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ACCESS TO THE REGION'S CORE
FINAL ENVIRONMENTAL IMPACT STATEMENT

Economic Impact Methodology Report

NJT Contract #03-118

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Submitted by:

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1. DESCRIPTION AND OBJECTIVE OF THE TASK/SUBTASK

The purpose of this report is to summarize the methodology that will be used to assess the economic impacts accruing to the region from the ARC FEIS long-term improvements and construction. The potential economic implications of the prospective ARC improvements include:

- The one-time economic impacts resulting from the construction and capital investments associated with the improvements. Because these are one-time expenditures, the impacts are limited to the period of construction and capital investment.
- The recurring, permanent economic impacts resulting from the prospective ARC improvements. The proposed improvements will have a more permanent economic impact on the transportation system. Such impacts can result from the ongoing operation and maintenance of the proposed transportation improvements, as well as net benefits accruing from decreased travel time and delay. The economic impact assessment conducted for the FEIS will analyze only the ongoing impacts of the annual operation and maintenance expenditures associated with the ARC improvements.

A custom-built multiregional input-output model will be used to assess the economic impacts. Rutgers University has been engaged to create a customized version of their R/ECON model for this project.

The economic impact assessment will estimate the total impacts, which are defined to include:

- Direct – the costs related to the proposed ARC improvements.
- Indirect – the purchases of goods and services by suppliers to the ARC improvements. These suppliers, in turn, purchase supplies and services to support their operations. Such purchases continue to ripple through the regional economy. In economic impact terms, this set of expenditure ripples is known as the indirect effect.
- Induced -- the spending (on such items as food, clothing, personal services, other retail items, and vehicles) by households of employees at the site and as well as employees of supporting firms through the wages and salaries they earn due to the prospective ARC improvements. The economic ripples generated by employee spending are known as the induced effect.

The indirect and induced impacts are sometimes referred to as the <u>multiplier effects</u>.

The economic impacts would be measured in terms of:

- Employment effects – jobs generated, including:
  - Direct employment: onsite jobs.
  - Total employment: The total number of jobs (direct, indirect and induced) generated in each of the geographically defined regions.
- Total output/business revenues – generally defined as gross business revenues generated in each of the geographically defined regions.
- Total earnings effects – defined as wages, salaries, and proprietors' income by place of work.
- Total value added -- defined as including business profits, earnings, dividends, interests, taxes, rents and royalties generated.

- Total local tax effects – defined as revenues generated primarily through property taxes on worker households and businesses. These effects also include income, sales, and other major other taxes collected in the areas analyzed.
- State tax effects – defined as personal and corporate income tax revenues, state property tax revenues, and excise, sales, and other state taxes generated by the level of economic activity in each of the geographically defined regions.
- Federal tax effects – defined as federal business and personal income tax revenues, social security taxes, and other major taxes collected by federal agencies.
- Occupational implications – the R/ECON model can identify the employment implications in terms of specific occupations.
- Impacts per million dollars invested – this measure allows for more direct comparison among concepts. Concepts may vary in terms of their expenditure requirements. In general, the higher the total amount invested, the more likely it is that the economic impact will be greater. Use of a measure, such as impacts per million dollars invested, normalizes the initial expenditures and provides a common ground for comparing concepts. For a region, the measurement is similar to the business notion of "return on investment."

2. DATA REQUIREMENTS

The following data elements will be required to apply this methodology:

Information/ Data Required	Description
Geographical region to be analyzed	A multiregional input-output model allows the impacts to be quantified for different geographies based on counties. The regional definition is generally based on a group of economically linked counties, MSAs or states. Defining the regions is the starting point in the method because input-output models must be customized to reflect the economies of the selected areas. Within the region, the individual states (NY, NJ, CT) will be modeled as sub-regions.
Construction cost and capital investment estimates associated with each alternative.	The construction costs and capital investments initiate the one-time economic impacts that will occur due to the development of the project. Additional details regarding the necessary specificity of the data are provided in the Methodology Section of this report.
Annual operating and maintenance expenditures associated with each alternative.	Annual operating and maintenance expenditures are permanent, recurring impacts that accrue to the regional economy.

