



**Marketing Research for the Quantifiable Benefits
of Transit in New Jersey
Volume I: Final Report**

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Submitted by

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16. Abstract New Jersey boasts an extensive system of public transportation that operates statewide, serving approximately two-thirds of the State's municipalities. The many benefits of public transportation have been widely discussed and analyzed in both academic literature and popular media. This research assembled data and information and estimated numerous quantifiable benefits of transit service to New Jersey residents, businesses, and communities. The research offers important insights, information and data regarding the benefits that NJ TRANSIT services provide to the State of New Jersey. The study proposes a series of storylines and delivers a series of infographics that can be used by NJ TRANSIT and other transportation stakeholders to implement a marketing campaign that communicates the benefits of public transportation to a range of audiences.					
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EXECUTIVE SUMMARY

New Jersey boasts an extensive system of public transportation that operates statewide, serving approximately two-thirds of the State's 565 municipalities. The many benefits of public transportation have been widely discussed and analyzed in both academic literature and popular media. Some studies have analyzed national data, while others focus on specific jurisdictions, projects or transit station areas. Some studies focus on a single category of benefit, such as economic, health, or environment; while others analyze multiple measures cutting across a range of benefit categories. Transit benefits are also considered in the context of direct/primary, indirect/secondary and sometimes induced/tertiary benefits.

For much of the past two decades, New Jersey policy makers have been mired in repeated debates regarding how best to fund transportation capital and operating costs in an era of significant fiscal strain. NJ TRANSIT faces many challenges related to maintaining legacy infrastructure systems and assets in a state of good repair, meeting operating budget needs, and paying for needed generational system improvements such as the Gateway Program of Trans-Hudson transportation improvements. These challenges have been amplified by the worldwide COVID-19 pandemic. When this research began in 2019, the public narrative surrounding transit in New Jersey was that NJ TRANSIT was a system in crisis, with consistent negative coverage in the press related to service disruptions and cancellations. Today, there is a renewed focus on recovery and investment

The objectives of this research study were to:

1. Quantify the economic, mobility, accessibility, environmental, and social benefits of public transportation to New Jersey;
2. Understand better what benefits are potentially most important to transit riders, non-transit riders and other stakeholder groups;
3. Determine how best to communicate the benefits of public transportation to these audiences; and
4. Develop a marketing framework, communication approaches, and collateral marketing materials to support a transit benefits marketing campaign as part of NJ TRANSIT's on-going communications strategy.

To achieve these research objectives, the research team implemented a multi-phase, mixed methods work plan that included both qualitative and quantitative research techniques. Phase 1 and Phase 2 of the study focused on developing a foundational understanding of what benefit measures may resonate most with various audiences in New Jersey, reviewing and synthesizing available academic and grey literature related to quantifying and communicating the benefits of public transportation; compiling and analyzing data from a variety of secondary sources and performing benefit calculations

as needed to prepare a series of easy-to-understand infographics factoids that can be used in future marketing and communication materials.

As part of phase three of the study, the research team developed a series of infographics and related marketing materials designed to communicate transit benefits to a lay audience using both traditional and social media approaches. These materials were market tested via four focus groups, and refined based on participant input. Finally, the research team developed a marketing framework and recommendations for using the materials as part of a comprehensive marketing campaign.

The results of this research demonstrate that NJ TRANSIT services provide many benefits to New Jersey residents, businesses and communities. Key findings include:

Economic benefits

- **Investment in NJ TRANSIT provides significant direct and indirect economic benefits to New Jersey.**
 - NJ TRANSIT employs more than 11,000 people and State spending on NJ TRANSIT operations, maintenance, and capital projects generates an additional 19,000 jobs in other businesses and companies.
 - NJ TRANSIT spending generates \$5 billion in economic activity each year. This means that every dollar invested in public transportation in New Jersey, generates two dollars in economic activity.
- **NJ TRANSIT service support community development.**
 - For example, in Hudson County, more than 28,000 housing units have been constructed along the Hudson Bergen Light Rail (HBLR) since it opened in 2000. Areas within walking distance of light rail stations have grown the most, especially in Jersey City and Hoboken.
 - Fifty percent of Hudson County's population growth between 2010 and 2018 occurred near HBLR stations.
- **NJ TRANSIT services increase property values.**
 - The average per acre value of residential and commercial properties located within ½ mile of NJ TRANSIT rail stations statewide is 2.4 times higher than the per acre value of residential properties located further away.
 - This property value premium generates \$260 million in local taxes collected by local governments. These funds support local services and contribute to community quality of life.

- **NJ TRANSIT services support business.**
 - NJ TRANSIT services allow customers to reach businesses and employees to travel to work by transit. Sixty-four percent of New Jersey businesses are located close to transit.¹
 - These businesses employ more than 2.6 million people, which represents 65 percent of all New Jersey jobs.
 - Sixty-two percent of all business sales in the State happen at businesses located close to transit.

- **NJ TRANSIT connects New Jersey to the region and world.**
 - NJ TRANSIT services connect New Jersey residents to jobs, entertainment, and other important destinations throughout the State as well as to destinations in New York City and Philadelphia.
 - More than 78 million riders use NJ TRANSIT operated or supported trains and buses to travel into and out of Manhattan annually.
 - More than 5.2 million riders use NJ TRANSIT operated or supported trains and buses to travel between New Jersey and Philadelphia annually.
 - Nearly three million travelers annually use NJ TRANSIT's Newark Airport Station on their way to destinations far and wide.
 - More than 1.7 million travelers each year use NJ TRANSIT stations to access AMTRAK trains for business and personal travel.

- **NJ TRANSIT supports tourism and related businesses.**
 - In addition to providing residents access to arts, culture, and entertainment destinations in New York City and Philadelphia, NJ TRANSIT connects residents and visitors to the Jersey Shore.
 - A recent study conducted by researchers at Rutgers University estimated that more than 130,000 weekend riders use NJ TRANSIT's North Jersey Coast Line each summer to access destinations along the Jersey Shore for recreational purposes.

