ASTRoMaP
Atlanta Strategic Truck Route Master Plan

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Preface

The City of Atlanta, eighteen surrounding counties and their combined municipalities form the leading logistics hub for the southeastern United States. Having begun as the town of Terminus, reflecting its origins as a key traffic center for the railroad industry in the early 1800's, the region has maintained service from two Class I rail lines, Norfolk Southern and CSX. Through infrastructural investment and development, the region boasts the world's busiest air passenger facility, Hartsfield-Jackson International Airport and direct access to three of the nation's major interstate corridors, I-20, I-75, and I-85. Supporting this multi-modal environment and servicing a broad range of dedicated movements, motor carrier operations are extensive throughout the region.

As growth of truck-related movements has and will continue to occur, the supporting transportation system must take steps to meet the challenges of existing traffic volumes, and plan for the efficient movement of that traffic into the future. With a maze of roads but few good, continuous routes by which trucks may travel over the metropolitan region, and local government agencies and bodies to implement investment, a method must be defined that provides efficient movement for the motor carrier and establishes a realistic trend for the application of funding to meet the infrastructural needs of the system.

In response to the recommendation from the Freight Mobility Plan, the Atlanta Regional Commission (ARC) elected to develop the Atlanta Strategic Truck Route Master Plan (ASTRoMaP). This project, in cooperation with state and local government bodies and agencies, including the Georgia Department of Transportation and participating county and municipal governments, designed a truck route system to provide regional access that will guide current and future decision making.

Introduction

Freight Mobility Plan

The ARC initiated the Freight Mobility Plan in 2006 to identify, provide understanding to, and produce strategic recommendations related to goods movement associated with the 18 county jurisdictions. Completed in 2008, the plan's results were categorized into three strategies for the improvement and maintenance of speed, reliability, and ease of freight movement in the region:

- Institutional and Policy Strategies
  - Concerns associated with the public understanding of freight movement needs
  - Incorporated a regional based approach
- Infrastructure Strategies
  - Planned physical system improvements
- Operational Improvement Strategies
  - Targeted public and private sector improvement initiatives
  - Shortest implementation requirements

The latter strategy included areas such as signalization enhancements, incorporation of land use planning sectors in the freight planning process, and the identification of a Regional Freight Priority Highway Network (RFPHN). With adoption of the Freight Mobility Plan, funds were made available for the further refinement of the RFPHN, in the 2008-2013 Transportation Improvement Plan (TIP).

Regional Freight Priority Highway Network (RFPHN)

The Regional Freight Priority Highway Network (RFPHN), **Figure 1**, was composed of interstates and state routes crossing the region. These roadways are used by the private sector to service the shippers of the region. Though possessing the basic form for a network, the system presented numerous roadways for truck usage and public sector funding. The broadly defined network incorporated all truck movements, resulting in the inability to target a specified movement type and effectively orchestrate a regionally oriented, strategic approach to effective truck movement.

Figure 1: Regional Freight Priority Network

Source: Wilbur Smith Associates

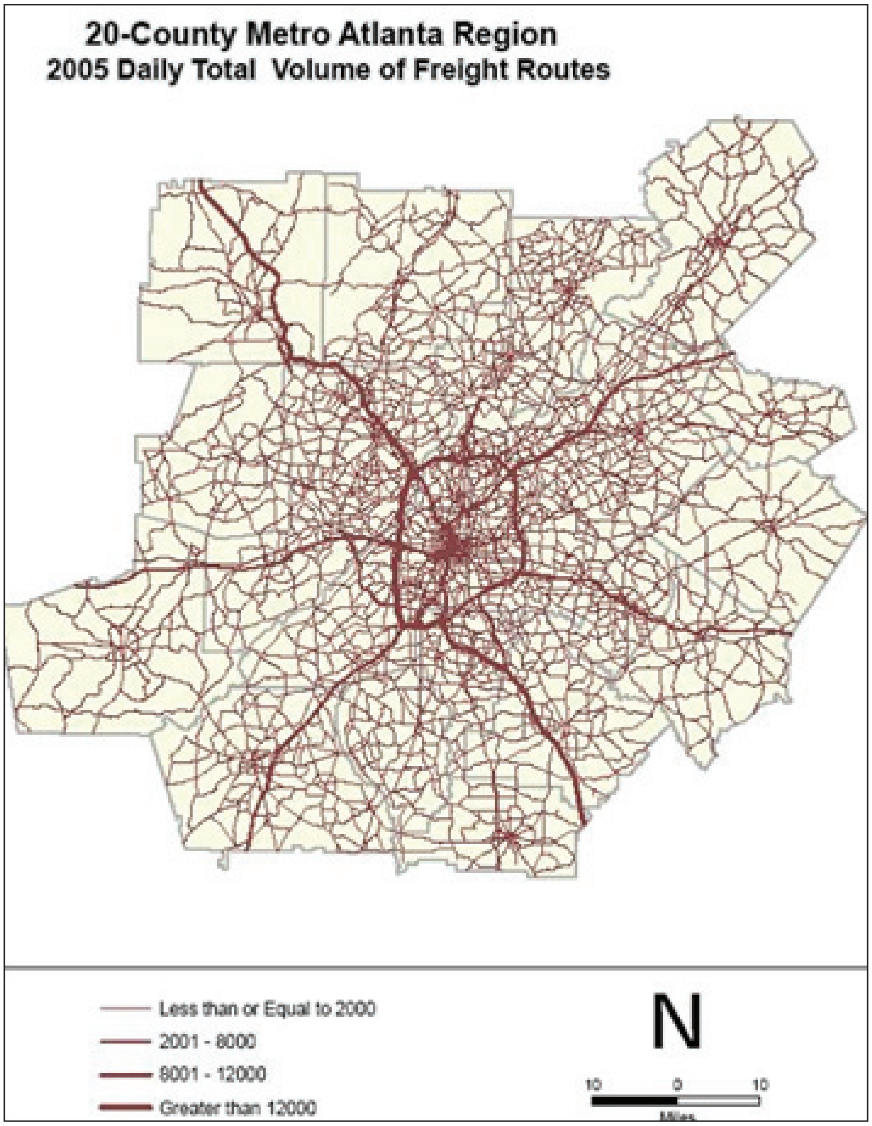
Methodology for Designation

Under the Freight Mobility Plan's analytical findings, a series of nodes for economic activity were identified. These nodes represented industrial, commercial, retail, and transportation areas requiring access to connect the various facilities and zones of consumption. The plan also considered defined data analysis such as percentage of truck traffic and infrastructure trends related to "through" versus local movement.

Comparative Analysis

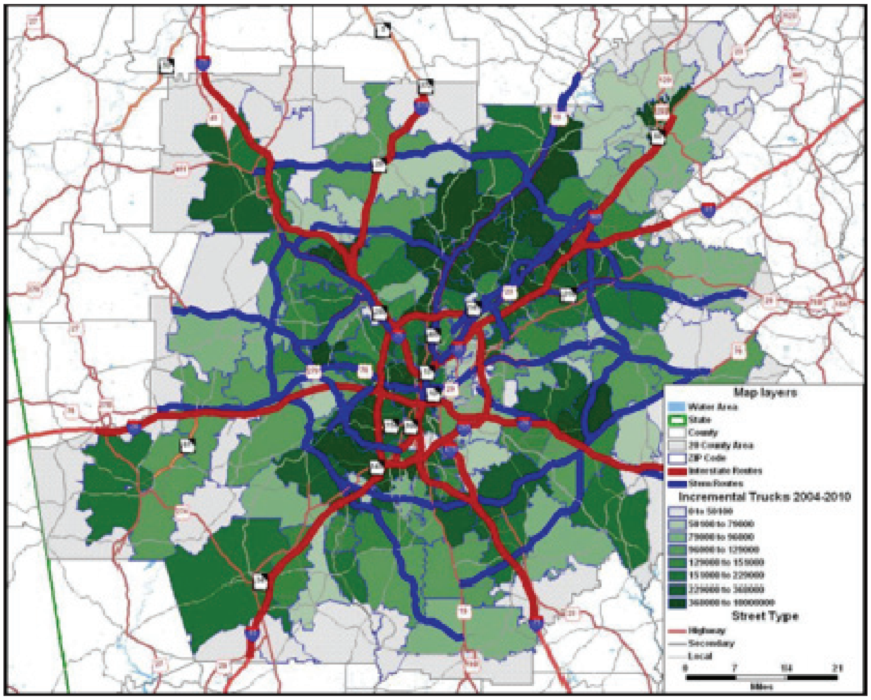
To validate the significance of the identified route structure, appropriate measures were compared to those findings noted above. Modeled freight truck volumes, **Figure 2**, for 2005 and projected truck movement growth by zip code, Figure 3, illustrated the importance of the initial network to satisfy truck growth.

Figure 2: Daily Truck Counts on Roadways



Source: Wilbur Smith Associates / ARC

Figure 3: RPFHN and Traffic Growth, by Zip Code



Source: Wilbur Smith Associates / ARC

Atlanta Strategic Truck Route Master Plan (ASTRoMaP)

Purpose

The Atlanta Strategic Truck Route Master Plan (ASTRoMaP) resulted from this need to further develop the RPFHN. The purpose for this plan was to identify preferred routes and develop strategies to support the efficient movement of truck traffic without disproportionately impacting existing communities, the environment, or the transportation network. To realize this purpose, the project consisted of four objectives:

- Collect and analyze data pertinent to the status, condition, and suitability of all routes within the RPFHN.
- Develop the specific route network into a grid system spanning the metropolitan region, considering the physical characteristics of the roadways alongside recommendations from stakeholders. Stakeholders were to fall broadly into three groups: public sector, private sector, and local communities.
- Identify and organize a series of “best practices” to guide future access management policies.
- Identify and evaluate projects to enhance the utilization of existing roadways as designated within the truck route plan

Focus

Explaining what the project was not was an important first step in communicating the purpose of the approach and methodology taken. The ASTRoMaP system did not address “final mile” delivery or pick-up on local roads, nor the route selection of trucks moving between points entirely outside the region (such as those driving from Florida to Tennessee). Rather, its focus was on cross-town travel: the corridors within the metropolitan region that could connect its economic centers, and link them to the outside world.

Local jurisdictions already were tasked with evaluating and assigning the policies for both the designation of local roads for truck routes and the prohibition of truck access. This focused policy, while required for the efficient movement of freight within the confines of local communities, nevertheless did not address the concerns of movements that must cross multiple jurisdictions within the region. The need to coordinate regional "through" movement was the basis for the ARC approach. The multi-jurisdictional aspect of freight movement suggested a regional network or system that supplied access across the region, while a second or more detailed approach, founded on a more local jurisdictionally led initiative was appropriate for the inclusion of local roads.

Methodology Overview

Two distinct paths were pursued for evaluating the RFPHN network, and those roadways requested for inclusion by the various jurisdictions involved: Data Collection and Outreach.

It was important that the methodology and supporting information be pertinent and reproducible, for future evaluation purposes. This produced a sequence of events designed to collect both quantitative and qualitative data and observations. The project incorporated:

- Outreach Programs: Throughout the process, the three stakeholder groups impacted by or influencing the truck route network would be engaged, these being the public sector (or jurisdictional agencies), the private sector, and the communities.
- Data Collection: Critical to the quantitative effort, jurisdictional bodies and agencies were approached for data pertinent to the physical characteristics of the identified roadways. These also included other empirical datasets such as land use designation and Environmental Justice designated census blocks.

The execution of and application of findings from these two approaches followed a critical path with the following components, whose outcome was the refinement of the RFPHN into the ASTRoMaP:

- Jurisdictional Interviews: To assess local jurisdictional freight planning and policy plus associated efforts for truck route designation
- Private Sector Interviews: To ascertain motivation behind specific route selection practices and understand key influences on the private sector
- Environmental Justice and Land Use Review: To identify adjacent designations and presence to grade potential avoidance strategies for truck route designation
- Needs Assessment: To catalog and draw understanding of the presence of physical and empirical attributes that influence the feasibility of truck route designation on a specific roadway
- Community Outreach: To further the understanding and education of the general public on the truck route process and gain insight to community needs
- Criteria Matrix: To assign values and weights to quantitative, and then qualitative, characteristics of roadways to help judge most appropriate truck route designation
- System Identification and Evaluation: To determine the truck route system based on all previous inputs and to vet for legacy considerations of selected roadways
- Strategies and Recommendations: To determine projects to allow or support the utilization of the designated roadways

Report Organization

This report is organized to follow the critical path identified above. As extensive documentation was required throughout the project, documentation has been placed on the ARC website and reference made throughout the course of this final report. The associated website, or url, is:

http://www.atlantaregional.com/truckrouteplan

Jurisdictional Outreach

Overview

Nineteen jurisdictions participated in in-person meetings, which had the advantages of encouraging participation by all involved parties, facilitating an exchange of more detailed information, and allowing for the use of visual aids such as maps and charts. Most of the local government officials that participated in the in-person interviews were enthusiastic and eager to share concerns and issues regarding freight traffic in their jurisdictions, thus underlining the importance of the topic of freight planning in the region overall. The involved counties and schedule are presented in **Figure 4**.

Figure 4: Jurisdiction Interview Schedule and Locations, by date and time

Jurisdiction	Date/time/place	Contact Staff
City of Atlanta	3/24/10:30/City Hall	Aldaheff
DeKalb	3/24/2:00/County Bldg	Keeter
Gwinnett	3/30/1:30/County Admin Bldg	Allen
Cherokee	4/2/10:00/County Bldg	Morton
Bartow	4/2/2:00/County Bldg	Byrd
Clayton	4/13/11:00/7960 N. McDonough St, Jonesboro	Adams
Barrow	4/13/2:00/233 E. Broad St, Winder	Leonard
Fulton	4/14/11/County Bldg,141 Pryor St, ATL	Francois
Henry	4/14/2:00/140 Henry Pkwy, McDonough	Mathews
Newton	4/20/2:00/85 Piper Rd, Covington	Walter
Rockdale	4/21/9:00/958 Milstead Avenue, Conyers	Valentin
Walton	4/21/1:30/1407 South Madison Ave, Monroe	Chandler
Paulding	4/22/2:00/240 Constitution Ave, Dallas	Greene
Coweta	4/23/10:00/ 22 E Broad St, Newnan	Edwards
Douglas	4/28/10:30/ 8700 Hospital Dr, Douglasville	Hulsey
Cobb	4/28/1:30/1890 County Services Pkwy, Marietta	Vance
Fayette	4/29/10:00/115 McDonough Rd, Fayetteville	Williams
Forsyth	4/30/10:00/110 E Main St, Cumming	Cunard
Spalding	5/5/11:00/ 120 North Hill St, Griffin	Dukes
Phone or Customized Communication		
N. Fulton Municipalities	5/26/1:30/38 Hill Street, Roswell, GA 30075	Reps from all
Hall	Phone	Yamala
Carroll	Phone	Planning Dept

Source: Wilbur Smith Associates

Methodology

Prior to each meeting, participants were provided with a discussion guide to offer a clearer understanding of the basis of the interview, as well as to allow every participant to prepare and organize pertinent materials and information beforehand. The guide provided each jurisdiction similar opportunities to describe previous, current, and on-going freight planning exercises, truck route strategies, truck movement concerns, and observations related to the RFPHN network. The details of the guide and detailed responses to the interview sessions are available on the ARC website, as the Jurisdictional Interview Summation Report.

Key Findings

Freight Integration into Needs Assessment

Comprehensive land use and transportation plans had largely neglected to adequately address the needs of a growing volume of freight movement through their communities. A small number of jurisdictions made attempts to draft commercial vehicle route networks in the 1950's and 1960's but little was done in regards to implementation. When explored in further detail, few studies had been performed that resulted in a proposed commercial truck route plan. Fewer had produced a truck route system that incorporated a definitive network of connected county and locally maintained routes to support the greater state route and interstate network in the Atlanta region.

Regardless of the level of freight planning, each jurisdiction recognized the importance of this plan as a necessary component of their planning process--though with various depths of commitment. An important distinction occurred in the approach taken by the various jurisdictions. Within the scope of their approaches, a jurisdiction may have exhibited a level of success toward freight accommodation, while not presenting an explicit strategy to incorporate freight movement within their transportation plan.

Presence of Designated Truck Routes

The interviews identified two fundamental approaches that have historically been used to define a designated truck route within the region:

- Route adoption/positive signing that indicates routes where commercial trucks are permitted and
- Prohibitive signing that indicates where commercial trucks may not travel.

Local jurisdictional needs and requirements facilitated truck route designation and led to numerous cases of conflicting roadway designation at county borders. State routes, by definition, are authorized for use by truck traffic free of local jurisdictional influence. Additionally, truck access to perform deliveries or pick-ups on all roadways is protected when the truck driver can illustrate need.

Utilization of Restricted Routes

The jurisdictional responses to this process often included a policy of minimizing, if not eliminating, the introduction of truck prohibitions onto the current road network. Should an individual, group or community inquire into restricting a route, the request typically is directed through either the local law enforcement agency or a specific department or planning official. In each case, it is determined whether the route is county, state or federal. If the route in question is a county or locally maintained roadway, a comparison to existing codes and regulations for authorized travel is performed. If no restriction is currently mandated, a review of the road design, land use policy, and existing designations and restrictions usually occurs. If restriction is deemed beneficial, it is placed before a commissioner, board of commissioners, or an advisory board comprised of local departments, for approval and recommendation. However, in all of the review processes recounted by the regional jurisdictions, neither motor carriers nor freight shippers were incorporated or involved in the decision making.

A shared belief among many transportation planners was that the general public was more accepting of commercial truck traffic in order to serve local needs, such as deliveries or services to local retail establishments. On the other hand, the public is often opposed to commercial trucks using local roads on cross-regional or interregional trips--thus placing pressure on local planners to restrict many local routes from commercial truck traffic. Unsurprisingly, the burden of having to address these two disparate needs generates ambiguity in the process.

Rail Crossing Concerns

During the interviews, the consultant team asked local officials to identify at-grade rail crossings that posed safety and congestion problems and mark them on a map. Local officials were also requested to identify those crossings that may not directly affect the flow of commercial traffic, but which still may pose a major concern. For example, at grade crossings on secondary roads may cause traffic backups that spill back onto important truck routes.

Specific Road Segments with Identified Concerns

Jurisdictions with a significant concentration of distribution and manufacturing entities related numerous intersections and lengths of roadway that proved to be persistent bottlenecks to the region. Most of the identified bottlenecks were attributed to geometries which failed to effectively accommodate truck traffic or to capacity issues, which increase the rate of truck interaction with the driving public. Competing interests often arise when state routes passed directly through town centers such as Fayetteville, McDonough, and Winder. Roadway and network designs focusing on residential, pedestrian, and public motoring considerations were valid though conflict with the flow of existing freight traffic along important candidate routes for the master plan system.

Initial Modifications to Truck Route Network

The RFPHN noted two categories of routes:

- Primary, which mainly includes interstate highways; and
- Secondary, which consists of states routes that serve a significant number of freight generators.

The RFPHN did not include every state route in the region. There were no recommendations for deletions from the preliminary routes by any jurisdiction, though alternatives were provided to state routes in several instances. Each jurisdiction provided comments on the RFPHN and the majority produced additional routes. “Why isn’t this included…” was a common inquiry. The observation that significant portions of the region were not served by any of the designated routes on the preliminary map returned the dialogue to the locally designated truck route discussion. Again, this exemplified the local jurisdiction understanding that freight movement was an important feature of the transportation network and further enhanced support of the project.

Current Level of Private Sector Involvement and Consideration

Interaction does exist between the private sector motor carriers and the involved jurisdictions. However, these occurrences are rare and are usually aimed at resolving a specific concern. The overall lack of communication or cooperation between public and private entities has not produced consensus and has possibly led to unintentional misinterpretations of what is the purpose of truck route designation and how best to implement their design. To underline this point, a number of the jurisdictions that had implemented a considerable number of route restrictions stated that truck traffic continued to be a concern. The fact that motor carriers do not proactively educate themselves on these codes and ordinances illustrates why the interaction with the private sector is integral to compliance. Many participants viewed this as a weakness to their planning efforts from both a development and an implementation perspective.

Future Land Use Considerations

Planning requires a regional perspective because development within the boundaries of a given jurisdiction may significantly impact an adjacent community. Local governments on the outer perimeter of the region voiced a greater desire to spur economic development by attracting businesses in technology-related industries, as well as research and development entities. The self identification as a "bedroom community" by many local governments in the Atlanta region was described as the justification for a lack of significance placed on future freight movement needs.

Private Sector Outreach

Overview

As identified during the jurisdictional outreach, engagement of the private sector had not been the practice during development of truck route designations. Since motor carrier operations are the intended users of the ASTRoMaP system, gaining an initial and continuing understanding of the guiding factors for route selection was pivotal to successful implementation of the system. This involvement utilized formal meetings with the Freight Advisory Task Force (FATF), an ARC sponsored organization comprised of transportation firms operating in the Atlanta area, to provide private sector insight to ARC initiatives. To supplement this formal interaction and delve into greater detail, on-site meetings were conducted at key motor carrier operator facilities: UPS, Coca-Cola, and FedEx Freight.

Methodology

During the FATF and individual carrier meetings, the participants were given a brief presentation. This presentation provided education on the purpose of the project and the progress made to date. The RFPHN was presented for comment on appropriateness, level of utilization, and guidance on why route selection resulted in specific roadways. The individual meetings featured management and driver participation.

Key Findings

Route Selection

A primary consideration is the ability to execute a travel plan that incorporates all known stops with the least amount of vehicle miles traveled (VMT). Timeliness, reliability, and ability to service shipper needs were mitigating factors influencing a choice that would reflect increased miles traveled. Carriers invest significant monies and manpower to the development of efficient route planning techniques, both automated and manual.

Roadway Identification

Participating carriers offered additions to the existing RFPHN, just as the jurisdictional planners had. As equipment size varied among participants from smaller delivery vans to tractors with 53 foot trailers, specific roadways identified reflected the ability for each carrier's drivers to operate safely and efficiently.

Desire for Future Involvement

Carriers recognize the need for participation in the planning process by public sector officials. The single greatest deterrent is planning horizon variances experienced as carriers typically operate in a daily to quarterly plan versus the public sector's five to thirty year horizon. Each operator expressed that interaction between private and public would be beneficial and assist in the education of both on a common plan.

