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# Appendix F

*Data Needs and Methodology for a Modal Diversion  
Analysis*

# Data Needs and Methodology for a Modal Diversion Analysis

A key finding of the Vermont Statewide Freight Study was that Vermont is heavily dependent on trucks for the movement of freight. Trucks represent over 90 percent of the tons of freight moved on an annual basis into, out of, and within Vermont. This is also true for Chittenden County. This is of great concern to the CCMPO, VAOT and the general public. It is for this reason that the VAOT and CCMPO included a task to look specifically at identifying what would be necessary to develop a truck-to-rail diversion model. The objective of this section is to outline the basic methodology for constructing a modal diversion model and to define the data elements required to conduct a detailed analysis. This task was completed as part of the Vermont Statewide Freight Study. However, the data needs and approach outlined below are relevant to Chittenden County as well.

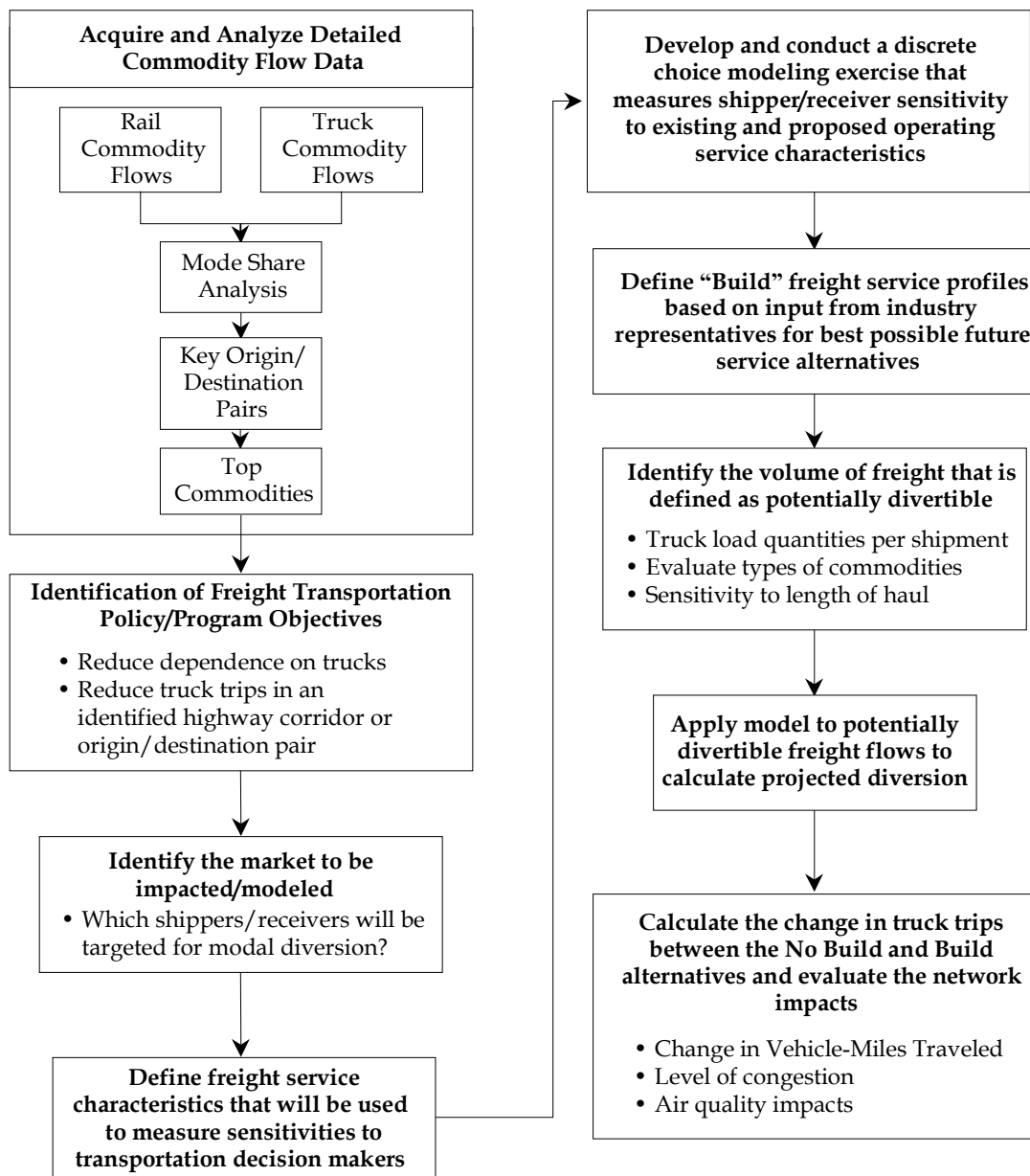
## ■ Overview of Modal Diversion Modeling

In order to effectively develop and implement a modal diversion model, four key elements must be addressed. They consist of market definition, data requirements and data collection, development and application of the diversion model, and application of the model outputs to a network analysis tool. Although each of these components may separately provide some benefit to the CCMPO and VAOT, it is necessary to address all of them to complete a thorough modal diversion analysis. Figure F.1 illustrates the steps in developing and applying a truck-to-rail modal diversion and transportation system impact model. The following describes the sequence of analytical steps that should be employed to complete this type of analysis.

The first step in a modal diversion analysis is to identify a specific corridor or market to be tested. This type of analysis cannot be undertaken in a general, non-specific way. A type of movement/operation must be defined. Data is then collected and analyzed to address the selected scenario. This is critical because the stated-preference survey, discussed below, will be designed to estimate the shippers'/receivers' sensitivities to specific transportation service alternatives.

For example, to measure the potential diversion from truck to rail of granite shipments originating in Barre and destined for a Canadian port, the analysis would need to be designed to define existing truck and rail service characteristics in that corridor, identify potential rail improvements (service, infrastructure, etc.), and then identify shippers/receivers currently moving granite between these two points. Users would then be engaged in a preference exercise to identify sensitivities to service characteristics. These preferences will populate a stated-preference model. The stated-preference model will be applied to specific potential future service alternatives (with unique service attributes) and the potential market to calculate the likely diverted freight shipments.

**Figure F.1 Truck-to-Rail Diversion and Transportation System Impact Model Development and Application**



The second step of the analysis is to identify the data requirements necessary to build the models and develop a data collection plan to accommodate these needs. Table F.1 provides an overview of the data requirements. The commodity flow data purchased by VAOT from Reebie Associates provides base data with three future years. These data sets represent current and future freight flows under anticipated economic and demographic growth forecasts. Thus they would represent “no-build” conditions as they do not account for any major infrastructure enhancements or modal shifts. Other data components would include detailed transportation service characteristics for “no-build” and “build”

alternatives, conversion factors to go from tons to units, stated-preference survey data, and truck trip tables for use in the statewide travel demand model. The stated-preference survey data would be used to estimate sensitivity to rail/truck level of service and forecast changes in truck market share in response to improvements in travel time, reliability, and cost for freight transportation alternatives. The truck trip tables developed as part of the truck freight model would be used as the base against which the impact of diverted tons/trips would be analyzed.