¹ For the purpose of this study, "close to" transit was defined as being within 0.5 miles of a NJ TRANSIT rail station, or 0.25 miles of a NJ TRANSIT bus route.

- Recreational riders spent an estimated \$16 million over the course of 15 summer weekends on hotels, restaurants, bars, shopping, and amusements at destinations served by the North Jersey Coast Line.
- It is not just the Jersey Shore that benefits from transit. Many visitors to the Performing Arts Center and Prudential Center in Newark use NJ TRANSIT services to travel to Newark for shows, concerts, hockey games, and other events.
 - These customers spend money not just on transit but also at the venue and nearby businesses.
 - Hockey fans that use NJ TRANSIT to get to the games spend more than \$7.5 million over the course of one hockey season alone.
 - NJ TRANSIT customers traveling to the Prudential Center to attend a marquee concert spent an estimated \$200,000 while attending the event.
- More than 400,000 residents and visitors each year use the NJ TRANSIT rail services to access sporting and other events at the Meadowlands Sports and Entertainment District.
- Atlantic City casinos, restaurants, bars, shops, entertainment venues, and other businesses benefit from transit access as well. More than 410,000 riders get on and off trains at the NJ TRANSIT Atlantic City Station each year, many for recreational and leisure purposes.

Environmental benefits

- **NJ TRANSIT reduces congestion.**
 - There are 140,000 fewer vehicles regularly using New Jersey roadways because people ride NJ TRANSIT instead of driving.
 - NJ TRANSIT services eliminate 150 million vehicle trips each year.
 - There are 1.5 billion fewer vehicle miles and 2.7 million fewer vehicle hours of travel each year because people ride NJ TRANSIT. That's the equivalent of driving from New York to Los Angeles 537,000 times. Additional vehicle miles and hours of travel contribute to highway travel delays.
 - For example, If NJ TRANSIT customers that travel into New York City for work each morning decided to drive instead, every weekday, traffic would increase by: 500 percent at the Lincoln Tunnel, 140 percent at the Holland Tunnel, and 120 percent on the George Washington Bridge.
- **NJ TRANSIT saves energy and reduces greenhouse gas emissions.**

- NJ TRANSIT services eliminate 644,000 metric tons of greenhouse gas emissions every year. That is equivalent to 72 million fewer gallons of gas consumed.
- It would require an area of over 840,000 forested acres to absorb that much pollution. This is an area the size of: Hudson, Union, Essex, Passaic, Bergen, Somerset, and Middlesex counties combined or 1,000 Central Parks.
- **NJ TRANSIT services reduce the need for parking, which means less pavement and less stormwater runoff and water pollution.**
 - If everyone that uses NJ TRANSIT today were to start driving tomorrow, the State of New Jersey would need more lanes of roadway and 30,000 to 50,000 more parking spaces to accommodate the additional cars.
 - That many parking spaces is equal to 1,000 to 2,000 acres of additional pavement just for parking.
 - More pavement means more water pollution. When it rains contaminants including gas, oil, and chemicals are washed into streams, rivers, bays, and the ocean.
 - 1,400 acres of additional parking results in nearly 620 million gallons for stormwater runoff each year.
 - This runoff contains pollution, including an estimated: 46,000 pounds of oil and grease, 1,200 pounds of heavy metals like lead, copper, zinc, cadmium, chromium and nickel, and 287,000 pounds of trash and floatable solids.
 - Pavement also increases nearby temperatures because it traps the energy from the sun. The surrounding air temperature in areas with lots of pavement can be two degrees warmer because of the trapped heat in pavement.

Benefits to people

- **NJ TRANSIT customers are diverse.**
 - People young and old, people of all races and all income levels use NJ TRANSIT services.
- **NJ TRANSIT is more affordable than travel alternatives.**
 - In New Jersey, low- and middle-income households that use public transit spend about 24-34 percent less on transportation every year than households that do not use transit.

- The same is true when you combine the costs of transportation and housing. Low- and middle-income households spend as much as 40 percent less on the combined cost of transportation and housing expenses.
- **NJ TRANSIT services provide access to opportunity.**
 - NJ TRANSIT's system provides more than 944,000 trips each weekday on 251 bus routes, three light rail lines, 12 commuter rail lines and through Access Link paratransit services.
 - NJ TRANSIT provides bus service to 386 NJ municipalities, rail service to 116 NJ municipalities and light rail service to 22 NJ municipalities.
 - NJ TRANSIT is the largest statewide transit agency in the U.S. with a service area of 5,325 square miles. This service area is more than 17 times the size of New York City's five boroughs combined.
 - NJ TRANSIT's system includes 165 rail stations, 62 light rail stations, and more than 19,000 bus stops linking major points in New Jersey, New York and Philadelphia.
 - Fifty-three percent of New Jersey residents live close to transit (i.e., 0.5-miles of rail station or 0.25 miles of a bus route), including 71 percent of low-income households, and 50 percent of households that have no access to a personal vehicle at home.
 - Sixty-five percent of jobs, 80 percent of hospitals, 65 percent of health service businesses, and 75 percent of food stores in New Jersey are located close to NJ TRANSIT services.
 - Twenty-nine percent of New Jersey residents live within 0.5 mile of rail station or 0.25 mile of high frequency bus route that provides direct service into Manhattan.
- **NJ TRANSIT helps older adults, people with disabilities, college students and veterans get around.**
 - NJ TRANSIT's bus fleet is 100 percent accessible using bus lifts and ramps. In addition, many NJ TRANSIT rail stations are accessible by elevator, ramp, mini high-level platform or portable lift.
 - NJ TRANSIT's Access Link provides service for people with disabilities who are unable to use local bus services. Qualified riders can use Access Link if their pick-up and drop-off points are within a 0.75-miles of an eligible bus route or light rail station.
 - NJ TRANSIT's Access Link fleet includes more than 400 vehicles operating throughout the State. In 2019, Access Link customers used the service to take nearly 2 million trips each year.