Environmental Justice and Land Use Review

Overview

This analysis incorporated two distinct identification practices describing parcels, lying within a one mile buffer, one half mile on either side, adjacent to the roadways, comprising the RPFHN; Environmental Justice (EJ) Census Blocks and Land Use Designation. The outcome of this analysis was to evaluate the presence of each, within individual jurisdictions, and assign a level of potential for removal of a roadway from truck route designation. The applied methodology is further described on the ARC website, within the document Jurisdictional Environmental Justice.

Environmental Justice Census Block

One of the most pressing social concerns when examining large-scale infrastructure impacts in metropolitan Atlanta is environmental justice (EJ). Environmental justice refers to the concept that over time, geographic areas with larger-than-average concentrations of minority populations or populations at or below the poverty line suffer disproportionately negative environmental impacts. Since 1994, federal agencies have been required to identify and address potential or actual disproportionately adverse environmental effects on minority and low-income populations. Thus it is appropriate to conduct a demographic analysis of the region, with a special emphasis on locating concentrations of such populations, in order to address environmental justice issues concerning existing and potential future freight traffic impacts.

Maintaining consistency with the Freight Mobility Plan, EJ census block groups were defined as those meeting any of the following criteria: greater than 9.1 percent in poverty, 30.4 percent African American, 3.6 percent Asian, or seven percent of Hispanic origin. Following criteria representing the regional average for concentrations of elderly and children in poverty: the elderly, 9.6 percent and 18.1 percent for children under age 11, they are typically at greater risk of suffering negative health impacts from freight traffic, because of pre-existing health conditions or the development of young lungs and immune systems.

Freight Intensive Land Use Designation

All land use designated parcels carry the possibility for freight induced traffic. Residential, of all types generate not only household goods movement, but also supporting small package and light truck deliveries, with seasonal influences such as holidays and academic periods increasing flow volumes. In addition, other parcels such as specialty or green areas, i.e. cemeteries and parks, would be low level freight generators.

In contrast, common designations associated with freight generation, i.e. industrial and commercial, generate higher levels of freight activity and are classified as Freight Intensive (FI). This classification includes quarries, agricultural and institutional areas such as public or governmental facilities, hospitals, and other large sites where the primary role for truck transport is to satisfy supply needs, **Figure 5**.

Figure 5: Land Use Designations, Freight and Non-freight Intensive

LAND USE DESIGNATIONS	FREIGHT INTENSIVE
Commercial	Yes
Industrial	Yes
Transportation, Communications, Utilities	Yes
Industrial, Commercial Complexes	Yes
Urban – Other	No
Agriculture	Yes
Forest – Mixed	Yes
Rivers	No
Reservoirs	No
Wetlands	No
Exposed Rock	No
Quarries/Pits/Mines	Yes
Transitional	Yes
Residential - Low Density	No
Residential - Medium Density	No
Residential - High Density	No
Residential - Multi-Family	No
Residential Mobile Home Park	No
Institutional – Intensive	Yes
Limited Access Highways	No
Golf Courses	No
Cemeteries	No
Parks	No

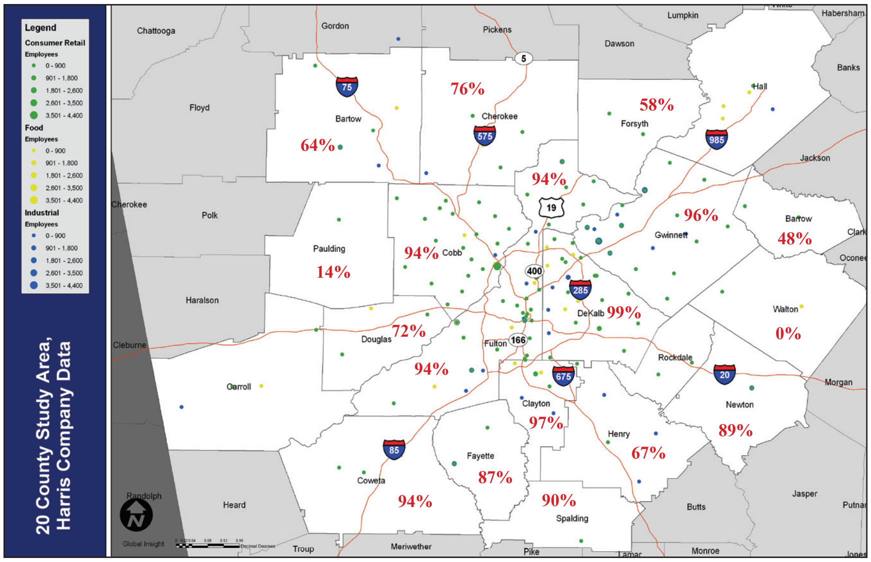
Key Observations

Identified with 2000 census data, a one mile buffer - one half mile on either side of the corridors comprising the RPFHN – touches on 910 Census Blocks encompassing a population of 1,991,527. Of these, 808 Census Blocks include Environmental Justice concerns, containing a population of 1,763,933 that is influencing or is influenced by the network.

EJ associated Census Blocks are not evenly distributed across the counties within the region. The percentage varies extensively leaving several counties with a challenge of balancing truck route needs with concerns of livability.

Distribution nodes illustrate a typical comparison, when aligned with the individual county's EJ Census Block density or percentage. Higher densities of distribution centers will drive higher levels of truck traffic to service that need. As depicted in **Figure 6**, for counties like Cobb and DeKalb whose EJ districts alongside the proposed routes approach 100 percent of their population, the opportunity to identify alternative routes that do not impact these census blocks is constrained. It became the challenge of the ASTRoMaP process to seek viable alternatives under these conditions.

Figure 6: Distribution Centers and EJ Proportions in the ASTRoMaP Coverage Area



Source: The Harris Company

Illustrative Example Analysis, Barrow County

Barrow County had 48.0 percent of the total population residing within eight identified EJ blocks of the county’s fifteen Census Blocks, **Figure 7**. Two blocks were identified as one ethnicity, minority population without low income or poverty assignment, five blocks with low income but no minority population assignment, and one with both low income and one minority population assignment.

Of these blocks only one was found to be associated with Younger, or less than 11 years of age yet thirteen were associated with the Aged designation, or greater than 65 years of age.

Figure 7: Barrow County Environmental Justice Census Block Data

State and County FIPS	Census Tract	Census Block Group	Census Block Group FIPS	Total Population	Environmental Justice (EJ) Communities (Against ARC Criteria)				EJ Rank/Order (map label)	Health Impact Vulnerable Communities (Against Regional Mean)	
					African American > 30.4%	Asian > 3.6%	Hispanic Origin > 7.0 %	Income Below Poverty > 9.1%		Children (11 and under) in Poverty > 18.1%	Elderly (65 and over) in Poverty > 9.6%
Barrow County											
13013	180101	1	130131801011	7901	2.8	4.0	3.8	5.6	1	6.5	7.0
13013	180101	2	130131801012	2229	1.7	1.1	1.7	7.2		9.6	10.9
13013	180102	1	130131801021	4970	3.6	2.5	2.6	6.5		6.5	20.4
13013	180201	3	130131802013	1952	11.7	2.9	3.2	4.0		3.8	14.7
13013	180201	4	130131802014	1687	29.8	0.3	4.1	15.5	4	5.9	26.4
13013	180201	5	130131802015	2459	3.6	1.3	1.9	13.9	4	14.4	14.3
13013	180202	1	130131802021	3005	34.4	1.5	1.2	11.3	5	13.8	6.5
13013	180202	2	130131802022	1636	21.3	0.8	3.1	16.9	4	16.9	21.9
13013	180300	2	130131803002	2926	3.1	0.8	6.2	5.5		4.5	17.5
13013	180400	1	130131804001	3602	14.4	1.1	1.8	7.1		5.2	16.7
13013	180400	2	130131804002	1568	21.9	0.5	1.3	20.2	4	30.6	15.2
13013	180400	3	130131804003	462	1.9	0.0	0.4	10.8	4	0.0	38.9
13013	180500	1	130131805001	2469	9.3	3.6	3.0	3.5		0.0	21.4
13013	180500	2	130131805002	3265	13.4	3.1	7.0	7.6		9.9	9.7
13013	180500	3	130131805003	1020	7.5	3.7	6.4	4.6	1	2.0	9.9

The EJ Rank/Order column is a collective label for the presence of multiple EJ concerns, **Figure 8**.

Figure 8: EJ Census Block Rank/Order Identification

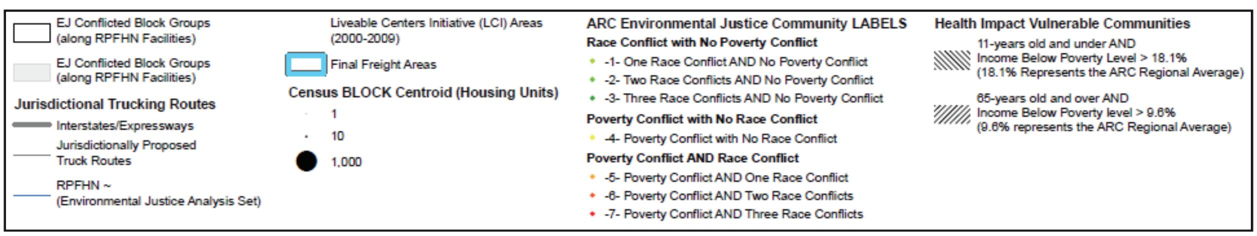
Race Conflict with No Poverty Conflict	
-1-	One Race Conflict with No Poverty Conflict
-2-	Two Race Conflicts with No Poverty Conflict
-3-	Three Race Conflicts with No Poverty Conflict
Poverty Conflict with No Race Conflict	
-4-	Poverty Conflict with No Race Conflict
Poverty Conflict AND Race Conflict	
-5-	Poverty Conflict AND One Race Conflict
-6-	Poverty Conflict AND Two Race Conflicts
-7-	Poverty Conflict AND Three Race Conflicts

Each corridor within the jurisdiction was mapped, for these two conditions, and then analyzed for the potential for removal. Land Use, **Figure 9**, is shown as brightly colored zones, where EJ concerns exist, and "faded" where EJ census blocks are not defined. A further legend, **Figure 10**, is provided to identify other features present on the individual map, **Figure 11**.

Figure 9: Land Use – Freight, Non-Freight Intensive Designation Legend

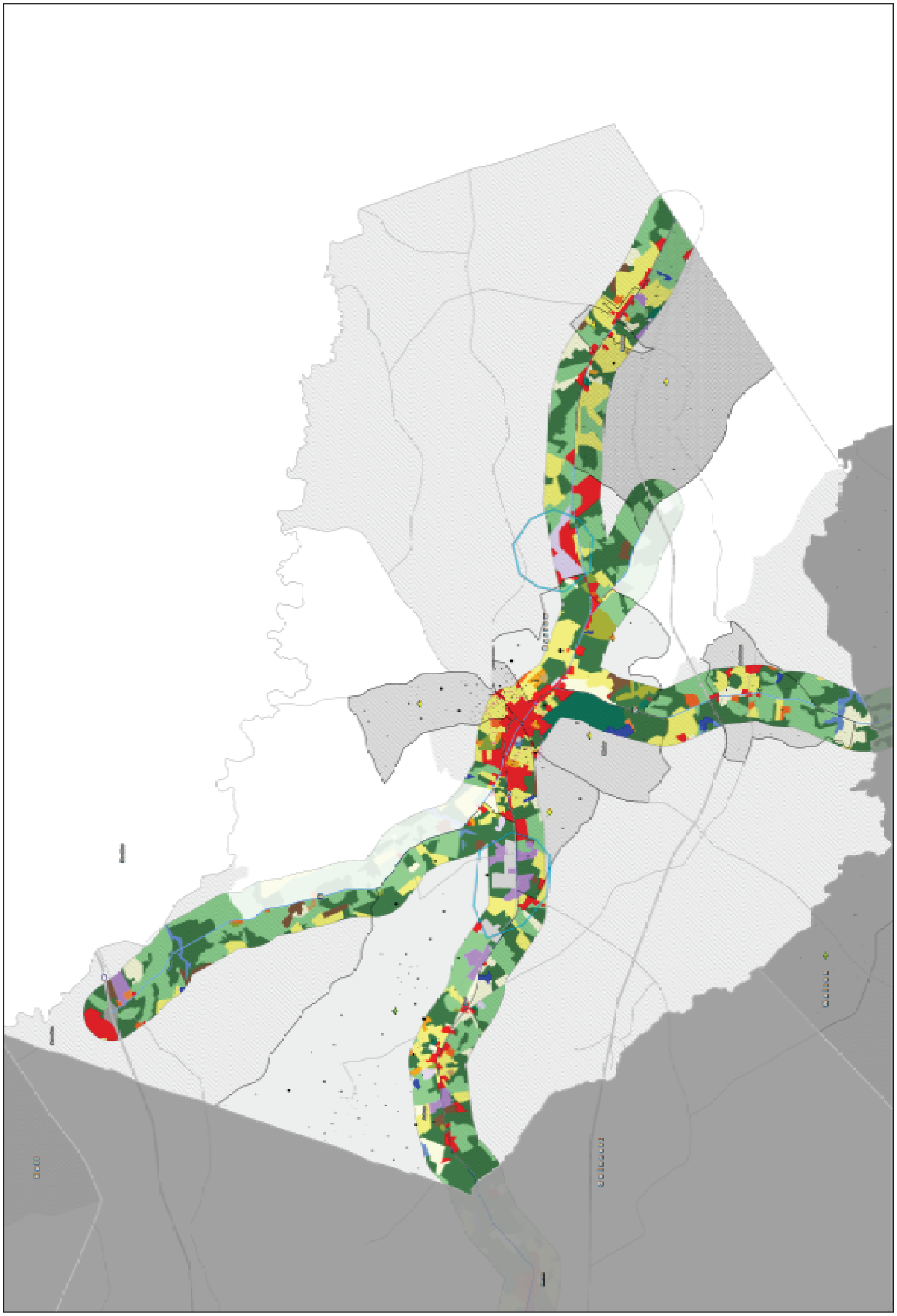
Landuse/Landcover 2008		
	Rivers	Res-high density
Commercial	Reservoirs	Res-multi family
Industrial	Wetlands	Res-mobile home park
Trans/Comm/Utilities	Exposed Rock	Institutional-intensive
Ind/Comm Complexes	Quarries/Pits/Mines	Ltd Access Highways
Urban - other	Transitional	Golf Courses
Agriculture	Res-low density	Cemeteries
Forest - mixed	Res-med density	Parks

Figure 10: Environmental Justice Census Block Legend



All utilized Land Use Designations presented in Figure 9 require color reproduction.

Figure 11: Barrow County, EJ Census Block and Land Use Designation



Four routes traverse the county, Figure 11, and are illustrated in **Figure 12**.

Figure 12: Routes identified within Barrow County[1]

	Northern/Western	Central	Southern/Eastern
GA-8	Balanced EJ	Balanced EJ	Balanced EJ
GA-11	Balanced EJ	Balanced EJ	Balanced EJ
GA-53	Balanced EJ	Balanced EJ	Balanced EJ
GA-211	Balanced EJ	Balanced EJ	Balanced EJ

1 The term “Balanced EJ” that appears in the table signifies one of four levels of potential removal. This category notates segments with EJ Census Block presence with moderate or high Freight Intensive Land Use designations. This suggests a low potential for removal.

Needs Assessment

Overview

Of similar importance was the identification of the existing characteristics of the infrastructure, truck presence, and freight generator influence on truck flow. A detailed discussion of this assessment and further elaboration on the condition and influence of each attribute noted is available on the ARC website, within the Needs Assessment, whose purpose throughout is to inform the refinement of the RPFHN into the ASTRoMaP. Data collection for the physical attributes of the available roadways within the region was based on two primary databases:

- RCFILE: Residing within GDOT, the file contains attribute information (linear, continuous, and point events) for state, county, and city level routes and is based on a “county-route-mile point” linear referencing system.[2]
- National Transportation Atlas Database: A set of nationwide geographic databases of transportation facilities, transportation networks, and associated infrastructure. These datasets include spatial information for transportation modal networks and intermodal terminals, as well as the related attribute information for these features. This file was used to obtain information related to the National Bridge Inventory.

Contributing data and information relative to other utilized criteria were drawn from:

- GDOT Design Policy Manual ver. 2.0 Revised 06/12/2009
- GDOT Crash Data
- ARC LandPro2008
- ARC 20-County Travel Demand Model
- Global Insight Transearch Data 2004

Existing Data Summary

Those characteristics that were explored were assigned to one of the four noted attribute types, and further categorized into one of three features:

2 http://proceedings.esri.com/library/userconf/proc96/TO300/PAP290/P290.HTM

Identifiable Attribute [Values were readily noted and collected]	Feature Type
Functional Class (defined by GDOT Design Standards[3])	[Continuous]
Actual Travel Lane Width	[Continuous]
Actual Shoulder Width	[Continuous]
Posted Speed	[Continuous]
Bridge Conditions	[Point]
Posted Bridge Weight Restrictions	
Bridge Minimal Vertical Clearance	
Bridge Sidewalk Width (continuing Functional Class design)	
Railway At-Grade Crossings	[Point]
Proximity to Land Use features	[Interpretive]
Crash History	[Continuous]
Inferred Attribute [Values noted as part of a collective set of values for a given condition]	
Design Speed	[Continuous]
Stopping Sight Distance	[Continuous]
Turning Radii	[Point]
Clear Zone	[Continuous]
Grade	[Continuous]
Non-Supported Attribute [Values where no obtainable data was identified]	
Roadway Weight Capacity	
Curve Off Tracking	
Other [Data values not assigned within the three previous attributes]	
Continuity/Connectivity/Accessibility	[Interpretive]

Continuous features occur along the total or significant portion of the length of the roadway. Point features occur as individual locations along the length of the roadway where a condition or feature exists. Interpretive features are the most difficult to quantify as they are subject to a variety of professional experience and expectations, influenced by conditions not immediately evident.

Presentation of each attribute, and all other GIS illustrations, was provided in five sectors or five defined areas within the region. The first allowed a detailed review of the area contained within I-285. The four subsequent views, Northwest, Southwest, Southeast, and Northeast illustrated the corresponding portion of the region, outside I-285.

Report Key Findings

Overview

Eleven key attributes associated with road design, physical construction, and usages are utilized for evaluation of routes. Routes that have the most "truck friendly" conditions were expected to supply the primary structure of the ASTRoMaP system.

Land Use Feature Proximity

The proliferation of parallel routes in the metropolitan center and along the northeast/southwest axis suggests that rationalizing these routes into a core network could be accomplished without harm to pickup and delivery service.   However, the broad scattering of significant access points outside these areas implies that even a winnowed network will be extensive in scope.

3 GDOT Design Standards are contained in Appendix A.

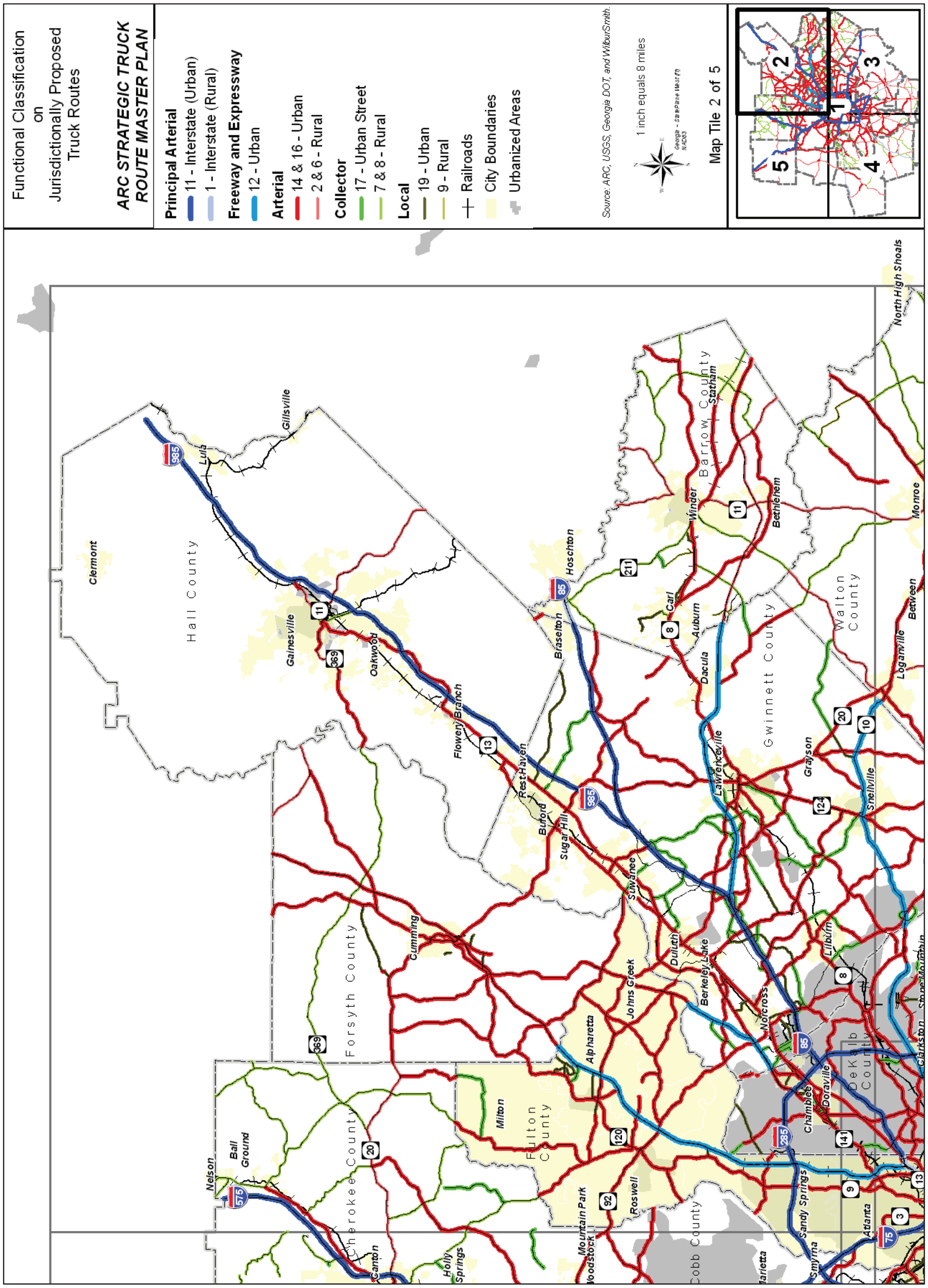
Facilities that can combine efficient routing through the region with high proportions of access to freight generation designated land use parcels are an essential objective of the ultimate network. This combination supplies the efficiency inherent in this approach by maximizing the utilization of as many roadways in a dual role of reaching industrial and commercial activity, and passage across town. In practice this has proven difficult because of the infringement of competing traffic on such roadways, and it implies that disciplined access management practices will be required throughout the region to sustain long range freight mobility.

