CASE STUDY

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Winston-Salem

Innovations in Local Freight Data

Freight in Demand: Facility Data Sheds Light on Freight in a Regional Travel Demand Model

July 2016

U.S. Department of Transportation
Federal Highway Administration

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Executive Summary

Challenges

Major industries in the Piedmont region of North Carolina have shifted from the textile industry to freight and logistics. This shift, coupled with the region's location in proximity to major logistic centers, as well as key consumers in the Boston-New York-Washington, DC megaregion, have put an emphasis on the need for efficient movement of freight through the area. As such, transportation agencies in the region have been increasingly interested on freight transportation. Agencies such as the Winston-Salem Metropolitan Planning Organization (MPO) have identified freight transportation goals and needs for their metropolitan planning area. While transportation planners are turning to modeling to address these needs, the existing travel demand model, the Piedmont Triad Regional Model (PTRM), was not sufficiently describing freight flows in the region.

Approach

A project proposed by the Winston-Salem MPO was one of seven projects selected to develop and pilot innovations in local freight data under the Strategic Highway Research Program 2 (SHRP2) Implementation Assistance Program. The Winston-Salem MPO-led project was supported by members of the Piedmont Triad Regional Model Team: Piedmont Authority for Regional Transportation (PART), North Carolina Department of Transportation (NCDOT) as well as neighboring MPOs of Burlington-Graham, Greensboro, and High Point. Together, the project team completed the first of three phases to their regional freight model development plan.

This project identified freight model design and future data collection needs for the region as well as identified, tabulated, and surveyed freight facilities to support development of a tour-based truck model. To identify the model design needs, the project team first held a workshop to get an understanding of the vision for the freight model, and later completed interviews with three peer MPOs to learn from their experience in freight modeling. The project team analyzed and combined information from several common data sources to develop a freight node database. Finally, the project team supplemented the freight node database with information collected through a comprehensive survey effort targeting freight facilities in the region.

Benefits

Outcomes of this project include a database that contains geocoded records for a sample of nearly 1,000 facilities in the region, a survey capturing details for 151 freight facilities in the region, and recommendations for development and deployment of a tour-based truck model followed by a more detailed local freight data collection to support tour-based model calibration and validation. The established list of freight facilities in the region will be used to develop and conduct in-depth surveys to capture truck trip behavior in a future phase of the model development. This effort provided the foundational data necessary to better support truck data in the future truck model.

Integration Into Business Practices

Recommendations developed through this project include implementing a bi-level model that captures both long- and short-haul truck movements supported by the development of a database with consistent input data for both the passenger travel demand model and the freight model. Such a database would need to be flexible enough to allow the addition of further models (e.g., land use, environmental modeling). In addition to the progress the project team made towards their future freight model, this project provided an opportunity for the MPOs to build relationships with the local freight community. Together, the activities completed in this project represent progress toward a tour-based freight model with lessons learned applicable to other agencies embarking on similar efforts.

Introduction

Background

The close proximity of the cities Greensboro, Winston-Salem, and High Point in North Carolina's Piedmont region have led to the area being known as the Piedmont Triad, a region home to more than 1.6 million residents. In the past, the main industry of this area has been focused on textiles. However, in recent years, economic changes have led to the increase in the freight and logistics industries due to the region's location between major logistic centers in the Southeastern United States and major consumers in the Boston-New York-Washington, DC megaregion. Forecasts conducted by the United States Department of Transportation (USDOT) using the Federal Highway Administration Office of Freight Management and Operation's Freight Analysis Framework data suggest that both freight volumes and the value of freight moved through the Piedmont Triad region will increase greatly in the near future, with these estimates showing a fourteen percent increase in volume and thirty eight percent increase in value between 2012 and 2040.

