CAMBRIDGE SYSTEMATICS

Economic Impact Analysis of New Orleans Regional Transit Authority

prepared for

New Orleans Regional Transit Authority

prepared by

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Table of Contents

1.0 Introduction

The Economic Impact Analysis assesses the economic benefits associated with the New Orleans Regional Transit Authority (RTA or NORTA) system today and, using sketch-level analysis, in the future. The future analysis includes the Buildout Scenario in which the transit system is enhanced.

The analysis communicates the benefits of transit in a manner that tells a compelling story about the multiple ways in which RTA services and operations add value to the region to help make the case for necessary funding and support for the system.

This approach is built on the philosophy that the study results need to be understandable and relevant to stakeholders. The study results show where and how RTA provides the region with economic opportunities and communicate clearly about those impacts which are significant and compelling. The study approach, designed to promote more informed decision-making, is built on four guiding principles:

- Data-driven, stakeholder-led process to build support for findings by ensuring the study process is (1) transparent, (2) objective, and (3) defensible;
- Use existing data and tools to the extent possible while maintaining the objectivity and defensibility; and
- Define a few good metrics that reflect what stakeholders care about.

Transit provides a range of benefits, from a better utilization of existing infrastructure to a platform to support economic development and improve the quality of life of the region served. The presence of public transit in a region enhances the overall transportation system, contributing to the economy through reductions in travel and vehicle ownership costs for transit users and those switching from auto to transit; decrease in traffic congestion for auto users and commercial vehicles which, in turn, has the potential to lower operations costs for business travelers and industries transporting commodities in the region; and improved business productivity gained from access to broader labor markets with more diverse skills enabled by expanded transit services.

Public transit also plays an important role in supporting land use patterns that reduce vehicle travel and public policy regarding air quality, carbon emissions and energy use. Furthermore, transit systems are essential to connecting people to jobs, particularly for low-income households, the disabled, and those without access to motor vehicles. Transit may allow firms access to a wider labor pool, while the workers in that labor pool have enhanced access to employment. The benefits of concentrating employment near transit accrue to both employers and employees. Transit also allows for pedestrian-friendly environment and urban amenities to help attract and retain employees.

1.1 Technical Overview

1.1.1 Benefit Types

The current transit system operated by RTA today generates significant economic benefits for the region. The economic benefits of the system are analyzed in several ways:

- **Enterprise benefits of transit-related expenditures.** The capital and operations spending by RTA ripple through the regional economy. This analysis quantifies these benefits.
- **Highway user benefits.** RTA services reduce highway trips, which improves the performance of region's road system, thus decreasing the cost of travel for residents, visitors, and businesses in the region. These effects are also multiplied through the regional economy. This analysis quantifies these benefits.
- **Affordable mobility benefits.** RTA's current transit services provide affordable mobility to residents without access to personal vehicles or other forms of dependable transportation, which in turn allows these individuals to reallocate their income for expenditures on other goods and services, and provides them greater access to employment opportunities. This analysis quantifies these benefits.
- **Other community impacts.** Other benefits generated by RTA include reduced crash costs, reduced emissions costs, and land use and value benefits. The crash and emission reductions are quantified as cost savings. Additional benefits are briefly described qualitatively.

1.1.2 General Approach and IMPLAN Model

This analysis uses several different approaches, described in **Sections 2-5**, to estimate the benefits associated with the RTA system today and in the future under the *New Orleans Future Transit Scenarios* (i.e., Buildout Scenarios). The IMPLAN model[1], a commonly used economic input-output model for transportation planners, helps quantify economic impacts. The IMPLAN online model acquired for this analysis covers the New Orleans Metropolitan Statistical Area (MSA) which comprises the following parishes: Jefferson, Orleans, Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist.

The direct economic impacts are estimated outside the economic model and translated into the necessary model inputs for IMPLAN. The indirect (resulting changes in industry-to-industry spending) and induced (resulting changes in household spending) benefits arising from the direct benefits are modeled using the New Orleans MSA IMPLAN model. IMPLAN generates estimates of the total economic benefits in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue. Economic output,

[1] For more information on the IMPLAN economic model, please see www.implan.com.

another measure of economic impact, quantifies the value of all sales of goods and services. It includes the sum of the final purchases and intermediate inputs and therefore double counts intermediate purchases. Value added, defined as economic output less intermediate inputs, focuses only on additional value of goods and services produced, and is therefore the preferred measure to report the economic impacts resulting from RTA. **Appendix A** describes IMPLAN and related terminology in greater detail.

1.1.3 Analysis Years and Year Dollars

The baseline analysis year is 2015. A significant portion of the relevant data for the baseline analysis year was gathered in support of this study. Dollar values from other years are inflated, deflated, interpolated, or extrapolated to 2015 for input into IMPLAN. The Consumer Price Index (CPI) for South Urban Areas, provided by the Bureau of Labor Statistics (BLS), are used for inflation and deflation. The future analysis year is 2040. The anticipated economic impacts in terms of jobs, employee compensation, GRP and tax revenue resulting from the future investment scenarios are presented in 2017 dollars.

Buildout timeframe for the *New Orleans Future Transit Scenarios* include the following:

- Phase 1 – Construction starts in 2018 and ends in 2022. Operations start in 2022.
- Phase 2 – Construction starts in 2023 and ends in 2027. Operations start in 2026
- Phase 3 - Construction starts in 2028 and ends in 2040. Operations start in 2035

Distribution of capital expenditures over the construction period include capital, vehicles and facility costs. The pashing approach, including the time frame for capital and operating expenditures, of proposed NORTA transit investments is presented in **Section 7**.

1.1.4 Baseline Analysis

The methodological approach for analyzing the baseline condition in 2015 encompasses the following main steps:

- The ongoing operations of RTA's requires expenditures on labor, supplies, utilities, and other goods and services. The procurement of these goods and services from local businesses gives rise to direct, indirect, and induced economic impacts in the area served by RTA. These are referred to as enterprise benefits and are presented in **Section 2**.

- As more travelers choose to use transit, there are spillover benefits to the highways. The most common benefits include congestion relief and decreased costs to maintain roadway state-of-good-repair (SOGR). Traffic congestion gives rise to inefficiencies and competitive disadvantages as traffic delays reduce work hours and worker productivity. They add to the amount of gas and oil people need to buy at the expense of goods and services they highly value. Economic savings thus arise whenever someone uses transit in lieu of making a car trip and these impacts are examined in **Section 3**.

- Many transit passengers do not have access to an automobile. Transit dependent customers forego mobility and employment and spend a considerably higher portion of their income on transportation at the expense of food, clothing, housing, and other staples. In creating an affordable transportation alternative, transit thus raises the economic standard of living for many members of the community, including students, the elderly, second-income earners, and low-income households. **Section 4** presents how CMTA services give rise to affordable mobility impacts.

- Congestion causes accidents with tragic costs in the form of death and injuries as well as property damage. Congestion contributes to increased pollution of air as well. Transit in New Orleans contributes measurably to the availability of neighborhood amenities whose purpose and economic value extends beyond the purpose and the economic value of mobility per se. They include social benefits such as emissions and safety as well as more qualitative benefits including shorter walking or wheeling distances to shops and offices, safer pedestrian access, the ability of households to sustain desired lifestyles with fewer automobile-related expenses, joint and diverse land uses, and others. Research indicates that the market value of residential property reflects the economic value of the neighborhood; value that reflects the quality of amenities, jobs, the sense of safety and well-being, and other locational attributes. These benefits are discussed in **Section 5**.

- The total economic impact of RTA's existing services is the sum of the enterprise benefits, highway user impacts, affordable mobility benefits and community benefits. **Section 6** presents the RTA statistics today and the estimation of the direct and total (direct, indirect and induced) economic impacts of the existing RTA services and **Section 7** shows the RTA statistics under the *New Orleans Future Transit Scenarios* (i.e., Bus Rapid Transit, Light Rail Transit and Streetcar) and the corresponding total (direct, indirect and induced) economic impacts over the 2023-2040 analysis period. **Section 8** describes the benefits that are difficult to reliably quantify, but need to be considered as part of the transit investment decision-making.

- **Section 9** summarizes findings, reporting total quantified direct benefits by benefit type today and under the Buildout Scenarios, and the corresponding total economic impacts in terms of jobs, labor income, value-added and tax revenue of the *New Orleans Future Transit Scenarios*.

1.1.5 Future Scenario Analysis

This sub-section addresses the approach for analyzing the Buildout Scenarios over the 2018-2040 analysis period. Given the level of detail expected from RTA's future scenario planning on ridership and demographics and the available data at the time this analysis was conducted, the economic impact analysis assesses the additional cumulative economic benefits to be generated by the *New Orleans Future Transit Scenarios* relative to the No Build (or baseline) and the combined benefits generated by current/modified services and the new services to be offered under each scenario.

The assessment of the economic benefits that may be expected in response to enhanced investment in transit encompasses two parts:

- The economic impacts of additional transit capital and operations spending generated by the implementation of the Buildout Scenario. Cost estimates are allocated into IMPLAN model inputs to estimate the total (direct, indirect and induced) impact in terms of additional number of jobs, labor income, GRP and tax revenue resulting from capital and operations spending on the expanded transit network.

- The economic effects of an enhanced transit service in the region's transportation performance. Similar to the approach used in the estimation of the economic benefits generated by today RTA's operations and services, this analysis estimates the efficiency improvements in the movements of people and services resulting from the *New Orleans Future Transit Scenario*, and the total (direct, indirect and induced) economic impact in terms of additional number of jobs, labor income, GRP and tax revenue, and its contribution to the regional economic competitiveness..

1.1.6 RTA Statistics

RTA provided transit ridership, revenue hours, revenue miles and annual passenger miles traveled (PMT) for the baseline year 2015 and the future investment scenario in 2040. RTA also provided projected population and employment for the RTA service area by parish or by more refined geography, such as Census tract, in 2015.

The study adjusted other relevant statistics according to the projections provided by RTA. Using these statistics, direct benefits are estimated for the future scenario. Direct benefits associated with the future scenario include highway user, affordable mobility, traffic safety and environmental emissions benefits. Given the lack of RTA enterprise information in the future, the enterprise benefits are estimated to grow at the same rate as the operations and maintenance expenditures over the 2015-2040 period.

The following sections provide more detail on how each part of the analysis addresses the baseline and future scenario.

2.0 Enterprise Benefits

The capital and operations spending by RTA reverberate through the regional economy on an annual basis. Based on data provided by RTA and its major vendors and contractors, the inputs for IMPLAN were prepared.

- **Wages and benefits**: Relevant data obtained from NORTA included wages and benefits total dollar amounts across parishes and employee counts by parish in 2015. Total wages and benefits were allocated proportionately among parishes based on the parish employee counts. This information was input into IMPLAN as an Industry Change to measure the impact associated with both change in production and labor income spending. For the Buildout Scenario, RTA employee wages and benefits were assumed to grow at the same rate as RTA operations and maintenance (O&M) expenditures over the 2015-2040 period.

- **Retirement benefits**: The sum of retirement disbursements obtained from NORTA were distributed across parishes consistently with how current employee counts are allocated. The analysis also assumes that the retirement benefits are borne by all households in each parish proportionately to the household share of income within the parish. To apply the latter assumption, this analysis uses the household income data available from IMPLAN to estimate the percentage of households falling into each household income range. The information is input into IMPLAN as a Household Spending Change, which only drives induced impact. Since there are no changes in industry production, no indirect impacts are generated by this type of activity. For the Buildout Scenario, RTA retirement benefits were assumed to grow at the same rate as RTA operations and maintenance expenditures over the 2015-2040 period.

- **Non-payroll Operations and Maintenance (O&M) and Capital Expenditures:** Because detailed information on O&M and capital expenditures were not obtained from NORTA, the total dollar amounts of O&M and capital expenditures provided by NORTA were allocated to the selected IMPLAN industry codes according to expenditure breakdowns reported in the National Transit Database (NTD). These benefits are assumed to accrue proportionately to the industry share of output in the combined Jefferson and Orleans Parishes compared to the industry share of output at the national level. To apply this assumption, this analysis utilized the output data available from IMPLAN for the combined Jefferson and Orleans Parishes and the U.S. and estimate the location quotient (LQ). The LQ assesses how concentrated the selected industries, that is, the industries involved in the construction, operations and maintenance of the transit infrastructure and services, are in the two-parish region as compared to the nation. This process is done separately for O&M versus capital expenditures. This information is then input into IMPLAN as an Industry Change activity to measure the impact on the industries experiencing the change in production. For the future Buildout Scenario, RTA provided information on annual operating, infrastructure and facility

costs over the 2023-2040 analysis period. These annual expenditures are allocated to the combined Jefferson and Orleans Parishes using the LQ approach described above.

The IMPLAN economic model for New Orleans MSA was used to measure the baseline induced and indirect benefits associated with the RTA system today as well as the induced and indirect benefits resulting from the *New Orleans Future Transit Scenario*. The economic model estimates changes in jobs, personal income, value added (gross regional product or GRP) and tax revenue in the region due to the transit services provided by RTA today and in the future. These impacts does not take into account the productivity gains from transit due to reduced congestion, reduced cost of maintaining the roadway infrastructure in a state of good repair, affordable mobility benefits, and improved roadway safety, to mention a few.

3.0 Highway User Benefits

RTA services reduce highway trips, which improves the performance of region's road system, thus, decreasing the cost of travel for residents, visitors, and businesses and reducing the maintenance and operations costs for highways.

3.1 Congestion Relief

Congestion in the New Orleans region imposes a direct cost on drivers and businesses. Texas Transportation Institute (TTI) translates the hours of delay caused by traffic congestion into real costs, that is, the value of the time lost by auto users and truck drivers and the increase in fuel consumption by autos and trucks due to moving in "stop-and-go" traffic and longer hours of operation.

Congestion levels and highway performance benefits resulting from existing public transportation services for the New Orleans urban area provided by TTI are used to estimate the extent to which today's transit services mitigate congestion in the area served by RTA. TTI highway performance benefits in 2007 and 2011 are average to generate values for 2015. To better isolate RTA's benefits, this total urban area benefit are multiplied by the proportion of New Orleans area transit PMT that corresponds to NORTA bus and streetcar trips and adjusted to not include AMTRAK boardings and alightings taking place in the urban area. Congestion relief benefits are allocated to autos and trucks based on the congestion costs endured by autos and trucks reported in the *TTI 2015 Annual Urban Mobility Scorecard*. Congestion relief benefits accruing to autos by trip purpose (commute, business, and all other purposes) are allocated based on the distribution of daily person miles of travel (PMT) per person by private vehicles by trip purpose and the average vehicle occupancy (AVO) by trip purpose provided by the *2009 National Household Travel Survey (NHTS).*

The assessment of the congestion relief benefits that are anticipated to be generated by the *New Orleans Future Transit Scenario* entitles the following steps:

- Estimate a linear regression model to project TTI New Orleans urban area historical combined daily freeway and arterial VMT into the future.
- Estimate a linear regression model to project future annual hours of delay. The combined daily freeway and arterial VMT and the corresponding annual hours of delay over the 1982-2014 period provided by TTI are used to project the annual hours of delay into the future. Specifically, a simple linear regression analysis using the combined daily freeway and arterial VMT as the dependent variable and the annual hours of delay as the explanatory variable are used to project the annual hours of delay over the 2023-2040 period.
- Estimation of displaced private vehicle miles traveled (VMT) under the *New Orleans Future Transit Scenario*. The mode shift factors provided by the *New Orleans COA Ridership Survey* pertaining

to alternative transportation modes available to riders if transit is unavailable and the corresponding average vehicle occupancy (AVO) for each of the alternative transportation modes are used to estimate displaced private VMT for the 2023-2040 period under the Buildout Scenario.

- Estimate the annual hours of delay saved by the *New Orleans Future Transit Scenario*. The annual hours of delay regression model estimated in previous steps is used to assess the annual hours of delay saved due to displaced private VMT for the 2023-2040 period under the Buildout Scenario.

- Annual hours of delay saved are allocated to autos and trucks based on the congestion costs endured by autos and trucks reported in the *TTI 2015 Annual Urban Mobility Scorecard*. Congestion relief benefits accruing to autos by trip purpose (commute, business, and all other purposes) are allocated based on the distribution of daily person miles of travel (PMT) per person by private vehicles by trip purpose and the average vehicle occupancy (AVO) by trip purpose provided by the *2009 National Household Travel Survey (NHTS).*

- Monetization of the hours of delay using the value of time (VOT) by vehicle type and trip purposed provided in the U.S. DOT Benefit-Cost Analysis Guidance for TIGER and INFRA Applications, Updated July 2017.

The direct economic impacts on work and business trips made by passenger cars and trucks (i.e., the trips with economic value) resulting from the effects of transit services on mitigating congestion are translated into the necessary model inputs for IMPLAN as follow:

- Travel time and fuel savings enjoyed by auto business and truck trips affect the Industry Change input in IMPLAN.

- Travel time and fuel savings accruing to auto commute trips affect the Household Spending Change input in IMPLAN. Savings in travel delay costs accruing to auto commuters are assumed to be borne by all households in the region proportionately to the household share of income within the region. To apply this assumption, this analysis uses the data available from IMPLAN to estimate the percentage of households falling into each income range for each parish in the service area.

IMPLAN inputs are allocated to Orleans Parish and Jefferson Parish, which, according to the ridership survey, contain the vast majority of the geocoded RTA rider home locations and all of the geocoded RTA work locations.[2] The indirect and induced benefits arising from the direct benefits are modeled using

[2] Based on an initial spatial query of the geocoded coordinates using GIS. The surveys were filtered to include records that had geocoded origins and/or geocoded destinations, were not duplicate survey takers, and were not only Jefferson Transit riders. When the resulting subset of geocoded coordinates is further filtered to only origins or destinations categorized as Home, 99.5 percent of the 1,717 records fall within Orleans Parish or Jefferson Parish. When the subset is instead further filtered to only origins or destinations categorized as Work, all of the 345 records fall within Orleans Parish or Jefferson Parish.

IMPLAN, generating estimates of the total economic benefits of reduced congestion in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue.

3.2 State of Good Repair of the Highway Infrastructure

As more highway users shifts to transit, reducing roadway travel, the annual cost of maintaining the highway infrastructure in a state of good repair is reduced. The quantification of these benefits involves the following steps:

- Calculate the marginal external unit costs associated with roadway pavement maintenance ($/VMT for autos and $/VMT for buses) and streetcar track maintenance ($/TMT) using collected NTD and US DOT data.
- Calculate the pavement maintenance cost resulting from RTA services by multiplying the average annual VMT for bus routes and TMT for streetcar routes by their corresponding external marginal pavement maintenance.
- Estimate the average annual VMT saved resulting from people using RTA services rather than alternative transportation modes and then calculate the avoided pavement maintenance cost by multiplying the average annual VMT saved by the corresponding external marginal cost of the alternative transportation modes on pavement maintenance. To account for the avoided VMT attributable to the provision of transit service, this analysis applies the mode shift factors provided by the *New Orleans COA Ridership Survey*. The unit pavement cost per passenger mile for each alternative transportation mode is estimated by dividing its marginal external pavement maintenance cost by its average vehicle occupancy (AVO).
- Calculate the net savings in pavement maintenance costs by subtracting the impact of RTA services on pavement maintenance from the traffic impact of alternative modes of transportation on pavement maintenance.

These benefits do not have a multiplier effect in the regional economy and therefore are not input into the IMPLAN model.

For the *New Orleans Future Transit Scenario*, marginal external unit costs associated with roadway pavement maintenance by vehicle type (i.e., $/VMT for autos, buses and streetcars) are assumed to be the same as the unit costs for the existing condition and net savings are calculated with the projected PMT and avoided VMT over the 2023-2040 analysis period.

4.0 Affordable Mobility Benefits

RTA's current transit services provide affordable mobility to residents without access to personal vehicles or other forms of dependable transportation, which in turn allows these individuals to reallocate their income for expenditures on other goods and services, and provides them greater access to employment opportunities. The calculation of mobility benefits include the estimation of the transportation cost expenditures that result when RTA riders shift to other modes of travel in the absence of transit (the "expenditure value benefit") and the foregone employment as RTA-dependent riders have no means to travel to and from work or make business-related trips in the absence of transit (the "foregone employment benefit").

4.1 Expenditure Value Benefit

A potential benefit of public transit is a reduction in transportation costs to those who use transit in place of another mode of travel to satisfy their transportation needs (i.e., trips to work, shop, school, etc.). In the absence of public transportation, transit riders would have to either use a different mode or forego the trip. The estimation of this benefit involves the following steps:

- Estimate linked trips for RTA buses and streetcars. RTA ridership is adjusted for linked trips using the ratio of linked trips to unlinked trips. This ratio was estimated based on data provided by the *New Orleans COA Ridership Survey*.

- Estimate the following metrics: fare per linked trip by dividing RTA fare revenue by linked trips, passenger miles per linked trip by dividing RTA passenger miles by linked trip, and RTA user cost per mile by dividing passenger miles per linked trip by fare per linked trip.

- Estimate the transit fares paid by RTA riders shifting to alternative transportation modes in the absence of transit by multiplying the fare per linked trip (estimated in the previous step) by linked trips shifting to alternative transportation modes.

- Estimate transportation costs incurred by RTA riders shifting to alternative transportation modes by applying the mode shift factors provided by the *New Orleans COA Ridership Survey* and user cost per mile for the alternative transportation modes using a range of publically available data sources as well as RTA user cost per mile estimated in the previous step.

- Subtract transit fares paid by RTA riders shifting to alternative modes from the transportation costs incurred by RTA riders shifting to alternative transportation modes to estimate the net expenditure value benefit.

- The expenditure value benefit is the net savings in transportation costs (i.e., transportation expenditures incurred by transit riders shifting to alternative transportation modes minus transit

fares paid by these riders) that result when individuals are able to use transit in place of another mode and reallocate their transportation expenditure savings on other goods and services.

The expenditure value benefit resulting from RTA transit services is translated into Household Spending Change inputs into IMPLAN. The IMPLAN inputs are allocated among Orleans and Jefferson Parishes according to the home locations reported in the RTA ridership survey. This Household Spending Change drives induced impact but not indirect impacts, since there are no subsequent changes in industry production. The induced benefits arising from the direct benefit are modeled using the IMPLAN model, generating estimates of the total economic benefits in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue.

For the future scenarios, RTA ridership are adjusted according to future ridership estimations provided by RTA. Other variables, such as the proportion of linked to unlinked trips, the marginal costs of other modes, transit fares per linked trip and the mode shift factors are assumed to be the same as the existing condition. Direct benefits are calculated and induced benefits are modeled using the IMPLAN model, generating estimates of the total economic benefits in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue over the 2023-2040 period.

4.2 Foregone Employment Benefit

Transit increases access to jobs and services for low-income individuals, the elderly and disabled, students, and people with no private means of transportation, thus contributing to the economic well-being of these population groups. The estimation of the foregone employment value of RTA for transit dependent residents are assessed by calculating the jobs (or opportunities to conduct business) lost when low-income passengers forgo job-related trips in the absence of transit services. This assessment involves the following steps:

- Use *New Orleans COA Ridership Survey* data to estimate shares of work and non-work trips by household income ranges as well as work trips that can be done (or cannot be done) using alternative transportation modes.
- Estimate linked foregone work trips by household income ranges and the number of riders that have to forego their work trips. To convert linked trips to number of riders, the analysis assumes a transit rider makes 480 work trips (i.e., 48 weeks per year x 5 days per week x 2 trips per day).
- Estimate forgone annual income without the availability of low-income riders to get to work using transit. This analysis assumes that riders from annual household income less than $35,000 who forego their work trips would lose their jobs.

The foregone employment benefit resulting from RTA transit services in 2015 are translated into Household Spending Change inputs into IMPLAN. IMPLAN inputs are allocated among Orleans and Jefferson Parishes according to the home locations for low-income households reported in the RTA ridership survey. This

change drives induced impact but not indirect impacts, since there are no subsequent changes in industry production. The induced benefits arising from the direct benefit are modeled using the IMPLAN model, generating estimates of the total economic benefits in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue.

For the future scenario, RTA ridership between 2015 and 2040 are interpolated from the data provided for those two years to generate values for the intermittent years, assuming a linear growth over the analysis period. Other values such as household income distributions of transit riders and low-income riders who forego their work trips and would lose their jobs are assumed to be the same as the existing condition. Direct benefits are calculated and induced benefits are modeled using the IMPLAN model, generating estimates of the total economic benefits in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue over the 2023-2040 period.

5.0 Community Impacts

In addition to private household and business impacts, transit services can give rise to public or societal benefits. These are often categorized as community impacts. This section discusses some of those broader societal benefits including emissions and air quality, safety, tax base expansion and livability or quality of life benefits.

5.1 Environmental Emission Benefits

By removing private passenger vehicles from roadways and reducing passenger cars trips, RTA services can lower the costs associated with air pollutants, generating environmental benefits in the region. This analysis estimates:

- Greenhouse gas (GHG) emissions produced by RTA transit mobile combustion, that is, tailpipe emissions from transit vehicles or electricity use for streetcars. This analysis does not include the emissions produced by stationary combustion from boilers and furnaces, and indirect emissions from electricity generation. Inputs on vehicle miles, passenger miles, and unlinked passenger trips obtained from NTD were used in this part of the analysis.