Congestion in commercial districts seems high, and the appearance of commercial areas along network routes is common and repetitive. This characterizes one of the fundamental design challenges for the truck route master plan: how to manage crossing truck traffic in retail zones.

Residential areas appear with sufficient frequency to suggest they cannot be avoided in the ultimate system design. In addition, they appear at the borders of many industrial territories, suggesting that safe and efficient passage through residential zones is a second fundamental design challenge for the master plan – as well as a basic requirement for freight accommodation under mixed use.

Road Design and Functional Class Designation

Figure 13: Functional Class, Northeast Quadrant Illustrative Example



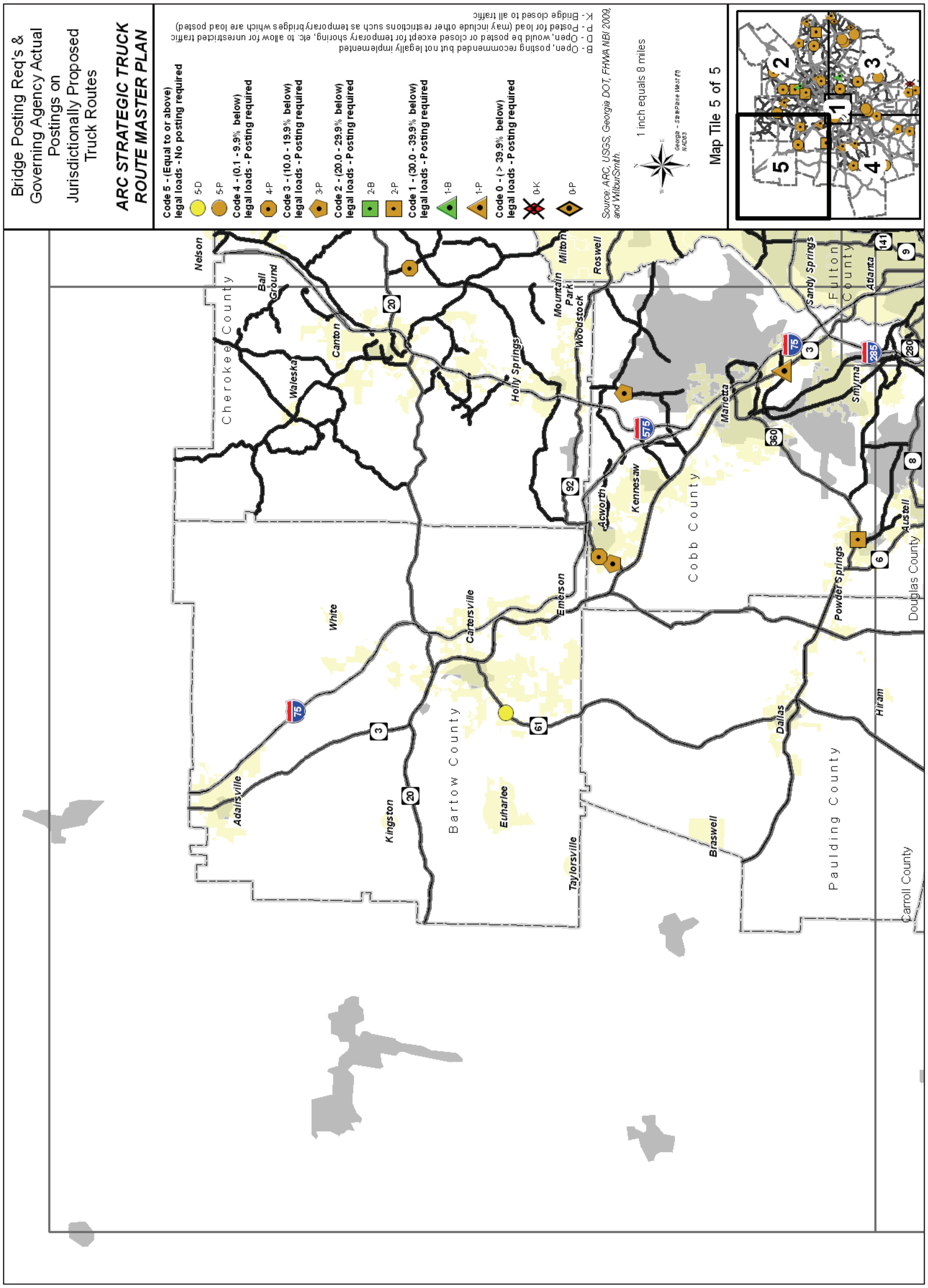
Within functional class, **Figure 13**, optimal or minimum standards for the roadway may have been compromised either during construction, as a result of subsequent modification or perhaps where the roadway held an earlier and lesser classification. Physical observations of these standards produced exceptions that will restrict segments or the entire roadway from being classified as "truck friendly".

Bridge Conditions

Bridges spanning a proposed route with less than minimum vertical clearance could negate the utilization of a segment of an optimal route. Investigation found that this attribute occurred in insufficient instances to substantively alter route selection.

Posted weight restrictions were more prevalent, **Figure 14**. These will require thoughtful consideration, balancing the importance of the route to the network, the improvement planning underway, and the presence of viable alternatives.

Figure 14: Posted Weight Restrictions, Northwest Quadrant Illustrative Example



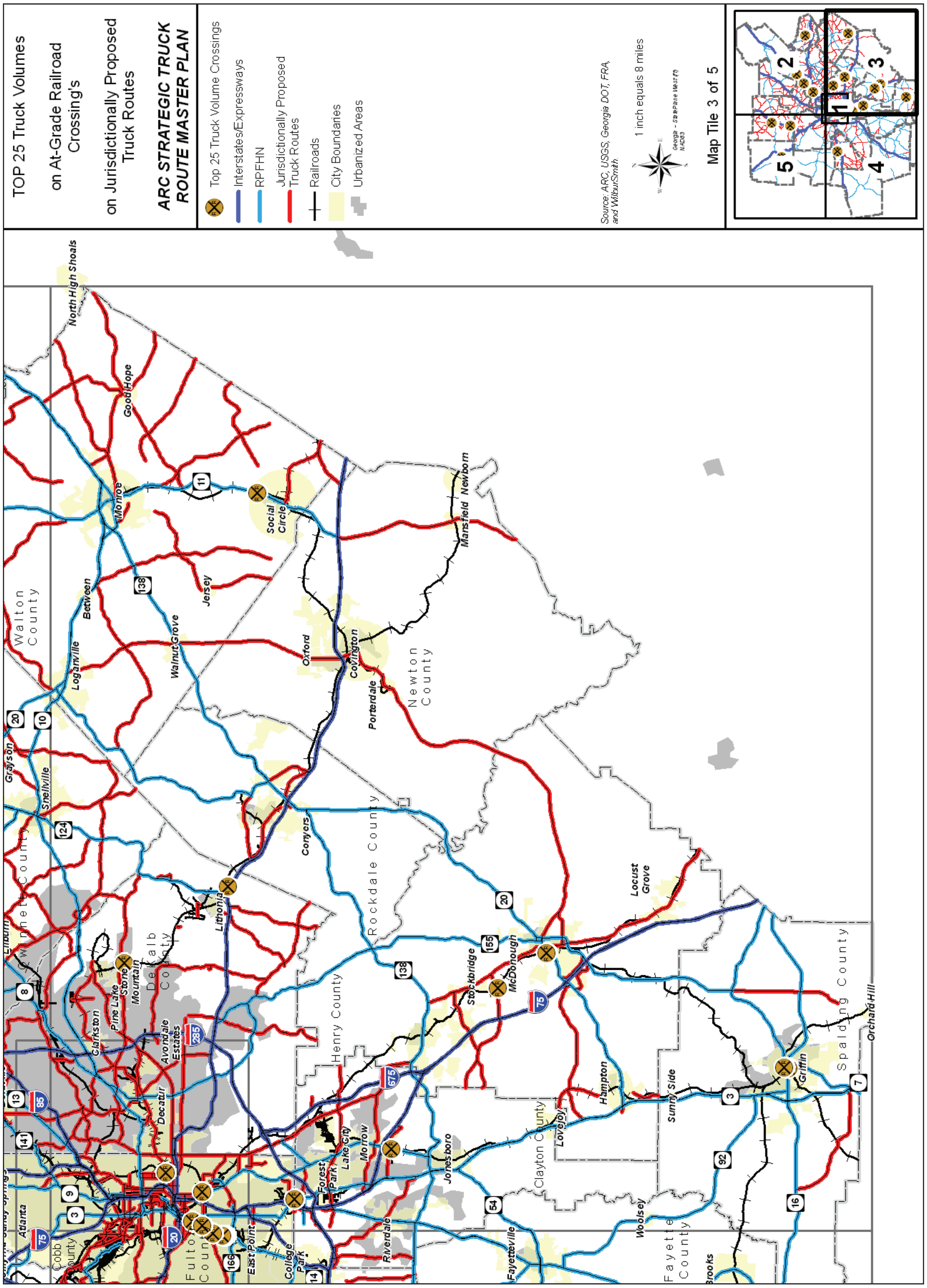
One route, GA 3, offers a good example of the issues to be weighed in the composition of the ASTRoMaP. GA 3 was proposed in the RPFHN and identified during the modeling process as a selected route. However, the segment extending northeast from the City of Atlanta:

- Does not appear on the concurrent feature mapping,
- Contains a bridge that is posted between 30 and 39.9 percent of its design load capacity,
- And contains numerous other design or construction attributes that are not optimal to "truck friendly" routes.

At-Grade Rail Crossing Considerations

The impact of at-grade rail crossings (**Figure 15**) on general traffic flow is well documented. The requirements of commercial drivers' code and regulation accentuate this impact even further for truck traffic. Ten such crossings are present on the original RPFHN designated routes. Safety and delay considerations factor heavily into the selection of a route with consideration to the benefits and drawbacks of retaining that corridor on the ASTRoMaP. The costs of mitigating the negative effects of an at-grade crossing may make other routes more attractive. Due to the ability to access any roadway given the "need" to execute a delivery or pick-up, at-grades pose a danger and delay to all truck traffic whether traveling on the ASTRoMaP or a local roadway.

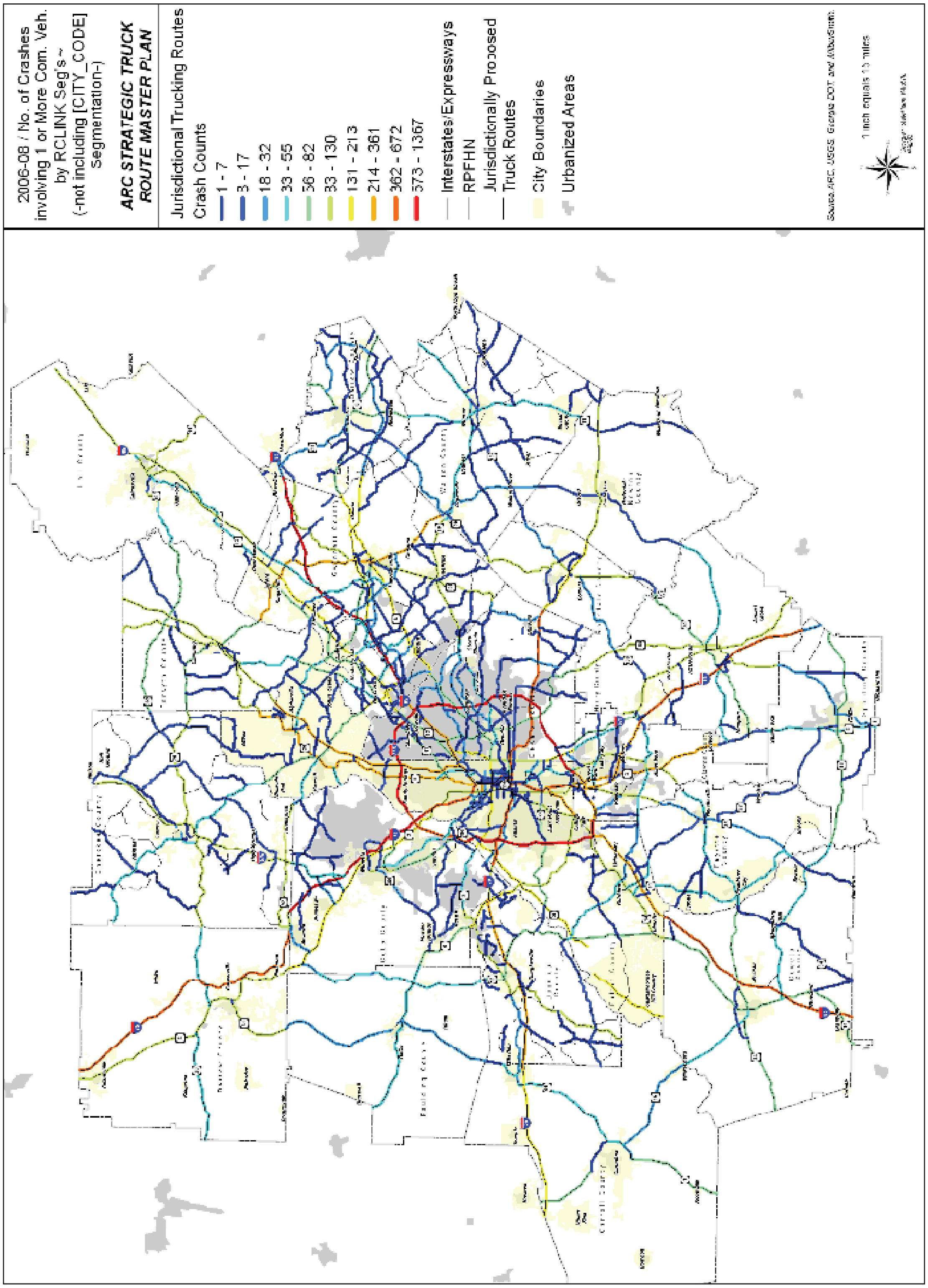
Figure 15: At-grade Rail Crossings, Southeast Quadrant Illustrative Example



Safety and Accident History

GDOT analysis shows that higher than normal crash rates occur along routes with little or no separation between directions of traffic. However, the design standard for medians within the functional class analysis is another physical feature that is not present throughout the arterial network. Heavily truck traveled corridors, such as GA 20, are favorably identified during continuous and point feature evaluation, though opposing traffic is separated by only pavement markings. Reflective of GDOT's analysis, increased accident rates are experienced on the northern leg of GA 20, from the Bartow-Cherokee County Line east, past the intersection of GA 20 and GA 369. Similar roadway segments exist throughout the RPFHN and are a source for improvement projects, ranging from installation of barriers to the need to expand the right-of-way and undertake expensive redesign efforts, **Figure 16**.

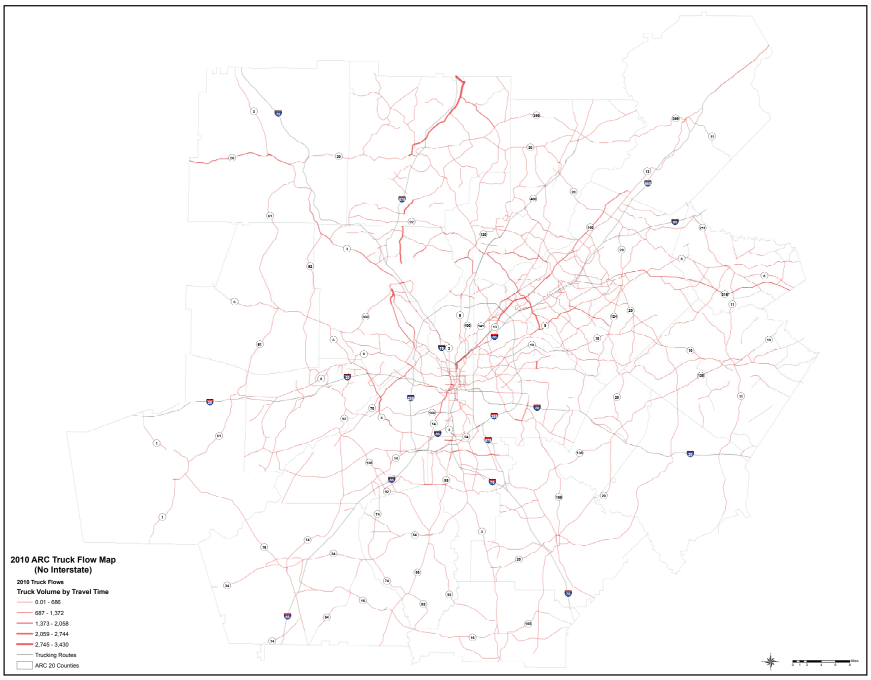
Figure 16: Commercial Vehicle Crash Frequency, 2006-2008



Comparisons between Modeling and Roadway Conditions

Travel Demand Modeling (TDM) and motor carrier surveys provide contrasting patterns for truck traffic. TDM analysis identifies a network of non-interstate roadways that could be expected to be utilized by truck traffic, given the absence of interstate roadways. This network follows decision making criteria more associated with appropriate land use venues and lacks impedance assignments for true roadway conditions. In other words, the TDM may not accurately account for road characteristics such as lane width, bridge restrictions, etc that would deter use by trucks. The baseline for modeled truck flow is illustrated in **Figure 17**.

Figure 17: TDM Baseline based on TRANSEARCH (excludes through movements and interstates)



As the private sector provides route selections, based on the same criteria of "no interstate movement", their responses to a greater extent represent the network that is fundamentally founded on the previously identified roadways containing the four continuous features and appears adaptive to segmentation of the roadways caused by obstacles and point features. This variance is not unexpected as the industry has proven highly adaptive to the infrastructure present. This does not, however, generate the situation where road design is followed, over productivity. Where roadways provide a more "truck friendly" design, the carrier typically utilizes them until required to exit the corridor, in order to affect delivery or pick-up. Faced with an opportunity to follow several "more truck friendly" routes, the carrier will then resort to the corridor producing the least amount of miles traveled, delay, and most closely places the truck in the vicinity of those shippers being serviced. In the previous mapping, GA 20 in the southeast sector contains all four continuous features, for most of the roadway's length. Without an alternative route, the more design motivated expectation would be for truck traffic moving from the southern metro, accessing Interstate 20, would utilize GA 20. A major carrier readily identified GA 81 as the more extensively utilized corridor to access Interstate 20, over GA 20. Though GA 81 is a more inferior truck friendly design, it requires fewer miles, for vehicles proceeding east on Interstate 20, and is noted as "quicker".

Public Outreach

Overview

The team conducted five meetings in freight sensitive areas including the City of Duluth, Bolton Road in the City of Atlanta, north Fulton County, Douglas County, and the community of Rex in Clayton County. Meeting locations (listed below) were jointly determined by ARC staff and the consultant team as geographically and strategically significant. The purpose of the meetings was to communicate the value of freight movement, solicit input and feedback on truck routes, data analysis, and the potential ASTRoMaP network as well as to discuss issues and potential mitigation strategies. Expert private and public sector stakeholders were on hand ranging from Technical Coordinating Committee (TCC) representatives, private trucking industry leaders, and law enforcement specialists in freight traffic control. Each participant provided the benefit of their experience and answered questions as needed. A detailed description encompassing the variety of comments received during these five meetings is available on the ARC website, within the document Public Outreach Summation.

Commentary Summation

Each meeting presented differing priorities and observations. The following are several comments, by meeting location:

Gwinnett Chamber: 19 attendees including Newton County, Gwinnett County, City of Norcross

- As an alternative to Jimmy Carter Rd, try Pleasantdale Rd, Buford Highway, Best Friend Rd, and Button Gwinnett Drive
- Mountain Industrial Blvd. from GA 8 to GA10 (DeKalb County)
- Stay away from schools, residential and retail as much as possible
- Suggestion of making the ASTRoMaP network available with online mapping websites and through software such as Microsoft Maps or as plug-ins to GPS systems.

Roberta T. Smith Elementary School in Rex: Five attendees including Clayton County, DeKalb County, and Henry County

- Clayton County representatives suggested including the entire length of Forest Parkway in Clayton as part of the ASTRoMaP network.

Douglas County's Hilton Garden Inn: Four attendees including Douglas County DOT and Cobb County DOT

- From a policy standpoint, we need close coordination with partners.
- Biggest issue is connectivity, for the segments that meet criteria we need a way to prioritize and implement needed pieces of the grid in short fashion.

City of Atlanta: 23 attendees including City of Atlanta, FedEx Freight

- Land use must be taken into consideration.
- Marietta Blvd needs to be a truck route over Marietta Rd.
- Most trucking companies are listening to concerns and are trying to be good neighbors.
- Encourage alternate truck (natural gas/electricity) technology.
- Trucks and community need to learn to coexist.
- More public input needed.

Fulton Chamber/CID: Six attendees including Fulton County Public Works and City of Johns Creek

- When changes to Port of Savannah occur, there will be a lot more trucks on the roads through Atlanta.
- Make sure you interview companies, especially service delivery ex. Coke, food, WalMart, Lowe's
- Education and communication with the community is important.
- Make sure you are constructing a network that is attractive.
- Will you consider the actual quality of the construction of the roadway?
- Are roundabouts attractive for trucks?

Additional comments were presented. These identified additional roadways more closely associated with "final mile", non-truck related concerns, and other recommendations for the truck route designation process.

Criteria Matrix

Overview

Continuing the process of preparing recommendations, a methodology was developed for prioritizing the routes and use in the regional planning process. Weights and values were assigned to each attribute to help quantify the process. Additional discussion of the resulting scorecard is available on the ARC website within the document Criteria Matrix.

