been identified at the summary level in **Table 6.1**.

Table 6.1: Key Finding and Planning Recommendations

Key Finding	Planning Recommendation
Local, regional, and state transportation and land use planning decisions are interdependent and should be better coordinated. Coordination between local governments, BCDCOG, Charleston Regional Development Alliance, Department of Commerce, and South Carolina State Ports Authority (SCSPA) on the economic development and industrial recruitment strategy for the region and its impacts on land use can be improved through integrated planning.	Encourage regional and local coordination with SCDOT at the Planning, District and Regional Production Group levels
	Evaluate the availability and proximity of workforce to support freight generating development and incorporate workforce transportation studies to connect available workers with freight related employment opportunities.
	Local governments should incorporate traffic impact studies into the permitting process for major freight generating land uses.
	Continue to plan for future freight related development along existing freight clusters and corridors. Monitor and improve transportation connections to appropriately serve commercial vehicles and intermodal connectors, as appropriate.
	Compare local goals and objectives for impacts of growth with state and regional economic development strategies.
	Zoning and future land use determinations should complement local and regional economic development goals by aligning comprehensive planning, building permitting and local and regional economic development marketing strategies.
	Local land use decision making should account for regional impacts to the transportation network by aligning local, regional, and state comprehensive land use and economic development strategic plans to the COG and MPO Long Range Transportation Planning (LRTP) process

⁴ https://ops.fhwa.dot.gov/publications/fhwahop12006/sec_1.htm

Using these observations as a basis, **Table 6.2** presents five planning and programming recommendations as valuable opportunities for greater coordination between land use planning and freight mobility planning in the BCD Region. These opportunities will guide subsequent plan development to further identify needs at the project level, as well as develop a mechanism to align the project programming and policy or project delivery processes.

Table 6.2: Potential Opportunities to Support Land Use Development

Opportunity	Description
Sub-Area & Neighborhood Freight Plan Program	Develop strategies and design standards to reduce conflicts between freight, auto, transit, and bike/ped for small towns and neighborhoods at the freight corridor level
At-Grade Rail Crossing Program	Prioritize and program at-grade crossing project improvements
Regional Truck Parking Plan	Identify and prioritize sites for future truck parking facilities to support local industry
Regional Freight Related Economic Development Study	Determine freight related planned acreage to better shape future industry cluster recruitment and marketing strategies, as well as utility and transportation infrastructure planning
Regional Supply Chain Resiliency Strategy	Develop a strategy to create immunity to local and global impacts to the network supply chain by identifying redundant supplier bases in and around the region

