Atlanta Regional Commission

DeKalb County GEORGIA

METRO SOUTH COMMUNITY IMPROVEMENT DISTRICT

Best Practices Report

Final Report

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In association with

HNTB

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1 Overview

1.1 Purpose

This Best Practices Report provides a synopsis of leading ideas, approaches, and implemented practices regarding goods movement from across the United States that are relevant to the Metro South Community Improvement District (MSCID). This report supports the project objective of researching and organizing the findings on freight specific transportation planning, operations, technologies, policies and land use, innovations in supply chain and logistics, safety, and access to and from the Study Area and Area of Influence defined in the *Inventory and Assessment Report*. The overall goal is to consider and leverage ideas and concepts for goods movement and livability through improving logistics, operations, efficiency, safety, access and the daily environment of establishments, residents, and commuters within and accessing the community.

1.2 Organization of Report

The remainder of this report reviews the following technical areas and assesses their applicability to the MSCID and/or Atlanta Regional Commission (ARC):

- Review of Previous Best Practices Reports from ARC Freight Cluster Plans
- State Guidance for Metropolitan Planning Organizations
- Regional Freight Plans
- Commercial Truck Access & Other Facilities
- Intelligent Transportation Systems
- Freight and Land Use
- Supply Chain Innovation
- Fleet Conversions, Electrification, and Alternative Vehicles

2 Review of Previous Best Practices Reports

To incorporate applicable best practices, the study team reviewed the Best Practices Reports from four previous ARC Freight Cluster Plans. Key, respective best practices are shown in Table 2-1.

Specific applications relevant to the MSCID include:

- Innovative Zoning for Freight
- Developing Truck Parking and Staging Areas
- Truck Parking Technologies

The following sections highlight excerpts from these reports.

Table 2-1: Summary Other Best Practices Reports[1]

Report	Best Practices Topic Areas
Aerotropolis Atlanta CIDs	• Emerging technologies including truck signal priority and autonomous trucks (i.e., connected autonomous vehicles) • Innovative land use including for fulfillment centers (i.e., logistics parks), given all modes including ped/bike • Supply chain logistics including currently evolving models
Gateway 85 CID	• Truck parking • Truck routing/access • Zoning overlay district & land use buffering • Stakeholder outreach • Technology solutions • Truck-personal vehicle separation
Spalding County	• Truck access • Innovative zoning, e.g., overlay zones • Freight stakeholder outreach - including the challenges of getting interests "to the table" • Freight signal priority - given that technology applications are still being vetted nationwide • Industrial development practices
Tucker Summit CID	• Truck access • Innovative zoning, e.g., overlay zones • Larger commercial trucks • Freight signal priority • Integrated heavy truck design into corridors given the shared use by personal vehicles.

2.1 Innovative Zoning Codes for Freight (Gateway85, Spalding and Tucker Summit)

Over the past 10 years, there has been little to no new development within the MSCID. As an older industrial area in one of the highest growing metropolitan areas in the U.S., it is reasonable to assume there are some opportunities for new industrial development and redevelopment in the MSCID area. This is particularly true given everchanging market shifts and limited amounts of industrial land throughout the region.

The Urban Manufacturing Alliance is a national coalition of organizations and individuals focused on ensuring that cities and towns continue to be home to manufacturing facilities. Based on research and work in a number of cities, including Boston, Indianapolis, and Nashville, they have developed a suite of best practices for retaining maker and manufacturer industries.

Site-scale interventions can increase the compatibility of industrial development with other neighboring uses. For example, placement of green infrastructure can serve as a buffer between neighborhoods and industrial activity and provide significant benefits to water quality and flood mitigation. Murphy Warehouses in the Twin Cities has been an industry leader in incorporating sustainable design into infill and greenfield industrial development. In some infill settings, there may be insufficient space on an

[1] The four freight cluster plans were conducted and completed by separate teams with similar scopes of services during the same timeframe.

individual parcel for community-scale green infrastructure. Some underutilized industrial land may be appropriate locations for green infrastructure installations funded by a combination of local businesses and public investment.

As the MSCID leadership continues to work with DeKalb County to revise the zoning regulations, opportunities could be explored for utilization of Urban Manufacturing Alliance recommendations and promoting more sustainable development and new development.

2.2 Develop Truck Parking and Staging Facilities (Gateway85)

Truck parking has been identified by MSCID leadership as an important issue and a focus of this Plan. The Gateway85 report highlighted the strategy of developing innovative means to accommodate trucks for short-term parking for loading and unloading. The section that follows discusses technologies that are applicable to long-term parking.

Lack of adequate truck parking is both a capacity and safety issue at every stage of the supply chain, from receiving points to intermodal facilities, and along long-haul routes. A shortage of truck parking leads to drivers parking on expressway on-ramps, closed inspection stations or rest areas, retail parking lots or even along local streets. These options create safety concerns for truck drivers as well as for motorists who must maneuver around the parked vehicles. Sometimes, truck drivers travel out of their way to find parking which puts unnecessary pressure on the transportation network and drivers' hours of service requirements.

The U.S. Department of Transportation (USDOT) and several stakeholder organizations representing the trucking industry, commercial vehicle safety officials, State Departments of Transportation, and the truck stop industry established The National Coalition on Truck Parking to address truck parking problems across the nation. This body has identified concrete steps that can be taken at all levels of government and by the private sector. Among these actions are incorporating overflow truck parking into shipping and distribution centers. By creating fenced-in "bullpen" areas outside of the gated area of the distribution center, owners can limit liability while also addressing issues of drivers waiting to make deliveries. Other companies, such as Unilever, assign designated staging and overnight parking spots on-site at distribution facilities.

Vacant or underutilized sites within industrial districts, particularly those that may have existing brownfield issues or other redevelopment challenges, can be great targets for additional truck parking facilities. For example, The City of Weed, CA created municipal truck parking for about 30 trucks on two pieces of city owned land zoned for industrial use. Moreno Valley, CA allows commercial truck parking on designated roadways in the city. Elmira, NY created a municipal truck parking area from an existing industrial-zoned lot adjacent to a carpool parking lot, reducing complaints from residents about trucks parking in the community.

Industrial tax districts could be used to fund pooled parking on these sites in areas with heavy concentrations of terminals, distribution centers and other industrial sites. This would support the demand for parking off the highway system and could reduce parking impacts on local streets. This approach may involve changes to local zoning requirements and agreements among industrial users and

developers to provide offsite parking that meets the staging needs and zoning requirements for groups of industrial properties.

In addition to increasing the supply of truck parking, efforts can be made to improve the efficiency of goods movement and the information available to truck drivers. Signage, real-time information, and partnerships with other communities along key truck routes can reduce bottlenecks in the truck network and spread-out responsibility and expense for maintaining truck infrastructure among more parties.