- NJ TRANSIT distributes approximately \$20 million each year to New Jersey counties to support community transportation services for older adults and people with disabilities.
 - County operated community transportation fleets include nearly 1,000 vehicles statewide.
 - Community transportation services operated by counties connect residents to medical appointments, jobs, recreation, school and training, shopping, visits with friends and family and other important destinations.
 - In 2019, New Jersey residents made nearly three million trips using NJ TRANSIT supported community transportation services operated by counties.
- NJ TRANSIT directs another \$24 million in Federal grant funds to local governments and not-for-profit organizations each year to support a range of local transportation, including shuttle buses, transportation to day-programs, nutrition classes, job access programs, travel instruction and others. Funds are also used to purchase vehicles.
- College students can save 25 percent on NJ TRANSIT monthly passes if their school participates in the University Partnership Program. Eighty-five schools currently participate.
- Adults 62 years and older, people with disabilities, and military personnel and their dependents save 50 percent or more on one-way fare ticket.
- **NJ TRANSIT improves roadway safety by reducing crashes.**
 - Taking public transit is safer than driving. There are fewer vehicle crashes each year because people use public transportation. In fact, if all NJ TRANSIT customers stopped using transit and started to drive instead, there would be approximately 7,000 more crashes each year on New Jersey roadways.
 - The cost of crashes, includes property damage, personal injury, loss of productivity and unfortunately in some cases death. While it is difficult to quantify these costs, researchers estimate that 7,000 additional crashes each year would result in an additional \$632 million of crash-related costs and an additional 15 deaths.
- **NJ TRANSIT customers are more active, which provides health benefits.**
 - Survey data has shown that commuters living near train stations in New Jersey walk an average of 10-20 minutes more per day. They average 30 percent more steps per day and are four times more likely to walk 10,000 steps—the steps per day target for healthy adults— when compared to people living farther away from transit.

- Walking more results in health benefits, such as lower rates of obesity, which reduces health care costs. National studies have found that higher rates of physical activity among transit users saves an average \$5,500 per person in annual health care costs.

Communicating the benefits of transit

Based on these findings, the research team recommends that NJ TRANSIT undertake a “Did You Know?” marketing campaign that communicates the benefits that NJ TRANSIT services provide to the State of New Jersey. The campaign should utilize a unique and identifiable “Did You Know?” logo on all campaign materials. This will create and reinforce a brand identity for the campaign. The campaign should focus on “telling the story” of transit services and benefits that utilizes three headlines and 20 storylines that communicate the more than 75 transit benefit facts summarized above and described in more detail in this final report.

The campaign should be geared toward three primary audiences:

1. The general public, both existing NJ TRANSIT customers and people that do not currently use NJ TRANSIT services,
2. Elected officials at the state and local levels, and
3. Businesses and the development community.

It should regularly and consistently share information and data about the benefits that NJ TRANSIT services provide residents, businesses, and communities in the State. Initially, the campaign can utilize the suite of collateral marketing materials prepared for this study; however, these materials should not be constraining.

Currently, NJ TRANSIT uses a variety of digital, mobile, print and other communication methods to share information with its customers and other constituencies. It already maintains a corporate website and mobile app, generates a regular stream of content via social media, and promotes its services via printed advertisements inside of its fleet of buses and rail vehicles, and throughout its station facilities. The proposed ‘Did You Know?’ campaign should be integrated into these existing activities as a new branded element of the agency’s regular communications and marketing.

BACKGROUND

New Jersey boasts an extensive system of public transportation that operates statewide, serving approximately two-thirds of the State's 565 municipalities. The many benefits of public transportation have been widely discussed and analyzed in both academic literature and popular media. For much of the past two decades, New Jersey policy makers have been mired in repeated debates regarding how best to fund transportation capital and operating costs in an era of significant fiscal strain. NJ TRANSIT faces many challenges related to maintaining legacy infrastructure systems and assets in a state of good repair, meeting operating budget needs, and paying for needed generational system improvements such as the Gateway Program of Trans-Hudson transportation improvements. These challenges have been amplified by the worldwide COVID-19 pandemic. When this study began in 2019, the public narrative surrounding transit in New Jersey was that NJ TRANSIT was a system in crisis, with consistent negative coverage in the press related to service disruptions and cancellations. Today, there is a renewed focus on recovery and investment. Research is needed to quantify the benefits of public transit service to New Jersey residents, business, and communities as well as to highlight ways to communicate these benefits to various constituencies.

RESEARCH OBJECTIVES

The objectives of this research study are to:

1. Quantify the economic, mobility, accessibility, environmental, and social benefits of public transportation to New Jersey;
2. Understand better what benefits are potentially most important to transit riders, non-transit riders and other stakeholder groups;
3. Determine how best to communicate the benefits of public transportation to these audiences; and
4. Develop a marketing framework, communication approaches, and collateral marketing materials to support a future transit benefits marketing campaign as part of NJ TRANSIT's on-going communications strategy.

INTRODUCTION

To achieve these research objectives, the research team implemented a multi-phase, mixed methods work plan that included both qualitative and quantitative research techniques. Phase 1 and Phase 2 of the study focused on developing a foundational understanding of what benefit measures may resonate most with various audiences in New Jersey, reviewing and synthesizing available academic and grey literature related to quantifying and communicating the benefits of public transportation; compiling and analyzing data from a variety of secondary sources and performing benefit calculations as needed to prepare a series of easy-to-understand factoids that can be used in future marketing and communication materials.

As part of Phase 3 of the study, the research team developed a series of infographics and related marketing materials designed to communicate transit benefits to a lay audience using both traditional and social media approaches. These materials were market tested via four focus groups, and refined based on participant input. Finally, the research team developed a marketing framework and recommendations for using the materials as part of a comprehensive marketing campaign.

LITERATURE SUMMARY

The literature on the transit benefits spans several decades and covers a wide-range of topics. For the purposes of this review, transit benefits were organized and will be discussed based on the following six categories:

1. Growth and economic benefits;
2. Mobility and accessibility benefits;
3. Sustainability and environmental benefits;
4. Emergency response and resiliency benefits;
5. Public health and other social benefits; and
6. Quality of life benefits.