Stakeholder Survey Response

In September 2009, a survey was conducted with public and private sector participants, to assess the priority for consideration of each data element (attribute). Level of Service described the capacities and flow of the given roadway, and had been collected but not presented as part of the Needs Assessment. The level of truck volume was seen as an indicator of “truck friendly” construction and the current ability of the roadway to provide access to freight generators. Six attributes were used to form a secondary level of evaluation, as they were more qualitative in nature. Ten quantifiable attributes remained. In conjunction with the survey results, each attribute was ranked to signify the level of influence on truck navigation, **Figure 18**.

Figure 18: Survey Results Comparison with Influence on Route Selection

ATTRIBUTE	PRIORITY	
Name	Survey	Influence
Functional Classification	1	1
Level of Service	-	2
Lane Width	4	3
Posted Speed	5	4
Truck Volume	-	5
Shoulder Width	6	6
At-Grade Crossing Presence	7	7
Bridge Shoulder Width	8	8
Bridge Posted Weight	2	9
Bridge Minimum Vertical	3	10

Truck Route Designation Scorecard, Quantifiable Attributes

Items such as functional class and lane width that weigh heavily on the ability of a truck to safely and successfully negotiate a route were viewed as having more influence. Attributes such as shoulder width and at-grade crossing presence, while still important regarding delay and safety, were seen as less detrimental to the assignment of trucks to the roadway. Two attributes, Minimum Vertical Clearance and Posted Weight Restrictions, in relation to bridges on a route, were seen as critical obstacles and thus assigned a point value of 100 (compared to the normal three points assigned to negative conditions). Where sub-standard heights or posted weight restrictions existed, they were regarded as presenting immediate barriers to the use of that segment, and where they did not exist they added nothing to the value of the segment. Therefore, each of these was seen as least applicable during the selection process, unless negatively impacting the roadway. Ranked from one to ten, the attribute in the sixth position was assigned ten percent, as the value of ten; spread across all ten attributes would score a one hundred percent. A declining scale for scoring was applied to the remaining values. The scorecard is presented in **Figure 19**.

Figure 19: Criteria Matrix for Route Designation

Prioritization Criteria			
EXAMPLE:			
CRITERIA	COMMENT		Weight
SCORE	SCORE	SCORE	
CONDITION	CONDITION	CONDITION	
Functional class	***Design attributes reflecting truck considerations***		***15%***
3	2	1	
Local	Collector	Arterial	
Level of Service	***Congestion and resultant recurring delays***		***15%***
3	2	1	
E or F Designation	D Designation	A, B, or C Designation	
Lane width	***Curb to curb***		***12%***
3	2	1	
< 12 ft	NA	12 ft or greater	
Posted speed	***MPH***		***12%***
3	2	1	
< 35	35-44	>45	
Truck Volume (see text)	***2010 Inbound plus outbound***	***Real-Time Truck Travel Analysis***	***12%***
3	2	1	
< 3,000	>2,999 and < 5,796	> 5,795	
Travel time index < .8	Travel time index from .8 to 1.0	Travel time index > 1.0	
Shoulder width	***Ability to remove disabled or task assigned vehicle from flow***		***10%***
3	2	1	
<5 ft or no shoulder		5 ft or greater	
Truck volumes at rail crossings			***7%***
3	2	1	
In top 25		Not in top 25	
Bridges with Pedestrian Services			***7%***
3	2	1	
No curb or sidewalk		>5 feet on either side	
Bridge Posting Requirements and Actual Postings			***5%***
100	2	1	
> or equal to 20% below		<20% below or no posting	
Minimum Vertical Clearance			***5%***
100	2	1	
< 15ft-Minimum vertical clearance		15ft or greater	

Truck Volume was indicative of current construction that tends the roadway to more “truck friendly” attributes; it also can be indicative of freight intensive land use designations. As identified in the Community Impact Mapping Analysis, where the need exists, truck access is granted without restriction. Therefore, where the truck route could reflect this presence, the selection of that roadway segment would facilitate local access, while not generating an additional roadway with increased truck volumes.

Bridges with Pedestrian Services reflect the current and future expectation that bridge spans will incorporate bicycle and pedestrian access. As this applies to truck route designation, safety is the intended evaluation. Functional classification assigns “bike-ped” access and discontinuance of this feature may present conflict between the elevated truck volume and pedestrians.

Truck Route Designation Scorecard, Qualitative Attributes

Six additional values were assigned to the post quantitative evaluation, **Figure 20**. These were applied to roadways identified in the quantitative analysis, and helped identify the positive or negative utility of a segment in the community, or in the commercial or operating environment.

Figure 20: Qualitative Assignment for Criteria Matrix

Community input		
Results of community outreach support or opposition to project		
3	2	1
Comments opposed to truck use	No comments	Comments in favor of truck use
Private industry input		
Results of meetings with private industry		
3	2	1
Comments opposed to truck use	No comments	Comments in favor of truck use
Jurisdictional input		
Results of meetings with ARC jurisdictions (TCC members)		
3	2	1
Comments opposed to truck use	No comments	Comments in favor of truck use
Connectivity		
Planning judgment coupled with data analysis to determine corridors that most efficiently connect destinations		
3	2	1
Results in little or no connectivity	Moderate connectivity	Required to provide significant connectivity
Land Use		
Proximity to features		
3	2	1
Conflicts with trucking operations	No relation to trucking operations	Conforms with trucking operations
Environmental Justice		
Proximity to features		
3	2	1
Conflicts with trucking operations	No relation to trucking operations	Conforms with trucking operations

ASTRoMaP Draft System

Assignment of Scoring to Roadways

Each roadway contained within the RPFHN and those later identified through the outreach segments of the project, were scored, as discussed in the Criteria Matrix documentation. Granularity was achieved by applying the scoring at the RCFile segment level. This provided scoring for lengths of less than a thousand feet or more than two miles, depending on the level of detail contained in the file. A segment composite score was calculated and was illustrated in a common legend, **Figure 21**. The fifth scoring range captures only those segments where the point obstacle of minimum vertical clearance or posted weight restriction is present. The overall road network under consideration and the applicable scoring is offered in **Figures 22** thru **27**.

Figure 21: Road Network Graphic Scorecard, Legend

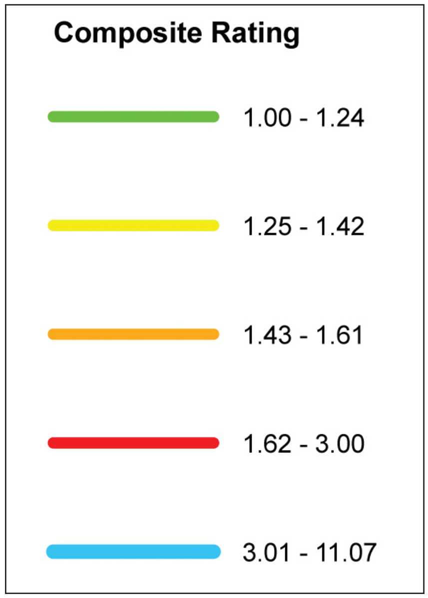


Figure 22: Road Network Graphic Scorecard, Overview

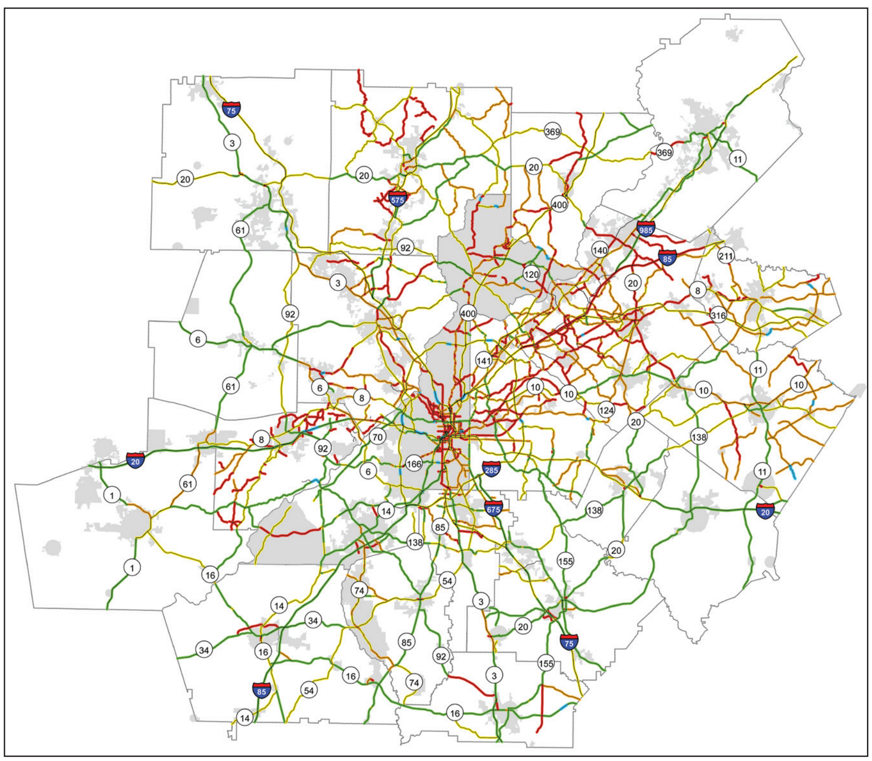


Figure 23: Road Network Graphic Scorecard, Downtown Sector

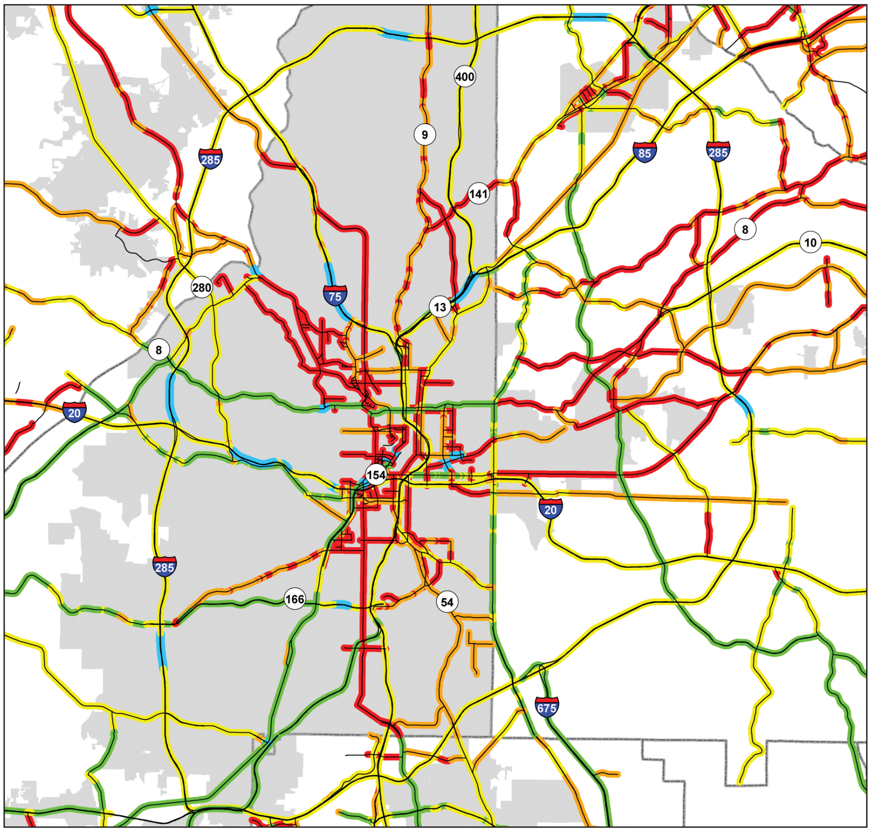


Figure 24: Road Network Graphic Scorecard, Northwest Sector

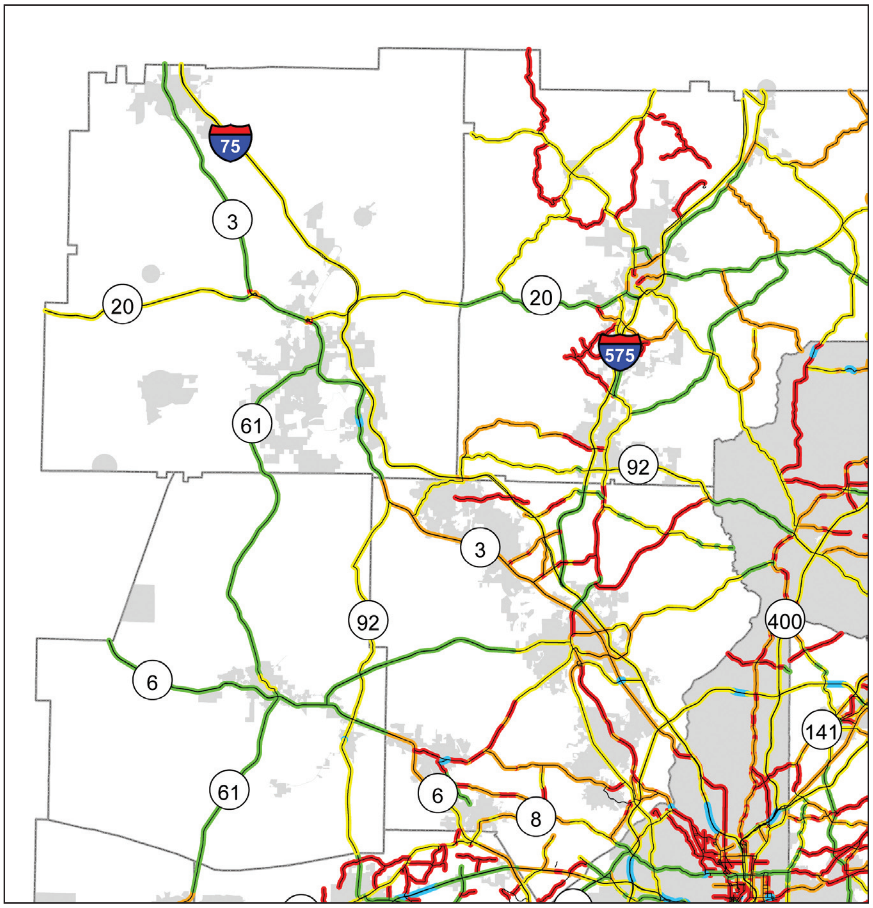


Figure 25: Road Network Graphic Scorecard, Southwest Sector

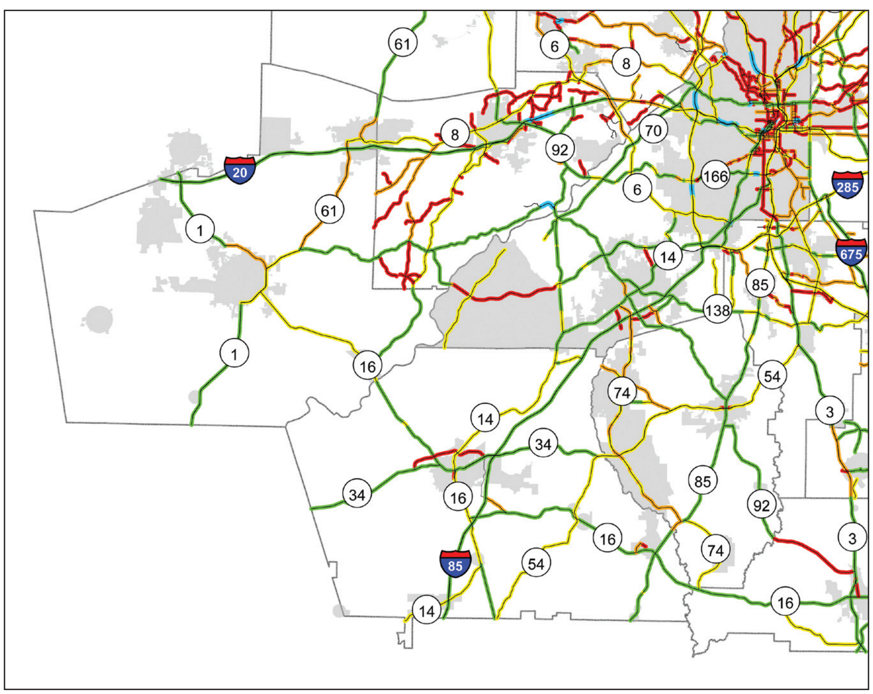


Figure 26: Road Network Graphic Scorecard, Northeast Sector

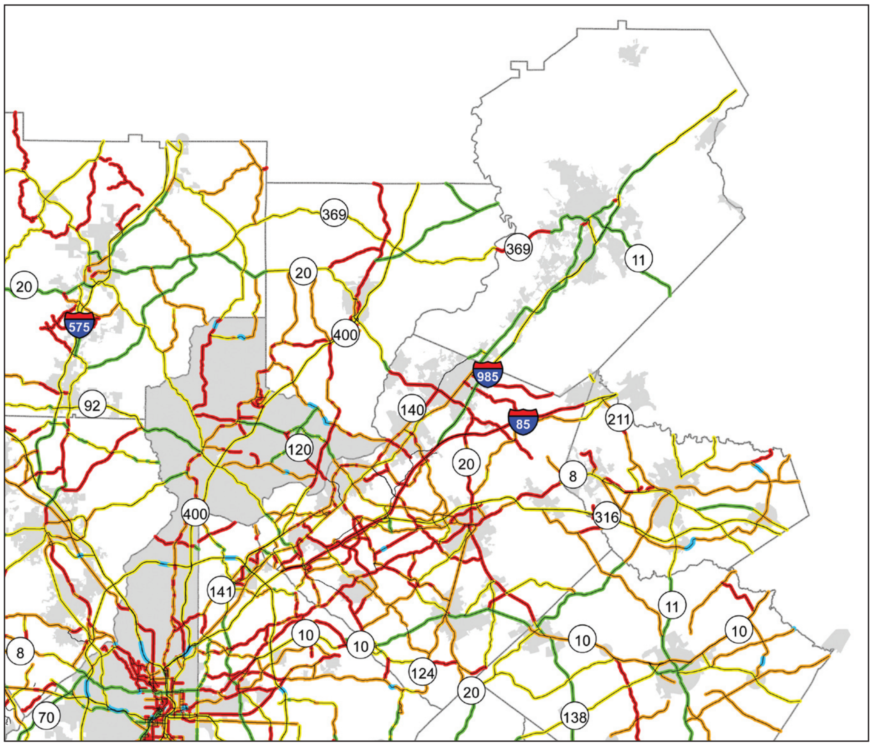
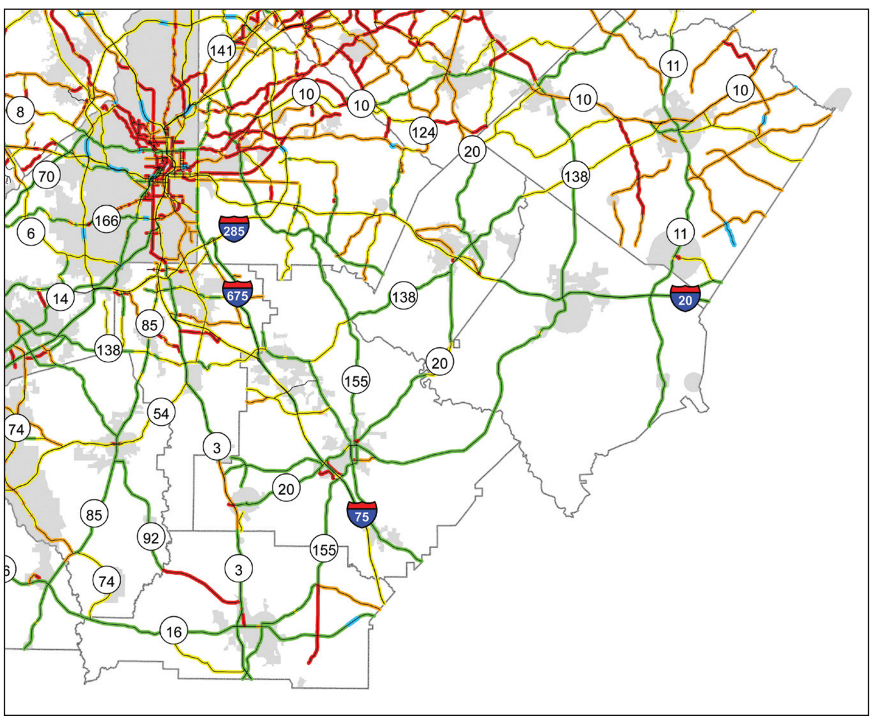


Figure 27: Road Network Graphic Scorecard, Southeast Sector



Methodology for Route Selection

With the "grid" concept providing a framework and the desire to provide corridors which met or exceeded the polled carrier response of "distance to the appropriate corridor", the network was evaluated for corridors moving along the east-west and the north-south axes. The carrier "distance to the appropriate corridor" described the acceptable time, under accepted driving conditions for the driver to reenter the network. This was identified as an optimal ten minutes with a maximum of fifteen minutes. For example, beginning in the northwest portion of the region, a low impedance path to the northeast was selected. This "path of least resistance" sought roadways scoring mostly in the first two categories, green and yellow, and remaining on the same relative latitude or longitude. A second review, where applicable, was performed along this initial corridor for connectivity purposes. These segments were identified in a manner to reduce the presence of the least desirable category (red), and still maintain the direction of travel.

ASTRoMaP System Overview

Following the process outlined in the Strategic Truck Route Identification Criteria Matrix, with due consideration of the Community Impact Mapping Technical Report, a "grid" network of appropriate corridors was identified, **Figure 28, 29**, and **30**. A more detailed description is available in **Figure 31**. A method of corridor identification is also proposed to allow for more meaningful recognition of signed routes and the ability to designate future expansion of the system. The initial two letters identify the primary direction of the corridor. A preceding "C" designates a connector route. This is followed by a designator noting the corridors relationship to the recognizable primary east-west corridor of I-20 or the north-south corridor consisting of GA-9, from the north to the downtown area, then south along GA-3. Substituting the letters "A, B, C, D" in lieu of the numeric for connector routes further identifies location and differential to corridor identification. Therefore an explanation of the first noted corridor would be:

Corridor on an East-West axis	EW-N4	North of I-20 and the fourth farthest for that reference

A corridor by corridor and "by connector" detailed review is provided on the ARC website within the document ASTRoMaP Draft System.

