

Economic Impact Study of NJ TRANSIT's Five-Year Capital Plan

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1. Introduction

1.1. Purpose of Report

The New Jersey Transit Corporation (NJ TRANSIT) is a significant economic engine for the state of New Jersey, producing direct and indirect effects on the state's economic activity. As the largest statewide public transit system in the United States, NJ TRANSIT is a large-scale purchaser of goods and services and an investor in the development and maintenance of its facilities and infrastructure. NJ TRANSIT's expenditures provide the safe, reliable and cost-effective transportation service that catalyzes economic activity throughout the state.

New Jersey's national and international competitiveness depends on well-functioning infrastructure, including public transportation, which can be transformative as it relates to productivity, quality of life, and future growth and prosperity. Historically, infrastructure funding gaps have inhibited the ability of public transit agencies to bring their systems into a state of good repair. NJ TRANSIT proposed its first 5-year needs-based Capital Plan in 2020 to allocate funds to address its state-of-good-repair needs. This multi-billion dollar program would generate significant direct and spillover impacts within the New Jersey economy creating jobs and economic activity throughout the state. NJ TRANSIT has commissioned Rutgers CAIT in collaboration with Econsult Solutions, Inc., to estimate the level of employment and economic activity supported by its new proposed Capital Plan. This report quantifies the employment and economic activity that would be supported by the investments, using an industry-standard modeling framework.

In addition to the direct and spillover employment and economic activity generated by capital investments, the resultant improvement in the transit network would have a wide range of enduring impacts on New Jersey's productivity and quality of life. These "catalytic" economic impacts would improve the State's competitiveness and its economic growth trajectory, and deliver ongoing societal benefits to public health, the environment, and the resiliency and efficiency of the transportation network. These catalytic benefits are enumerated but are not directly quantified in this report.

1.2. Report Methodology

NJ TRANSIT's investments in transportation improvements support significant employment and economic activity in New Jersey. The Capital Plan would involve significant expenditures in purchasing and labor costs on projects throughout the State of New Jersey. These investments would create upfront (one-time) economic activity for design, construction, and procurement of materials and supplies. This direct activity in turn would have indirect (supply chain) and induced (labor impact) impacts within the New Jersey economy. These spillover impacts mean that industries like construction and engineering that directly execute capital projects are not the only sectors that see economic benefits.

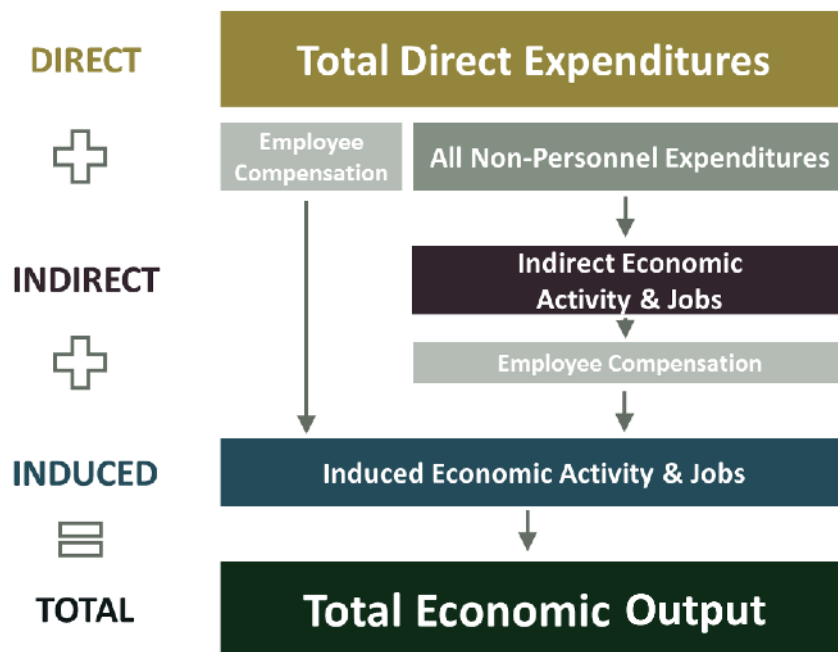
Economic impact estimates are generated by utilizing input-output models to translate an initial amount of direct economic activity into the total amount of activity that it supports, which includes multiple waves of spillover impacts generated by NJ TRANSIT's spending on goods and services as well as spending of labor income by employees. The economic impacts from these expenditures are modeled using IMPLAN, an industry standard input-output model software program. Such models are designed to estimate two sets of spillover impacts from organizational expenditures:

- The **indirect effect**, which measures the multiplier effect from the purchase of goods and services from regional vendors (i.e. supply chain impacts); and
- The **induced effect**, which measures the multiplier effect from the spending of labor income by employees within a particular geography (i.e. labor income impacts).

The total output associated with the investments in NJ TRANSIT's Capital Plan is the sum of its own direct footprint (in terms of project construction and operations upon completion), plus the indirect and induced effects generated by that direct footprint (see Figure 1.1 for input-output model methodology).

NJ TRANSIT's capital investments would also improve the productivity of the state's economy and the quality of life for its residents, generating catalytic impacts for the trajectory of future job growth and economic activity in New Jersey. Transit investments also have impacts for environmental sustainability, public health, and equity of access to opportunity. These catalytic impacts are the subject of Section 3 of this report, which describes the documented range of long-term benefits from public investments categorically, but does not quantify the catalytic benefits associated with NJ TRANSIT's Capital Plan.

Figure 1.1: Input-Output Model Methodology



Source: Econsult Solutions, Inc.

1.3. Report Outline

The remainder of the report is organized as follows:

- *Section 2* summarizes the proposed project costs in NJ TRANSIT's Capital Plan by project type and over time, and describes the economic outputs from projects.
- *Section 3* provides an overview of long-term economic, quality of life, and societal benefits that are unlocked by investment in public transit.
- *Appendix A – Economic Modeling Assumptions* outlines the assumptions used to calculate the upfront impact from capital investment and the annual impact from operations.
- *Appendix B – Economic and Fiscal Impact Modeling* explains the detailed approach and methodology utilized to quantify the economic and fiscal impacts described throughout the report.
- *Appendix C – Economic Outputs by Proposed Capital Project*

2. Economic Impacts of NJ TRANSIT's Capital Plan

NJ TRANSIT is New Jersey's public transportation corporation and the third largest provider of bus, rail, and light rail transit in the U.S., covering a service area of 5,325 square miles.¹ NJ TRANSIT's Capital Plan, which includes funding for rail improvements, station upgrades, bridge renovations, and fleet management and procurement, among others, conceptualizes a strong, efficient transit system and highlights the need for multi-year, steady funding.

This section describes the employment and economic activity supported by investments made as a part of the NJ TRANSIT's Capital Plan. The more than 100 projects included in the Plan are projected to cost approximately \$37.5 billion.² Most of these investments are proposed to occur within the next five to ten years, with some having a longer time frame to reach completion. **During the entire period, direct capital investments enumerated in the plan would generate an estimated \$54.9 billion in economic output in New Jersey, supporting 245,000 job-years of direct, indirect, and induced jobs (full-time employment, FTE)³ and providing \$15 billion in employee compensation in a variety of sectors.⁴**

The impacts of the Capital Plan would go beyond this initial infusion in economic activity. It would generate significant catalytic impacts, including increased economic competitiveness, enhanced quality of life, and greater resiliency. These impacts are further described in Section 3.