Information/ Data Required	Description
New economic development associated with the alternatives.	New economic development may occur as a result of the proposed improvements. Development-related impacts are a separate stream of economic implications than the transportation investments. Similar to the transportation benefits, economic development-related benefits can include one-time impacts during the construction and capital investment stage and recurring impacts associated with new job generation. The qualitative discussion of potential economic development impacts will focus on the recurring benefits.
Cost/benefit impacts: Requires inputs from travel demand model, such as changes relative to no-build (baseline) in vehicle miles, commercial vehicle miles, personal hours of travel saved; travel time differences disaggre-gated in various ways, to reflect differences in peak and off-peak travel, agency; unit values for benefits and costs derived from current research.	Formal benefit-cost analysis, focusing primarily on direct benefits to transportation system users, but also including external benefits from different transportation use patterns, including environmental impacts. Agency cost savings, such as savings in highway construction or tunnel rehabilitation also included, as well as parking cost savings. Other benefits may be included, provided no double-counting.

3. CITATIONS OF APPLICABLE GUIDELINES/REGULATIONS

The methodology was prepared in accordance with academic and accepted practices for the application of input-output analysis. The R/ECON input-output model, provided and maintained by Rutgers University, is constantly refined and updated (both in terms of the underlying data and programming) and has been extensively reviewed and evaluated in academic forums. Versions of the model have been used in economic impact analyses for more than 25 years.

4. PROPOSED VARIATIONS FROM FTA GUIDANCE

None known.

5. KEY ASSUMPTIONS

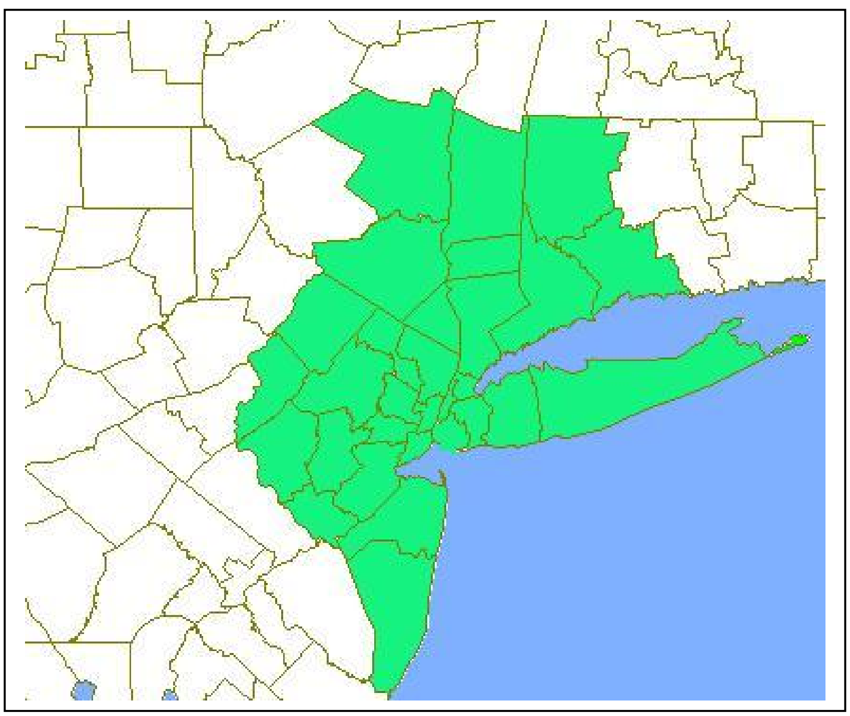
Several assumptions are implicit in the application of input-output models to economic impact assess-ments. These are described in the additional information provided in the Supporting Documentation section of this report.

6. METHODOLOGY APPROACH

STEP 1: DEFINE THE GEOGRAPHICAL AREAS TO BE COVERED IN THE ASSESSMENT AND CREATE THE MULTIREGIONAL MODEL.

- Work collaboratively with NJ TRANSIT to finalize the geographical area and subregions that will be covered in the analysis and customize the model. The economic data for this customization is already in place at R/ECON. Tax, employment, occupational, and regional data is also already in place. A slightly modified version of the NY-Newark-Bridgeport Combined Statistical Area (CSA) as defined by the US Census is recommended. As shown on Figure I-1, the recommended region covers three states and includes the following counties:
  - Connecticut – Fairfield, New Haven, Litchfield
  - New Jersey – Bergen, Hudson, Passaic, Essex, Hunterdon, Morris, Sussex, Warren, Union, Middlesex, Monmouth, Ocean, Somerset, Mercer
  - New York – Bronx, Kings, New York, Dutchess, Orange, Putnam, Queen, Richmond, Rockland, Westchester, Nassau, Suffolk, Ulster
  - Customize and create the multiregional input-output model. The team recommends that the overall geographical area be analyzed. The three subregions would be the group of counties in each of the three states.