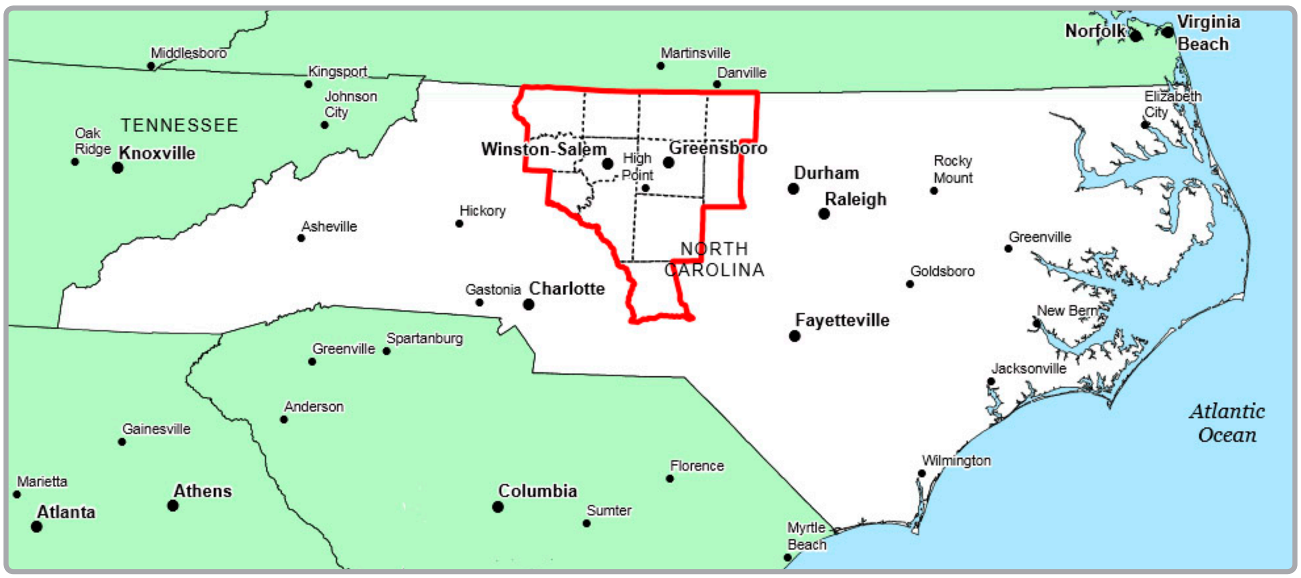


Figure 1. Piedmont Triad Region[1]

The combination of freight's importance to the region as well as its forecasted growth led the project team to initiate major activities to enhance their ability to plan for and support freight transportation needs. This team had developed strong working relationships including reoccurring meetings each year to discuss the travel demand model as well as planning potential analysis tool improvements. In addition, stakeholders from regional logistics companies have joined to form the Piedmont Triad Logistics and Distribution Roundtable to provide input for planning and policy decisions that affect freight and logistics.

The project team has developed, maintains, and updates the Piedmont Triad Regional Model (PTRM), a multi-modal four-step regional travel demand model that local agencies use to support long-range transportation planning and programming decisions. In 2014, the project team began to update the PTRM to a base year of 2013 and at the same time, the team identified the development of a freight model as a critical step toward improving freight planning capabilities in the region. The project team developed a phased approach to model development with the three phases:

[1] Winston-Salem Urban Area Metropolitan Planning Organization (2013), *2035 Transportation Plan Update. A Multi-modal Approach to Transportation Planning and Facility Investment*, Winston-Salem, NC.

1. Identify freight data needs and freight nodes (i.e., any facility that generated or attracted truck traffic) and conduct a survey to support development of improved freight modeling tools;

2. Develop a tour-based freight model in the PTRM; and

3. Conduct a travel diary survey to update the freight model developed in the previous phase.

Project Team

This project included several strong partnerships that greatly enhanced the project team's ability to complete the effort. As shown in **Table 1**, several regional entities were involved in the project, and all served in multiple roles.

Table 1. Project Team

Project Partner	Role
Winston-Salem MPO	Co-coordinator on the project, lead agency on the SHRP2 C20 Implementation Assistance Program, led all project management activities.
Piedmont Authority for Regional Transportation (PART)	Co-coordinated the project with the Winston-Salem MPO, served as the model custodian, and provided technical and administrative assistance across the entire domain of the project.
Greensboro MPO	Members of the PART Model Team, provided substantial support during the project development process and technical assistance across the entire domain of the project.
High Point MPO	
Burlington-Graham MPO	
North Carolina Department of Transportation (NCDOT)	As a member of the PART Model Team, the NCDOT provided similar support as the MPO partners. In addition, the NCDOT's Model Team acted as a sounding board to support model development and provide technical support. The NCDOT also provided administrative support with agreements and contract management.
Federal Highway Administration	Provided coordination support as well as technical and administrative guidance.

Objectives

The project team identified three objectives to develop and refine a freight model for the region. The key objectives and work approach are detailed in **Table 2**.

Table 2. Key Objectives and Work Approach

Objective	Work Approach	Outcomes
Understand the data needs for a tour-based truck model	Conduct a workshop, literature review, and complete interviews with peer agencies	Model design recommendations and Phase III data collection recommendations
Identify freight facilities in the region	Complete an extensive review of commonly available data sources to locate freight facilities	Freight node database
Document characteristics of the region's freight facilities	Survey freight facilities	Detailed information on freight nodes in the region

Process

Project Management

The successful management of this project had several key components. To begin, the project team had a history of working together as demonstrated through the working group that was established to develop and maintain the travel demand model. The project team also had agreed on a clear goal in developing a tour-based freight model and understood that they would not accomplish this goal in a single effort. Instead, the project team developed a phased approach with each phase resulting in a step towards the overall goal. The project team acknowledged the necessity for freight data collection and modeling expertise and hired a consultant to fill this need.

Project Implementation

The project included four major activities. The first activities were model design and freight node identification. Following the completion of both of these activities, the project team surveyed the region's freight facilities. Finally, the project team developed recommendations for future data collection.