- GHG emissions displaced by RTA transit services due to:

  - Mode Shift: Avoided trips through mode shift from private passenger vehicles, taxis or other alternative transportation modes to RTA transit vehicles. This analysis uses the shift factors provided by the *New Orleans COA Ridership Survey* to allocate RTA PMT to alternative transportation modes available to riders if transit is unavailable. These values are multiplied by the corresponding average vehicle occupancy (AVO) for each of the alternative transportation modes to estimate displaced VMT in 2015 (for the existing condition) and displaced VMT over the 2023-2040 period (for the Buildout Scenario). It should be noted that the mode shift factor does not include changes to trip lengths or transit-induced shifts to walking and biking. These changes are considered in the land use multiplier.

  - Congestion Relief: Improved operating efficiency of private passenger vehicles and commercial vehicles, including reduced idling and stop-and-go traffic. This analysis estimates the reduce in auto and truck fuel consumption due to traffic decongestion resulting from existing public transportation services in the New Orleans urban area using the historical data provided by TTI and applying linear regression analyses to produce estimates in 2015 (for the existing condition) and over the 2023-2040 period (for the Buildout Scenario).

  - Compact land use patterns: Lower emissions due to more compact land use patterns enabled by public transit that promote walking and cycling, shorter and less frequent trips in private automobiles, and reduced private vehicle ownership. This is called the land use multiplier. This

analysis uses the national default multiplier of 1.9 vehicle-mile reductions per passenger mile provided by the ICF International.[3] This factor is multiplied by the passenger miles traveled (PMT) in 2015 and over the 2023-2040 period (for the Buildout Scenario) to estimate the reduction in GHG emissions for the existing condition and the Buildout Scenario, respectively.

- The net cost reduction of RTA on GHG emissions by subtracting emissions produced by RTA from emissions displaced by RTA. This analysis uses the GHG emissions rates provided by the APTA's Transit Emission Quantifier Tool and the midrange damage cost estimate from the National Research Council (NRC) study of $30 per ton of CO2 equivalent (CO2e) (in 2009$). This is the value used by the Federal Transit Administration (FTA) to capture the monetary value of change of GHG emissions.[4]

5.2 Traffic Safety Benefits

By removing vehicles from roadways and reducing passenger cars trips, RTA services can also lower the costs associated with traffic crashes. Crash costs include *internal costs*, which are damages and risks to the individual traveling by a particular vehicle or mode, and *external costs*, which are uncompensated damages and risks imposed by an individual on other people. Internal crash costs are assigned per passenger mile, while external risk is assigned to vehicle miles. External risks do not increase with vehicle occupancy while internal crash costs decline as vehicle occupancy increases. For example, a vehicle carrying only a driver imposes only about 10 percent of the internal crash risk as a vehicle carrying ten people, but the external crash risk is considered the same for both. The assessment of the crash cost changes involves the following steps:

- Use the average internal and external crash costs by vehicle class provided by the Victoria Transport Policy Institute[5] and inflate these values to 2015 dollars based on the CPI for South Urban Areas. Internal costs are in $/PMT and external costs are in $/VMT.

- Estimate the crash cost associated with RTA transit services today. For the existing condition, the average internal unit costs for transit vehicles (in $/PMT) is multiplied by PMT and the average external unit cost for transit vehicles (in $/VMT) is multiplied by revenue miles for RTA bus and streetcar from NTD in 2015. These two values are added. The result represents the crash cost associated with RTA transit services today.

- Estimate the crash cost associated with RTA transit services under the *New Orleans Future Transit Scenario*. For the Buildout Scenario, PMT and revenue miles between 2015 and 2040 are interpolated from the RTA data provided for those two years to generate values for the intermittent

[3] Bailey, L., P.L. Mokhtarian, *et al*. *The Broader Connection between Public Transportation*, Energy Conservation and Greenhouse Gas Reduction, 2008.

[4] U.S. DOT, Federal Transit Administration, Propose New Starts and Small Starts Policy Guidance, 2013.

[5] Victoria Transport Policy Institute, Transportation Cost and Benefit Analysis II – Safety and Health Costs (May 18, 2016).

years, assuming a linear growth over the analysis period. The projected PMT and revenue miles are multiplied by the average internal and external crash costs for transit vehicles, respectively. These two values are added. The result represents the crash costs associated with RTA transit services for the Buildout Scenario.

- Estimate the avoided crash costs due to RTA transit services. To account for the avoided PMT and VMT attributable to the provision of transit service, this analysis applies the mode shift factors provided by the *New Orleans COA Ridership Survey*. The average internal unit costs for the alternative transportation modes (in $/PMT) is multiplied by the avoided PMT and the average external unit costs for the alternative transportation modes (in $/VMT) is multiplied by the avoided VMT. The two values are added. These calculations are made using 2015 data from NTD and PMT and VMT estimates over the 2023-2040 period. The results represents (1) the avoided crash costs due to RTA transit services today and (2) the avoided crash costs due to RTA transit services under the Buildout Scenario.

- Estimate net savings in crash costs by subtracting the impact of RTA services on crash costs from the savings in crash costs resulting from people using transit rather than alternative transportation modes. These calculation are done for the existing condition based on 2015 data from NTD and for the Buildout Scenario based on 2023-2030 data provided by RTA.

5.3 Additional Transit Benefits

In addition to the benefits and economic impacts addressed in previous section, there are other benefits that frequently arise from public transit. These benefits are difficult to reliably quantify, but need to be considered as part of the transit investment decision-making. The final report will overview the following benefits from a qualitative perspective:

- Livability benefits, including property values, walkability, and social capital
- Agglomeration benefits
- Smart growth

6.0 Economic Benefits of NORTA's Current Operations and Services

6.1 RTA Statistics

The assessment of the direct benefits generated by NORTA's current operations and services relies in the background transit data and the corresponding sources presented in **Table 6.1** thru **Table 6.3**.

Table 6.1 NORTA Ridership and Passenger Miles Traveled (PMT), 2015

Item	Unlinked Passenger Trips	Share (%)
NORTA Bus and Streetcar Trips	18,431,674	99%
AMTRAK Trips	189,456	1%
Total =	**18,621,130**	**100%**

Item	Passenger Miles Traveled (PMT)	Share (%)
NORTA	47,513,289	77%
All Transit Services	61,518,368	100%

Transit Mode	RTA Vehicle Revenue Miles	Share (%)
NORTA Bus	4,794,173	83%
NORTA Streetcar	952,665	17%
Total =	**5,746,838**	**100%**

Notes:

1. Metrics (unlinked passenger trips and passenger miles) of transit services in New Orleans area come from the National Transit database (NTD), available at https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.
2. Amtrak ridership comes from Amtrak Fact Sheet, Fiscal Year 2015 State of Louisiana, available at https://www.amtrak.com/pdf/factsheets/LOUISIANA15.pdf, 2015, Accessed July 2017.

Table 6.2 Estimated NORTA Linked Trips, 2015

RTA Route Count (a)	Linked Trips (b)	Unlinked Trips (c) = (a) x (b)
1	3,258	3,258
2	2,026	4,052
3	391	1,173
4	35	140
5	7	35
Grand Total =	**5,717**	**8,658**
Weighted Average (i.e., unlinked to linked ratio) = (c) / (b)		**1.51**

Mode	Unlinked Passenger Trips	Linked Trips
	(d)	**(e) = (a)/1.51**
Bus	11,150,026	7,362,520
Streetcar	7,281,648	4,808,175
Total =	**18,431,674**	**12,170,695**

Notes:

1. Estimated unlinked to linked ratio based on the data provided by the New Orleans COA Ridership Survey; and
2. Unlinked passenger trips come from the National Transit database (NTD), available at https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.

Table 6.3 Mode Shift Factors and Estimated PMT displaced by RTA Transit Services

Alternative Transportation Modes	Mode Shift Factors	Linked Trips from RTA Buses	Linked Trips from RTA Streetcars	PMT from Bus	PMT from Streetcar	Total PMT
	(a)	(b) = (a) x [Total Unlinked BusTrips/1.51]	(c) = (a) x [Total Unlinked Streetcar Trips/1.51]	(d)	(e)	(f) = (d) + (e)
Another Bus	2%	167,702	109,520	772,089	310,158	1,082,247
Bicycle	6%	441,751	288,491	2,033,796	817,001	2,850,797
Carpool	6%	426,753	278,696	1,964,748	789,263	2,754,011
Drive	9%	698,076	455,886	3,213,901	1,291,063	4,504,964
Driven	34%	2,507,347	1,637,451	11,543,678	4,637,237	16,180,915
No Trip	11%	811,241	529,790	3,734,904	1,500,357	5,235,261
Taxi	16%	1,201,182	784,445	5,530,169	2,221,536	7,751,705
Walk	15%	1,108,468	723,898	5,103,322	2,050,067	7,153,390
Grand Total =	**100%**	**7,362,520**	**4,808,175**	**33,896,607**	**13,616,682**	**47,513,289**
% Transit trips shifting to alternative transportation modes in the absence of RTA services =						**89%**
% Forego transit trips in the absence of RTA transit services =						**11%**

Notes:

1. Estimated unlinked to linked ratio based on the data provided by the New Orleans COA Ridership Survey; and
2. Total unlinked passenger trips and passenger miles traveled (PMT) come from the National Transit database (NTD), available at https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.

6.2 Enterprise Benefits

Wages and Benefits - NORTA paid nearly $12.6 million in wages and benefits to 695 full-time employees (FTE) in 2015 (**Table 6.4**). Ninety seven (97) percent of NORTA employees resides in New Orleans Metropolitan Statistical Area (MSA) while the remaining 3 percent lives outside of the MSA.

Table 6.4 NORTA Wages and Benefits: Number of Employees and Estimated Employee Compensation by Parish of Residence, 2015

Parish of Residence	Number of Full-Time Employees	Combined Wages and Benefits (2015$)
New Orleans MSA = (a)	**674**	**$12,191,961**
• Jefferson	129	$2,333,476
• Orleans	461	$8,339,012
• St Tammany	49	$886,359
• St Bernard	19	$343,690
• St John	13	$235,157
• Combined St. Charles, St. James and Plaquemines	3	$54,267
Outside of New Orleans MSA = (b)	**21**	**$379,868**
Total = (a) + (b)	**695**	**$12,571,829**

Sources: (1) New Orleans Regional Transit Authority (RTA or NORTA) and (2) Email correspondence with Taylor Marcantel at RTA, May 2017

Note: The rest of New Orleans MSA includes St. Charles, St. James and Plaquemines parishes.

The number of FTE residing in Jefferson, Orleans, St Tammany, St Bernard and St John parishes as well as in the rest of the parishes within New Orleans MSA (i.e., St. Charles, St. James and Plaquemines parishes) are input into the New Orleans MSA IMPLAN model as changes in the transit and ground passenger transportation industry sector, which corresponds to the IMPLAN Sector 412, to estimate the total economic impacts. In 2015, the total (direct, indirect and induced) economic impacts generated by RTA employees living in New Orleans MSA (**Tables 6.5** and **6.6)** are estimated to account for nearly 880 jobs, $28 million in labor income, $44.6 million in value added and $7.7 million in combined federal, state and local taxes.

Table 6.5 Total Economic Impacts (Jobs, Labor Income and GRP) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2015

Geography	Impact Type	Employment	Labor Income (in 2015$)	GRP (in 2015$)
Jefferson Parish	Direct Effect	129	$3,348,200	$4,492,766
	Indirect Effect	22	$1,178,924	$1,824,155
	Induced Effect	24	$1,041,788	$1,875,422
	Total Effect	**175**	**$5,568,913**	**$8,192,343**
Orleans Parish	Direct Effect	461	$11,695,558	$20,565,903
	Indirect Effect	69	$4,161,813	$6,112,248
	Induced Effect	61	$2,638,689	$4,747,322
	Total Effect	**591**	**$18,496,059**	**$31,425,473**
Other Parishes within New Orleans MSA	Direct Effect	84	$2,726,815	$2,952,770
	Indirect Effect	15	$670,554	$1,009,671
	Induced Effect	15	$505,220	$994,883
	Total Effect	**114**	**$3,902,590**	**$4,957,324**
New Orleans MSA (Grand Total)	Direct Effect	674	$17,770,573	$28,011,439
	Indirect Effect	106	$6,011,291	$8,946,074
	Induced Effect	99	$4,185,697	$7,617,627
	Total Effect	**879**	**$27,967,562**	**$44,575,140**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 6.6 Total Economic Impacts (Tax Revenues) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2015

Tax Revenue Type	Federal (in 2015$)	State & Local (in 2015$)	Total (in 2015$)
Jefferson Parish			
Tax on Production and Imports	$50,833	$324,457	$375,290
Social Security Contributions	$556,208	$6,393	$562,601
Personal Income Tax	$391,291	$70,917	$462,208
Corporate Profits and Dividend Taxes	$177,185	$8,449	$185,634
Personal Sales and Property Taxes	N/A	$29,250	$29,250
Total =	**$1,175,517**	**$439,467**	**$1,614,983**
Orleans Parish			
Tax on Production and Imports	$129,459	$869,845	$999,305
Social Security Contributions	$1,670,279	$30,424	$1,700,703
Personal Income Tax	$1,047,130	$188,470	$1,235,600
Corporate Profits and Dividend Taxes	$940,258	$44,348	$984,606
Personal Sales and Property Taxes	N/A	$142,988	$142,988
Total =	**$3,787,127**	**$1,276,075**	**$5,063,202**
Other Parishes within New Orleans MSA			
Tax on Production and Imports	$25,134	$204,538	$229,672
Social Security Contributions	$336,829	$6,012	$342,841
Personal Income Tax	$278,271	$50,630	$328,901
Corporate Profits and Dividend Taxes	$62,789	$3,216	$66,005
Personal Sales and Property Taxes	N/A	$25,247	$25,247
Total =	**$703,023**	**$289,642**	**$992,666**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$205,426	$1,398,841	$1,604,267
Social Security Contributions	$2,563,317	$42,829	$2,606,146
Personal Income Tax	$1,716,692	$310,017	$2,026,709
Corporate Profits and Dividend Taxes	$1,180,232	$56,013	$1,236,245
Personal Sales and Property Taxes	N/A	$197,484	$197,484
Grand Total =	**$5,665,667**	**$2,005,184**	**$7,670,851**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Notes:

1. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Retirement Benefits - NORTA paid nearly $ $3 million on retirement benefits in 2015 (**Table 6.7**). To allocate the retirement benefits among New Orleans MSA parishes, this analysis assumes the following:

- Ninety-seven (97) percent of NORTA retirees lives within New Orleans MSA;
- Ninety (90) percent of retirees stays in their homes and communities;
- Retirement disbursements are allocated across parishes consistently with the share of employee counts by parish in 2015; and

  Retirement benefits are borne by all households in each parish proportionately to the household share of income within the parish. To apply this assumption, this analysis uses the 2015

household income data available from IMPLAN to estimate the percentage of households falling into each household income range.

Table 6.7 NORTA Retirement Benefits: Total and Estimated Benefits by Parish, 2015

Item	Value	Source
Pension Benefits = (a)	$2,997,000	RTA Financial Statements 2015
Employees living in New Orleans MSA = (b)	674	NORTA
Employees living outside of New Orleans MSA = (c)	695	NORTA
Share of NORTA Employees living in New Orleans MSA = (d) = (b) / (c)	97%	Estimated
% Retirees Leaving in New Orleans MSA = (e)	90%	Assume
New Orleans MSA Pension Benefits = (f) = (a) x (d) x (e)	$2,615,799	
Parish	**Employment Share (g)**	**Retirement Benefits (h) = (f) x (g)**
Jefferson	19%	$500,650
Orleans	68%	$1,789,144
St Tammany	7%	$190,169
St Bernard	3%	$73,739
St John	2%	$50,453
Combined St. Charles, St. James and Plaquemines	1%	$11,643
New Orleans MSA (Grand Total) =	**100%**	**$2,615,799**

Allocation of Retirement Benefits among Parishes						
Household Income Range	**Jefferson**	**Orleans**	**St Tammany**	**St Bernard**	**St John**	**Combined St Charles, St James and Plaquemines**
Households LT15k	$69,753	$424,188	$18,017	$10,127	$6,434	$1,370
Households 15-30k	$88,926	$342,982	$26,239	$14,600	$7,974	$1,757
Households 30-40k	$55,467	$171,424	$18,482	$8,663	$4,500	$1,053
Households 40-50k	$45,472	$140,190	$14,785	$6,786	$5,803	$1,009
Households 50-70k	$70,028	$207,925	$28,253	$10,474	$8,435	$1,801
Households 70-100k	$72,797	$199,454	$30,943	$12,286	$8,148	$1,796
Households 100-150k	$58,975	$157,531	$30,724	$7,382	$6,004	$1,826
Households 150-200k	$18,451	$62,263	$10,802	$2,252	$2,232	$682
Households 200k+	$20,781	$83,186	$11,925	$1,169	$923	$349
Total =	**$500,650**	**$1,789,144**	**$190,169**	**$73,739**	**$50,453**	**$11,643**

Notes:

1. RTA Financial Statements 2015 available at https://app.lla.state.la.us/PublicReports.nsf/379A0BD03BAE7EAB8625800A0073ED1C/$FILE/000107DD.pdf; Accessed July 2017; and

2. The rest of New Orleans MSA includes St. Charles, St. James and Plaquemines parishes.

The retirement benefits for Jefferson, Orleans, St Tammany, St Bernard and St John parishes as well as the rest of the parishes within New Orleans MSA are input into the New Orleans MSA IMPLAN model to estimate the total economic impacts. In 2015, the total (direct, indirect and induced) economic impacts generated by RTA retirement benefits in New Orleans MSA (**Tables 6.8** and **6.9**) are estimated to account for 17 jobs, close to $0.8 million in labor income, $1.3 million in value added and nearly $0.3 million in combined federal, state and local taxes.

Table 6.8 Total Economic Impacts (Jobs, Labor Income and GRP) Accruing to New Orleans MSA Resulting from NORTA Retirement Benefits, 2015

	Impact		
Geography	**Employment**	**Labor Income (in 2015$)**	**GRP (in 2015$)**
Jefferson Parish	3	$159,115	$282,504
Orleans Parish	12	$523,496	$926,187
Other Parishes within New Orleans MSA	2	$69,879	$130,283
New Orleans MSA (Grand Total)	**17**	**$752,490**	**$1,338,973**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Notes:

1. Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.
2. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 6.9 Total Economic Impacts (Tax Revenues) Accruing to New Orleans MSA Resulting from NORTA Retirement Benefits, 2015

Tax Revenue Type	Federal (in 2015$)	State & Local (in 2015$)	Total (in 2015$)
Jefferson Parish			
Tax on Production and Imports	$3,718	$23,732	$27,450
Social Security Contributions	$16,983	$204	$17,188
Personal Income Tax	$11,093	$2,010	$13,103
Corporate Profits and Dividend Taxes	$7,561	$361	$7,922
Personal Sales and Property Taxes	N/A	$829	$829
Total =	**$39,356**	**$27,137**	**$66,492**
Orleans Parish			
Tax on Production and Imports	$10,013	$67,276	$77,289
Social Security Contributions	$50,340	$966	$51,307
Personal Income Tax	$28,692	$5,164	$33,856
Corporate Profits and Dividend Taxes	$25,646	$1,210	$26,856
Personal Sales and Property Taxes	N/A	$3,918	$3,918
Total =	**$114,691**	**$78,534**	**$193,226**
Other Parishes within New Orleans MSA			
Tax on Production and Imports	$1,555	$12,872	$14,427
Social Security Contributions	$7,017	$138	$7,155
Personal Income Tax	$5,140	$930	$6,070
Corporate Profits and Dividend Taxes	$3,449	$170	$3,619
Personal Sales and Property Taxes	N/A	$297	$297
Total =	**$17,161**	**$14,407**	**$31,569**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$15,286	$103,880	$119,166
Social Security Contributions	$74,341	$1,309	$75,650
Personal Income Tax	$44,925	$8,105	$53,029
Corporate Profits and Dividend Taxes	$36,656	$1,740	$38,396
Personal Sales and Property Taxes	N/A	$5,045	$5,045
Grand Total =	**$171,208**	**$120,078**	**$291,286**

Source: Outputs from the IMPLAN economic model for New Orleans MSA

Note:

1. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 6.10 shows the RTA non-payroll operating expenditures in 2015 and the selected IMPLAN industry sectors directly impacted by these expenses. **Table 6.11** shows the RTA capital expenditures in 2015 and the selected IMPLAN industry sectors directly impacted by these expenses. These expenditures are apportioned to the combined Jefferson and Orleans parishes based on the allocation factors shown in **Table 6.12**. The dollar amounts expended in the combined Jefferson and Orleans parishes are shown in **Table 6.13** (non-payroll operating expenditures) and **Table 6.14** (capital expenditures).

Table 6.10 RTA Non-Payroll Operating Expenditures and Selected IMPLAN Industry Sectors, 2015

Expense Type	Dollar Amount*	IMPLAN Industry Code	IMPLAN Industry Name
Fuel and Lube	$3,440,905	402	Retail - Gasoline stores
Other Materials & Supplies	$1,481,211	396	Retail - Motor vehicle and parts dealers
Utilities	$1,247,794	49	Electric power transmission and distribution
Casualty and Liability	$8,250,059	438	Insurance agencies, brokerages, and related activities
Purchased Transportation	$69,282,215	412	Transit and ground passenger transportation
Miscellaneous	$105,440	406	Retail - Miscellaneous store retailers
Total Non-Payroll Expenditures =	**$83,807,624**		

Note: *The dollar amounts come from the National Transit Database (Operating Expenses - Agency Total by Type tab; Capital Expenses - Agency Totals tab), https://www.transit.dot.gov/ntd/ntd-data, 2015, accessed May 2017.

Table 6.11 RTA Capital Expenditures and Selected IMPLAN Industry Sectors, 2015

Expense Type	Dollar Amount*	IMPLAN Industry Code	IMPLAN Industry Name
Guideway	$332,187	64	Maintenance and repair construction of highways, streets, bridges, and tunnels
Stations	$92,073	62	Maintenance and repair construction of nonresidential structures
Administrative Buildings	$5,936	62	Maintenance and repair construction of nonresidential structures
Maintenance Buildings	$40,879	62	Maintenance and repair construction of nonresidential structures
Passenger Vehicles	$1,559,399	344	Light truck and utility vehicle manufacturing
Other Vehicles	$146,449	344	Light truck and utility vehicle manufacturing
Fare Collection Equipment	$66,650	351	Motor vehicle electrical and electronic equipment manufacturing
Communication & Information Systems	$200,668	429	Satellite, telecommunications resellers, and all other telecommunications
Other	$982,711	406	Retail - Miscellaneous store retailers
Total Capital Expenditures =	**$3,426,952**		

Note:

1. *The dollar amounts come from the National Transit Database (Operating Expenses - Agency Total by Type tab; Capital Expenses - Agency Totals tab), https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.

Table 6.12 Industry Output Concertation in the Combined Jefferson and Orleans Parishes Compared to the Nation

Location Quotient (LQ)	Industry Output Concentration in the Combined Jefferson and Orleans Parishes Compared to the Nation	Allocation Factor
LQ ≤ 1.0	All local	1.00
1.0 < LQ ≤ 0.75	Mostly local	0.75
0.75 < LQ ≤ 0.5	Even split	0.50
0.50 < LQ ≤ 0.25	Mostly non-local	0.25
0.25 < LQ	All non-local	0.00

Table 6.13 Allocation of RTA Non-Payroll Operating Expenditures to the Combined Jefferson and Orleans Parishes, 2015

Expense Type	Non-Payroll Operating Expenditures (in 2015$)*	IMPLAN Industry Code	LQ Output	Allocation Factor (Table 6.12)	Dollar Amount Expended in the Combined Parishes (in 2015$)
Utilities	$1,247,794	49	0.85	0.75	$935,846
Other Materials & Supplies	$1,481,211	396	1.14	1.00	$1,481,211
Fuel and Lube	$3,440,905	402	0.94	0.75	$2,580,679
Miscellaneous	$105,440	406	1.33	1.00	$105,440
Purchased Transportation	$69,282,215	412	1.89	1.00	$69,282,215
Casualty and Liability	$8,250,059	438	1.76	1.00	$8,250,059
Total Non-Payroll Expenditures =	**$83,807,624**				**$82,635,449**

Note:

1. *The dollar amounts come from the National Transit Database (Operating Expenses - Agency Total by Type tab; Capital Expenses - Agency Totals tab), https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.

Table 6.14 Allocation of RTA Capital Expenditures to the Combined Jefferson and Orleans Parishes, 2015

Expense Type	Dollar Amount*	IMPLAN Industry Code	Location Quotient (LQ)	Allocation Factor (Table 6.12)	Dollar Amount Expended in the Combined Two Parishes
Guideway	$332,187	64	1.15	1.00	$332,187
Stations, Administrative Buildings and Maintenance Buildings	$138,888	62	1.15	1.00	$138,888
Passenger Vehicles and Other Vehicles	$1,705,848	344	0.00	0.00	$0
Fare Collection Equipment	$66,650	351	0.01	0.00	$0
Communication & Information Systems	$200,668	429	0.50	0.5	$100,334
Other	$982,711	406	1.33	1.00	$982,711
Total Capital Expenditures =	**$3,426,952**				**$1,554,120**

Note:

1. *The dollar amounts come from the National Transit Database (Operating Expenses - Agency Total by Type tab; Capital Expenses - Agency Totals tab), https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.