It is clear from the review that there has been significant interest for some time in understanding and communicating the benefits associated with public transit services. To do this, researchers and practitioners have explored both quantitative and qualitative benefit measures. Some studies have analyzed national data, while others focus on specific jurisdictions, projects, or transit station areas. Some studies focus on a single category of benefit, such as economic, health, or environment, while others analyze multiple measures cutting across a range of benefit categories.

Transit benefits are also considered in the context of direct/primary, indirect/secondary and sometimes induced/tertiary benefits. For example, the direct benefit of government spending transit construction, operations and maintenance is job creation. The wages paid to transit employees allows them to spend their wages in the local economy to buy goods and services or for some other purpose. This is an indirect or secondary benefit of government investment in public transit. When a transit employee buys lunch at a nearby café, that in turn supports a local business that pays wages to their employees and taxes to the government. These later effects are considered induced or tertiary benefits of transit investment. In addition, the timing of benefits explored in the literature varies. Some benefits accrue in the short-term while other take longer to materialize.

What is also clear from the review is that many transit benefits are interrelated and sometimes must be analyzed together. For example, mobility benefits such as the potential for transit to reduce vehicle miles traveled (VMT) is closely related to emissions benefits which derive from VMT reduction. Similarly, accessibility benefits such as

improved access to well-paying jobs may be closely related to improving household incomes, and better health outcomes over the long-term.

Not all resource documents reviewed for this study provide details regarding benefit calculation methods and data, but many do. In addition, not all calculation methodologies are easily replicable as part of this study because of data availability, time and/or budget constraints. For example, it is quite common for studies to rely on survey research data, which is not contemplated here. Another example relates to economic benefits. Most studies related the economic benefits of transit systems and investments make use of detailed econometric models which are data intensive and expensive to run. This type of analysis is beyond the scope of the current study.

A summary spreadsheet matrix of resources reviewed for this study is included by reference and attached separately to this report. The matrix identifies the resource citation; type of document; geographic scope/location covered by the analysis; whether the document addresses quantitative, qualitative, or both types of benefit measures and what category of measures are addressed; whether the document explains calculation methods and data sources; whether the methods are replicable as part of the current study; and whether the document presents an approach for communicating and or marketing transit benefits. The remainder of this section presents a summary of the literature identified for each of the benefit categories listed above.

Growth and economic impacts

The economic benefits associated with public transit investment, systems and services is well documented in the literature. The most frequently cited metrics include direct impacts from transit capital, operations and maintenance expenditures, such as jobs, and economic output as well as indirect benefits such as secondary job growth, income tax revenue from wages paid to the transit workforce, and induced benefits such as multiplier effects in the broader economy from induced spending.

A 2009 Transit Cooperative Research Program (TCRP) project examined the economic impacts of nationwide public transportation capital and operating investments separately and found that \$1 billion dollars in average spending (capital and operating) on public transportation generates 36,000 jobs, \$3.6 billion in business sales, \$1.8 billion in value-added Gross Domestic Product, \$1.6 billion in labor income and approximately \$490 million in tax revenues to Federal and State government.⁽¹⁾ Subsequent studies using updated national expenditure data have found consistent results.^(2,3) These studies led to the creation of an online economic impacts calculator tool available to members of the American Public Transportation Association. The tool helps agencies understand “both direct and subsequent (multiplier) effects as agency activities ripple through the local economy and the “diverse occupational mix of jobs supported by agency operations and capital activities.”⁽⁴⁾ Further research by Chatman et al (2012) for TCRP found that the presence of transit infrastructure can lead to large agglomeration benefits, measured by increases in employment density and regional population.^(5,6)

Similar calculations have been made at the state, metropolitan region, county and project level. (See references 7, 8, 9, 10, and 11.) For example, a 2004 study measuring the impact of transit on the Montreal metro region in Quebec, Canada found that transit authorities supported 12,845 jobs, either directly or through suppliers, and contributed \$300 million in annual revenues to the Quebec and Canada governments. ⁽⁷⁾ Studies pertaining to New Jersey have shown that transit users' expenditures contribute significantly to New Jersey's economy. ^(12,13,14) For example, a study by Deka et al. showed that recreational travelers from New Jersey and neighboring states who travel by the North Jersey Coast Line (NJCL) to visit tourist destination along the New Jersey coast spend almost \$15 million in the New Jersey shore communities on summer weekends. This spending generates \$9 million in earnings, 225 annualized jobs, and \$1 million in state taxes. ^(12,13) More importantly, at least 80 percent of these benefits are generated from transit users visiting from other states, especially New York.

In addition to spending benefits such as jobs created or supported, economic output, and increased government sales and income tax revenue, ^(1-17, 20) studies have discussed and, in some cases, quantified other economic benefits such as:

- Enhanced property value in areas served by transit, especially near transit stations; ^(See references 7, 8, 15, 16, and 22.)
- Increased local property tax revenue resulting from higher property values; ^(8,15,16)
- Increased spending by transit users in local economies; ^(See references 12, 13, 14, and 19.)
- Improved business access to consumer and/or labor markets; ^(See references 1, 2, 3, 7, 8, 10, 15, 16, 19, and 23.)
- Improved worker access to well-paying jobs; ^(16,22)
- Tourism and entertainment benefits when visitors are able to use transit; ^(7,8,15)
- Land and infrastructure efficiency benefits associated with transit supporting compact, concentrated transit-oriented development; ^(See references 15, 16, 20, 22, and 23.)
- Cost savings and productivity gains (travelers and business) from lower levels of congestion attributable to the presence of public transit; ^(See references 1, 2, 3, 8, 10, 15, 16, 18, 21, 22, and 23.)

Finally, many studies cite reduced household transportation costs associated with traveling by transit compared to driving as an economic benefit. ^(See references 1, 2, 3, 8, 10, 15, 16, 17, 18, and 23.)