Figure I-1: Recommended Geographical Regional for Analysis



The only modifications to CSA definition are the exclusion of Pike County, PA and the inclusion of Warren County, NJ. These modifications align the recommended region with the ARC service area.

STEP 2: UNDERTAKE THE ASSESSMENT OF THE CONSTRUCTION AND CAPITAL INVESTMENTS ASSOCIATED WITH EACH IMPROVEMENT ALTERNATIVE.

- Work with NJ TRANSIT to identify the following information for each improvement/alternative. The information and assumptions used overall and for each alternative will be documented.
  - Expenditures for materials and supplies – what specific materials and supplies will be purchased? How much will be spent on each type? Where are the firms that supply these materials located? (Note, particularly for specialized items, such as a boring machine – will that be purchased or leased from within region or outside of it? If from within the region, is it from New Jersey, New York City, or other sources.) If supplier location information is not available, then the built-in economic information and assumptions within the model will be used.
  - Location of the construction activity.
  - Duration of the construction period.
  - Any information or estimates of the construction labor anticipated to be employed on the project. If labor estimates are not available, then the built-in economic data and assumptions within the model will be used.
  - Assumptions regarding the residency of construction labor – depending on the state of the economy, the number of construction projects underway and the specialties involved, the construction of the ARC improvements may draw a workforce from a very wide area. The model can be customized to reflect the anticipated amount of construction labor that will come from various portions of the region, along with outside the area. This information is important because many personal expenditures (the induced impacts) are made near the place of residence rather than at the workplace.
- Assess the construction and capital investment impacts of each alternative.
- Review the results of the model runs.
- Develop impacts per million dollars invested.
- Summarize findings.

STEP 3: ASSESS THE RECURRING ECONOMIC IMPACTS

- Work with NJ TRANSIT to identify the anticipated annual operating and maintenance expenditures associated with each improvement/alternative. The information and assumptions used overall and for each alternative will be documented.
- Assess the recurring impacts associated with annual operating and maintenance expenditures.

STEP 4: IDENTIFY AND ARTICULATE THE ADDITIONAL ONGOING ECONOMIC IMPACTS

- Identify additional ongoing economic impacts, including new economic development activity that could occur as a result of the improvements (such as new office development). The quantitative findings from the separate ERA study will be incorporated by reference.

STEP 5: IDENTIFY AND ASSESS USER BENEFITS/COSTS

- Obtain travel demand model outputs: changes relative to No-Build (baseline) in vehicle miles traveled (VMT) and hours of travel (HT)
- Review available research into best NY/NJ regional values for travel time, vehicle operating costs, parking costs, highway construction and other agency costs, and most important, values for environmental effects, including air pollution, noise, and other relevant indicators
- Obtain cost data, including project capital and operations and maintenance costs
- Determine discount rate, based on best economic practice
- Conduct Present Value Analysis, using 30-year timeframe

STEP 6: COMPLETE ECONOMIC IMPACT ASSESSMENT

- Summarize findings
- Review with team, client and advisory committee
- Finalize findings

STEP 7: DOCUMENTATION

Results of the economic analysis will be incorporated into the FEIS.

BACKGROUND ON INPUT-OUPUT MODELING AND APPLICATION TO REGIONAL ECONOMIC IMPACT ASSESSMENTS

The basic framework for input-output (I-O) analysis originated nearly 250 years ago when François Quesenay published *Tableau Economique* in 1758. Quesenay's "tableau" graphically and numerically portrayed the relationships between sales and purchases of the various industries of an economy. More than a century later, his description was adapted by Leon Walras, who advanced input-output (I-O) modeling by providing a concise theoretical formulation of an economic system (including consumer purchases and the economic representation of "technology").