**Table F.1 Data Needs for Truck-to-Rail Modal Diversion Modeling**

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**Definition of Market**

- Origin/destination pairs
- Types of commodities
- Size of shipment load

**Market**

- Commodity flow data for defined market area
- Conversion factors for tons to units calculation (i.e., Vehicle Inventory and Use Survey)

**Service Sensitivities**

- Stated-preference survey results for defined market
  - This will consist of data intensive surveys with shippers/receivers that meet the market definition

**Alternative Levels of Service**

- Level of service matrices for each defined alternative
  - Development of new/future service alternatives should be based on private sector expertise, ideally from the transportation service providers
  - Future alternatives should be based on desired goals/ objectives of transportation policy

**Impacts**

- Truck trip tables for each alternative to model highway impacts and other secondary impacts such as air quality
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The third step of the analysis is to develop a mode choice model. This is developed from the stated-preference survey data and is the core of the modal diversion analysis. The model should be sensitive to all policy-related factors (i.e., time, cost, reliability, etc.) expected to differ between the “no-build” and “build” alternatives. The model’s level of service defined for both the “no-build” and “build” alternatives also will need to be produced at the desired level of origin and destination (O-D) detail.

A choice survey presents respondents with a series of future choices (in this case, the transportation mode they would use to ship their products) in which service attributes such as travel time, cost, and reliability are systematically varied. The results are input to a mathematical model which determines the tradeoff points among the attributes where the respondents will change mode.

This technique is typically used to forecast consumer response to products and services which do not presently exist. Applications of this technique include new public transportation services, such as a rapid transit system in a region with only bus service today, or innovative consumer products such as cellular telephones and paging devices. The advantage of this approach compared to standard survey techniques is that it does not simply rely on what a respondent says they might do, but quantitatively tests these responses against a defined set of service attributes. In these choice surveys, different shipping alternatives would be described in terms of the attributes that describe the alternative – travel time, cost, reliability, frequency of service, delivery window, destination in the defined Vermont region, and any physical changes to the infrastructure impacting route selection. In the choice surveys, the values of each of these attributes are systematically varied, asking the shipping decision-makers to choose an alternative under varying levels of service. This information is then estimated to identify how shipping decision-makers tradeoff the attributes when making their shipping decision. Finally, these models are applied to estimate how shippers would make their decisions for the actual proposed new freight transportation alternatives.

The fourth and final step of the analysis is to incorporate the output data from the mode choice model into the travel demand model. The Vermont truck freight model consisting of truck trip tables created as part of this study are the most reliable source to assess changes in demand forecasts. The freight model uses the accepted statewide travel demand model developed for all vehicles. Using this model ensures consistence in the planning practices in Vermont and will facilitate more rigorous analyses, such as congestion and air quality impacts. This will allow CCMPO and VAOT to measure the impact of the build alternatives as they relate to vehicle-miles of travel, levels of congestion (V/C ratios), and secondary impacts such as the change in vehicle emissions.

## ■ Data Collection and Data Requirements

### Survey Sampling Plan

The sampling plan requires the development of a cost-effective approach that can be implemented in a timely manner. Therefore, it targets those shippers most likely to divert to rail. The sample is limited to shipments which must travel in the defined corridor, are not already on rail, have an origin and/or destination within the specific Vermont region, and are at least truckload size. The logic behind this criteria is described below.

The analysis should not be limited to traditionally “rail-bound” commodities but looks instead at all commodities which move in significant quantities into or out of the region and which are not already on rail. In addition, the diversion potential would not be assessed based on national trends but rather on the specific responses of Vermont-based shipping/receiving decision-makers.

The survey focuses on those shippers/receivers currently sending truckload or greater sized shipments via truck to/from points in the Vermont region. Shippers currently using rail would be excluded based on the assumption that they will continue to use rail if service

improves. Essentially, rail will attract (at least) 100 percent of the share that it currently achieves. Shipments to/from points in the Vermont region will either continue to use existing rail service or will use the new service.

Shippers currently making less than truckload size shipments would be excluded. Rail is not economically viable for shipments of this size, so it is assumed that 100 percent of the less-than-truckload size shipments will remain truck trips. To account for the combination of a series of less than truckload size shipments into truckload shipments, the distribution centers where this would occur should be surveyed, as well.

The survey sample should be based on shippers/receivers in the defined region. The geographic regions for which Vermont has commodity flow data are shown in Section 2.0 in Figures F.2 and F.3. Receivers should be used as a starting point for the survey sample and data should be collected on the shipments that they receive. The key to developing accurate results will be identifying the decision-maker responsible for choosing how these shipments arrive. This decision-maker should be the one to complete the choice experiments concerning their potential use of new freight transportation alternatives. (An example recruiting questionnaire used for the Cross Harbor Freight Movement Major Investment Study is provided at the end of this appendix.) Data collected from the qualitative interviews conducted as part of Regional and Statewide Freight Studies, will be used to understand key transportation considerations for the region.

This analysis would focus on U.S. and Canadian shipments which either originate in, are destined for, or have both an origin and destination within the defined Vermont market area. This area is the same as the geographic dimensions of the commodity flow database. This includes intraregional shipments that have **both** an origin and a destination within the region, and interregional shipments that have **either** an origin or a destination in the region. In the case of interregional shipments, the shipments originate in or are destined for one of the internal Vermont counties, based on the market area being tested. Since intraregional shipments tend to be short, it is expected that the results of the choice exercise would find the most diversion potential exists from the interregional trips, which account for approximately 42 percent of all commodity movements in the state.

An analysis of through traffic potentially could be a key component of this type of analysis, given Vermont's geographic location, and based on the relative importance of through trips to the volume of freight moving on Vermont highways (35 percent of all freight flows). However, identifying shippers/receivers located outside Vermont that ship products through Vermont would be a more difficult and expensive task. It would require clearly-defined freight alternatives with potential benefits that are expected to benefit the larger regional traffic flows.

The manufacturing and wholesale Standard Industrial Classification (SIC) codes<sup>1</sup> should be used to identify likely receivers of the survey in the Vermont market. Businesses receiving

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<sup>1</sup>The Standard Industrial Classification (SIC) system is the federal classification system created by the U.S. Office of Management and Budget for reporting business statistics. SIC codes are used by the Bureau of the Census and other federal agencies that collect and publish business data. The SIC code system has become the national standard used to classify, sort, and categorize every industry, and is used as an identifying system in business directories, publications and statistical sources.

truckload or larger sized shipments in the region should be identified. Businesses that receive many of these shipments are likely to have a distribution center and would be covered with the distribution center sample. Manufacturing facilities, however, are likely to receive direct shipments of raw materials, so they would be contacted directly. The transportation, communication, public utility, finance, insurance, real estate, business service, health, social services and public administration businesses are unlikely to receive shipments directly from other businesses in truckload or larger sized shipments. In the retail sector, businesses will either receive shipments from their distribution center or from a wholesale supplier. Thus, by sampling the distribution centers, manufacturers, and wholesalers, those businesses that are responsible for the majority of the truckload size or larger shipments moving in the region will be sampled.