Mobility and accessibility

The literature on transit benefits consistently identifies improved accessibility to jobs, customers, and other needed destinations, ^(See references 1, 2, 3, 7, 8, 10, 15, 16, 19, 22, and 23.) and enhanced mobility as a significant benefit of public transit. This is especially true for those who cannot or choose not to drive, including older adults, people with disabilities and lower-income populations. ^(See references 8, 15, 16, 18, 23, 30, 31, and 33.) Research shows that low-income and minority populations are far more likely to use public transportation than

others because a large proportion of them do not have cars available. ^(34,35) Similarly, people with disabilities use public transit for a higher share of trips than people without disabilities. ⁽³⁶⁾

VMT reduction and congestion relief ^(See references 1-3, 8, 10, 15, 16, 18, 21-24, 26-29, and 37-39.) are also cited as important benefits of public transit. For example, for more than a decade, studies conducted by the Texas Transportation Institute (TTI) have estimated the combined effects of roadway congestion in terms of yearly delay experienced by drivers stuck in traffic, “wasted” fuel per auto commuter, and the costs of congestion. In 2005, TTI estimated “that if public transportation service was discontinued nationwide and the riders traveled in private vehicles instead, urban areas would have suffered an additional 541 million hours of delay and consumed on the whole 340 million more gallons of fuel in 2005. The value of the delay and fuel that would be consumed if there were no public transportation service would be an additional \$10.2 billion congestion cost, a 13 percent increase over current levels.” ⁽²¹⁾

Sustainability and the environment

Research has documented that public transportation has several sustainability and environmental benefits. Most often, these are identified as secondary benefits related to reductions in vehicle miles traveled by private autos and light-duty trucks. Lower rates of VMT reduce transportation-related emissions. ^(See references 7, 8, 15, 18, 22-24, 26-29, 37, and 39-41.) For example, studies prepared by ICF International for the Transit Cooperative Research Program “found a significant correlation between transit availability and reduced automobile travel, independent of transit use. Transit reduces U.S. travel by an estimated 102.2 billion vehicle miles traveled (VMT) each year. This is equal to 3.4 percent of the annual VMT in the U.S. in 2007.” ^(24,27)

According to a study published by the Federal Transit Administration (FTA), “public transportation produces significantly lower greenhouse gas emissions (GHG) per passenger mile than private vehicles.” FTA found that “heavy rail transit, such as subways, produce 76 percent less GHG emissions per passenger mile than an average single-occupancy vehicle (SOV). Light rail systems produce 62 percent less and bus transit produces 33 percent less.” ⁽²⁸⁾ A 2011 study in the Washington, DC. metropolitan region found that travel by Metro saved 40.5 million gallons of fuel annually and avoided 260 tons VOC, 22 tons PM, and 0.5 million tons of CO₂. Collectively these emissions savings amounted to an estimated \$9.5 million (\$2010). ⁽⁸⁾

A study conducted Deka and Marchwinski pertaining to NJ TRANSIT’s Pascack Valley Line, found that deviation of potential automobile users to transit reduces GHG emissions by about one-third even after emissions from transit is accounted for. ⁽²⁹⁾ Furthermore, transit helps to reduce traffic congestion on congested roadways. Another study conducted by the research team showed that the NJCL helps to reduce traffic at certain locations on the Garden State Parkway by seven to nine percent during weekend peak periods ^(12,13). The same study also showed that the services provided by NJ TRANSIT

helps to reduce traffic in downtown Newark by five to 15 percent during events at the Prudential Center.

Emergency response and resilience

Public transit's benefits related to emergency preparedness and resilience is less well documented in the literature. This is particularly true with regard to academic literature. The academic literature related to the role transportation plays in emergency preparedness, response and recovery is primarily focused on highway evacuation and systems performance. Only one article identified addressed specifically transit's role. This article by Schwartz and Litman (2008) reviewed how prepared transit agencies and metropolitan regions are to support evacuation operations. Researchers found that preparedness was lacking in most metro regions and went on to recommend ways agencies can bolster capabilities to respond effectively in emergencies. ⁽⁴²⁾ No examples of quantified benefits were identified for this category.

With that said, there are a number of examples where transit's benefits related to emergencies and community resilience are treated qualitatively. These references are found in popular media, industry related publications and in the form of practitioner guidance. ^(15,16,20,42-46) In most cases, the references describe the appropriate roles transit agencies could and should prepare to play in emergencies.

A report prepared by the Transportation Research Board ⁽⁴³⁾ contends that public transit "can play a vitally important role in an emergency evacuation, egress, and ingress of people supplies from and to critical locations in times of emergency." Among the evidence presented, the report cites the critical role the New York Metropolitan Transportation Authority and NJ TRANSIT played "...shuttling passengers out of Lower Manhattan" and "employees, buses, and equipment to the World Trade Center site to support emergency responders" in the wake of the September 11, 2001 terror attack in New York City. The report also notes that "in Washington, D.C., the shutdown of the federal government following the strike on the Pentagon clogged local roads, and Metrorail became the mode of choice for transport from the area."

A report prepared for the Texas Department of Transportation ⁽⁴⁴⁾ suggests the following potential benefits transit can provide:

- Evacuation of local residents during flooding, fires, hazardous-material spills, bomb threats, or other emergency conditions;
- Transport of emergency workers and volunteers to and from an emergency staging site;
- Supplemental transportation for people and supplies within a city or county during recovery from flooding or other area-wide disasters;

- Use of air-conditioned/heated buses as shelter/respice facilities for emergency workers and victims; especially valuable during a fire or hazardous-material response effort;
- Communications support, if buses are radio-equipped;
- Monitoring of road and weather conditions; determining safe travel routes; and
- Supplemental vehicles for police or another local agency.