2.3 Truck Parking Technologies (Spalding County)

The Spalding County freight best practices report cited that currently, few systems exist for commercial drivers to access truck parking availability information. Although some private parking facilities offer parking availability information through mobile phone applications, these systems rely on cumbersome manual data collection and are not widely deployed. In addition, the National Association of Truck Stop Operators maintains a directory of private truck stop operators. However, these services do not provide real-time information on truck parking availability. ITS-based truck parking systems are in operation in Minnesota, Florida, Michigan, and California, among others under development. As these systems evolve, they continue to strive to provide operational information directly to the truck driver, whether in response to an incident or congestion ahead on the driver's route; or by allowing the driver to interact with the truck parking application to reserve a parking space in advance of arriving at the parking lot. These technologies will be incredibly useful in TSCID, directly providing this information to drivers in the district before they need it may reduce instances where the driver violates hours of service (HOS) requirements in parking lots along MIB. It may also contribute to improved efficiency since drivers could travel directly to the parking facility where spaces are available without having to venture off their routes. As such, the MSCID should coordinate with its partners and business community to ensure information regarding nearby available parking is available to their logistics carriers.

3 State Guidance for Metropolitan Planning Organizations

The team considered state guidance supporting Metropolitan Planning Organizations (MPOs). Guidance reviewed includes the Florida MPO Program Management Handbook, the Illinois Department of Transportation Guidance for MPOs, and the ARC's own Regional Transportation Community Engagement Plan – A Guide to Metropolitan Planning Organization Basics."

3.1 Florida MPO Program Management Handbook (March 11, 2020)

The Florida Department of Transportation's Office of Policy and Planning revised its MPO Program Management Handbook in March 2020 to provide guidance to the in-state MPOs and even its own personnel.[2] Similar to the Illinois manual, the handbook comprehensively covers the purpose and composition of an MPO, the Unified Planning Work Program, the Long Range Transportation Plan, the Transportation Improvement Program, Public Involvement, Performance Management, Title VI and Non-

[2] Source: "MPO Program Management Handbook," Florida Department of Transportation Office of Policy Planning, April 30, 2021. Available at https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/policy/metrosupport/resources/fdot-mpo-handbook99c4d55af487435394909e5f80818235.pdf?sfvrsn=861c81ff_37.

Discrimination Program Guidance, and other elements including pedestrian and bicycle safety and freight planning. The Florida handbook illuminates the need to include freight in the MPO planning process, supporting planning efforts in the MSCID. Chapter 11 of the Florida handbook is completely dedicated to freight planning, providing:

- Discussion on the Federal Requirements and Guidelines
- Description of Freight Performance Management
- Overview of Florida Freight Planning
- Explanation of Florida's MPO Freight Advisory Committee (MPOAC)
- Resource Guide for Local Governments (with a list of key references).

This handbook is a recent and relevant example of state guidance for MPO's providing best practices for incorporating freight planning into the overall planning process. From an ARC perspective, this guidebook presents the FHWA factors that influence our overall freight policy. Within the upcoming RTP and Regional Freight Plan update, the ARC could consider including a section that provides the overall role of the regional freight plan in the overall state and federal policy framework.

3.2 Illinois Department of Transportation Guidance for MPOs (Feb 2020)

The Illinois Department of Transportation (IDOT) maintains a Cooperative Operations Manual for Metropolitan Planning Organizations (MPOs), stressing the State's intent to work collaboratively with the local level of government for the transportation planning process.[3] The manual has the same intent as the Atlanta Regional Commission's (ARC) "Regional Transportation Community Engagement Plan – A Guide to Metropolitan Planning Organization Basics," although developed from a state perspective which provides more comprehensive or a broader range of information.

This IDOT guide is a good example of how the Regional Transportation Community Engagement Plan can be expanded, notably to include freight stakeholders – landowners, providers, third-party logistics providers, carriers, etc. In accordance with 23 USC 134 and 49 USC 5303, consultation with various interested parties including freight shippers, providers of freight transportation services are recommended.

Moving forward, the ARC's Regional Transportation Community Engagement Plan could be updated to provide more guidance and procedures for private sector outreach, which is critical to both freight and economic development efforts undertaken by the agency. This information could include many of the interview and survey techniques being undertaken as part of this FCP.

4 Regional Freight Plans

Peer regional freight plans were reviewed for best practices that could be carried forward by the ARC during its future activities. The plans identified:

[3] Source: https://idot.illinois.gov/Assets/uploads/files/Transportation-System/Manuals-Guides-&-Handbooks/Highways/Metropolitan%20Planning%20Organization%20Cooperative%20Operations%20Manual.pdf

1. Ohio-Kentucky-Indiana (OKI) Regional Freight Plan – Innovative survey techniques for shippers
2. Wichita Area MPO Regional Freight Plan – Added focus on railway operations

4.1 Ohio-Kentucky-Indiana (OKI) Regional Freight Plan

In 2011, the Ohio-Kentucky-Indiana Regional Council of Governments undertook a regional freight plan for the Cincinnati MPO area, which includes eight counties in three states. While the presence of the Ohio River presents a freight profile different from that of the Atlanta region, both Cincinnati and Atlanta are major national freight hubs served by a wide range of shippers. The update of the OKI plan was developed through an innovative committee structure.

The Supply Chain Consortium (SCC) is a voluntary group of industry peers who work together on benchmarking and best practices on supply chain performance. The SCC is led by an Advisory Board composed of senior supply chain executives. The Advisory Board provides guidance on process content, development priorities, and peer invitations. The SCC covers four major industries: distributors/wholesalers, manufacturers, retailers, and service providers.

The SCC data represents the "voice of the shipper" providing shipper opinions on the following subjects:

- Shipper forecast of their freight volumes (five year maximum)
- Port selection criteria
- Factors in location of operating/distribution facilities
- Those considering the OKI region for location or expansion
- Those not considering the OKI region for location or expansion
- Perceptions of the OKI regional freight network
- Rating compared to other regions
- Identification of bottlenecks

For the freight planning effort, OKI used the SCC in two ways:

- To distribute a shipper survey to more than 1,100 SCC company members. Approximately 43 companies completed the survey, which is a response rate of about 4 percent. While this response rate was low, those companies that did respond have active transportation facilities in the OKI region and shared very similar comments regarding the regional freight network.
- To query the SCC database for further analysis and compilation of national and regional data that was directly pertinent to the OKI region. The database is a compilation of a series of more than 200 questions that each consortium member completes as part of their membership. This query generated a profile of 172 firms that ship products into, out of and through the OKI region. The profile of their responses was compared to the 43 companies that directly responded to the survey to provide a complete profile of regional shipping trends and issues.

As the ARC Freight Advisory Task Force continues to coordinate on ongoing Freight Cluster Plans, the database of potential contacts for survey activities should continue to expand and be utilized for future regional planning activities.

4.2 WAMPO Freight Plan

In lieu of the Wichita Area MPO's (WAMPO) Railroad Crossing Plan, the WAMPO Freight Plan (2010) is considered for best practices because it included information from the Railroad Crossing Plan and referenced all freight modes – the rail system, aviation, and street and highway system. Further, it considered safety and what it termed "transmodal facilities."