An exercise would be conducted with key stakeholders in Vermont with commodity knowledge (the VAOT, CCMPO, regional planning commissions (RPC), and economic/industrial development corporations (EDC/IDC) to assess key divertible commodities at various SIC code and Standard Transportation Commodity Classifications (STCC) levels.<sup>2</sup> At the two-digit STCC level, almost every category would likely be included as potentially divertible, especially with the industry trend of containerizing as many goods as possible. It is recommended that the surveys be randomly distributed to manufacturing and distributing/warehousing facilities (the focus of the analysis). Given a random sample, the responses will end up being an accurate reflection of the distribution of commodities moving in the defined market region. Thus, all commodities are considered **potentially** divertible. The choice survey would determine which commodities are **most likely** to divert. The findings of the analysis will be based on an aggregation of all data at a minimum. The actual sample size will impact the ability to disaggregate the results by categories. If the sample size is small it will be difficult to obtain statistically significant findings at a disaggregated level (i.e., at a three- or four-digit SIC code level).

Dun & Bradstreet data is a possible source of the shippers/receivers sample. It provides a comprehensive list of the businesses in the region that can be sorted and pulled according to the sample criterion. If all potentially eligible companies are contacted, this will be the universe. The activity is therefore limited by the total number of available companies meeting the selection criteria and then again by the actual number that agree to participate. A Dun & Bradstreet record includes the following information for each business selected for the sample:

- Duns Number (D&B's company identifier);
- Company Name;
- Trade Name;
- Address, City, State, Zip Code;

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<sup>2</sup>The Standard Transportation Commodity Classifications were developed in the early 1960s by the American Association of Railroads (AAR) to analyze commodity movements by rail only. The STCC continues to be used by the AAR as a tariff mechanism. It has been adopted as the commodity classification system for all modes by several commodity reporting databases, including the 1993 Commodity Flow Survey of the U.S. Census Bureau.

- Mailing Address, City, State, Zip Code;
- Metropolitan Statistical Area (MSA);
- Latitude & Longitude;
- Area Code and Phone Number;
- Executive First Name, Middle Initial, Last Name, and Title;
- Executive Code;
- Sales;
- Number of Employees in the Business;
- Number of Employees at the Location;
- Year the Company Started;
- Duns Number of the Parent Company (if Subsidiary) HQ\_Duns \$;
- Headquarters City and State; and
- Six SIC Codes Detailing the Business Type;

The Dun & Bradstreet sample can be used to provide a representative, unbiased, and statistically valid sample for the surveys. The sample from the qualitative business interviews conducted as part of the Regional and Statewide Freight Studies should not be used for data collection because it would introduce sampling biases that could not be controlled either in terms of who was interviewed, or any biases which might be introduced as a result of their participation in the earlier survey. However, if someone from the previous interviews happens to appear in the random sample, they do not need to be excluded.

## Data Collection

A set of survey instruments and choice experiments will need to be developed and a data collection company specializing in this type of activity will need to be identified to execute the survey. A phone-fax-phone surveying approach should be used. In this approach, an initial recruiting survey will be used to do the following:

- Screen out respondents who do not qualify for the survey (i.e., they do not make shipments relevant to the proposed freight project);
- Identify the appropriate decision-maker in the company;
- Collect basic data about the origins, destinations, quantities, and types of shipments being made by the company for use in tailoring the choice experiments;
- Solicit the respondent's agreement to conduct the choice exercises; and
- Obtain the respondent's fax number.

This portion of the survey will take approximately 15 to 20 minutes. To insure that the desired final sample size is achieved, respondents should be over-recruited. Once the respondent agrees to complete the choice experiments, a set of choice experiments will be generated for the respondent. Figure F.2 provides an example of a set of choice experiments developed for the Cross Harbor Freight Movement Major Investment Study. Each experiment is tailored to most appropriately reflect the operation and choices available to the respondent. These are then faxed to the respondent along with instructions for their completion. After the respondent receives the choice experiments, the survey firm will conduct a follow-up call to assist the respondent in completing the choice experiments and to collect the customer-preference information from the choice experiments.

Prior to implementing the survey, it is a good practice to conduct a pre-test of the survey. The purpose of the pre-test is to insure that all of the survey questions are clear to respondents and that there are no problems associated with the survey. These interviews are usually monitored live or tape-recorded for review at a later time. Since the pre-test is designed to mimic the actual survey as closely as possible, the sample of pre-test respondents can be drawn from the same data source, such as Dun & Bradstreet data.

**Figure F.2 Choice Exercise (Simplified Example)**

*If these were your only alternatives, which of the following cross-harbor shipping options would you use to ship printed catalogs from California to locations East of the Hudson River?*

	A	B	C	D
Shipment Option	Current Route	Rail Carload via Float Barge	Rail Carload via Tunnel	Rail Intermodal
Description	Rail from CA to distribution center; truck from distribution center to Long Island	Rail carload from CA to Long Island	Rail carload from CA to Long Island	Intermodal rail from CA to Long Island
Crossing Type	George Washington Bridge	Cross-harbor float barge from northern NJ	Cross-harbor tunnel from northern NJ	Cross-harbor tunnel from northern NJ
East-of-Hudson Terminus	NA	Brooklyn waterfront near Bay Ridge	Central Long Island	Intermodal terminal in central Long Island with truck access to LI Expressway
Tunnel Access Restrictions	NA	No restrictions	No restrictions	No restrictions
Price*	\$2,640/truckload (22 ton) (\$120/ton)	\$1,600/carload (70 ton) (\$23/ton)	\$2,520/carload (70 ton) (\$36/ton)	\$1,850/truckload (22 ton) (\$84/ton)
Transit Time	13 days, 7 hours	12 hours	27 days	13 days, 7 hours
Frequency of Service	On-demand	Every 12 hours	Once daily	Every 12 hours
Delivery Window	9 hours	2 hours	48 hours	8 hours
Delivery Window Reliability	100%	80%	90%	95%

\* Note that prices are for different tonnage amounts.

A monetary incentive can also be used as part of the data collection strategy. The incentive increases the cooperation rate of potential respondents (reducing the cost of recruiting

respondents), reduces biases associated with data collection by attracting a larger proportion of the total sample, and speeds up data collection. Incentive checks should be mailed only to those respondents who complete both portions of the survey.

### *Development of Service Attribute Data*

The range of possible service attributes for each alternative developed to support the choice exercise will be refined to reflect a single, specific definition for each alternative. The steps involved in this process include:

- Future year “no-build” matrices will be developed for each policy-related aspect of service included in the stated-preference survey and will be used in model application. Origin-destination (O-D) matrices for travel time, cost, and reliability for the truck and rail modes (carload, transload, and intermodal) will be developed.
- Corresponding level of service matrices will be developed for truck and rail for each build alternative.
- The difference between each “build” alternative and the “no-build” alternative for each level of service attribute will be calculated across each O-D pair under study.