Model Design

The project team held a workshop to discuss and assess how stakeholders in the region anticipate using the freight model to evaluate local and regional policies and programs. Since the project team members had already spent considerable time developing their goals and needs for a freight component of the model, this workshop served as an opportunity for the team members to share their views with the consultant. During the workshop, the consultant focused their learning on the long-term vision and the project team's thoughts on challenges, opportunities, and needs for the model. From this meeting, the project team developed a freight model framework for the region by conducting a literature review and outlining different alternatives and their implications.

The model design effort clearly articulated the available data sources for the model, the design alternatives, and the implications of the different alternatives. Typically, freight-related transportation behavior occurs differently on different geographic scales. Long-haul freight often has a single origin and destination while freight-related movement on a smaller geographic scale often is better represented as a chain of trips, such as a delivery vehicle stopping at several locations before returning to its origin. The project team recommended a bi-level model to capture freight movement on these two geographical scales. The first layer of the model would be freight movement across North America (i.e., long distance) and the second layer would be freight moved within the Triad region (i.e., short distance).

The project team recommended that items common to both the PTRM and the freight model should be identified and a common database built to capture these items to assist in the model development and future updates. Examples of common items include multi-modal transportation networks, household and population data, establishment data, and macroeconomic data.

Finally, the project team provided detailed information on several alternatives to other freight modeling components dependent on the needs and in-house capabilities of PART and their partners. A detailed description of the benefits, limitations, data requirements, staff requirements, and cost implications were provided for each of the components. The alternatives, benefits, and limitations are listed in **Table 3**.

Table 3. Model Alternatives Developed by the Project Team

Model Component	Alternatives	Benefit	Limitation
Economic and Trade Forecasts	Fixed forecasts	Easy to implement.	No economic scenarios can be analyzed.
	TREDIS format	NCDOT has contracted with TREDIS to provide economic forecasts.	TREDIS is proprietary and delivered as a "black box" limiting the options for adjusting forecasts.
	ECOS forecast adjuster	Economic scenarios can be developed in-house.	The tool depends on reasonable assumptions of future development.
Short-Distance Freight Flows	Trip-based model	The trip-based model is easier to implement than a tour-based model.	Modeling trips is a simplification of representing truck tours.
	Tour-based model	The tour-based model is the only approach to represent actual truck travel behavior.	Tour-based models heavily depend on quality data inputs. Establishment surveys are mandatory.
Long-Distance Freight Flows	Borrow from NCSTM	A simple solution to provide freight flows by mode and commodity across North America.	NCSTM flows are based on FAF data that have been disaggregated and processed.
	Commodity flow model	Model allows testing economic scenarios more realistically.	Commodity flow models treat flows between two firms independent from growth or decline in other industries.
Truck types	Based on vehicle type	Most truck counts are collected by number of axles and/or units.	It is difficult to convert trucks by vehicle type into weight categories, which are more commonly used in environmental impact modeling and highway maintenance programs.
	Based on weight class	Environmental models prefer working with trucks by weight as a better indicator of emissions than number of axles.	Most truck counts are provided by vehicle types, making it challenging to validate trucks defined by weight.
Mode Choice	Do nothing	Simplifies model.	Modal split of commodity flows is static and not scenario sensitive.
	Rule-based	Allows representation of mode shift for selected flows.	Model depends on rules defined by freight experts.
	Modal diversion	Model can be estimated based on local data and reflect observed conditions.	Modal diversion models are limited to scenarios they have been calibrated for.
Assignment	Equilibrium assignment	Established methodology that performs reasonably fast and generates reasonable traffic flows on the aggregate.	Absolute speed is known to be represented rather poorly.
	Dynamic traffic assignment	Method allows representing individual vehicles.	Tends to increase runtimes significantly.

Please note: **TREDIS** - Transportation Economic Development Impact System, **ECOS** - Economic Scenario Generator, **FAF** - Freight Analysis Framework, **NCSTM** - North Carolina Statewide Transportation Model

Freight Node Identification

The project team identified freight nodes (e.g., any facility attracting or generating truck traffic) by locating freight generators and handlers using chamber of commerce data available from each of the 11 counties in the Piedmont Triad region. Using this preliminary list of freight nodes, the project team researched and verified the presence of each facility through company websites and other Internet sources and matched the facility with information in the InfoUSA database to capture the NAICS code and total number of employees. The freight traffic flows at each facility were classified (e.g., small, medium, large) based on local knowledge of traffic and typical vehicle size. At this stage, the database included 661 freight facilities and information on:

- Location (street address, city, county)
- Contact (name, phone, contact person)
- Type (industry sector, facility type, primary commodity)

After further review, the project team observed that the database was missing several important freight facilities in the region due to gaps in the chamber of commerce data. To address this gap, the team reviewed freight nodes identified in a geographic information systems (GIS) database of freight facilities developed in conjunction with the North Carolina statewide model, conducted Internet searches, and reviewed aerial imagery of the region. These additional efforts added 335 freight nodes to the database.