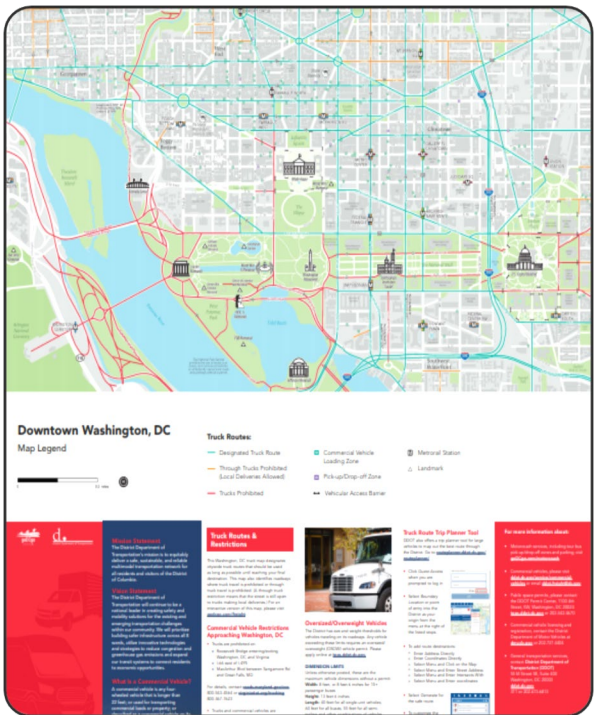
The rail system discussion addressed multiple crossings and included a hazard index which would be applicable to the MSCID for current truck delays because of the diversion via Henrico Road. Moreover, the rail system discussions considered applicable ITS systems for which the Freight Plan referenced the WAMPO Regional Transportation Systems Management & Operations (TSMO) Plan updated in 2019.

Finally, the ITS Plan cited WICHWay, the ITS network operated by the Kansas Department of Transportation in cooperation with the Federal Highway Administration and WAMPO and other communities. WICHway has 89 closed circuit cameras, 79 traffic sensors and 33 dynamic message signs. There is also a Traffic Management Center operated 24/7 to monitor traffic conditions, post messages and update the website (www.WICHway.org) to help drivers avoid incidents, severe weather, maintenance, and construction zones plus, occasional special events and other factors affecting traffic. As part of the next Regional Freight Plan update, the ARC may want to consider identifying specific crossings throughout the region that are creating delays and developing an overall strategy to increase safety and mobility at these locations.

5 Commercial Truck Access and Other Facilities

Best practices also include how trucks can or do access the MSCID. Best practices discussed include the accessibility of truck routing information to drivers such as in Washington, DC, and New York City; truck parking information exemplified by the Florida Truck Parking Availability System; and I-75 Truck Lanes.

Figure 5-1: District of Columbia Truck Route Map



Source: "DC Truck Map Brochure_12.10.20_web.pdf," Accessed March 4, 2021. Accessed online at: https://ddot.dc.gov/sites/default/files/dc/sites/ddot/service_content/attachments/DC%20Truck%20Map%20Brochure_12.10.20_web.

5.1 Washington, DC: Truck Routing Information

The Washington, DC region is home to more than 5.3 million residents, which is comparable to the Atlanta region (with close to six million residents). Goods movement in the District is challenged by diagonal streets overlaid on a street grid, intense land use of residential, government facilities, and commercial interests, and heavy commuter patterns. See Figure 5-1.

The District Department of Transportation (DDOT) determined it needed road-sharing and developed substantial online/virtual guidance for commercial truck drivers such as permissible routes and restrictions, a truck route trip planner tool, a guidance map for oversize/overweight commercial vehicles, and current curbside management and regulatory programs.[4] Permissible routes consider the multitude and mix of land uses including residential, government, and retail.

From an ARC and MSCID perspective, the presence of such an application in the Atlanta region could reduce truck and neighborhood conflicts throughout the region. It should be noted that this would certainly be a major undertaking given the number of Counties and municipalities in the 18-county region. Furthermore, this information is tracked differently depending on the enforcement agency.

5.2 New York City Truck Route Information

In contrast, the City of New York (like Washington, DC) maintains and provides more immediate and contemporary information to drivers in the form of online and printed maps. Further, the New York City website for "Truck Routing" directly references the ability to reach land uses that are not on designated truck routes.[5] The same information, even for less dense commercial/industrial land uses like the

[4] Source: "Commercial Vehicles," District Department of Transportation. Available at https://ddot.dc.gov/service/commercial-vehicles. Accessed March 4, 2021.

[5] Source: "Truck Routing," New York City, Department of Transportation. Available at https://www1.nyc.gov/html/dot/html/motorist/truckrouting.shtml.

MSCID, can provide current and recent route changes to drivers navigating corridors and intersections in the MSCID, reducing delays due to truck movements as well as incidents and accidents.

5.3 Florida's Truck Parking Availability System

Given improved access to any commercial/industrial area and current Hours of Service (HoS) regulations, there is a greater need for truck parking and up-to-date information for drivers. In 2018, the Florida Department of Transportation began implementing its Truck Parking Availability System (TPAS) which provides advance notice of truck parking availability at public rest locations along interstate and state highway corridors.[6] (See Figure 4-5.) The system has been installed along the I-4, I-10, I-75, and I-95 corridors, the primary travel routes for Class 8/9 trucks (typically 80,000-pound, 18-wheel trucks) that have a hard time parking due to size. The system was also made possible by an Accelerated Innovation Deployment Grant in 2015 (for $1 million), showing the potential application in Georgia.[7]

Figure 5-2: FDOT Truck Parking Availability System

Source: FDOT District 5 Truck Parking Study, October 2018

This new advanced notification of truck parking system provides needed support to drivers required to adjust to the September 2020 HoS Regulations. Prior to these technological advances, drivers would depart interstate and other highway corridors only without knowledge of available spaces. Florida's TPAS informs operators while they are traversing congested and other corridors, providing real time information on space availability at nearby locations which can minimize unproductive travel time and improve roadway safety.[8] This system has been further complemented by private industry efforts including Pilot, Flying J, and Love's to provide similar information through a reservation system and crowdsourcing information to help drivers plan better.[9]

These two best practice applications in the public and private sector would help in the MSCID, providing additional vibrant/throughput capacity through the more efficient use of spaces and the capability to

[6] Source: "Primer for Improved Freight Mobility and Delivery Operations, Logistics, and Technology Strategies," Office of Operations, Federal Highway Administration, Accessed March 11, 2021. Available at https://ops.fhwa.dot.gov/publications/fhwahop18020/rt_truck_parking.htm. Further, in 2020, FDOT conducted a statewide ArcGIS analysis of vacant property to determine potential new locations for truck parking. Criteria included location, size, and configuration for truck access into and within the sites. Results are currently pending.

[7] Source: "Truck Parking Availability System," Traffic Engineering and Operations Office, Florida Department of Transportation, Accessed March 11, 2021. Available at https://www.fdot.gov/traffic/traf-incident/tpas.

[8] Source: "Truck Parking Availability System," Florida Department of Transportation, Accessed March 4, 2021. Available at https://www.fdot.gov/traffic/traf-incident/tpas.