As corridors were developed common segments were found that both an east-west and north-south corridor shared. These are described as "concurrent corridors" and further assistance the identification of primary areas of focus for future project identification.

Figure 28: ASTRoMaP System

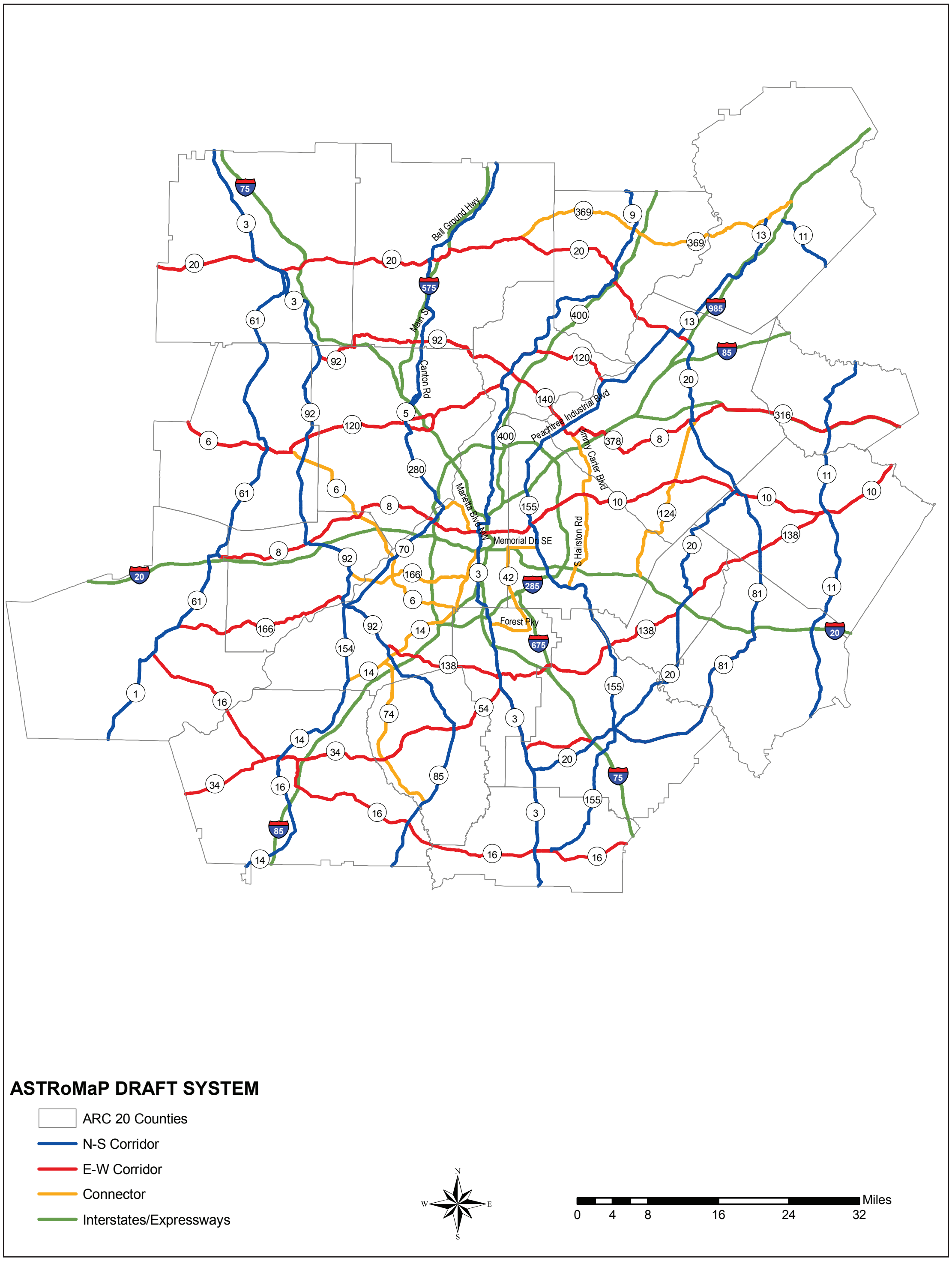


Figure 29: ASTRoMaP System, East-West Corridors

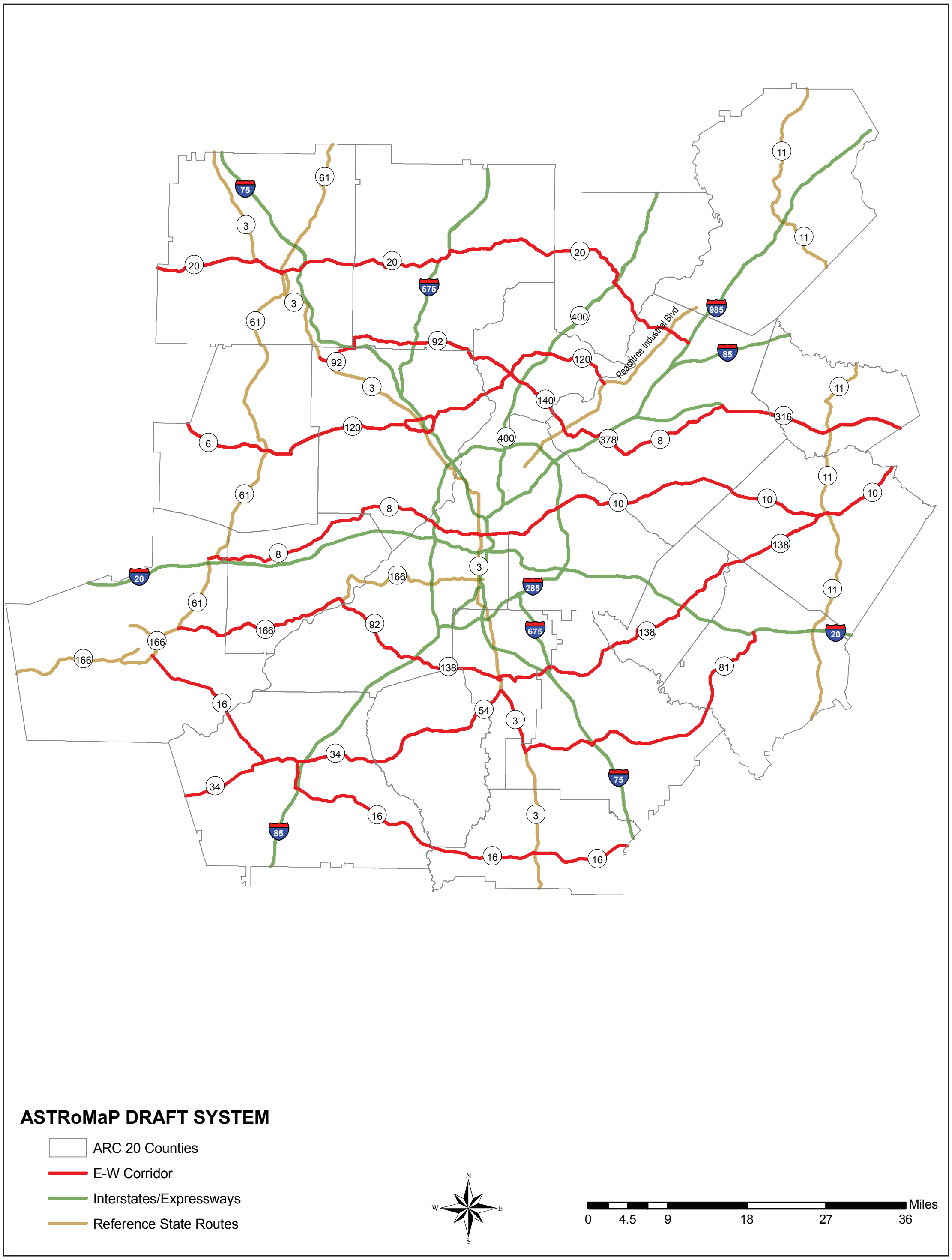


Figure 30: ASTRoMaP System, North-South Corridors

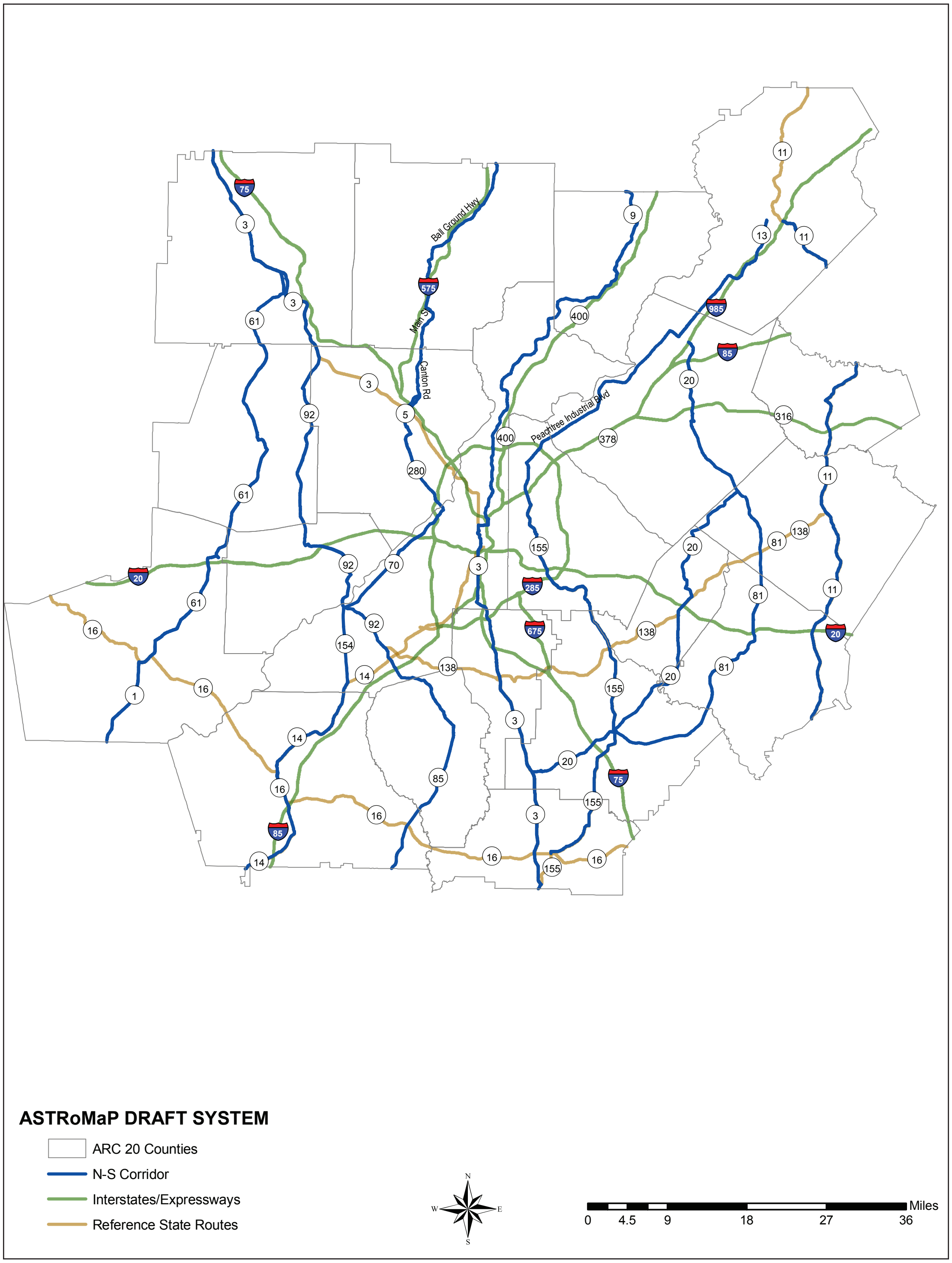


Figure 31: ASTRoMaP Corridor Description

ID	INCLUDED ROADWAYS	WEST TERMINUS	EAST TERMINUS	LENGTH
EW-N4	GA-20	Region western border	Interstate-985	59
EW-N3	GA-3, GA-92, GA-120	GA-3	Peachtree Industrial Boulevard	39.9
EW-N2	GA-6, GA-120, GA-140, GA-13, GA-378, GA-8, GA-316	Region western border	Region eastern border	111
EW-N1	GA-8, GA-10 (US-78)	US-61	Region eastern border	89.9
EW-S1	GA-166, GA-92, GA-138	GA-61	GA-11	89.7
EW-S2	GA-34, GA-54, GA-3, GA-81	Region western border	Interstate-20	89.4
EW-S3	GA-16	GA-166	Region eastern border	69.9
			Corridor Miles	*568.5*
ID	INCLUDED ROADWAYS	WEST TERMINUS	EAST TERMINUS	LENGTH
NS-W3	GA-3, GA-61, GA-1	Region northern border	Region southern border	65.9
NS-W2	GA-3, GA-92, GA-154 GA-14	Region northern border	Region southern border	101.5
NS-W1	Canton Hwy, Marietta Hwy, Canton Hwy, Main St, Canton Rd, GA-5, GA-280, Bolton Rd, GA-70, GA-92, GA-85	Region northern border	Region southern border	97.7
NS-E0	GA-9, GA-3	Region northern border	Region southern border	88.1
NS-E1	GA-13, GA-347, Peachtree Industrial Blvd, GA-141, Clairmount Road, Holiday GA-155	Region northern border	GA-16	89.1
NS-E2	GA-20	Interstate-985	GA-3	67
NS-E3	GA-81	GA-10	GA-155	52.2
NS-E4	GA-11	Interstate-985	Region southern border	75.6
			Corridor Miles	*637.1*
ID	INCLUDED ROADWAYS	WEST TERMINUS	EAST TERMINUS	LENGTH
CNS-EC	GA-124	Interstate 20	GA-8	20.7
CNS-EB	Jimmy Carter Blvd, Mountain Industrial Blvd, N Hairston Road, Wesley Chapel Road	GA-140/Peachtree Industrial Blvd	GA-155	21.5
CNS-EA	Memorial Drive GA-154, GA-42, GA-331 (Halsey RR yard access: Memorial Drive, Boulevard SE,)	GA-3	GA-155	18.4
CNS-WA	Bolton Road, Marietta Blvd NW (includes enclosed Marietta Road NW)	GA-280	GA-8	5.6
CNS-WB	GA-6	GA-92	GA-14	29.8
CNS-WC	GA-14	GA-154	GA-3	22.9
CNS-WD	GA-74	GA-14	GA-85	19.2
			Corridor Miles	*138.1*
ID	INCLUDED ROADWAYS	WEST TERMINUS	EAST TERMINUS	LENGTH
CEW-SA	GA-166	GA-92	GA-3	17.8
CEW-ND	GA-360	GA-20	Interstate 985	35.8
			Corridor Miles	*53.6*
Total Network Mileage				**1377.9**

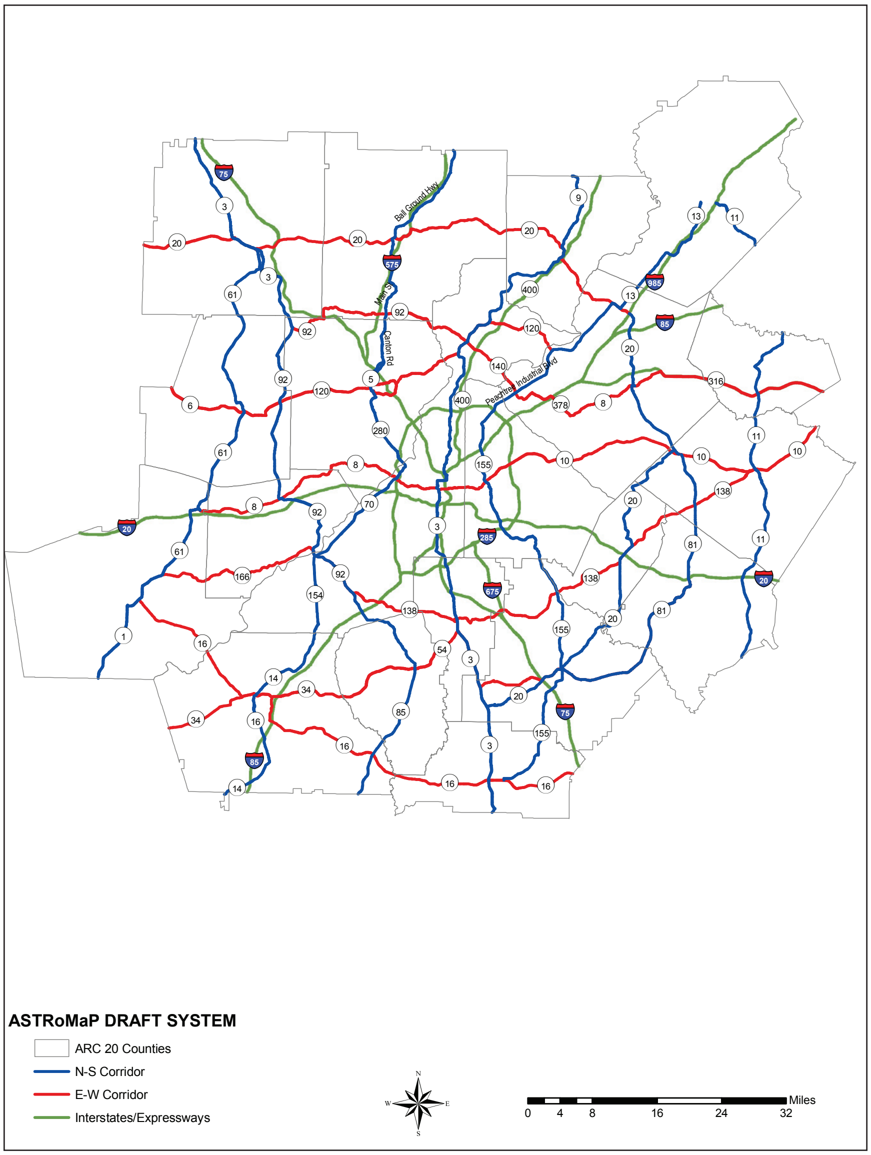
Jurisdictional-Technical Committee Response

Overview

The ASTRoMaP System was processed through four distinct versions, prior to arrival at the network presented above. Each version was an enhancement of the previous to address specific requirements and stakeholder response.

Version 1.0

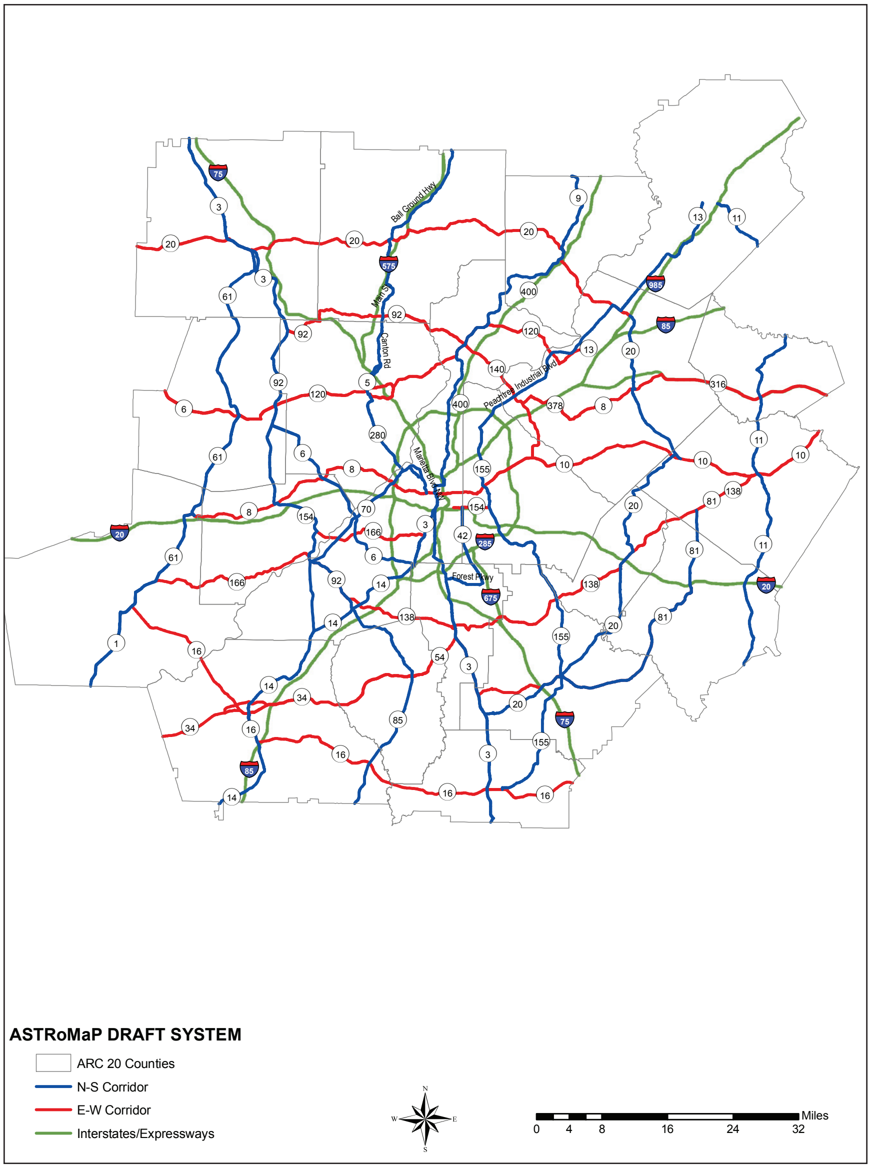
Figure 32: ASTRoMaP Version 1.0



The initial version, **Figure 32**, identified those corridors produced by the application of the scoring methodology and identifying directional corridors.