The ongoing capital expenditures and operations of RTA require expenditures on labor, supplies, utilities, and other goods and services. The expenditures on local providers of these goods and services gives rise to direct, indirect, and induced economic impacts in the New Orleans region. In 2015, the total (direct, indirect and induced) economic impacts generated by RTA non-payroll operating expenditures (**Table 6.15**) are estimated to account for nearly 1,100 jobs, $45 million in labor income, $69 million in value added and $13.4 million in combined federal, state and local taxes. In 2015, the total (direct, indirect and induced) economic impacts generated by RTA capital expenditures (**Tables 6.16**) are estimated to account for nearly 26 jobs, $1.0 million in labor income, $1.3 million in value added and $0.3 million in combined federal, state and local taxes.

Table 6.15 Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to the Combined Jefferson and Orleans Parishes from RTA Non-Payroll Operating Expenditures, 2015

Impact Type	Employment	Labor Income (in 2015$)	GRP (in 2015$)
Direct Effect	749	$27,579,723	$39,716,180
Indirect Effect	152	$8,843,519	$13,794,901
Induced Effect	192	$8,643,319	$15,402,198
Total Effect	**1,093**	**$45,066,561**	**$68,913,279**

Tax Revenue Type	Federal (in 2015$)	State & Local (in 2015$)	Total (in 2015$)
Tax on Production and Imports	$465,118	$3,038,148	$3,503,266
Social Security Contributions	$4,458,703	$68,885	$4,527,589
Personal Income Tax	$2,852,276	$515,242	$3,367,518
Corporate Profits and Dividend Taxes	$1,603,347	$76,030	$1,679,376
Personal Sales and Property Taxes	N/A	$297,233	$297,233
Total =	**$9,379,444**	**$3,995,538**	**$13,374,982**

Source: Outputs from the IMPLAN economic model for New Orleans MSA

Table 6.16 Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to the Combined Jefferson and Orleans Parishes from RTA Capital Expenditures, 2015

Impact Type	Employment	Labor Income (in 2015$)	GRP (in 2015$)
Direct Effect	19	$635,113	$737,456
Indirect Effect	3	$151,018	$261,977
Induced Effect	4	$186,709	$332,753
Total Effect	26	$972,839	$1,332,186

Tax Revenue Type	Federal (in 2015$)	State & Local (in 2015$)	Total (in 2015$)
Tax on Production and Imports	$19,085	$124,666	$143,751
Social Security Contributions	$94,559	$1,441	$96,000
Personal Income Tax	$61,866	$11,176	$73,042
Corporate Profits and Dividend Taxes	$16,992	$806	$17,798
Personal Sales and Property Taxes	N/A	$6,447	$6,447
Total =	**$192,502**	**$144,536**	**$337,038**

Source: Outputs from the IMPLAN economic model for New Orleans MSA

The total composite (direct, indirect and induced) enterprise effects of RTA in New Orleans MSA are presented in **Table 6.17**. In 2015, RTA supported the creation of over 2,000 new jobs which added nearly $75 million in labor income and generated $116 million in GRP in the region. This additional economic activity resulted in almost $22 million in combine federal, state and local tax revenues.

Table 6.17 Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA from RTA Enterprise Benefits, 2015

	Direct Effect		
	Employment	**Labor Income (in 2015$)**	**GRP (in 2015$)**
Employee Wages and Benefits	674	$17,770,573	$28,011,439
Retirement Benefits	0	$0	$0
Capital Expenditures	19	$635,113	$737,456
Non-Payroll Operating Expenditures	749	$27,579,723	$39,716,180
Total Direct Effect =	**1,439**	**$45,985,409**	**$68,465,074**
	Indirect Effect		
Employee Wages and Benefits	106	$6,011,291	$8,946,075
Retirement Benefits	0	$0	$0
Capital Expenditures	3	$151,018	$261,977
Non-Payroll Operating Expenditures	152	$8,843,519	$13,794,901
Total Indirect Effect =	**261**	**$15,005,828**	**$23,002,952**
	Induced Effect		
Employee Wages and Benefits	99	$4,185,697	$7,617,627
Retirement Benefits	17	$752,490	$1,338,973
Capital Expenditures	4	$186,709	$332,753
Non-Payroll Operating Expenditures	192	$8,643,319	$15,402,198
Total Indirect Effect =	**312**	**$13,768,215**	**$24,691,551**
	Total (Direct, Indirect and Induced) Effect		
Employee Wages and Benefits	879	$27,967,562	$44,575,140
Retirement Benefits	17	$752,490	$1,338,973
Capital Expenditures	26	$972,839	$1,332,186
Non-Payroll Operating Expenditures	1,093	$45,066,561	$68,913,279
Grand Total =	**2,015**	**$74,759,452**	**$116,159,577**

	Tax Revenue		
	Federal (in 2015$)	**State & Local (in 2015$)**	**Total (in 2015$)**
Employee Wages and Benefits	$5,665,667	$2,005,184	$7,670,851
Retirement Benefits	$171,208	$120,078	$291,286
Capital Expenditures	$9,379,444	$3,995,538	$13,374,982
Non-Payroll Operating Expenditures	$192,502	$144,536	$337,038
Grand Total =	**$15,408,821**	**$6,265,336**	**$21,674,157**

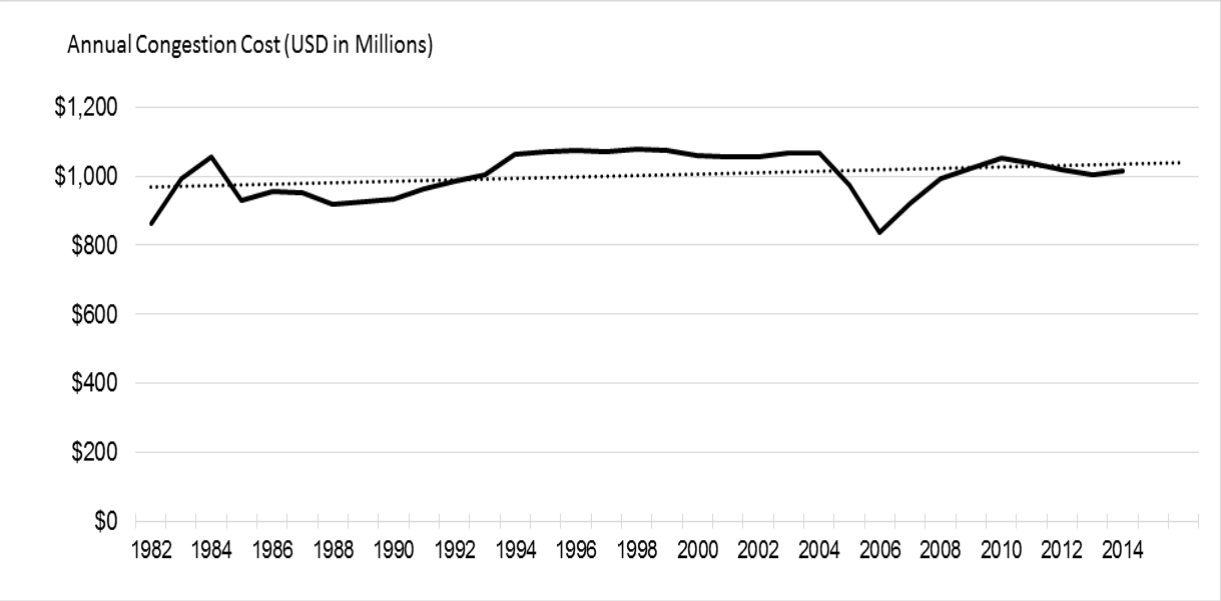
Source: Outputs from the IMPLAN economic model for New Orleans MSA.

6.3 Congestion Relief

Congestion in the New Orleans region imposes a direct cost on drivers and businesses. While these costs are absorbed by households and business enterprises and may not seem initially tangible, they represent a significant burden. TTI translates the hours of delay caused by traffic congestion into real costs, that is, the value of the time lost by auto users and truck drivers and the increase in fuel consumption by autos and

trucks due to moving in "stop-and-go" traffic and longer hours of operation. As shown in **Figure 6.1**, the annual congestion cost burden in the New Orleans urban area has flattened since 2008. Given this trend, this analysis estimates the average annual hours delay saved by public transit based on the values reported by TTI in the years spanning from 2009 to 2011.

Figure 6.1 Annual Congestion Costs for New Orleans Urban Area Drivers, 1982-2014



Source: TTI 2015 Annual Urban Mobility Scorecard, available at https://mobility.tamu.edu/ums/, accessed May 2017.

The average annual monetary value of savings in avoided travel delay and fuel spent by autos and trucks due to public transit in New Orleans urban area represents $46.4 million (**Table 6.18**). Congestion costs experienced by highway users in New Orleans urban are accounted for over $1.0 billion in 2015 (**Table 6.19**). By removing more cars and reducing passenger cars trips from New Orleans roadways, transit can reduce this burden on passenger cars and the trucking industry. RTA services can also lower the costs associated with traffic accidents and air quality emissions, generating safety and environmental benefits in the region.

Table 6.18 Average Annual Savings in Travel Delay and Fuel Spent by Autos and Trucks due to Public Transit in the New Orleans Urban Area, 2009-2011

Year	Delay Avoided (1000 Hours)	Congestion Cost Saved ($ Million)	Adjusted Cost Saved ($ Million in 2015$)
2011	1,748	$40.30	$42.43
2010	1,879	$41.40	$45.08
2009	1,815	$46.70	$51.71
Average (2009-2011)	**1,814**	**$42.80**	**$46.41**

Source: TTI 2015 Annual Urban Mobility Scorecard, available at https://mobility.tamu.edu/ums/, accessed May 2017.

Notes:
1. 2011 is the latest year for which public transportation benefits has been reported by TTI;
2. The annual congestion cost saved due to existing transit services is the yearly value of savings in delay time and wasted fuel accruing to highway users; and
3. Cost savings are inflated from 2009, 2010 and 2011 to 2015 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

Table 6.19 Cost of Congestion to the Trucking Industry and Auto Users in New Orleans Urban Area, 2015

Vehicle Type	Congestion Costs (2015$)	Congestion Costs (%)
Trucks	$281,000,000	27.7%
Autos	$733,000,000	72.3%
Total =	**$1,014,000,000**	**100.0%**

Source: TTI 2015 Annual Urban Mobility Scorecard, https://mobility.tamu.edu/ums/, accessed May 2017.

The average annual congestion costs saved due to RTA current operations and services represent $35.5 million (**Table 6.20**). This analysis uses the distribution of daily person miles of travel (PMT) per person by private vehicles by trip purpose and the average vehicle occupancy (AVO) by trip purpose provided by the *2009 National Household Travel Survey* (**Table 6.21**) to allocate the monetary savings in delay time and wasted fuel accruing to highway users due to NORTA transit services. The results of this part of the analysis are presented in **Table 6.22**.

Table 6.20 Average Annual Congestion Cost Saved due to RTA Services, 2015

Item	Value	Source
Average Annual Hours Delay Saved by Public Transit = (a)	1,814,000	**Table 6.18**
Average Annual 2015 $ Delay Saved by Public Transit = (b)	$46,406,933	**Table 6.18**
RTA vs Other local transit adjuster = (c)	77%	**Table 6.1**. This value corresponds to the proportion of NTD NO area transit PMT that is NO RTA bus and streetcar.
RTA vs Amtrak adjuster = (d)	99%	**Table 6.1**. This value corresponds to RTA bus and streetcar / (RTA bus and streetcar + Amtrak)
NORTA Annual Hours Delay Saved = (e) = (a) x (c) x (d)	1,386,776	
NORTA 2015$ Delay Saved by Public Transit = (f) =(b) x (c) x (d)	**$35,477,410**	

Table 6.21 Distribution of Daily Person Miles of Travel (PMT) per Person by Private Vehicles and Average vehicle Occupancy

Purpose	Daily Person Miles of Travel (PMT) per Person in 2009*	Auto Trip Purpose
To or From Work	6.47	Commute
Work Related Business	1.88	Business
Family/Personal Errands	10.3	All other purpose
School/Church	1.8	All other purpose
Social and Recreational	9.98	All other purpose
Other	1.49	All other purpose
Total	**31.92**	

Purpose	Average Vehicle Occupancy (AVO) in 2009**	Auto Trip Purpose
To or From Work	1.13	Commute
Shopping	1.78	All other purpose
Other Family/Personal Errands	1.84	All other purpose
Social and Recreational	2.20	All other purpose
All Purposes	**1.67**	

Notes:

1. *Daily Person Miles of Travel per Person in 2009 comes from Table 12 of the *Summary of Travel Trends: 2009 National Household Travel Survey (NHTS)*, Report No. FHWA-PL-11-022, June 2011; and
2. **Average Vehicle Occupancy (AVO) in 2009 comes from Table 16 of the *Summary of Travel Trends: 2009 National Household Travel Survey (NHTS)*, Report No. FHWA-PL-11-022, June 2011.

Table 6.22 Congestion Cost Savings Accruing to Autos and Trucks by Trip Purpose due to NORTA Services, 2015

	Autos				
Trip Purpose	**Daily Person Miles of Travel (PMT) per Person (a)**	**Average Vehicle Occupancy (AVO) (b)**	**Daily Person Miles of Travel (PMT) per Vehicle (c) = (a) x (b)**	**Congestion Cost Savings (%) (d) = 72.3% x (c) /54.96**	**Total Congestion Cost Savings (2015$)**
Auto Commute	6.47	1.13	7.31	9.6%	$3,414,245
Auto Business	1.88	1.00	1.88	2.5%	$877,950
Auto All Other Purposes*	23.57	1.94	45.73	60.2%	$21,353,704
Total Autos =	**31.92**		**54.92**	**72.3%**	**$25,645,899**
Total Trucks =		1.00		27.7%	$9,831,511
Grand Total =				100.0%	**$35,477,410**

Notes:

1. Auto all other purposes include family/personal errands, shopping, school/church, social and recreational trips;
2. Average daily PMT per person by trip purpose estimated based on the 2009 data provided in Table 12 of the *Summary of Travel Trends: 2009 National Household Travel Survey (NHTS)*, Report No. FHWA-PL-11-022, June 2011;
3. Average AVO for auto commute and all other purposes trips come from the 2009 data provided in Table 16 of the *Summary of Travel Trends: 2009 National Household Travel Survey (NHTS)*, Report No. FHWA-PL-11-022, June 2011;
4. AVO for auto business trips is assumed to be equal to one; and
5. Congestion cost savings accruing to auto users are allocated to auto trip purpose using PMT per vehicle by trip purpose as a proxy since vehicle hours traveled (VHT) by trip purpose was not available at the time this analysis was conducted.

The direct economic impacts on work and business trips made by passenger cars and trucks (i.e., the trips with economic value) resulting from the effects of RTA transit services on mitigating congestion are translated into the necessary model inputs for IMPLAN (**Table 6.23**). The total composite (direct, indirect and induced) congestion relief benefits of RTA in New Orleans MSA are presented in **Table 6.24**. In 2015, RTA supported the creation of 70 new jobs which added nearly $3.5 million in labor income and generated $5.9 million in GRP in the region. This additional economic activity resulted in $145 thousand in combine federal, state and local tax revenues.

Table 6.23 Congestion Relief Benefits Resulting from NORTA Transit Services - IMPLAN Input Values and Activities

Direct Benefit	Monetized Value of Direct Benefits (in millions of 2015$)	IMPLAN Input Variable
Auto Business Trips, Savings in Travel Delays and Fuel Consumption Costs	$0.88	Industry Change in Output
Truck Trips, Savings in Travel Delay Costs and Fuel Consumption Costs	$9.8	Industry Change in Output
Auto Commute Trips, Savings in Travel Delay Costs*	$3.4	Household Income Change
Total =	**$14.08**	

Household Income Range	Households (count)	Household (%)	Auto Commute Trips, Savings in Travel Delay Costs*
Less than $10,000	61,711	19%	$640,021
$10,000 to $15,000	60,756	18%	$630,108
$15,000 to $25,000	34,045	10%	$353,090
$25,000 to $35,000	27,879	8%	$289,140
$35,000 to $50,000	42,213	13%	$437,797
$50,000 to $75,000	42,370	13%	$439,426
$75,000 to $100,000	33,958	10%	$352,184
$100,000 to $150,000	11,800	4%	$122,378
$150,000 and Above	14,473	4%	$150,100
Total Households =	**329,204**	**100%**	**$3,414,245**

Note:

1. *This analysis assumes the savings in travel delay costs accruing to auto commuters are borne by all households in the combine Jefferson and Orleans parishes proportionately to the household share of income within the parish. To apply this assumption, this analysis uses the 2015 data available from IMPLAN to estimate the percentage of households falling into each income range.

Table 6.24 Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenues) Accruing to New Orleans MSA Resulting from Congestion Relief Benefits provided by NORTA Services, 2015

Impact Type	Employment	Labor Income (in 2015$)	GRP (in 2015$)
Direct Effect	25	$1,368,289	$2,115,333
Indirect Effect	8	$475,794	$780,281
Induced Effect	37	$1,675,571	$2,962,798
Total =	**70**	**$3,519,654**	**$5,858,412**

Tax Revenue			
Tax Revenue Type	**Federal (in 2015$)**	**State (in 2015$)**	**Total (in 2015$)**
Tax on Production and Imports	$77,239	$504,522	$581,761
Social Security Contributions	$351,813	$5,477	$357,290
Personal Income Tax	$222,133	$40,127	$262,260
Corporate Profits and Dividend Taxes	$138,476	$6,566	$145,042
Personal Sales and Property Taxes	N/A	$23,148	$23,148
Total =	**$789,661**	**$579,840**	**$1,369,501**

6.4 State of Good Repair of the Highway Infrastructure

The marginal external costs associated with roadway pavement maintenance use in this analysis are shown in **Table 6.25.** These values represents the additional spending (or saving) in all costs of maintaining pavements by vehicle class resulting from a unit increase/decrease in vehicle-miles traveled (VMT).

Table 6.25 Marginal External Pavement Maintenance Cost by Vehicle Class

	Road Pavement Maintenance Cost	
Vehicle Class	**In 1997$/VMT**	**In 2015$/VMT**
Automobiles	$0.009	$0.013
Pickups and Vans	$0.003	$0.004
Single Unit Trucks	$0.034	$0.050
Combination Trucks	$0.044	$0.065
Buses	$0.072	$0.106

Notes:

1. The marginal pavement costs by vehicle class come from the U.S. Department of Transportation (US DOT), 1997 Federal Highway Cost Allocation Study, based on data from Tables II-6, IV-11, V-21, and represent all costs of maintaining pavements, including resurfacing and reconstruction.
2. The marginal external pavement maintenance costs are inflated from 1997 to 2015 dollars using the Consumer Price Index for all urban consumers (CPI-U) for the South urban areas.

The pavement maintenance cost resulting from RTA services are presented in **Table 6.26.** This estimation is conducting by multiplying the average annual VMT for buses and streetcars by their corresponding external marginal pavement maintenance costs.

Table 6.26 Impact of RTA Services on Pavement Maintenance Costs, 2015

Mode	RTA Vehicle Revenue Miles (Table 6.1)	Road Pavement Maintenance Cost (in 2015$/VMT)	Additional Pavement Maintenance Cost (in 2015$)
Bus	4,794,173	$0.106	$506,324

Notes:

1. RTA Vehicle Revenue Miles come from the National Transit Database (Operating Expenses by Function tab; Metrics - Agency Totals tab), available at https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017; and

The average annual VMT saved resulting from people using RTA services rather than alternative transportation modes and the corresponding savings in pavement maintenance cost are shown in **Table 6.27**.

Table 6.27 Avoided Pavement Maintenance Costs due to NORTA Transit Services, 2015

Alternative Transportation Modes	Passenger Miles Traveled (Table 6.2)	Marginal External Pavement Maintenance Cost ($/VMT)	Average Vehicle Occupancy (AVO)	$/Passenger Mile	Avoided Pavement Maintenance Cost
	(a)	(b)	(c)	(d) = (b) / (c)	(e) = (d) x (a)
Another Bus	1,082,247	$0.106	7.07	$0.015	$16,166
Bicycle	2,850,797	N/A	N/A	N/A	N/A
Carpool	2,754,011	$0.013	2.50	$0.005	$14,543
Drive	4,504,964	$0.013	1.67	$0.008	$35,612
Driven	16,180,915	$0.013	2.50	$0.005	$85,445
No Trip	5,235,261	N/A	N/A	N/A	N/A
Taxi	7,751,705	$0.013	1.00	$0.013	$102,335
Walk	7,153,390	N/A	N/A	N/A	N/A
Grand Total	**47,513,289**				**$254,101**

Notes:
1. The mode shift factors come from the New Orleans COA Ridership Survey based on survey outcomes pertaining to alternative transportation modes available to riders if transit is unavailable;
2. Trips made by RTA buses and streetcars and their corresponding bus and streetcar passenger miles are estimated based on the RTA data from the National Transit Database (Metrics), available at https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017;
3. Marginal external pavement maintenance cost by vehicle type come from **Table 6.25**;
4. Due to unavailable regional data, the AVO for the 'another bus' alternative mode is estimated as RTA bus vehicle revenue mile /RTA bus passenger miles = 4,794,173 / 33,896,607 = 7.07;
5. The AVO for the 'drive' alternative mode corresponds to the AVO for 'all purpose' trips from **Table 6.21**; and
6. The AVO for 'carpool' alternative mode comes from the *Transit Performance Monitoring System (TPMS) Results*, Phases I and II (2002) and Phase III (2004), prepared by McCollom Management Consulting for the American Public Transit Association (APTA) and the Federal Transit Administration (FTA). TPMS project recommends this value when local data is unavailable.

The expected annual net disbenefits associated with the SOGR of the highway infrastructure resulting from RTA transit services are estimated to account for over $252,000 (**Table 6.28**). These disbenefits have no a multiplier effect in the regional economy and therefore, they are not input into the economic model.

Table 6.28 Net Avoided Pavement Maintenance Costs Resulting from NORTA Transit Services, 2015

Item	Value	Source
Avoided Pavement Maintenance Costs (in 2015$) = (a)	$254,101	**Table 6.27**
RTA Additional Pavement Maintenance Cost (in 2015$) = (b)	$506,324	**Table 6.26**
Total Disbenefits = (a) – (b)	**-$252,223**	

6.5 Affordable Mobility Benefits

As shown in **Table 6.3**, 89 percent of RTA trips would shift to alternative transportation modes while the remaining 11 percent would forego trips in the absence of RTA transit services. **Table 6.29** presents the estimated RTA user cost per mile for bus riders and streetcar riders based on data from the National Transit Database (NTA) and the New Orleans COA Ridership Survey.

The mode shift factors along with RTA data from the National Transit Database (NTA), the New Orleans COA Ridership Survey and estimated user cost per mile for each alternative transportation mode are used to estimate the transportation costs incurred by RTA riders shifting to alternative transportation modes in the absence of transit (**Table 6.30**).

Table 6.29 RTA User Cost Per Mile, 2015

Mode	Unlinked Passenger Trips	Total Linked Trips	Linked Shifting to Other Modes	Linked Foregone	RTA Fare Revenue	Average Fare Per Linked Trip (in 2015$)	RTA Passenger Miles Traveled (PMT)	Passenger Miles Per Linked Trip	User Cost Per Mile (in 2015$)
	(a)	(b) = 1.51/(a)	(c) = 89% x (b)	(d) = 11% x (b)	(e)	(f) = (e) / (b)	(g)	(h) = (g) / (b)	(i) = (h) / (f)
Bus	11,150,026	7,362,520	6,551,279	811,241	$11,293,335	**$1.53**	33,896,607	4.6	**$0.33**
Streetcar	7,281,648	4,808,175	4,278,386	529,790	$6,676,365	**$1.39**	13,616,682	2.8	**$0.49**
Total	18,431,674	12,170,695	10,829,665	1,341,030	$17,969,700	**$1.46**	47,513,289		

Notes:

1. The unlinked to linked trip ratio (i.e., 1.51) comes from **Table 6.2**;
2. The share of RTA riders shifting to alternative transportation modes in the absence of RTA services (i.e., 89 percent) comes from **Table 6.3**;
3. The share of RTA riders foregoing their trips in the absence of transit (i.e., 11 percent) comes from **Table 6.3**; and
4. RTA fare revenue and RTA passenger miles come from the National Transit Database (NTD), available at https://www.transit.dot.gov/ntd/ntd-data, 2015, Accessed May 2017.