Several of the original 661 freight facilities were no longer active and were removed when the database was finalized. The finished database provides the project team with comprehensive coverage of freight facilities in the Piedmont region containing a wealth of information about 968 freight nodes. Each freight node was geocoded to allow the locations of the freight nodes to be presented graphically (shown in **Figure 2**). The process to update the database is straightforward and reoccurring updates can be built into existing practices. Keeping the database current will not only maximize the usefulness of the artifact, but also serve as a historical record of freight facilities in the region and may further assist decision makers and planners in understanding the growth of freight facilities in the region. More information on the database can be found in the Resources section of this case study.

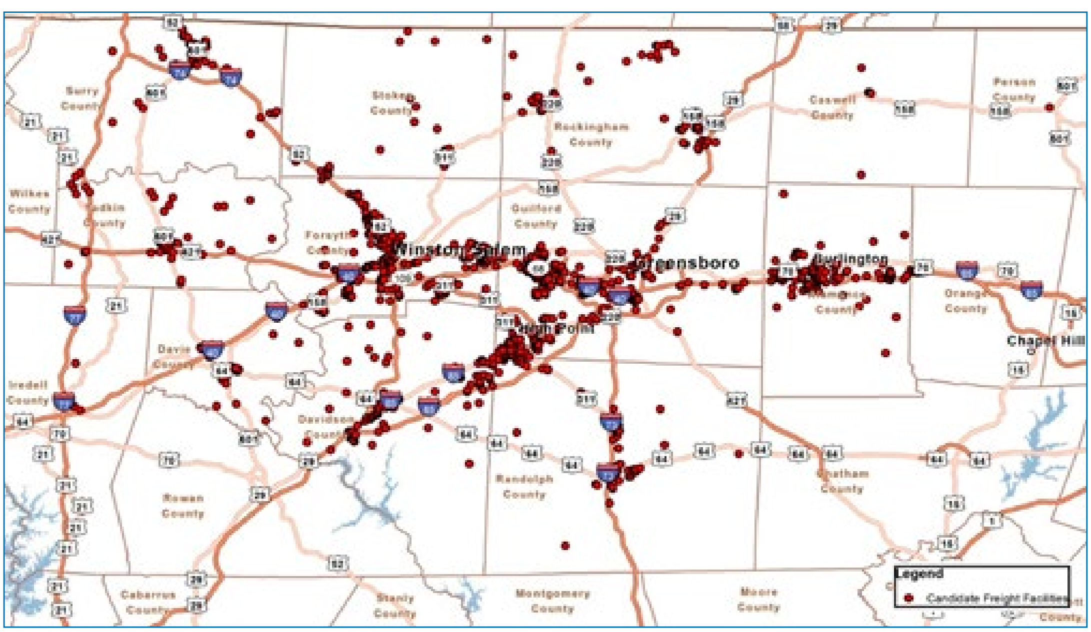
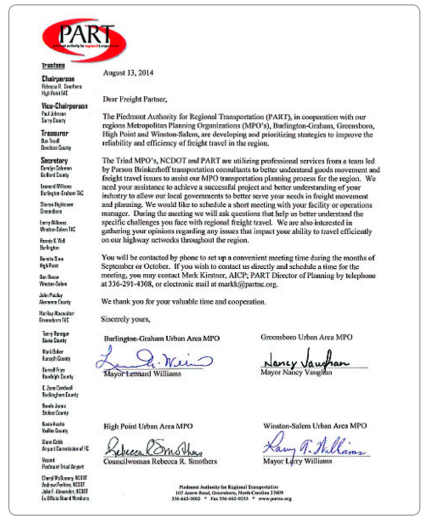


Figure 2. Freight Facilities Captured in Freight Node Database

Surveys

With the freight node database illustrating the available freight facilities in the region, the project team developed a sampling plan to select freight facilities to be surveyed. Before the team selected a random sample of facilities, the project team identified any facilities that had previously shown interest in participating in the survey effort and labeled these facilities as "preferred." This list of preferred facilities was reviewed to determine if they fit with the project team's sampling objectives. Including preferred facilities, where possible, is useful as the project team's experience has shown that individuals interested in participating will be more likely to provide responses, and the responses will be of higher quality. A random sample of the remaining facilities was developed and combined with the list of preferred facilities to generate the survey sample selection.


August 13, 2014

Dear Freight Partner,

The Piedmont Authority for Regional Transportation (PART), in cooperation with our regions Metropolitan Planning Orgnaizations (MPO's), Burlington-Graham, Greensboro, High Point and Winston-Salem, are developing and prioritizing strategies to improve the reliability and efficiency of freight travel in the region.

The Triad MPO's, NCDOT and PART are utilizing professional services from a team led by Parson Brinkerhoff transportation consultants to better understand goods movement and freight travel issues to assist our MPO transportation planning process for the region. We need your assistance to achieve a successful project and better understanding of your industry to allow our local governments to better serve your needs in freight movement and planning. We would like to schedule a short meeting with your facility or operations manager. During the meeting we will ask questions that help us better understand the specific challenges you face with regional freight travel. We are also interested in gathering your opinions regarding any issues that impact your ability to travel efficiently on our highway networks throughout the region.

