Chapter 6.2: Economic Conditions and Effects

A. INTRODUCTION

This chapter examines the economic conditions and effects associated with the Cross Harbor Freight Program (CHFP) alternatives described in Chapter 4, "Alternatives." Specifically, this chapter includes the following analyses:

- Economic Impact Analysis, which examines the job-creation and economic activity implications of the CHFP investment. The analysis considers a combination of direct, indirect, and induced effects from both construction (generating benefits during the construction period) and operations (generating annual benefits over time) for a representative selection of the Build Alternatives. This analysis focuses on a 23-county regional study area consisting of the ten counties in the New York Metropolitan Transportation Council (NYMTC) region and the 13 counties in the North Jersey Transportation Planning Authority (NJTPA) region (see Figure 5-2). The travel demand models covering these two regions were used as the analysis tools to calculate vehicle miles traveled (VMT) and vehicle hours traveled (VHT) savings and associated economic effects.
- Cost and Revenues Analysis addresses potential revenues that could be generated by the Build Alternatives, and the potential for private sector participation in the project to contribute to the capital and operating and maintenance costs in part or in whole.
- Local Effects Analysis, which identifies potential direct displacement of residents and/or businesses and the effect of induced growth.

The chapter begins with an explanation of the methodology used. Existing economic conditions are then described for the region and the potentially affected counties and local study areas.

B. METHODOLOGY

ECONOMIC IMPACTS FROM CONSTRUCTION

The construction of any of the proposed alternatives would affect the regional economy by employing workers in the construction industry and procuring supplies and services from regional businesses. These impacts were estimated using Port Authority of New York and New Jersey (PANYNJ) regional productivity metrics in combination with the widely used IMPLAN economic modeling program. Economic effects were reported for the 23-county regional study area, including:

- The five New York City counties – New York, Kings, Bronx, Queens, and Richmond;
- Five other New York State counties – Nassau, Suffolk, Westchester, Rockland, and Putnam; and
- The thirteen NJTPA counties – Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren.

To estimate the number of direct jobs supported by construction activities, the analysis considered the amount of construction spending and the productivity of workers in different construction sectors. Most of the construction spending was assigned to various parts of the construction sector, but the purchase of equipment such as barges, trucks, and cranes was assigned to specific manufacturing industries. The analysis assumed that new barges would be locally manufactured. For other equipment purchases, the analysis relied on IMPLAN's estimates of the benefit to regional manufacturers. Measures of worker productivity were based on PANYNJ estimates of output per worker on its construction projects. These large projects generally employ union workers who have higher productivity and wages than the average worker in the construction industry. The IMPLAN model was modified to use these PANYNJ-specific factors.

Indirect and induced impacts from construction were also quantified using IMPLAN. The 23-county regional study area was modeled and multipliers were extracted for equipment purchases, indirect spending on construction, and labor income. The "multiplier" value is the ratio of direct benefits to total benefits. To calculate indirect impacts the labor income from construction activities was subtracted from the initial spending on those activities and the remainder was multiplied by the indirect spending multipliers from IMPLAN. The labor income itself was multiplied by the labor income multipliers to estimate the induced impact. Finally, IMPLAN was used to estimate the direct, indirect, and induced impacts of equipment purchases.

ECONOMIC IMPACT FROM OPERATIONS

Economic impact analysis of operations quantifies the monetized value of transportation system benefits and the direct, indirect, and induced monetized benefits of program-related increases in economic activity within the 23-county regional study area. These benefits are the result of ongoing annual operations, over and above the one-time benefits of construction.

Economic impact is measured as changes in economic activity in a given region, arising from a project or a change in policy. It can be expressed through a number of economic variables including sales (output), employment, and personal income (earnings). Reduction in transportation cost and improved connectivity to domestic and international markets arising from transportation capacity expansion increases output of firms (especially export oriented manufacturing industries) and increases demand for key factors of production including labor, materials, equipment, and supporting downstream activities which are supplied by other local and non-local firms. This chain of activities leads to local economic expansion through increased employment, personal income, and business profits. Generally, total assessment of economic impacts comprises estimation of three impact types, namely direct, indirect, and induced.

- *Direct Impacts.* Direct impacts associated with transportation improvement are the direct effects of changes in output (sales) or production cost, and spending in key economic industries including wholesale and retail trades, manufacturing, and transportation and logistics. For instance, the direct effect of improved roadway to a manufacturing firm is the reduction in crew and inventory costs.
- *Indirect Impacts*. As business sales increase, demand for key input materials also increases in tandem, and vice versa. Therefore, the indirect impact associated with increased business sale (output) is estimated or referred to as increase in demand (purchases) for key input materials by local firms who are the direct suppliers to these businesses. For example, increased construction activities increase the demand (purchases) for steel, concrete, timber, fuel etc. Consequently, spending on factors of production stimulate expansion of businesses

downstream of the production chain. Accordingly, changes in output, employment, and income arising from these expansions are considered to be indirect impacts.

- *Induced Impacts*. Direct and indirect impacts are the sources of induced impacts, and it normally constitutes the largest portion of total impacts. Changes in output, employment, and income, stemming from household consumption of goods and services are induced impacts. Similar to indirect impacts, increase or decrease in personal consumption also lead to increase or decrease in business sales (output). This chain of activities also translates into changes in employment, and income.

The economic impact analysis of operations consists of two stages: Regional Impact Modeling and Other Business Attraction.

REGIONAL IMPACT MODELING

The No Action Alternative assumes that freight activity in the study area, both east and west-of-Hudson, would continue to grow and be served by both truck and rail. Rail freight crossing the Hudson via Selkirk and Mechanicville was projected to increase at 2.5 percent annually, and truck freight tonnage at all crossings was projected to increase at 1.4 percent annually, based upon the Market Research findings and interviews with Class I railroads. This increase in activity would generate the expansion of freight-dependent businesses (i.e., producers, manufacturers, warehouse/distribution centers, wholesalers, and retailers) throughout the region, whether or not the Build Alternatives are implemented.

Above and beyond the No Action Alternative, the Build Alternatives would provide additional regional benefit by:

- Shifting a portion of projected freight transport by truck to alternative modes or to new, alternative routes. This would result in less congestion and reduced delay-related costs, which is a positive economic benefit for all highway users.
- Reducing freight transportation costs for freight shippers and receivers.

The cost savings associated with the Build Alternatives would translate directly into increased economic activity, in the form of expanded businesses and new businesses. These effects are estimated using a regional economic simulation model developed by REMI (Regional Economic Models Incorporated). Two types of inputs are generated for the model—direct transportation system user cost savings, and direct freight shipper and receiver savings—and the model calculates the associated indirect and induced benefits derived from those savings. (The ratio of direct benefits to total benefits is known as the "multiplier.") The resulting total benefits are expressed in terms of annual jobs, personal income, business output (total value of goods and services produced), and gross regional product (business output less business costs).

REMI Input: Direct Highway System User Cost Savings

The diversion of freight from truck to rail, from truck to water, or to new, alternative routes by truck, could lead to congestion relief and other benefits on specific segments of the region's highway system. The region's two travel demand models—NYMTC's Best Practice Model (BPM) and NJTPA's Regional Transportation Model Enhanced (RTME)—were used to generate estimates of travel time savings by users, in the form of reduced Vehicle Hours of Travel (VHT), as discussed in Chapter 5, "Transportation". These savings, in turn, were monetized using values of user time published by the U.S. Department of Transportation (USDOT) as part of the guidance for the Transportation Investments Generating Economic Recovery (TIGER) program. All truck trips were assumed to be work-related; 6 percent of auto trips were assumed to be non-

home-based business-related (i.e., travel from one's office to a client or customer), and the remainder were assumed to be commute or leisure-related. This assumption is consistent with the output of most regional travel demand models.

It is important to note that these benefits occur not to the trucks that diverted to rail, but to cars and trucks that did not divert to other modes or routes, but instead remained on the existing highway network. The benefits from freight that did divert, lowering transportation costs as a result, are captured as shipper-related benefits.

REMI Input: Direct Freight Shipper and Receiver Cost Savings

Where shippers have access to alternative transportation service that meets their needs, their transportation costs can be reduced; and these transportation cost savings translate directly into higher profits, competitive advantage, and other similar benefits.