Wassily Leontief greatly advanced Walras's theoretical formulation and was awarded the Nobel Prize in 1973. Leontief first used his approach in 1936 when he developed a model of the 1919 and 1929 U.S. economies to estimate the effects of the end of World War I on national employment. Recognition of his work awaited wider acceptance and use of the approach. This meant development of a standardized procedure for compiling the requisite data (today's national economic census of industries) and enhanced capability for calculations (i.e., the computer). The federal government immediately recognized the importance of Leontief's development and has been publishing input-output tables of the U.S. economy since 1939.

A. Depicting the Economy

I-O modeling focuses on the interrelationships among sectors in an economy. Within the I-O model, the economy of an area is mapped out in table form, with each industry listed across the top as a consuming sector (or market) and down the side as a producing sector. A column in the table or "matrix" depicts the inputs needed from every other industry to produce its output. **Table 4.14-A** is known as an *inter-industry transactions matrix*.

Table 4.14-A

Transactions Matrix

	Agricul-ture	Manu-facturing	Services	Other	Final Demand	Total Output
Agriculture	10	65	10	5	10	100
Manufacturing	40	25	35	75	25	200
Services	15	5	5	5	90	120
Other	15	10	50	50	100	225
Value Added	20	95	20	90		
Total Input	100	200	120	225		

Based on the example matrix developed for the *Regional Port Impact Model Handbook.*

Each column shows the purchases made by a consuming industry from each of the producing industry sectors. Similarly, each row depicts the sales of a producing industry to all consuming industry sectors. For example, in Table 4.14-B, agriculture, as a producing industry sector, sold $65 million of goods to manufacturing. Conversely, the table depicts that the manufacturing sector of the economy as a consuming industry purchased $65 million of goods from the agricultural sector.

An inter-industry matrix can be aggregated or quite detailed in terms of the sectors of the economy for which separate columns and rows are created. Research has found that detailed matrices tend to be more accurate; aggregated models can have as much as 50 percent error inherent in them. The current U.S. model has more than 500 industries representing many four-digit Standard Industrial Classification (SIC) codes.

A *final demand* column is also included in **Table 4.14-A**. This column, which is outside the square inter-industry matrix, includes imports, exports, government purchases, changes in inventory, private investment, and household purchases. The value added row, which is also outside the square inter-industry matrix, includes wages and salaries, profits, interest, depreciation, and indirect business taxes. Both the final demand column and the value added row equal the gross national product (assuming the table depicts the U.S. economy).

As previously noted, the final demand column includes household purchases and the value added row includes wages and salaries. By extracting household purchases from the final demand column into separate column in the inter-industry matrix and similarly, wages and salaries from the value added row into a separate row in this matrix, the *induced impacts* can be captured later in the multiplier calculations. The elements included in the multiplier – direct, indirect, and induced impacts are defined in the Appendix.

The information in matrix depictions of economies (such as the example in **Table 4.14-A**) is used to develop a *direct or technical requirements matrix*. An example of a technical requirements matrix is shown in **Table 4.14-B**. Using the matrix in Table 1A as a starting point, the numbers within each column are divided by the column total. For example, the cell for manufacturing's purchases from agriculture is 65/200 = 0.33. Each cell in a consuming industry column in the direct requirements matrix shows how many cents of the *input* from a producing industry is necessary to produce one dollar of the consuming industry's *output* and are called *technical coefficients*. Hence, the term "input-output."

Table 4.14-B

Direct or Technical Requirements Matrix

	Agriculture	Manufacturing	Services	Other
Agriculture	0.10	0.33	0.08	0.02
Manufacturing	0.40	0.13	0.29	0.33
Services	0.15	0.03	0.04	0.02
Other	0.15	0.05	0.42	0.22

The resulting technical requirements matrix can then be mathematically used in a procedure called the *Leontief Inverse* to generate a matrix whose elements reflect the *total requirements, including the direct, indirect, and induced requirements*, needed to support the level of final demand shown in **Table 4.14-A**. In mathematical terms, the Leontief inverse is represented by:

$$(I-A)^{-1}$$

The resultant matrix is called the *total requirements matrix*. The total requirements matrix resulting from the direct requirements matrix originally used in **Table 4.14-A** is shown in its resulting total requirements form in **Table 4.14-C**.