Table 6.30 Estimated Transportation Costs Incurred by RTA Riders Shifting to Alternative Transportation Modes, 2015

Alternative Transportation Modes	RTA PMT from Bus (Table 6.3)	RTA PMT from Streetcar (Table 6.3)	User Cost Per Mile (Replace Bus)	User Cost Per Mile (Replace Streetcar)	Bus Mode Shift Cost	Streetcar Mode Shift Cost
	(a)	(b)	(c)	(d)	(e) = (a) x (c)	(f) = (b) x (d)
Another Bus	772,089	310,158	$0.33	$0.33	$257,237	$103,335
Bicycle	2,033,796	817,001	$0.10	$0.10	$203,380	$81,700
Carpool	1,964,748	789,263	$0.29	$0.29	$559,953	$224,940
Drive	3,213,901	1,291,063	$0.57	$0.57	$1,831,923	$735,906
Driven	11,543,678	4,637,237	$0.29	$0.29	$3,289,948	$1,321,612
No Trip	3,734,904	1,500,357	$0.00	$0.00	$0	$0
Taxi	5,530,169	2,221,536	$2.76	$3.24	$15,264,473	$7,188,630
Walk	5,103,322	2,050,067	$0.00	$0.00	$0	$0
Grand Total =	**33,896,607**	**13,616,682**			**$21,406,914**	**$9,656,124**

Notes:

1. The mode shift factors and the linked trips made by RTA buses (or streetcars) come from **Table 6.3**;
2. RTA bus (or streetcar) passenger miles come from the National Transit Database (NTD);
3. Due to unavailable regional data, the user cost per mile for the 'another bus' mode is estimated as follow: RTA passenger miles per linked trip / RTA fare per linked trip;
4. User cost per mile for the 'bicycle' mode corresponds to the mid-point of $0.05 - $0.015 provided by the Victoria Transport Institute;
5. User cost per mile for the 'drive' mode corresponds to the average marginal vehicle operating cost for passenger vehicles estimated using data provided by the American Automobile Association (AAA);
6. User cost per mile for carpooling is assumed to be 50 percent of the marginal cost for the 'drive' mode; and
7. The user cost per mile for bus (or streetcar) riders shifting to taxi is estimated as follow: [$3.50 base + ($2.00 PMT)] / Bus (or Streetcar) PMT per linked trip; the base rate and the cost per mile come from Taxi Fare Finder.

The expenditure value benefit is the net savings in transportation costs (i.e., transportation expenditures incurred by transit riders shifting to alternative transportation modes minus transit fares paid by these riders) that result when individuals are able to use transit in place of another mode and reallocate their transportation expenditure savings on other goods and services. As shown in **Table 6.31**, in 2015, this income benefit accounts for over $15 million.

Table 6.31 Expenditure Value Benefits Arising from RTA Transit Services, 2015

Mode	Fare Per Linked Trip	Linked Trips Shifting to Alternative Transportation Modes	Transit Fares paid by RTA riders Shifting to Other Transportation Modes	Mode Shift Cost	RTA Net Savings
	(a)	(b)	(c) = (a) x (b)	(d)	(d) - (b)
Bus	$1.53	6,551,279	$10,048,977	$21,406,914	$11,357,937
Streetcar	$1.39	4,278,386	$5,940,728	$9,656,124	$3,715,395
Total			$15,989,705	$31,063,038	**$15,073,333**

Notes:

1. Fare per linked trip comes from **Table 6.29**;
2. Linked trips shifting to alternative transportation modes are estimated based on the estimates provided in **Table 6.2**; and
3. Mode shift cost comes from **Table 6.3**.

Table 6.32 presents RTA riders who would forego their work trips in the absence of transit and the resulting foregone annual income. This analysis assumes that riders with annual household income of less than $35,000 who have to forego their work trips in the absence of RTA transit services would lose their jobs. In 2015, the number of foregone jobs in the absence of RTA transit services is estimated to be 500 jobs which translates into a foregone average annual income of nearly $8.5 million.

Table 6.32 Foregone Jobs and Annual Income without the Availability of RTA Transit Services, 2015

		Distribution by Household Income						
Item	**Value**	**Less than $15,000**	**$15,000-$24,999**	**$25,000-$34,999**	**$35,000-$49,999**	**$50,000-$74,999**	**$75,000 or more**	**Grand Total**
Work Trips - Use Alternative Mode in the Absence of Transit (%) = (a)		8.09%	7.39%	5.88%	3.00%	0.94%	0.42%	25.7%
Work Trips - No Trip in the Absence of Transit (%) = (b)		0.85%	0.67%	0.45%	0.18%	0.18%	0.06%	2.4%
Total Work Trips (%) = (c) = (a) + (b)		8.93%	8.06%	6.33%	3.18%	1.12%	0.48%	28.1%
Total RTA Linked Trips = (d)	12,170,695							
Linked Foregone Work Trips = (e) = (b) x (d)		103,204	81,089	55,288	22,115	22,115	7,372	291,183
Trips Per Worker = 48 work weeks per year x 5 days per work week x 2 trips per day = (f)	480							
Riders foregoing work trips = (g) = (e) / (f)		215	169	115	46	46	15	607
Riders foregoing work trips who would lose jobs = (g)		215	169	115	0	0	0	499
Estimated Average Annual Income		$7,500	$20,000	$30,000	$42,500	$62,500	$75,000	
Foregone Annual Income (in 2015$)		**$1,612,562**	**$3,378,617**	**$3,455,432**	**$0**	**$0**	**$0**	**$8,446,610**

Notes:

1. Distribution of work trips by household income comes from the New Orleans COA Ridership Survey;
2. Total (bus and streetcar) RTA linked trips come from **Table 6.2**; and
3. The average annual income is assumed to be the mid-point of the household income range.

The direct expenditure value benefits resulting from RTA transit services are translated into the necessary model inputs for IMPLAN. The indirect and induced benefits arising from the direct benefits are modeled using the IMPLAN model. As shown in **Table 6.33**, in 2015 RTA supported the creation of 100 new jobs which added nearly $4.4 million in labor income and generated $7.8 million in GRP in the region. This additional economic activity resulted in nearly $1.7 million in combine federal, state and local tax revenues.

Table 6.33 Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenues) Accruing to New Orleans MSA Resulting from Expenditure Value Benefits provided by RTA Transit Services, 2015

Impact Type	Employment	Labor Income (in 2015$)	GRP (in 2015$)
Induced Effect*	100	$4,423,655	$7,828,710

Tax Revenue			
Tax Revenue Type	**Federal (in 2015$)**	**State (in 2015$)**	**Total (in 2015$)**
Tax on Production and Imports	$86,126	$575,876	$662,001
Social Security Contributions	$429,168	$7,966	$437,134
Personal Income Tax	$247,784	$44,629	$292,413
Corporate Profits and Dividend Taxes	$216,191	$10,206	$226,396
Personal Sales and Property Taxes	N/A	$32,295	$32,295
Total =	**$979,269**	**$670,971**	**$1,650,240**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. *Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.

The estimated foregone employment benefits resulting from RTA transit services are translated into the necessary model inputs for IMPLAN. The indirect and induced benefits arising from the direct foregone employment benefits are modeled using the IMPLAN model, generating estimates of the total economic benefits. In 2015, RTA supported the creation of nearly 65 jobs, $2.8 million in personal income, $4.9 million in GRP and over $1.0 million in tax revenue (**Table 6.34**).

Table 6.34 Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenues) Accruing to New Orleans MSA Resulting from Foregone Employment Benefits provided by RTA Transit Services, 2015

Impact Type	Employment	Labor Income (in 2015$)	GRP (in 2015$)
Induced Effect*	65	$2,803,924	$4,886,113

Tax Revenue			
Tax Revenue Type	**Federal (in 2015$)**	**State (in 2015$)**	**Total (in 2015$)**
Tax on Production and Imports	$50,825	$339,827	$390,652
Social Security Contributions	$272,705	$5,070	$277,775
Personal Income Tax	$156,899	$28,260	$185,159
Corporate Profits and Dividend Taxes	$133,317	$6,293	$139,610
Personal Sales and Property Taxes	N/A	$20,440	$20,440
Total =	**$613,746**	**$399,890**	**$1,013,636**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. *Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.

6.6 Community Impacts

The assessment of the safety benefits involves collecting internal and external crash costs by vehicle class (**Table 6.35**). These values on conjunction with RTA data from the NTD are used to estimate RTA crash costs (**Table 6.36**) and the avoided crash costs on other modes due to RTA transit services (**Table 6.37**) in 2015. The net savings in crash costs resulting from RTA transit services in 2015 are shown in **Table 6.38.** This analysis finds that public transit provided by RTA saved over $3.0 million in 2015 in accident costs. The safety benefits accruing to auto users have no multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 6.35 Average Internal and External Crash Costs by Vehicle Type

Vehicle Class	Average Internal Crash Costs (in 2007$ per passenger mile)	Average Internal Crash Costs (in 2015$ per passenger mile)	Average External Crash (in 2007$ per vehicle mile)	Average External Crash (in 2015$ per vehicle mile)
Average Car	$0.083	$0.095	$0.055	$0.063
Average Diesel Bus/Electric Bus/Trolley	$0.004	$0.005	$0.264	$0.303
Average Bicycle	$0.083	$0.095	$0.003	$0.003
Average Walk	$0.083	$0.095	$0.003	$0.003

Note:

1. Average internal and external crash costs by vehicle class (in 2007 dollars) come from the Victoria Transport Policy Institute, *Transportation Cost and Benefit Analysis II – Safety and Health Costs* (May 18, 2016). These average values are inflated from 2007 to 2015 dollars based on the Consumer Price Index (CPI) from all South Urban Areas, from the Bureau of Labor Statistics (BLS).

Table 6.36 Impact of RTA Transit Services on Crash Cost, 2015

Input	Value	Source/Explanation
Passenger Miles = (a)	47,513,289	2015 NTD Metrics, NO RTA Bus and Streetcar
Vehicle Revenue Miles = (b)	5,746,838	2015 NTD Metrics, NO RTA Bus and Streetcar
RTA Total Internal Crash Cost = (c) = $0.005 x (a)	$218,307	Passenger Miles * $/Passenger Mile
RTA Total External Crash Cost = (d) = $0.303 x (b)	$1,742,710	Vehicle Miles * $/Vehicle Mile
RTA Total Crash Costs = (e) = (c) + (d)	**$1,961,016**	Internal + External Costs

Table 6.37 Avoided Crash Costs on Other Modes Resulting from People Using Transit, 2015

Alternative Transportation Modes	Passenger Miles Traveled (PMT) from Bus	Passenger Miles Traveled (PMT) from Streetcar	Avoided PMT on this Mode	Average Internal Crash Costs ($/PMT)	Internal Cost (in 2015$)	AVO	Avoided VMT	Average External Crash Costs ($/VMT)	External Cost (in 2015$)	Total Avoided Cost (in 2015$)
	(a)	(b)	(c) = (a) + (b)	(d)	(e) = (c) x (d)	(f)	(g) = (c) / (f)	(h)	(i) = (g) x (h)	(j) = (e) + (i)
Another Bus	772,089	310,158	1,082,247	$0.005	$4,973	7.07	153,068	$0.303	$46,417	$51,390
Bicycle	2,033,796	817,001	2,850,797	$0.095	$271,792	1.00	2,850,797	$0.003	$9,824	$281,616
Carpool	1,964,748	789,263	2,754,011	$0.095	$262,564	2.50	1,101,604	$0.063	$69,595	$332,160
Drive	3,213,901	1,291,063	4,504,964	$0.095	$429,498	1.67	2,697,583	$0.063	$170,424	$599,922
Driven	11,543,678	4,637,237	16,180,915	$0.095	$1,542,671	2.50	6,472,366	$0.063	$408,901	$1,951,572
No Trip	3,734,904	1,500,357	5,235,261	$0.000	$0	0.00	0	$0.000	$0	$0
Taxi	5,530,169	2,221,536	7,751,705	$0.095	$739,039	1.00	7,751,705	$0.063	$489,725	$1,228,764
Walk	5,103,322	2,050,067	7,153,390	$0.095	$681,996	1.00	7,153,390	$0.003	$24,650	$706,647
Grand Total	**33,896,607**	**13,616,682**	**47,513,289**		**$3,932,534**		**28,180,513**		**$1,219,536**	**$5,152,070**

Notes:

1. RTA Bus PMT and Streetcar PMT come from **Table 6.3**; and
2. Average internal and external crash costs come from **Table 6.35**.

Table 6.38 Net Savings in Crash Costs Resulting from RTA Transit Services, 2015

Item	Crash Costs (in 2015$)	Source
Avoided Crash Costs on Other Modes Resulting from People using RTA Transit = (a)	$5,152,070	**Table 6.37**
Crash Costs Resulting from RTA Transit Services = (b)	$1,961,016	**Table 6.36**
Net Savings in Crash Costs Resulting from RTA Services = (c) = (a) - (b)	**$3,191,053**	Estimated

The greenhouse gas (GHG) emission rates by vehicle type and the unit damage costs of greenhouse gas emissions used in this analysis are presented in **Tables 6.39** and **6.40**.

Table 6.39 Greenhouse Gas Emission Rates by Vehicle Type

	Single Occupied Car	Vanpool-Gas	Bus-Diesel
Grams CO_2E / VMT	368	371	2,600
Metric tons CO_2E / VMT	**0.000368**	**0.000371**	**0.002600**

Source: APTA's Transit Emission Quantifier Tool.

Table 6.40 Unit Damage Costs of Greenhouse Gas Emissions

Study	Values (in $/metric ton CO_2e)			Comments
	Lower	Mid	Upper	
NRC (2009)	$10	**$30**	$100	Committee ranges based on review of literature
EPA/NHTSA (2010)	$5 (2010) $16 (2050)	$22 (2010) $46 (2050)	$36 (2010) $66 (2050)	For 5%, 3%, and 2.5% discount rates, respectively; damage value of emissions in given year, increasing over time

Sources:

1. National Research Council (NRC) (2009). *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, Committee on Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption; National Research Council, National Academy of Sciences.
2. U.S. Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA) (2010). *Draft Regulatory Impact Analysis: Proposed Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles.* EPA-420-D-10-901, October 2010.

The greenhouse gas (GHG) emissions produced by RTA transit services and the corresponding monetary value are estimated based on the RTA vehicle revenue miles (**Table 6.41**). The reduced GHG emissions attributable to the provision of RTA transit service are estimated to be generated by three factors: mode shift, congestion relief, and compact land-use patterns are presented. The estimated savings in emissions (1) due to avoided mode shift to alternative transportation modes are presented in **Table 6.42,** (2) due to congestion relief based on reduced fuel consumption are presented in **Table 6.43**, and (3) due to compact land-use patterns are presented in **Table 6.44.**

Table 6.41 Greenhouse Gas Emissions Resulting from RTA Bus Services, 2015

Item	Value	Source
Bus VMT = (a)	4,794,173	**Table 6.1**
Bus Metric Tons CO_2E / VMT = (b)	0.002600	**Table 6.39**
Bus Metric Tons CO_2E = (c) = (a) x (b)	12,465	Calculated
Streetcar Metric Tons CO_2E = (d)	3,000	Assumed
Total Metric Tons CO_2E = (e) = (c) + (d)	15,465	Calculated
Unit Damage Cost of GHG emissions (in 2009$/metric tons CO_2E) = (f)	$30.0	**Table 6.40**
Unit Damage Cost of GHG emissions (in 2015$/metric tons CO_2E) = (g)	$33.2	Calculated
Damage Costs of Greenhouse Gas Emissions (in 2015$) = (h) = (e) x (g) =	**$513,727**	Calculated

Notes:
1. Due to unavailable regional data, the RTA streetcar metric tons CO_2E are assumed to be equal to the average of the estimated GHG emissions from operation of sample streetcar projects provided by the Federal Transit Administration, *Greenhouse Gas Emissions from Transit Projects: Programmatic Assessment*, January 2017; and
2. The unit damage cost of greenhouse gas (GHG) emissions is inflated from 2009 to 2015 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

Table 6.42 Savings in Damage Costs of Greenhouse Gas Emissions Resulting from Avoided Mode Shift, 2015

Alternative Transportation Modes	PMT	Average Vehicle Occupancy (AVO)	Vehicle Miles Traveled	Metric tons CO_2E / VMT	Metric tons CO_2E
	(a)	**(b)**	**(c) = (a) / (b)**	**(d)**	**(e) = (c) x (d)**
Another Bus	1,082,247	7.07	153,068	0.002600	398
Bicycle	2,850,797	N/A	N/A	0.000000	N/A
Carpool	2,754,011	2.50	1,101,604	0.000368	406
Drive	4,504,964	1.67	2,697,583	0.000368	994
Driven	16,180,915	2.50	6,472,366	0.000368	2,384
No Trip	5,235,261	N/A	N/A	0.000000	N/A
Taxi	7,751,705	1.00	7,751,705	0.000368	2,856
Walk	7,153,390	N/A	N/A	0.000000	N/A
Total	**47,513,289**		**18,176,326**		**7,038**
Unit Damage Cost of GHG emissions (in 2009$/metric tons CO_2E) = (f)					$30.0
Unit Damage Cost of GHG emissions (in 2015$/metric tons CO_2E) = (g)					$33.2
Damage Costs of Greenhouse Gas Emissions (in 2015$) = (h) = (e) x (g)					**$233,787**

Note:
1. The unit damage cost of greenhouse gas (GHG) emissions is inflated from 2009 to 2015 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

Table 6.43 Savings in Damage Costs of Greenhouse Gas Emissions Resulting from Congestion Relief, 2015

Item	Value	Source
RTA Annual Hours of Delay Saved = (a)	1,386,776	**Table 6.20**
RTA Annual Hours of Delay Saved /Annual Excess Fuel Consumed (in gallons) = (b)	2.07	Estimated based on the New Orleans Urban Area data reported in the TTI 2015 Annual Urban Mobility Scorecard; https://mobility.tamu.edu/ums/; Accessed May 2017.
Avoided Fuel Consumed (in gallons of gasoline) = (c) = (a) / (b)	669,130	Calculated
CO_2 (metric tons/gallon of gasoline) = (d)	0.008887	Federal Register (2010), Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, page 25,330
CO_2 (metric tons) = (e) = (c) x (d)	5,947	Calculated
Unit Damage Cost of GHG emissions (in 2009$/metric tons CO_2E) = (f)	$30.0	**Table 6.40**
Unit Damage Cost of GHG emissions (in 2015$/metric tons CO_2E) = (g)	$33.2	Calculated
Damage Costs of Greenhouse Gas Emissions (in 2015$) = (h) = (e) x (g)	**$197,539**	Calculated

Note: The unit damage cost of greenhouse gas (GHG) emissions is inflated from 2009 to 2015 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

Table 6.44 Savings in Damage Costs of Greenhouse Gas Emissions Resulting from Compact Land-Use Patterns, 2015

Alternative Transportation Modes	Avoided PMT on This Mode	Average Internal Crash Costs ($/PMT)	Metric tons CO_2E / VMT	Metric tons CO_2E
	(a)	(b) = 1.9 VMT reductions per PMT x (a)	(c)	(d) = (b) x (c)
Another Bus	1,082,247	2,056,270	0.002600	5,346
Bicycle	2,850,797	5,416,515	0.000000	0
Carpool	2,754,011	5,232,621	0.000368	1,928
Drive	4,504,964	8,559,431	0.000368	3,153
Driven	16,180,915	30,743,738	0.000368	11,326
No Trip	5,235,261	9,946,995	0.000000	0
Taxi	7,751,705	14,728,240	0.000368	5,426
Walk	7,153,390	13,591,440	0.000000	0
Grand Total	**47,513,289**	**90,275,249**		**27,179**
Unit Damage Cost of GHG emissions (in 2009$/metric tons CO_2E) = (e)				$30.0
Unit Damage Cost of GHG emissions (in 2015$/metric tons CO_2E) = (f)				$33.2

Damage Costs of Greenhouse Gas Emissions (in 2015$) = (g) = (d) x (f)	**$902,866**

Note:

1. This analysis uses the national default multiplier of 1.9 provided by the ICF International. *The Broader Connection between Public Transportation, Energy Conservation and Greenhouse Gas Reduction*, Bailey, L., P.L. Mokhtarian, et al., 2008.

The net savings in GHG emissions (i.e., emissions displaced by RTA transit services minus emission produced by RTA transit services) resulting from RTA operations are shown in **Table 6.45**.This analysis finds that in 2015 RTA services saved nearly 25 thousand metric tons of CO2e, representing nearly $0.8 million dollars saved in GHG emission damage costs. These benefits have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 6.45 Net Savings in Greenhouse Gas Emission Damage Costs Resulting from RTA Transit Services (in 2015$)

Item	Metric tons CO_2E	Value (in 2015$)
GHG Emissions displaced by Transit Services = (a) = (b) + (c) + (d)	**40,164**	**$1,334,192**
- Mode Shift = (b)	7,038	$233,787
- Congestion Relief = (c)	5,947	$197,539
- Compact Land-Use Patterns = (d)	27,179	$902,866
GHG Emissions produced by Transit Services = (e)	**15,465**	**$513,727**
Net Savings in Greenhouse Gas Emission Damage Cost = (f) = (a) – (e)	**24,699**	**$820,464**

7.0 Economic Benefits of *New Orleans Future Transit Scenario*

This section presents the estimated economic benefits resulting from the three *New Orleans Future Transit Scenarios*, that is, Bus Rapid Transit (BRT), Streetcar (SC) and Light Rail Transit (LRT).These economic impacts are generated due to travel efficiency gains accruing to transit riders and highway users in the area served by NORTA, community benefits and enterprise (NORTA wages and salaries, retirement benefits, and construction and operations expenditures) resulting from each of the buildout scenarios.

7.1 RTA Statistics

Table 7.1 presents the transit data in the baseline year 2016/17 and horizon year 2040 with and without the proposed investments. For the No Build Condition, ridership, transit revenue miles, transit revenue hours and passenger miles traveled (PMT) between 2016/17 and 2040 No Build were interpolated from the data provided for those two years to generate values for the intermittent years, assuming a linear growth over the 2022-2040 analysis period. For the Build Condition, ridership, transit revenue miles, transit revenue hours and passenger miles traveled (PMT) between 2016/17 and 2040 Build were interpolated from the data provided for those two years to generate values for the intermittent years, assuming a linear growth over the 2022-2040 analysis period. **Table 7.2** presents the cumulative ridership, transit revenue miles, transit revenue hours and PMT for the Build and No Build conditions and the changes between the Build and the No Build over the 2022-2040 period. These changes serve as the basis for estimating the additional direct benefits to be generated by the proposed transit investments from the opening year 2022 to the horizon year 2040.

The distribution of changes in Passenger Miles Traveled (PMT) among alternative transportation modes in the absence of NORTA Transit Investments (**Table 7.3**) and the corresponding avoided Vehicle Miles Traveled (VMT) over the 2022-2040 period (**Table 7.4**) are also used in the assessment of the potential additional direct benefits to be generated by *New Orleans Future Transit Scenarios*.

Table 7.1 NORTA Transit Scenarios - Ridership, Revenue Miles, Revenue Hours, and Passenger Miles Traveled in Baseline and Horizon Years

	Bus Rapid Transit (BRT)											
	Annual Ridership			Annual Revenue Miles			Annual Revenue Hours			Annual Passenger Miles Traveled		
	Baseline	Build	No Build	Baseline	Build	No Build	Baseline	Build	No Build	Baseline	Build	No Build
Mode	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**
Bus	10,561,789	17,578,099	14,230,438	5,351,564	12,182,840	8,607,655	446,906	918,286	718,820	31,685,367	43,945,248	42,691,313
Streetcar	7,610,484	9,422,504	10,253,994	1,249,402	2,301,718	2,009,585	160,316	194,982	257,858	14,459,920	23,556,260	19,482,588
Light Rail	0	0	0	0	0	0	0	0	0	0	0	0
Ferry	746,179	1,394,533	1,005,365	21,122	200,764	33,973	10,563	50,192	16,990	373,090	1,045,900	502,683
Paratransit	216,720	270,900	291,998	1,155,866	1,444,833	1,859,138	112,178	140,223	180,431	1,408,680	1,760,850	1,897,986
On-Demand Services	0	164,948	0	0	3,162	0	0	296	0	0	1,131,543	0
Total =	**19,135,172**	**28,830,984**	**25,781,794**	**7,777,954**	**16,133,317**	**12,510,351**	**729,963**	**1,303,979**	**1,174,100**	**47,927,056**	**71,439,801**	**64,574,569**

	Light Rail Transit (LRT)											
	Annual Ridership			Annual Revenue Miles			Annual Revenue Hours			Annual Passenger Miles Traveled		
	Baseline	Build	No Build	Baseline	Build	No Build	Baseline	Build	No Build	Baseline	Build	No Build
Mode	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**
Bus	10,561,789	9,174,781	14,230,438	5,351,564	7,144,755	14,230,438	446,906	564,656	718,820	31,685,367	22,936,953	42,691,313
Streetcar	7,610,484	9,422,504	10,253,994	1,249,402	2,126,679	10,253,994	160,316	180,396	257,858	14,459,920	23,556,260	19,482,588
Light Rail	0	8,403,318	0	0	5,038,085	0	0	360,733	0	0	21,008,295	0
Ferry	746,179	1,394,533	1,005,365	21,122	200,764	1,005,365	10,563	50,192	16,990	373,090	1,045,900	502,683
Paratransit	216,720	270,900	291,998	1,155,866	1,444,833	291,998	112,178	140,223	180,431	1,408,680	1,760,850	1,897,986
On-Demand Services	0	164,948	0	0	3,162	0	0	296	0	0	1,131,543	0
Total =	**19,135,172**	**28,830,984**	**25,781,794**	**7,777,954**	**15,958,278**	**25,781,794**	**729,963**	**1,296,496**	**1,174,100**	**47,927,056**	**71,439,801**	**64,574,569**

	Street Car (SC)											
	Annual Ridership			Annual Revenue Miles			Annual Revenue Hours			Annual Passenger Miles Traveled		
	Baseline	Build	No Build	Baseline	Build	No Build	Baseline	Build	No Build	Baseline	Build	No Build
Mode	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**	**2016/17**	**2040**	**2040**
Bus	10,561,789	9,174,781	14,230,438	5,351,564	7,144,755	14,230,438	446,906	564,656	718,820	31,685,367	22,936,953	42,691,313
Streetcar	7,610,484	17,825,822	10,253,994	1,249,402	7,164,764	10,253,994	160,316	541,128	257,858	14,459,920	44,564,555	19,482,588
Light Rail	0	0	0	0	0	0	0	0	0	0	0	0
Ferry	746,179	1,394,533	1,005,365	21,122	200,764	1,005,365	10,563	50,192	16,990	373,090	1,045,900	502,683
Paratransit	216,720	270,900	291,998	1,155,866	1,444,833	291,998	112,178	140,223	180,431	1,408,680	1,760,850	1,897,986
On-Demand Services	0	164,948	0	0	3,162	0	0	296	0	0	1,131,543	0
Total =	**19,135,172**	**28,830,984**	**25,781,794**	**7,777,954**	**15,958,278**	**25,781,794**	**729,963**	**1,296,495**	**1,174,100**	**47,927,056**	**71,439,801**	**64,574,569**

Notes: Transit statistics for the three investment scenarios come from file “New Calculations.docx” provided by Transdev on 03/06/2018.