Transportation rates are changing rapidly, particularly in light of ongoing fuel price fluctuations. A survey of information on public rates, as well as private industry rates was conducted to develop best available estimates of typical rates for major commodities and trade lanes, for truck versus rail. Sources consulted included:

- The Intermodal Transportation and Inventory Cost (ITIC) Model is a freight mode choice model from the Federal Highway Administration's (FHWA) Office of Freight Management and the Federal Railroad Administration (FRA). It calculates the logistics cost and decision tradeoffs seen by shipper logistics managers, and then assigns the truck/rail diversion to alternatives that minimize total logistics cost.
- The MIT Spreadsheet Logistics Model estimates the truck/rail mode choice for 48 typical types of customers, based on customer characteristics (use rate and trip length); commodity characteristics (value/pound); and mode characteristics (e.g., price, trip time, and reliability) for rail, truck, and intermodal options.
- The Uniform Rail Costing System (URCS) Model (Surface Transportation Board) estimates the changes in shipper productivity associated with rail system performance changes. The URCS model uses data on average carrier cost and performance measures to estimate the cost of providing service, and can estimate how a change in facility capacity or speed (affecting rail cars per day) would translate into average shipper dollar savings per ton-mile.
- Federal data from the U.S. Department of Agriculture (on trucking costs) and Bureau of Transportation Statistics.
- Class I Railroad annual reports and Association of American Railroads (AAR) published revenue data.
- Interviews with Class I railroads, waterborne transportation service providers, and trucking firms operating in the study area.
- Cost estimates from TIGER Grant applications that received grant awards from USDOT.

Based on these sources, a regression-based method for estimating average end-to-end trucking costs was developed. The three primary inputs are: (a) variable per-mile costs, reflecting capital and operating costs (labor, fuel, equipment) which vary in proportion to the length of haul, as well as typical fixed costs (loading, unloading, etc.), based on USDOT data; and (b) additional fixed costs that typically apply to truck trips across the Hudson River (tolls, congestion, and "empty" travel distance before obtaining the next revenue-generating load). These detailed regression-based costs were applied on a trip-by-trip basis as part of the project mode choice

model, to determine whether truck freight would shift to alternative modes. Because most of the freight that would actually divert from truck to rail is moving over long distances, the great majority of costs are captured in the variable per-mile costs, and these were used as the basis for the economic impact and benefit analysis. The main advantage of this approach is that the trucking cost assumptions are fully consistent with USDOT-sourced factors that have been used in successful TIGER grant applications.

For rail cost estimation, the key consideration was railroad pricing strategy. In this approach, the assumption is that railroads would price their services as close to trucking as possible, while still offering a discount. The discount is necessary because rail is usually not as fast as trucking, and except for moves between rail terminals does not offer door-to-door service like trucking. After reviewing data and interviewing railroad representatives, it was determined that a rail discount of 10 percent compared to an equivalent truck move was the most likely and appropriate pricing assumption. This discounted price is "all-inclusive" and reflects the cost of rail handling as well as any required truck delivery or special handling at either end of the trip.

Similarly, for the Rail Tunnel with Chunnel Service Alternative, the Rail Tunnel with Shuttle Service Alternative, and the Rail Tunnel with Automated Guided Vehicle (AGV) Technology Alternative, it was assumed that users would save 10 percent compared to the equivalent cost of trucking, using the distance traversed by the Chunnel service for calculations. Subsequent Tier II analyses will focus on the specific conditions—operations, equipment, etc.—required to achieve these savings.

For the Waterborne Alternatives, costs of the waterborne portion of the trip were estimated based upon cost information provided by barge operators in the region, and on the experience of the Detroit-Windsor truck ferry. In addition, the cost of trucking on each end of the waterborne segment was included. For the Lift On-Lift Off (LOLO) Container Barge Alternative, a lift fee of $200 was levied on every container.

Freight shippers and receivers at both ends of the trip would benefit. Therefore, 50 percent of the projected benefit was assigned to the originating county and 50 percent to the terminating county. Most of the demand for the Enhanced Railcar Float Alternative and the Rail Tunnel Alternative is associated with long-haul traffic, which has either an origin or destination in the 23-county regional study area, but not both. For the Rail Tunnel with Chunnel Service Alternative, the projected benefits additional to the Rail Tunnel Alternative are a result of short-haul traffic, with both ends of the trip within the 23-county region.

REMI Outputs: Direct, Indirect, and Induced Benefits

Based on the direct inputs provided, the REMI model estimates the share of direct benefits that would be retained within the study area, and the additional spending and benefits that would be generated from the direct benefits that are retained (i.e., multiplier benefits). Benefit categories include jobs created, business output, and gross regional product. Annual and cumulative benefits are calculated through 2060, the maximum horizon of the REMI model available for this analysis. The evaluation methods were fully compliant with published TIGER guidance, except that the timeframe used for the evaluation is somewhat longer (46 years, as opposed to 20 or 30 years) given the more permanent nature of railroad and waterborne system investments relative to highway investments. The REMI analysis will be completed for preferred alternatives in Tier II.

BUSINESS AND EMPLOYMENT REDISTRIBUTION

The REMI analysis captures job creation and other benefits related directly to transportation system user cost savings and freight shipper cost savings. However, there are two other types of job creation effects which are not captured in the REMI analysis: warehouse/distribution employment and rail yard employment.

Warehouse/Distribution Employment

Additional warehouse and distribution space (and related employment) would be generated in the east-of-Hudson region for shippers and receivers using partial container-load or partial railcar shipments as a result of the Build Alternatives. Effects were calculated as follows:

- The results of project mode choice surveys were used to estimate the volume of traffic (in tons and intermodal units) associated with each Build Alternative that would require new warehouse/distribution space, by county.
- The amount of warehouse/distribution space required to meet the need, in square feet, was calculated.
- The number of direct employees generated from this square footage was calculated and summed by region (New York City, New York Counties, New Jersey Counties).

In the No Action Alternative, this employment growth would be captured in the west-of-Hudson region, rather than east-of-Hudson. This effect therefore represents a redistribution of future employment growth within the 23-county region, as opposed to a net increase in employment and in corresponding economic benefits.

Rail Yard Employment

Rail yard employment at the proposed yards was estimated based on employees-per-ton factors used in publicly available TIGER analyses for Norfolk Southern. Tons of freight that would be generated at each yard were multiplied by the employees per ton factor to estimate the direct employment.

The use of Build Alternatives, which feature the substitution of rail and/or float service for some or all of the truck VMT within an end-to-end trip, could impact employment in the trucking sector. Change in long-haul trucker employment was calculated as an offset to increased railroad employment, based on annual truck VMT and estimated VMT per trucker per year.

COST AND REVENUE ANALYSIS

Cost and Revenue Analysis considers whether the Build Alternatives make economic sense from the standpoint of a private operator such as a railroad or barge operator. It is assumed that private operators would not want to use infrastructure unless it provided revenues sufficiently in excess of their costs to operate. This analysis examines the types of revenues that could be generated by the Build Alternatives, and whether or not those revenues are likely to exceed the costs to construct, operate, and maintain the infrastructure and service.

LOCAL EFFECTS ANALYSIS

There could be two countervailing effects of the project in the local study areas: (1) the development of facilities related to the project's Build Alternatives and associated infrastructure could result in displacement of existing businesses in the study area; and (2) new permanent jobs could be created in the study area as a result of operations under the Build Alternatives.

DISPLACEMENT ANALYSIS

Various sources of economic data are used to assess local impacts, including the New Jersey Department of Labor (NJDOL) and the New York State Department of Labor (NYSDOL) county-level employment data. Workplace estimates for each of the study areas were obtained at the census tract level from ESRI, Inc., a supplier of demographic and business marketing information.

Additional sources for the local impact assessment included field surveys, GIS land use data derived from New York City Department of Finance Real Property Assessment Data (RPAD), and the New Jersey Department of Environmental Protection (NJDEP) Land Use Land Cover Data. Locations of industrial areas were also identified using zoning maps.

Information on potentially displaced businesses was gathered through field surveys and the following sources: Dunn & Bradstreet; ESRI, Inc.; Cole's; real estate data from brokers; and New York City's RPAD database.

Localized adverse economic effects may occur from displacement and relocation of businesses due to the construction or expansion of project facilities or infrastructure. Specific analysis tasks were as follows:

1. Define the extent of needed land in the local study areas. A screening level analysis of potential local impacts was conducted around project elements where construction or operational activities may occur. In many instances developable land is available in these areas and industrial use is permissible under current zoning.
2. Describe existing economic characteristics of local study areas. GIS and other secondary sources, in combination with existing condition results and field visits, were used to identify key businesses in the local study areas that may be affected by construction and operation of the Build Alternatives.
3. Assess potential local effects of construction of Build Alternatives. The analysis also discusses the economic effects of potential direct or indirect job displacement.

LOCAL JOB CREATION

For the same area considered by the displacement analysis, job creation estimates were tallied based on the 23-county region employment estimates developed under "Economic Impacts from Operations," as previously discussed.

C. EXISTING CONDITIONS

This section focuses on existing economic conditions in the region and within the local study areas that would be affected by the Build Alternatives. The section provides a discussion of economic conditions in a regional study area potentially impacted by the project, and in Hudson and Essex County, New Jersey and Kings County, Queens County, and Bronx County, New York, as they are the counties that would be most directly affected by the project. In addition, conditions are described for the combined Nassau and Suffolk Counties. The county-level overview is followed by a closer look at the types of businesses found near each of the potential facilities. The analysis uses employment and businesses data provided by the Bureau of Labor Statistics and state employment agencies. Because data is released on an ongoing, revolving basis, release dates vary. For Essex County, NJ, data for 1980 and 1990 were not available. The 1990 data series was substituted by 1993 data.