Table 4.14-C **Total Requirements Matrix**				
	Agriculture	Manufacturing	Services	Other
Agriculture	1.5	0.6	0.4	0.3
Manufacturing	1.0	1.6	0.9	0.7
Services	0.3	0.1	1.2	0.1
Other	0.5	0.3	0.8	1.4
Industry Multipliers	3.3	02.6	3.3	2.5

As a way of explaining how the direct or technical requirements are transformed through the Leontief Inverse into the total requirements or impacts, note that the technical coefficient for the manufacturing sector's purchase from the agricultural sector was 0.33, indicating the 33 cents of agricultural products need to be directly purchased to produce a dollar's worth of manufacturing products. The same "cell" in **Table 4.14-C** has a value of 0.6 which indicates that in order for the manufacturing sector to sell a dollar's worth of output, the agricultural sector must produce output worth 60 cents – 33 cents worth to be sold to the manufacturing sector and 27 cents worth to be sold to other sectors in the economy that will use it to produce materials and services that they will also need to sell to the manufacturing sector. The sum of each column in the total requirements matrix is the *multiplier* for that sector of the economy. The relationship between the total requirements matrix and final demand (which is the market for the products) is depicted mathematically as:

$$(I-A)^{-1} \quad x \quad Y \quad = \quad X$$

Total Requirements Matrix x Final Demand = Total Output

B. Changes in Investment and Economic Translators

The multipliers resulting from the creation of the total requirements matrix can be used to assess the economic impacts associated with changes in investment, such as an investment in the construction of expanded maritime terminals. This change in investment is considered, in I-O Analysis, a change in final demand and can be either positive or negative. (A negative investment is a situation where funds or an activity becomes lost to a region, for example, the loss of maritime-based commerce resulting from vessels being unable to enter the harbor because of inadequate channel depths.) Mathematically, this is depicted as:

$$(I-A)^{-1} \quad x \quad \Delta Y \quad = \quad \Delta X$$

Total Requirements Matrix Demand x Change in Final = Change in Total Output

A change in investment can be one-time, such as expenditures for labor and materials during construction. A change in investment can also be recurring, for example, the annual operation and maintenance expenditures associated with transit lines. One-time and recurring impacts are generally not mixed in either the analysis or reporting of economic impacts.

C. Advantages and Limitations of Input-Output Modeling

Advantages: Input-output modeling is among the most accepted means for assessing economic impacts, as previously indicated. The approach provides a concise and accurate means for articulating the interrelationships among industry sectors. The models can be quite detailed. As noted previously, the current U.S. model currently has more than 500 industries representing many four-digit Standard Industrial Classification (SIC) codes and the R/ECON model has 515 sectors. This level of detail provides a consistent and systematic approach, as well as a more accurately means for assessing the multiplier effects of changes in economic activity.

Input-output models also the advantage of being about to be set up for specific regional economies and to capture the flows among geographical areas within a region. Multiregional models, such as the one proposed for here, can also be created.

Limitations: I-O Analysis makes several key assumptions. First, the information used to create an input-output model is for *a given point in time*. The information in the model reflects a "snapshot" of the technical requirements and industry relationships at a given point in time. Because of this, input-output models are regularly updated. The US model is updated every five years. In general, more frequent updates are not necessary because overall industry requirements and relationships change at a slow pace.

In addition, input-output modeling assumes that these are no economies of scale to production in an industry; that is, the proportion of inputs used in an industry's production process does not change regardless of the output level.

Further, regional input-output models generally assume that technical requirements and industry relationships are the same within the region as they are at the national level. That is, the type and proportion of inputs required to produce an industry's output is the same as the national average. For an area as large and diverse as the New York-Newark-Bridgeport Combined Statistical Area (CSA), this assumption is valid. However, at a county or municipal level, the assumption can be less valid.

D. The Customized Multi-Regional Model

Rutgers University supplies the 515-sector base R/ECON model, which will be furthered customized by the Center for Urban Policy Research (CUPR) at Rutgers University to reflect the CSA area and subregions. The R/ECON model is based on the US I-O model. The technical coefficients in the model are based on 1997 information that has been updated to 2000 using information from the US Bureau of Labor Statistics. This is the latest information available for the model's format.

After the Regional Purchase Coefficients (RPCs, see discussion below) for each industry in each region are estimated, interregional trade flows are estimated using a gravity model approach with excess out put and demand data for each regional industry. In this way, the estimated RPCs set the internal interindustry flows for each region. Subsequently, the balance of each region's production is distributed with available spatial proximate demand.