An example of the format of these level of service matrices is shown in Figure F.3. In developing the service matrices for each alternative, it is critical that domain expertise be used. This would require close coordination with and involvement of shippers and carriers. Level of service estimates must be developed for each type of proposed future freight service (i.e., rail carload, rail transload, rail intermodal, truckload) and for each route option within modes. Based on the results of the diversion and the available infrastructure capacities, it may be necessary to re-run the model with constrained demand.

## ■ **Diversion Model Development and Application**

A diversion model will be developed by applying the results of the choice surveys to the attributes of each alternative and the future commodity flow data developed previously. The choice model is used to make a preliminary evaluation of the impact of changes in travel time, reliability, and cost on the mode split of commodities moved by truck. The application steps include the following:

- The choice model is applied in an incremental manner – for each “build” alternative, changes in truck tonnage market share are calculated; and
- The projected change in “divertible” commodity tonnage market share moved by truck is converted to actual tonnage diverted from truck to rail.

Figure F.3 Sample Level of Service (LOS) Matrix

Variables		LOS Metrics								
Mode	Crossing	Service Type	Origin	Destination	Travel Time (hours)	Price (per ton)	Frequency	Tunnel Access Restriction	Delivery Window	Delivery Window Reliability
Rail	XH Tunnel	Bulk-Transload	East Canada (Montreal)	Central LI	87	38.59	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	West Canada (Vancouver)	Central LI	229	101.15	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	Mid Atlantic (Washington)	South Bronx	75	24.88	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	Southeast (Atlanta)	South Bronx	122	42.96	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	Southwest (Houston)	South Bronx	153	64.47	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	West (Salt Lake)	South Bronx	224	76.81	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	Midwest (Chicago)	South Bronx	116	42.28	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	New England (Portland)	South Bronx	113	28.38	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	East Canada (Montreal)	South Bronx	83	35.29	On demand	None	8 hours	0.94
Rail	XH Tunnel	Bulk-Transload	West Canada (Vancouver)	South Bronx	225	97.85	On demand	None	8 hours	0.94
Rail	XH Tunnel	Intermodal	Mid Atlantic (Washington)	Brooklyn	26	27.10	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	Southeast (Atlanta)	Brooklyn	44	42.48	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	Southwest (Houston)	Brooklyn	87	66.48	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	West (Salt Lake)	Brooklyn	134	83.17	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	Midwest (Chicago)	Brooklyn	41	40.71	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	New England (Portland)	Brooklyn	60	34.59	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	East Canada (Montreal)	Brooklyn	41	34.68	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	West Canada (Vancouver)	Brooklyn	140	108.26	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	Mid Atlantic (Washington)	Queens	30	30.39	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	Southeast (Atlanta)	Queens	48	45.76	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	Southwest (Houston)	Queens	91	69.76	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	West (Salt Lake)	Queens	138	86.45	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	Midwest (Chicago)	Queens	45	43.99	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	New England (Portland)	Queens	64	37.87	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	East Canada (Montreal)	Queens	45	37.96	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	West Canada (Vancouver)	Queens	144	111.54	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	Mid Atlantic (Washington)	Central LI	32	42.84	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	Southeast (Atlanta)	Central LI	50	58.21	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	Southwest (Houston)	Central LI	93	82.22	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	West (Salt Lake)	Central LI	140	98.91	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	Midwest (Chicago)	Central LI	47	56.45	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	New England (Portland)	Central LI	66	50.32	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	East Canada (Montreal)	Central LI	47	50.41	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	West Canada (Vancouver)	Central LI	146	124.00	Daily	None	12 hours	0.8
Rail	XH Tunnel	Intermodal	Mid Atlantic (Washington)	South Bronx	32	30.18	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	Southeast (Atlanta)	South Bronx	50	45.55	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	Southwest (Houston)	South Bronx	93	69.55	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	West (Salt Lake)	South Bronx	140	86.24	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	Midwest (Chicago)	South Bronx	47	43.78	Daily	None	8 hours	0.9
Rail	XH Tunnel	Intermodal	New England (Portland)	South Bronx	66	37.66	Daily	None	8 hours	0.8
Rail	XH Tunnel	Intermodal	East Canada (Montreal)	South Bronx	47	37.75	Daily	None	8 hours	0.8

This approach is applied to inter- and intraregional commodity flows, since shippers in the region would likely be handling both. Interregional trips are expected to be the primary source of diversion to rail because in general rail service is considered noncompetitive with trucks in short-haul markets.

Through trips have neither an origin nor a destination in the region, and constitute 35 percent of total trips in Vermont. Based on the structure of the modal diversion analysis, these trips may or may not be included in the modeling exercise. This will be dependent on the market definition. If they are not included, it may be possible to adjust the diversion numbers manually.

## Development of Future-Year Truck Trip Tables

The truck freight model developed as part of this study, along with the future projections of commodity flows supplied by Reebie Associates, will be the foundation for the development of future year truck trip tables. The model contains future year truck trip tables and assignments. The modal diversion model will be based on commodity flows in tons. Once the diversion calculations are completed, the diverted tonnage will need to be converted to truck trips, using the same methodology for developing the existing truck trip tables. Then these trips will need to be added/subtracted to the “no-build” truck trips tables to model future “build” conditions on the network. The details of these steps are described below. Some of these steps are in the past tense because they were developed as part of the development of the truck freight model.

This methodology involves a very specific and defined approach to: 1) determining what types of commodity trips are most likely to divert to rail; and 2) calculating the volume of tons and number of truck trips represented by this **potentially** divertible market. The **actual** volume of divertible commodities and trips is then determined by applying the diversion percentages resulting from the choice modeling exercise for each alternative to the potentially divertible market.

1. **Tonnage Matrices.** Future year Reebie commodity flow data for total truck tons within a defined commodity group will be organized in an origin-destination matrix for all external regions, as well as the internal region. One matrix would be developed for each two-digit STCC group for a total of 30 matrices.
2. **Average Payload Calculation.** Using the 1997 Vehicle Inventory and Use Survey (VIUS) from the Bureau of the Census, an average tonnage estimate was developed for all trucks by commodity group and by average trip length category<sup>3</sup>. This involved expanding each record in the survey database to the full population of trucks as well as by its annual vehicle miles of travel. Records were then summarized by VIUS commodity group and trip length based on the percentage of total miles spent carrying that commodity in that trip category. An average payload was then computed from

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<sup>3</sup>Trip length categories were based on VIUS categories. Categories included: under 50 miles, 50 to 100 miles, 100 to 200 and 200 to 500 miles combined, and over 500 miles.

the average weight and empty weight for each grouping. A final payload was computed by factoring down this payload to account for the percentage of loads that are empty, which varied by trip length (shorter trips being more likely to have an empty back haul). These final VIUS payloads were matched to the corresponding two-digit STCC groups used by Reebie. (See Table F.2.)