Version 2.0

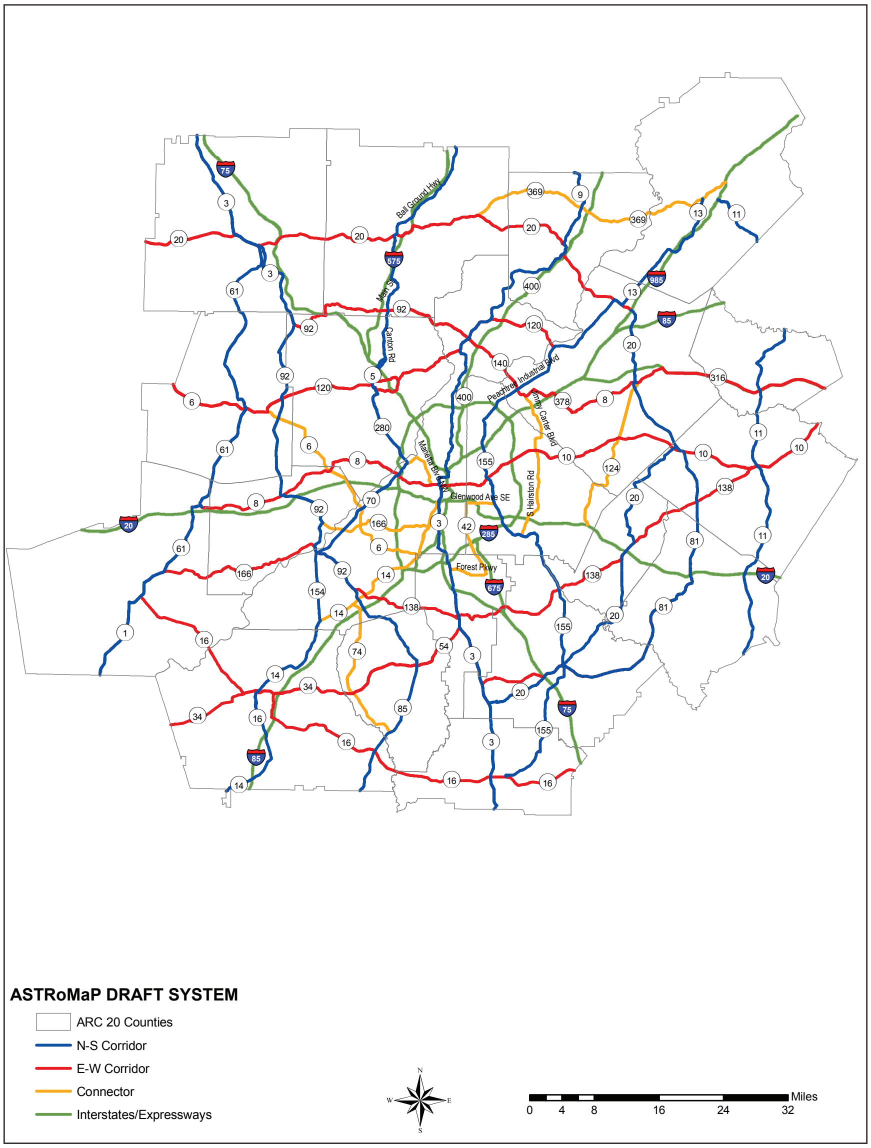
Figure 33: ASTRoMaP Version 2.0



Similar to the first version, comparison to the needs and requirements for NHS Connectors added corridors to service access to railroad yards, airports, and other intermodal needs, **Figure 33**.

Version 3.0

Figure 34: ASTRoMaP Version 3.0



This version, **Figure 34**, was marked by the generation of the "connector" classification. These consist of corridors or specific roadways that provide access to freight generating clusters or nodes of activity. Such areas are identified on ARC's Unified Growth Policy Map as Center City, Regional Center, Town Center or Freight Areas. These corridors are multi-jurisdictional on the county level but do not provide cross regional access. In addition, corridors designated as NHS intermodal connectors would be eligible for consideration as ASTRoMaP connectors. The initial feedback received from local jurisdictional review was incorporated.

Version 4.0

The version presented as the draft system was augmented by additional jurisdictional input during a working session of the Technical Committee (TCC) on March 19, 2010 and final clarification of the connector NCS-EA, designating Memorial Drive instead of Glenwood Drive on May 11, 2010. These final adaptations addressed concerns expressed by community and jurisdictions.

Strategies and Recommendations

Introduction

By applying the Criteria Matrix and "scoring" individual segments along multiple roadways, portions of the assigned ASTRoMaP system were identified as not meeting the optimal expectations to attract and convey truck traffic.

To properly assess these concerns, engineers traveled a significant proportion of the entire system. Observing conditions on the designated corridors and connectors, in conjunction with locations identified from spot speed analysis and real-time truck travel data, improvement projects were documented. Indirect route observation, utilizing aerial route assessment with tools such as Google Maps, was conducted to further enhance project assessment in areas requiring linear projects across multiple miles of a given corridor.

Infrastructural Improvements

Introduction

Potential improvement was guided by AASHTO "truck friendly" recommendations to road design. The focus of these assessments was to identify short or medium term projects that would contribute to the utilization of the corridor or connector in a "quick win" to ten year timeframe. These also could be implemented with little to moderate funding by associated agencies and jurisdictional bodies. Assisting with long term planning, where budget requirements are great and extended scheduling is required, projects requiring ten or more years and projected funding needs of $20 million or more were also identified. This latter category was titled Capital Expenditure or CapEx projects to distinguish them from the focus project grouping.

Proposed projects in this plan will have positive impacts on travel performance but will also incorporate context sensitivity features to mitigate impact on policies and values of the existing communities. Potential policy recommendations may help designated roadways appropriately enhance communities or at minimum reduce impact of strengthening truck routes. A policy strategy recommended enhancing community sensitivity and general quality of life is Context Sensitive Design.

Due to the complexity of the study area, potential impacts to the built and natural environment, and differing values and views from the public and stakeholders, potential roadway projects should be completed using context sensitive solutions. Context sensitivity preserves and enhances community and natural environments. By thinking beyond the pavement, solutions can be implemented that not only accomplish mobility objectives, but also respect and enhance both the natural and built environments.

Within the varying context of the Atlanta region, roadway improvements should incorporate urban design characteristics that reinforce urban character, such as pedestrian-scale and aesthetic treatments that encourage all modes of transportation including trucks. Maintenance and enhancement of community character is important to sustain livability within the urban context.

Project Worksheet

Engineers prepared Project Worksheets for each candidate improvement. These notated, by project:

- Route: Corridor or connector ID
- Location
- Source: Observation type
- Jurisdiction: Expected agency or body to guide project
- Concern: Issue observed
- Proposed Actions:
  - Interim Solution: If one exists
  - Solution: Identified corrective action
- Picture or Map: illustrating relative location of project

A total of fifty projects were identified within the short-medium grouping and six CapEx projects. The short-medium group was assessed for projected cost utilizing the Georgia Department of Transportation CES (Cost Estimate) tool to provide estimates for:

- Preliminary Engineering
- Utility Relocation
- Construction
- Right of Way Purchase

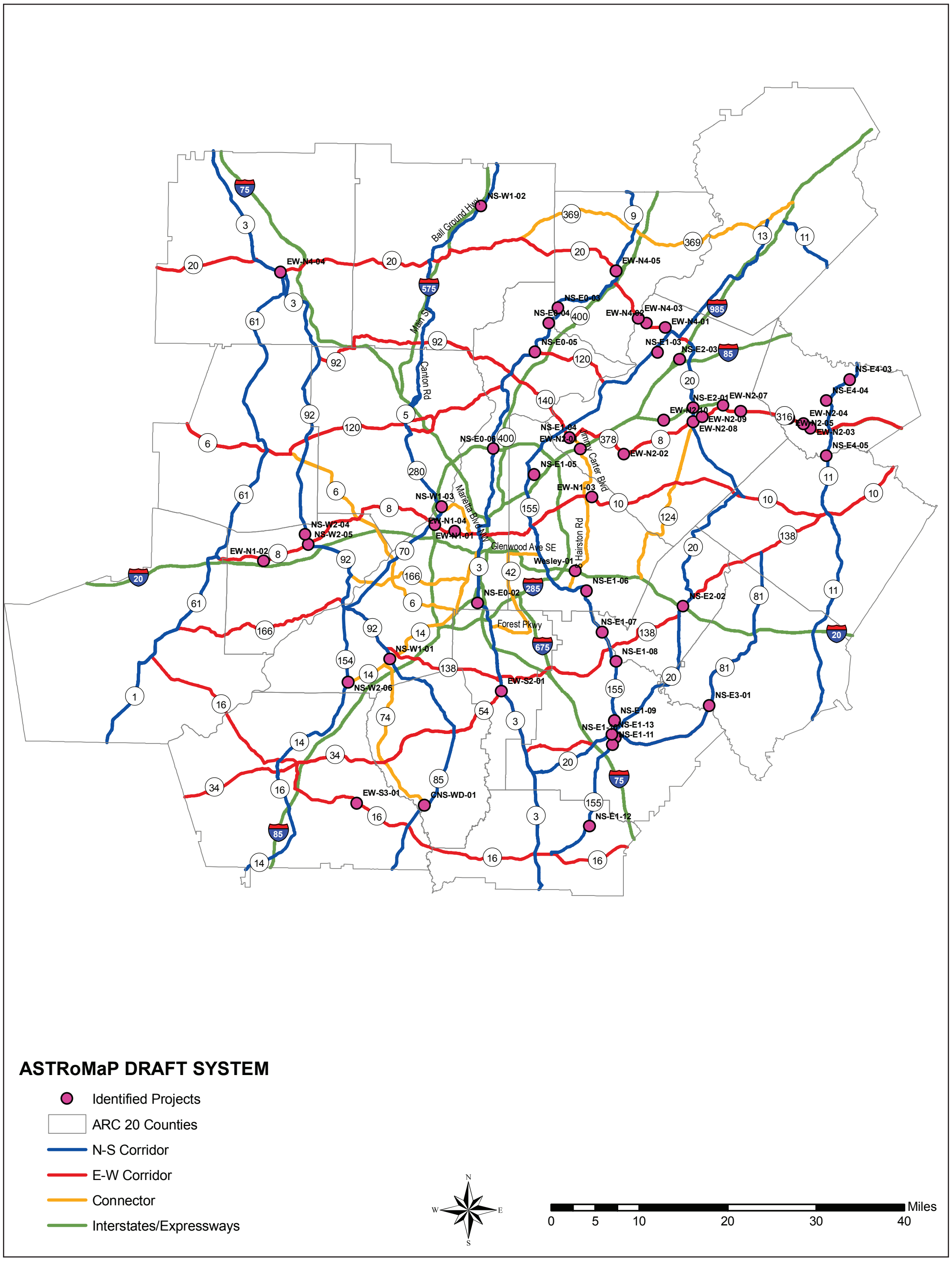
Cost-Benefit Analysis and Cost Estimation

The cost-benefit analysis methodology is based on User Benefit Analysis For Highways Manual, which is also referred to as Red Book, published by American Association of State Highway and Transportation Officials (AASHTO) in August 2003. The original construction, preliminary engineering, right-of-way (ROW) and utility costs of each project are estimated by ROW and Utility Cost Estimation Tool (RUCEST) and Construction Estimation Tool (CES) developed by Georgia Department of Transportation (GDOT) in 2008. The user benefit calculation reflects the benefit enjoyed by travelers directly affected by a transportation project and is determined by comparing travel time, operating, and accidents before and after a project is implemented. An Excel-based tool called Redbook Wizard disseminated by AASHTO along with the Red Book was utilized to organize project information and calculate the user benefits and costs of each highway improvement project.

Project Assignments

Projects were identified across the region. **Figure 35** illustrates the locations.

Figure 35: Infrastructural Improvement Project Locations

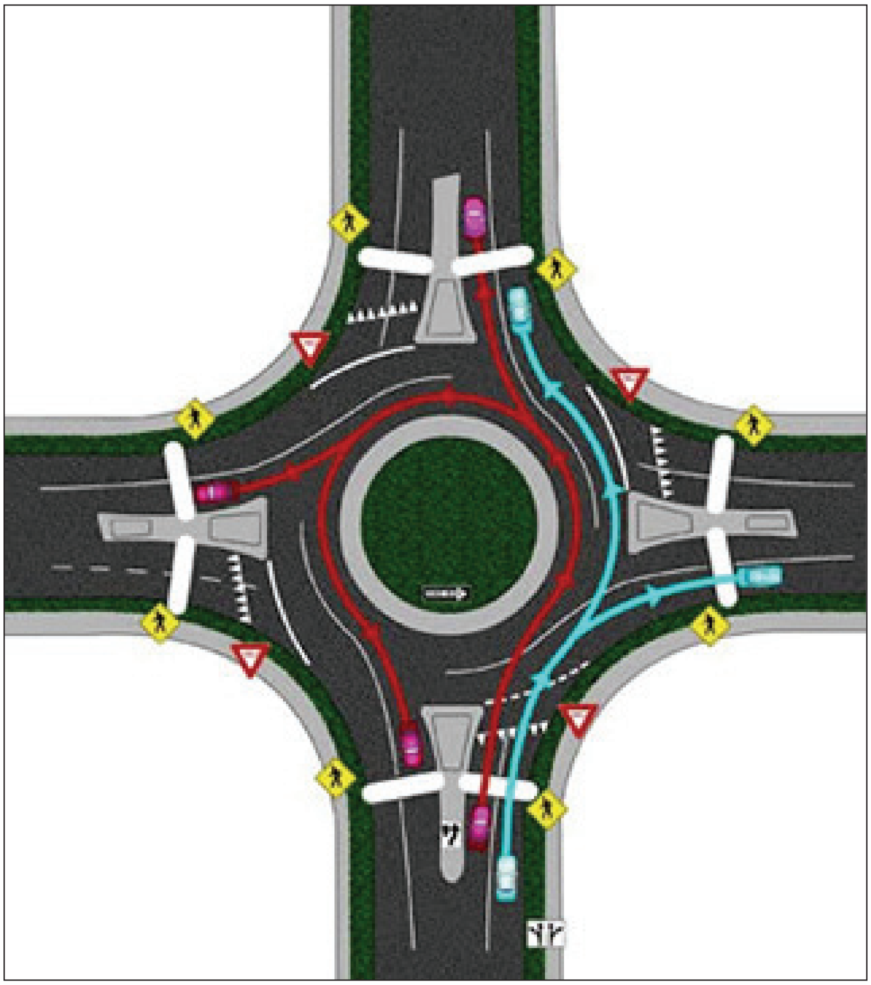


Policy or Design Strategies

Roundabout Designs and Implementation

General Design

Figure 36: Example Illustration of Roundabout Design



Source: 02/03/2010, http://www.ci.watertown.mn.us/images/pics/roundabout_diagram_small.jpg

Traditional intersections, with appropriately equipped signaling, continue to increase in cost and implementation. An alternative with many agencies is initial placement or replacement with continuous flow intersections such as roundabout designs, example illustration **Figure 36**. These may be constructed in urban and rural conditions, as well as part of single or multiple lane roadways. Several jurisdictions are requiring studies be submitted that state why a roundabout should not be proposed instead of the traditional justification for imposing a roundabout in lieu of a traditional intersection. In a statement intended to guide future considerations and implementations of safety countermeasures, "…,they should be considered as an alternative for all proposed new intersections on federally-funded highway projects,…"[4] With adoption of a pro-roundabout strategy by state and local DOT's, the roundabout initially must overcome opposition from the driving public and the freight community. Trucking firms and drivers with preconceived

4 Memorandum, USDOT, FHWA, July 10, 2008, "ACTION: Considerations and Implementation of Proven Safety Countermeasures", Jeffery A. Lindley, Associate Administrator for Safety

concerns and experience with other similar designs such as traffic circles cite safety and access issues in opposition. Trucks that choose to avoid these designs elevate concerns by shippers that rates may increase and reduced coverage by trucking companies may occur; resulting in raised transportation costs. It is important that to realize the benefits of steady and continuous flow of traffic and reduction of adverse safety conditions, design and education should be a priority.

As larger roundabout design may incorporate a greater right of way than traditional intersections, much design effort is geared to mitigate the cost and designs such as the mini-roundabout are applied. These have the capacity to accommodate large tractor-trailer combinations with appropriate planning and design. In either or combination of the designs, several solutions can be evaluated for construction. It is important to note that each supplemental "truck friendly" design strategy has potential compromises of efficiency and safety, for all traffic modes; truck, automobile, bike, and pedestrian.

Truck Aprons

Figure 37: Truck Apron

Source: 02/03/2010, http://www.ksdot.org/roundabouts/images/truck.jpg

As vehicle length increases, the need to provide an expanded lane width for turning is necessary. Where truck traffic is expected, placement of truck aprons, road surface between the travel lanes and the landscape interior of larger roundabouts, accommodates the "trailing" movement of the trailer. To mitigate other vehicle usage and or abuse, and to identify the road surface as such, a different surface, such as pavers, concrete, and other aggregate pavement is utilized, **Figure 37**. Striping that is recognizable by all drivers may also be used in tandem with surface changes. Without this added lane width, longer trucks will avoid the roundabout due to both equipment and cargo damage as a result of driving over elevated curb heights. Where this damage does occur, either alternative routing should be provided to commercial vehicles or continuing maintenance dollars can be repeatedly expected to reconstruct the curb and landscape.

Traversable Islands

Figure 38: Traversable Island Construction

Source: 02/03/2010, http://safety.fhwa.dot.gov/intersection/roundabouts/presentations/safety_aspects/long.cfm

In extremely space restricted areas such as roundabouts, introducing islands, which may be driven over by trucks, while still directing automobile and other traffic in the traditional circular flow, is an accepted practice, **Figure 38**. Construction of this type is typically for intersections with lower truck volumes, as there is added wear on the materials used in the construction of the island. Islands may create a diminished rate of flow because trucks must reduce speeds to reduce load shift and possible resulting cargo damage,

Decision Sight Distance

To accommodate multi-lane roundabout designs sufficient advance signing is required. Though discussed later in this report, as each lane proceeding into the roundabout is designed to accommodate a left or right turn or straight through traffic pattern, signage must be highly visible and provide the truck driver ample reaction time to select and then move to the appropriate lane, **Figure 39**.

Figure 39: Multi-lane Roundabout with Signage, VanDyke Blvd, Sterling Heights, MI

Source: Google Maps

Education Documentation

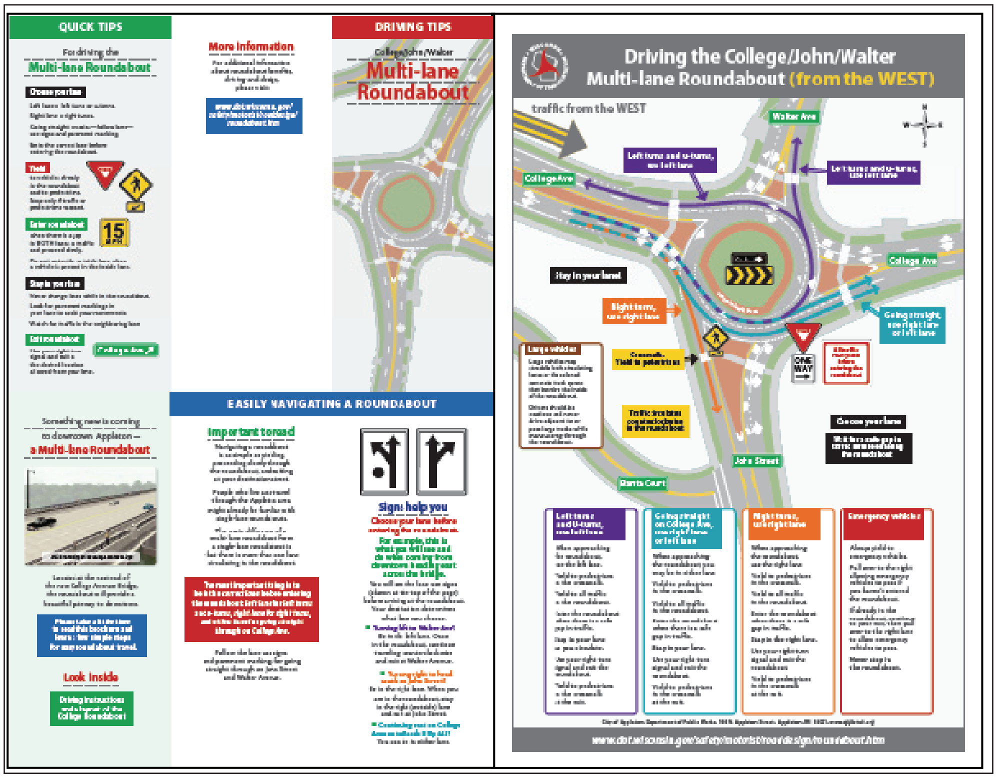
Where roundabouts have been pursued, adverse opinions have existed as to the safety and the concern over proper use; affecting productivity of the vehicle using the roundabout. Two strategies to mitigate these concerns:

- How-to Guidebooks
- Safety Awareness

"How To" Guides

Supplying driver-user friendly documentation to truck drivers at welcome centers, truck stops, and local facilities where truck operations exist can assist in the successful negotiation of roundabouts. State DOT's, including Wisconsin and Virginia, have been instrumental in presenting written and visual education products for the driving public on the "why's" and "how's" of roundabout utilization. This process can easily be replicated at the MPO level. The City of Appleton, Wisconsin hosts location specific guides on roundabouts within their limits, **Figure 40**. These guides describe through graphics and verbiage the design and specific actions necessary to navigate. Targeting automobile traffic, notes and discussions of decision points related to truck traffic are noted as well.

Figure 40: Roundabout Education Brochure, Appleton WI



Source: 02/05/2010, http://www.appleton.org/departments/public/traffic/roundabouts/files/CJW%20Brochure.pdf

Safety Related Statistics

Accident frequency rates and levels of severity have been proven to drop significantly as a result of roundabouts. Presentation within the brochures and online avenues mentioned previously can disseminate those figures. Posting of statistics in a manner that does not impair flow and safety but clearly advises truck users of roundabout benefits is an effective marketing tool. Truck driver communication consists of a great deal of one-on-one discussions over radios and at collection points, such as truck stops and places of work. An effective program relating safety, utilization methods, and efficiency metrics can reach a larger audience than simply those directly targeted, as a result.