These were identified via a literature review and scan of transit agency practices in Texas. In addition, several blog posts and online newsletters discuss the role transit agencies have played in emergency evacuations in recent years. ^(45,46)

Public health and other social benefits

Public transportation can also generate a variety of public health and social benefits. ^(See references 7, 8, 10, 11, 15, 17-20, 22, 23, 25, 32, 33, 37-39, 41, and 47-51.) For example, a number of empirical research studies indicate that people that use transit walk more, ⁽⁴⁷⁻⁵¹⁾ which can improve overall health and reduce obesity and body mass index. ^(47,48) Transit users also tend to walk more because they do so to access services in their neighborhoods and at their destinations. ⁽⁵⁰⁾ One New Jersey-based analysis assessed the physical activity patterns of transit commuters living near three different suburban rail stations and found 78 percent of riders living near a station met physical activity recommendations—compared with 44 percent for the entire state. ⁽⁴⁹⁾ Another study collected self-reported information and distributed pedometers to train and auto commuters in northern New Jersey. The train commuters reported an average of 30 percent more steps and were four times more likely to walk 10,000 steps—the equivalent of meeting physical activity recommendations. ⁽⁵¹⁾

Increased physical activity related to transit use has been shown to have a measurable effect on upstream health outcomes such as lowered obesity rates. A 2008 study converted the additional minutes spent walking to transit into energy expenditure and reduction in obesity prevalence and, using this potential reduction, calculated the present value savings of \$5,500 per person ⁽⁴⁸⁾.

In terms of other social benefits, transit use can reduce households' expenditure on transportation. As noted previously, individual and household cost savings are also sometimes counted as an economic benefit. Statistical models in a study by a research team member that used national Consumer Expenditure Survey data showed that the overall transportation cost of households containing transit users was lower than households that did not contain any transit user ⁽⁵²⁾.

“Quality of life” benefits

The quality of life benefit of transit is most often discussed in the literature as a suite of measures that appear in the other categories ⁽⁵³⁾. For example, in the general context of transportation, studies have often linked quality of life with mobility and accessibility.

(25,30,31) Studies also show that transportation is linked to quality of life through various measures of “physical, mental, social, and economic well-being—which are predominantly influenced by three components of the transportation system: mobility/accessibility, the built environment, and vehicle traffic.”⁽⁵⁴⁾ Given the paucity of studies identified in the literature that specifically mention quality of life in the context of transportation, this article, by Lee and Sener (2016), is important because it defines multiple dimensions of quality of life in the context of transportation system components. This framing may provide a basis for organizing a marketing strategy that communicates the benefits of public transit in New Jersey. This study also includes a useful review of the literature defining and exploring the multiple dimensions of quality of life.

SUMMARY OF WORK PERFORMED

Focus groups

As part of Phase 1 of the study, the research team convened four focus groups. The purpose of the sessions was to gain insights and obtain feedback from New Jersey residents, elected officials, and business owners on how public transit impacts them personally, the State of New Jersey, their constituents (elected officials), and/or their employees and customers (business owners). Focus group discussions also sought to capture information about which benefits associated with public transit are most important to various stakeholders, as well as strategies to communicate and market the benefits of public transit.

The following is a summary of the key findings and common themes gleaned from the Phase 1 focus group discussions.

Familiarity with NJ TRANSIT services

- Across all groups, there was an overall high degree of awareness regarding the availability of NJ TRANSIT services.
 - Many participants reported being very familiar with and regularly using one or more services, including a number that reported either currently or formerly using NJ TRANSIT services to commute back and forth to work or school.
 - Access Link was the least known service.
 - There was a general misperception that the majority of NJ TRANSIT’s customers are rail riders, rather than bus riders.
- Perceptions of NJ TRANSIT services varied widely based on where participants lived and/or worked and based on their personal experiences.

- Most existing NJ TRANSIT customers reported being overall satisfied with NJ TRANSIT services. Those that reported being satisfied appreciated service frequency and the convenience of available services where they live and/or work. Regular users acknowledged that services are generally reliable, and many reported being satisfied with the relative affordability of transit services compared to the other travel options available to them.
- At the same time, unsatisfied customers and those that do not regularly use NJ TRANSIT services expressed a variety of common frustrations and complaints about NJ TRANSIT services.
 - Non-NJ TRANSIT customers explained that the main reasons why they do not use public transit is because transit is not “convenient,” they find it “frustrating,” “it does not go where they need it to go,” they do not like using it during “inclement weather,” and it is difficult to use “when you have to get kids to activities like sports.”
 - A number of participants reported experiencing transit trips that took significantly longer than the same trip by car.
 - Others expressed frustrations regarding what they described as poor customer communication regarding service disruptions.
 - NJ TRANSIT customers complained about: bus and light-rail overcrowding; reliability issues, including train cancelations; poor customer service and rude train/bus operators; unclean stations, stops and terminals; and accessibility issues that included lack of elevators at rail stations and bus operator treatment of customers utilizing wheelchairs (e.g. failing to stop and pick-up customers using wheelchairs).
 - Elected officials reported regularly hearing complaints about service reliability; poor communication and transparency about service delays; lack of adequate and reliable parking at rail stations; limited services statewide with infrequent service in many places; vehicle and station cleanliness; and high cost. Several observed that transit reliability complaints have increased over the past two years.
 - Business owners noted that they often hear complaints from their employees and/or customers related to: the cost of taking NJ TRANSIT services; the fact that many areas have limited services; lack of frequent service; problems associated with service reliability; and lack of adequate parking at rail stations, especially for commuters.