You will be contacted by phone to set up a convenient meeting time during the months of September or October. If you wish to contact us directly and schedule a time for the meeting, you may contact Mark Kirstner, AICP; PART Director of Planning by telephone at 336-291-4308, or electronic mail at markk@partnc.org.

We thank you for your valuable time and cooperation.

Sincerely yours,

Burlington-Graham Urban Area MPO
Mayor Leonard Williams

Greensboro Urban Area MPO
Mayor Nancy Vaughan

High Point Urban Area MPO
Councilwoman Rebecca R. Smothers

Winston-Salem Urban Area MPO
Mayor Larry Williams

Figure 3. Survey Introduction Letter Shared with Survey Candidates

Before conducting the surveys, the project team completed several preparation activities. First, the team developed letters indicating the purpose of the survey, which were then sent to each of the potential survey candidates. The letter, signed by the mayors in the region and PART Chairperson, clearly stated the project partners, the project purpose, and invited the survey candidates to participate in the survey. The project team also conducted on-site interviewer training to provide consistency across the survey teams and to go over basics such as roles, logistics, and survey etiquette.

Findings from the survey add depth to the freight node database by providing additional insight into truck movements to and from the facilities. Through the survey process, the project team contacted more than 800 of the 968 freight facilities listed in the database. The process resulted in the collection of 151 completed surveys representing the distribution of the freight facilities in the region as captured by the completed freight node database. Based on the survey findings, the project team developed averages for employment, building square footage, number of truck bays, and daily truck traffic, shown in **Table 4**.

Table 4. Freight Carrier Survey Results: Average Values by Facility Type

Node Type	Sample Size	Avg. Full Time Employees	Avg. Building Square Footage	Avg. Number of Truck Bays	Avg. Daily Trucks
Distribution Center	48	105.6	161,595	32.2	36.9
Intermodal Facility	20	137.2	92,998	43.6	85.5
Retail	12	24.9	40,108	3.8	8.7
Shipper	78	146.6	138,226	13.0	16.3

The project team identified several relationships within this data that could aid transportation planners. One of these relationships was the relationship between daily truck trips (i.e., number of trucks entering the facility per day) and the number of truck bays present at a freight facility. This relationship, grouped by facility type, is presented in **Figure 4**. The analysis shows that the statistical strength of the relationship varies with facility type, but retail centers, distribution centers and intermodal facilities have strong relationships with the number of truck bays and truck trips per day. This relationship is useful to transportation planners because the number of truck bays at a facility can be determined quickly with a visual inspection of publicly available aerial images, providing planners with a technique to develop a rough estimate of truck trips that may start or end at a given facility.