2.1. About NJ TRANSIT's Capital Plan

The proposed plan is NJ TRANSIT's first 5-year Capital Plan and first needs-based capital program that is not constrained by available funds. Prior to this, NJ TRANSIT had been planning capital improvement work on a year-to-year basis, submitting to the state legislature annual reports of active projects and working within their available budget. This Plan instead acts as a planning exercise derived from a 10-year strategic plan and envisions the projects necessary to meet the expectations of transit riders and to assure that New Jersey has a first-class transit system.⁵

The projects included in NJ TRANSIT's Capital Plan span a 24-year period, with project time frames ranging from one year to twenty-four years. Project types include the construction of new stations or station upgrades, fleet procurement, rail improvements, power distribution or substation upgrades, Bus Rapid Transit (BRT) systems, and other infrastructure improvements like bridge upgrades. This is the first needs-based Capital Plan of NJ TRANSIT, identifying the investments needed to meet organizational

¹ NJ TRANSIT (2020). About Us. Retrieved May 14, 2020 from <https://www.njtransit.com/about/about-us>.

² All analysis in this report has been completed in 2020 dollars. Project costs reflect anticipated future expenditures starting in FY 2021, excluding expenditures that have already taken place prior to this period.

³ The number of jobs is expressed as job-years for multi-year employment, equivalent to a single year of full-time employment.

⁴ The \$14.5 billion employee compensation is included as a part of the \$52.9 billion total economic output in New Jersey.

⁵ NJ Department of Transportation. (2020). Transportation Capital Program Fiscal Year 2020. Retrieved May 14, 2020 from <https://www.state.nj.us/transportation/capital/tcp20/>.

goals and deliver top quality transit service. Previous capital plans have been constrained by available resources, and were submitted to the State Legislature as part of the NJDOT budget, as per legislative requirements.⁶

Projects in the Capital Plan were identified and drafted with five primary goals in mind:

- **State of good repair** investments focus on extending the service life of infrastructure and modernizing equipment.
- **Safety** goals identify projects that would decrease the risk of accidents among passengers and crew members, reduce track outages, and improve accessibility.
- **Business performance** efforts reduce energy consumption, support clean energy initiatives, and improve service reliability and frequency of service. This goal further focuses on lowering operating and maintenance costs where possible to maximize income.
- **Customer experience** goals are to increase ridership capacity while also focusing on service reliability, on-time performance, and customer comfort.
- **Resiliency** investments focus on reduced susceptibility to power outages, flooding, and other extreme weather events.

NJ TRANSIT is a major employer of the building and construction trades in New Jersey through its ongoing maintenance and upkeep needs of various stations and yards; and the capital improvements outlined in the agency's Capital Plan would further support the industry over a long and sustained period. Particularly during a potential economic downturn like the one we are currently seeing as a result of the coronavirus pandemic, this additional capital activity could serve the state well in what may otherwise be a slower period. In addition, enhanced transit service and quality as a result of these capital improvements could aid in the state's recovery. These broader economic and social impacts beyond those from the direct construction and operation of the capital projects measured in this analysis are discussed in Section 3.

Figure 2.1 below shows a breakdown of project costs by type. Spending totals \$37.5 billion across more than 100 projects. Rail and bus investments represent the largest portions, followed by large scale regional transit projects. Other project types include light rail, investments in information technology, innovation and network improvements, and Access Link paratransit service. Projects within the rail, bus and light rail categories are broken into subsets, including fleet expenditures totaling \$10.2 billion across these three components.

⁶ NJ Department of Transportation. (2020). Transportation Capital Program Fiscal Year 2020. Retrieved May 14, 2020 from <https://www.state.nj.us/transportation/capital/tcp20/>.

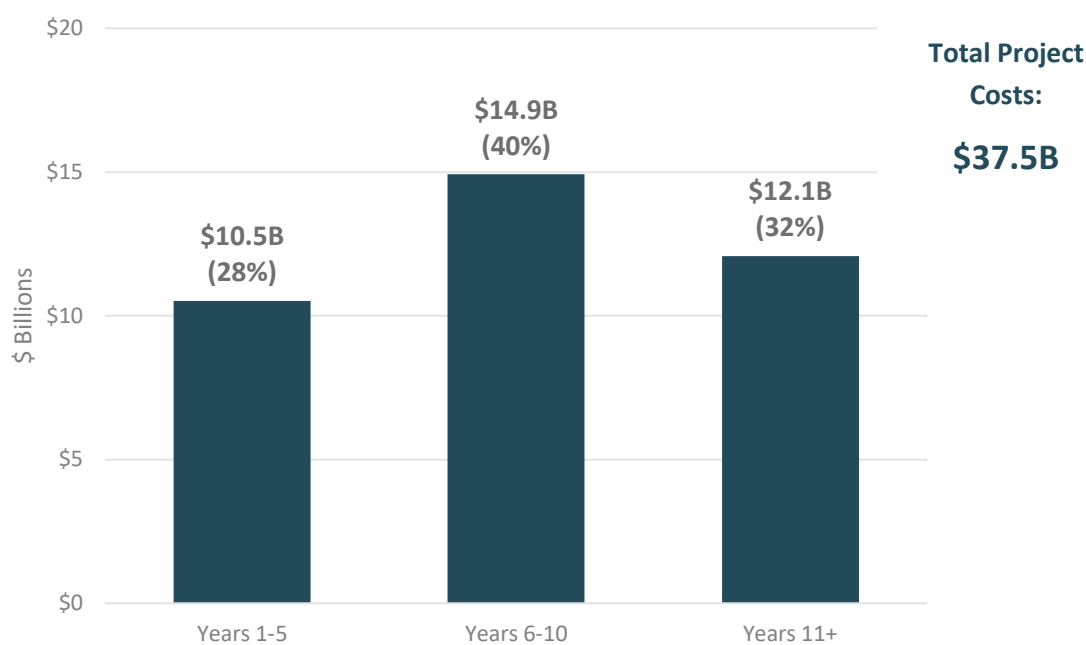
Figure 2.1: Estimated Total Project Costs by Project Type, 2020

Project Type	Cost (\$M)	% of Total
Rail	\$15,544	41%
Infrastructure	\$10,097	
Expansions	\$1,845	
Fleet	\$3,602	
Bus	\$10,527	28%
Infrastructure	\$1,379	
Garages	\$2,652	
Fleet	\$6,497	
Regional Transit Projects	\$8,789	23%
Light Rail	\$1,889	5%
Non-Fleet	\$1,804	
Fleet	\$85	
IT, Innovation and Transport Network Improvements	\$660	2%
Access Link	\$110	<1%
Total	\$37,519	100%

Source: NJ TRANSIT *Totals may not sum due to rounding

Figure 2.2 below shows the planned project costs by year across the proposed Capital Plan. More than \$10 billion in project cost (28 percent of the Plan's anticipated total spending) would take place in the first five years, and nearly another \$15 billion (or 40 percent of the total) between years six and ten.

Figure 2.2: NJ TRANSIT's Capital Plan Spending Over Time



Source: NJ TRANSIT, Econsult Solutions, Inc.

The majority of expenditures associated with the Capital Plan are on construction or major purchases of fleet/equipment. However, a portion of the expenditures will go to conceptual and preliminary designs needed to initiate the projects, and a portion to systemic needs such as information technology. This spending in a diversity of sectors in addition to construction-related industries is important because it broadens the types of employment generated and local business supported, especially in the first five years of the Plan.

Figure 2.3: NJ TRANSIT's Capital Plan Costs by Type of Expenditure

Years	Construction and Design Costs (\$M)	Fleet Purchase Costs (\$M)	Other (\$M)	Total (\$M)
1–5	\$5,765	\$3,797	\$957	\$10,520
6–10	\$12,013	\$2,724	\$181	\$14,918
11+	\$8,447	\$3,635	\$0	\$12,082
Total	\$26,224	\$10,156	\$1,138	\$37,519

Source: NJ TRANSIT, Econsult Solutions, Inc.

2.2. Estimated Economic Impact from Capital Investments

In an interconnected economy, direct expenditures give rise to “spillover” impacts throughout the supply chain (in the form of indirect effects) and through the recirculation of labor income (in the form of induced effects).