Signage Practices

The most common issue related to poor sign practices is the failure to provide adequate advance notice for the truck driver of special considerations adjacent to or on the roadway and provide sufficient time for decision making. Each opportunity to communicate conditions to the truck driver requires increased separation between the vehicle and the event than the average automobile. Where conditions require alternatives, an additional consideration is that the truck driver must have adequate roadway and traffic interaction to remedy a poor decision.

Restricted or posted weight limits on bridges, left turn exits, prohibited routes and minimum vertical clearances are the more common scenarios faced by drivers unfamiliar with local road conditions. In each case where inadequate placement has reduced reaction time, once recognized, the driver is presented with either radical vehicle movement or continuing on, possibly into areas not “truck friendly”. The Manual on Uniform Traffic Control Devices (MUTCD) 2009 provides guidance not only for the type and size of signage, but also on placement. Section 2C.27 of the MUTCD discusses conditions and placement of the Low Clearance sign. Sub section 03 notes:

Section 2C.27 Low Clearance Signs (W12-2 and W12-2a)

Standard:

01 **The Low Clearance (W12-2) sign (see Figure 2C-5) shall be used to warn road users of clearances less than 12 inches above the statutory maximum vehicle height.**

Guidance:

02 *The actual clearance should be displayed on the Low Clearance sign to the nearest 1 inch not exceeding the actual clearance. However, in areas that experience changes in temperature causing frost action, a reduction, not exceeding 3 inches, should be used for this condition.*

03 *Where the clearance is less than the legal maximum vehicle height, the W12-2 sign with a supplemental distance plaque should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.*

04 *In the case of an arch or other structure under which the clearance varies greatly, two or more signs should be used as necessary on the structure itself to give information as to the clearances over the entire roadway.*

05 *Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.*

Option:

06 The Low Clearance sign may be installed on or in advance of the structure. If a sign is placed on the structure, it may be a rectangular shape (W12-2a) with the appropriate legend (see Figure 2C-5).

Addressing At-Grade Rail Crossings

Introduction

Safety and efficient flow of traffic, both general and truck specific, are two concerns directly related to at-grade rail crossings. Incidents occurring at crossings have remained constant in recent years, but nationally, the United States has among the highest amounts of incidents per year in the developed countries. Georgia is one of the top ten states in the nation for grade crossing collisions. In 2009, about nine percent of those collisions were trains colliding with semi-trailers.

The approximately 1500 at-grade rail crossings within the region present a concern for flow and safety for truck movement throughout the region. A physical review of each site is beyond the scope of this project, yet assessing those directly influencing the ASTRoMaP system is imperative.

The review of these locations took place with physical assessment of those on or near the proposed ASTRoMaP system and a data collection effort based on the Federal Rail Administration (FRA) publicly available database

Highway-Rail Grade Crossing Collisions

According to FRA statistics[5], 1,880 highway-rail grade crossing collisions occurred in 2009. Approximately 61 percent of all Year 2009 highway-rail grade crossing collisions occurred in fifteen states, including Georgia.

The Georgia Department of Transportation (GDOT), Rails Safety Section, Office of Utilities, receives approximately $8M annually of federal 130 funds. These dollars are used to fund grade crossing signal projects, pay for preliminary engineering studies associated with grade crossings, and fund hazard elimination projects.

The Surface Transportation Act of 1987 established the Section 130 program. In 1991 Congress passed ISTEA which required that 10 percent of each state's STP funds be set aside for safety improvements under Sections 130 and 152 (Hazard Elimination).

5 Based on Preliminary 2009 Federal Railroad Administration Statistics, UPDATED 3/9/10

Grade crossing signal projects are determined by a hazard ranking index using criteria developed by the Federal Railroad Administration's (FRA) and developed into an Accident Prediction Formula. Using the formula, the GDOT develops a priority ranking for each crossing in the state and the highest ranked crossings are slated for signals until all 130 funding is allocated. A change in the criteria may dictate a crossing receive signals even though it's further down the list. The list is updated annually and any change in a crossing's statistics could move it up or down the list. A basic grade crossing installation - gates, lights, bells, and constant warning time currently costs about $185,000.

Currently Georgia has 5,951 public at-grade highway-rail grade crossings of which 2,097 have gates, 244 have flashing lights only, and 3,610 have cross bucks only. There are 2,361 private at-grade crossings.

Class I Railroads

Norfolk Southern (NS) and CSX, the two Class I railroads in the state, have Grade Crossing Safety Departments charged with eliminating redundant crossings, identifying corridors for signalization projects, and developing engineering solutions to improve safety at highway/rail grade crossings. Both railroads have funding allocated for those purposes and work closely with state and local governments in public/private partnerships to bring projects to fruition. For this project – Atlanta Regional Commission Proposed Truck Route - both railroads and the GDOT have indicated a willingness to consider the route as a corridor. Local jurisdictions will need to be involved and no funding will be allocated towards quiet zones.

Current federal law requires train engineers to sound the locomotive horn when approaching a public at-grade crossing for not less than 15 seconds or more than 20 seconds. Quiet zones are designated track segments where train engineers are not required to sound the horn except in the case of an emergency. These segments must meet certain FRA criteria to compensate for the lack of a train horn so motorists' safety and the community's safety are not compromised.

Short Line Railroads

There are two short line railroads along the proposed truck route system, Georgia Northeastern Railroad (GNRR) in Cherokee and Cobb Counties and Great Walton Railroad (GRWR) in Walton County. Both railroads operate trains as needed with no set schedule.

The GNRR operates from the GA/TN state line thru Ellijay, GA, parallel to I-575 to Marietta. There are two to five trains daily depending on customers' needs and track speed is a maximum 15 mph. The railroad interchanges with the CSX in Marietta.

The GRWR operates one train daily from Social Circle, GA, to Monroe. Track speed is 10 mph. The railroad interchanges with CSX at Social Circle. The tracks parallel SR 11 and cross route 11 once just outside the Monroe city limits.

The most common danger associated with slow track speeds, under 30 mph, is that motorists are more likely to try to beat an approaching train over the crossing.

Site Surveys

Crossings along the proposed truck route were assessed for grade separation possibilities, signalization, high profile ("humped back"), sight distance issues, signage, and closure possibilities.

It should be noted federal law requires railroads to pay five percent of grade separation costs (structure costs only) provided a signalized grade crossing is closed as a result of the grade separation.

Some states have laws governing the distance vegetation must be cleared back from the crossing to provide sufficient sight distance for the motorist to see an approaching train.

Currently Georgia does not have such a law. The DOT uses the sight distance triangle, **Figure 41**, from the Grade Crossing Handbook as a guide. Sight distance is the correlation of vehicle speed, train speed, and the distance needed for the motorist to react to an approaching train based on those speeds, Figure 41 ad **Figure 42**. Trucks are typically considered the slowest vehicle to cross the tracks after first stopping and proceeding in first gear.

Figure 41: Site Distance Triangle

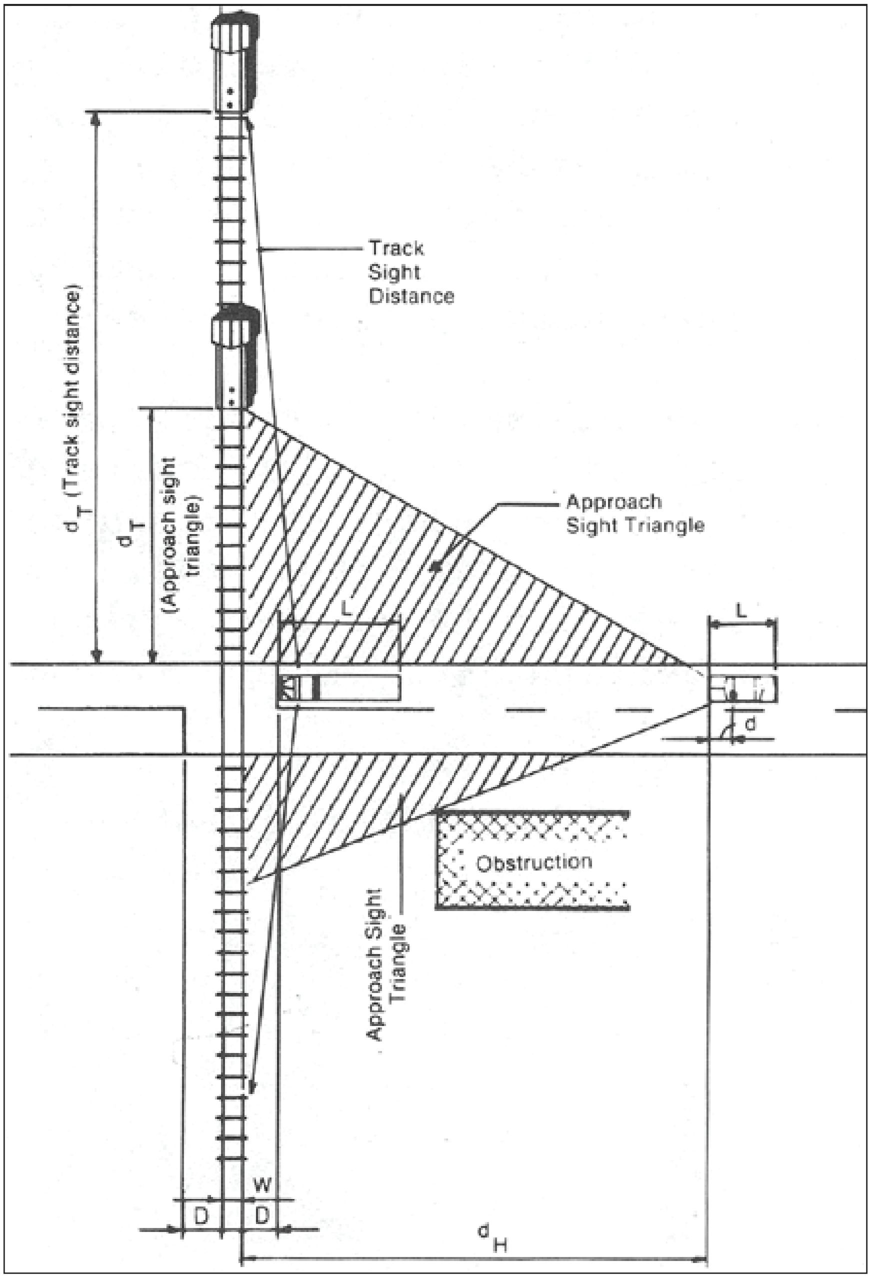


Figure 42: Site Distance Components

	Case B: Departure from stop	Case A: Moving vehicle							
	Vehicle speed (mph)								
Train speed (mph)	0	10	20	30	40	50	60	70	80
	Distance along railroad from crossing, d_T (feet)								
10	240	146	106	99	100	105	111	118	126
20	480	293	212	198	200	209	222	236	252
30	721	439	318	297	300	314	333	355	378
40	961	585	424	396	401	419	444	473	504
50	1201	732	530	494	501	524	555	591	630
60	1441	878	636	593	601	628	666	709	756
70	1681	1024	742	692	701	733	777	828	882
80	1921	1171	848	791	801	838	888	946	1008
90	2162	1317	954	890	901	943	999	1064	1134
	Distance along highway from crossing, d_H (feet)								
		69	135	220	324	447	589	751	931

Source: A Policy on Geometric Design of Highway and Streets, 2004, by AASHTO

Surprisingly, there are few grade crossings actually crossing roadways on the proposed route system and for the most part those crossings are located on low train traffic branch lines, industry tracks, or sidings. All of those crossings are signalized with gates, lights, bells, and, where necessary, cantilever signals.

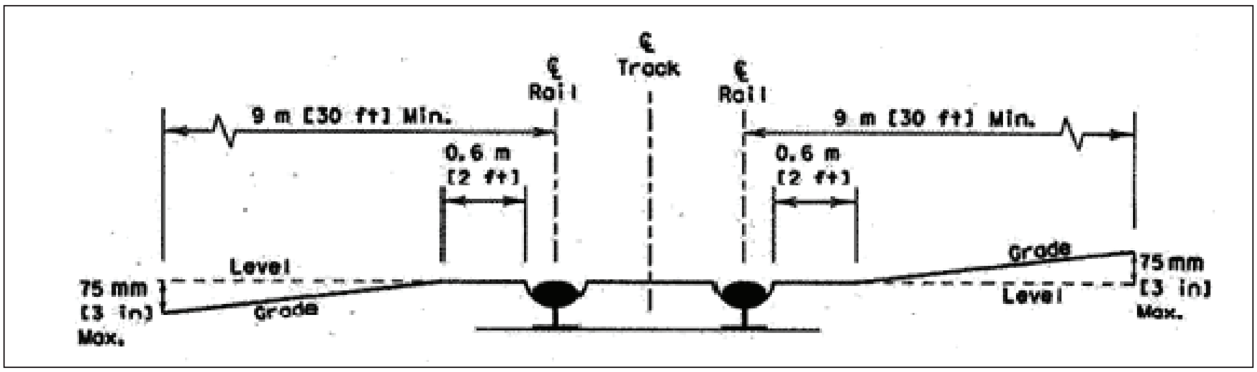
The largest percentage of grade crossings is located on tracks that parallel many of the proposed truck routes. The distance the tracks are located from the roadway varies from as little as 30’ to 50’ to several miles.

Locations where the tracks are within the 30’ to 50’ of the roadway create a unique set of concerns. Truck drivers turning off the truck route onto a perpendicular street or into an industry or business should look in both directions for an approaching train. Drivers can generally see well in the direction of travel but to look in the opposite direction have to make a concerted effort to look over their shoulder and possibly even turn their body to see properly depending on the angle the road crosses the tracks. All of the crossings surveyed were equipped with gates, lights, bells, and, where necessary, cantilevers. These active warning devices provide the driver with a visual and audible warning of an approaching train. Even so, drivers should not depend entirely on active warning devices.

Returning to the truck route from an industry or business the driver is on a perpendicular road making it easy to look in both directions for a train. However, the short queuing distance from the track to the intersecting roadway leaves the rear of the truck across the tracks. If ongoing traffic is sufficiently heavy and the driver cannot make an immediate turn, an oncoming train will not be able to stop in time and a collision will occur. One remedy is to create an acceleration lane for the driver turning right. Making a left turn would still be cause for concern. If the driver stops before crossing the tracks and proceeds when the way is clear, the fact he has to proceed from a complete stop requires more lead time to make the turn due to slow acceleration speed. Posting a Do Not Stop on the Tracks sign (R8-8) is suggested.

In many cases existing crossings are high profile crossings ("humped crossings"). The AREMA Manual for Railway Engineering "recommends that the crossing surface be in the same plane as the top of the rails for a distance of 600 millimeters (2 feet) outside of the rails, and that the surface of the highway be not more than 75 millimeters (2 inches) higher or lower than the top of the nearest rail at a point 7.5 meters (30 feet) from the rail, unless the track superelevation dictates otherwise." This is illustrated in **Figure 43**. This policy has been adopted by AASHTO.

Figure 43: Humped Crossing Design Parameters



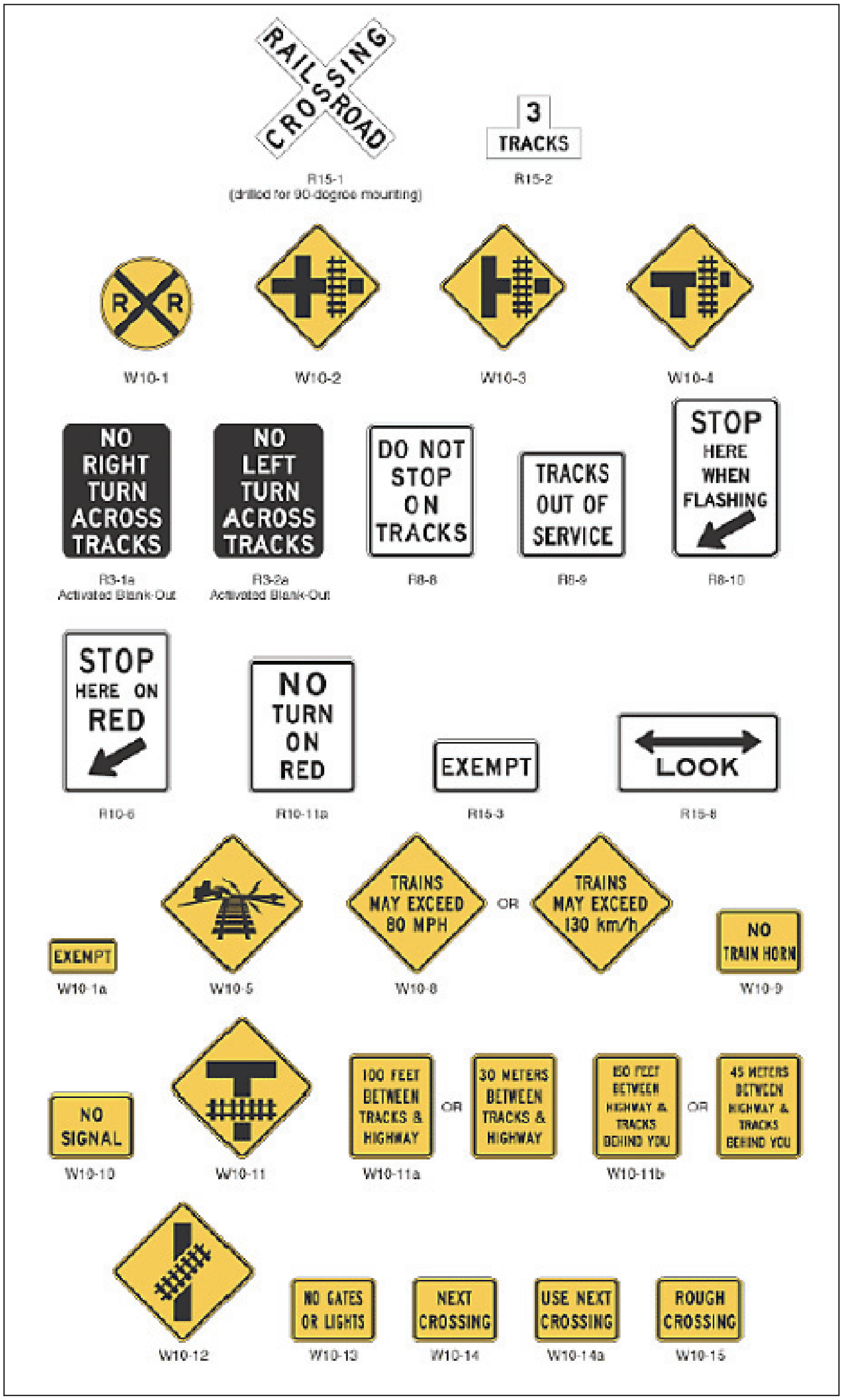
Trucks attempting to use these high profile crossings risk getting hung up and struck by a train.

The Douglasville area has several of these crossings. The concern results from the different topography on each side of the track and is exacerbated by the short distance between the roadway and the track. The city has erected "humped crossing" signs (W10-5) alerting truck drivers to the concern and, in some cases, have even prohibited trucks from using certain crossings.

The Douglasville situation will be significantly rectified on completion of the GA-92 grade separation project. GDOT advises an estimated start date of 2014, and when completed will eliminate three existing grade crossings. McCarley St., DOT #726589M, is an example of a redundant crossing that should be closed.

Rail crossing signage is diverse and allows for numerous warning messages to be transmitted to the vehicle operator, **Figure 44**.

Figure 44: MUTCD, 2008, Railroad Signage



The ideal situation would be for planners and developers to agree to develop regulations placing industry and businesses in locations where the tracks are not so close to the roadway. Unfortunately there is already significant development along the proposed routes where these short queuing distances exist.

Locations of Parallel Tracks

Railroad	Road	County	Comments
CSX	SR 8/23	Barrow	Tracks parallel highway on the north side, close and far away. CSX Abbeville Sub mainline, track speed 10 mph, 2 trains daily
NS	SR 3	Clayton	Tracks parallel highway for about 2 miles, close and away. NS Mainline, track speed 25 mph, 17 trains daily.
NS	SR 8	Cobb	Tracks parallel highway in Austell. NS mainline, track speed for freight trains 60 mph, for AMTRAK 79, mph, 24 trains daily Austell to Birmingham, 107 trains daily Atlanta to Chattanooga.
NS	16E	Coweta	Tracks parallel highway on the south side at Carrollton and at Whitesburg run parallel on the north side, close and away. NS mainline, track speed 25 mph, 3 trains daily – Griffin to Cedartown
NS	SR 8/78	Douglas	Tracks parallel highway from Austell to Bremen, close and away. NS mainline, track speed for freight trains 60 mph, for AMTRAK 79 mph, 24 trains daily – Austell to Birmingham.
CSX	SR 8/29	Gwinnett Barrow	Tracks parallel highway from Winder to downtown Atlanta, close and away. Athens mainline, track speed 50 mph, 47 trains daily.
NS	SR 13/23	Gwinnett Hall	Tracks parallel highway from Gainesville to downtown Atlanta, close and away. NS Mainline, tracks speed for freight trains 60 mph, for AMTRAK 79 mph, 29 trains daily.
NS	SR 23	Butts Henry	Tracks parallel highway from Jackson to Interstate 285, close and away. NS mainline, track speed 25 mph, 17 trains daily.
CSX	SR 81	Newton	Tracks parallel highway in Covington then east along I-20 to downtown Atlanta. CSX mainline, track speed 50 mph, 17 trains daily.
CSX	SR 278	Rockdale	Track parallels highway in Conyers east along I-20and Old Covington Highway to Covington. CSX mainline, track speed 50 mph, 21 trains daily.
NS	SR16	Spalding	Track parallels highway from Newnan to Griffin, close and away. NS mainline, track speed 26 mph, 17 trains a day – Atlanta to Macon S line.
CSX	SR 11	Walton	Tracks parallel highway from just west of Social Circle to just east of downtown. GA line to Augusta, track speed 50 mph, 18 trains daily.
GRWR	SR 11	Walton	Tracks parallel highway from Social Circle to Monroe, close and far away. One train daily, track speed 10 mph, interchange with CSX at Social Circle.

NOTE-Close and far away indicate tracks are 30' to 50' from the roadway at some locations and 0.1 of a mile or more away at others. Crossings more than 0.5 miles from the designated truck route were not surveyed as they would not impact traffic on the route.