Table 7.2 Ridership, Revenue Miles, Revenue Hours, and Passenger Miles Traveled over the 2022-2040 Analysis Period under the Build and No Build Conditions

	BRT, Cumulative Change 2022-2040		
Item	**Baseline**	**Build**	**Build – No Build**
Transit Revenue Hours	18,776,239	20,106,470	1,330,232
Transit Revenue Miles	200,065,923	236,406,255	36,340,332
Passenger Miles Traveled (PMT)	1,099,675,789	1,173,504,153	73,828,364
Ridership (Unlinked Passenger Trips)	439,052,324	468,836,957	29,784,633

	LRT, Cumulative 2022-2040		
Item	**Baseline**	**Build**	**Build – No Build**
Transit Revenue Hours	18,776,239	20,030,824	1,254,585
Transit Revenue Miles	324,354,818	234,703,858	-89,650,960
Passenger Miles Traveled (PMT)	1,099,675,789	1,173,504,153	73,828,364
Ridership (Unlinked Passenger Trips)	439,052,324	468,836,957	29,784,633

	SC, Cumulative 2022-2040		
Item	**Baseline**	**Build**	**Build – No Build**
Transit Revenue Hours	18,776,239	20,030,814	1,254,575
Transit Revenue Miles	324,354,818	234,703,858	-89,650,960
Passenger Miles Traveled (PMT)	1,099,675,789	1,173,504,153	73,828,364
Ridership (Unlinked Passenger Trips)	439,052,324	468,836,957	29,784,633

Table 7.3 Distribution of Changes in Passenger Miles Traveled (PMT) among Alternative Transportation Modes in the Absence of NORTA Transit Investments, 2022-2040

Alternative Transportation Modes	Mode Shift Factors	Cumulative (2022-2040)		
		BRT	LRT	SC
Another Bus	2.3%	1,681,646	1,681,646	1,681,646
Bicycle	6.0%	4,429,702	4,429,702	4,429,702
Carpool	5.8%	4,279,311	4,279,311	4,279,311
Drive	9.5%	7,000,023	7,000,023	7,000,023
Driven	34.1%	25,142,660	25,142,660	25,142,660
No Trip	11.0%	8,134,792	8,134,792	8,134,792
Taxi	16.3%	12,044,961	12,044,961	12,044,961
Walk	15.1%	11,115,270	11,115,270	11,115,270
Grand Total	**100.0%**	**73,828,364**	**73,828,364**	**73,828,364**

Notes:

1. Estimated based on the cumulative PMT shown in **Table 7.1** and the mode shift factors shown in **Table 6.3**.
2. This analysis assumes that the mode shift factors will not change over the 2022-2040 analysis period.

Table 7.4 Avoided Vehicle Miles Traveled (VMT) due to NORTA Transit Investments, 2022-2040

Alternative Transportation Modes	AVO	Cumulative (2022-2040)		
		BRT	BRT	BRT
Another Bus	7.07	237,844	237,844	237,844
Bicycle	N/A	0	0	0
Carpool	2.50	1,711,724	1,711,724	1,711,724
Drive	1.67	4,191,630	4,191,630	4,191,630
Driven	2.50	10,057,064	10,057,064	10,057,064
No Trip	N/A	0	0	0
Taxi	1.00	12,044,961	12,044,961	12,044,961
Walk	N/A	0	0	0
Grand Total		**28,243,223**	**28,243,223**	**28,243,223**

Notes:

1. Avoided VMT = changes in PMT shifting to alternative transportation modes in the absence of transit (**Table 7.3)** multiplied by their corresponding average vehicle occupancy (AVO).
2. The mode shift factors comes from **Table 6.3**.
3. The average vehicle occupancy (AVO) values come from **Table 6.27.**
4. This analysis assumes that the mode shift factors and the AVO will not change over the 2022-2040 analysis period.

7.2 Enterprise Benefits

Construction and Operations Expenditures - Economic impacts from *New Orleans Future Transit Scenarios* initially occur as a result of the actual construction expenditures on the facilities. Construction expenditures are of economic value to the New Orleans region because infrastructure development expenditure increases the GRP and supports the creation and retention of construction related jobs. Once the construction phase is completed, subsequent expenditures are required to operate the facilities, which also results in additional economic impacts for the New Orleans region.

The pashing approach, including the time frame for capital and operating expenditures, of proposed NORTA transit investments is presented in **Table 7.5**. This pashing approach is used to estimate total capital costs and operating expenditures associated with the three investment scenarios (**Table 7.6**). Capital costs include transit vehicle acquisition, infrastructure and facility costs. Operating costs include the operation costs of existing services plus the operation costs of the new services provided by the Buildout Scenario. Infrastructure and facility costs capture only the hard costs (e.g., site preparation activities, earthwork and structures) and does not include planning, engineering, and land or building acquisition costs since these costs do not contribute to the construction industry.

In analyzing the economic impacts of construction and operations spending of the Buildout Scenarios in the New Orleans region, this analysis assumes that these expenditures accrue proportionately to the industry share of output in the combined Jefferson and Orleans parishes compared to the industry share of output at the national level. To apply this assumption, this analysis utilized the output data available from IMPLAN for the combined Jefferson and Orleans parishes and the U.S. and estimate the location quotient (LQ) to assess how concentrated the industries (involved in the construction and operations of the Buildout Scenario) are in the two-parish region as compared to the nation. These expenditures are apportioned to the selected industries in the combined Jefferson and Orleans parishes. The allocated expenditures are input into IMPLAN as an Industry Change activity to measure the impact on the industries experiencing the change in production.

The expected total economic impacts resulting from the allocation of capital (infrastructure and facility) costs and operating expenses associated with existing and new services for each of the three *New Orleans Future Transit Scenarios* in the combined Jefferson and Orleans Parishes are presented in **Table 7.7**. The expected total economic impacts resulting from the allocation of capital (infrastructure and facility) costs and new operating expenses associated with the new services offered by the *New Orleans Future Transit Scenarios* in the combined Jefferson and Orleans Parishes are presented in **Table 7.8**.

Table 7.5 Phasing Approach of Proposed NORTA Transit Investments

Investments	Phase #	Time Frame for	
		Capital Cost Expenditures	Operating Cost Expenditures
Proposed High Capacity Transit Routes			
Veterans/Airport	Phase 3	2028-2040	2035-2040
Elmwood/Claiborne	Phase 3	2028-2040	2035-2040
West Bank Expressway	Phase 3	2028-2040	2035-2040
Rampart/St. Claude Streetcar - non-rail portion	Phase 3	2028-2040	2035-2040
Rampart/St. Claude Streetcar - rail portion	Phase 3	2028-2040	2035-2040
Rampart/St. Claude Streetcar - whole corridor	Phase 3	2028-2040	2035-2040
Canal-Cemeteries - existing	Phase 2	2023-2027	2026-2040
Canal-City Park - existing	Phase 2	2023-2027	2026-2040
St. Charles - existing	Phase 2	2023-2027	2026-2040
Broad/Gentilly/Chef	Phase 2	2023-2027	2026-2040
Tulane	Phase 2	2023-2027	2026-2040
Proposed Select Service Routes			
General DeGaulle	Phase 2	2023-2027	2026-2040
Elysian Fields	Phase 2	2023-2027	2026-2040
Magazine	Phase 2	2023-2027	2026-2040
Riverfront - existing	Phase 2	2023-2027	2026-2040
Downtown Mobility Improvements			
CBD Mobility Improvements	Phase 3	2028-2040	2035-2040
FQ Mobility Improvements	Phase 2	2023-2027	2026-2040
Microtransit Shuttle			
New Orleans East	Phase 1	2018-2022	2022-2040
Algiers	Phase 1	2018-2022	2022-2040
Ferry / Water Transportation			
Algiers Point - existing	Phase 2	2023-2027	2026-2040
Chalmette/Lower Algiers - existing	Phase 2	2023-2027	2026-2040
Gretna	Phase 2	2023-2027	2026-2040
Poland Ave	Phase 3	2028-2040	2035-2040
Proposed Regional Express			
Slidell	Phase 2	2023-2027	2026-2040
Covington	Phase 2	2023-2027	2026-2040
Chalmette	Phase 2	2023-2027	2026-2040
Proposed On-Demand Connectors			
New Orleans East	Phase 1	2018-2022	2022-2040
Algiers	Phase 1	2018-2022	2022-2040
All Other Areas	Phase 1	2018-2022	2022-2040
Major Transit Centers			
Downtown Transit Center	Phase 2	2023-2027	2026-2040
New Orleans East Transit Center/Park-n-Ride	Phase 2	2023-2027	2026-2040
Algiers Transit Center/Park-n-Ride	Phase 2	2023-2027	2026-2040

Notes:

1. The phases and their duration come from the file “Phasing.docx” provided by Transdev.
2. Phase I begins operating in 2022, Phase 2 in 2026 and Phase 3 in 2035.

Table 7.6 New Orleans Future Transit Scenarios – Capital and Operating Expenditures, 2018-2040

Capital Cost Category	Cumulative Cost (Millions of 2017$)		
	BRT	SC	LRT
Infrastructure Cost, 2018-2034	$703	$3,049	$8,161
Facility Cost, 2018-2034	$76	$76	$76
Vehicle Cost, 2018-2034	$67	$67	$67
Total Capital Costs, 2018-2034 = (a) =	**$846**	**$3,192**	**$8,304**

Operating Costs	Cumulative Cost (Millions of 2017$)		
	BRT	SC	LRT
Existing Services, 2018-2040	$2,309	$2,309	$2,309
New Services, 2022-2040	$2,624	$3,591	$2,986
Total Operating Costs, 2018-2040 = (b) =	**$4,934**	**$5,900**	**$5,295**

Total Capital and Operating Costs	Cumulative Cost (Millions of 2017$)		
	BRT	SC	LRT
Total Costs, 2018-2040 = (a) + (b) =	**$5,780**	**$9,092**	**$13,599**

Note:

1. Annual capital and operating costs come from the File “SMP Cost Summary 2018-02-15 BRT.xlxs”, “SMP Cost Summary 2018-02-13 LRT.xlxs” and “SMP Cost Summary 2018-02-15 SC.xlxs” provided by Transdev

Table 7.7 Total Economic Impacts resulting from the Allocation of Capital (Infrastructure and Facility) Costs and Operating (Existing and New Services) Expenses of the *New Orleans Future Transit Scenarios* in the combined Jefferson and Orleans Parishes, 2018-2040

BRT			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Direct Effect	35,560	$2,234	$2,553
Indirect Effect	13,040	$698	$1,176
Induced Effect	15,330	$699	$1,246
Total =	**63,930**	**$3,630**	**$4,975**

Tax Revenue Type	**Tax Revenue (Millions of 2017$)**		
	Federal	**State & Local**	**Total**
Tax on Production and Imports	$36	$238	$275
Social Security Contributions	$328	$5	$333
Personal Income Tax	$235	$42	$278
Corporate Profits and Dividend Taxes	$84	$4	$88
Personal Sales and Property Taxes	N/A	$25	$25
Total =	**$684**	**$314**	**$998**

SC			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Direct Effect	55,090	$3,444	$3,934
Indirect Effect	20,270	$1,125	$1,894
Induced Effect	23,880	$1,088	$1,941
Total =	**99,240**	**$5,658**	**$7,769**

Tax Revenue Type	**Tax Revenue (Millions of 2017$)**		
	Federal	**State & Local**	**Total**
Tax on Production and Imports	$56	$366	$422
Social Security Contributions	$516	$7	$524
Personal Income Tax	$366	$66	$432
Corporate Profits and Dividend Taxes	$133	$6	$139
Personal Sales and Property Taxes	N/A	$38	$38
Total =	**$1,071**	**$484**	**$1,555**

LRT			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Direct Effect	80,640	$5,009	$5,716
Indirect Effect	29,760	$1,729	$2,905
Induced Effect	35,190	$1,604	$2,860
Total =	**145,590**	**$8,342**	**$11,481**

Tax Revenue Type	**Tax Revenue (Millions of 2017$)**		
	Federal	**State & Local**	**Total**
Tax on Production and Imports	$81	$530	$611
Social Security Contributions	$769	$11	$781
Personal Income Tax	$538	$97	$635
Corporate Profits and Dividend Taxes	$199	$9	$209
Personal Sales and Property Taxes	N/A	$56	$56
Total =	**$1,587**	**$704**	**$2,292**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Table 7.8 Total Economic Impacts resulting from the Allocation of Capital (Infrastructure and Facility) Costs and Operating (New Services) Expenses of the *New Orleans Future Transit Scenarios* in the combined Jefferson and Orleans Parishes, 2018-2040

BRT			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Direct Effect	21,050	$1,320	$1,508
Indirect Effect	7,710	$419	$705
Induced Effect	9,090	$414	$738
Total =	**37,850**	**$2,152**	**$2,951**

Tax Revenue Type	**Tax Revenue (Millions of 2017$)**		
	Federal	**State & Local**	**Total**
Tax on Production and Imports	$21	$140	$162
Social Security Contributions	$195	$3	$198
Personal Income Tax	$139	$25	$164
Corporate Profits and Dividend Taxes	$50	$2	$53
Personal Sales and Property Taxes	N/A	$15	$15
Total =	**$406**	**$185**	**$592**

SC			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Direct Effect	40,590	$2,530	$2,889
Indirect Effect	14,930	$846	$1,422
Induced Effect	17,640	$804	$1,433
Total =	**73,160**	**$4,180**	**$5,745**

Tax Revenue Type	**Tax Revenue (Millions of 2017$)**		
	Federal	**State & Local**	**Total**
Tax on Production and Imports	$41	$268	$309
Social Security Contributions	$383	$6	$389
Personal Income Tax	$270	$49	$319
Corporate Profits and Dividend Taxes	$99	$5	$104
Personal Sales and Property Taxes	N/A	$28	$28
Total =	**$793**	**$355**	**$1,149**

LRT			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Direct Effect	66,130	$4,095	$4,671
Indirect Effect	24,420	$1,449	$2,434
Induced Effect	28,950	$1,320	$2,353
Total =	**119,500**	**$6,864**	**$9,458**

Tax Revenue Type	**Tax Revenue (Millions of 2017$)**		
	Federal	**State & Local**	**Total**
Tax on Production and Imports	$66	$432	$499
Social Security Contributions	$636	$9	$646
Personal Income Tax	$442	$80	$522
Corporate Profits and Dividend Taxes	$165	$8	$173
Personal Sales and Property Taxes	N/A	$46	$46
Total =	**$1,310**	**$575**	**$1,885**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Wages and Benefits – NORTA has estimated that employee wages & benefits to be generated by the *New Orleans Future Transit Scenarios* over the 2018-2040 period will grow at the same rate as the annual expenditures to operate the build scenarios. Based on this assumption, employee wages & benefits to be paid by NORTA in 2018 are expected to grow by 138 percent, 157 percent and 188 percent by 2040 under the BRT, LRT and SC scenarios, respectively (**Table 7.9**).

Table 7.9 Expected NORTA Employee Wages and Benefits Growth Rates under the *New Orleans Future Transit Scenarios*

Transit Scenario	Average Annual Operating Cost Services (Millions of 2017$)			Growth Rate (%)
	Existing Services, 2016/17	New Services, 2022-2040	Combined Existing & New Services, 2022-2040	
	(a)	(b)	(c) = (a) + (b)	
BRT	$100	$138	$239	**138%**
LRT	$100	$157	$258	**157%**
SC	$100	$189	$289	**188%**

To estimate the wages and benefits to be paid by NORTA during the analysis period, the following steps are taken:

- Estimation of the wage growth rate for "all occupancies" using the May 2015 and May 2016 wage data for New Orleans-Metairie urban area provided by the Occupational Employment Statistics (OES), Bureau of Labor Statistics (BLS).
- Estimation of wages and benefits to be paid by NORTA to its employees in 2018 by multiplying the 2015 NORTA wages and benefits by the estimated annual wage growth rate. The 2018 employee wages and benefits is deflated from 2018 to 2017 dollars using the CPI-U in the South urban areas in year 2017 and the projected 2018 CPI-U based on historical data for the last 10 years.
- Estimation of the 2040 NORTA wages and benefits for each investment scenario by multiplying the 2018 NORTA employee wages and benefits by 138 percent, 157 percent and 188 percent under the BRT, LRT and SC scenarios, respectively.
- The estimated NORTA wages and benefits in 2018 and 2040 are interpolated to generate values for the intermittent years, assuming a linear growth over the analysis period. This represents an average annual growth rate in employee wages & benefits of 4.0 percent, 4.4 percent and 4.9 percent under the BRT, LRT and SC scenarios, respectively, over the 2018-2040 period.
- The cumulative wages and benefits over the 2018-2040 period are allocated proportionately among parishes based on the 2015 parish employee counts.

The outcomes of these estimations are shown in **Table 7.10**.

Table 7.10 NORTA Employee Wages and Benefits under the *New Orleans Future Transit Scenarios*

Transit Scenario	Estimated NORTA Employee Wages & Benefits (in 2017$)			
	2018	2040	CAGR	Cumulative, 2018-2040
BRT	$12,402,893	$29,465,115	4.0%	$454,803,342
LRT	$12,402,893	$31,815,371	4.4%	$475,538,856
SC	$12,402,893	$35,749,388	4.9%	$509,358,912

Parish of Residence	Share (%)	BRT	LRT	SC
New Orleans MSA = (a)	**97.0%**	**$441,061,083**	**$461,170,056**	**$493,968,211**
• Jefferson	18.6%	$84,416,735	$88,265,485	$94,542,877
• Orleans	66.3%	$301,675,310	$315,429,370	$337,862,530
• St Tammany	7.1%	$32,065,272	$33,527,200	$35,911,636
• St Bernard	2.7%	$12,433,473	$13,000,343	$13,924,920
• St John	1.9%	$8,507,113	$8,894,971	$9,527,577
• Combined St. Charles, St. James and Plaquemines parishes	0.4%	$1,963,180	$2,052,686	$2,198,672
Outside of New Orleans MSA = (b)	**3.0%**	**$13,742,259**	**$14,368,800**	**$15,390,701**
Total = (a) + (b) =	**100.0%**	**$454,803,342**	**$475,538,856**	**$509,358,912**

The projected annual wages and benefits accruing to Jefferson, Orleans, St Tammany, St Bernard and St John parishes as well as in the rest of the parishes within New Orleans MSA (i.e., St. Charles, St. James and Plaquemines parishes) are input into the New Orleans MSA IMPLAN model as changes in the transit and ground passenger transportation industry sector, which corresponds to the IMPLAN Sector 412, to estimate the total economic impacts. The cumulative total (direct, indirect and induced) economic impacts to be generated by wages and benefits paid by RTA to its employees living in New Orleans MSA are estimated to account for:

- BRT Scenario - 3,870 jobs, $574 million in labor income, $674 million in value added and $129 million in combined federal, state and local taxes (**Tables 7.11** and **7.12**).
- LRT Scenario – 5,070 jobs, $880 million in labor income, $1,019 million in value added and $196 million in combined federal, state and local taxes (**Tables 7.13** and **7.14**).
- SC Scenario – 5,500 jobs, $972 million in labor income, $1,106 million in value added and $214 million in combined federal, state and local taxes (**Tables 7.15** and **7.16**).

Table 7.11 BRT Scenario - Total Economic Impacts (Jobs, Labor Income and GRP) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2018-2040

Geography	Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Jefferson Parish	Direct Effect	310	$91	$94
	Indirect Effect	60	$3	$4
	Induced Effect	490	$22	$39
	Total Effect	**860**	**$115**	**$137**
Orleans Parish	Direct Effect	1,100	$324	$345
	Indirect Effect	170	$10	$14
	Induced Effect	1,220	$53	$96
	Total Effect	**2,490**	**$387**	**$455**
Rest of Parishes within New Orleans MSA	Direct Effect	200	$60	$60
	Indirect Effect	40	$1	$2
	Induced Effect	280	$10	$19
	Total Effect	**520**	**$71**	**$82**
New Orleans MSA (Grand Total)	Direct Effect	1,610	$474	$498
	Indirect Effect	270	$14	$21
	Induced Effect	1,990	$85	$154
	Grand Total Effect	**3,870**	**$574**	**$674**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Rest of parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.12 BRT Scenario - Total Economic Impacts (Tax Revenues) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2018-2040

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Jefferson Parish			
Tax on Production and Imports	$0.6	$3.8	$4.4
Social Security Contributions	$13.2	$0.2	$13.4
Personal Income Tax	$8.0	$1.4	$9.4
Corporate Profits and Dividend Taxes	$1.4	$0.1	$1.4
Personal Sales and Property Taxes	N/A	$0.6	$0.6
Total =	**$23.2**	**$6.1**	**$29.3**
Orleans Parish			
Tax on Production and Imports	$1.3	$8.6	$9.8
Social Security Contributions	$40.1	$0.8	$40.9
Personal Income Tax	$20.3	$3.7	$24.0
Corporate Profits and Dividend Taxes	$4.6	$0.2	$4.8
Personal Sales and Property Taxes	N/A	$2.8	$2.8
Total =	**$66.3**	**$16.0**	**$82.3**
Rest of Parishes within New Orleans MSA			
Tax on Production and Imports	$0.3	$2.2	$2.4
Social Security Contributions	$7.7	$0.2	$7.9
Personal Income Tax	$5.0	$0.9	$5.9
Corporate Profits and Dividend Taxes	$0.6	$0.0	$0.6
Personal Sales and Property Taxes	N/A	$0.4	$0.4
Total =	**$13.6**	**$3.6**	**$17.2**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$2.1	$14.5	$16.7
Social Security Contributions	$61.1	$1.1	$62.2
Personal Income Tax	$33.3	$6.0	$39.3
Corporate Profits and Dividend Taxes	$6.5	$0.3	$6.9
Personal Sales and Property Taxes	N/A	$3.7	$3.7
Grand Total =	**$103.0**	**$25.7**	**$128.8**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Rest of parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.13 LRT Scenario - Total Economic Impacts (Jobs, Labor Income and GRP) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2018-2040

Geography	Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Jefferson Parish	Direct Effect	340	$140	$143
	Indirect Effect	60	$3	$5
	Induced Effect	750	$34	$60
	Total Effect	**1,150**	**$177**	**$208**
Orleans Parish	Direct Effect	1,190	$501	$524
	Indirect Effect	180	$11	$16
	Induced Effect	1,860	$82	$147
	Total Effect	**3,230**	**$594**	**$686**
Rest of Parishes within New Orleans MSA	Direct Effect	220	$92	$93
	Indirect Effect	40	$2	$2
	Induced Effect	430	$15	$29
	Total Effect	**690**	**$109**	**$124**
New Orleans MSA (Grand Total)	Direct Effect	1,750	$734	$760
	Indirect Effect	280	$15	$23
	Induced Effect	3,040	$131	$236
	Grand Total Effect	**5,070**	**$880**	**$1,019**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Rest of parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.14 LRT Scenario - Total Economic Impacts (Tax Revenues) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2018-2040

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax (Millions of 2017$)
Jefferson Parish			
Tax on Production and Imports	$0.9	$5.7	$6.5
Social Security Contributions	$20.4	$0.3	$20.7
Personal Income Tax	$12.2	$2.2	$14.4
Corporate Profits and Dividend Taxes	$2.0	$0.1	$2.1
Personal Sales and Property Taxes	N/A	$0.9	$0.9
Total =	**$35.5**	**$9.1**	**$44.6**
Orleans Parish			
Tax on Production and Imports	$1.9	$12.6	$14.5
Social Security Contributions	$61.9	$1.3	$63.1
Personal Income Tax	$31.1	$5.6	$36.6
Corporate Profits and Dividend Taxes	$6.2	$0.3	$6.5
Personal Sales and Property Taxes	N/A	$4.2	$4.2
Total =	**$101.0**	**$24.0**	**$124.9**
Rest of Parishes within New Orleans MSA			
Tax on Production and Imports	$0.4	$3.2	$3.6
Social Security Contributions	$11.9	$0.3	$12.2
Personal Income Tax	$7.7	$1.4	$9.1
Corporate Profits and Dividend Taxes	$0.9	$0.0	$0.9
Personal Sales and Property Taxes	N/A	$0.6	$0.6
Total =	**$20.8**	**$5.5**	**$26.3**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$3.2	$21.5	$24.6
Social Security Contributions	$94.2	$1.8	$96.0
Personal Income Tax	$50.9	$9.2	$60.1
Corporate Profits and Dividend Taxes	$9.0	$0.4	$9.4
Personal Sales and Property Taxes	N/A	$5.7	$5.7
Grand Total =	**$157.3**	**$38.6**	**$195.8**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Rest of parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.15 SC Scenario - Total Economic Impacts (Jobs, Labor Income and GRP) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2018-2040