We employed industry-standard economic modeling techniques to estimate the direct economic activity generated by projects in NJ TRANSIT's Capital Plan, and translated that activity into total measurable economic output, employment, and earnings. To ensure estimates were reasonable and conservative, we made certain assumptions to refine the model inputs from NJ TRANSIT's Capital Plan. For example, some of the expenditures associated with the capital projects would be taking place outside of the state (such as equipment purchases or some of the agency's fleet procurement). Figure 2.4 shows the estimated breakdown of in-state expenditures (Direct Output) and out-of-state procurement (which is not included in the input-output analysis and thus would not have an impact on the state economy, as a conservative assumption). The assumptions of these estimates are further described in Appendix A.

Figure 2.4: NJ TRANSIT's Capital Plan Project Costs, Estimate of Spending In and Out of State

Capital Expenditures	Amount
Total Project Cost (\$B)	\$37.5
Out-of-State Activity (\$B)	(\$6.7)
Direct NJ Activity (\$B)	\$30.8

Source: NJ TRANSIT, Econsult Solutions, Inc.

Beyond its direct footprint of \$30.8 billion, capital investments would produce significant indirect and induced effects throughout the state economy. These projects would generate an economic output of approximately \$54.9 billion within New Jersey, supporting 245,000 FTE job-years of employment and

\$15 billion in earnings (which is a part of the total economic output).⁷ Note that all direct, indirect, and induced output and employment supported discussed in this report measure the economic impact within New Jersey.

Figure 2.5: Estimated Employment and Economic Output Supported by NJ TRANSIT's Capital Plan within New Jersey

Impact Type	Amount
Direct NJ Output (\$B)	\$30.8
Indirect & Induced NJ Output (\$B)	\$24.1
Total NJ Output (\$B)	\$54.9
Direct NJ Employment (FTE job-years)	132,000
Indirect & Induced NJ Employment (FTE job-years)	112,000
Total NJ Employment (FTE job-years)	245,000
NJ Employee Compensation (\$B)	\$15.0

Source: IMPLAN, Econsult Solutions, Inc.

The above table shows the aggregate economic output associated with all projects in the Capital Plan. Section 2.3 and 2.4 evaluate the employment and economic outputs of the Plan by project category and time frame.

The economic impacts associated with NJTRANSIT's Capital Plan affect a wide range of industries, far beyond the design sector and construction sectors. While the construction industry and architecture, engineering and related services are the largest individual beneficiaries from these investments, other industries including health care and social assistance; retail; professional, scientific, and technical services; administrative and support and waste management and remediation services; other services (except public administration); and accommodation and food services also see significant benefits from the indirect (supply chain) and induced (labor income) impacts of the capital activity. The average annual compensation from employment supported by this direct and indirect activity is more \$60,000.

⁷ Job-years reflect a single year of full-time employment. When expressed over a multi-year time frame, these figures do not reflect a unique number of new positions created, as the same FTE position that exists for multiple years counts as multiple job-years. For example, an employment increase of 100 FTE job-years over ten years can also be expressed as 10 FTE jobs per year.

2.3. Capital Plan Impacts by Project Type

NJ TRANSIT's Capital Plan includes projects in ten broad categories, as was described in Section 2.1. A full list of these projects, with associated costs, start date, and duration, can be found in Appendix C. All projects would create employment and economic activity in New Jersey throughout their design and construction phases. Project impacts by project type are shown in Figure 2.6. Further impacts that are generated by these projects such as economic competitiveness, quality of life, and resiliency are described in Section 3, with select projects highlighted.

Figure 2.6: Estimated Employment and Economic Output Supported in New Jersey by Project Type

Project Type	Project Cost (\$B)	Direct NJ Output (\$B)	Total NJ Output (\$B)	NJ FTE (Job Years)	NJ Employee Compensation (\$B)
Rail	\$15.5	\$13.3	\$23.7	101,000	\$6.3
<i>Infrastructure</i>	\$10.1	\$10.1	\$17.8	82,000	\$4.9
<i>Expansions</i>	\$1.8	\$1.8	\$3.7	13,000	\$1.0
<i>Fleet</i>	\$3.6	\$1.3	\$2.2	6,000	\$0.4
Bus	\$10.5	\$6.4	\$11.1	49,000	\$2.9
<i>Infrastructure</i>	\$1.4	\$1.4	\$2.6	14,000	\$0.9
<i>Garages</i>	\$2.7	\$2.7	\$4.6	25,000	\$1.4
<i>Fleet</i>	\$6.5	\$2.4	\$3.9	10,000	\$0.6
Regional Transit Projects	\$8.8	\$8.5	\$15.1	74,000	\$4.4
Light Rail	\$1.9	\$1.8	\$3.5	14,000	\$1.0
<i>Non-Fleet</i>	\$1.8	\$1.8	\$3.4	14,000	\$1.0
<i>Fleet</i>	\$0.1	\$0.0	\$0.1	0	\$0.0
IT, Innovation, Network	\$0.7	\$0.7	\$1.3	7,000	\$0.5
Access Link	\$0.1	\$0.1	\$0.1	1,000	\$0.0
Total	\$37.5	\$30.8	\$54.9	245,000	\$15.0

Source: IMPLAN, Econsult Solutions, Inc. *Totals may not sum due to rounding

2.4. Capital Plan Impacts Over Time

As described in Section 2.1, more than one-quarter the Plan's anticipated spending would take place within the first five years, and another 40 percent in years six through ten. Figure 2.7 below shows the breakdown of economic impacts within the New Jersey economy associated with the projects over time.

The employment and economic output in New Jersey associated with project spending in the first five years would generate an estimated \$13.3 billion in economic output in the state, supporting 60,000 direct, indirect, and induced jobs and providing \$3.7 billion in employee compensation.

Between years six and ten of the Plan, capital investments would generate an estimated \$22.9 billion in economic impact in New Jersey, supporting 107,000 direct, indirect, and induced jobs and providing \$6.5 billion in employee compensation.

Figure 2.7: Estimated Employment and Economic Output within New Jersey Supported by NJ TRANSIT's Capital Plan, Over Time

Impact Type	Years 1–5	Years 6–10	Years 11+	Total
Total Project Cost (\$B)	\$10.5	\$14.9	\$12.1	\$37.5
<i>Out-of-State Activity (\$B)</i>	<i>(\$2.9)</i>	<i>(\$2.0)</i>	<i>(\$1.8)</i>	<i>(\$6.7)</i>
Direct NJ Output (\$B)	\$7.6	\$12.9	\$10.3	\$30.8
Indirect & Induced NJ Output (\$B)	\$5.7	\$10.0	\$8.3	\$24.1
Total NJ Output (\$B)	\$13.3	\$22.9	\$18.6	\$54.9
Direct NJ Employment (FTE job-years)	32,000	60,000	40,000	132,000
Indirect & Induced NJ Employment (FTE job-years)	27,000	47,000	38,000	112,000
Total NJ Employment (FTE job-years)	60,000	107,000	78,000	245,000
NJ Employee Compensation (\$B)	\$3.7	\$6.5	\$4.8	\$15.0

Source: IMPLAN, Econsult Solutions, Inc. *Totals may not sum due to rounding

3. Catalytic Impacts of NJ TRANSIT's Capital Plan

Economic modeling of direct and spillover impacts from capital expenditures undertaken in this report is a valuable tool to understand the contributions of these investments to the expansion of the state's economic footprint. Importantly, transportation investments yield enduring impacts well beyond those associated with the upfront expenditure period. The true goal of these infrastructure investments is to enhance transit service, resiliency and operational efficiency in ways that improve the economic productivity, quality of life, and environmental outcomes for the state.

Investments that enhance the competitiveness of New Jersey not only grow the state's existing level of economic activity, as reflected in Section 2 of this report, but also enhance the future trajectory of growth in the economy and the employment base. Conversely, New Jersey operates in a competitive environment with other states, regions, and countries, and failing to invest in core infrastructure has negative long-term implications for the trajectory of growth. The implications for productivity and the associated growth trajectory of transit investments represent the catalytic impacts of these capital projects.