REGIONAL STUDY AREA

In 2012, there were approximately 9.1 million public and private sector employees in the 23-county region (Table D-1 in **Appendix D**). About 5 percent were employed by government agencies. The largest sector was the service sector, with almost 310,000 businesses employing 4 million employees. The retail sector was the second strongest sector, accounting for about 20 percent of regional employment. The Finance and Real Estate Sector accounted for about 10 percent of all employees (and businesses), which is significantly larger than the sector's share of employees for the entire country (approximately 6 percent). Region-wide the manufacturing sector accounts for approximately 7 percent of employees, which is in line with sub-market trends.

The more than 9 million employees are employed by approximately 780,000 businesses. The distribution of sector businesses mirrors the distribution of employees. Service sector businesses account for 40 percent of all businesses followed by retail shops, which represent about 23 percent of region's businesses. However, manufacturing businesses account for only about 3 percent of businesses, which leads to the conclusion that most manufacturing jobs are provided by larger manufacturing businesses.

NEW JERSEY STUDY AREAS

HUDSON COUNTY

Total private sector employment in Hudson County stood at approximately 209,000 in 2010, an increase of more than 17 percent since 1980 (see Table D-2 in **Appendix D**). While transportation, finance, insurance and real estate (FIRE), and services in general gained substantially, manufacturing employment decreased by 88 percent between 1980 and 2009. In 1980 manufacturing was the strongest sector in Hudson County with more than 68,000 employees, which was equal to 38 percent of the total employment in the county. In 2009, manufacturing jobs accounted for only about 8,500 jobs and represented 4.0 percent of total employment.

The largest employment sector in 2009 was the service sector with over 88,000 employees, followed by the FIRE sector with 40,000 employees, and transportation and communications with 28,000 employees.

ESSEX COUNTY

In 2009, total private sector employment in Essex County, NJ was approximately 296,000, and had decreased by about 11 percent since 1993. Table D-3 in **Appendix D** shows that most sectors, with the exception of the services sector lost jobs. In particular, the retail trade and finance, insurance and real estate sectors lost over 30 percent of employment. Similar to Hudson County, manufacturing employment has also significantly decreased over the past decades. Since 1993, employment in the manufacturing sector has fallen from about 50,000 to approximately 20,000 employees, and only accounted for 7 percent of total employment in 2009, down from 15 percent in 1993.

In 2009, non-manufacturing employment accounted for 93 percent of all employees, with service jobs representing 57 percent of non-manufacturing jobs.

LOCAL STUDY AREA

The transportation industry is the predominant industry in the Oak Island Yard and Port Newark/Port Elizabeth portion of the study area. The large portion of transportation-related jobs

is expected, considering the proximity to one of the largest commercial harbors in the United States and Newark Liberty International Airport. The services industry provided over 20 percent of private sector employment in the study area, while the retail trade industry employed about 10 percent of private sector employment.

The services industry represented approximately 30 percent of all businesses in the study area, retail trade establishments about 20 percent, and the transportation industry 12 percent. The relatively small number of transportation-related businesses in combination with the large portion of employees in this sector suggests that transportation business tend to be much larger in terms of employment than service and retail establishments.

Activities in the Greenville Yard Study Area are also closely related to activities at the harbor. The wholesale trade industry had the greatest concentration of workers in the study area, with approximately 27 percent of all private sector employees. The transportation industry followed with 26 percent of private sector employment in the study area, while the services industry had about 15 percent of private sector employment.

The service industry provided 15 percent of the total jobs and represented over 20 percent of private sector businesses in the study area. Transportation establishments made up 15 percent of businesses in the Greenville Yard Study Area. The retail trade industry also represented approximately 15 percent of all private sector businesses in the study area.

The proximity of the Greenville Yard Study Area to the New Jersey Turnpike Extension and Route 440 provides good accessibility for trucks delivering or picking up goods from businesses in the study area. Most of the businesses in the study area are located in large 1- to 2-story warehouse and distribution buildings with large paved circulation areas for truck loading. The study area is home to businesses such as the Tropicana Distribution Center, the Summit Import Corporation, and Garment Distribution, Inc.

Port Jersey Boulevard is the main east-west connection in the Greenville Yards industrial area and connects the New Jersey Turnpike with freight operations businesses, the Global Marine Terminal, as well as a crane equipment storage and maintenance facility. Several other major warehouses and transportation operations are housed in the Port Jersey Distribution Services complex, including Shipco Air Freight, Phoenix Warehouses, and a New Jersey Diesel Emission Inspection Center. The BMW Vehicle Preparation Center is located in this vicinity on Colony Road.

NEW YORK CITY STUDY AREAS

KINGS COUNTY

Total private sector employment in Brooklyn increased by 34.2 percent between 1980 and 2010, adding approximately 120,000 jobs over the past three decades (see Table D-6 in **Appendix D**). Most jobs were added in the services sector, where employment increased 183 percent from 1980 to 2009. However, the increase in service-related jobs may be amplified by switching from SIC to NAICS-based[1] classification system, which resulted in the reclassification of a number of

[1] The switch from the Standard Industry Code (SIC) to the North American Industry Code (NAIC) system occurred in 2008 to provide greater constancy across the larger North American economies and to integrate better the growing number of computer-related industry sectors.

job categories. The manufacturing sector experienced the largest loss, decreasing by almost 80 percent. In 2009, only about 4.5 percent of jobs in Brooklyn were in the manufacturing sector.

At approximately 57,000 jobs, the retail trade sector was the second-largest sector in the county in 2009. Employment in wholesale trade industries remained relatively stable between 1980 and 2009, at around 25,000 jobs. The transportation/communications industry (which includes trucking and warehousing) also remained stable since 1980, employing approximately 26,000 employees in 2009. The FIRE sector experienced a major increase over the past 30 years, growing from 23,400 to 30,441 employees.

The principal industrial areas in Brooklyn are located along the waterfront in South Williamsburg—primarily at the Brooklyn Navy Yard, Northside (Williamsburg), Greenpoint, Sunset Park, and Red Hook. Further east, there are manufacturing uses along Atlantic Avenue, in Bedford-Stuyvesant, and in East New York. In the south-central portion of the borough there are industrial concentrations in the Flatlands and McDonald Avenue areas. Many of the borough's industrial uses are concentrated in the New York City's Industrial Business Zones (IBZs). IBZs were created to offer industrial users planning certainty by guaranteeing to retain current zoning for the foreseeable future.

One of the principal industrial areas in this northern section of the borough is the North Brooklyn Industrial Zone, which spans from the mouth of the Newtown Creek to Johnson Avenue. The North Brooklyn industrial area abuts the Maspeth IBZ and together they form one of the most important industrial clusters in New York City. The industrial zone includes mostly small- to medium-sized companies, including major businesses such as Boar's Head Distributors, Miron Lumber Company, Ambrosino Construction Corp., Adco Paper & Packaging, Martin Greenfield Clothiers, Ltd., Budweiser and Mona Lisa Fine Furniture. However, other companies, such as Pfizer, have recently closed their facilities in the area.

Farther to the south along the waterfront, industrial activity is principally located in the Sunset Park neighborhood, which spans from about 17th Street to 65th Street and includes the area west of Third Avenue. In the early 20th century the development of the Bush Terminals (Industry City) and the Brooklyn Army Terminal (BAT) provided many businesses with manufacturing, warehousing, and distribution space. During the 1960s, industrial activity in Sunset Park—particularly port-related transportation, warehousing, and distribution—diminished with the creation of container ports and transportation and warehousing facilities across the harbor in New Jersey. This trend undermined Brooklyn's maritime industry and facilitated the overall decline of the borough's manufacturing base.

The trend was somewhat reversed in Sunset Park beginning in the 1980s with the establishment of the 400-acre Sunset Park In-Place Industrial Park (IPIP) in 1982, which later became part of the Southwest Brooklyn IBZ. The industrial area includes businesses in the apparel trades, food processing and distribution, metal fabricating, construction, furniture and woodworking industries. Most prominent among the signs of industrial stabilization include the successful redevelopment of the Brooklyn Army Terminal and Industry City, where a large portion of the tenants are involved in apparel manufacturing. Nearby, the 65th Street corridor, paralleling the tracks of New York City Transit and the Bay Ridge Branch, contains manufacturers involved in fabricated metals and publishing.

LOCAL STUDY AREA

Industrial land uses are the most prominent in the study area in the vicinity of South Brooklyn Marine Terminal (SBMT), 51st Street, and 65th Street Yard, occupying approximately 45 per-

cent of the land area. The service sector, wholesale trade, and manufacturing sectors are the dominant employment sectors in the area with approximately 20 percent of private sector employment in each area.