Geography	Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Jefferson Parish	Direct Effect	380	$158	$161
	Indirect Effect	70	$3	$5
	Induced Effect	850	$38	$68
	Total Effect	**1,300**	**$199**	**$234**
Orleans Parish	Direct Effect	1,330	$557	$566
	Indirect Effect	70	$4	$6
	Induced Effect	2,030	$89	$161
	Total Effect	**3,430**	**$650**	**$732**
Rest of Parishes within New Orleans MSA	Direct Effect	250	$104	$104
	Indirect Effect	40	$2	$3
	Induced Effect	480	$17	$33
	Total Effect	**770**	**$123**	**$140**
New Orleans MSA (Grand Total)	Direct Effect	1,960	$818	$831
	Indirect Effect	180	$9	$14
	Induced Effect	3,360	$144	$261
	Grand Total Effect	**5,500**	**$972**	**$1,106**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Rest of parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.16 SC Scenario - Total Economic Impacts (Tax Revenues) Accruing to New Orleans MSA Resulting from NORTA Employee Compensation Expenditures, 2018-2040

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Jefferson Parish			
Tax on Production and Imports	$1.0	$6.4	$7.4
Social Security Contributions	$22.9	$0.3	$23.2
Personal Income Tax	$13.7	$2.5	$16.2
Corporate Profits and Dividend Taxes	$2.2	$0.1	$2.3
Personal Sales and Property Taxes	N/A	$1.0	$1.0
Total =	**$39.9**	**$10.3**	**$50.1**
Orleans Parish			
Tax on Production and Imports	$1.9	$12.9	$14.8
Social Security Contributions	$68.3	$1.4	$69.7
Personal Income Tax	$33.9	$6.1	$40.0
Corporate Profits and Dividend Taxes	$5.3	$0.2	$5.5
Personal Sales and Property Taxes	N/A	$4.6	$4.6
Total =	**$109.4**	**$25.2**	**$134.6**
Rest of Parishes within New Orleans MSA			
Tax on Production and Imports	$0.4	$3.6	$4.1
Social Security Contributions	$13.4	$0.3	$13.7
Personal Income Tax	$8.6	$1.6	$10.2
Corporate Profits and Dividend Taxes	$1.0	$0.0	$1.0
Personal Sales and Property Taxes	N/A	$0.6	$0.6
Total =	**$23.4**	**$6.1**	**$29.5**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$3.3	$22.8	$26.2
Social Security Contributions	$104.6	$2.0	$106.6
Personal Income Tax	$56.2	$10.1	$66.4
Corporate Profits and Dividend Taxes	$8.5	$0.4	$8.9
Personal Sales and Property Taxes	N/A	$6.3	$6.3
Grand Total =	**$172.6**	**$41.6**	**$214.3**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Rest of parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Retirement Benefits – RTA has estimated that retirement benefits to be generated by the *New Orleans Future Transit Scenarios* over the 2018-2040 period will grow at the same rate as the annual operations and maintenance expenditures under the build scenarios. Based on this assumption, retirement benefits paid by RTA from 2018 to 2040 are expected to grow by 138 percent, 157 percent and 188 percent under the BRT, LRT and SC scenarios, respectively (**Table 7.9**). To estimate the retirement benefits to be paid by NORTA during the analysis period, the following steps are taken:

- Estimate the retirement benefits to be paid by NORTA in 2018 using historical data (**Table 7.17**). This analysis assumes that 2018 retirement benefits would account for $8.4 million. This value corresponds to the average retirement benefits paid by RTA from 2011 to 2016. This value is deflated from 2018 to 2017 dollars using the CPI-U in the South urban areas in year 2017 and the projected 2018 CPI-U based on historical data for the last 10 years.
- Estimate the 2040 RTA retirement benefits for each investment scenario by multiplying the 2018 RTA retirement benefits by 138 percent, 157 percent and 188 percent under the BRT, LRT and SC scenarios, respectively.
- The RTA retirement benefits in 2018 and 2040 are interpolated to generate values for the intermittent years, assuming a linear growth over the analysis period. This represents an average annual growth rate in retirement benefits of 4.0 percent, 4.4 percent and 4.9 percent under the BRT, LRT and SC scenarios, respectively, over the 2018-2040 period.
- The cumulative RTA retirement benefits over the 2018-2040 period are allocated proportionately among parishes based on the 2015 parish employee counts.

Table 7.17 NORTA Retirement Benefits, 2011-2016

Year	RTA Pension Benefits (in thousand dollars)	Year-to-Year Change (%)
2016	$12,313	311%
2015	$2,997	-83%
2014	$18,000	-528%
2013	-$4,203	-138%
2012	$11,023	7%
2011	$10,286	
Average (2011-2016)	**$8,403**	

Data Sources:

1. Carr Riggs & Ingram (CRI), CPAs and Advisors, Regional Transit Authority, Financial Statements, December 31, 2016 and 2015.
2. Carr Riggs & Ingram (CRI), CPAs and Advisors, Regional Transit Authority, Financial Statements, December 31, 2015.
3. Source: Gurtner Zuniga Abney, Certified Public Accountants & Consultants, Regional Transit Authority, Financial Statements as of and for the years ended December 31, 2013 and 2013 and Independen Auditors' Report
4. Source: Silva Gurtner & Abney, Certified Public Accountants & Consultants, Regional Transit Authority, Financial Statements as of and for the years ended December 31, 2012 and 2011 and Independen Auditors' Report

The outcomes of these estimations are shown in **Tables 7.18**, **7.19** and **7.20**. To allocate the retirement benefits among New Orleans MSA parishes, this analysis assumes the following:

- Ninety-seven (97) percent of NORTA retirees would live within New Orleans MSA;
- Ninety (90) percent of retirees would stay in their homes and communities;
- Retirement disbursements are allocated across parishes consistently with the share of employee counts by parish in 2015; and
- Retirement benefits are borne by all households in each parish proportionately to the household share of income within the parish. To apply this assumption, this analysis uses the 2015 household income data available from IMPLAN to estimate the percentage of households falling into each household income range.

Table 7.18 BRT Scenario - Estimated NORTA Retirement Benefits, 2018-2040

Transit Scenario	Estimated NORTA Retirement Benefits (in 2017$)			
	2018	2040	CAGR	Cumulative, 2018-2040
BRT	$8,261,143	$19,625,705	4.0%	$302,928,951
LRT	$8,261,143	$21,191,131	4.4%	$316,740,167
SC	$8,261,143	$23,811,444	4.9%	$339,266,550

Item	Value	Source
Pension Benefits (in 2017$) = (a)	$302,928,951	NORTA estimate
Share of NORTA Employees living in New Orleans MSA = (b)	97%	**Table 6.7**. This value represents the share of NORTA employees living within NO metro area.
% Retirees Leaving in New Orleans MSA = (c)	90%	Assume
New Orleans MSA Pension Benefits (in 2017$) = (d) = (a) x (b) x (c)	**$264,398,132**	
Parish	**Employment Share (e)**	**Retirement Benefits (f) = (d) x (e)**
Jefferson	19%	$50,604,390
Orleans	68%	$180,842,046
St Tammany	7%	$19,221,823
St Bernard	3%	$7,453,360
St John	2%	$5,099,667
Combined St. Charles, St. James and Plaquemines	0%	$1,176,846
New Orleans MSA (Grand Total) =	**100%**	**$264,398,132**

Allocation of Retirement Benefits among Parishes (in 2017$)						
Household Income Range	**Jefferson**	**Orleans**	**St. Tammany**	**St. Bernard**	**St. John**	**Combined St. Charles, St. James and Plaquemines**
Less than $15k	$7,050,497	$42,875,856	$1,821,140	$1,023,656	$650,310	$138,524
$15k - $30k	$8,988,373	$34,667,742	$2,652,136	$1,475,736	$806,015	$177,574
$30k - $40k	$5,606,445	$17,327,126	$1,868,084	$875,607	$454,874	$106,428
$40k - $50k	$4,596,142	$14,170,054	$1,494,475	$685,957	$586,561	$101,967
$50k - $70k	$7,078,279	$21,016,514	$2,855,707	$1,058,636	$852,556	$182,059
$70k - $100k	$7,358,151	$20,160,304	$3,127,612	$1,241,814	$823,556	$181,563
$100k - $150k	$5,961,046	$15,922,820	$3,105,529	$746,171	$606,897	$184,526
$150k - $200k	$1,865,001	$6,293,367	$1,091,840	$227,655	$225,591	$68,933
More than 200k+	$2,100,454	$8,408,261	$1,205,301	$118,128	$93,307	$35,272
Total =	**$50,604,390**	**$180,842,046**	**$19,221,823**	**$7,453,360**	**$5,099,667**	**$1,176,846**

Table 7.19 LRT Scenario - Estimated NORTA Retirement Benefits, 2018-2040

Transit Scenario	Estimated NORTA Retirement Benefits (in 2017$)			
	2018	2040	CAGR	Cumulative, 2018-2040
BRT	$8,261,143	$19,625,705	4.0%	$302,928,951
LRT	$8,261,143	$21,191,131	4.4%	$316,740,167
SC	$8,261,143	$23,811,444	4.9%	$339,266,550

Item	Value	Source
Pension Benefits (in 2017$) = (a)	$316,740,167	NORTA estimate
Share of NORTA Employees living in New Orleans MSA = (b)	97%	**Table 6.7**. This value represents the share of NORTA employees living within NO metro area.
% Retirees Leaving in New Orleans MSA = (c)	90%	Assume
New Orleans MSA Pension Benefits (in 2017$) = (d) = (a) x (b) x (c)	**$276,452,641**	
Parish	**Employment Share (e)**	**Retirement Benefits (f) = (d) x (e)**
Jefferson	19.1%	$52,911,559
Orleans	68.4%	$189,087,044
St Tammany	7.3%	$20,098,189
St Bernard	2.8%	$7,793,175
St John	1.9%	$5,332,173
Combined St. Charles, St. James and Plaquemines	0.4%	$1,230,501
New Orleans MSA (Grand Total) =	**100.0%**	**$276,452,641**

Allocation of Retirement Benefits among Parishes (in 2017$)						
Household Income Range	**Jefferson**	**Orleans**	**St. Tammany**	**St. Bernard**	**St. John**	**Combined St. Charles, St. James and Plaquemines**
Less than $15k	$7,371,945	$44,830,663	$1,904,170	$1,070,327	$679,959	$144,840
$15k - $30k	$9,398,174	$36,248,323	$2,773,053	$1,543,018	$842,763	$185,670
$30k - $40k	$5,862,056	$18,117,109	$1,953,254	$915,528	$475,613	$111,280
$40k - $50k	$4,805,691	$14,816,099	$1,562,611	$717,231	$613,303	$106,616
$50k - $70k	$7,400,994	$21,974,705	$2,985,905	$1,106,902	$891,426	$190,359
$70k - $100k	$7,693,626	$21,079,458	$3,270,206	$1,298,431	$861,104	$189,841
$100k - $150k	$6,232,824	$16,648,778	$3,247,117	$780,191	$634,567	$192,939
$150k - $200k	$1,950,031	$6,580,296	$1,141,619	$238,035	$235,876	$72,076
More than 200k+	$2,196,218	$8,791,613	$1,260,253	$123,514	$97,561	$36,880
Total =	**$52,911,559**	**$189,087,044**	**$20,098,189**	**$7,793,175**	**$5,332,173**	**$1,230,501**

Table 7.20 SC Scenario – Estimated NORTA Retirement Benefits, 2018-2040

Transit Scenario	Estimated NORTA Retirement Benefits (in 2017$)			
	2018	2040	CAGR	Cumulative, 2018-2040
BRT	$8,261,143	$19,625,705	4.0%	$302,928,951
LRT	$8,261,143	$21,191,131	4.4%	$316,740,167
SC	$8,261,143	$23,811,444	4.9%	$339,266,550

Item	Value	Source
Pension Benefits (in 2017$) = (a)	$339,266,550	NORTA estimate
Share of NORTA Employees living in New Orleans MSA = (b)	97%	**Table 6.7**. This value represents the share of NORTA employees living within NO metro area.
% Retirees Leaving in New Orleans MSA = (c)	90%	Assume
New Orleans MSA Pension Benefits (in 2017$) = (d) = (a) x (b) x (c)	**$296,113,797**	
Parish	**Employment Share (e)**	**Retirement Benefits (f) = (d) x (e)**
Jefferson	19.1%	$56,674,599
Orleans	68.4%	$202,534,808
St Tammany	7.3%	$21,527,561
St Bernard	2.8%	$8,347,422
St John	1.9%	$5,711,394
Combined St. Charles, St. James and Plaquemines	0.4%	$1,318,014
New Orleans MSA (Grand Total) =	**100.0%**	**$296,113,797**

Allocation of Retirement Benefits among Parishes (in 2017$)						
Household Income Range	**Jefferson**	**Orleans**	**St. Tammany**	**St. Bernard**	**St. John**	**Combined St. Charles, St. James and Plaquemines**
Less than $15k	$7,896,234	$48,018,995	$2,039,593	$1,146,448	$728,318	$155,141
$15k - $30k	$10,066,566	$38,826,284	$2,970,271	$1,652,757	$902,700	$198,874
$30k - $40k	$6,278,962	$19,405,588	$2,092,168	$980,640	$509,439	$119,194
$40k - $50k	$5,147,469	$15,869,811	$1,673,743	$768,240	$656,921	$114,199
$50k - $70k	$7,927,349	$23,537,534	$3,198,261	$1,185,624	$954,823	$203,898
$70k - $100k	$8,240,792	$22,578,617	$3,502,782	$1,390,775	$922,345	$203,342
$100k - $150k	$6,676,099	$17,832,830	$3,478,051	$835,677	$679,697	$206,661
$150k - $200k	$2,088,716	$7,048,283	$1,222,810	$254,964	$252,651	$77,202
More than 200k+	$2,352,412	$9,416,867	$1,349,882	$132,298	$104,500	$39,503
Total =	**$56,674,599**	**$202,534,808**	**$21,527,561**	**$8,347,422**	**$5,711,394**	**$1,318,014**

The retirement benefits for Jefferson, Orleans, St Tammany, St Bernard and St John parishes as well as the rest of the parishes within New Orleans MSA are input into the New Orleans MSA IMPLAN model to estimate the total economic impacts over the analysis period. The cumulative total (direct, indirect and induced) economic impacts to be generated by RTA retirement benefits in New Orleans MSA are estimated to account for:

- BRT Scenario – 1,750 jobs, $76 million in labor income, $135 million in value added and nearly $30 million in combined federal, state and local taxes (**Table 7.21**).
- LRT Scenario – 1,840 jobs, $80 million in labor income, $142 million in value added and over $4 million in combined federal, state and local taxes (**Table 7.22**).
- SC Scenario – 1,970 jobs, $85 million in labor income, $152 million in value added and nearly $14 million in combined federal, state and local taxes (**Table 7.23**).

Table 7.21 BRT Scenario - Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA Resulting from NORTA Retirement Benefits, 2018-2040

Geography	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Jefferson Parish	360	$16	$29
Orleans Parish	1,190	$53	$94
Rest of Parishes within New Orleans MSA	200	$7	$13
New Orleans MSA (Grand Total)	**1,750**	**$76**	**$135**

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Jefferson Parish			
Tax on Production and Imports	$0.4	$2.4	$2.8
Social Security Contributions	$1.7	$0.0	$1.7
Personal Income Tax	$1.1	$0.2	$1.3
Corporate Profits and Dividend Taxes	$0.8	$0.0	$0.8
Personal Sales and Property Taxes	N/A	$0.1	$0.1
Total =	**$4.0**	**$2.7**	**$6.7**
Orleans Parish			
Tax on Production and Imports	$1.0	$6.8	$7.8
Social Security Contributions	$5.1	$0.1	$5.2
Personal Income Tax	$2.9	$0.5	$3.4
Corporate Profits and Dividend Taxes	$2.6	$0.1	$2.7
Personal Sales and Property Taxes	N/A	$0.4	$0.4
Total =	**$11.6**	**$7.9**	**$19.5**
Rest of Parishes within New Orleans MSA			
Tax on Production and Imports	$0.2	$1.3	$1.5
Social Security Contributions	$0.7	$0.0	$0.7
Personal Income Tax	$0.5	$0.1	$0.6
Corporate Profits and Dividend Taxes	$0.4	$0.0	$0.4
Personal Sales and Property Taxes	N/A	$0.0	$0.0
Total =	**$1.8**	**$1.5**	**$3.2**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$1.5	$10.5	$12.1
Social Security Contributions	$7.5	$0.1	$7.7
Personal Income Tax	$4.5	$0.8	$5.4
Corporate Profits and Dividend Taxes	$3.7	$0.2	$3.9
Personal Sales and Property Taxes	N/A	$0.5	$0.5
Grand Total =	**$17.3**	**$12.2**	**$29.5**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.
2. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.22 LRT Scenario - Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA Resulting from NORTA Retirement Benefits, 2018-2040

Geography	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Jefferson Parish	380	$17	$30
Orleans Parish	1,250	$55	$98
Rest of Parishes within New Orleans MSA	210	$7	$14
New Orleans MSA (Grand Total)	**1,840**	**$80**	**$142**

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Jefferson Parish			
Tax on Production and Imports	$0.4	$2.5	$2.9
Social Security Contributions	$1.8	$0.0	$1.8
Personal Income Tax	$1.2	$0.2	$1.4
Corporate Profits and Dividend Taxes	$0.8	$0.0	$0.8
Personal Sales and Property Taxes	N/A	$0.1	$0.1
Total =	**$4.2**	**$2.9**	**$7.0**
Orleans Parish			
Tax on Production and Imports	$1.1	$7.1	$8.2
Social Security Contributions	$5.3	$0.1	$5.4
Personal Income Tax	$3.0	$0.5	$3.6
Corporate Profits and Dividend Taxes	$2.7	$0.1	$2.8
Personal Sales and Property Taxes	N/A	$0.4	$0.4
Total =	**$12.1**	**$8.3**	**$20.4**
Rest of Parishes within New Orleans MSA			
Tax on Production and Imports	$0.2	$1.4	$1.5
Social Security Contributions	$0.7	$0.0	$0.8
Personal Income Tax	$0.5	$0.1	$0.6
Corporate Profits and Dividend Taxes	$0.4	$0.0	$0.4
Personal Sales and Property Taxes	N/A	$0.0	$0.0
Total =	**$1.8**	**$1.5**	**$3.4**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$1.6	$11.0	$12.6
Social Security Contributions	$7.9	$0.1	$8.0
Personal Income Tax	$4.8	$0.9	$5.6
Corporate Profits and Dividend Taxes	$3.9	$0.2	$4.1
Personal Sales and Property Taxes	N/A	$0.5	$0.5
Grand Total =	**$18.1**	**$12.7**	**$30.8**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.
2. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

Table 7.23 ST Scenario - Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA Resulting from NORTA Retirement Benefits, 2018-2040

Geography	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Jefferson Parish	410	$18	$32
Orleans Parish	1,340	$59	$105
Rest of Parishes within New Orleans MSA	220	$8	$15
New Orleans MSA (Grand Total)	**1,970**	**$85**	**$152**

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Jefferson Parish			
Tax on Production and Imports	$0.4	$2.7	$3.1
Social Security Contributions	$1.9	$0.0	$1.9
Personal Income Tax	$1.3	$0.2	$1.5
Corporate Profits and Dividend Taxes	$0.9	$0.0	$0.9
Personal Sales and Property Taxes	N/A	$0.1	$0.1
Total =	**$4.5**	**$3.1**	**$7.5**
Orleans Parish			
Tax on Production and Imports	$1.1	$7.6	$8.7
Social Security Contributions	$5.7	$0.1	$5.8
Personal Income Tax	$3.2	$0.6	$3.8
Corporate Profits and Dividend Taxes	$2.9	$0.1	$3.0
Personal Sales and Property Taxes	N/A	$0.4	$0.4
Total =	**$13.0**	**$8.9**	**$21.9**
Rest of Parishes within New Orleans MSA			
Tax on Production and Imports	$0.2	$1.5	$1.6
Social Security Contributions	$0.8	$0.0	$0.8
Personal Income Tax	$0.6	$0.1	$0.7
Corporate Profits and Dividend Taxes	$0.4	$0.0	$0.4
Personal Sales and Property Taxes	N/A	$0.0	$0.0
Total =	**$2.0**	**$1.6**	**$3.6**
New Orleans MSA (Grand Total)			
Tax on Production and Imports	$1.7	$11.8	$13.5
Social Security Contributions	$8.4	$0.1	$8.6
Personal Income Tax	$5.1	$0.9	$6.0
Corporate Profits and Dividend Taxes	$4.2	$0.2	$4.4
Personal Sales and Property Taxes	N/A	$0.6	$0.6
Grand Total =	**$19.4**	**$13.6**	**$33.0**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.
2. Other parishes within New Orleans MSA includes Plaquemines, St. Bernard, St. James, St. Tammany, St. Charles, and St. John the Baptist parishes.

In summary, the cumulative total (direct, indirect and induced) economic impacts to be generated by NORTA enterprise benefits in New Orleans MSA over the 2018-2040 period are expected to account for:

- BRT Scenario – 69,550 jobs, $4.3 billion in labor income, $5.8 billion in value added and $1.2 billion in combined federal, state and local taxes (**Tables 7.24**).
- LRT Scenario – 152,500 jobs, $9.3 billion in labor income, $12.6 billion in value added and $2.5 billion in combined federal, state and local taxes (**Tables 7.25**).
- SC Scenario – 106,710 jobs, $6.7 billion in labor income, $9.0 billion in value added and $1.8 billion in combined federal, state and local taxes (**Tables 7.26**).

Table 7.24 BRT Scenario - Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA Resulting from Enterprise Benefits, 2018-2040

Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Direct Effect	37,530	$2,724	$3,080
Indirect Effect	14,500	$765	$1,290
Induced Effect	17,520	$791	$1,413
Total =	**69,550**	**$4,280**	**$5,784**

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Tax on Production and Imports	$40	$263	$303
Social Security Contributions	$397	$6	$403
Personal Income Tax	$273	$49	$322
Corporate Profits and Dividend Taxes	$95	$4	$99
Personal Sales and Property Taxes	N/A	$29	$29
Total =	**$805**	**$352**	**$1,156**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Table 7.25 LRT Scenario - Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA Resulting from Enterprise Benefits, 2018-2040

Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Direct Effect	82,770	$5,760	$6,506
Indirect Effect	31,290	$1,799	$3,026
Induced Effect	38,440	$1,742	$3,110
Total =	**152,500**	**$9,301**	**$12,642**

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Tax on Production and Imports	$86	$563	$649
Social Security Contributions	$871	$13	$885
Personal Income Tax	$593	$107	$701
Corporate Profits and Dividend Taxes	$212	$10	$222
Personal Sales and Property Taxes	N/A	$62	$62
Total =	**$1,763**	**$755**	**$2,518**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Table 7.26 SC Scenario - Total Economic Impacts (Jobs, Labor Income, GRP and Tax Revenue) Accruing to New Orleans MSA Resulting from Enterprise Benefits, 2018-2040

Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Direct Effect	57,460	$4,280	$4,797
Indirect Effect	21,790	$1,194	$2,013
Induced Effect	27,460	$1,241	$2,217
Total =	**106,710**	**$6,715**	**$9,027**

Tax Revenue Type	Federal Tax Revenue (Millions of 2017$)	State & Local Tax Revenue (Millions of 2017$)	Total Tax Revenue (Millions of 2017$)
Tax on Production and Imports	$61	$401	$462
Social Security Contributions	$629	$10	$639
Personal Income Tax	$427	$77	$504
Corporate Profits and Dividend Taxes	$146	$7	$153
Personal Sales and Property Taxes	N/A	$45	$45
Total =	**$1,263**	**$539**	**$1,802**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

7.3 Congestion Relief

The estimation of congestion relief cost benefits involves multiplying the value of time (VOT) by trip purpose by the corresponding avoided annual hours of delay due to the Buildout Scenarios. Hourly wage rates in the New Orleans-Metairie Urban Area region (**Table 7.27**) are applied in the calculations of the dollar value of travel time saved by highway users due to the enhanced transit system provided by RTA scenarios**Error! Reference source not found.**. Generally, the opportunity cost is a function of the trip purpose, roadway network users' wage rate, and the magnitude of time saved. This analysis recognizes that both traveling to work and traveling from work have economic value but uses a conservative approach. For commuters, the VOT is estimated as fifty percent of the hourly wage rate for "all occupations" in the MPO region. The VOT associated with business trips made by passenger cars and trucks is valued at one-hundred percent. Travel time associated with leisure and recreational trips are assumed to only represent opportunity costs and are not used in this economic impact analysis. The estimated congestion cost savings resulting from the three *New Orleans Future Transit Scenarios* are presented in **Table 7.28**.