E. Regionalizing the Model – Regional Purchase Coefficients

Regional input-output models, such as the one used by in this economic impact assessment, need to account for the percentage of the demand for an industry's output or the requirements for a transportation project that can be readily supplied by firms within the specified region. Firms within the specified region may not be able to supply all the products needed. Therefore, goods and services may need to be purchased from outside of the specified region.

Demand that is met by firms with the specified region generates a multiplier effect within that area. Expenditures for goods produced outside the specified region "leak" a substantial portion of the multiplier effect to that other area. That is, the location where these goods are produced will benefit from the ripple effect of the expenditures. The greater the percentage of expenditures made within the specified region, the greater the multiplier effect to the area.

The R/ECON Model uses *regional purchase coefficients* to account for these expenditure flows. A regional purchase coefficient (RPC) is defined as the proportion of the regional demand that can be expected to be supplied from producers within a given region. An RPC value of one indicates that all demand is met by firms in the specified region. Similarly, an RPC of zero indicates that none of the demand is met by New Jersey firms. Therefore, RPCs range in value from zero to one. RPCs are applied to both the impact vector for an investment and to the Total Requirements Matrix so that expenditure streams that leak out of the area after the initial investment are accounted for. In mathematical terms, this is depicted as:

$$(I\text{-}RA)^{-1} \quad \times \quad R\Delta Y \quad = \quad \Delta X$$

Regionalized Total Requirements Matrix	x	Regionalized Translator	=	Change in Regional Output

A variety of techniques are available to develop RPCs, including modified location-quotient, supply-demand, econometric analysis, and regional analysis. The economic impact model in this assessment uses an econometric approach developed by Stevens and Treyz (1985) as is briefly discussed below.

The R/ECON Input-Output model comes with economic data to support analysis for a region or multiple regions for which impacts analysis is desired. The regional economic data provided in the model are derived from supplied data by a variety of federal sources, as listed below.

- *County Business Patterns Data*, U.S. Bureau of the Census, Department of Commerce, http://www.census.gov/epcd/cbp/view/cbpview.html
- *Earnings by Industry (Table SA05)*, Regional Economic Measurement Division, Bureau of Economic Analysis, U.S. Department of Commerce, http://www.bea.doc.gov/bea/regional/spi/#download

- *Wage and Salary Disbursements by Industry (Table SA07)* Regional Economic Measurement Division, Bureau of Economic Analysis, U.S. Department of Commerce, http://www.bea.doc.gov/bea/regional/spi/#download
- *Full- and Part-time Employment by Industry (Table SA25)*, Regional Economic Measurement Division, Bureau of Economic Analysis, U.S. Department of Commerce, http://www.bea.doc.gov/bea/regional/spi/#download
- *Gross State Product* (*GSP*) *Data*, Bureau of Economic Analysis, U.S. Department of Commerce, http://www.bea.doc.gov/bea/regional/gsp/
- *Covered Employment and Wages (ES202 data)*, Bureau of Labor Statistics, ftp://ftp.bls.gov/pub/special.requests/cew/
- *Value of Production by Commodity, Census of Agriculture*, National Agricultural Statistics Service, U.S. Department of Agriculture, http://govinfo.kerr.orst.edu/ag-stateis.html/
- *Census of Government Finances*, U.S. Bureau of the Census, Department of Commerce, http://www.census.gov:80/govs/www/cog.html

To produce earnings and total employment by region, *ES202* data on payroll and payroll employment,[1] available at the five-digit North American Industrial Classification System (NAICS) level for nonagricultural are compiled for the specified geography.[2] The ES202 payroll and payroll employment data are subsequently enhanced using BEA's state-level *Table SA05* earnings/payroll and *Table SA25* total employment/payroll employment ratios at a more aggregate level. These ratios are then applied to the detailed sectors in the economic model with which they are associated. Subnational data on agricultural income and employment by industry are derived using the region's share of the national value of production of the commodity. Thus, for agriculture only, it is assumed that the sector has the same average earnings per employee everywhere in the United States.