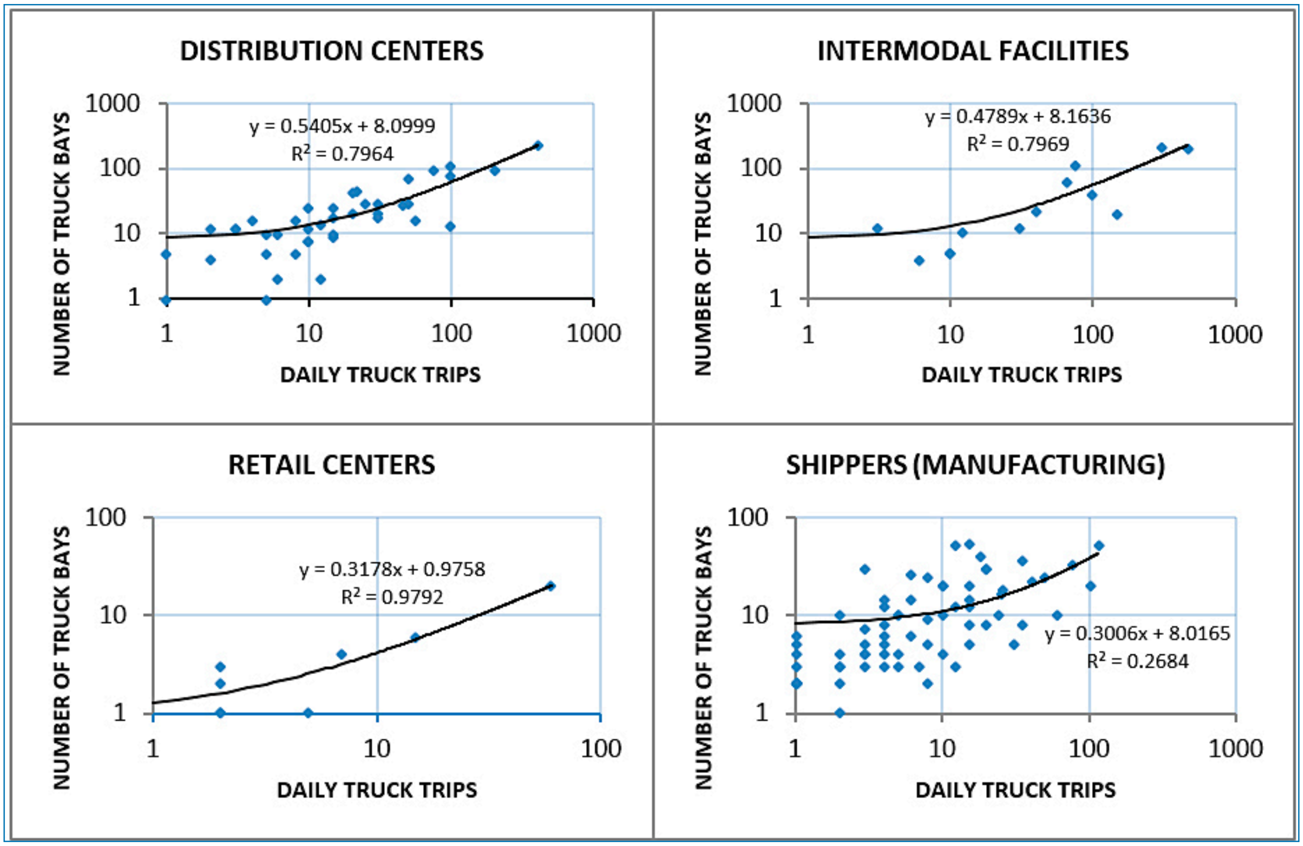


Figure 4. Relationship between Daily Truck Trips and Number of Truck Bays

Peer MPO Data Collection

To develop data collection recommendations, the project team leveraged the experiences of several of their peers. The project team conducted interviews with three MPOs well known in the United States for their advanced efforts in freight modeling: Atlanta Regional Commission (ARC), the San Diego Association of Governments (SANDAG) and the Maricopa Association of Governments (MAG).

ARC is using proprietary data from TranSearch to develop freight flows, and data from the American Transportation Research Institute (ATRI) to model freight tours. During the interview with SANDAG, the project team discussed SANDAG's recent establishment survey; SANDAG used InfoUSA data to develop a survey sample of firms in the MPO's region. For industries where SANDAG did not receive a sufficient sample size, SANDAG used survey data from Calgary, Alberta that SANDAG found provided truck volumes that could be validated fairly well in the SANDAG region. Lastly, MAG indicated that they had completed a truck survey in 2007, but found the results of the survey effort of limited use due to challenges with respondents' willingness to complete the surveys. Instead, MAG developed their tour-based model for heavy trucks using ATRI GPS data.

The project team, through a combination of their own expertise and findings from the stakeholder interviews, developed a list of recommended data fields that should be collected during Phase III of this effort. The fields recommended for Phase III data collection are shown in **Table 5** and will allow the project team to work swiftly as they move forward in developing their freight model.

Table 5. Recommended Data Fields for Phase III Data Collection

Type	Data Fields
Establishment	▪ Location (street address, should be filled in before survey is delivered to establishment) ▪ Industry classification ▪ Number of employees (absolute number and full-time equivalents) ▪ Main commodities shipped or main services provided ▪ Number of vehicles by type ▪ Number of truck deliveries or service visits received on an average day (such as delivery of raw materials, parcel service, trash truck, etc.)
Travel	▪ Departure location (establishment, home, other) and time ▪ Vehicle type ▪ Cargo loaded at time of departure (commodities and approximate quantity) ▪ For every stop, the driver should note: • Arrival time • Stop location (street address) • Stop purpose (unload cargo, load cargo, provide service, refueling, lunch, etc.) • Stop duration

Outcomes

Project Benefits

One of the primary benefits of this project was the improved understanding of freight movement in the region. However, this project also produced several other important benefits for the project team. For one, while information on truck trips will not be collected until Phase III, the information collected in this project provides insight into the region's truck demand, and this knowledge can inform the long-range transportation plan and project prioritization, develop performance measures, and assist in developing land-use forecasts. In addition, improvements to the region's freight data provide more insight into the freight facilities in the region, which will lead to improved decision making.

This project also aided in conveying the importance of freight in the region. Locating and quantifying the freight facilities in the region as well as freight-related employment can show how freight-related jobs support the region and assist transportation agencies in promoting freight transportation as a job creator. Further, the combination of land use information and the georeferenced database can assist planners and decision makers in identifying suitable locations for additional freight clusters in the region and attracting businesses to these clusters.

Activities completed under this project developed partnerships and improved collaboration between the public and private sector in the region. Prior to this study, project team had assumed their chamber of commerce data was comprehensive; however, they quickly learned there were many gaps in the list. This project developed a vastly improved list of freight facilities. The project team intends to keep new private sector contacts engaged using freight-related roundtable meetings and other updates in order to facilitate future activities requiring private sector input, such as Phase III of the modeling effort. In addition to the public-private sector collaboration, findings from this project can serve to facilitate public sector collaboration. Outcomes of this project can also serve as input to both the NCDOT's statewide model as well as State Freight Plan updates, providing the MPOs in the region a clear opportunity to work with the State on freight-related improvements.

Transferability of the Project

The activities completed by the project team can be readily implemented in other locations interested in improving the quality of their freight data, developing a freight model, or both. The majority of the data sources used in this project are publicly available, and the lessons learned from the data collection process can be used by other agencies to increase efficiencies in the data collection process.