[9] Source: (1) "Improved Parking Reservations at Your Fingertips!" Pilot Flying J, Accessed March 4, 2021. Available at https://pilotflyingj.com/prime-parking/. (2) "Carriers Use Pre-Planning to Help Drivers Secure Truck Parking," Transport Topics, March 15, 2021. Available at https://www.ttnews.com/articles/carriers-use-pre-planning-help-drivers-secure-truck-parking.

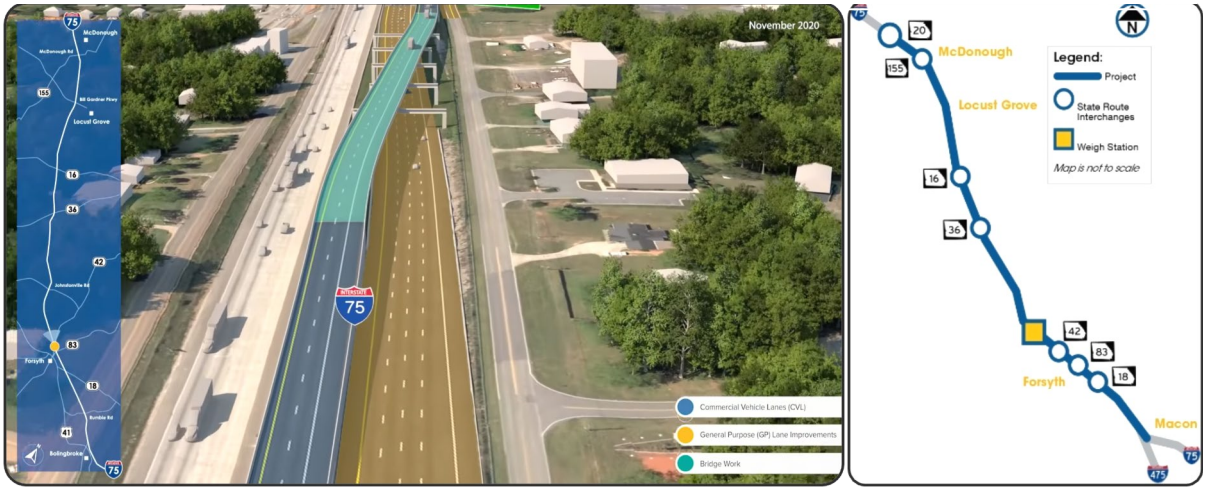
reserve parking before arriving. Immediate benefits include timely information for drivers and a safer driving environment for truck and general traffic operators.[10]

Further, extensive data collection using applications, websites, and user memberships with private sector truck parking facilities like Pilots, Flying J, TA, Love's, and other travel centers could provide a greater system wide illustration of truck parking demand, impacts, locations, safety, and amenities. Where strong partnerships exist between the private sector and public sector service providers such as those operating toll plazas, weigh stations, rest areas, agricultural inspection, and truck only parking facilities provided through the Georgia Department of Transportation, then a collaborative approach to meeting the need of truck drivers could meet challenges unmet by one or the other like location, capacity, or facilities.

5.4 Georgia's I-75 Truck Lanes

The Georgia Department of Transportation (GDOT) is currently planning and designing a truck-only facility along the northbound alignment of I-75 between the I-475/I-75 interchange in Macon at the southern end and McDonough at the northern end. See Figure 5-2. The facility will consist of two truck lanes that are barrier-separated from the general-purpose lanes. On-ramps will be provided for local access to urban areas like Forsyth, from which the new facility would provide a bridge over general-purpose lanes. Further, the truck lanes will be configured to provide trucks access to the weigh station north of Forsyth. Moreover, further north in the upgraded corridor will be a new, direct slip ramp from Forsyth so all trucks can be in the "truck lanes." However, trucks with local destinations can use the next slip ramp to access the general-purpose lanes.

Figure 5-3: Georgia I-75 Truck Lanes



Source: Georgia Department of Transportation, I-75 Commercial Vehicle Lanes, Video Gallery, Available at https://0014203-gdot.hub.arcgis.com/

[10] Source: "Improved Parking Reservations at Your Fingertips!", Pilot/Flying J, Accessed March 11, 2021. Available at https://pilotflyingj.com/prime-parking/.

This commercial vehicle improvement is projected to reduce delays by 12 percent for trucks and six percent for passenger vehicles in the general-purpose lanes between its two termini. It is anticipated to reduce maintenance and operational costs while increasing overall safety by segmenting throughput of heavier trucks in the new truck lane facility given their greater Gross Vehicle Weight Rating and directly reducing the trucks in general purpose lanes to only that needing local access. In addition, the road design is incorporating future connected and autonomous vehicle technology further increasing safety along bisected segments using real time operational Intelligent Transportation Systems (ITS). A new slip ramp to allow trucks local access to SR 36 (Barnesville-Jackson Road), SR 16, and Bill Gardner Parkway will be developed via the general-purpose lanes. Just north of the SR 36, the truck lanes merge back to the mainline in Henry County, 19 miles south of the MSCID, where commercial vehicles can take I-675 to access the MSCID. As freight travel demand continues to increase in the Atlanta region, potential for expansion of I-75 to I-675 or construction of a new facility on I-285 may be considered. Given the amount of logistics firms in the area, access to these facilities would be very beneficial to the MSCID.

6 Intelligent Transportation Systems

6.1 Adaptive Traffic Control Systems

Traffic signal control systems are becoming "smarter" with focus on targeting impacts such as congestion and emissions. GDOT in cooperation with the ARC, CIDs and local governments are working on traffic signal enhancements throughout the Greater Atlanta region through the Connective Vehicle Regional Program (CV1K).[11] Enhancements include emergency vehicle preemption, transit signal priority, pedestrian alerts on transit buses, queue warning and speed harmonization.[12] Given the level of transit and freight within DeKalb County , the MSCID should encourage the County to get more involved with the overall program to ensure the district is ready to accommodate connected freight vehicles when appropriate and develop a smart corridor along Moreland Avenue.