This section reviews the categories of economic, quality of life, and societal benefits that are unlocked by investments in public transit. Benefits are documented within the context of established economic frameworks and evidence, though they are not quantified specifically with respect to NJ TRANSIT's Capital Plan.

3.1. Economic Competitiveness and Quality of Life Benefits

Transportation investments and service improvements provide a range of quality of life benefits for users, providing affordable transportation options to access opportunities and amenities. These improvements in attractiveness translate to enhanced economic value for homeowners and locational attractiveness and productivity for businesses, enhancing the state's long-term growth trajectory.

Amenity Value

Capital investments support the maintenance and enhancement of transportation service for riders of NJ TRANSIT's. This service often yields a cost savings and/or time savings for riders relative to their alternative option, such as a private vehicle. This transportation service therefore represents an amenity, the value of which can be observed through housing market transactions for residential properties with high-quality transit access. Rigorous statistical analysis comparing houses with otherwise similar characteristics have consistently shown that proximity to transit services enhancing property

values, delivering a premium to homeowners who are riders and non-riders alike.⁸ Importantly, these increased property values can only be supported if productivity and earnings also rise.

Locational Attractiveness and Productivity

Transportation improvements that are attractive to residents also increase the attractiveness of the state as a business location. By reducing the financial and time cost of commuting, these improvements reduce the effective cost of doing business. Further, mass transit modes can deliver significant volumes without enduring congestion, supporting increased commercial activity. A body of economic literature has established positive effects from agglomeration on productivity, which ultimately leads to greater earnings.⁹ Research has also explored the direct relationship between transit and high growth business clusters across the United States.¹⁰

Commercial Value and Development

Enhancing the attractiveness and productivity of a business location changes the economics of development within the area. The anticipated level of development for a given site can be understood as the profit maximizing development size given a set of market conditions.¹¹ In this framework, developers weigh construction costs against anticipated rents yielded by the market, and build to a level of activity (reflected in land-constrained urban areas by building height) that maximize returns. The contributions of transit to business attractiveness and productivity increase the anticipated rent, which in turn increases the profit-maximizing level of development. This additional development means more upfront activity in construction and supporting sectors, and a higher level of economic activity, employment, commercial value and tax base over the long-term.

⁸ For example, a recent analysis of residential property sales across seven regions (Boston, MA; Eugene, OR; Hartford, CT; Los Angeles, CA; Minneapolis-St. Paul, MN; Phoenix, AZ; Seattle, WA) found premiums of 4 – 24 percent in median sales price from transit proximity. See: American Public Transportation Association (APTA) and National Association of Realtors (NAR) (2019). *The Real Estate Mantra – Locate Near Public Transportation*.

A recent meta-analysis for the Transportation Research Board showed positive residential value effects across more than 100 studies, with larger effect sizes in more compact regions with greater transit accessibility. See: *Transportation Research Record: Journal of the Transportation Research Board* (2016). Hamidi, Shima, Kittrell, Katherine & Ewing, Reid. *Value of Transit as Reflected in U.S. Single-Family Home Premiums: A Meta-Analysis*.

⁹ For summaries of literature on agglomeration effects and their relationship with transit service, see: National Bureau of Economic Research (NBER) (2010). Glaeser, Edward (Editor). *"Agglomeration Economics."* London School of Economics (2018). Graham, Daniel J. *Quantifying Wider Economic Impacts of Agglomeration for Transport Appraisal: Existing Evidence and Future Directions*.

¹⁰ Economic Development Research Group, Inc. for the American Public Transportation Association (APTA) (2013). *The Role of Transit in Support of High Growth Business Clusters in the U.S.*

¹¹ This "optimal density" framework to describe urban real estate markets draws on the work of DiPasquale and Wheaton: Denise DiPasquale, William C. Wheaton (1996). *Urban Economics and Real Estate Markets*.

Access to Opportunity and Budget Savings

Transit service is also fundamental to connecting residents and communities to employment and to key services such as education, health care and recreation. Reliable and affordable public transportation provides disadvantaged residents the means to access economic and educational opportunities. This service creates a more inclusive economy in the short-term, and over the long-term helps to promote social mobility and reduce entrenched poverty.¹²

Affordable transportation service also provides direct budget savings and asset-building capacity for households. While the amenity value represented by transit access may increase housing costs, “location efficiency”¹³ yielded by proximity to transit can reduce car ownership and operating costs by offsetting amounts, resulting in a net savings to households.¹⁴ This trade-off is also wealth-generating over time for homeowners, since housing values tend to appreciate, while cars represent a depreciating asset, and car operating expenditures are lost a household.

Economic Growth Trajectory

Taken together, the productivity, quality of life and equitable benefits of public transit investments impact the long-term growth trajectory of the state. These improvements make New Jersey more attractive within a competitive environment to both residents and businesses. This translates to higher activity levels within specific employment nodes, positive spillovers in productivity, and a generalized lift in development activity and property value.¹⁵ This virtuous cycle enhances the long-term growth trajectory of New Jersey relative to a scenario in which investments are more limited, and transit service is not enhanced, or to a scenario in which investments are foregone and transit service degrades. This enhanced trajectory grows the state and local tax base, delivering an ongoing fiscal return on the upfront capital investment.¹⁶

¹² The Equality of Opportunity Project, a large scale longitudinal study of upward mobility by geography led by Raj Chetty, has identified transportation and commute time as a crucial factor in escaping poverty. See: New York Times (May 7, 2015). Bouchard, Mikayla. Transportation Emerges as Crucial to Escaping Poverty.

¹³ “Location efficiency: describes the financial, amenity and quality of life benefits that may be associated with a particular residential location. Accounting for these factors represents a more robust approach to evaluating housing than costs alone. For more information, see: Center for Neighborhood Transit (CNT). Location Efficiency Hub <<https://www.cnt.org/projects/location-efficiency-hub>>

¹⁴ For example, an analysis by Econsult Solutions, Inc. found that public transit service within the City of Philadelphia yielded a net budget savings of more than \$800 for the average household in Philadelphia when accounted for impacts on both housing and transportation costs. Econsult Solutions, Inc. (ESI) (2018). SEPTA Service: A Value Proposition for Philadelphians. <<https://econsultsolutions.com/wp-content/uploads/2019/07/SEPTA-Property-Value-and-Affordability.pdf>>

¹⁵ This relationship was observed empirically in a longitudinal analysis by Chapman (Cal-Berkeley) and Noland (Rutgers), who traced linkages between transit service and downtown and regional employment density, wages, and gross product. This historical analysis found positive indirect growth effects from increases in transit seats or rail service miles per capita, with stronger effects in large and more dense metro areas. Urban Studies (2014). Chatman, Daniel and Noland, Robert. Transit Service, Physical Agglomeration and Productivity in US Metropolitan Areas.

¹⁶ For example, a recent study of a package of proposed capital investments in the Philadelphia region by the Southeastern Pennsylvania Transportation Authority (SEPTA) projected that \$6.5 billion package of capital projects would yield a return of \$17.1 billion in additional state and local tax revenue (net present value), and ROI of 2.6x. Econsult Solutions, Inc. (ESI) (2019). SEPTA Projects of Significance Economic and Fiscal Impact. <<https://econsultsolutions.com/wp-content/uploads/2019/03/SEPTA-Future-Projects-Impact-Full-Report-March-2019.pdf>>

Highlighted Projects

Several projects within NJ TRANSIT's Capital Plan are likely to be particularly impactful in generating the economic competitiveness and quality of life impacts reviewed above:

- The Hoboken Terminal Redevelopment project serves as a major catalyst of commercial activity, both through station improvements to enhance multi-modal transportation flow and through significant commercial development envisioned onsite, enhancing activity at this important business node.
- The Walter Rand Transportation Center Redevelopment project provides an intermodal link among a range of modes serving South Jersey, enhancing the attractiveness of Camden as a commercial center to accommodate and accelerate existing growth trends.
- Fleet procurement activity of the scale envisioned in the plan would encourage New Jersey suppliers to enhance their capacity to produce and service rolling stock within the state, creating a sustainable increase in New Jersey activity and employment.