The waterfront facilities within the Brooklyn portion of the study area are located within the Southwest Brooklyn IBZ. Located along the waterfront, the Brooklyn Army Terminal is a large, six-to seven-story warehouse complex, extending from 58th to 63rd Streets. Originally used for transport of war materials by ship and train during WWI and WWII, the complex now houses more than 50 private businesses involved in light manufacturing, warehousing, and distribution and back-office operations.

The majority of employees in the East New York Site Study Area were employed in the service sector, with over 50 percent of total private sector employment. The next highest concentration of employees was in the manufacturing sector, which had approximately 15 percent of total employment). The retail trade sector followed with 12 percent of private sector employment.

QUEENS COUNTY

Private sector employment in Queens grew by 29 percent between 1980 and 2009, adding nearly 111,000 jobs (see Table D-9 in **Appendix D**). Like all other boroughs, the majority of the growth occurred in the service sector, which added almost 150,000 workers, an increase of 170 percent during the 30-year period. Service businesses provided about 235,000 jobs, the highest number of any private industrial sector. Both the transportation sector and the retail sector are important generators of economic activity, employing combined about 110,000 workers in 2009. Since 1980, transportation-related businesses (-2.2 percent), retail stores (-19.1 percent) and the wholesale trade sector (-10.1 percent) have all lost jobs.

Manufacturing in Queens is concentrated in several neighborhoods adjacent to the East River, including Hunters Point, Long Island City, and Dutch Kills. Recently, residential development, especially on the waterfront has increasingly competed with industrial uses and has changed the manufacturing character of Long Island City and Hunters Point. Other industrial areas are further inland and include West Maspeth, Ridgewood, Glendale, Flushing, College Point, Willets Point, and Jamaica neighborhoods. The industrial areas surrounding LaGuardia Airport and John F. Kennedy International Airport primarily contain businesses associated with the air transportation industry, such as handling and transportation of airfreight, as well as some construction-related uses and wholesaling.

Maspeth Industrial Business Area, together with North Brooklyn Business Area and the Long Island City Business Area, forms the largest cross-borough industrial cluster. Maspeth has a concentration of metal fabrication, textile mill products, and paper and allied products, as well as trucking and warehousing due in large part to its close proximity to the Long Island Expressway and the Brooklyn-Queens Expressway. East of Maspeth is Ridgewood, which is known for its apparel and textile mill products, and paper and allied products.

LOCAL STUDY AREA

Approximately 33 percent of private sector employees in the vicinity of Fresh Pond Yard were in the service sector. The retail trade sector followed with 25 percent of employment in the study area, followed by the manufacturing sector, which had 10 percent of private sector employment.

The service sector had approximately 37 percent of businesses in the study area. Retail trade establishments made up 32 percent of private sector businesses. The construction sector had the

next highest concentration of businesses in the Fresh Pond Yard Study Area, with 9 percent of total private sector businesses in the study area.

The highest concentration of employment in the vicinity of Maspeth Yard was in the wholesale trade sector, with over 30 percent of private sector employment. The service sector followed with 16 percent and. nearly 13 percent of employment was in the transportation sector and in the retail trade sector.

West Maspeth benefits from proximity to major transportation routes. Superior truck access to the Long Island Expressway and the Brooklyn-Queens Expressway, supplemented by rail freight via the New York & Atlantic Railway, has helped expand industrial activity in West Maspeth, continuing the neighborhood's history as one of the key industrial concentrations in Queens.

The wholesale trade and service sectors each accounted for over 20 percent of private sector businesses in the study area. The next-highest concentration of businesses in the study area was in the retail trade sector (approximately 17 percent), followed by the construction sector (approximately 16 percent).

Some of the more intensive industrial uses in the study area are trucking companies, warehousing, and distribution companies. The larger warehouses and distribution facilities are located along 56th Road and Maspeth Avenue in close proximity to the rail lines. The northern portion of the study area generally contains businesses that manufacture and/or distribute building materials. Along Review Avenue there are primarily smaller construction, manufacturing, and transportation businesses. The southeastern portion of the study area contains heavier industrial uses, including a Department of Sanitation facility as well as trucking companies.

BRONX COUNTY

Manufacturing in the Bronx is concentrated in the South Bronx within the Hunts Point and Port Morris neighborhoods; in the East Bronx within the Bronx River and Zerega neighborhoods; in the Mid-Bronx within the Bathgate and Morrisania neighborhoods; in the West Bronx along the Harlem River; and in the North Bronx within the Wakefield and Eastchester neighborhoods.

The Hunts Point Peninsula, which is also part of the larger Port Morris Industrial Business Area, began experiencing industrial expansion as businesses moved to the area during the 20th century. The area flourished due to its proximity to the tri-state region, its existing rail lines, and the availability of space for industrial and commercial uses. During the 1960s and 1970s, the opening of the New York City Produce Market in 1967 and the Hunts Point Meat Market in 1974 substantially increased business activities. Today, the area is home to more than 600 businesses in apparel and textile manufacturing, construction, food manufacturing and distribution, transportation, chemicals and plastics, and wood, lumber and paper products.

Industrial uses are scattered along the Harlem River in the West Bronx. They primarily include food processing and wholesaling, automotive repair (particularly in the Highbridge area), construction, and printing and publishing.

LOCAL STUDY AREA

The Bronx Study Area incorporates portions of the neighborhoods of Port Morris, Longwood, and Hunts Point. Although the Bruckner Expressway, a major, limited-access highway (I-278) runs north-south through the study area, the roadway is elevated and provides no access to the study area, except at its intersection with the Major Deegan Expressway (I-87). Local streets, including Hunts Point Avenue, Leggett Avenue, and Tiffany Street provide the principal points

of access to the industrial area east of the Bruckner Expressway. Over 75 percent of the study area is occupied with industrial uses, such as manufacturing loft buildings, garages and gas stations, warehouses, transportation and distribution facilities, and utilities. Residential and commercial uses, generally located northwest of Bruckner Boulevard, occupy combined about 10 percent of the area.

The service sector had the highest number of employees in the study area, with 30 percent of private sector employment. Approximately 26 percent of employees worked in the wholesale trade sector. The third-highest concentration of employment was in the manufacturing sector (approximately 15 percent). Because of the close proximity of the Hunts Point markets (the City's principal wholesale food market), a high percentage of these employees work in food manufacturing businesses.

The highest concentration of businesses in the Bronx Study Area is related to the service sector (37 percent). Although the retail trade sector had the fourth-highest share of employment in the study area (11 percent), it had the second-highest concentration of businesses (approximately 25 percent). The wholesale trade sector followed with 14 percent of private sector employment in the Oak Point Yard Study Area.

LONG ISLAND STUDY AREAS

Total employment in Nassau and Suffolk Counties grew by almost 41 percent between 1980 and 2009 (see Table D-14 in **Appendix D**). Although total employment in Nassau and Suffolk counties has grown over the last few decades, manufacturing employment declined by nearly 60 percent. However, when compared to Hudson County and the New York City counties, manufacturing still represents a larger share of the total employment (7 percent). While the manufacturing sector was shrinking significantly, the service sector grew by almost 180 percent. Between 1990 and 2009, the retail sector was the only other sector, besides manufacturing, to lose jobs. All other sectors experienced double-digit growth, including construction (which nearly doubled), wholesale trade (70 percent), transportation and communication (over 60 percent percent), and FIRE (38 percent).

Most of the manufacturing clusters on Long Island are located either near the Long Island Rail Road right of way or are close to one of the larger traffic arteries, such as the Long Island Expressway or the Veterans Highway. In Nassau County larger clusters of industrial activity can be found in New Cassel and Hicksville. Both of these clusters were in close proximity to the former Grumman industrial complex, and used to house many businesses directly linked to the supply chain of this producer of military and aerospace products. Since Grumman left, many of the medium-sized supply businesses, such as American Defense Systems (formerly located in Hicksville) have also relocated to other parts of the country. Today the New Cassel Industrial Area is dominated by smaller construction and construction materials businesses catering to local residents and contractors. However, due to the historic strength of the defense sector on Long Island, the region was able to develop a strong foundation in engineering, research and product development.

In Suffolk County major industrial and manufacturing clusters have formed along Route 110 in Farmingdale; along the rail right of way in Islip; in Hauppauge, between the LIE and the Northern State Parkway/Veterans Highway; and in Ronkonkoma and Bohemia along Veterans Highway. The Hauppauge industrial area is occupied by many high-value manufacturers and research and development (R&D) firms, while the industrial area in Islip houses a large portion

of distribution companies. Industrial areas in Farmingdale and Ronkonkoma house a diverse mix of mid-size manufacturers and regional distributors.