6.2 Truck Signal Priority

6.2.1 Connected Vehicles

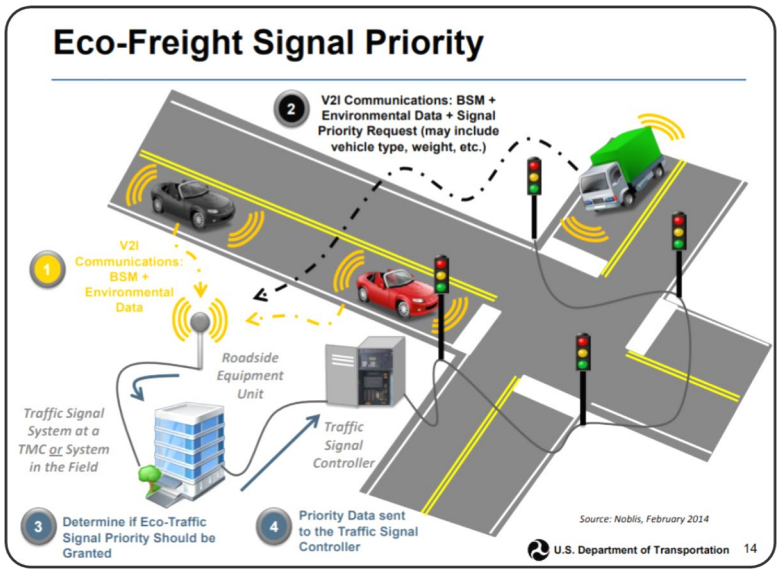
Freight signal priority provides precedence to freight and commercial vehicles traveling in a signalized network along a defined corridor. The goal of freight signal priority is to reduce stops and delays to increase travel time reliability specifically for freight traffic to improve on-time deliveries, enhance intersection safety, and increase overall network efficiency. Freight signal priority could be applied in conjunction with other intelligent transportation systems, or Integrated Corridor Management (ICM) strategies. Freight signal priority is an innovative strategy that the MSCID, in coordination with GDOT's Regional Traffic Operations Program (RTOP), could consider as part of their long-term strategy for Moreland Avenue. Although some technology applications may not be immediately implementable in

11 "The CV1K program targets implementing connected vehicle technologies operating in the 5.9 GHz safety spectrum at 1,000 traffic signal intersections." Source: "Transportation Coordinating Committee, December 11, 2020, Meeting Notes. Available at https://cdn.atlantaregional.org/wp-content/uploads/12-11-2020-notes.pdf.

12 Note that Dekalb County is not a local partner in the first round of the CV1K project. The City of Dunwoody and PCIDs in north Dekalb are the only local partners in Dekalb County, and implementation there would not impact the MSCID. Also, more information can be found at http://itsarchitecture.atlantaregional.org/projdetail.htm?id=9.

the MSCID since it will take time for roadside infrastructure and freight vehicles to be equipped with V2I communication technology, the applications may offer an incentive for freight shippers as the technology improves overall corridor efficiency. With less delay at intersections, drivers would be better equipped to make on-time deliveries, and fuel consumption and emissions due to idling at intersections could be reduced.[13]

Figure 6-1: Example of Signal Priority Process



Source: U.S. Department of Transportation. Dynamic Mobility Applications (DMA) Program – Multimodal Intelligent Traffic Safety System (MMITSS).

As part of the Dynamic Mobility Applications program, the USDOT is exploring the possibilities for smarter traffic signal timing using vehicle-to-infrastructure (V2I) communications. The Multi-Modal Intelligent Traffic Signal Systems (MMITSS) is a bundle of applications that allows traffic signals to be monitored and adjusted in real-time to maximize traffic flows or to accommodate specific user groups, such as freight, transit, emergency vehicles, and pedestrians.[14]

With the development of connected vehicle technology for signal priority for freight platooning (supported by the 2020 2020 Regional Traffic Operations Program (RTOP) Connected Vehicle Deployment Plan), safety and current level of service (LOS) can be improved.

Truck signal priority can also be applied in conjunction with other Integrated Corridor Management (ICM) strategies that address other modal movements including pedestrian and personal vehicle. In the MSCID, truck signal priority is a strategy that can be leveraged with GDOT's Regional Traffic Operations Program (RTOP) as a long-term strategy for the Moreland Avenue corridor. Moreover, cost barriers can be mitigated as new trucks and technology are developed or leverage existing technologies such as geospatial positioning systems (GPS) that private operators use.[15]

It should be noted that there are difficulties for implementing Connected Vehicle technology. These include:

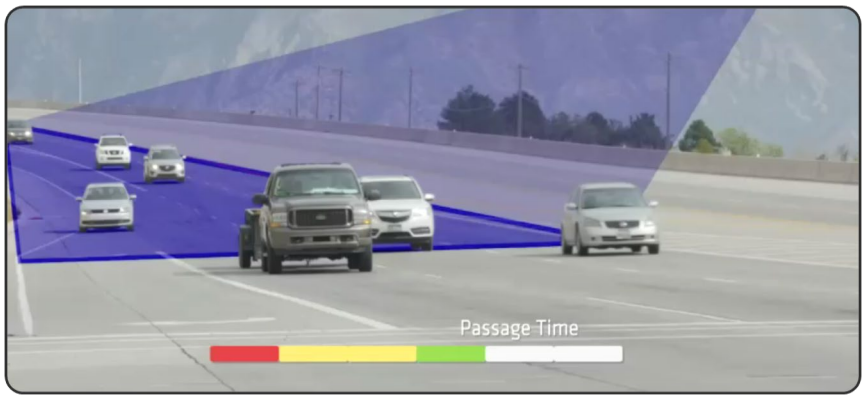
[13] USDOT. *Integrated Corridor Management and Freight Opportunities.* December 2015.
[14] U.S. Department of Transportation. *Dynamic Mobility Applications (DMA) Program – Multimodal Intelligent Traffic Safety System (MMITSS).* Available online at: https://www.its.dot.gov/research_archives/dma/bundle/mmitss_plan.htm
[15] The Tucker Summit CID addressed freight signal priority for the more efficient movement of trucks. Here, freight signal priority is considered for safety and better integration into the MSCID.

- Equipment costs are a consideration. Connected vehicles require On Board Units (OBUs) to function. Given most trucks traverse multiple regions and jurisdictions and the different types of technologies available, the utility of specific OBUs may be too limited to warrant their purchase by a certain shipper.
- Connected Vehicles have difficulty performing in peak hours and, as a result, technology is typically recommended for off peak use. Many local fleets like UPS and FedEx travel in the study area during peak hours and would not benefit from the technology. Another consideration is how multiple trucks would influence overall signal timing and impact congestion.
- Truck preemptive signalization also presents equity issues. While using signal preemption for emergency vehicles is generally accepted, preemption for freight over private vehicles may not be politically acceptable.

6.2.2 Camera-Linked Dilemma Zone Signal Technology

Another potential ITS application applicable to the MSCID and the Moreland Avenue corridor could be camera-linked signal pre-emption based on real-time surveillance of vehicles. This technology seeks to improved safety and operation using a traffic responsive signal timing (extended green) to respond to high truck volumes to reduce the 'dilemma zone' (when trucks cannot either safely brake or continue through) for trucks approaching signalized intersections with characteristics that would require more safe braking distances since they cannot stop as quickly as a general passenger vehicle. An advantage of this technology is that cameras read every type of truck regardless of their on-board equipment.

Figure 6-2: Dilemma Zone Illustration



Source: ARC

Implementation of this technology was supposed to be taking place on SR 6 in Douglas and Cobb Counties to foster the operation of the Truck Friendly Lanes on the facility. However, as is common with many new technologies, there have been operational issues reported by GDOT regarding its implementation.