Lessons Learned

The key lesson learned through this project is the caution that must be taken when relying on a single dataset. The initial approach to populating the freight node database relied on freight facilities listed in the chamber of commerce data available from each of the 11 counties in the Piedmont Triad region. The project team was able to increase the number of records in the database by nearly fifty percent from the initial iteration when they expanded to include additional data sources. Business listings and chamber of commerce data are a useful starting point for identifying freight facilities, and can be greatly improved with other publicly available sources (e.g., Internet searches and aerial images). However, care should be taken when using Internet searches and aerial images as the team found that information collected through these sources typically had less accurate name, street address, and status information or could be outdated. To overcome this issue, the project team typically identified and corrected errors as they visited the facilities in person to administer the survey.

The project team learned several lessons with regard to the data collection process. The original survey administration plan included contacting each freight facility and scheduling a day and time where to visit the facility and administer the survey. Early in this process, the project team ran into a number of issues resulting in a very low (approximately seven percent) survey response rate. The reason for this is that it was often difficult to reach the facility's contact on the initial phone call, and several follow-up phone calls were typically required to reach the appropriate individual. The project team made modifications to the survey process to improve the response rate by revising the survey to include only the most valuable information and where possible, pre-populating the survey for each freight facility. Instead of attempting to schedule a time and date for the survey, the project team visited each facility unannounced making contact with personnel at the site to determine if an appropriate individual was available to complete the survey. If an appropriate person was not available, the project team left a self-addressed and stamped envelope along with the pre-populated survey for the appropriate individual to fill out and return to the project team.

The project team attempted several other approaches (e.g., visiting freight-related meetings in the region to distribute surveys and reach out to the North Carolina Truckers Association), but visiting the freight facilities in-person received the highest response rate. By the end of the study period, these modifications improved the response rate from approximately seven percent to nearly thirty percent.

Next Steps

The conclusion of this project marked the end of the first of three phases to develop a tour-based truck model in the PTRM. The next major step for the project team members will be to develop the freight model. The project team has already completed a work plan for this activity, and their immediate next step is to begin drafting the scope of work and schedule for the freight model. Once the project team has completed the freight model, the third and final phase will be to collect additional local freight data to refine the model.

Conclusion

This project represents a successful approach to freight data collection and model development. Working with several partners in the region, the project team laid the foundation for developing a freight model for the region. Outcomes of this project include a database that contains geocoded records for nearly 1,000 facilities in the region, recommendations on the development of a tour-based truck model, a survey capturing details for 151 freight facilities in the region, and recommendations that detail data required to fine-tune the tour-based truck model to characteristics specific to the region. Activities and lessons learned through this project are readily applicable to many other regions of the country, and the approach used by the project team could be replicated elsewhere by others looking to improve their understanding of freight in their region.

Product Information

Product Title: SHRP2 C20: Innovations in Local Freight Data

Agency Name: Winston-Salem MPO with support from the Parsons Brinckerhoff Consultant Team

Contact Information:

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Resources

This section includes resources and related project documentation.

Data Sources and Descriptions

The data sources used in this project are shown in **Table 6**.

Table 6. Project Data Sources

Activity	Data Sources	Data Description
Model Design	Stakeholder input	The project team held a workshop to capture the model needs from a wide range of stakeholders
	Literature review	A review of the state of the practice of freight modeling and data collection
Freight Data Collection Recommendations	Stakeholders interviews	The project team conducted interviews with three MPOs well known for their advanced efforts in freight modeling
Freight Node Identification	County chamber of commerce data	Business listings were investigated for the presence of freight facilities
	InfoUSA Database	Information on NAICS codes and total number of employees were captured from this database
	NC Statewide Transportation Model (NCSTM) Data	The NCSTM contained geo-referenced warehouse and distribution facilities specific to the Triad region that were further investigated to determine if the location was appropriate to capture as a freight facility
Surveys	Aerial imagery	Publicly available aerial images of the freight facility
	Internet searches	Information on the freight facility's website
	Freight facility personnel	Data collected through the survey

Interview Questions

1. Date and Time: ______
2. Interviewer names: ______
3. Interviewee names: ______
4. Name and address of establishment: ______
5. What is the NAICS code for this establishment (filled out before)? ______ ☐ Site verified
6. Names of people present: ______
7. How many full time employees work at this facility? ______
8. What is the square footage of this facility (all buildings combined)? ______
9. Can you tell me the number of truck bays at this facility?
10. What are your hours of operation? ______
    Is that the same time that trucks are allowed to enter your facility? ______
11. Do you have direct rail access at this facility? If yes, what is the approximate percentage of product shipped by rail? ______

12. Do you have a primary "inbound" commodity? If yes, ____________________

    (If no) Can you tell me your top three? ____________________

13. Is your "outbound" commodity different? If yes, ____________________

14. On a typical day, how many trucks enter and leave this facility? ____________________

    (Enter) ____________ (Leave) ____________

    If there is no "typical" day, is there a day of week or seasonal variation? If yes, describe:

15. Can you tell me the approximate percentage of trucks by type that operate through this facility?
    Container truck: ____________
    Conventional 5axle trailer trucks: ____________
    Single-unit trucks: ____________
    Tankers, flat beds, or other large specialty trucks: ____________
    Delivery vans: ____________

16. Do you have any recurring origins or destinations in the Triad region such as an intermodal facility? ____________________

    If Yes: Can you tell me the approximate location of that facility and how many trips per day are typical (use map and write down area number)
    Area Number: ____________ Trips per day: ____________
    Area Number: ____________ Trips per day: ____________
    Area Number: ____________ Trips per day: ____________
    Area Number: ____________ Trips per day: ____________
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    Area Number: ____________ Trips per day: ____________
    Area Number: ____________ Trips per day: ____________

17. Do the truck operators report any re-occurring traffic related problems such as safety (blind spots), traffic congestion, etc.? ____________________

18. Do you have any additional comments or suggestions to convey to the transportation planners for the region as they explore investment decisions that promote efficient freight travel?

    ____

OTHER NOTES:

____

Mail Back Questionnaire

The Piedmont Authority for Regional Transportation (PART), in cooperation with our regions Metropolitan Planning Organizations (MPO's), Burlington-Graham, Greensboro, High Point and Winston-Salem, are developing and prioritizing strategies to improve the reliability and efficiency of truck travel in the region.

The Triad MPO, NCDOT and PART are utilizing professional services from a team led by Parson Brinkerhoff to better understand goods movement and freight travel issues to assist our MPO transportation planning process for the region. We need your assistance to achieve a successful project and better understanding of your industry to allow our local governments to better serve your needs in freight movement and planning. Please answer the following questions at the bottom of this page, place the page in the pre-stamped envelope, and drop this in with your outgoing US mail. Your information will not be shared with anyone outside of the project participants. Results of the survey will be used to improve truck and freight transportation in the Triad region.

Approximately how many full time employees work at this facility?

What are your hours of operation for receiving or dispatching trucks?

If you have direct rail access at this facility, what is the approximate percentage of product shipped in by rail?

What types of products or materials are brought in by truck? (List major types)

What types of products or materials leave by truck? (List major types)

On a typical day, how many trucks enter this facility?

Can you list the approximate percentage of trucks by type that enter this facility?

Container truck: ______________________________ (%)

Conventional 5 axle trailer trucks:______________ (%)

Single-unit trucks:_____________________________ (%)

Delivery vans: ________________________________ (%)

Other:____ (%)

Do the truck operators report any re-occurring traffic related problems such as safety, traffic congestion, etc.?

Do you have any additional comments or suggestions to convey to the transportation planners for the region as they explore investment decisions that promote efficient freight travel?

For questions regarding this survey, please contact XXXXXXX.

Freight Node Database Fields

Table 7 below shows the field names and description of each database field.

Table 7. Freight Nodes Database Fields

Field Name	Description
ID	TransCAD unique ID
Longitude	Record longitude
Latitude	Record latitude
RecordID	Unique record ID (matches RecordID in survey database)
Source	Source of the Freight Node data
SurveyComp	Survey completed by
Status	Type of survey administered
Name	Name of the Freight Node
Address	Address for the Freight Node
City	City for the Freight Node
County	County for the Freight Node
FacType	Facility Type
Category	Facility Category (Distribution Center, Intermodal Facility, Major Shipper, Retailer)
Commod	Freight Node primary commodity
Bays	Number of truck bays (per aerial image)
BldgSF	Building square footage (per aerial image)
MapLink	Web link for Freight Node location
IndustrySector	NAICS Industry Sector
InfoUSA_ID	ID from InfoUSA database
InfoUSA_Name	Freight Node name from InfoUSA database
InfoUSA_NAICS	Full NAICS code from InfoUSA database
3-digit_NAICS	Derived from 8-digit InfoUSA code
PTRM_NAICS_Group	NAICS code grouping used for PTRM
InfoUSA_Emp	Employment as reported in the InfoUSA database

Technical Documentation

- Piedmont Authority for Regional Transportation (2015), Piedmont Triad Freight Study, Greensboro, NC. Available online at: http://www.cityofws.org/Portals/0/pdf/transportation/forms-reports/mtp/2015TriadFreightStudyReport.pdf. Last accessed December 22, 2015.

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

The second Strategic Highway Research Program (SHRP2) is a partnership of the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the Transportation Research Board (TRB). TRB completed the research, and now FHWA and AASHTO are jointly implementing the resulting SHRP2 Solutions that will help the transportation community enhance productivity, boost efficiency, increase safety, and improve the reliability of the Nation's highway system.

For More Information

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Learn more about the SHRP2 program, its Capacity focus area, and Freight Demand Modeling and Data Improvement (C20) products at www.fhwa.dot.gov/GoSHRP2/

STRATEGIC HIGHWAY RESEARCH PROGRAM
U.S. Department of Transportation Federal Highway Administration
American Association of State Highway and Transportation Officials - Transportation Research Board

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