As discussed in Chapter 4, "Alternatives," the Pilgrim Intermodal Terminal proposed by New York State Department of Transportation (NYSDOT) and the existing Brookhaven Rail Terminal site serve as illustrative examples for the determination of potential environmental effects resulting from CHFP operation in Nassau/Suffolk. These two sites, discussed below are not the only possible sites for the Long Island Facility, but rather sites that are generally representative of potential environmental effects on Long Island due to the operation of CHFP alternatives.

The service sector had the greatest concentration of workers in the vicinity of Pilgrim Intermodal Terminal, with approximately 46 percent. The manufacturing sector had the second-highest number of employees in the study area, with 17 percent, followed by the wholesale trade sector, with 17 percent. The greatest share of businesses in the vicinity of Pilgrim Intermodal Terminal was in the service sector. The retail trade sector and the wholesale trade sector each had approximately 16 percent of businesses in the study area. The fourth-highest concentration of businesses in the Pilgrim Intermodal Terminal Study Area was in the manufacturing sector, which represented 11 percent of businesses.

Approximately 33 percent of private sector employees in the vicinity of Brookhaven Rail Terminal were in the service sector. The retail trade sector followed with the next-highest share of study area employment at approximately 30 percent. The construction sector and the wholesale trade sector followed at approximately 10 percent each. The service sector had 26 percent of private sector businesses in the study area; retail trade establishments made up approximately 20 percent and construction sector followed with approximately 15 percent.

D. PROBABLE IMPACTS OF THE ALTERNATIVES

ECONOMIC IMPACTS FROM CONSTRUCTION

As described in Section B of this chapter, economic impacts associated with construction activities were estimated using the PANYNJ IMPLAN model for one alternative in each class of alternatives. Differences in construction benefits among the service options within each class of alternatives were estimated by scaling the benefits based on the difference in estimated construction cost. Economic effects were reported for the 23-county environmental study area.

The key input to the construction analysis is project cost. Total project costs are shown in **Table 6.2-1**. The analysis used hard costs only (construction costs and contingency costs), and excluded soft costs (engineering services, program management, property acquisition, insurance and legal, etc.), because construction spending is what creates the demand for employment. This analysis considers four construction methods for a rail tunnel, including a tunnel with one track that is constructed by boring through the earth under the harbor, a one-track tunnel constructed using a "hybrid" method of boring and immersed tube construction, a two-track bored tunnel, and a two-track hybrid tunnel. Infrastructure needed for the Rail Tunnel with Chunnel Service Alternative, Rail Tunnel with Shuttle Service Alternative, Rail Tunnel with AGV Technology Alternative, and the Rail Tunnel with Truck Access Alternative are shown as an incremental expenses that would be incurred over and above the cost of construction for the Rail Tunnel Alternative.

Table 6.2-1
Cost Inputs for Build Alternatives
(Millions of 2012 Dollars)

Alternative Class	Alternative		Construction Cost Subtotal	Design Contingency	Total Hard Cost	Soft Cost	Total Cost
Waterborne	Enhanced Railcar Float	Brooklyn	$80	$28	**$108**	$35	**$142**
		Bronx	$106	$37	**$143**	$46	**$190**
	Truck Float/Truck Ferry		$53	$19	**$72**	$23	**$95**
	RORO* Container Barge		$59	$21	**$80**	$26	**$106**
	LOLO Container Barge		$74	$26	**$100**	$32	**$132**
Rail Tunnel	Rail Tunnel		$3,903 to $5,627	$1,186 to $1,703	**$5,089 to $7,330**	$1,838 to $2,657	**$6,927 to $9,987**
	Add-On Cost (in Addition to Rail Tunnel Alternative)	With Chunnel Service	$243	$85	**$328**	$105	**$433**
		With Shuttle Service	$51	$18	**$68**	$22	**$90**
		With AGV Technology	$451	$158	**$609**	$195	**$803**
		With Truck Access	$498	$174	**$672**	$215	**$888**

Source: STV, Inc.

Notes:

* RORO = Roll On-Roll Off

1. Construction cost subtotal includes the estimated cost to construct the infrastructure required for each alternative, including rail yard construction/reconstruction, land acquisition, site work and terminal development, track construction/reconstruction, bridge construction/reconstruction, tunnel construction, vehicle and vessels such as barges, ferries, cranes, or AGVs, etc., and equipment as applicable to each alternative. Construction cost includes the cost of labor and materials.

2. Construction contingency represents a set-aside, valued at approximately 35 percent of the construction cost subtotal, intended to cover any unforeseen costs or potential cost overruns during construction.

3. Total hard costs is the sum of the construction cost subtotal and construction contingency.

4. Soft costs are the costs of engineering, permitting, insurance, program management, construction management, construction contingency/owner reserve, and other non-construction costs.

5. Total cost is the sum of all hard and soft costs.

6. The range of costs provided for the Rail Tunnel Alternatives account for different track configurations (single track versus double track) and tunnel construction techniques (boring versus immersed tube).

Some of this construction spending is retained as direct spending in the 23-county region; direct spending, in turn, generates indirect and induced spending, some of which is retained in the 23-county region. The direct economic impacts and the total economic impacts (including direct, indirect, and induced impacts) for the 23-county region are summarized below.

WATERBORNE ALTERNATIVES

The Waterborne Alternatives would generate the smallest economic benefits resulting from construction expenditure. The Waterborne Alternatives would generate between 200 and 300

direct job-years, 478 to 720 total job-years (including indirect and induced jobs), $30 million to $45 million in wages, and $116 million to $175 million in total spending.

RAIL TUNNEL ALTERNATIVES

The Rail Tunnel Alternative would generate approximately 12,500 to 18,000 direct job-years, 28,000 to 41,000 total job-years (including indirect and induced jobs), $1 billion to $1.5 billion in direct wages, $1.8 billion to $2.6 billion in total wages, and $7.2 to $10.4 billion in total spending. The range represents the difference in construction costs estimated for the tunnel options listed in **Table 6.2-1**.

The incremental construction costs associated with each of the Rail Tunnel Alternatives with service and technology options presented in **Table 6.2-1** also generate economic benefits. These additional expenditures could generate an additional 176 to 1,743 direct job-years, 418 to 4,122 total job-years (including indirect and induced jobs), $14 million to $144 million in direct wages, $26 million to $256 million in total wages, and $104 million to $1.0 billion in total spending. The Rail Tunnel with Truck Access Alternative would generate the greatest economic impact during the construction phase because it requires the greatest construction expenditure.

ECONOMIC IMPACTS FROM OPERATIONS

As previously discussed in Section B of this chapter, economic impact analysis of operations quantifies the monetized value of transportation system benefits and the direct, indirect, and induced monetized benefits of program-related increases in economic activity within the 23-county regional study area. These represent benefits from ongoing annual operations, over and above the one-time benefits from construction. The analysis consists of two parts: Regional Impact Modeling and Other Business Attraction.

DIRECT HIGHWAY SYSTEM USER AND SHIPPER/RECEIVER COST SAVINGS

Regional impact modeling utilizes the REMI economic simulation model, along with two sets of inputs: direct highway system user cost savings, and direct freight shipper and receiver cost savings. All savings are calculated as compared to the No Action Alternative.

As previously discussed in Section B, highway system user time savings were calculated using regional transportation demand models (NYMTC BPM and NJTPA RTM-E). The time savings, in hours per day, were translated into hours per year (at 295 days per year, as a typical mid-weekday traffic volume is equal to approximately 1/295th of the annual traffic volume, on average[1]) and dollars per year (at values of time recommended by the USDOT as guidance for the TIGER grant program; please refer to **Appendix C** for calculation details). For non-truck savings, only business-related travel was considered. It should also be noted that the majority of travel time savings achieved by the Build Alternatives are within the 23-county analysis region. Travel over the national highway system outside the region does of course incur some congestion, but much of the traffic is over non-urban interstates and has the ability to avoid congestion by route and time-of-day travel choices. In contrast, the 23-county region is one of the most congested in the country, and for pickups and deliveries within the 23-county region,

[1] *National Cooperative Freight Research Program (NCFRP) Report 8: Freight-Demand Modeling to Support Public-Sector Decision Making*, Transportation Research Board of the National Academies, 2010.

the choice of routes and travel times is very constrained. Therefore, the majority of travel time benefit achieved at the national level is also reflected in the 23-county REMI analysis. The total national benefit is captured in the benefit-cost analysis, as discussed later in this chapter.

As previously discussed in Section B, freight shipper and receiver cost savings were based on the amount of freight attracted by each Build Alternative, the equivalent trucking distance and cost, and an assumed discount against the equivalent trucking cost (please refer to **Appendix C** for calculation details). The estimated shipper cost savings by Build Alternative are presented in **Table 6.2-2** cumulative through the year 2060, in current dollars and without any discounting of future year values. Unlike travel time savings, where the majority of national benefit accrues in the 23-county region, the majority of freight shippers benefiting from the Build Alternatives are located outside the 23-county analysis region—at the other end of long-haul domestic and international trips, or in upstate New York and New England beyond the 23-county region. These benefits generate efficiencies that allow businesses in the region to be more competitive, thereby generating more economic activity in the form of increased jobs, wages, gross domestic product, and output. Estimation of the economic impacts for preferred alternatives will be completed in Tier II.