3.2. Health and Environment

Investments in transportation also have significant implications for the environment and for public health. By reducing reliance on vehicles, transit service is crucial to reducing emissions, a trend accelerated by the deployment of new technologies. These effects and the land use and lifestyle patterns encouraged by transit have significant implications for the environment and for the health of New Jersey's population.

Emissions Reductions

Public transit service reduces emissions by consolidating large volumes of passengers into fewer vehicles, reducing the number of private cars on the road. This has the effect of significantly reducing the average emissions per passenger mile.¹⁷ Transit service also reduces congestion, which is a source of increased emissions per vehicle through lengthened trip times and increased stopping and starting. As alternative fuel sources and lower emissions vehicles become more common in transit (discussed further below), investments in new technology and fleet replacement would yield further environment benefits. Public transit represents a crucial component of air quality, emissions reduction, and climate mitigation strategies.

¹⁷ Guidance published by the Federal Transit Administration states emissions per passenger mile are reduced by 76 percent through heavy rail, 62 percent through light rail, and 33 percent through buses relative to private cars. See: Federal Transit Administration (2015). Transit's Role in Environmental Stability. <<https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/transit-environmental-sustainability/transit-role>>

Alternative Energy Management

Transit agencies across the industry are increasingly moving towards more sustainable energy sources.¹⁸ These technologies yield both environmental benefits and often operational benefits through more efficient energy management. These improvements can reduce operating costs and increase resiliency over time while reducing emissions. Capital investments in implementing approaches such as electric buses and train batteries therefore yield both social and economic benefits over the long-term.

Land Use Patterns

Transit service influences land use patterns, both in downtown areas and along service nodes, encouraging clusters of transit-oriented development and reducing sprawl. This effect reduces sprawl and encourages less environmentally intensive land uses, both through reduced commute lengths and greater preservation of undeveloped land. The land use patterns encouraged by transit are crucial to a smart growth strategy for New Jersey, in which the state preserves its natural assets in a sustainable way while mitigating the effects of climate change.¹⁹

Population Health

Transportation investments promote public health both by limiting exposure to harmful substances and stressors (like emissions) and through enabling health promoting behaviors. Research has identified positive relationships between transit access, physical activity and reduced chronic disease, demonstrating the importance of behavior changes associated with land use patterns encouraged by transit. Health benefits are also derived from the increased access to employment, health care services, social services and food enabled by transit service.²⁰ Given the prominence of public health as a matter of policy, fiscal impact and quality of life, the population health benefits of transportation investments represent a major component of the social and economic return on investment case. Of course, in the post-COVID-19 world, the dynamics of land use, transit usage, and public health will be altered at least temporarily; however, as the recovery process anticipates these challenges, the overarching health benefits of a strong transit network should remain.

Highlighted Projects

Projects within NJ TRANSIT's Capital Plan that highlight the health and environmental benefits of transportation investments include:

¹⁸ For example, according to APTA's 2020 Fact Book, only 42 percent buses nationally are now diesel powered (down from nearly 70 percent in 2009) and hybrid electric buses now represent 18 percent of the market. See: American Public Transportation Association (APTA) (2020). 2020 Public Transportation Fact Book. Figure 14.

¹⁹ For more information on smart growth strategies and the benefits for New Jersey, see: New Jersey Futures. Smart Growth 101. < <https://www.njfuture.org/smart-growth-101/> >

²⁰ For a summary of evidence on the public health benefits of fixed use transit, see: University of British Columbia Health & Community Design Lab (2018). The Health Effects of Fixed-Guideway Transit Investment: A Review of Methods and Best Practices.

- The Bus Garage Modernization Program and the Electric Bus Fleet Implementation Program would provide the equipment necessary to begin to deploy electric buses, reducing emissions, improving air quality and increasing the efficiency of bus operations and maintenance.
- The Train Battery Pilot project would test the use of batteries to power existing NJ TRANSIT trains. This technology has the potential to reduce emissions, increase resiliency, improve the efficiency of energy use and reduce costs through regenerative braking, which captures and stores energy generated by braking to power subsequent acceleration.
- Northern and Southern expansion projects for the Hudson Bergen Light Rail would improve mobility options and reduce transit gaps through well-populated corridors. These extensions would grow transit ridership, connect with existing centers of development, and influence future land use patterns.
- The Glassboro-Camden Line project is a proposed 18-mile passenger rail line that would improve mobility and connections between established activity centers in a densely populated area of Southern New Jersey lacking efficient travel options.

3.3. Operational Efficiency and Resiliency

Investments to upgrade outdated infrastructure increase the resiliency of the system and improve its operational efficiency. These improvements increase system reliability, reducing the frequency and likelihood and economically damaging service outages, and also enhance business performance of the system on a long-term basis, enabling more efficient ongoing use of public funds.

Service and Energy Resiliency

Extreme events like Superstorm Sandy have demonstrated the need to protect critical infrastructure against future challenges. Capital investments can upgrade outdated infrastructure through more advanced approaches designed to withstand adverse conditions. The resiliency of the transportation network and critical infrastructure like its energy supply are crucial to avoiding extended outages and the associated economic losses.

Addressing Critical Infrastructure (State of Good Repair)

State of good repair projects are not always thought of as catalytic in nature, but they are essential to maintain the catalytic benefits that a transit system delivers. Due to the age of its infrastructure, state of good repair projects are an essential part of NJ TRANSIT's Capital Plan. The alternative of disinvestment has economic costs in degraded quality, safety and reliability, which can be compounded when unanticipated events occur.²¹ Outdated infrastructure and disinvestment also influence forward-looking investment and business locations decision, due both to uncertainty regarding the availability of quality

²¹ For a literature summary on the economic consequences of failing to maintain public transportation infrastructure, see: American Public Transportation Association (APTA) (2018). The Economic Cost of Failing to Modernize Transportation.

service and uncertainty about future fiscal policies that would be needed to address costs that magnify as they go unaddressed.

Life-Cycle Cost Reduction

Under the Capital Plan, NJ TRANSIT has a major opportunity to be a leader in significant improvement to optimization of the delivery and life cycle performance of infrastructure investments, increasing the return on the limited funding available. Additional components of such a strategy can include performance-based standards, and an increased focus on life cycle performance, especially through life cycle cost analysis (e.g., value of using higher initial cost but longer lasting materials and components; dramatic reduction of time to bring projects into service). Detailed life cycle cost analysis should be incorporated into the decision-making criteria for: (1) project selection, planning, design and construction; (2) operation and maintenance; and (3) end-of-service-life disposition of the asset. The analysis would also reflect the long-term nature of the investments and their societal impacts. A major objective of optimizing the capital program investments is to deliver better value, which in turn may attract greater investment.

Operational Benefits and Efficient Use of Public Funds

Capital investments that upgrade the quality of key public infrastructure often have the benefit of reducing ongoing operating costs and growing ridership revenue by enhancing capacity. These business performance improvements allow transit agencies to make better use of public dollars on an ongoing basis, providing a public return on the capital investment.

Capital investments can address key chokepoints limiting reliability and ridership growth, and address situations where outdated design creates safety and cost issues in basic operations and maintenance. Upgrades to the quality of fleet, storage and repair facilities and other core components allow a transit system to operate more efficiently, improving business performance and the stewardship of public dollars over the long-term.

Highlighted Projects

A number of projects with NJ TRANSIT's Capital Plan would help to improve the resiliency, efficiency and performance of the system on an ongoing basis, including:

- NJ TRANSITGRID would modernize the agency's electric grid, providing a cleaner and more efficient source of power for NJ TRANSIT operations. By creating a dedicated source of power, the project would also minimize disruptions to the public transportation network in the event that the commercial grid is compromised by severe events.
- The Raritan Bridge Replacement project would modernize and increase the resiliency of a key connection between coastal New Jersey and job centers in North Jersey and New York. The project would increase reliability of rail operations during both normal weather and extreme events such as Superstorm Sandy, which resulted in an 18-day outage to the original bridge, which dates to 1908.