Crossings of Concern

Crossings listed in Table 12: Jurisdictionally Identified Railroad Crossings of Concern - were surveyed. With the exception of Jonesboro St. (SR 20), in McDonough, the crossings may impact local jurisdictions in terms of traffic patterns but have little or no impact on the actual proposed truck routes with the exception of the safety concerns when tracks are located close to the roadway. Jurisdictions should contact the railroads' Grade Crossing Departments to develop engineering solutions and determine financial assistance available. NS' contact person is W. L. (Bill) Barringer in Atlanta, 404-582-5295. CSX contact is Cliff Stayton in Jacksonville, FL, 904-366-5049.

Jonesboro Road is the main route from I-75 into downtown McDonough. In mid-afternoon, traffic trying to move through town is slowed significantly because of the circular traffic pattern controlled by traffic signals. Traffic can back up to NS' tracks approximately 0.4 miles west of downtown. Should a train pass during that time traffic in both directions is stopped with no relief until the train passes. A grade separation should be considered at this location. There is sufficient land west of the crossing but an engineering study would have to be conducted to determine if there is sufficient room to the east. There are two large, apparently historical homes, at the tracks that could be a factor but, again, an engineering study should find a solution.

Another possibility for an overpass is Buford Highway, DOT #717845C, in Gwinnett County. There is a small retail area where an overpass might be feasible. Those stores could be accessed from North Berkley Lake Rd.

Some closure possibilities were also noted: Cherokee St., DOT #3404428, Bartow County, Beulah St., DOT #3404428, Bartow County, and Mt. Tabor Rd., DOT #279657C, in Newton County. These locations would need more detailed study before suggesting to local government they be closed.

Prioritizing At-Grade Crossings

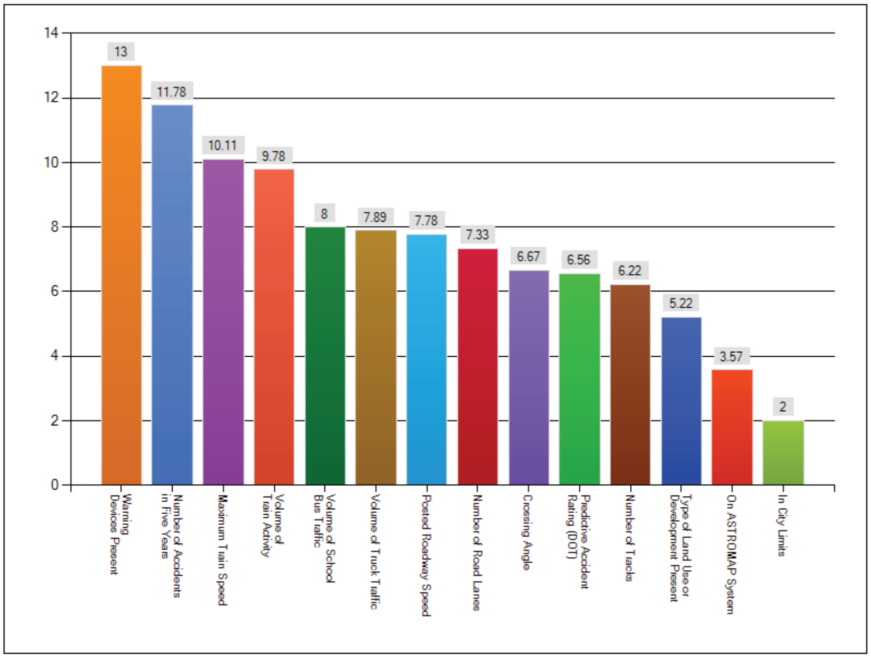
The rail industry relies upon the Predictive Accident Rate assigned by the DOT to prioritize crossings for review. Developing a methodology by ARC participants may augment this by providing local jurisdictions with a ranking by which to propose crossing closures or upgrades for consideration.

The Federal Rail Administration (FRA) maintains an extensive database providing more than 50 specific identifying features for each crossing in the U.S. In Data File attachment A, all at-grade crossings are noted, by county, and 47 specific data tags are presented. Within these fields, fourteen were identified as complete fields in the database and extended to members and interested parties associated with the FATF and TCC. These were:

- Volume of Train Activity
- Volume of Truck Traffic
- Volume of School Bus Traffic
- Number of Tracks
- Number of Road Lanes
- Maximum Train Speed
- Posted Roadway Speed
- Predictive Accident Rating (DOT)
- Number of Accidents in Five Years
- Crossing Angle
- Warning Device Present
- Type of Land Use or Development Present
- In City Limits
- On ASTRoMaP System

Each invitee was requested to rank, by level of importance, each record field type as it should be considered for future action. As of March 31, 2010, of the 69 invitations, eight responses had been received; six public sector and two private sector. With a maximum score of 14, the survey revealed, **Figure 45** that the presence of warning devices dominated the choice as most important.

Figure 45: Rail Prioritization Survey Results



Source: Wilbur Smith Associates

Development of a standardized criteria matrix is complicated by location specific conditions. A significant measure is the advanced warning or queue established to trigger warning device activation. Triggering devices are programmed with a standard timing sequence that represents the type of train traffic most commonly associated with the track and to provide the most achievable safety conditions. As identified in the FRA database, minimum and maximum train speeds may vary by as few as ten miles per hour to as much as sixty-nine, for the region. The greater the range, the higher the probability that the warning will occur well in advance of a train. This variation introduces the variable more closely associated with at-grade crossing incidents; driver impatience. Crossings where higher speed passenger service exists, signalization may be set to react to this faster closing rate on the crossing. Hence, when a slower moving freight train triggers the warning devices, motor vehicle operators may believe the warning device is faulty and begin to traverse the crossing. This condition leads to a high proportion of train-motor vehicle accidents.

DOT Predictive Accident Ratings, though scoring relatively low in the survey results, as stated previously, is the primary industry measure of prioritization. Though variations exist, this rating is founded on a basic formula, which for simplification, is composed of factors related to volumes of highway and train traffic, daylight train traffic, maximum train speeds, number of tracks, highway paving conditions at the crossing, and number of highway lanes. Many of the highest survey results were components of the Predictive Accident Rating; of the 14 components offered for consideration, numbers 2, 3, 4, 6, 8, and 10 are present in the rating. Daylight train activity and paving conditions are present in the attached data file provided by the FRA.

It is the recommendation of this plan that the DOT Predictive Accident Rating be the basis for jurisdictional prioritization. This measure addresses six of the top nine (when excluding the Rating itself from the rankings) identified by the survey as local concerns and will provide a common ground of exchange with the private sector.

Summary

After surveying the roadways on the proposed truck routes it appears the movement of trucks will be affected when the driver turns off the designated route and has to cross the tracks. Frequency of train movements are predicted to increase, one report estimating by as much as 88 percent by 2035. The length of trains is also predicted to increase meaning there will be longer trains more often at existing highway/rail grade crossings.

The only way to avoid delays is to eliminate the crossings by constructing overpasses or underpasses. This would be especially helpful at rail yard locations where switching operations occur. As previously indicated, this is not always practical given the density of the area and the cost of acquiring right-of-way and construction.

Closing a grade crossing is another alternative and may seem logical from an engineering perspective. This option almost always runs afoul of the political process. The local road authority and associated government body have to agree to the closure and pass a resolution accordingly. Both class I railroads and GDOT have incentive funds available to assist with closures and are willing to work with local governments to eliminate redundant crossings. In the event the local government refuses to agree to a closure, there is a state law, Code of Georgia, Section 32-6-193.1, which allows a railroad to petition the state to force the closure provided certain criteria are met. If this action is taken the local government loses any financial incentive offered.

Railroads were once the impetus for growth in communities but now are a dividing force both physically and politically. Trains provide delays, cause congestion, and are a concern during emergency response.

A systems approach should include the highway/rail grade crossing as a component of the larger transportation system. The intersection of the highway and railroad affect both vehicle and train movements. It is suggested that all counties along the proposed truck routes work with the railroads' respective grade crossing department and the GDOT to develop a comprehensive corridor project in their respective jurisdictions.

Projects

Overview

With over 1,300 miles of continuous roadway included in the ASTRoMaP System, a significant number of project locations can be identified. The process described presented a trend of common project types, which may provide local jurisdictions guidelines as to next steps. Each jurisdictional segment of the system may also hold unique challenges and thus these identified trends are not exclusive of other project types. To completely access project needs will require a thorough review of the information and data presented in the Needs Assessment, Criteria Matrix, ASTRoMaP Draft System for segments identified as less than optimal, as described by AASHTO "truck friendly" recommendations. These should be considered in conjunction with local knowledge and continuing outreach efforts with motor carrier operators within the jurisdiction, responsible agencies, and community leaders. A complete listing of all identified projects, through this plan's involvement, are available on the ARC website, within the Strategies and Recommendations document.

Trend Project Categories

Intersection Geometrics

In proportion to the overall size and length of the truck traffic, the larger the equipment operated, the greater the need for increased turning radii. Many intersections in the region were designed or constructed previous to modern truck equipment dimensions. Semi-tractor/trailer combinations now have the possibility of being up to 53 feet in trailer length alone. As the truck route incorporates intersections where two-lane routes intersect other two-lane roadways or previous functional class designation reduced the area encompassed by a given intersection, **Figure 46**, trailer "off tracking" is a concern. This presents a pedestrian safety concern, delays in negotiating the intersection, promotes reduced life for the roadway, or leads to damages to equipment and cargo.

Figure 46: Effects of Reduced Intersection Turning Radii on Truck Traffic

These projects vary significantly in cost and effort, dependent on needs of right of way acquisition, utility relocation, and other influencing conditions. An example is found on NS-E0 and is identified in the Strategies and Recommendations document as the third project on this corridor.

NS-E0-03

Route	NS-EO
Location	Intersection SR 9/Grassland Pkwy
Source	ASTRoMaP/Field Observation
Jurisdiction	GDOT
Concern	Trucks encroaching on the intersection shoulder
Proposed Actions	Interim Solution: Increase size of intersection radii
	Long-term Solution: Increase size of intersection radii, add right-turn lane on SR 9 southbound

Project ID	Concern	Project Type	County	Phase	Phase cost	Total Cost	Benefit cost ratio
NS-E0-03	Trucks encroaching on the intersection shoulder	Intersection Improvement	Forsyth	CST	$71,467.87	$267,655.31	14.58
				PE	$7,146.79		
				ROW	$97,540.65		
				UTIL	$91,500.00		

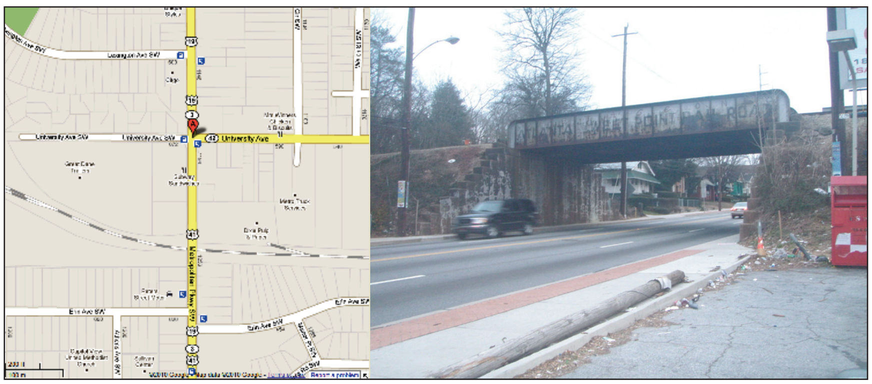
	User Benefits from Operation				User Benefits from Construction			Total User Benefits		
Segment	User Value of Time Benefits	User Operating Cost Benefits	User Accident Reduction Benefits	Agency Operating Benefits	Improved			Improved		
All Segments	**$ 114,695**	**$ 772**	**$ 2,081,199**	**$ (10,352)**	**$ (71,450)**	**$ -**	**$ -**	**$ 2,114,864**	**$ -**	**$ -**
SR 9 and Grassland Pkwy	$ 114,695	$ 772	$ 2,081,199	$ (10,352)	$ (71,450)	$ -	$ -	$ 2,114,864		
	Capital Costs			Net Benefits			Benefit-Cost Ratio			
Segment	Improved			Improved			Improved			
All Segments	**$ 145,049**	**$ -**	**$ -**	**$ 1,969,815**	**$ -**	**$ -**	**14.580**			
SR 9 and Grassland Pkwy	$ 145,049	$ -	$ -	$ 1,969,815			14.580			

Bridge Replacement

Overhead clearance and posted weight restrictions are obvious issues when introducing greater volumes and possibly greater diversity of truck and load sizes to a corridor. Recommended heights are at minimum 15 feet and load capacities should reflect legal weights. These projects are higher cost and effort where replacement is necessary, though mitigation strategies of lowered road surface may be an option to reduce cost and accommodate all truck types. An example, again on NS-E0:

NS-E0-02

Route	NS-E0
Location	SR 3/Atlanta West Point Railroad bridge near University Ave.
Source	ASTRoMaP/Field Observation
Jurisdiction	GDOT
Concern	Insufficient railroad bridge clearance of 14’-6”
Proposed Actions	Interim Solution: Do nothing
	Long-term Solution: Replace railroad bridge or lower roadway to increase clearance to 16’-6”



Project ID	Concern	Project Type	County	Phase	Phase cost	Total Cost	Benefit cost ratio
NS-E0-02	Insufficient railroad bridge clearance of 14’-6”	Bridge replacement	Fulton	CST	$2,486,484.00	$3,775,930.88	0.169
				PE	$248,648.40		
				ROW	$1,016,048.48		
				UTIL	$24,750.00		

	User Benefits from Operation				User Benefits from Construction			Total User Benefits		
Segment	User Value of Time Benefits	User Operating Cost Benefits	User Accident Reduction Benefits	Agency Operating Benefits	Improved			Improved		
All Segments	$ 170,342	$ 952	$ 241,035	$ (10,255)	$ (40,993)	$ -	$ -	$ 361,080	$ -	$ -
SR 3 near University Ave.	$ 170,342	$ 952	$ 241,035	$ (10,255)	$ (40,993)	$ -	$ -	$ 361,080		

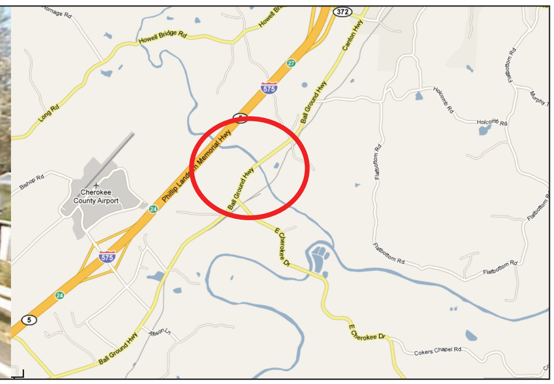
	Capital Costs			Net Benefits			Benefit-Cost Ratio		
Segment	Improved			Improved			Improved		
All Segments	$2,140,676	$ -	$ -	$ (1,779,596)	$ -	$ -	0.169		
SR 3 near University Ave.	$2,140,676	$ -	$ -	$ (1,779,596)			0.169		

Capacity Enhancement

Roadway and bridge widening are an expected form of improvement to accommodate truck traffic needs. Among the more costly, these projects should identify roadway segments where overall traffic capacity needs are observed as necessary for future growth. These projects may include travel lane addition, shoulder development, or bridge widening. An example:

NS-W1-02

Route	NS-W1
Location	Bridge on Ball Ground Hwy over Sharp Mountain Creek just south of Ball Ground
Source	ASTRoMaP/Field Observation
Jurisdiction	GDOT
Concern	Bridge width
Proposed Actions	Interim Solution: Do nothing
	Long-term Solution: Replace bridge



Project ID	Concern	Project Type	County	Phase	Phase cost	Total Cost	Benefit cost ratio
NS-W1-02	Bridge width	Bridge Replacement	Cherokee	CST	$4,553,472	$5,156,395.26	0.06
				PE	$455,347.20		
				ROW	$62,526.06		
				UTIL	$85,050		

	User Benefits from Operation				User Benefits from Construction			Total User Benefits		
Segment	User Value of Time Benefits	User Operating Cost Benefits	User Accident Reduction Benefits	Agency Operating Benefits	Improved			Improved		
All Segments	**$ 161,669**	**$ 965**	**$ 59,533**	**$ (11,102)**	**$ (14,656)**	**$ -**	**$ -**	**$ 196,409**	**$ -**	**$**
Ball Ground Hwy	$ 161,669	$ 965	$ 59,533	$ (11,102)	$ (14,656)	$ -	$ -	$ 196,409		

	Capital Costs			Net Benefits			Benefit-Cost Ratio		
Segment	Improved			Improved			Improved		
All Segments	**$ 3,270,755**	**$ -**	**$ -**	**$ (3,074,346)**	**$ -**	**$ -**	**0.060**		
Ball Ground Hwy	$ 3,270,755	$ -	$ -	$ (3,074,346)			0.060		

Pull-outs

These may be a strategy to provide temporary locations for truck traffic to attend to repairs and other stoppages which may otherwise hinder general traffic flow. An alternative use for pull-outs is for mass transit assets, city buses. This type improvement, as with capacity enhancing, shoulders additional benefits for all traffic on the specific segment. Cost-benefit analysis consistently identified these as highly beneficial to the system. An example:

NS-E1-05

Route	NS-E1
Location	North of Intersection SR 13/ Dresden Drive
Source	ASTRoMaP/Field Observation
Jurisdiction	GDOT
Concern	Bus stops at this location both north and southbound obstruct the right lane impeding the movement of traffic.
Proposed Actions	Interim Solution: Do nothing
	Long-term Solution: Add turnout lane for bus stops

Project ID	Concern	Project Type	County	Phase	Phase cost	Total Cost	Benefit cost ratio
NS-E1-05	Bus stops at this location both north and southbound obstruct the right lane impeding the movement of traffic	Turn lane	DeKalb	CST	$203,009.52	$1,828,461.99	2.497
				PE	$20,300.95		
				ROW	$1,563,151.52		
				UTIL	$42,000.00		

	User Benefits from Operation				User Benefits from Construction			Total User Benefits		
Segment	User Value of Time Benefits	User Operating Cost Benefits	User Accident Reduction Benefits	Agency Operating Benefits	Improved			Improved		
All Segments	**$ 163,677**	**$ 1,007**	**$ 394,895**	**$ (10,824)**	**$ (23,276)**	**$ -**	**$ -**	**$ 525,480**	**$ -**	**$ -**
SR 13 and Gaines Ferry Road	$ 163,677	$ 1,007	$ 394,895	$ (10,824)	$ (23,276)	$ -	$ -	$ 525,480		
	Capital Costs			Net Benefits			Benefit-Cost Ratio			
Segment	Improved			Improved			Improved			
All Segments	**$ 282,479**	**$ -**	**$ -**	**$ 243,001**	**$ -**	**$ -**	**1.860**			
SR 13 and Gaines Ferry Road	$ 282,479	$ -	$ -	$ 243,001			1.860			

Grade Separation, Rail Crossings

As discussed previously, at-grade rail crossings pose a safety and impedance factor to all types of movements associated with the crossing. Though presence on the system itself is limited, adjacent crossings are of concern. These are notably long-term and CapEx oriented expenditures requiring significantly interaction with the private sector. An example:

NS-E2-01

Route	NS-E2
Location	Intersection SR 20/SR 316
Source	ASTRoMaP/Field Observation
Jurisdiction	GDOT
Concern	Traffic backups northbound and southbound at this signalized intersection
Proposed Actions	Interim Solution: Do nothing
	Long-term Solution: Implement a grade separated interchange

Project ID	Concern	Project Type	County	Phase	Phase cost	Total Cost	Benefit cost ratio
NS-E2-01	Traffic backups northbound and southbound at this signalized intersection	Interchange	Gwinnett	CST	$20,000,000.00	$31,392,000.61	1.269
				PE	$2,000,000.00		
				ROW	$9,120,500.61		
				UTIL	$271,500.00		

	User Benefits from Operation				User Benefits from Construction			Total User Benefits		
Segment	User Value of Time Benefits	User Operating Cost Benefits	User Accident Reduction Benefits	Agency Operating Benefits	Improved			Improved		
All Segments	$ 163,677	$ 1,007	$ 394,895	$ (10,824)	$ (23,276)	$ -	$ -	$ 525,480	$ -	$ -
SR 13 and Gaines Ferry Road	$ 163,677	$ 1,007	$ 394,895	$ (10,824)	$ (23,276)	$ -	$ -	$ 525,480		

	Capital Costs			Net Benefits			Benefit-Cost Ratio
Segment	Improved			Improved			Improved
All Segments	$ 282,479	$ -	$ -	$ 243,001	$ -	$ -	1.860
SR 13 and Gaines Ferry Road	$ 282,479	$ -	$ -	$ 243,001			1.860

Other project types identified during the plan, and available in the Strategies and Recommendations document on the ARC website, include:

- Improvement of interchanges between the ASTRoMaP system and the interstate corridors
- Replacement of traditional intersections with roundabouts to solution congestion and turning radii concerns

Summary and Acknowledgements

Development of the Atlanta Strategic Truck Route Master Plan was guided by the overall goal to identify preferred routes and develop strategies to support the efficient movement of truck traffic without disproportionately impacting existing communities, the environment, or the transportation network. Working to achieve this goal, an extensive data collection and analysis process was followed and significant levels of outreach were performed. The outreach effort included public sector, private sector and community groups and incorporated those observations and suggestions where available.

The project team would like to acknowledge the assistance of:

- Residents of the region who provided invaluable assistance
- Members of the local jurisdictions, county and municipal, who provided their time and feedback to achieve a regionally oriented network
- Members of agencies associated with affected infrastructural assets
  - Georgia Department of Transportation (GDOT)
- Members of the private sector, motor carrier, transportation providers and those operating fleets within their organizations
  - Central Transport International
  - Coca-Cola
  - CSXI
  - FedEx Freight
  - Southeastern Freight Lines
  - J.B. Hunt
  - Schneider National
  - United Parcel Service (UPS)
- Contributing consultant team members
  - American Transportation Research Institute (ATRI)
  - Halcrow Group
  - Hughes Consulting
  - Sycamore Consulting Inc
  - Wilbur Smith Associates (prime)

And notably the members of the Atlanta Regional Commission.