6.3 Dynamic Speed Limits and Lane Assignment

Figure 6-3: WASHDOT Active Transportation and Demand Management

Source: Washington State Department of Transportation

Washington State Department of Transportation (WSDOT) uses an active transportation and demand management (ATDM) strategy. (See Figure 6-3) The advance technology consists of overhead ITS signage that can provide freight and passenger vehicles with advance notice to adverse or positive roadway conditions. These systems have proven to reduce the occurrences of collisions, improve fluidity of traffic and increase awareness with displays of variable speed limits, symbols for lane changes to direct freight and passengers away from a blocked lane, and messaging that can warn drivers of accidents, construction, or congestion ahead.[16]

Washington was one of the first State transportation agencies to install an ATDM system. Since 2010, WSDOT has used this dynamic signage along sections of I-5, I-90, and State Route 520. The State's emergency responders report high compliance with the lane control symbols. Law enforcement officers patrolling the corridors also report feeling safer when working on the roadway.

This system is reporting positive and measurable results with before-and- after crash study evaluations on I-5. Results describe 1.3 percent lower weekday accidents with a substantial 14 percent reduction in collisions on weekends. This technology could support truck only lane design scenarios in super congested corridors, allowing for a more flexible design.

16 *Source: Washington State Department of Transportation, "Benefits of ATDM." Available at* http://www.wsdot.wa.gov/Operations/Traffic/ActiveTrafficManagement/Benefits.htm. Also, see the Transportation Systems Management and Operations in Action, Available at: https://ops.fhwa.dot.gov/publications/fhwahop17025/

6.4 Connected and Autonomous Vehicles

Various manufacturers of self-driving trucks have been testing this technology in Georgia. This includes Waymo and Volvo. Waymo began testing self-driving trucks in the Atlanta region in 2018, moving goods with a human driver in the cab. Further, the ARC is looking ahead to self-driving trucks. This not only supports autonomous commercial trucks but also the value of the truck-managed lanes to the value of the Atlanta Region, including the MSCID.

Similarly, looking ahead at the potential for the future development (next generation) of autonomous trucks, Volvo has been actively conducting research on automated vehicles that could leverage new infrastructure technology in the I-75 Corridor's dedicated truck lanes but also on city streets (in the MSCID). The latest proof of concept is ***Vera***, an autonomous vehicle developed in conjunction with DFDS, a logistics company. (See Figure 5-3.) The immediate plan for application is to travel the 12-kilometer route between the DFDS logistics terminal and the Port of Gothenburg (Sweden). The added benefit is that the vehicle is also electric emitting zero emissions.[17] This is important because Atlanta is a designated non-attainment area by the Environmental Protection Agency.[18] Furthermore, the technology is considered the next step beyond Waymo which in 2019 was testing driverless truck technology in Georgia and recently undertook a partnership with Samsung for the processing chips.[19]

Figure 6-4: Volve Group Automated Truck Technology

Source: Volvo Group News and Media 2019, Autonomous Electric Truck

6.5 Heads-Up Display in Commercial Vehicles

Heads-Up Display (HUD) is commonly used technology in passenger vehicles that helps drivers obtain vehicle information without diverting their attention from the roadway. In 2016, Continental, one of the first companies to develop a HUD for commercial vehicles, installed the technology in its 'Innovation Truck." (Figure 6-5).

[17] Source: "Volvo Vera: Future of Autonomous Transportation Solutions," TechAcute.com. February 8, 2021. Available at https://techacute.com/volvo-vera-future-of-autonomous-transport-solutions/.

[18] Source: "Georgia Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants," Environmental Protection Agency, February 28, 2021. Available at https://www3.epa.gov/airquality/greenbook/anayo_ga.html.

[19] Source: "Samsung to develop autonomous driving chip for Google's Waymo: Media," ETAuto.com, March 15, 2021. Available at https://auto.economictimes.indiatimes.com/news/auto-components/samsung-to-develop-autonomous-driving-chip-for-googles-waymo-media/81516693

The technology supplements conventional instrument clusters, providing the driver a safer driving environment with the provision of information in his/her field of vision. The display gets its data via the CAN bus and include speed, navigation instructions and traffic sign warnings such as overtaking restrictions and speed limits, to distance warnings, gas tank levels and the driving time remaining until the next break. As noted, the technology helps a driver maintain situational awareness and is applicable industrywide. It is not reliant on roadside infrastructure which means it benefits any commercial/industrial region such as the MSCID (and other CIDs) in Atlanta.

Figure 6-5: Commercial Truck Heads Up Display

Source: Continental, available at https://www.continental.com/en/press/fairs-events/head-up-display-22026/.

7 Freight and Land Use

Land use considerations are addressed through federal and industry guidance, notably from the Federal Highway Administration, Transportation Research Board, and American Planning Association. These are addressed below.

7.1 American Planning Association – Policy Guidance on Freight

The American Planning Association (APA) has developed guidance to closely explore the topic and how freight could be integrated into the larger transportation system and communities served by the system. Regarding best practices, APA encourages the following areas of best practices that could influence land use policy:

- Planners should work to ensure that the local context is considered when incorporating freight strategies into community plans and policies. This may be especially true as former industrial areas are redeveloped with residential and commercial uses near still active freight rail lines.
- Municipalities should require loading zones to be incorporated in new developments and set standards for them as well as for loading docks as a part of certain land uses. Providing appropriate locations for truck parking to accommodate required driver rest periods should also be considered.
- Designated freight routes for hazardous materials to avoid to the extent possible environmentally sensitive areas, population centers, parks and recreation facilities and drinking

water sources. Such corridor networks, once designated, should be protected from incompatible development such as recreational trails, housing development and public utilities subject to being negatively impacted were a hazardous materials incident to occur. Enhancing advanced notification to state, regional and local emergency managers of hazardous materials shipments should be pursued.

All these elements can improve freight movement and reduce conflicts in the MSCID area with the proper policy framework through working with DeKalb County to:

- Identify potential conflict areas for freight and residential development and develop potential strategies to ensure community cohesiveness as part of their ongoing *DeKalb County 2050 Unified Plan* effort. This would include any areas currently identified that are potential redevelopment candidates.
- Work with DeKalb County to develop recommended site plan guidelines, including those for truck parking to better serve the existing and anticipated freight needs of the County.
- Develop a freight routing plan specific to DeKalb County that assists municipalities throughout the County on how to manage hazardous materials in the County. This will assist in the planning of community facilities and minimize community risks.

7.2 Transportation Research Board - Freight Land Use Guidance

The Transportation Research Board's (TRB) National Cooperative Highway Research Board will publish 08-111 for "Effective Decision-Making Methods for Freight-Efficient Land Use" in Fall 2021. The report will guide quantification and evaluation of the impact of land use practices and policies to support the efficient movement of all modes of freight. The report will also include quantitative and qualitative land use assessment tools (models) to assist local, regional, and state land use and transportation decision makers for the efficient movement of freight. The application of these tools to the MSCID are expected to help provide insight for the improved integration of land use planning, decisions/outcomes, and efficient freight movement. It will also consider emerging trends and technologies such as those addressed in this report.

The ARC should look to research this guidebook once it is published for its applicability in the region's industrial clusters.