Impact of public transit on New Jersey

- There was unanimous consensus at the elected official, business owner, and NJ TRANSIT customer focus group sessions that, overall, NJ TRANSIT services are beneficial to New Jersey residents, businesses and communities. A majority of non-NJ TRANSIT customer participants also agreed that services are beneficial.
- Participants at each of the four focus group sessions were able to self-identify multiple benefits of transit. Most commonly these were associated with economic, mobility, accessibility, sustainability, and environmental benefits. None were able to cite any specific statistics, just a general sense and belief that transit provides benefits. Specific benefit measures identified by participants were as follows:
 - **Growth and economic benefits**
 - Transit creates jobs.
 - Transit helps people “get to work.”
 - Access to transit enables many New Jersey residents to reside in the suburbs while still accessing diverse job opportunities in the New York City area, which increases their salaries.
 - The availability of public transit helps New Jersey to attract businesses, contributing to economic growth.
 - Transit increases sales revenue for local businesses located near transit.
 - Transit increases “foot traffic” which stimulates businesses.
 - Transit increases property value and allows growth around transit stations/stops.
 - However, some noted that increased property value was not necessarily a positive measure as that could contribute to increased taxes and rents, and may contribute to pricing individuals out of their respective neighborhood.
 - **Mobility and accessibility benefits**
 - Transit reduces traffic congestion.
 - Some disagreed, noting that they doubted or could not relate to the idea that transit impacted congestion significantly anywhere except when traveling into New York City.

- Decreased pollution benefits everyone, including persons suffering from respiratory illnesses.
 - Transit is safer than driving.
 - Transit reduces auto travel, which they described as a dangerous travel mode.
 - Reliable transportation helps address community health disparities and positively influence health outcomes.
 - Transit use increases people’s level of physical activity.
 - Transit use reduces stress compared to driving thus contributing to positive mental health.
 - Commuting by transit “frees up your time” so you can do other things while traveling...read a book, look at social media, get some work done or to just rest!
 - Transit offers an overall relaxing, easy commute.
 - Transit can contribute to personal independence and affords opportunities for social interactions
 - Public transit can contribute to a “sense of community” or belonging.
 - Transit can save you money if you don’t need to own a car.
 - Transit is a more cost-efficient travel option compared to driving in many scenarios.
 - Not all agreed with this statement, noting that this very much depended on individual circumstances.
- Participants from both the business owner and elected official sessions also self-identified benefits associated public health and more generally with overall quality of life.
 - Participants at both the NJ TRANSIT customer and non-NJ TRANSIT customer focus groups uniformly disagreed that transit offers public health benefits. Most expressed health concerns, such as being exposed to germs/illness from fellow passengers, as opposed to health benefits.
 - This contrasted with the perceptions of business owners and elected officials, who expressed a belief that transit provided public health benefits that derive from increased physical activity among transit customers.

- No participant in any of the four sessions self-identified transit benefits related to emergency response and community resilience.
 - Participants were prompted with examples, such as NJ TRANSIT services aiding with emergency evacuations during Tropical Storm Irene and Super storm Sandy, as well as providing transportation in the aftermath of the September 11, 2001 terror attacks. Several participants expressed interest in these examples but indicated they did not find this benefit particularly compelling. Others voiced support for promoting these benefits more widely. As one NJ TRANSIT customer opined, increasing public awareness for these kinds of services will help demonstrate how NJ TRANSIT “supports communities.”
- While no single benefit or benefit category emerged as most compelling, economic, environmental and mobility/accessibility benefits garnered the most attention and discussion.
 - It was also noted that the appeal of various benefits will vary depending on the audience. For example, environmental benefits might appeal more to younger persons while older adults might be more interested in personal economic benefits and accessibility benefits.

Communication methods

All participants indicated they would be receptive to hearing messages related to the benefits of public transit. Overall, approximately a dozen methods for communicating the benefits of public transit were suggested by one or more participants from the four focus group sessions. The most frequently suggested methods were social media, television, and radio. Other commonly cited suggestions included hyperlocal media, online news outlets, and municipal websites and social media feeds. While non-transit customers and business owners were supportive of employing billboard ads, elected officials and transit customer participants were not.

Many participants of both the business owner and NJ TRANSIT customer focus group sessions noted that regardless of the marketing approach, a diversity of ads and materials communicating the benefits of transit should be developed. For example, a message could be targeted to older adults and persons with disabilities, while another could be targeted to younger persons.

Non-NJ TRANSIT customers

Television and radio ads were mentioned, as were billboard advertisements. Regarding the latter, it was suggested that LED and traditional billboard advertising be placed along populated roadways, boardwalks, local street fairs, environmental events, and other recreational spaces. Non-transit participants did not support the use of social media to communicate transit benefits. Several did recommend utilizing hyperlocal media, including online local news services such as the TAPinto network and Patch. Someone

also suggested sharing short videos that highlight a “personal story” demonstrating the positive impacts of transit.

NJ TRANSIT customers

Most participants suggested utilizing social media platforms, television (News 12) and radio ads, hyperlocal online news outlets, and statewide online news outlets such as nj.com. Several individuals suggested marketing the benefits of transit at local community events but recommended that NJ TRANSIT should determine a “fun” way to engage attendees, such as offering giveaways of inexpensive “swag.” Several also recommended sharing the benefits via NJ TRANSIT public information events, such as Access Link forums. NJ TRANSIT customers were not supportive of utilizing billboards to advertise transit benefits.

Elected officials

Most participants suggested utilizing social media platforms, with one participant specifically recommending the video-sharing social networking service TikTok. Several shared that Facebook is used by a primarily older cohort compared to other social media platforms. The NJ.gov Twitter feed was cited by several as a good model. Hyper local online news services such as the TAPinto network and Patch were suggested. One participant recommended using press releases in traditional newspapers. Several elected officials recommended using municipal newsletters as well as sharing marketing materials with municipal communication departments to assist with message dissemination.

Business owners

The business owners focus group suggested billboard ads placed on station platforms, along roadways, and in/near tunnel entrances into NYC. Television ads on News 12, municipal government channels, and PBS were recommended, as were radio ads on 101.5 and WFMU stations. Advertising on online news outlets including nj.com, njbiz.com, and roi-nj.com were suggested, as was leveraging local chambers of commerce. Many mentioned social media, but their support for this medium was not as strongly expressed as by the elected official and transit customer participants. One business participant also suggested marketing transit benefits via bus wrap advertisements.

Potential storylines and graphics

At each focus group session, participants were shown a series of 12 example infographics communicating the benefits of transit. Participants were asked to make observations and provide feedback on the information being communicated and the style and design of the graphics. The facilitator made it clear that the information in the graphics was not specific to New Jersey. Overall, participants responded positively to graphics that:

- Clearly and simply communicated the core message;
- Were uncomplicated; and

- Used bold colors to communicate core messaging and statistics, especially when combined with softer color schemes in the overall design.