- Fleet replacement investments for rail and bus would modernize NJ TRANSIT's fleet, increasing reliability and performance, reducing operating costs and repairs, lowering the environmental footprint, and improving the passenger experience.
- The Newark Draw Bridge Replacement& Capacity Enhancement project would add an additional track to resolve an operational bottleneck. This would enhance rail capacity to catch up with ridership growth, reduce outages and alleviate the need for routine maintenance work to be performed during overtime hours, reducing operating costs.

Appendix A – Economic Modeling Assumptions

Industry-standard economic modeling techniques are employed throughout this analysis to estimate the direct and spillover economic activity generated by capital investments outlined in NJ TRANSIT's Capital Plan. This appendix describes the approaches and assumptions used to define the level and nature of direct impact within New Jersey. Where needed, conservative assumptions are made to ensure that modeled results are reasonable. Project specifications and costs should be understood as preliminary, and may shift as projects are actualized.

Appendix B that follows describes in detail the input-output modeling techniques used to define the indirect and induced impacts of this direct activity within the New Jersey economy. The total output, employment and earnings reported in this analysis are a sum of these direct, indirect and induced impacts.

Estimated costs and descriptions for projects within the Capital Plan were provided by NJ TRANSIT. All costs are expressed in common dollar terms (\$2020), conservatively excluding potential escalations in expenditures and associated impact for work taking place in future years. In addition, all project costs (such as planning and design) incurred prior to FY 2021 are excluded from this analysis.

To identify the economic impacts of capital investments, project costs are sorted into activity types and locations. Activity types yield unique multiplier effects within the input-output modeling framework described in Appendix B based on the primary location of project activities, and the primary industry or industries in which the project activity occurs. Both the location of the project and the sector in which a project's spending occurs influence how the direct project spending translates to indirect impacts in the supply chain and induced labor income impacts.

Project location, as a key input parameter, affects salary level, local employment as well as how much purchasing stays in the geography. Project locations are defined based on project descriptions. Projects that represent system or statewide investments (including park & ride shelter upgrades, new bus shelters, rail and bus fleet replacement, and IT improvements) are modeled on a statewide basis. Projects for which a primary location can be defined are modeled in northern, central, or southern New Jersey regions, which are defined in correspondence with the regions utilized by the New Jersey Department of Transportation.²²

Adjustments to direct impacts are made for projects where direct activity occurs partially outside of New Jersey. One project of this type involves Access Improvements to Penn Station in New York. While these improvements take place outside of the state, New Jersey contractors may represent a material

²² Counties are assigned to NJDOT regions as follows:
North: Bergen, Essex, Hudson, Morris, Passaic, Sussex, Union, Warren
Central: Hunterdon, Mercer, Middlesex, Monmouth, Ocean, Somerset
South: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Salem
New Jersey Department of Transportation (2019). Regional Boundary Map.
<<https://www.state.nj.us/transportation/about/employ/regions.shtm>>

portion of the work associated with the projects. As a proxy for the proportion of New Jersey activity, Bureau of Labor Statistics data is utilized to estimate the size of the construction sectors in the Northern New Jersey portion of the New York Metropolitan Statistical Area (MSA) relative to the construction sector in the full MSA, and this proportion (28 percent) is utilized as an estimate for the share of project costs impacting the New Jersey economy.

Another set of projects requiring adjustments are procurement efforts for the rail and bus fleet. Suppliers with existing capacity to meet this demand are currently located outside of New Jersey, and in some cases internationally. However, the magnitude of purchasing envisioned in the Capital Plan is expected to induce new facilities and activity within New Jersey to remanufacture, service and maintain the new fleet in an efficient manner. Based on conversations with NJ TRANSIT, the magnitude of this activity is estimated based on the assumption of a 150-200 employee operation for manufacturing activity along with a 40-50 employee operation for maintenance. This annual activity level (using the midpoint of these estimates) is extrapolated over the 20-year production period, and translated to direct impact supported using IMPLAN.

This “ground up” method allocates about \$3.7 billion in fleet procurement activity within the state of New Jersey, representing about one-third of fleet replacement activity in the Capital Plan. This proportion of local activity is applied across each of the fleet replacement components of the Capital Plan. The remaining project cost is treated as out of state activity, and is conservatively excluded from economic impact modeling and results. Specialized train batteries are also assumed to be sourced primarily from outside of the state, with 10 percent of in-state activity assumed for installation and management.

Accounting for these adjustments, Figure A.1 below presents modeled and non-modeled costs by project type.

Figure A.1: Total and Modeled Project Costs by Type

Project Type	Project Cost (\$B)	Excluded Activity (Out of State) (\$B)	Direct NJ Output (\$B)
Rail	\$15.5	\$2.2	\$13.3
<i>Infrastructure</i>	\$10.1	\$0	\$10.1
<i>Expansions</i>	\$1.8	\$0	\$1.8
<i>Fleet</i>	\$3.6	\$2.3	\$1.3
Bus	\$10.5	\$4.1	\$6.4
<i>Infrastructure</i>	\$1.4	\$0	\$1.4
<i>Garages</i>	\$2.7	\$0	\$2.7
<i>Fleet</i>	\$6.5	\$4.1	\$2.4
Regional Transit Projects	\$8.8	\$0.3	\$8.5
Light Rail	\$1.9	\$0.1	\$1.8
<i>Non-Fleet</i>	\$1.8	\$0	\$1.8
<i>Fleet</i>	\$0.1	\$0.1	\$0.0
IT, Innovation, Network	\$0.7	\$0	\$0.7
Access Link	\$0.1	\$0	\$0.1
Total	\$37.5	\$6.7	\$30.8

*Source: NJ TRANSIT, Econsult Solutions, Inc. *totals may not sum due to rounding*

Projects are then grouped by sector of activity in order to appropriately characterize the downstream economic effects. Twelve unique activity types are utilized within the IMPLAN modeling program described in Appendix B. These twelve activity types fall into five “super sectors” within the North American Classification System (NAICS), with the majority of activity occurring within the construction and manufacturing sectors.²³

Certain projects cut across multiple activity types. These include Light Rail development and extensions, and certain Station Redevelopment and Design projects. Activity for the Glassboro-Camden Light Rail Line is allocated among activity types based cost estimates in a 2009 Alternative Analysis study for the project, which are reconciled to current total cost estimates.²⁴ In other cases, activity is divided based on guidance from NJ TRANSIT and publicly available information as to the nature of the project.²⁵

²³ Two-digit NAICS codes in which direct activity is modeled are: 23 – Construction, 33 – Manufacturing, 54 – Professional, Scientific and Technical Services, 22 – Utilities, 56 – Administrative and Support Services.

²⁴ STV Incorporated for Delaware River Port Authority (DRPA) (2009). Southern New Jersey to Philadelphia Mass Transit Expansion Alternative Analysis Study.

²⁵ The following projects are allocated between multiple activity types: Glassboro-Camden Light Rail Line, Hoboken Terminal Redevelopment (multiple phases), Hudson Bergen Light Rail Line (multiple projects), Gateway Storage Yard and Hudson Tunnel Design.

Appendix B – Economic and Fiscal Impact Modeling

Economic impact estimates are generated by utilizing input-output models to translate an initial amount of direct economic activity into the total amount of economic activity that it supports, which includes multiple waves of spillover impacts generated by spending on goods and services and by spending of labor income by employees. This section summarizes the methodologies and tools used to construct, use, and interpret the input-output models needed to estimate this project's economic impact.

B.1. Input-Output Model Theory

In an inter-connected economy, every dollar spent generates two spillover impacts:

- First, some amount of the proportion of that expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is called the “indirect effect,” and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, some amount of the proportion of that expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the “induced effect,” and reflects the fact that some of those goods and services are purchased from local vendors, further stimulating a local economy.