8 Supply Chain Innovation

The supply chain has been transforming over the last ten years, thanks to technology. This transformation also helped the food industry keep up with unprecedented demand in 2020 during the pandemic. Transformations with which most are familiar include online shopping for traditional non-perishable goods but are becoming more evident in the retail food industry.

The supply chain industry that once relied on traditional distribution centers now relies on innovations including fulfillment centers which provide quicker and easier online ordering and delivery options. Technologies are emerging that hold promise for streamlining fulfillment processes to speeding logistics

and the traditional supply chain is rapidly transforming into a more advanced, more functional process driven by digital technology, artificial intelligence, and other innovations.

This could result in greater access to facilities in the Area of Influence referenced in the *Inventory and Assessment Report* such as the Gillem Logistics Center (GLC) in Forest Park, Georgia. Table 8-1 shows the tenants that have state-of-the-art distribution centers in the 1,168-acre facility.

Table 8-1: Gillem Logistics Center Tenants

Tenant	Space (Square Feet)
Kroger	1,300,000
Home Depot	1,017,627
JIT Packaging	373,996
Kuehne & Nagel	211,000
Cummins	137,750
Andapak, LLC	50,750

Further, the implementation of "6 River Solutions" is a reality in the Atlanta region and can be in the MSCID.[20] "6 River Systems" has developed an autonomous robotic fulfillment technology called "Chuck" that incorporates AI technology to support the order fulfillment process at the inventory storage and retrieval stage within a given supply chain. 6-River Systems developed an industry white paper discussing eight of the most prominent innovations that are transforming supply chains and related freight industries. Self-service logistics like Amazon's Flex delivery program or Uber Freight allows individuals to set up their own third-party logistics company. On-demand warehousing meets a high demand for inventory space while customers are less inclined to want long-term lease agreements or be burdened with the expense of having their own facilities. Robotics are certainly nothing new, however, using them to retrieve inventory or to stack and retrieve merchandise is new with collaborative mobile robotics. Blockchain logistics is becoming more popular given the capability to do rapid inventory control, sourcing and locating, and identifying counterfeit or mismarked packages prior to long-haul or more expensive supply chain moves. There are many other freight related innovations included geolocational technologies, truck platooning and piloting, big data and artificial intelligence that are all innovations to supply chain and logistics industries.[21]

As these technologies come to reality, the MSCID will need to work with its membership, particularly its long-haul carriers such as Schneider, Old Dominion, etc., to monitor the implementation of technology advancements to plan for needed infrastructure.

[20] "6RS will support fulfillment activities at Project Verte's distribution center (DC) in Atlanta, which fulfills orders for numerous retailers and brands. The Atlanta DC will also serve as 6 River Systems' southeast hub for site tours, allowing fulfillment professionals in the Atlanta area to tour an active, high-volume warehouse powered by flexible automation solutions." Source: "Project Verte, Full Circle E-Commercial Solution Provider, Deploys 6 River Systems Solutions in Atlanta DC," September 24, 2020. Available at https://6river.com/project-verte-full-circle-e-commerce-solution-provider-deploys-6-river-systems-solutions-in-atlanta-distribution-center/.

[21] Eight Innovations that are Transforming Supply Chains, Chris Dunakin, August 28, 2020. https://6river.com/innovations-transforming-supply-chains/

9 Fleet Conversions, Electrification, and Alternative Fuels

There are currently various developments for commercial trucks consistent with currently utilized energy alternatives for Class 1-4 trucks.[22] As more affordable and/or accessible cleaner energy sources become more of a favorable alternative to MSCID carriers and logistics companies, it will be important for the MSCID to work with DeKalb County to identify changing infrastructure needs for the MSCID to meet the needs of its membership.

In the industry, ABB developed an E-truck in collaboration with E-Force which was showcased in Switzerland in 2019. The goal is to have an all-electric ABB-supported delivery fleet in Switzerland by December 2022.[23] Further, United Parcel Service (UPS) has been using natural gas and electric vehicles, along with FedEx, Amazon, and other providers who are also investing in alternative technology.[24] The critical issue has been getting the necessary infrastructure to charge batteries of Class 8/9 trucks consistent with refueling with diesel, given the value of time in goods movement. Also, FedEx will acquire 500 electric light-commercial vehicles from BrightDrop, a new General Motors Company, showing the possibilities.[25]

Other explored alternatives include all-electric, hybrid, and Liquefied Natural Gas (LNG) powertrains. Given diesel engines can be retrofitted for LNG, this could be the first consideration for the industry and ultimately its provision in the MSCID. Freightliner which operates in Macon, Georgia, has a "Shaping Future Transportation" initiative with Daimler AG that includes hybrid technology or 12-volt batteries for its business class M2 hybrid system.[26] Supporting this initiative is that the LNG truck market has grown substantially in 2020 and is expected to continue increasing in utilization led by freight – trucks and trains (but expectedly trucks first). As cited, "Global demand for LNG in road transport is estimated at 45 million metric tons in 2025 and 96 million tons in 2035 from almost zero in 2010."[27] Moreover,

[22] Class 1 trucks have a GVWR of 0–6,000 pounds (0–2,722 kilograms). Class 2 trucks have a GVWR of 6,001–10,000 pounds (2,722–4,536 kilograms). Moreover, Class 3 trucks have a GVWR of 10,001–14,000 pounds (4,536–6,350 kilograms).

[23] "Zero-emission electric truck for ABB showcased in Swiss capital," ABB, June 19, 2019. Available at https://new.abb.com/news/detail/25739/zero-emission-electric-truck-for-abb-showcased-in-swiss-capital

[24] Source: "FedEx Express to get 500 electric vehicles from new GM company BrightDrop," Commercial Appeal, January 12, 2021. Available at https://www.commercialappeal.com/story/money/industries/logistics/2021/01/12/general-motors-brightdrop-fedex-express-electric-vehicles/6637138002/.

[25] Source: "FedEx Express to get 500 electric vehicles from new GM company BrightDrop," Commercial Appeal, January 12, 2021. Available at https://www.commercialappeal.com/story/money/industries/logistics/2021/01/12/general-motors-brightdrop-fedex-express-electric-vehicles/6637138002/

[26] Source: "Freightliner Hybrid Trucks," Accessed March 15, 2021, Available at http://imp.isyncpro.com/ftl-hybrid-electric-trucks.pdf

[27] Source: "LNG projected to gain significant market share in transport fuels by 2035," Gas Processing & LNG. Available at http://gasprocessingnews.com/news/lng-projected-to-gain-significant-market-share-in-transport-fuels-by-2035.aspx.