3. **Conversion of Tonnage Matrices to Trip Matrices Using Payloads.** For each Reebie commodity matrix, O-D pairs were assigned to VIUS trip length categories based on their distance from Vermont. The corresponding VIUS payloads for each trip length category within a commodity group were used to convert the matrix tonnage to number of truck trips. This involved dividing the payloads in pounds by 2,000 (one U.S. ton = 2,000 pounds) to get payloads in tons, and then dividing the appropriate matrix value in tons by the VIUS payload in tons that correspond to that trip length. This would be repeated for each commodity matrix to produce 30 new matrices of truck trips by trip length category.
4. **Reduction to “Divertible” Trips.** Total commodity-carrying truck trips will have to be reduced to those trips that would operationally be able to easily switch to rail. These “divertible” trips are defined as truckload tractor-trailers. Using VIUS, the full population of trucks will be determined based on an expansion of the survey database. This is organized according to commodity group and trip length category. An expanded count of truckload tractor-trailers is then determined, similarly organized, and then divided by the full population count. The resulting factors by commodity and trip length are applied to the truck trip matrices.
5. **Conversion of reduced trip matrices to tonnage matrices.** To determine the final number of tons that are potentially divertible, the commodity-carrying tractor-trailer truckload trip matrices have to be converted back to tons. Again using VIUS, a set of tractor-trailer truckload payloads will be developed for each two-digit STCC commodity group by average trip length. These payloads will be multiplied by the reduced trip matrices to arrive at one divertible tonnage matrix by trip length for each of 30 commodities.
6. **Application of tonnage matrices to mode choice model.** The tractor-trailer truckload divertible tonnage by commodity and trip length is used in the mode choice analysis to determine the percentage of tons in each O-D pair that would divert as a result of a given freight improvement.

**Table F.2 Correlation of VIUS Codes to STCCs**

STCC2	STCC Commodity Group	VIUS Codes	VIUS Product Group
1	Farm products	1, 2, 30	Farm products; live animals; animal feed
8	Forest products	6	Logs and other forest products
9	Fresh fish or marine products	3	Processed food
10	Metallic ores	4	Mining products
11	Coal	4	Mining products
13	Crude petroleum or natural gas	10	Petroleum
14	Nonmetallic minerals	4	Mining products
19	Ordnance or accessories	20	Mixed cargo
20	Food or kindred products	3	Processed food
21	Tobacco products	1	Farm products
22	Textile mill products	17	Textile mill products
23	Apparel or related products	17	Textile mill products
24	Lumber or wood products	5, 7	Building materials; lumber and fabricated wood products
25	Furniture or fixtures	16	Furniture or hardware
26	Pulp, paper, or allied products	8	Paper products
27	Printed matter	8	Paper products
28	Chemicals or allied products	9	Chemicals
29	Petroleum or coal products	10	Petroleum
30	Rubber or miscellaneous plastics	20	Mixed cargo
31	Leather or leather products	17	Textile mill products
32	Clay, concrete, glass, or stone	4, 5, 26	Mining products; building materials; glass products
33	Primary metal products	12	Primary metal products
34	Fabricated metal products	13	Fabricated metal products
35	Machinery	14	Machinery
36	Electrical equipment	14	Machinery
37	Transportation equipment	15	Transportation equipment
38	Instruments, photo equipment, optical equipment	14,19	Machinery; craftsman's equipment
39	Miscellaneous manufacturing products	20, 22, 27	Mixed cargo; other; miscellaneous products
40	Fak/miscellaneous	(average of all)	
50	Warehouse, distribution, intermodal	(average of all)	

## ■ Application to the State Travel Demand Model

Once the projected diverted tons have been converted to truck trips they will need to be applied to the truck freight model. The truck trip tables for the “no-build” alternatives have already been developed as part of this study. This involved a calibration function that modified the Reebie-based commodity flow truck tables. Therefore, it will be necessary to review that calibration process before applying the new truck trip tables based on the diverted tonnage to the network. One possible solution to this step is to compare the diverted trip tables to the original, non-calibrated no build truck tables. This comparison, resulting in a net change for specific origin/destination pairs, will be applied proportionally to the calibrated truck trip tables, which will be at the traffic analysis zone level, as opposed to the Reebie county-level data. The following briefly describes this process.

- The assumptions about the external stations used in the truck freight model will need to be verified to ensure that they represent all truck traffic originating/destined outside of Vermont.
- Total truck vehicle miles traveled (VMT) will be obtained from the truck freight network. This VMT estimate corresponds to the truck traffic volumes and the distances covered by trucks within Vermont.
- The level of service (LOS) service matrix will be used to calculate on an O-D basis the distances that a truck would cover within Vermont when traveling between each O-D pair.
- The results of the model application for “divertible” truck traffic will be used to calculate the change in total truck traffic on an O-D basis.
- These results will be used to calculate the O-D specific and total VMT for the “no-build” and each of the “build” alternatives based on the ton-based truck trip table.
- The percentage change in total VMT between the “no-build” and the “build” alternatives will be calculated based on the ton-based truck trip table.
- The estimated percentage change in VMT (based on the ton-based truck trip table) will be applied to the “no-build” VMT estimate obtained from the truck freight matrix and used to estimate the total truck VMT expected for each “build” alternative.

It should be noted that when diverting freight flows from truck to rail over longer distances, once the shipment arrives at the rail terminal it will be put back on truck for final delivery in most cases.

### *Secondary Impacts*

This approach can also be used to assess secondary impacts of diverted vehicles, such as changes in air quality. Changes in truck VMT would be a primary input factor for this type of analysis. For example, this would be combined with the MOBILE-5 emissions model. Inputs to the air quality analysis would include vehicle miles traveled by trucks

and average truck speeds for each O-D pair would be used to determine the emission rates.

The specific steps in the air quality analysis would be as follows:

- Obtain from the truck freight model a truck trip table and loaded highway network for the future year.
- Find the distance and time estimates for all zones in the network. Use these estimates to calculate zone-to-zone distance, zone-to-zone time, zone-to-zone truck VHT (number of trucks multiplied by time), and zone-to-zone truck VMT (number of trucks multiplied by distance).
- Compress the truck trip table, the truck VMT table, and truck VHT table to the county level to correspond with the tonnage tables. Calculate the county-to-county speed as county-to-county VHT divided by county-to-county VMT.
- Calculate the base truck emissions as the sum for each county-to-county truck VMT multiplied by the Mobile 5a emission factor, which is a function of the county-to-county speed.
- Remove the truck trips and truck VMT from the table as diverted.
- Recompute VMT and emissions as above.

## **Cross Harbor Freight MIS Receiver Recruiting Questionnaire**

### **Screening and Recruiting**

Good (morning/afternoon). My name is \_\_\_\_\_. I am calling from \_\_\_\_\_, an independent research firm. This is not a sales call. We are conducting research for a governmental agency that will lead to improved freight transportation options in New York City and the tri-State region. As part of this effort we are collecting information and informed opinions from firms that receive goods shipped from locations West of the Hudson River.