Table 6.2-2
Shipper/Receiver Cost Savings in 23-County Region Through 2060 (Millions of 2012 Dollars, No Discounting)

Alternative Class	Alternative		New York City	New York State Counties	New Jersey Counties	Total (23 counties)
Waterborne	Enhanced Railcar Float	New Jersey to Brooklyn	134	62	None	**196**
		New Jersey to Bronx	85	58	None	**143**
	Truck Float/Ferry	New Jersey to Brooklyn	None	None	None	**None**
		New Jersey to Bronx	None	None	None	**None**
	LOLO/RORO Container Barge	New Jersey to Brooklyn	1	None	None	**1**
		New Jersey to New England	None	None	None	**None**
Rail Tunnel	Rail Tunnel	Seamless	453	188	None	**641**
		Base	449	187	None	**636**
		Limited	441	180	None	**621**
	Rail Tunnel with Chunnel Service		453	189	4	**646**
	Rail Tunnel with Shuttle Service		450	188	None	**637**
	Rail Tunnel with AGV Technology		450	188	1	**639**
	Rail Tunnel with Truck Access		449	187	None	**636**

Source: Cambridge Systematics analysis based on projected demand volume and origin-destination, and on reasonably anticipated per-mile cost savings accruing to shippers and receivers.

Waterborne Alternatives

In 2035, the Waterborne Alternatives would save highway users between $1 million and $13 million in non-discounted 2012 dollars. The LOLO and RORO Container Barge Alternatives represents the low end of the range, and the Enhanced Railcar Float Alternative with service to Brooklyn represents the high end of the range. Through 2060, the Waterborne Alternatives could achieve a cumulative cost savings of up to $600 million in non-discounted 2012 dollars.

As **Table 6.2-2** shows, the Enhanced Railcar Float would achieve cumulative shipper/receiver cost savings through 2060 of $195 million with service to Brooklyn and $143 million with service to the Bronx. The Truck Float and Truck Ferry Alternatives, as well as the truck-serving component of the Rail Tunnel with Truck Access Alternative do not result in a significant shipper cost savings because the VMT savings are relatively small, and there is no shift from truck to a less expensive alternative mode.

New Jersey does not derive shipper/receiver cost savings from the Waterborne Alternatives. The reason is: the Waterborne Alternatives attract traffic with an origin or destination outside of the 13-county NJTPA region, with container traffic between Port Newark/Elizabeth and Nassau/Suffolk being an exception. In the case of container traffic, the beneficiaries of these cost savings are in Nassau/Suffolk (one origin/destination point) and overseas (the other origin/destination), and benefit cannot be assigned to New Jersey, which functions as an intermediate transfer point for the traffic. New Jersey's economic benefits are therefore driven almost entirely by reductions in highway VMT and VHT.

Rail Tunnel Alternatives

The Rail Tunnel Alternative under the Limited, Base, and Seamless Operating Scenarios would save highway users between $130 and $135 million. The Rail Tunnel Alternatives with Chunnel Service, AGV Technology, Shuttle Service, and Truck Access options would save highway users between $116 and $162 million. Cumulative savings through 2060 resulting from the Rail Tunnel Alternative could range from $4.6 billion (Rail Tunnel Alternative under the Limited Operating Scenario) to $5.8 billion under the Rail Tunnel with AGV Technology Alternative.

As **Table 6.2-2** shows, the Rail Tunnel Alternatives generate shipper/receiver cost savings ranging from a cumulative shipper cost savings of $621 million dollars (Limited) to $646 million dollars (Seamless) through 2060. This follows from the fact that the Seamless Operating Scenario would divert the most traffic from truck to rail. The benefits for the Rail Tunnel with Chunnel Service Alternative and Rail Tunnel with AGV Technology Alternative would be greater than the benefits for the Rail Tunnel alone, assuming the Base Operating Scenario for both.

The benefits for the Rail Tunnel with Chunnel Service Alternative, Rail Tunnel with Shuttle Service Alternative, and Rail Tunnel with AGV Technology Alternative would be greater than the benefits for the Rail Tunnel alone, assuming the Base Operating Scenario, because these service alternatives would attract more traffic.

New Jersey does only derives savings from the Rail Tunnel with Chunnel Service Alternative and the Rail Tunnel with AGV Technology Alternative because these are the only two Rail Tunnel Alternatives which divert a significant volume of truck traffic originating in the 13 northern New Jersey counties to an alternative mode. The Rail Tunnel with Truck Access Alternative represents a change in truck routing, but does not result in a shift to an alternative, cheaper, mode.

BUSINESS AND EMPLOYMENT REDISTRIBUTION

As previously discussed in the Methodology section of this chapter, the REMI analysis captures job creation and other benefits related directly to transportation system user cost savings and freight shipper cost savings, but it does not capture two other types of job creation effects: warehouse/distribution employment and rail yard employment.

From the extensive program of mode choice surveys performed for this project, it was determined that among the population of shippers and receivers that would utilize Build Alternatives, approximately 20 percent of the tonnage requires warehouse/distribution facilities; and of this tonnage, approximately 12 percent is currently sited east-of-Hudson while 8 percent is sited west of Hudson. As a result, the utilization of Build Alternatives—which eliminate a "point of rest" in New Jersey, where the transfer to/from warehouse/distribution facilities would otherwise occur—would redistribute future warehouse/distribution employment associated with 8 percent of the Build Alternative tonnage from the west-of-Hudson to the east-of-Hudson. Based on this estimate, and on tonnage associated with the Build Alternatives, and on appropriate conversion factors, the associated direct warehouse/distribution employment effects for the 23-county region can be estimated.

As previously discussed in the Methodology section of this chapter, increases in rail and float traffic would result in new employment related to those facilities. To estimate the employment effects, the tons of freight diverted by Build Alternative and region in year 2060 was tabulated from the project demand estimates; then factors for employees per 1,000 tons were applied. Employment includes not only railroad workers, but also local truck drayage service providers making local deliveries to and from the terminals. A summary of changes in rail yard employment is shown in **Table 6.2-3.**

By utilizing Build Alternatives, more traffic moves by rail and float, and more rail and float employees are needed, along with local truck drivers making delivery trips to and from the rail terminals. However, less traffic moves directly between freight shippers and receivers by truck only, truck VMT is reduced, and as a result fewer non-rail related truckers are needed, resulting in less growth in trucker employment compared to the No Action Alternative. It is not possible to accurately determine the allocation of these effects by subregion—it would depend on where the impacted truckers are based—but it is reasonable to estimate the likely effect for the 23-county region, as reported in **Table 6.2-4**.

Overall, it is likely that these two effects—added rail yard employment and reduced non-rail related trucker employment—would result in net increase in employment within the 23-county region for all Build Alternatives, except for the Container Barge and Truck Float and Ferry Alternatives. The greatest increase in net employment would occur with the Rail Tunnel with Chunnel Service, followed by the Rail Tunnel with AGV Technology, the Rail Tunnel with Shuttle, and the Rail Tunnel with Seamless Operating Scenario. Although railroads are more efficient on an employee-per-ton basis than trucking, local rail yards would also generate jobs for local truckers; and while there would be corresponding losses of non-rail related trucking jobs, nearly half of those losses would be out of the 23-county region, at the other end of the truck trip.

Table 6.2-3
Changes in Rail Yard Employment in the 23-County Region, Year 2060

Alternative Class	Alternative		New York City	New York Counties	New Jersey Counties	Total
Waterborne	Enhanced Railcar Float	New Jersey to Brooklyn; Carload and Intermodal	753	310	(268)	796
		New Jersey to Bronx; Carload and Intermodal	288	155	(26)	417
		New Jersey to Brooklyn; Carload Only	529	83	(302)	309
		New Jersey to Bronx; Carload Only	97	52	(55)	94
Rail Tunnel	Rail Tunnel	Seamless	1,102	462	132	1,696
		Base	1,102	462	(71)	1,493
		Limited	1,102	462	(164)	1,401
	Rail Tunnel (Base) With Chunnel Service		1,440	462	267	2,170
	Rail Tunnel (Base) with Shuttle Service		1,200	506	70	1,706
	Rail Tunnel (Base) with AGV Technology		1,252	529	145	1,926
	Rail Tunnel (Base) with Truck Access		1,102	462	(71)	1,493

Source: Cambridge Systematics analysis.
Notes:
1. Rail yard tonnage changes in New York City and New York Counties reflects the following effects: some west-of-Hudson rail traffic moved to east-of-Hudson terminals; higher east-of-Hudson traffic from truck to rail diversion; inland port operations; and Chunnel operations. It does not include tonnage that would be routed over Selkirk and handled in New York rail yards under the No Action Alternative.
2. Rail yard tonnage change in New Jersey Counties reflects the following effects: some west-of-Hudson rail traffic moved to east-of-Hudson terminals; fillet/toupee operations for double stack traffic; inland port operations; and Chunnel operations.
3. Employment estimates are based on tonnage multiplied by employment per 1,000 tons. For non-Chunnel services, the conversion factor was based on Norfolk Southern Crescent Corridor TIGER I Analysis, which estimated 0.2 direct rail yard-located jobs (including rail operations and local truck delivery) per 1,000 tons. There is no US precedent for the Chunnel Terminal but rail yard employment would certainly be lower (since the Chunnel users deliver freight themselves and there is no additional local truck employment), and a factor of 0.1 jobs per 1000 tons is applied.
4. The Enhanced Float column includes only estimates related to the Brooklyn service option. Because this service option generates the highest demand among the Enhanced Float Alternative service options, it will generate the greatest impact on employment.
5. The Truck Ferry Alternatives and Container Barge Alternatives are not shown, as they do not result in a change in rail tonnage.