Market competition is expected to include Volvo and Daimler cited here, but also Fiat, Isuzu, and Paccar.[28]

Freightliner is also investing in electric energy technology for commercial trucking, e.g., the eCascadia and eM2 which are currently being utilized in North America.[29] In fact, Georgia Power and Light entered into a partnership in 2020 with Cox for the installation of 20 Level 2 fleet chargers, six fleet DC Fast Chargers and six public DC Fast Chargers. "The DC Fast Chargers can be combined with 125kW high-output charging for the larger batteries being developed."[30]

In Georgia and as part of the Georgia Ports' program, "Will It Work?" (and consistent with IKEA's 2019 plan to electrify its last-mile delivery), IKEA began testing an electric (BYD Class 8) yard tractor in 2017.[31] The tractor operated at both the nearby IKEA distribution facility and the Garden City Terminal in Savannah.[32] What is currently needed is further investment in supporting electric truck infrastructure including charging stations that can provide the energy to trucks in comparable time or at critical truck parking locations. Currently, federal hours of service regulations essentially mean truck drivers stop during evening hours to get rest – with the right locations for electric recharging for vehicles both the drivers and the vehicles could be recharging together[33]. Right now, nearby Florida is reviewing electric infrastructure options for implementation on key corridors.

Finally, looking ahead, the use of electric truck technology, synonymous with truck technologies discussed here (e.g., truck routing) will grow. This means first small commercial vehicles for urban use and subsequently larger commercial vehicles for interstate or transportation between urban areas. While electric vehicle technology is still being developed for larger trucks, the immediate technology considered is LNG (as addressed above). There are currently more than 20 major manufacturers that include Daimler Trucks, Landi Renzo, Ford Motor, Volkswagen, KAMAZ, Beiqi Foton Motor, Volvo Trucks, Renault, GAZ, BRC Gas Equipment, Maruti Suzuki India Limited, Hyundai Motor India Ltd, Isuzu Motors,

[28] Source: "LNG Truck Market Size 2021 By Global Business Trends, Share, Future Demand, Progress Insight, Statistics, Key Regions, Leading Players Updates, Area Marketplace Expanding and Forecast to 2025," Marketwatch.com, February 14, 2021. Available at https://www.marketwatch.com/press-release/lng-truck-market-size-2021-by-global-business-trends-share-future-demand-progress-insight-statistics-key-regions-leading-players-updates-area-marketplace-expanding-and-forecast-to-2025-2021-02-14

[29] Source: "Freightliner is Miles Ahead - Meet Your New Fleet of Freightliner Electric Trucks," Freightliner, Accessed March 15, 2021. Available at https://freightliner.com/electric-trucks.

[30] Source: "Cox and Georgia Power Complete Large Fleet EV Charging Installation," Fleetforward.com, August 10, 2020. Available at https://www.fleetforward.com/10123138/cox-and-georgia-power-complete-large-fleet-ev-charging-installation

[31] *BYD Co. Ltd. In in Shenzhen, China, is the world's largest electric vehicle manufacturer in consumer and commercial/industrial vehicles.*

[32] *Source: "Georgia Ports, IKEA to preview electric trucks," Savannah Morning News, February 16, 2017. Available at https://www.savannahnow.com/news/2017-02-16/georgia-ports-ikea-preview-electric-trucks.*

[33] *Source: "Charging infrastructure for commercial trucks lags CO2 targets, report finds," Green Car Reports, April 8, 2020. Available at https://www.greencarreports.com/news/1127733_charging-infrastructure-for-commercial-electric-trucks-lags-co2-targets-report-finds.*

IMPCO Technologies, General Motors, CNH Industrial, Dongfeng Motor, MAN Truck & Bus, Navistar, Cummins Westport, Fiat Chrysler Automobiles.[34]

10 Application to the MSCID

The MSCID has various issues regarding congestion, safety (in part from the joint use of corridors by trucks and personal vehicles), truck access, and other factors highlighted in the *Inventory and Assessment Report.*

The practices generally include state and regional guidance, ITS, land use integration between commercial/industrial and other types which means shared corridor use by trucks and personal vehicles, and the next generation of transportation technology that will help circulation and congestion in the MSCID. Each of the practices addressed under these general headings provide a look into the possibilities for improvement in the MSCID, both specific to corridors (through roadside infrastructure) and new mobile applications such as heads-up display in commercial vehicles. Further, forthcoming guidance by the Transportation Research Board can help provide critical considerations as well as qualitative and quantitative tools for freight access and land use in the MSCID. Finally, as new technologies are being developed, they are being applied directly to vehicles and transportation. These include how vehicles communicate with each other and roadside infrastructure as well as new forms of sustainable energy with fewer impacts (e.g., emissions) to the environment. Once applied to the industry, the Atlanta region, and hence the MSCID, the benefits will become clear in the built environment.

While many of the practices and technologies will need implementation at the GDOT, ARC, and/or DeKalb County, the best practices discussed here are intended to help provide solutions to the MSCID. Highlights of the applicability of the best practices within are as follows:

- The review of previous best practices from previous studies provides guidance for the MSCID to continue to work with DeKalb County to 1) incorporate innovative zoning techniques in the Bouldercrest Overlay District to promote new development and redevelopment in the area and 2) implement policies to promote truck parking opportunities to meet the overall shortage in the area.
- The state guidance for MPOs presents opportunities for the ARC to present the overall role of the regional freight plan in the overall state and federal policy framework within the upcoming RTP and Regional Freight Plan updates as well as recognize the importance of freight-related outreach in its community outreach guides.

[34] Source: "Light And Heavy Duty Natural Gas Vehicle Market 2021 Industry Trends, Size, Growth Insight, Share, Competitive Analysis, Statistics, Regional, Demand, Development Status, Opportunities and Global Forecast to 2025," Market Watch, June 19, 2021. Available at https://www.marketwatch.com/press-release/light-and-heavy-duty-natural-gas-vehicle-market-2021-industry-trends-size-growth-insight-share-competitive-analysis-statistics-regional-demand-development-status-opportunities-and-global-forecast-to-2025-2021-06-19.

- The regional freight plans provide examples of innovative private sector coordination that could build on the Freight Advisory Task Force and elevate the attention to rail operations to mitigate potential rail crossing issues.
- The commercial truck access technologies provide examples of those that could someday take root in Atlanta. They could serve to provide better information to truckers in the region regarding permitted truck routes and available truck parking that, in turn, could mitigate conflicts related to truck travel.
- The implementation of truck only lanes could provide opportunities for the MSCID should they be implemented by GDOT along I-285 and I-675; however, if implemented this would likely be a long-term improvement.
- The adaptive traffic control and ITS applications for corridor management highlighted within could provide opportunities within the MSCID, especially along Moreland Avenue, with proper coordination with GDOT and DeKalb County.
- The freight and land use information highlights the need to work with DeKalb County to 1) Identify potential conflict areas for freight and residential development and develop potential strategies to ensure community cohesiveness, 2) develop recommended site plan guidelines, including those for truck parking to better serve the existing and anticipated freight needs of the County and 3) develop a freight routing plan specific to DeKalb County that assists municipalities throughout the County on how to manage hazardous materials in the County. This will assist in the planning of community facilities and minimize community risks.
- The utilization of the supply chain and fleet conversion technologies presented herein should be monitored so that MSCID can coordinate with DeKalb County to provide the necessary infrastructure to keep the district competitive.

Atlanta Regional Commission

METRO SOUTH CID

DeKalb County GEORGIA

Credit: Blackhall Studios

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