Q1 May I speak with the person responsible for deciding how goods are shipped to your location?

Currently speaking to that person ..... (SKIP TO Q4)

Forwarded to the correct person ..... (SKIP TO Q3)

No

Q2 Is there a convenient time when I could call back and reach them?

1. Yes ..... (RESCHEDULE AND THANK)

2. No ..... (THANK AND TERMINATE)

Q3 Good (morning/afternoon). My name is \_\_\_\_\_. I am calling from \_\_\_\_\_, an independent research firm. This is not a sales call. We are conducting research for New York City's Economic Development Corporation that will lead to improved freight transportation options in New York City and the tri-State region. As part of this effort we are collecting information and informed opinions from firms that use transportation and distribution systems. Are you the person most responsible for deciding how goods are shipped to your location?

1. Yes

2. No ..... (GET NAME AND ASK TO BE TRANSFERRED; REPEAT Q3)

Q4 Does your firm receive shipments at your location from locations west of the Hudson River? (WE ONLY WANT FIRMS THAT RECEIVE SHIPMENTS AT THEIR LOCATION EAST OF THE HUDSON RIVER FROM LOCATIONS WEST OF THE HUDSON RIVER)

1. Yes

2. No ..... (THANK AND TERMINATE)

Q5 We would like to ask you a few questions about your freight movements through the tri-State region. We are also interested in your opinions about improved cross harbor freight transportation facilities and how these improvements would impact

*Receiver Recruiting Questionnaire*

your operations. In appreciation for your participation, you will receive a \$50 honorarium when you complete the survey. Your participation would involve 10 to 15 more minutes on the phone today providing background information. Based on this information, we would fax to you descriptions of improved cross harbor freight facilities designed to meet your needs. A few days later we would call you again to get your opinions of these proposed improvements. This second call would take about ten minutes. Are you willing to participate in this study?

- 1. Yes ..... (SKIP TO Q7)
- 2. No

Q6 Is there a time that would be more convenient for you?

- 1. Yes ..... (RESCHEDULE AND THANK)
- 2. No..... (THANK AND TERMINATE)

**Types of Shipments**

Q7 First, we would like to understand the types of goods that you receive at your location. What goods or commodities do you receive the most of AT YOUR LOCATION from locations WEST of the Hudson River? Please exclude hazardous materials such as explosives and flammables that would not be allowed in a tunnel. (EMPHASIZE THAT WE ARE ONLY INTERESTED IN THE TYPES OF GOODS THAT THEY RECEIVE THEMSELVES FROM LOCATIONS WEST OF THE HUDSON RIVER. LIMIT TO TOP THREE)

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

IF NO COMMODITIES LISTED FOR 7b OR 7c, ENTER 999

Q8f Do you make the decisions about how (RESPONSE to Q7a) is shipped to your location?

- 1. Yes ..... (SKIP TO Q8a)
- 2. No.....

Q8g Could you please give me the name, address, and telephone number of the person who does make these decisions?

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_

PHONE: \_\_\_\_\_

*Receiver Recruiting Questionnaire*

ADD THIS PERSON TO THE SAMPLE OF DISTRIBUTION CENTERS

SKIP TO Q9

Q8a Where is (RESPONSE TO Q7a) that you receive at your location shipped from?  
(GET STATE)

\_\_\_\_\_ (Need to code states as numbers 1 through 50; code Canadian provinces as follows: 51 as Newfoundland, 52 as Nova Scotia, 53 as New Brunswick, 54 as Quebec, 55 as Ontario, 56 as Manitoba, 57 as Saskatchewan, 58 as Alberta, 59 as British Columbia, 60 as Yukon Territory, 61 as Northwest Territories and code outside US and Canada as 62)

(IF COMMODITY Q7a IS SHIPPED FROM MORE THAN ONE STATE, ASK FOR STATE WITH LARGEST VOLUME)

Q8a1 Is this location the original point of origin for this commodity, a distribution center, an intermodal rail terminal, or a port?

1. Original point of origin ..... (SKIP TO Q8b)
2. Distribution center ..... (SKIP TO Q8a2)
3. Intermodal rail terminal ..... (SKIP TO Q8a2)
4. Port

Q8a1a From what country does this shipment originate?

1. US
2. Canada
3. Other

Q8a1b How long does (RESPONSE TO Q7a) typically stay at the port before it is shipped to you?

\_\_\_\_\_ days \_\_\_\_\_ hours

SKIP TO Q8b

Q8a2 In what state is the original point of origin? (GET STATE)

\_\_\_\_\_ (Need to code states as numbers 1 through 50; code Canadian provinces as follows: 51 as Newfoundland, 52 as Nova Scotia, 53 as New Brunswick, 54 as Quebec, 55 as Ontario, 56 as Manitoba, 57 as Saskatchewan, 58 as Alberta, 59 as British Columbia, 60 as Yukon Territory, 61 as Northwest Territories and code outside US and Canada as 62)

(IF COMMODITY Q7a IS SHIPPED FROM MORE THAN ONE STATE, ASK FOR STATE WITH LARGEST VOLUME)

*Receiver Recruiting Questionnaire*

Q8a3 How is (RESPONSE TO Q7a) shipped from its original point of origin to the (distribution center/intermodal rail terminal)?

- 1. Truck..... Skip to Q8a4
- 2. Rail..... Skip to Q8a4
- 3. Intermodal rail..... Skip to Q8a4
- 4. Ship/barge
- 5. Other (Please specify)..... Skip to Q8a4

Q8a3a In what port does the ship/barge unload the shipments?

- 1. Port Elizabeth
- 2. Other (Please specify)

Q8a3b How is (RESPONSE TO Q7a) shipped from the port to the distribution center/intermodal rail terminal?

- 1. Truck
- 2. Rail
- 3. Other (Please Specify)

Q8a4 How long does it take these shipments to reach the (distribution center/intermodal rail terminal) from their original point of origin?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q8a5 How long does (RESPONSE TO Q7a) typically stay at the (distribution center /intermodal rail terminal) before it is shipped to you?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q8b How is (RESPONSE TO Q7a) shipped to your location?

- 1. Truck
- 2. Rail..... (SKIP TO Q9)
- 3. UPS, Federal Express, or similar delivery service..... (SKIP TO Q9)
- 4. Other (Please specify)..... (SKIP TO Q9)

Q8c Who operates this truck? Is it operated by (READ LIST)

- 1. Your company
- 2. The company shipping the goods
- 3. A third party motor carrier
- 4. UPS, Federal Express, or similar delivery service..... (SKIP TO Q9)

*Receiver Recruiting Questionnaire*

5. Other (please specify)

Q8d Is your typical shipment size for (RESPONSE TO Q7a) a full truck load or less than truck load?

1. All shipments are full truck load
2. All shipments are less than truck load ..... (SKIP TO Q9)
3. Some shipments are full truck load/ some shipments are less than truck load ....

Q8e How many truckloads of (RESPONSE TO Q7a) do you receive annually from locations west of the Hudson River?