Table 6.2-4
Changes in Railroad and Non-Rail Related Trucking Employment in the 23-County Region, Year 2060

Alternative	Alternatives		Avoided Truck VMT 23-Counties (Million)	Estimated Change in Non-Rail Trucking Jobs, National	Estimated Change in Trucking Jobs, 23 Counties[2, 3]	Estimated Change in Railroad Jobs*	Net Change in Rail Yard and Non-Rail Trucking Jobs
Waterborne	**Enhanced Railcar Float**	New Jersey to Brooklyn; Carload and Intermodal	47.2		(381)	796	415
		New Jersey to Bronx; Carload and Intermodal	44.7		(361)	417	56
		New Jersey to Brooklyn; Carload only	27.0		(218)	309	91
		New Jersey to Bronx; Carload only	20.0		(162)	94	(68)
	LOLO/ RORO Container Barge	New Jersey to Brooklyn	20.2		(302)	0	(302)
		New Jersey to New England	11.2		(84)	0	(84)
	Truck Float/ Ferry	New Jersey to Brooklyn	0.2		(3)	0	(3)
		New Jersey to Bronx	0.1		(1)	0	(1)
Rail Tunnel	**Rail Tunnel**	Seamless	129.7	(1,940)	(990)	1,696	706
		Base	129.5	(1,938)	(986)	1,493	507
		Limited	128.3	(1,919)	(974)	1,401	427
	Rail Tunnel (Base) with Chunnel Service		163.0		(986)	2,170	1,183
	Rail Tunnel (Base) with Shuttle Service		129.8		(990)	1,706	716
	Rail Tunnel (Base) with AGV Technology		129.7		(988)	1,926	938
	Rail Tunnel (Base) with Truck Access		129.5		(986)	1,493	507

Source: Cambridge Systematics analysis.
Notes:
*From **Table 6.2-3**
1. Avoided Truck VMT for the 23-county region includes inbound and outbound VMT, but excludes pass-through VMT. Employment changes related to pass-through VMT would not be felt within the 23-county region.
2. Calculated by dividing avoided annual truck VMT by the average annual VMT truckers log per year. Average annual trucker VMT is estimated to be 66,860 vehicle-miles, according to Federal Motor Carrier Safety Administration (FMCSA) data, 2011.
3. Estimated change in trucking jobs within the 23-county region is lower than the estimated change in national jobs. For truck VMT that originates or terminates outside the 23-county region, half the associated trucking employment is assigned to the out-of-region origin or destination.
4. Even though the Rail Tunnel with Chunnel Service Alternative results in more truck VMT reduction than the Rail Tunnel Alternative, assuming the Base Operating Scenario for both, the extra truck VMT avoided does not translate into more truck jobs lost. The chunnel service actually provides a service to truckers, much like a bridge or a ferry boat, so local truck utilization remains unchanged. This is not the case for the Rail Tunnel with AGV Technology Alternative or Rail Tunnel with Shuttle Service Alternative, which require a trucker to transport the load at either end of the trip through the facility, but VMT avoided between the alternatives' termini result in reduced trucker demand.

The following paragraphs discuss the probable impacts of the Build Alternatives on warehouse and distribution center and rail yard employment.

Waterborne Alternatives

The Waterborne Alternatives would add between 972 and 2,250 warehouse and distribution center jobs in New York City and up to 2,274 jobs in other New York counties. There is no net effect on the 23-county region as a whole, since growth in warehouse/distribution jobs is not increased or decreased—it is simply redistributed within the region. Further, the effect on New Jersey, in percentage terms, is actually very small. With a current inventory of around 900 million square feet[1], and a reasonable annual growth rate of 1.4 percent (consistent with the growth in traffic for the Build Alternatives), New Jersey would have a warehouse space inventory of around 1.2 billion square feet in year 2060. The Waterborne Alternatives would shift less than 10 million square feet (about 0.6 percent) of New Jersey's future warehouse and distribution center inventory.

As shown in **Table 6.2-3**, the Enhanced Railcar Float Alternative would result in a net increase of 90 to 800 railroad jobs in the region. Also, a higher share of its tonnage is associated with rail drayage relocation from New Jersey terminals, so it has a proportionally greater effect on New Jersey railroad employment than the Rail Tunnel Alternative, where a higher share of tonnage is associated with long-haul traffic and does not impact New Jersey railroad employment. The Truck Float/Ferry Alternatives and RORO/LOLO Container Barge Alternatives would not have an impact on rail yard employment, as they would not result in significant changes in rail traffic volumes or origins and destinations in the region. All of the Waterborne Alternatives would result in a reduction in truck driver employment, due to reduced truck VMT, as **Table 6.2-4** shows.

Rail Tunnel Alternatives

In year 2060, warehouse/distribution development under the Rail Tunnel Alternative would add growth of between 4,007 and 4,098 direct jobs in New York City and 2,885 direct jobs in New York Counties, depending on the level of service. There would be a corresponding reduction in direct job growth in New Jersey Counties. Again, there is no net effect on the 23-county region as a whole, since growth in warehouse/distribution jobs is not increased or decreased—it is simply redistributed within the region. The various rail tunnel service options result in the following impacts on warehouse and distribution center employment:

- The Rail Tunnel with Chunnel Service Alternative would add 4,035 jobs in New York City and 2,885 jobs in other New York counties;
- The Rail Tunnel with Shuttle Service Alternative would add 5,014 jobs in New York City and 3,321 jobs in other New York counties;
- The Rail Tunnel with AGV Technology Alternative would add 5,534 jobs in New York City and 3,553 jobs in other New York counties; and
- The Rail Tunnel with Truck Access Alternative would add 11,657 direct jobs in New York City and 5,762 jobs in other New York counties.

The effect on New Jersey's warehouse and distribution center market remains quite small. The Rail Tunnel Alternative would shift approximately 14 million of New Jersey's estimated future inventory of 1.2 billion square feet to the east-of-Hudson, or around 1 percent of New Jersey's

[1] Source: A. Strauss-Wieder, Inc. for the New York Shipping Association

future inventory. The Rail Tunnel with Truck Access Alternative would have the greatest impact, shifting 35 million square feet, or 2.9 percent of New Jersey's future inventory.

The Rail Tunnel Alternative would increase railroad employment in New York City and New York Counties. Under the Seamless Operating Scenario, there is also an increase in New Jersey Counties rail yard employment; even though New Jersey rail yards lose employment growth with the relocation of some rail traffic to east-of-Hudson terminals (through "rail dray relocation," as discussed in the Chapter 4, "Alternatives"), they gain employment growth from fillet/toupee operations (converting double-stack containers to single-stack, and vice-versa). The Seamless Operating Scenario handles the most containers, so there is the most fillet/toupee business for New Jersey. Under the Base and Limited Operating Scenarios, there is less container traffic, less fillet/toupee business, and fewer New Jersey rail yard jobs, resulting in a slightly negative effect on growth in rail yard jobs in New Jersey counties.

The Rail Tunnel with Chunnel Service Alternative, Rail Tunnel with Shuttle Alternative, and Rail Tunnel with AGV Technology Alternative generate significant additional railroad jobs in New York City and New Jersey Counties because they add new rail yards or new rail yard capacity to accommodate their respective traffic and handling needs.

COSTS AND REVENUES ANALYSIS

This analysis assesses, qualitatively, the potential for the Build Alternatives to generate revenues, in the form of railroad revenue, truck tolls, and container barge revenue, to cover a portion of the capital and operating and maintenance costs. In practice, costs and profitability for any transportation service—truck, rail, waterborne and/or the combination of the three—depend on operating details and specific customer requirements. This next level of detail is an important component of analyses that would be undertaken as part of any subsequent Tier II analysis to identify cases where higher or lower price advantages for rail may be indicated.