To produce value-added and tax revenue data, the value added/earnings ratios by industry are calculated from the two-digit SIC data and the data on earnings derived as discussed above. Similar calculations from the same data sets are made to estimate indirect federal government tax/earnings ratios and indirect state and local government tax/earnings ratios. The state-local split of indirect business taxes and personal taxes is calculated based on Census of Government Finances data for the region. Wages net of taxes are estimated by calculating the share of compensation from the GSP data files composed of the wages from BEA's Table SA07, which are also only available by state.
The estimated outputs by industry are derived from the labor-income coefficients of the R/ECON national Input-Output table and the earnings data discussed above. See Lahr (2001) and Jackson (1998) for a more precise mathematical treatment of the techniques discussed here.

After the above data are collected, regional demand data by industry are estimated using the techniques described in Treyz and Stevens (1985, equation 2). That is, in order to derive regional demands by

[1] Payroll employment is the number of employees who receive regular wages and salaries. Hence, these figures do not include business proprietors unless they receive wages as well as income that they accrue by owning the business.

[2] The smaller a region is from an economic perspective, the greater the number of the disclosure problems in CBP data. Hence, before using the CBP data, all disclosure problems were filled in using a method like that described in Gerking et al. (2001).

industry, the regional output estimates (obtained using the techniques discussed above) are first multiplied up the columns of the national direct requirements matrix. The sums of the rows of the resulting matrix are then obtained to get regional interindustry demand. To get total regional demand, of course, one must add to interindustry demand the demands for industry production placed by regional final demand—i.e., locally based government operations, regional households, and the region's international exports. Regional final demand was estimated by finding the product of regional output and national final demand/output ratio by industry.

Adjustments for interregional trade are also made using techniques developed by Treyz and Stevens (1985, 553/554).

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Types of Occupations Generated Annually When the Build Alternative Improvements Are Fully Operational

	Occupational Categories	Number of Jobs
TOTAL NUMBER OF JOBS		752
Executive, administrative, and managerial occupations		63
	Managerial and administrative occupations	45
	Management support occupations	19
Professional specialty occupations		*29*
	Engineers	3
	Architects and surveyors	0
	Life scientists	0
	Computer, mathematical, and operations research occupations	4
	Physical scientists	0
	Religious workers	2
	Social scientists	0
	Social and recreation workers	1
	Lawyers and judicial workers	1
	Teachers, librarians, and counselors	6
	Health diagnosing occupations	1
	Health assessment and treating occupations	4
	Writers, artists, and entertainers	4
	All other professional workers	3
Technicians and related support occupations		*36*
	Health technicians and technologists	29
	Engineering and science technicians and technologists	5
	Technicians, except health and engineering and science	2
Marketing and sales occupations		*58*
	Cashiers	14
	Counter and rental clerks	3
	Insurance sales agents	2
	Marketing and sales worker supervisors	8
	Models, demonstrators, and product promoters	0
	Parts salespersons	1
	Real estate agents and brokers	0
	Retail salespersons	19
	Sales engineers	0
	Securities, commodities, and financial services sales agents	1
	Travel agents	1
	All other sales and related workers	10

	Occupational Categories	Number of Jobs
Administrative support occupations, including clerical		118
	Adjusters, investigators, and collectors	8
	Communications equipment operators	1
	Computer operators	1
	Information clerks	11
	Mail clerks and messengers	1
	Postal clerks and mail carriers	2
	Material recording, scheduling, dispatching, and distributing occupations	25
	Records processing occupations	17
	Secretaries, stenographers, and typists	10
	Other clerical and administrative support workers	43
Service occupations		*52*
	Cleaning and building service occupations, except private household	13
	Food preparation and service occupations	22
	Health service occupations	4
	Ambulance drivers and attendants, except EMTs	0
	Dental assistants	1
	Medical assistants	0
	Nursing and psychiatric aides	3
	Occupational therapy assistants and aides	0
	Pharmacy aides	0
	Physical therapy assistants and aides	0
	All other health service workers	0
	Personal service occupations	3
	Amusement and recreation attendants	1
	Baggage porters and bellhops	0
	Child care workers	1
	Barbers, cosmetologists, and related workers	0
	Flight attendants	0
	Personal care and home health aides	1
	Ushers, lobby attendants, and ticket takers	0
	Private household workers	8
	Child care workers, private household	3
	Cleaners and servants, private household	5
	Cooks, private household	0
	Housekeepers and butlers	0
	Protective service occupations	3
	Fire fighting occupations	0
	Law enforcement occupations	0
	Other protective service workers	2
	All other protective service workers	0