Table 7.27 Value of Time (VOT) by Vehicle Type and Trip Purpose

Occupation	Hourly Wage Rate		Trip Purpose	Value of Time (VOT)	Average Vehicle Occupancy (AVO)
	in 2016$	In 2017$		in 2017$	
All Occupations	$20.9	$21.30	Auto, Commute	$10.6	1.13
			Auto, Business	$21.3	1.00
			Auto, Leisure	$10.6	1.94
Truck Drivers (Average)	$18.7	$19.05	Truck, Business	$19.1	1.00

Notes:

1. The hourly wage rates for "all occupations" and "truck drivers" in 2016 dollars comes from the Occupational Employment Statistics (OES) provided by the Bureau of Labor Statistics (BLS) for the New Orleans-Metairie Urban Area. These hourly wage rates are inflated from 2016 to 2017 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.
2. Average vehicle occupancy (AVO) comes from **Table 6.22**.

Table 7.28 Congestion Costs Saved under the *New Orleans Future Transit Scenarios*, 2022-2040

BRT, LRT, SC										
Avoided Daily VMT	Avoided Annual Hours of Delay	Avoided Annual Hours of Delay by Trip Purpose				Congestion Cost Savings by Trip Purpose (in 2017$)				Total Congestion Cost Savings (in 2017$)
		Auto Commute	**Auto Business**	**Auto Leisure**	**Trucks**	**Auto Commute**	**Auto Business**	**Auto Leisure**	**Trucks**	
(a)	(b)	(c) = 9.6% x (b)	(d) = 2.5% x (b)	(e) = 60.2% x (b)	(f) = 27.7% x (b)	(g) = $10.6/hr x (c)	(h) = $21.3/hr x (d)	(i) = $10.6/hr x (e)	(j) = $19.1/hr x (f)	(k) = (g) + (h) + (i) + (j)
76,203	405,801	39,053	10,042	244,250	112,456	$469,925	$213,873	$5,045,804	$2,142,533	$7,872,135

Notes:

1. Avoided Daily VMT due to RTA Build Scenario = Avoided Annual VMT (from **Table 7.4**) divided by 364 (i.e., 52 weeks x 7 days/week). The 364 days/year come from the national constants used by *TTI 2015 Urban Mobility Scorecard* to estimate the effect of congestion in all U.S. urban areas.
2. The avoided annual hours of delay due to the Build Scenario are estimated using a linear regression analysis.
3. The shares of the hours of delay by trip purpose come from **Table 6.22**.
4. The value of time (VOT) by trip purpose comes from **Table 7.14.**

The direct economic impacts enjoyed by auto commuters, auto business travelers and trucks who remain on the road resulting from the effects of the *New Orleans Future Transit Scenario* on mitigating congestion are translated into the necessary model inputs for IMPLAN (**Table 7.29**). The indirect and induced benefits arising from the additional direct congestion relief benefits are modeled using the IMPLAN model, generating estimates of the total economic benefits of reduced congestion in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue (**Table 7.30**). Under the *New Orleans Future Transit Scenarios*, the congestion relief benefits are anticipated to support the creation of 15 new jobs which would add $0.7 million in labor income and generate $1.1 million in GRP in the region. This additional economic activity would result in $0.3 million in combine federal, state and local tax revenues.

Table 7.29 Congestion Relief Benefits provided by BRT, LRT and SC Scenarios, 2022-2040 - IMPLAN Input Variables and Values

Direct Benefit	Monetized Value of Direct Benefits (in millions of 2017$)	IMPLAN Input Variable
Auto Business Trips, Savings in Travel Delays Costs	$213,873	Industry Change in Output
Truck Trips, Savings in Travel Delays Costs	$2,142,533	Industry Change in Output
Auto Commute Trips, Savings in Travel Delay Costs	$469,925	Household Income Change
Total =	**$2,826,331**	

Household Income Range	Household (%)	Auto Commute Trips, Savings in Travel Delay Costs
Households LT15k	18.7%	$88,090
Households 15-30k	18.5%	$86,726
Households 30-40k	10.3%	$48,598
Households 40-50k	8.5%	$39,796
Households 50-70k	12.8%	$60,257
Households 70-100k	12.9%	$60,481
Households 100-150k	10.3%	$48,473
Households 150-200k	3.6%	$16,844
Households 200k+	4.4%	$20,659
Total =	**100.0%**	**$469,925**

Notes:

1. This analysis assumes the savings in travel delay costs accruing to auto commuters are borne by all households in the combine Jefferson and Orleans parishes proportionately to the household share of income within the parish. To apply this assumption, this analysis uses the 2015 data available from IMPLAN to estimate the percentage of households falling into each income range.
2. This analysis assumes that the household distribution by income ranges in the combine Jefferson and Orleans parishes in the future remains the same as the distribution in 2015.

Table 7.30 Economic Impacts (Jobs, Labor Income, GRP and Tax Revenues) Accruing to New Orleans MSA Resulting from the Additional Congestion Relief Benefits provided by the *New Orleans Future Transit Scenarios*, 2022-2040

BRT, LRT, SC			
Impact Type	Employment	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Direct Effect	5	$0.3	$0.5
Indirect Effect	2	$0.1	$0.2
Induced Effect	6	$0.3	$0.5
Total =	**13**	**$0.7**	**$1.1**

Tax Revenue			
Tax Revenue Type	**Federal Tax Revenues (Millions of 2017$)**	**State & Local Tax Revenue (Millions of 2017$)**	**Total Tax Revenue (Millions of 2017$)**
Tax on Production and Imports	$0.01	$0.10	$0.11
Social Security Contributions	$0.07	$0.00	$0.07
Personal Income Tax	$0.04	$0.01	$0.05
Corporate Profits and Dividend Taxes	$0.03	$0.00	$0.03
Personal Sales and Property Taxes	N/A	$0.0	$0.0
Total =	**$0.15**	**$0.11**	**$0.26**

7.4 State of Good Repair of the Highway Infrastructure

The avoided pavement maintenance cost, estimated by multiplying the average annual VMT saved resulting from people using RTA services rather than alternative transportation modes (**Table 7.4**) by the corresponding external marginal cost of the alternative transportation modes on pavement maintenance, is shown in **Table 7.31**. The pavement maintenance cost resulting from additional RTA services under the *New Orleans Future Transit Scenarios* is shown in **Table 7.32**. The additional net pavement maintenance cost is presented in **Table 7.33**. These disbenefits have no a multiplier effect in the regional economy and therefore, they are not input into the economic model.

Table 7.31 Avoided Pavement Maintenance Costs under the *New Orleans Future Transit* Scenarios, 2022-2040

BRT, LRT and SC			
Alternative Transportation Modes	**Marginal External Pavement Maintenance Cost (in 2017$/VMT)**	**Avoided Vehicle Miles Traveled (VMT), 2022-2040**	**Avoided Pavement Maintenance Cost (in 2017$), 2022-2040**
	(a)	(b)	(c) = (a) x (b)
Another Bus	$0.109	237,844	$25,917
Bicycle	N/A	-	$0
Carpool	$0.014	1,711,724	$23,315
Drive	$0.014	4,191,630	$57,093
Driven	$0.014	10,057,064	$136,985
No Trip	N/A	-	$0
Taxi	$0.014	12,044,961	$164,062
Walk	N/A	-	$0
Total =		**28,243,223**	**$407,373**

Note:

1. Marginal external pavement maintenance costs for alternative transportation modes come from **Table 6.27**.
2. The avoided pavement maintenance cost is the same for the three investment scenarios because the avoided VMT is the same as shown in **Table 7.4**.

Table 7.32 Pavement Maintenance Costs Resulting from Additional/Avoided Transit Vehicles Miles Traveled under the *New Orleans Future Transit Scenarios*, 2022-2040

New Orleans Future Transit Scenarios	**Changes in Transit Revenue Miles, 2022-2040**	**Marginal External Pavement Maintenance Cost (in 2017$/VMT)**	**Additional Pavement Maintenance Cost (2017$)**
	(d)	(e)	(f) = (d) x (e)
BRT	31,693,107	$0.109	$3,453,485
LRT, SC	-24,044,029	$0.109	-$2,619,992

Note:

1. Marginal external pavement maintenance cost due to RTA vehicles comes from **Table 6.25**.
2. Changes in transit revenue miles come from **Table 7.2**. The BRT scenario results in additional Revenue Miles while the LRT and SC scenarios results in avoided Revenue Miles.

Table 7.33 Net Savings/Costs in Pavement Maintenance Resulting from the *New Orleans Future Transit Scenarios*, 2022-2040

New Orleans Future Transit Scenarios	Avoided Pavement Maintenance Cost	Additional Pavement Maintenance Cost	Net Savings (or Costs)
	(a)	**(b)**	(a) – (b)
BRT	$407,373	$3,453,485	**-$3,046,112**
LRT, SC	$407,373	-$2,619,992	**$3,027,365**

Note:

1. Avoided pavement maintenance costs resulting from people using RTA services rather than alternative transportation modes come from **Table 7.20.**
2. Additional/Saved pavement maintenance costs due to additional/Avoided transit revenue miles come from **Table 7.21.**

7.5 Affordable Mobility Benefits

Table 7.34 exhibits the transportation costs borne by transit riders using alternative transportation modes in the absence of the enhanced transit services provided by the *New Orleans Future Transit Scenarios* and **Table 7.35** presents the transit fares paid by transit riders shifting to alternative transportation modes in the absence of the *New Orleans Future Transit Scenario*. As shown in **Table 7.36**, the estimated cumulative expenditure value benefits to be generated by the Build scenario are expected to account for $21.7 million.

Table 7.34 Transportation Costs Borne by Transit Riders using Alternative Transportation Modes in the Absence of NORTA Transit Investments, 2022-2040

	BRT, LRT and SC			
Alternative Transportation Modes	**Distribution of Passenger Miles Traveled (PMT) among Alternative Transportation Modes**	**User Cost Per Mile**		**Transportation Costs Borne by Transit Riders using Alternative Transportation Modes in the Absence of Transit Investments (in 2017$)**
		(in 2015$)	**(in 2017$)**	
	(a)	(b)	(c)	(d) = (b) x (c)
Another Bus	1,681,646	$0.33	$0.34	$578,067
Bicycle	4,429,702	$0.10	$0.10	$457,038
Carpool	4,279,311	$0.29	$0.29	$1,258,336
Drive	7,000,023	$0.57	$0.59	$4,116,728
Driven	25,142,660	$0.29	$0.29	$7,393,225
No Trip	8,134,792	$0.00	$0.00	$0
Taxi	12,044,961	$2.76	$2.85	$34,302,569
Walk	11,115,270	$0.00	$0.00	$0
Total =	**73,828,364**			**$48,105,963**

Note:

1. User costs per mile in 2015$ come from **Tables 6.29** and **6.30.** These values were inflated from 2015 to 2017 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

   User costs per mile come are multiplied by the distribution of PMT among alternative transportation modes (**Table 7.4**) to estimate transportation costs borne by transit riders using alternative transportation modes in the absence of NORTA transit investments.

Table 7.35 Transit Fares paid by Transit Riders Using Alternative Transportation Modes in the Absence of NORTA Transit Investments, 2022-2040

BRT, LRT and SC					
Unlinked Passenger Trips	**Linked Trips**	**Linked Trips Shifting to Other Transportation Modes**	**Average Transit Fare per Rider**		**Transit Fares paid by RTA riders (2017$)**
(a)	(b) = (a) / 1.51	(c) = 89% x (b)	(in 2015$) (d)	(in 2017$) (e)	(f) = (e) x (c)
29,784,633	19,667,215	17,500,179	$1.46	$1.51	**$26,383,712**

Notes:

1. Ridership (Unlinked Passenger Trips) comes from **Table 7.2**.
2. The unlinked to linked trip ratio (i.e., 1.51) comes from **Table 6.2**.
3. The share of RTA riders shifting to alternative transportation modes in the absence of RTA services (i.e., 89 percent) comes from **Table 6.3.**
4. The average RTA fare per linked trip in 2016$ (i.e., $1.46) comes from **Table 6.29**. This fare is inflated from 2015 to 2017 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

Table 7.36 Net Expenditure Value Benefits Resulting from NORTA Transit Investments, 2022-2040

BRT, LRT and SC		
Transportation costs borne by transit riders using alternative transportation modes in the absence of NORTA Transit Investments (in 2017$)	**Transit fares paid Transit Riders using Alternative Transportation Modes in the absence of NORTA Transit Investments (in 2017$)**	**Net Expenditure Value Benefit (in 2017$)**
(a)	(b)	(c) = (a) - (b)
$48,105,963	**$26,383,712**	**$21,722,251**

Notes:

1. Transportation costs borne by transit riders using alternative transportation modes in the absence of NORTA transit investments come from **Table 7.23**.
2. Transit fares paid by transit riders using alternative transportation modes in the absence of NORTA Transit Investments come from **Table 7.24**.

Table 7.37 exhibits the linked foregone work trips and the corresponding foregone annual income without the availability of the *New Orleans Future Transit Scenarios*, respectively. As shown in this table, the estimated cumulative foregone employment benefits to be generated by the Build scenarios are expected to account for $7.1 million (2017$).

Table 7.37 Foregone Income in the Absence of NORTA Transit Investments, 2022-2040

BRT, LRT and SC							
Linked Trips = (a)	= 29,784,633/1.51		= 19,667,215				
Household Income Ranges	**Share of Forgone Work Trips in the Absence of Transit**	**Linked Foregone Work Trips**	**Trips Per Worker =**	**Riders foregoing work trips**	**Riders foregoing work trips who would lose their jobs**	**Estimated Average Annual Income (in 2017$)**	**Estimated Foregone Income (in 2017$)**
	(b)	(c) = (a) x (b)	(d) = 48 x 5 x 2	(e) = (c)/(d)	(f) = 50% x (e)	(g)	(h) = (f) x (g)
Less than $15,000	0.85%	166,772	480	347.44	174	$8,000	$1,389,769
$15,000-$24,999	0.67%	131,035	480	273	136	$21,000	$2,866,398
$25,000-$34,999	0.45%	89,342	480	186	93	$31,000	$2,885,011
$35,000-$49,999	0.18%	35,737	480	74	N/A	$44,000	N/A
$50,000-$74,999	0.18%	35,737	480	74	N/A	$65,000	N/A
$75,000 or more	0.06%	11,912	480	25	N/A	$78,000	N/A
Total =	**2.39%**	**470,536**	480	**980**	**403**		**$7,141,178**

Note:

1. Linked trips = Ridership (from **Table 7.2**) divided by the Unlinked to Linked Trip Ratio (i.e., 1.51).
2. The shares of foregone work trips by household income in the absence of transit service come from **Table 6.32.**
3. To convert linked foregone work trips to number of riders, the analysis assumes a transit rider makes 480 work trips (i.e., 48 weeks per year x 5 days per week x 2 trips per day).
4. This analysis assumes that 50 percent of riders from annual household incomes that make less than $35,000 who forego their work trips would lose their jobs.

The estimated expenditure value and foregone employment benefits resulting from the Build scenarios are translated into Household Spending Change inputs into IMPLAN. The IMPLAN inputs are allocated among Orleans and Jefferson Parishes according to the home locations reported in the RTA ridership survey. This Household Spending Change drives induced impact but not indirect impacts, since there are no subsequent changes in industry production. The induced benefits arising from the direct benefit are modeled using the IMPLAN model, generating estimates of the total economic benefits in terms of jobs, personal income, value added (gross regional product or GRP) and tax revenue. These economic impacts are exhibited in **Tables 7.38**.

Under the *New Orleans Future Transit Scenario*, the RTA affordable mobility benefits are anticipated to support the creation of 200 new jobs which would add $9 million in labor income and generate $15 million in GRP in the region. This additional economic activity would result in $3.2 million in combine federal, state and local tax revenues.

Table 7.38 Economic Impacts (Jobs, Labor Income, GRP and Tax Revenues) Accruing to New Orleans MSA Resulting from the Additional Affordable Mobility Benefits provided by the *New Orleans Future Transit Scenarios*, 2022-2040

BRT, LRT, SC			
Impact Type	**Employment**	**Labor Income (Millions of 2017$)**	**GRP (Millions of 2017$)**
Induced Effect*	200	$9	$15

Tax Revenue			
Tax Revenue Type	**Federal (Millions of 2017$)**	**State (Millions of 2017$)**	**Total (Millions of 2017$)**
Tax on Production and Imports	$0.2	$1.1	$1.3
Social Security Contributions	$0.8	$0.02	$0.9
Personal Income Tax	$0.5	$0.1	$0.6
Corporate Profits and Dividend Taxes	$0.4	$0.02	$0.4
Personal Sales and Property Taxes	N/A	$0.1	$0.1
Total =	**$1.9**	**$1.3**	**$3.2**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note: *Change in household income only drives induced impact. No indirect impacts are generated by this type of activity since there are no changes in industry production.

7.6 Community Impacts

The net savings/costs in safety, i.e., avoided crash costs on other modes resulting from people using new RTA transit services minus additional (or saved) crash costs resulting for new RTA transit services, for the three investment scenarios over the 2022-2040 period are shown in **Table 7.39.** BRT transit investment is expected to increase crash costs by nearly $2.0 million while LRT and SC are expected to save crash costs

by $17.6 million. These benefits have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 7.39 Net Savings in Crash Costs Resulting from NORTA Transit Investments, 2022-2040

BRT	
Item	**Value (in 2017$)**
Avoided Crash Costs on Other Modes Resulting from People using RTA Transit	
Internal Crash Costs	$6,304,613
External Crash Cost	$1,899,883
Total = (a)	**$8,204,497**
Additional Crash Costs Resulting from RTA Transit Services	
Internal Crash Costs (Increase due to increasing PMT) (see Note 1)	$134,773
External Crash Cost (Increase due to increase Revenue Miles) (see Note 2)	$10,007,452
Total = (b)	**$10,142,225**
Net Savings in Crash Costs Resulting from RTA Services (2017$) = (a) - (b)	**-$1,937,728**

LRT, SC	
Item	**Value (in 2017$)**
Avoided Crash Costs on Other Modes Resulting from People using RTA Transit	
Internal Crash Costs	$6,304,613
External Crash Cost	$1,899,883
Total = (a)	**$8,204,497**
Avoided Crash Costs Resulting from RTA Transit Services	
Internal Crash Costs (Decrease due to decreased PMT) (see Note 3)	$923,632
External Crash Cost (Decrease due to decreased Revenue Miles) (see Note 4)	$8,489,377
Total = (b)	**$9,413,010**
Net Savings in Crash Costs Resulting from RTA Services (2017$) = (a) + (b)	**$17,617,506**

Notes:

1. BRT - Based on changes in Passenger Mile Traveled (PMT) resulting from bus, streetcar, paratransit and on-demand services. Ferry PMT was excluded.
2. BRT - Based on changes in Transit Revenue Miles resulting from bus, streetcar, paratransit and on-demand services. Ferry revenue miles was excluded.
3. LRT and SC - Based on changes in Passenger Miles Traveled (PMT) resulting from bus, streetcar, light rail, paratransit and on-demand services. Ferry PMT was excluded.
4. LRT and SC - Based on changes in Transit Revenue Miles resulting from bus, streetcar, light rail, paratransit and on-demand services (excluded ferry). Ferry revenue miles was excluded.

The net savings/costs in GHG emissions, that is, emissions displaced by new RTA transit investments (due to mode shift, congestion relief and compact land-use patterns provided by transit) minus emissions produced (or saved) by new RTA transit investments, for the three investment scenarios over the 2022-

2040 are shown in **Table 7.40**. While the BRT transit investment is anticipated to generate 28 thousand metric tons of CO2e, representing nearly $2.3 million in GHG emission damage costs, the LRT and SCT transit investments are expected to avoid 125 thousand metric tons of CO2e, representing nearly $4.3 million saved in GHG emission damages. These benefits have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 7.40 Net Savings/Costs in Greenhouse Gas Emissions Resulting from NORTA Transit Investments, 2022-2040

BRT		
Item	**Metric tons CO_2E**	**Value (in 2017$)**
GHG Emissions displaced by Transit Services due to Mode Shift, Congestion Relief and Compact Land-Use Patterns = (a)	**54,908**	**$1,881,914**
- Mode Shift	10,936	$374,806
- Congestion Relief	1,740	$59,640
- Compact Land-Use Patterns	42,232	$1,447,469
GHG Emissions produced due to Increased RTA Revenue Miles (see Note 1) = (b)	**83,162**	**$2,850,282**
Additional Net GHG Emission Damage Costs = (a) – (b)	**-28,254**	**-$968,367**

LRT, SC		
Item	**Metric tons CO_2E**	**Value (in 2017$)**
GHG Emissions displaced by Transit Services due to Mode Shift, Congestion Relief and Compact Land-Use Patterns = (a)	54,152	**$1,881,914**
- Mode Shift	10,936	$374,806
- Congestion Relief	1,740	$59,640
- Compact Land-Use Patterns	41,477	$1,447,469
GHG Emissions saved due to Reduced RTA Revenue Miles (see Note 2) = (b)	**70,546**	**$2,417,910**
Additional GHG Emission Damage Cost Savings = (a) + (b)	**124,699**	**$4,299,824**

Notes:

1. BRT - Based on changes in Transit Revenue Miles resulting from new bus, streetcar, paratransit and on-demand services. Ferry revenue miles was excluded.
2. LRT and SC - Based on changes in Transit Revenue Miles resulting from new bus, streetcar, light rail, paratransit and on-demand services. Ferry revenue miles was excluded.
3. This analysis uses the GHG emissions rates for diesel buses shown in **Table 6.39**.
4. This analysis uses the midrange damage cost estimate from the National Research Council (NRC) study of $30 per ton of CO2 equivalent (CO2e) (in 2009$). This value is inflated from 2009 to 2017 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

8.0 Other Transit Benefits

In addition to the benefits and economic impacts addressed in previous section, there are other benefits that frequently arise from public transit. These benefits are difficult to reliably quantify, but need to be considered as part of the transit investment decision-making. Following is an overview of some of the more common hard to quantify transit benefits.

8.1 Livability Benefits

Although the concept of livability is new and lacks definition and focus, it is considered as an externality effect of transportation investments. Generally, livability is premised on neighborhood livability including noise, land-use, walking environment, and social capital. As a result of inadequate definition, various livability studies have applied varied metrics (**Table 8.1**) for livability evaluation.

Table 8.1 Community Livability Benefit and Metrics

Benefits	Metrics
Amenities/Aesthetics	Property Values
Community Cohesion	Social Capital
Public Health	Walkability, Emissions

Property Values

Numerous studies have documented that proximity to transit facilities increases the value of nearby residential, commercial, and retail properties. The studies show that access to transit, as a positive amenity, will be reflected in higher commercial and residential property values. For example:

- Property values around Dallas Area Rapid Transit (DART) stations are on average 25 percent higher than similar real estate elsewhere in area. The area also enjoys a 30 percent premium for retail uses.[6]

- The Houston light-rail transit (LRT) line (METRORail) began service in the beginning of 2004. A study of 2006 to 2007 property sales data for homes located in traffic analysis zones (TAZs) near the Houston METRORail line found that the presence of light-rail service had a positive impact on home values for properties up to three miles away from light-rail stations. Increases in property values were greatest for homes within one-quarter mile of a station. In the same study area, proximity to a bus stop was found to have a negative relationship to residential property values.

- More intensively used transit systems have a greater impact on property values, as demonstrated by a study of five rail systems in California. The study showed that the transit systems exhibiting the strongest correlations between property values and proximity to transit stations were the systems

[6] Freeman, Gregory and Myasnik Poghosyan. *Construction Impact of LA Metro's Proposed Transportation Projects*, 2009-2039. Los Angeles, California: Los Angeles County Economic Development Corporation, 2008.

(BART, San Diego Trolley) with the highest rates of ridership and with the most service to locations within their respective regions. [7]

Increased property value in the wake of transit investment is one of the approaches employed to measure livability benefits. In this approach, travel efficiency gains and accessibility are captured in higher property values and rents. Generally, properties closest to transit stations experience the highest appreciation in value and it abates as the distance from the transit station increases. Care must be taken when quantifying the economic impact of transit so as to not double-count the impact by including both travel time benefits and property value changes.

Walkability

Residential and commercial property developments at transit stations and along corridor create high population density in these areas. High population density is a function of retail sales, therefore, retail outlets are attracted to these areas to provide access to essential consumer goods needed to main quality of life. Proximity to housing, jobs, recreational centers, and retail outlets promotes walking among residents, healthier environment (less emissions) which in turn improves public health of residents. Examples of public transportation health benefits related to walking are outlined below.

- A study to track walking activity of train commuters found that rail users averaged 30% more walking, more frequently reported walking for 10 minutes or more, and were four times more likely to achieve the 10,000 daily steps, as recommended for fitness and health, than auto commuters.[8]

- A travel survey in Atlanta, Georgia, found that transit users are more likely to walk longer distances and meet recommended physical activity targets by walking than non-transit users.[9]

Improvement in walkability also results in less dependency on personal vehicles and lower levels of stress and depression. Bailey (2007) suggests that residents of households in transit oriented developments drive 45 percent less than residents of automobile-dependent neighborhoods.[10] Many commuters find riding high quality public transit less stressful than driving.[11] Increased neighborhood walkability has been also associated with reduced symptoms of depression.[12] These health benefits are difficult to quantify but potentially significant.