The role of input-output models is to determine the linkages across industries in order to model the magnitude and composition of spillover impact to all industries of a dollar spent in any one industry. Thus, the total economic impact is the sum of its own direct economic footprint plus the indirect and induced effects generated by that direct footprint.

B.2. Input-Output Model Mechanics

To model the impacts resulting from the organizational expenditures, Econsult Solutions, Inc. developed a customized economic impact model using the IMPLAN input/output modeling system. IMPLAN represents an industry standard approach to assess the economic and job creation impacts of economic development projects, the creation of new businesses, and public policy changes within its surrounding area.

IMPLAN has developed a social accounting matrix (SAM) that accounts for the flow of commodities through economics. From this matrix, IMPLAN also determines the regional purchase coefficient (RPC), the proportion of local supply that satisfies local demand. These values not only establish the types of goods and services supported by an industry or institution, but also the level in which they are acquired locally. This assessment determines the multiplier basis for the local and regional models created in the IMPLAN modeling system. IMPLAN takes the multipliers and divides them into 536 industry categories in accordance to the North American Industrial Classification System (NAICS) codes.

The IMPLAN modeling system also allows for customization of its inputs which alters multiplier outputs. Where necessary, certain institutions may have different levels of demand for commodities. When this occurs, an “analysis-by-parts” (ABP) approach is taken. This allows the user to model the impacts of direct economic activity related to an institution or industry with greater accuracy. Where inputs are unknown, IMPLAN is able to estimate other inputs based on the level of employment, earnings, or output by an industry or institution.

B.3. Employment and Wages Supported

IMPLAN generates job estimates based on the term “job-years”, or how many jobs are supported each year. For instance, if a construction project takes two years, and IMPLAN estimates there are 100 employees, or more correctly “job-years” supported, over two years, that represents 50 annual jobs. Additionally, these can be a mix of full and part-time employment. Consequently, job creation could feature more part-time jobs than full-time jobs. To account for this, IMPLAN has a multiplier to covert annual jobs to full-time equivalent jobs.

Income to direct, indirect, and induced jobs is calculated as employee compensation. This includes wage and salary, all benefits (e.g., health, retirement) and payroll taxes (both sides of social security, unemployment taxes, etc.). Therefore, IMPLAN’s measure of income estimates gross pay opposed to just strictly wages.

Appendix C – Economic Output by Proposed Capital Project

Category	Project Name	Project Start Date	Time Frame (Years)	Project Cost (\$M)	Total NJ Economic Output (\$M)	Employment Supported in NJ (FTE)	NJ Employee Compensation (\$M)
Bus Garages	Northern Bus Garage	2021	5	\$536	\$915	4,889	\$277
Bus Garages	Second Northern Bus Garage	2021	9	\$392	\$669	3,576	\$203
Bus Garages	Bus Garage Modernization Program	2021	11	\$1,115	\$1,932	10,572	\$591
Bus Garages	Bus Garage Replacement Program	2023	11	\$609	\$1,038	5,550	\$315
Bus Infrastructure	North Bergen Park & Ride Parking Garage	2021	11	\$139	\$236	1,263	\$72
Bus Infrastructure	Old Bridge Park & Ride Enhancement	2021	7	\$22	\$39	183	\$11
Bus Infrastructure	Park & Ride Bus Shelter Modernization Program	2021	7	\$75	\$130	711	\$40
Bus Infrastructure	Local Bus Shelter Modernization Program	2021	8	\$17	\$29	156	\$9
Bus Infrastructure	Surface Transportation Technology Innovation Program	2021	5	\$20	\$39	199	\$16
Bus Infrastructure	Passaic Bus Terminal Redevelopment	2021	3	\$6	\$10	51	\$3
Bus Infrastructure	Multimodal and Bus Terminal Facility Improvements	2021	5	\$38	\$65	347	\$20
Bus Infrastructure	Walter Rand Transportation Center Redevelopment	2021	9	\$275	\$478	2,784	\$146
Bus Infrastructure	New Brunswick Rapid Surface Transit Study	2022	4	\$10	\$20	108	\$8
Bus Infrastructure	Rapid Surface Transit System Development & Design Program	2021	10	\$538	\$1,117	6,138	\$463
Bus Infrastructure	Bergen County Bus Rapid Transit Network	2022	9	\$168	\$304	1,404	\$83
Bus Infrastructure	Princeton Transitway	2022	7	\$61	\$109	516	\$30
Bus Infrastructure	Local Police Shelter Implementation Program	2021	8	\$13	\$22	119	\$7
Bus Fleet	Bus Fleet Replacement - Cruiser Buses	2021	3	\$386	\$233	603	\$36
Bus Fleet	Bus Fleet Replacement - Articulated Buses	2021	2	\$92	\$56	143	\$8
Bus Fleet	Bus Fleet Replacement Program	2021	20	\$5,690	\$3,442	8,887	\$524
Bus Fleet	Bus Fleet Electrification Implementation Program	2022	7	\$311	\$188	485	\$29
Bus Fleet	Electric Bus Fleet Early Deployment	2021	2	\$10	\$6	16	\$1
Bus Fleet	Low Speed AV Pilot	2021	2	\$8	\$5	12	\$1
Access Link	Access Link Fleet Modernization and Expansion	2021	5	\$48	\$29	75	\$4
Access Link	Access Link Electric Vehicle (EV) Pilot Program	2021	2	\$3	\$2	4	\$0

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Category	Project Name	Project Start Date	Time Frame (Years)	Project Cost (\$M)	Total NJ Economic Output (\$M)	Employment Supported in NJ (FTE)	NJ Employee Compensation (\$M)
Light Rail	River LINE Right-of-Way Flooding	2021	2	\$1	\$2	7	\$0
Light Rail	River LINE Fleet Overhaul	2021	5	\$85	\$51	133	\$8
Light Rail	Newark Light Rail (NLR) Capacity Enhancement	2021	4	\$33	\$65	222	\$18
Light Rail	NLR - Station Modernization & Access Program	2021	6	\$130	\$222	1,186	\$67
Light Rail	Hudson-Bergen Light Rail (HBLR) Hoboken WYE Bypass	2023	6	\$89	\$173	649	\$48
Light Rail	Hudson-Bergen Light Rail (HBLR) Northern Branch Corridor	2023	11	\$1,178	\$2,293	8,592	\$630
Light Rail	Hudson-Bergen Light Rail (HBLR) Route 440 Extension	2021	8	\$238	\$463	1,736	\$127
Light Rail	Paterson Avenue Grade Crossing Elimination	2021	9	\$136	\$232	1,241	\$70
Rail Fleet	Rail Fleet Replacement - Phase I - Overhaul	2022	10	\$1,110	\$671	1,734	\$102
Rail Fleet	Rail Fleet Replacement - Phase II - New Car Purchases	2021	9	\$2,414	\$1,460	3,770	\$222
Rail Fleet	Train Battery Pilot	2022	4	\$46	\$9	80	\$3
Rail Fleet	Machine Vision Implementation Program	2021	5	\$32	\$63	319	\$26
Rail Infrastructure	WC interlocking Reconfiguration	2021	5	\$13	\$21	61	\$6
Rail Infrastructure	West Summit Interlocking	2021	8	\$97	\$154	450	\$44
Rail Infrastructure	Millburn Interlocking Reconfiguration	2023	9	\$111	\$223	759	\$60
Rail Infrastructure	Dover Interlocking Reconfiguration Study	2021	2	\$1	\$2	5	\$0
Rail Infrastructure	New Interlocking between Glen and Cedar Interlockings	2023	6	\$14	\$21	63	\$6
Rail Infrastructure	Trenton Station Improvements	2028	7	\$49	\$86	449	\$24
Rail Infrastructure	Newark Penn Station Platform D Improvements	2021	9	\$26	\$45	240	\$14
Rail Infrastructure	Regional Rail Station Modernization & Access Program	2021	10	\$790	\$1,369	7,490	\$419
Rail Infrastructure	Lyndhurst Station	2021	5	\$28	\$48	255	\$14
Rail Infrastructure	Roselle Park Station Improvements	2021	5	\$23	\$41	206	\$11
Rail Infrastructure	Edison Station Improvements	2021	7	\$36	\$61	333	\$19
Rail Infrastructure	Elizabeth Station Improvements	2021	2	\$54	\$92	490	\$28
Rail Infrastructure	Jersey Avenue Station	2025	9	\$238	\$409	2,236	\$126
Rail Infrastructure	Metuchen Station Improvements	2021	7	\$31	\$53	291	\$16
Rail Infrastructure	New Brunswick Station Improvements	2021	5	\$13	\$23	126	\$7
Rail Infrastructure	North Elizabeth Station Improvements	2021	7	\$32	\$56	285	\$15
Rail Infrastructure	North Brunswick Station	2021	6	\$160	\$275	1,503	\$84
Rail Infrastructure	Roseville Cut Improvements	2021	8	\$111	\$201	928	\$55