A) \_\_\_\_\_ Truck loads annually

(IF RESPONDENT DOES NOT KNOW ANNUAL AMOUNT, ASK FOR MONTHLY OR WEEKLY NUMBER)

B) \_\_\_\_\_ Truck loads monthly

C) \_\_\_\_\_ Truck loads weekly

Q8h At what time do these shipments typically arrive at you location?

1. 12 AM to 5 AM
2. 5 AM to 10 AM
3. 10 AM to 3 PM
4. 3PM to 7 PM
5. 7 PM to 12 Midnight
6. No set time
7. Do not know

Q8i Do you require these shipments to arrive within a certain time window?

1. Yes
2. No..... (SKIP TO Q8l)

Q8j What is the length of this window?

\_\_\_\_\_ hours

Q8k What percent of these shipments meet this requirement?

\_\_\_\_\_ %

Q8l How long does it take these shipments to reach you from their point of origin?

\_\_\_\_\_ days \_\_\_\_\_ hours

*Receiver Recruiting Questionnaire*

Q8m At what point do these trips cross the Hudson River?

1. Verrazano Narrows Bridge
2. George Washington Bridge
3. Tappan Zee Bridge
4. Lincoln Tunnel
5. Holland Tunnel
6. I-84 Bridge
7. Gothals Bridge
8. Outer Bridge Crossing
9. Other (please specify)\_\_\_\_\_

Q9f (IF Q7b =999 THEN SKIP TO Q11a) Next, I would like to ask you some questions about your shipments of (RESPONSE TO Q7b). Do you make the decisions about how (RESPONSE TO Q7b) is shipped to your location?

1. Yes ..... (SKIP TO Q9)
2. No

Q9g Could you please give me the name, address, and telephone number of the person who does make these decisions?

NAME: \_\_\_\_\_  
COMPANY: \_\_\_\_\_  
STREET ADDRESS \_\_\_\_\_  
CITY: \_\_\_\_\_ STATE: \_\_\_\_\_  
PHONE: \_\_\_\_\_

ADD THIS PERSON TO THE SAMPLE OF DISTRIBUTION CENTERS  
SKIP TO Q10

Q9 Where is (RESPONSE TO Q7b) that you receive at your location shipped from?  
(GET STATE)

\_\_\_\_\_ (Need to code as numbers 1 through 50; code Canadian provinces as follows: 51 as Newfoundland, 52 as Nova Scotia, 53 as New Brunswick, 54 as Quebec, 55 as Ontario, 56 as Manitoba, 57 as Saskatchewan, 58 as Alberta, 59 as British Columbia, 60 as Yukon Territory, 61 as Northwest Territories and code outside US and Canada as 62)

(IF COMMODITY Q7b IS SHIPPED FROM MORE THAN ONE STATE, ASK FOR STATE WITH LARGEST VOLUME)

*Receiver Recruiting Questionnaire*

Q9a1 Is this location the original point of origin for this commodity, a distribution center, an intermodal rail terminal, or a port?

1. Original point of origin ..... (SKIP TO Q9b)
2. Distribution center ..... (SKIP TO Q9a2)
3. Intermodal rail terminal)..... (SKIP TO Q9a2)
4. Port

Q9a1a From what country does this shipment originate?

1. US
2. Canada
3. Other

Q9a1b How long does (RESPONSE TO Q7b) typically stay at the port before it is shipped to you?

\_\_\_\_\_ days \_\_\_\_\_ hours

SKIP TO Q9b

Q9a2 In what state is the original point of origin? (GET STATE)

\_\_\_\_\_ (Need to code states as numbers 1 through 50; code Canadian provinces as follows: 51 as Newfoundland, 52 as Nova Scotia, 53 as New Brunswick, 54 as Quebec, 55 as Ontario, 56 as Manitoba, 57 as Saskatchewan, 58 as Alberta, 59 as British Columbia, 60 as Yukon Territory, 61 as Northwest Territories and code outside US and Canada as 62)

(IF COMMODITY Q7b IS SHIPPED FROM MORE THAN ONE STATE, ASK FOR STATE WITH LARGEST VOLUME)

Q9a3 How is (RESPONSE TO Q7b) shipped from its original point of origin to the (distribution center/intermodal rail terminal)?

1. Truck..... (SKIP TO Q9a4)
2. Rail..... (SKIP TO Q9a4)
3. Intermodal rail ..... (SKIP TO Q9a4)
4. Ship/Barge
5. Other (Please specify) ..... (SKIP TO Q9a4)

Q9a3a In what port does the ship/barge unload the shipments?

1. Port Elizabeth
2. Other (Please specify)

*Receiver Recruiting Questionnaire*

Q9a3b How is (RESPONSE TO Q7a) shipped from the port to the distribution center/intermodal rail terminal?

1. Truck
2. Rail
3. Other (Please Specify)

Q9a4 How long does it take these shipments to reach the (distribution center/intermodal rail terminal) from their original point of origin?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q9a5 How long does (RESPONSE TO Q7b) typically stay at the (distribution center /intermodal rail terminal) before it is shipped to you?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q9b How is (RESPONSE TO Q7b) shipped to your location?

1. Truck
2. Rail.....(SKIP TO Q10)
3. UPS, Federal Express, or similar delivery service.....(SKIP TO 10)
4. Other (Please specify).....(SKIP TO Q10)

Q9c Who operates this truck? Is it operated by (READ LIST)

1. Your company
2. The company shipping the goods
3. A third party motor carrier
4. UPS, Federal Express, or similar delivery service.....(SKIP TO Q10)
5. Other (please specify)

Q9d Is your typical shipment size for (RESPONSE TO Q7a) a full truck load or less than truck load?

1. All shipment are full truck load
2. All shipments are less than truck load .....(SKIP TO Q10)
3. Some shipments are full truck load/some shipments are less than truck load

Q9e How many truckloads of (RESPONSE TO Q7b) do you receive annually from locations west of the Hudson River?

A) \_\_\_\_\_ Truck loads annually

*Receiver Recruiting Questionnaire*

(IF RESPONDENT DOES NOT KNOW ANNUAL AMOUNT, ASK FOR MONTHLY OR WEEKLY NUMBER)

B) \_\_\_\_\_ Truck loads monthly

C) \_\_\_\_\_ Truck loads weekly

Q9h At what time do these shipments typically arrive at you location?

1. 12 AM to 5 AM
2. 5 AM to 10 AM
3. 10 AM to 3 PM
4. 3PM to 7 PM
5. 7 PM to 12 Midnight
6. No set time
7. Do not know

Q9i Do you require these shipments to arrive within a certain time window?

1. Yes
2. No.....(SKIP TO Q9l)

Q9j What is the length of this window?

\_\_\_\_\_ hours

Q9k What percent of these shipments meet this requirement?

\_\_\_\_\_ %

Q9l How long does it take these shipments to reach you from their point of origin?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q9m At what point do these trips cross the Hudson River?