- The Rail Tunnel Alternatives would generate revenues for the railroads operating the service. Because the Enhanced Railcar Float Alternative is a rail service that uses a waterborne float, it can be expected to generate the same type of railroad revenues as well. Based on experience with private railroads, and from information made public through railroad-sponsored TIGER grant applications, a "fair rate" for rail service is equal to about 90 percent the cost of trucking. As railroads would note, every service is different, depending on route, volume, and handling. But on average, barring unusual costs for construction, operations, or maintenance, railroads expect to operate profitably and successfully at this price point. Of the price charged to customers, some of that revenue represents revenues to local truckers, some to warehouse and distribution center operators, or other intermediate service providers, and some is revenue to the railroads. The exact shares would vary, but on average it is reasonable to assume at least 50 percent of the total end-to-end transportation cost would be realized in the form of railroad revenues. From revenues, railroads make expenditures in many categories—labor and benefits, maintenance, debt service, taxes, and property (including rolling stock, land, track, terminals, and other equipment). With respect to property, taking the average for years 2009-2011 as reported in Year 2011 Annual Reports from Norfolk Southern and CSX, on average, 17.5 percent of railroad operating revenues were reinvested in property. It is reasonable to assume, therefore, that about 17.5 percent of the revenue generated from the Rail Tunnel Alternatives could be reinvested in the property by a private railroad operator.

- The Truck Float/Ferry Alternative and the Rail Tunnel with Truck Access Alternative would generate revenue in the form of truck tolls. In the case of the Rail Tunnel with Truck Access Alternative, the truck tolls would be revenue above and beyond the railroad revenue generated from the rail traffic. The Demand Analysis assumed that the toll charged to trucks using the Rail Tunnel with Truck Access and the Truck Float/Ferry Alternatives is equal to the toll charged on existing Hudson River and New York Harbor crossings, in order to ensure that the projected demand was not influenced by the price of the toll but the overall cost, speed, and reliability features offered by each alternative. Indeed a toll price significantly greater than the tolls on existing crossings can be expected to result in lost traffic and revenue.
- The Container Barge Alternatives require significant transportation costs—including fuel, barge charges, barge fees, port fees, and labor—as well as stevedoring costs at each terminal, in the case of the LOLO Container Barge Alternative. The transportation costs vary, of course, by the distance travelled. Therefore the transportation costs for the Container Barge service to Davisville, Rhode Island are much greater than the transportation costs for the service to Brooklyn. Stevedoring costs are calculated as a flat fee per container. Container barge services compete against trucking, and must offer a price that is competitive with the price of trucking in order to generate the projected demand.

Each of the Build Alternatives, therefore, offer the potential to generate revenues in the form of user fees—including railroad revenue yielded from the price charged to move each railcar or intermodal container handled, tolls charged to trucks moving on the Truck Float/Ferry Alternative and the truck portion of the Rail Tunnel with Truck Access Alternative, and fees levied on each container moved by the Container Barge Alternative. This revenue potential could entice private sector participation in the financing and operation of the Build Alternatives. The revenue is not likely to cover all of the capital, operating, and maintenance costs, however, and public funding will likely be necessary. For the Rail Tunnel Alternatives, the cost-versus-revenue ratio will be most favorable for the service alternatives that generate the greatest volume of demand, and for the Rail Tunnel with Truck Access Alternative, which yields truck toll revenue in addition to railroad revenue. For the Waterborne Alternatives, the cost-versus-revenue ratio would be most favorable for the shortest-distance alternatives, due to the fact that the difference in operating costs for the Brooklyn service compared to the New England service far exceeds the difference in demand and potential revenue. Identifying and evaluating potential sources for the additional required funding would be a critical task in a Tier II analysis.

LOCAL EFFECTS ANALYSIS

LOCAL EFFECTS ANALYSIS

Property acquisition and business displacement may occur where project-related facilities need to expand or be constructed to support an alternative. As noted throughout this Tier I EIS, detailed designs based on actual operating plans are not available at this time. Therefore, the approximate size of each required facility is based on the need to accommodate projected demand for a given alternative. Furthermore, in many cases it is not possible to determine what businesses or tenants may be in a given building several years hence, when the Tier II impact assessments will be conducted. Accordingly, the land acquisition estimates presented in this section are discussed generally, for the purpose of comparing potential impacts across project alternatives.

DISPLACEMENT UNDER THE BUILD ALTERNATIVES

Table 6.2-5 shows the approximate acreage that would be required to establish new facilities to support the project alternatives or to expand existing freight handling facilities, such as rail yards (e.g., Fresh Pond) or waterfront facilities (e.g., Oak Point Yard). For the Rail Tunnel Alternatives, the acreages presented for the Rail Tunnel with Chunnel Service Alternative, Rail Tunnel with Shuttle Alternative, Rail Tunnel with AGV Technology Alternative, and the Rail Tunnel with Truck Access Alternative are shown as additional acres, over what is required for the Rail Tunnel Alternative. A more detailed discussion of the land needed by facility and by alternative is provided in Chapter 6.1, "Land Use, Neighborhood Character, and Social Conditions." In some cases, particularly for the waterfront facilities that would accommodate new waterborne alternatives—e.g., Port Newark/Port Elizabeth or Red Hook in the case of the Container Barge Alternatives—the existing facility may be expanded by rearranging existing uses rather than acquiring additional property.

Table 6.2-5
Potential Land Acquisition by Facility per Alternative

	Potential Land Acquisition in Acres									
	Waterborne Alternatives					Rail Tunnel Alternatives				
Facility	Enhanced Float	Truck Float[2]	Truck Ferry[2]	LOLO[2]	RORO[2]	Rail Tunnel	Shuttle[1]	Chunnel[1]	AGV[1]	Rail Truck Tunnel[1]
West-of-Hudson										
Oak Island Yard	NA	NA	NA	NA	NA	50	+0	+20	+0	+0
Greenville Yard	0	NA	NA	15	15	TBD	+0	+0	+30	+30
Port Newark/Port Elizabeth	NA	10	10	15	15	NA	NA	NA	NA	NA
East-of-Hudson										
65th Street Yard	7.5	10	10	15	15	7.5	+0	+0	+0	+0
51st Street Yard	0	10	10	15	15	0	0	0	0	0
SBMT	NA	10	10	15	15	NA	NA	NA	NA	NA
Red Hook Container Terminal	NA	NA	NA	15	15	NA	NA	NA	NA	NA
Oak Point Yard	TBD	10	10	NA	NA	9	+0	+0	+0	+0
Hunts Point Yard	NA	10	10	NA	NA	NA	NA	NA	NA	NA
East New York Yard	0	NA	NA	NA	NA	TBD	+0	+13	+15	+15
Fresh Pond Yard	3.5	NA	NA	NA	NA	3.5	+0	+0	+0	+0
Maspeth Yard	15	10	10	NA	NA	60	+10	+0	+0	+0
Pilgrim Intermodal Terminal	NA	NA	NA	NA	NA	TBD	TBD	NA	NA	NA
Brookhaven Rail Terminal	NA	NA	NA	NA	NA	TBD	TBD	NA	NA	NA

Notes: NA-Not Applicable TBD – To Be Determined

(1) Since the Shuttle, Chunnel, AGV and Truck Access Alternatives represent service options that may be added to the Rail Tunnel Alternative, the acreages shown here represent land acquisition in addition to what would be required under the Rail Tunnel Alternative.

(2) The acreage presented here represents a conservative estimate of acreage required for this alternative, since termini for these alternatives may be accommodated (in full or in part) at an existing facility and land acquisition may not be required. As noted in Chapter 4, "Alternatives," only one terminus east-of-Hudson and one terminus west-of-Hudson would be established under this alternative, therefore these acreages are not cumulative

Based on the approximate area needed for each alternative class, as presented in **Table 6.2-5**, the assumption that only one set of crossing terminals would be developed for the Waterborne Alternatives, and preliminary acquisition footprints, job displacement by alternative was calculated with the results summarized in **Table 6.2-6**. Additional studies in Tier II would be

required to determine the location of the land that would be acquired and assess the number of jobs that would be displaced with greater accuracy.

Table 6.2-6
Land Acquisition and Approximate Number of Jobs Displaced

Alternative Class	Land Acquisition (acres)	Jobs Displaced
Waterborne	20 to 30	540 to 1,000
Rail Tunnel	130 to 175	1,200 to 1,450
Sources: AKRF and industry standard ratios		

E. TIER II ANALYSIS AND POTENTIAL MITIGATION MEASURES

With respect to economic conditions and effects, the most important additional steps to be undertaken as part of any future Tier II documentation are:

- More detailed analysis of freight transport costs, based on detailed operating plans;
- More refined construction costs and resulting changes in economic impacts from construction;
- Inclusion of operation and maintenance cost estimates;
- Further analysis of potential revenue streams and financing options;
- Benefit-cost analysis;
- Economic impact analysis; and
- Mitigation strategies to address potential adverse economic effects. ✷