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Category	Project Name	Project Start Date	Time Frame (Years)	Project Cost (\$M)	Total NJ Economic Output (\$M)	Employment Supported in NJ (FTE)	NJ Employee Compensation (\$M)
Rail Infrastructure	Delco Lead	2021	6	\$223	\$383	2,095	\$118
Rail Infrastructure	County Yard Expansion	2021	6	\$117	\$201	1,099	\$62
Rail Infrastructure	Small Yards Rehabilitation Program	2021	15	\$449	\$778	4,257	\$238
Rail Infrastructure	Modify Lyons Siding on Gladstone Line	2027	6	\$11	\$20	81	\$5
Rail Infrastructure	New Boonton Yard	2026	7	\$40	\$67	360	\$20
Rail Infrastructure	Midline Loop	2021	10	\$306	\$558	2,263	\$140
Rail Infrastructure	Hunter Flyover	2021	9	\$300	\$602	2,051	\$162
Rail Infrastructure	Raritan River Bridge Replacement	2021	7	\$527	\$947	4,501	\$264
Rail Infrastructure	Overhead Bridge Replacement Program	2021	24	\$846	\$1,536	7,280	\$426
Rail Infrastructure	Newark Draw Bridge Replacement & Capacity Enhancement	2021	11	\$676	\$1,221	5,649	\$336
Rail Infrastructure	Undergrade Bridge Replacement Program	2021	24	\$1,903	\$3,457	16,385	\$960
Rail Infrastructure	South Laurel Ave Bridge Replacement & Clearance Improve	2021	7	\$47	\$83	397	\$23
Rail Infrastructure	Brielle Draw Bridge Replacement & Capacity	2021	9	\$204	\$366	1,741	\$102
Rail Infrastructure	HX Draw Bridge Replacement	2024	9	\$269	\$486	2,248	\$134
Rail Infrastructure	Upper Hack Lift Bridge Capacity Enhancement	2024	9	\$267	\$482	2,231	\$133
Rail Infrastructure	Shark River Draw Bridge Replacement	2029	9	\$170	\$305	1,451	\$85
Rail Infrastructure	West Front Street Bridge Replacement Study	2027	2	\$2	\$4	17	\$1
Rail Infrastructure	Morgan Draw Bridge Replacement	2026	9	\$236	\$423	2,014	\$118
Rail Infrastructure	Rail Electric Traction Substation Assessment	2021	4	\$9	\$15	83	\$5
Rail Infrastructure	New Graw Signal Substation	2025	5	\$20	\$35	190	\$11
Rail Infrastructure	Suffern Substation and Crew Quarters	2021	5	\$21	\$36	192	\$11
Rail Infrastructure	Wood to Steel Pole Conversion on Gladstone Branch	2021	6	\$81	\$135	149	\$16
Rail Infrastructure	Electric Traction Storage Facility	2021	6	\$26	\$44	242	\$14
Rail Infrastructure	NJ TRANSIT Grid	2021	6	\$577	\$859	938	\$96
Rail Infrastructure	New Signal Crew Facilities	2021	8	\$11	\$19	100	\$6
Rail Infrastructure	Auxiliary Transit Operations Facility	2021	9	\$131	\$223	1,190	\$68
Rail Infrastructure	Red Bank Crew Quarters Replacement	2022	7	\$7	\$12	66	\$4
Rail Infrastructure	Northern MOW Facility	2021	8	\$40	\$67	360	\$20
Rail Infrastructure	Newark Penn Station Rehabilitation	2023	9	\$454	\$775	4,141	\$235
Rail Infrastructure	Bergen Tunnel South Tube Rehabilitation	2021	8	\$155	\$284	1,409	\$78

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Category	Project Name	Project Start Date	Time Frame (Years)	Project Cost (\$M)	Total NJ Economic Output (\$M)	Employment Supported in NJ (FTE)	NJ Employee Compensation (\$M)
Rail Expansion	Lehigh Third and Fourth Tracks	2032	13	\$752	\$1,509	5,141	\$405
Rail Expansion	Westbound Waterfront Connector	2026	10	\$474	\$951	3,241	\$255
Regional Transit Projects	Portal Bridge North	2021	10	\$1,873	\$3,384	15,648	\$931
Regional Transit Projects	Portal Bridge South Capacity Enhancement	2030	11	\$431	\$790	3,918	\$218
Regional Transit Projects	Penn Station New York – NJ TRANSIT Access Improvement	2021	9	\$340	\$162	867	\$49
Regional Transit Projects	Hoboken Terminal And Yard Resilient Redevelopment Phase I	2021	7	\$257	\$454	2,227	\$134
Regional Transit Projects	Hoboken Terminal And Yard Resilient Redevelopment Phase II	2021	12	\$2,900	\$5,122	25,127	\$1,513
Regional Transit Projects	Hoboken Long Slip	2021	6	\$179	\$305	1,628	\$92
Regional Transit Projects	Gateway Storage Yard and Hudson Tunnel Design	2021	11	\$2,396	\$4,209	20,938	\$1,215
Regional Transit Projects	New Jersey Ferry Fleet Improvements	2022	10	\$414	\$717	3,925	\$219
IT, Innovation & Trans. Network	Public Transportation Health & Safety Improvement Program	2021	5	\$156	\$324	1,780	\$134
IT, Innovation & Trans. Network	Comprehensive Transit Trip Planner App	2021	2	\$3	\$6	30	\$2
IT, Innovation & Trans. Network	NJT Mobile App Development	2021	5	10	\$20	100	\$8
IT, Innovation & Trans. Network	IT Business Unit Improvements	2021	5	\$103	\$193	1,330	\$98
IT, Innovation & Trans. Network	IT Improvements	2021	5	\$65	\$127	648	\$53
IT, Innovation & Trans. Network	IT Surface Transit Improvements	2021	5	\$148	\$290	1,476	\$121
IT, Innovation & Trans. Network	IT Rail Improvements	2021	5	\$53	\$104	528	\$43
IT, Innovation & Trans. Network	Enterprise Asset Management: Facility Inspections FY21-23	2021	3	\$9	\$18	100	\$8
IT, Innovation & Trans. Network	Enterprise Asset Management PMO	2021	5	\$8	\$17	94	\$7
IT, Innovation & Trans. Network	Updated Planning Studies	2021	5	\$5	\$10	57	\$4
IT, Innovation & Trans. Network	SoGR Program	2021	5	\$100	\$182	705	\$53
Bus Garages	Northern Bus Garage	2021	5	\$536	\$915	4,889	\$277
Bus Garages	Second Northern Bus Garage	2021	9	\$392	\$669	3,576	\$203
Bus Garages	Bus Garage Modernization Program	2021	11	\$1,115	\$1,932	10,572	\$591