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[7] Booz Allen & Hamilton. Impacts of Rail Transit on Property Values, 1999.

[8] Richard E. Wener and Gary W. Evans, (2007), "A Morning Stroll: Levels of Physical Activity in Car and Mass Transit Commuting," *Environment and Behavior*, Vol. 39, No. 1, 62-74

[9] Ugo Lachapelle and Lawrence D. Frank (2008), "Mode Of Transport, Employer-Sponsored Public Transit Pass, And Physical Activity," *Journal Of Public Health Policy*

[10] Linda Bailey (2007), *Public Transportation and Petroleum Savings in the U.S.: Reducing Dependence on Oil*, ICF International for the American Public Transportation Association.

[11] Richard E. Wener and Gary W. Evans, (2007), "A Morning Stroll: Levels of Physical Activity in Car and Mass Transit Commuting," *Environment and Behavior*, Vol. 39, No. 1, 62-74

[12] Ethan M. Berke, Laura M. Gottlieb, Anne Vernez Moudon, Eric B. Larson (2007), "Protective Association Between Neighborhood Walkability and Depression in Older Men," *Journal of the American Geriatrics Society*, Vol. 55, No 4, pp. 526–533.

8.2 Agglomeration Benefits

In general, greater densities at transit stations generate a larger market for employees, residents, or customers that can easily access transit. Similarly, high transit ridership generates an incentive for businesses, services, and residents to locate at greater densities near stations. For instance:

- Amazon, the largest on-line retailer in the world, located its new headquarters facility on a site in Seattle served by light rail where people can work in an urban environment and spend less time in their cars. The location was selected, in part, because it fulfilled Amazon's desire to reduce the number of single-occupancy vehicles coming into Seattle.[13]

- In 2003, BellSouth Corporation, a Fortune 100 communications Services Company headquartered in Atlanta, consolidated its suburban offices into three downtown locations convenient to the public transportation system.[14]

- Charlotte won major employers such as GMAC Financial Services, in part because of its investment in light rail.[15]

The ability to stimulate concentrations of employment near transit stations and reverse trends of job sprawl depends in part on leveraging the natural propensity for certain industries to agglomerate, or concentrate, near transit.[16] Some industries may benefit from agglomeration near transit because they can take advantage of access to a larger labor pool. This may include not only the transit-dependent workers, but also, the transit-dependent-by-choice young workers seeking urban environments (i.e., an urban fabric that encourages interaction) that transit helps stimulate.[9] By accessing a larger, higher quality labor pool, employers may be able to attract and retain higher quality workers, and increase productivity and profitability. For instance, a study conducted by the Federal Transit Administration (FTA) shows a positive correlation between access to high quality transit services and labor productivity.[17]

Some public transportation investments may increase economic productivity by enabling the growth and densification of cities, downtowns or industrial clusters. Understanding the potential for such agglomeration impacts could be useful in allocating funding to maximize the benefits of proposed projects. **Table 8.2** displays some of the potential sources for agglomeration impacts of public transit projects.

[13] Site Selection, "Amazonian: Huge New HQ, 3,000 More Employees," March 2008.

[14] Longman, Phillip J., "American Gridlock," U.S. News & World Report, May 28, 2001.

[15] Chapman, Dan. "Rivalry to be Economic King of the South Heats Up." Atlanta Journal Constitution. 10 May, 2009.

[16] Center for Transit Oriented Development (CTOD), *Transit and Regional Economic Development*, May 2011.

[17] Lewis, David, Khalid Bekka et al. *Transit Benefits 2000 Working Papers: A Public Choice Policy Analysis*. Federal Transit Administration Office of Policy Development, 2000

Table 8.2 Hypothesized Agglomerations Effects of Mass Transit Investments

Agglomeration mechanism	Likely facilitated by some public transport projects?
Knowledge spillovers (skilled labor learning from each other; quick dissemination of innovative practices)	Indirectly, (a) by facilitating local and walk-accessible firm concentrations, (b) by increasing speed of business travel (but only where public transport is used for business travel and/or where public transport reduces road congestion), and (c) casual interactions that may occur while commuting by public transport, either in stations or on vehicles.
Labor market pooling (enabling better matching of workers to jobs; less turnover)	Yes, by increasing size of the labor pool within commuting distance
Reduced cost of negotiations (enabling vertical disaggregation and supplier specialization)	Indirectly, by facilitating local and walk-accessible firm concentrations
Infrastructure sharing (closely related to economies of scale in transportation provision)	Yes – there is shared access to public transport infrastructure, but this particular mechanism of agglomeration is already included in FTA guidelines by counting travel times along with anticipated densification near stops.
Amenity sharing (specialized public and private goods)	Yes – but this is a consumer-side benefit, and is hard to measure except very indirectly, via land prices

Source: TCRP H-39, M*ethodology for Determining the Economic Development Impacts of Transit Projects*, 2012

8.3 Smart Growth

Closely related to agglomeration benefits are the public sector benefits that arise from more densely concentrated development. The Smart Growth Twin Cities Regional Development Options Report[18] estimated that regional development models that encourage greater density and walkability could result in significant savings in public infrastructure costs of between $2.5 and $3 billion over a 30-year period. Additional impacts that were attributed to a denser development model include those already captured quantitatively as part of this economic analysis such as increased access to transit ridership and better air quality.

[18] Metropolitan Council (2002), *Smart Growth Twin Cities Regional Development Options Report*, prepared by Cambridge Systematics with Calthorpe Associates.

9.0 Summary of Findings

9.1 Direct Economic Benefits

Table 9-1 summarizes the direct benefits resulting from RTA's current operations and services today, including expenditures in capital and operations, system performance, as well as RTA contributions to roadway congestion relief, cost of maintaining the roadway infrastructure in a state of good repair, affordable mobility, air quality and traffic safety. Direct benefits generated by RTA's current operations and services today represents $171 million (in 2017$).

Table 9.2 presents the combined direct enterprise benefits under each transit scenario resulting from existing and future NORTA employee wages and benefits, retirement benefits, and capital and operations expenditures over the 2018-2040 time frame. Among the three scenarios, the LRT scenario is anticipated to yield the highest enterprise benefits with $14.4 million (in 2017$) while the BRT scenario is expected to yield the lowest enterprise benefits with $5.5 million (in 2017$).

Tables 9.3 and **9.4** summarize the additional direct economic benefits resulting from the services provided by the proposed transit investments over the 2022-2040 period. These quantitative benefits correspond to the additional cumulative direct benefits to be generated by the Build Condition relative to the No Build (Baseline) condition from the opening year 2022 to the horizon year 2040. The changes in travel delays, revenue miles, passenger miles traveled (PMT) and ridership between the Build and No Build Conditions serve as the basis for estimating these additional direct benefits. This assessment involves the estimation of the potential transportation efficiency gains accruing to RTA transit riders and highway users in the area served by RTA, the impact of RTA services to the state of good repair of the highway infrastructure, the affordable mobility benefits, and the expected community benefits in terms of emission cost savings and improved traffic safety

Table 9.5 presents the combined total direct benefits under each transit scenario resulting from existing and new services over the 2018-2040 time frame. The quantitative direct benefits include the benefits under the following categories: enterprise effects, congestion relief, state of good repair of the highway infrastructure, affordable mobility, environmental emissions and traffic safety. Among the three scenarios, the LRT scenario is anticipated to yield the highest direct benefits (nearly $14.5 million in 2017$) while the BRT scenario is expected to yield the lowest direct benefits (nearly $6.6 million in 2017$).

Table 9.1 Annual Direct Economic Benefits of NORTA's Current Operations and Services, 2017

Benefit Category	Direct Benefits	Value (in Millions of 2017
Enterprise Effects	695 Full-Time Employees and $12.6 Million paid in Wages and Benefits	**$106.1**
	• 691 in State Employees, $12.5 Million in Wages & Benefits	
	○ 674 Employees in New Orleans Urban Area, $12.2 Million in Wages & Benefits	
	○ 21 Employees Outside of New Orleans Urban Area, $0.3 Million in Wages & Benefits	
	• 4 out-of-state employees, $0.1 Million in Wages and Benefits	
	$3.0 Million paid in retirement benefits	
	$83.8 Million paid in non-payroll operating expenditures	
	$3.4 Million in Capital Spending	
Congestion Relief	1.4 Million Hours Saved, Valued at $34.5 Million	**$36.6**
	• Auto Commute Trips Saved $3.4 Million	
	• Auto Business Trips Saved $0.9 Million	
	• Auto 'All Other Purpose' Trips Saved $21.3 Million	
	• Trucks Saved $9.8 Million	
State of Good Repair of the Highway Infrastructure	$0.2 Million in Additional Pavement Maintenance Cost	**-$0.3**
Affordable Mobility	$15.0 Million in transportation cost savings for transit riders	**$24.3**
	$8.4 Million in Income for Transit Dependent Riders	
Environmental Emissions	$0.82 Million in Greenhouse Gas (GHG) Emission Damage Cost Savings	**$0.8**
Traffic Safety	$3.2 Million in Traffic Crash Cost Savings	**$3.3**
	Total =	**$170.8**

Note:

1. The direct economic benefits are inflated from 2015 to 2017 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

Table 9.2 Combined Direct Enterprise Benefits to be generated by the Proposed Transit Investments, 2018-2040

Transit Investment	Direct Benefits	Value (in Millions of 2017$)
BRT	$454.8 Million in RTA Employee Wages and Benefits	**$6,538**
	$302.9 Million in RTA Retirement Benefits	
	$846 Million in Capital Expenditures	
	$4,934 Million in Operating Expenditures	
SC	$509 Million in RTA Employee Wages and Benefits	**$9,941**
	$339 Million in RTA Retirement Benefits	
	$3,192 Million in Capital Expenditures	
	$5,900 Million in Operating Expenditures	
LRT	$478 Million in RTA Employee Wages and Benefits	**$14,391**
	$317 Million in RTA Retirement Benefits	
	$8,304 Million in Capital Expenditures	
	$5,295 Million in Operating Expenditures	

Note:

1. This table presents the combined direct enterprise benefits under each transit scenario resulting from existing and future NORTA employee wages and benefits, retirement benefits, and capital and operations expenditures over the 2018-2040 time frame.

Table 9.3 Additional Direct Economic Benefits Resulting from BRT Implementation, 2022-2040

Benefit Category	Direct Benefits	Value (in Millions of 2017$)
Congestion Relief	Over 400,000 Hours Saved, Valued at $7.9 Million	$7.9
	- Auto Commute Trips Saved ~ $0.5 Million	
	- Auto Business Trips Saved ~ $0.2 Million	
	- Auto "All Other Purpose" Trips Saved $5.1 Million	
	- Trucks Saved $2.1 Million	
State of Good Repair (SOGR) of the Highway Infrastructure	$3.0 Million in Additional Pavement Maintenance Cost	-$3.0
Affordable Mobility	$21.7 Million in transportation cost savings for transit riders	$21.7
	$7.1 Million in Income for Transit Dependent Riders	$7.1
Environmental Emissions	$1.0 Million in Additional Greenhouse Gas (GHG) Emission Damage Costs	-$1.0
Traffic Safety	$1.9 Million in Additional Traffic Crash Costs	-$1.9
Total =		**$30.8**

Note:

1. This table represents the direct economic benefits generated by the Build Condition relative to the No Build (Baseline) Condition from the opening year 2020 of the BRT Scenario to the horizon year 2040.

Table 9.4 Additional Direct Economic Benefits Resulting from LRT/SC Implementation, 2022-2040

Benefit Category	Direct Benefits	Value (in Millions of 2017$)
Congestion Relief	Over 400,000 Hours Saved, Valued at $7.9 Million	$7.9
	- Auto Commute Trips Saved ~ $0.5 Million	
	- Auto Business Trips Saved ~ $0.2 Million	
	- Auto "All Other Purpose" Trips Saved $5.1 Million	
	- Trucks Saved $2.1 Million	
State of Good Repair (SOGR) of the Highway Infrastructure	$3.0 Million in Additional Pavement Maintenance Cost	$3.0
***Affordable Mobility**	$21.7 Million in transportation cost savings for transit riders	$21.7
	$7.1 Million in Income for Transit Dependent Riders	$7.1
Environmental Emissions	$4.3 Million in Additional Greenhouse Gas (GHG) Emission Damage Costs	$4.3
Traffic Safety	$17.6 Million in Additional Traffic Crash Costs	$17.6
Total =		**$61.7**

Note:

Note:

1. This table represents the direct economic benefits generated by the Build Condition relative to the No Build (Baseline) Condition from the opening year 2020 of the LRT (or SC) Scenario to the horizon year 2040.

Table 9.5 Combined Direct Economic Benefits to be generated by the Proposed Transit Investments, 2018-2040

Benefit Category	BRT (Millions of 2017$)	SC (Millions of 2017$)	LRT (Millions of 2017$)
Enterprise Effects	$6,538	$9,941	$14,391
Congestion Relief	$44	$44	$44
State of Good Repair (SOGR) of the Highway Infrastructure	-$3	$3	$3
Affordable Mobility	$53	$53	$53
Environmental Emissions	-$0.1	$5.1	$5
Traffic Safety	$1	$21	$21
Total =	**$6,633**	**$10,067**	**$14,518**

Notes:

1. These values represented the combined direct economic benefits generated by NORTA's baseline operations and services (shown in **Table 9.1**) plus the additional benefits to be generated by the proposed transit investments (shown in **Tables 9.2, 9.3** and **9.4**).
2. It is assumed that the direct economic benefits of NORTA's baseline operations and services estimated based on 2015 data are a good representation of the direct economic benefits generated by NORTA today. These direct economic benefits are inflated from 2015 to 2017 dollars using the Consumer Price Index for all urban consumers (CPI-U) in the South urban areas.

9.2 Total Economic Benefits

Table 9-6 summarizes the total annual economic benefits (including direct, indirect, and induced benefits) generated by RTA operations and services today. **Table 9-7**, **9-8** and **9-9** summarize the combined total (direct, indirect and induced) economic impacts to be generated by existing and new services under the three scenarios (i.e., BRT, LRT and SC scenarios) over the analysis period. Among the three scenarios, LRT is expected to generate the greatest economic impact, that is, over 153,000 new jobs, around $9.3 billion (in 2017$) in labor income, $12.8 billion (in 2017$) in value added and $2.5 billion (in 2017$) in combined federal, state and local taxes. In contrast, BRT is expected to generate the smallest economic impacts, accounting for 70,000 new jobs, $4.3 billion (in 2017$) in labor income, $6.0 billion (in 2017$) in value added and $1.2 billion (in 2017$) in combined federal, state and local taxes.

Table 9.6 Summary of Total Economic Benefits of RTA's Current Operations and Services, 2017

Benefit Category	Jobs	Labor Income (Millions of 2015$)	GRP (Millions of 2015$)
Enterprise Effects (**Table 6.17**)	2,015	$74.8	$116.2
Congestion Relief (**Table 6.24**)	70	$3.5	$5.9
Expenditure Value Benefits (**Table 6.33**)	100	$4.4	$7.8
Foregone Employment Benefit (**Table 6.34**)	65	$2.8	$4.9
Total =	**2,250**	**$85.5**	**$134.7**

Benefit Category	Tax Revenue (Millions of 2015$)		
	Federal	State	Total
Enterprise Effects (**Table 6.17**)	$15.4	$6.3	$21.7
Congestion Relief (**Table 6.24**)	$0.8	$0.6	$1.4
Expenditure Value Benefits (**Table 6.33**)	$1.0	$0.7	$1.7
Foregone Employment Benefit (**Table 6.34**)	$0.6	$0.4	$1.0
Total =	**$17.8**	**$7.9**	**$25.7**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. The contribution of NORTA to the state of good repair of the highway infrastructure as well as to the air quality and road safety have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 9.7 Combined Total (Direct, Indirect and Induced) Economic Benefits to be generated by the Proposed BRT Scenario, 2018-2040

Benefit Category	Jobs	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Enterprise Effects	69,550	$4,280	$5,904
Congestion Relief	85	$4	$7
Affordable Mobility Benefits	365	$16	$28
Total =	**70,000**	**$4,301**	**$5,939**

Benefit Category	Tax Revenue (Millions of 2017$)		
	Federal	**State**	**Total**
Enterprise Effects	$805	$352	$1,156
Congestion Relief	$1	$1	$2
Affordable Mobility Benefits	$4	$2	$6
Total =	**$810**	**$355**	**$1,164**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. NORTA contributions to the state of good repair of the highway infrastructure as well as to the air quality and road safety have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 9.8 Combined Total (Direct, Indirect and Induced) Economic Benefits to be generated by the Proposed LRT Scenario, 2018-2040

Benefit Category	Jobs	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Enterprise Effects	152,500	$9,301	$12,762
Congestion Relief	85	$4	$7
Affordable Mobility Benefits	365	$16	$28
Total =	**152,950**	**$9,322**	**$12,797**

Benefit Category	Tax Revenue (Millions of 2017$)		
	Federal	**State**	**Total**
Enterprise Effects	$1,763	$755	$2,518
Congestion Relief	$1	$1	$2
Affordable Mobility Benefits	$4	$2	$6
Total =	**$1,768**	**$758**	**$2,526**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. NORTA contributions to the state of good repair of the highway infrastructure as well as to the air quality and road safety have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

Table 9.9 Combined Total (Direct, Indirect and Induced) Economic Benefits to be generated by the SC Scenario, 2018-2040

Benefit Category	Jobs	Labor Income (Millions of 2017$)	GRP (Millions of 2017$)
Enterprise Effects	106,710	$6,715	$9,147
Congestion Relief	85	$4	$7
Affordable Mobility Benefits	365	$16	$28
Total =	**107,160**	**$6,736**	**$9,182**

Benefit Category	Tax Revenue (Millions of 2017$)		
	Federal	**State**	**Total**
Enterprise Effects	$1,263	$539	$1,802
Congestion Relief	$1	$1	$2
Affordable Mobility Benefits	$4	$2	$6
Total =	**$1,268**	**$542**	**$1,810**

Source: Outputs from the IMPLAN economic model for New Orleans MSA.

Note:

1. NORTA contributions to the state of good repair of the highway infrastructure as well as to the air quality and road safety have no a multiplier effect in the regional economy and therefore, they are not input into the IMPLAN economic model.

9.3 Key Findings

RTA's operations and transit services provide a range of benefits, from a better utilization of existing infrastructure and capacity to a platform to support economic development and improve the quality of life of the New Orleans urban area. The presence of public transit in the region enhances the overall transportation system, contributing to the economy through reduction in travel and vehicle ownership costs for transit users and those switching from auto to transit; decrease in traffic congestion for auto users and commercial vehicles which, in turn, has the potential to lower operations costs for business travelers and industries transporting commodities in the region; and improved business productivity gained from access to broader labor markets with more diverse skills enabled by expanded transit services.

Economy

- The annual direct benefits generated by NORTA transit services today on New Orleans MSA support the creation of nearly 2,250 new jobs, which adds $88 million (in 2017$) in labor income, $139 million (in 2017$) in GRP (or value added), and nearly $27 million (in 2017$) in federal, state and local tax revenues.

- The proposed NORTA transit investments are expected to support the region's economic growth and development over the long term. The LRT scenario is expected to support over 153,000 new jobs, around $9.3 billion in labor income, $12.8 billion in GRP and $2.5 billion in federal, state and local government revenues over the 2018-2040 period. The SCT scenario is anticipated to support 107,000 new jobs, $6.7 billion in labor income, $9.2 billion in GRP and $1.8 billion in federal, state and local government revenues over the 2018-2040 period. The BRT scenario is expected to support 70,000 new jobs, $4.3 billion in labor income, $6.0 billion in GRP and $1.2 billion in federal, state and local government revenues over the 2018-2040 period.

- The LRT scenario is anticipated to generate the greatest direct economic benefits and consequently, the greatest regional economic impacts.

- The proposed NORTA transit investments are estimated to provide substantial economic impacts due to its enterprise effects with generate, over the 2018-2040 period, a cumulative increase of between 69,550 jobs and $4.3 billion (in 2017$) in labor income (under the BRT Scenario) and 152,500 jobs and $9.3 billion (in 2017$) in labor income (under the LRT Scenario), including an additional increase of between $5.8 billion (in 2017$) in GRP and $1.2 billion (in 2017$) in tax revenue (under the BRT Scenario) and $12.6 billion (in 2017$) in GRP and $2.5 billion (in 2017$) in tax revenue (under the LRT Scenario).

- The expansion of NORTA transit services will allow the New Orleans' economy to grow beyond what the local road network will support. RTA's operations and services are essential to connecting people to jobs, particularly for low-income households, young people with no access to a car, seniors, and the disabled. The benefits of concentrating employment near transit accrue to both

employers and employees. RTA transit may allow firm access to a wider labor pool while the workers in that labor pool have enhanced access to employment. This is especially important for lower-income workers for whom automobile ownership may be a significant economic hardship. Transit also allows for pedestrian-friendly environments and urban amenities that help attract and retain employees.

Highway User Mobility and Reliability

- NORTA's current operations and services contribute to highway reliability by saving highway users 1.4 million hours in travel delay, valued at $36.6 million (in 2017$). *The New Orleans Future Transit Scenarios* are anticipated to avoid highway users over 1.8 million hours in travel delays, valued at $44 million (in 2017$). This is a conservative estimate given the limited data available to conduct this analysis which could be enhanced by examining the reduction in vehicle hours traveled under the Build Scenario provided by the regional travel demand model.

- NORTA's current operations and services improve highway mobility by saving over 28 million in vehicle miles traveled on alternative transportation modes. *The New Orleans Future Transit Scenarios* are anticipated to save 56 million in vehicle miles traveled by avoiding riders shifting to alternative transportation modes in the absence of transit.

Affordable Mobility

- NORTA's current operations and services provide $15.6 million (in 2017$) in transportation cost savings for transit riders and $8.7 million (in 2017$) in income for transit dependent riders.

- *The New Orleans Future Transit Scenarios* are expected to provide an affordable alternative to driving, especially for low-income riders commuting to work by transit. Income generated by low-income riders who are transit dependent is estimated to account for $15.8 million (in 2017$). RTA transit services would also provide transportation cost savings for transit riders, valued at $37.3 million (in 2017$). These affordable mobility benefits will allow these individuals to reallocate their income for expenditures on other goods and services, and provide them greater access to employment opportunities.

Environmental Sustainability and Community

- By removing private passenger vehicles from roadways and reducing passenger cars trips, RTA services can lower the costs associated with air pollutants, generating environmental benefits in the region. NORTA transit services also play an important role in supporting land use patterns that reduce vehicle travel and public policy regarding air quality, carbon emissions and energy use.

- Greenhouse gas (GHG) emissions displaced by RTA transit services reported in this analysis capture the GHG reductions due to transportation mode shift, congestion relief and compact land

use patterns. Contribution of NORTA's current operations and services to environmental sustainability represents 24,700 metric tons of GHG emissions, valued at $0.8 million (in 2017$). *The LRT and SC scenarios are* anticipated to avoid 145,000 metric tons of GHG emissions, valued at $5 million (in 2017$). In contrast, the BRT scenario is expected to add 3,500 metric tons of GHG emissions, valued at $120,000 (in 2017$).

- NORTA's current operations and services save $3.3 million (in 2017$) in traffic safety. *The New Orleans Future Transit Scenarios* are anticipated to continue enhancing safety by saving between $1.0 million (in 2017$) under the BRT scenario and $21 million (in 2017$) under the LR or SC scenarios in traffic crashes.

Appendix A. New Orleans MSA IMPLAN Model

The IMPLAN economic model for New Orleans Metropolitan Statistical Area (MSA) are used to estimate the direct, indirect, and induced effects arising from the public transit services provided by RTA today and the expected benefits that would come from future services based on planned investments.

The economic data for IMPLAN includes 536 industry sectors. IMPLAN Industry sectors are classified on the basis of the primary commodity or service produced. Corresponding data sets are also produced for each parish within New Orleans MSA, allowing analyses at the parish level and for geographic aggregations such as clusters of contiguous parishes.

The model applies multiplier effects to changes in final demand for each industry within the defined economic area, attributable to a change in expenditures in one or more industries. Multipliers estimate three components of total change in final demand within the defined area:

- **Direct impacts**: changes within the affected industry
- **Indirect impacts**: industry-to-industry interactions in response to altered demands of the directly impacted industry
- **Induced effects**: changes in household spending as total income and population adjust due to a direct industry impacts

The economic impacts, reported in terms of employment, labor income, gross regional product (GRP) and tax revenue, are defined as follows:

- **Employment** is the estimate of the number of jobs, full-time plus part-time, by place of work (full-time and part-time jobs are given equal weight) generated by the investment.
- **Labor Income** is a measure of wages and benefits associated with the additional employment generated by the investment.
- **Gross Regional Product (GRP)** also referred to as “value added” (economic output less intermediate inputs) captures the additional value created in the production process which includes employee compensation (labor income), proprietor income (i.e., payments received by self-employed individuals as income), other income types, and indirect business taxes.
- **Tax Revenue** is the increase in property and sales tax revenue for the local government, as well as changes in income tax revenues as and taxes on production and imports for the federal and state government, that are realized when local resident and business activity changes.