1. Verrazano Narrows Bridge
2. George Washington Bridge
3. Tappan Zee Bridge
4. Lincoln Tunnel
5. Holland Tunnel
6. I-84 Bridge
7. Gothals Bridge
8. Outer Bridge Crossing
9. Other (please specify) \_\_\_\_\_

*Receiver Recruiting Questionnaire*

Q10f (IF Q7c =999 THEN SKIP TO Q11a) Next, I would like to ask you some questions about your shipments of (RESPONSE TO Q7c). Do you make the decisions about how this is shipped to your location?

1. Yes ..... (SKIP TO Q10)
2. No

Q10g Could you please give me the name, address, and telephone number of the person who does make these decisions?

NAME: \_\_\_\_\_  
COMPANY: \_\_\_\_\_  
STREET ADDRESS \_\_\_\_\_  
CITY: \_\_\_\_\_ STATE: \_\_\_\_\_  
PHONE: \_\_\_\_\_

ADD THIS PERSON TO THE SAMPLE OF DISTRIBUTION CENTERS  
SKIP TO Q11

Q10 Where is (RESPONSE TO Q7c) that you receive at your location shipped from?  
(GET STATE)

\_\_\_\_\_ (Need to code as numbers 1 through 50; code Canadian provinces as follows: 51 as Newfoundland, 52 as Nova Scotia, 53 as New Brunswick, 54 as Quebec, 55 as Ontario, 56 as Manitoba, 57 as Saskatchewan, 58 as Alberta, 59 as British Columbia, 60 as Yukon Territory, 61 as Northwest Territories and code outside US and Canada as 62)

(IF COMMODITY Q7c IS SHIPPED FROM MORE THAN ONE STATE, ASK FOR STATE WITH LARGEST VOLUME)

Q10a1 Is this location the original point of origin for this commodity, a distribution center, an intermodal rail terminal, or a port?

1. Original point of origin ..... (SKIP TO Q10b)
2. Distribution center ..... (SKIP TO Q10a2)
3. Intermodal rail terminal ..... (SKIP TO Q10a2)
4. Port

Q10a1a From what country does this shipment originate?

1. US
2. Canada
3. Other

*Receiver Recruiting Questionnaire*

Q10a1b How long does (RESPONSE TO Q7c) typically stay at the port before it is shipped to you?

\_\_\_\_\_ days \_\_\_\_\_ hours  
SKIP TO Q10b

Q10a2 In what state is the original point of origin? (GET STATE)

\_\_\_\_\_ (Need to code states as numbers 1 through 50; code Canadian provinces as follows: 51 as Newfoundland, 52 as Nova Scotia, 53 as New Brunswick, 54 as Quebec, 55 as Ontario, 56 as Manitoba, 57 as Saskatchewan, 58 as Alberta, 59 as British Columbia, 60 as Yukon Territory, 61 as Northwest Territories and code outside US and Canada as 62)

(IF COMMODITY Q7c IS SHIPPED FROM MORE THAN ONE STATE, ASK FOR STATE WITH LARGEST VOLUME)

Q10a3 How is (RESPONSE TO Q7c) shipped from its original point of origin to the (distribution center/intermodal rail terminal)?

1. Truck..... (SKIP TO Q10a4)
2. Rail..... (SKIP TO Q10a4)
3. Intermodal rail ..... (SKIP TO Q10a4)
4. Ship/Barge
5. Other (Please specify) ..... (SKIP TO Q10a4)

Q10a3a In what port does the ship/barge unload the shipments?

3. Port Elizabeth
4. Other (Please specify)

Q10a3b How is (RESPONSE TO Q7a) shipped from the port to the distribution center/intermodal rail terminal?

1. Truck
2. Rail
3. Other (Please Specify)

Q10a4 How long does it take these shipments to reach the (distribution center/intermodal rail terminal) from their original point of origin?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q10a5 How long does (RESPONSE TO Q7c) typically stay at the (distribution center /intermodal rail terminal)before it is shipped to you?

\_\_\_\_\_ days \_\_\_\_\_ hours

*Receiver Recruiting Questionnaire*

Q10b How is (RESPONSE TO Q7c) shipped to your location?

1. Truck
2. Rail.....(SKIP TO Q11)
3. UPS, Federal Express, or similar delivery service.....(SKIP TO Q11)
4. Other (Please specify).....(SKIP TO Q11)

Q10c Who operates this truck? Is it operated by (READ LIST)

1. Your company
2. The company shipping the goods
3. A third party motor carrier
4. UPS, Federal Express, or similar delivery service.....(SKIP TO Q11)
5. Other (please specify)

Q10d Is your typical shipment size for (RESPONSE TO Q7c) a full truck load or less than truck load?

1. All shipments are full truck load
2. All shipments are less than truck load .....(SKIP TO Q11)
3. Some shipments are full truck load/some shipments are less than truck load

Q10e How many truckloads of (RESPONSE TO Q7c) do you receive annually from locations west of the Hudson River?

A)\_\_\_\_\_ Truck loads annually

(IF RESPONDENT DOES NOT KNOW ANNUAL AMOUNT, ASK FOR MONTHLY OR WEEKLY NUMBER)

B)\_\_\_\_\_ Truck loads monthly

C)\_\_\_\_\_ Truck loads weekly

Q10h At what time do these shipments typically arrive at you location?

1. 12 AM to 5 AM
2. 5 AM to 10 AM
3. 10 AM to 3 PM
4. 3PM to 7 PM
5. 7 PM to 12 Midnight
6. No set time
7. Do not know

*Receiver Recruiting Questionnaire*

Q10i Do you require these shipments to arrive within a certain time window?

1. Yes
2. No.....(SKIP TO Q10l)

Q10j What is the length of this window?

\_\_\_\_\_ hours

Q10k What percent of these shipments meet this requirement?

\_\_\_\_\_ %

Q10l How long does it take these shipments to reach you from their point of origin?

\_\_\_\_\_ days \_\_\_\_\_ hours

Q10m At what point do these trips cross the Hudson River?

1. Verrazano Narrows Bridge
2. George Washington Bridge
3. Tappan Zee Bridge
4. Lincoln Tunnel
5. Holland Tunnel
6. I-84 Bridge
7. Gothals Bridge
8. Outer Bridge Crossing
9. Other (please specify)\_\_\_\_\_

Q11a (IF Q8f=2 AND Q9f=2 AND Q10f=2 THEN TERMINATE OR IF Q8h=MISSING AND Q9h=MISSING AND Q10H=MISSING THEN TERMINATE) Is there now a rail siding at your location?

1. Yes
2. No

Q11b Was there ever a rail siding at your location?

1. Yes
2. No

Q12 Can you give me a fax number so I can send you the information that you need to complete this research study?

\_\_\_\_\_

*Receiver Recruiting Questionnaire*

Q13 When would be a convenient time to call you back within the next 3 to 5 days?

\_\_\_\_\_ (RECORD DATE)

\_\_\_\_\_ (RECORD TIME)

END Thank you for your assistance. Someone will be calling you back on (READ CALL BACK DAY/TIME) to complete the remainder of this interview.