	Occupational Categories	Number of Jobs
Agriculture, forestry, fishing, and related occupations		3
	Farm operators and managers	0
	Farm workers	1
	Fishers and fishing vessel operators	0
	Forestry, conservation, and logging occupations	0
	Landscaping, groundskeeping, nursery, greenhouse, and lawn service occupations	2
	Supervisors, farming, forestry, and agricutural related occupations	0
	Veterinary assistants and nonfarm animal caretakers	0
	All other agricultural, forestry, fishing, and related workers	0
Precision production, craft, and repair occupations		135
	Blue-collar worker supervisors	22
	Construction trades	32
	Carpenters	3
	Ceiling tile installers and acoustical carpenters	0
	Construction equipment operators	1
	Electricians	5
	Boilermakers	2
	Bricklayers, blockmasons, and stonemasons	0
	Carpet, floor, and tile installers and finishers	0
	Cement masons, concrete finishers, and terrazzo workers	0
	Drywall installers and finishers	0
	Elevator installers and repairers	0
	Glaziers	0
	Hazardous materials removal workers	0
	Highway maintenance workers	0
	Insulation workers	0
	Painters and paperhangers	1
	Pipelayers and pipelaying fitters	0
	Plasterers and stucco masons	0
	Plumbers, pipefitters, and steamfitters	1
	Roofers	0
	Sheet metal workers and duct installers	3
	Structural and reinforcing metal workers	0
	All other construction trades workers	16
	Extractive and related workers, including blasters	2
	Mechanics, installers, and repairers	42
	Machinery mechanics, installers, and repairers	6
	Vehicle and mobile equipment mechanics and repairers	11
	Other mechanics, installers, and repairers	20

	Occupational Categories	Number of Jobs
Production occupations, precision		22
	Assemblers, precision	1
	Food workers, precision	1
	Inspectors, testers, and graders, precision	7
	Metal workers, precision	11
	Printing workers, precision	0
	Textile, apparel, and furnishings workers, precision	1
	Woodworkers, precision	0
	Other precision workers	1
Plant and system occupations		0
	Chemical plant and system operators	0
	Electric power generating plant operators, distributors, and dispatchers	0
	Gas and petroleum plant and system occupations	0
	Stationary engineers	0
	Water and liquid waste treatment plant and system operators	0
Operators, fabricators, and laborers		235
	Numerical control machine tool operators and tenders, metal and plastic	0
	Combination machine tool setters, set-up operators, operators, and tenders, metal and plastic	0
	Machine setters, set-up operators, operators, and tenders	13
	Machine tool cut and form setters, operators, and tenders, metal and plastic	2
	Metal fabricating machine setters, operators, and related workers	1
	Other machine setters, set-up operators, operators, and tenders	6
	Metal and plastic processing machine setters, operators, and related workers	1
	Printing, binding, and related workers	1
	Textile and related setters, operators, and related workers	3
	Woodworking machine setters, operators, and other related workers	0
	Hand workers, including assemblers and fabricators	16
	Cannery workers	0
	Coil winders, tapers, and finishers	0
	Electrical and electronic assemblers	0
	Machine assemblers	0
	Welders and cutters	7
	All other assemblers, fabricators, and hand workers	7
	Cutters and trimmers, hand	0
	Grinders and polishers, hand	0
	Meat, poultry, and fish cutters and trimmers, hand	0
	Painting, coating, and decorating workers, hand	0
	Pressers, hand	0
	Sewers, hand	0
	Solderers and brazers	0

Occupational Categories	Number of Jobs
Transportation and material moving machine and vehicle operators	186
Motor vehicle operators	95
Material moving equipment operators	3
All other material moving equipment operators	2
Rail transportation workers	87
Water transportation and related workers	0
Helpers, laborers, and material movers, hand	19
Cleaners of vehicles and equipment	3
Freight, stock, and material movers, hand	2
Hand packers and packagers	2
All other helpers, laborers, and material movers, hand	10
Helpers, construction trades	1
Machine feeders and offbearers	0
Parking lot attendants	0
Refuse and recyclable material collectors	0
Service station attendants	1

Source: Transit Link Consultants, 2007