Participants did not like graphics that presented a multitude of statistics, which they found confusing. This sentiment was especially true if the statistics presented were difficult to visualize and/or provided little or no context. Participants from the elected official session expressed skepticism about the statistics presented in many of the graphics.

More detailed documentation related to the focus group discussions, including participant details and a focus group topic guide, is included in the Phase 1 report from this study (dated March 10, 2020). See Volume II, Appendix B.

Data collection and analysis

Based on findings from the literature review and Phase 1 focus groups, the research team identified a comprehensive list of potential benefit measures and storylines that could be used to support a broad public and stakeholder information campaign regarding the benefits of transit in New Jersey. The list was narrowed in consultation with NJ TRANSIT staff, and a final set of benefit measures and storylines were selected. Once the list was narrowed, the research team collected the data and information necessary to populate the storylines with content and estimated benefits, where necessary, for the selected measures. The following sections summarize the data collected and methods used to calculate benefits.

Growth and Economic Benefits

As noted in the literature review section, public transit provides a range of growth and economic benefits. These range from supporting land development and population growth to promoting job creation and economic activity generated from transit agency spending.

Jobs and economic output

To estimate the impact of NJ TRANSIT spending on New Jersey's economy, the research team used a web-based economic modeling tool developed by the American Public Transit Association (APTA).⁽⁵⁵⁾ The tool reports direct, indirect, and induced effects associated with operations and maintenance (O&M) and for capital spending. In addition, the tool generates data that details the number of jobs generated by economic sector from capital, operations and maintenance spending and jobs by occupation.⁽⁵⁶⁾ Table 1 explains the four primary measures in more detail.

Table 1 – APTA Economic Impact Tool economic measures

Measure	Direct Effects	Indirect (Supplier) Effects	Induced Effects
Employment	Agency jobs (O&M) and jobs supported in construction, engineering, and related firms and manufacturing jobs for vehicle and equipment purchases, if applicable and sourced from the local economy (Capital)	Jobs supported in supplier firms attributable to “Outside of agency” purchases of goods and services produced “locally” from all rounds of business-to-business transactions	Jobs created as result of local income re-spending by agency personnel that reside “locally” (O&M) and personnel employed by firms associated with construction projects and vehicle and equipment purchases that also reside “locally”
Labor Income	Annual wages paid to agency employees (O&M) and annual wages paid to workers in construction, engineering and related firms and manufacturing firms (Capital)	Annual wages paid to workers in outside firms supported by the agency’s purchases of goods and services sourced locally	Annual wages paid to workers in outside firms and businesses supported by income re-spending
Value Added	The contribution made to overall regional or state domestic product, (i.e., the difference between total revenue generated and the total cost of inputs, including the sum of labor, materials, and services purchased from other businesses within a reporting period. This includes the value of labor income for (O&M) and value of goods produced plus profits made by firms attributable to construction projects and vehicle and equipment purchases (Capital)	The contribution made to overall regional or state domestic product, including profit made by firms attributable to agency purchases of goods and services sourced locally	The contribution made to overall regional or state domestic product, including, profit made by firms and businesses for goods associated with all rounds of income re-spending
Output	Value of all goods and services produced	Value of goods and services produced	Value of goods and services produced

Source: APTA My Economic Impact Tool: How to Use It. Note: “Locally” refers workers that live in the State of New Jersey, jobs created in New Jersey, and spending that occurs in New Jersey.

The APTA economic impact calculator uses IMPLAN, an input-output model, running in the background. Input-output analysis is used to estimate the economy-wide effects of changes in economic activity. The APTA tool was specifically designed to estimate impacts of transit investments using agency-specific expenditure and employment data reported to the National Transit Database (NTD). Data from three NTD data tables are used as data inputs – the employment table, the operating expenditure table, and the

capital expenditure table. For this project, the research team used 2017 NTD data, which is the most current complete data set available.

The APTA tool economic modeling results are summarized in Table 2. In 2017, NJ TRANSIT's invested \$2,555.7 million in transit capital projects, operations and maintenance. This included \$2,091.4 million for operations and maintenance and \$464.2 million in capital projects. This level of expenditure generated an estimated 30,456 jobs in New Jersey, including 11,963 NJ TRANSIT jobs. Of these, 1,458 jobs were in construction and related firms associated with capital projects and 7,879 outside agency jobs associated with the agency's purchase of goods and services in New Jersey. Income re-spending by NJ TRANSIT employees and others whose jobs are supported by NJ TRANSIT investment created an estimated 9,155 jobs.

Table 2 – Summary of economic impacts from transit investment

Impact Type	Employment	Labor Income (\$M)	Value Added (\$M)	Output (\$M)
Direct Effect	13,421	1,345.74	1,368.14	2,324.00
Transit Operations & Maintenance	11,963	1,245.90	1,245.90	2,091.60
Transit Capital Investment	1,458	99.84	122.24	232.40
Indirect (Supplier) Effect	7,879	466.52	600.08	1,224.49
Induced (Income Re-spending) Effect	9,155	497.44	845.09	1,368.95
Total Effect	30,456	2,309.70	2,813.31	4,917.44

In 2017, labor income, including wages and fringe benefits, received by NJ TRANSIT employees, workers filling jobs supported by NJ TRANSIT investment, and employee re-spending totaled more than \$2.3 billion. The value-added to the New Jersey economy from NJ TRANSIT investment totaled \$2.8 billion. Overall, NJ TRANSIT investment resulted in \$4.9 billion in economic output in the State in 2017. For more information on the APTA economic impact tool analysis see Volume II, Appendix A and B.

Supporting growth and development

Land and infrastructure efficiencies are commonly identified as benefits of transit. The availability of high-quality, frequent public transit service, especially rail transit, is frequently associated with encouraging or facilitating compact, concentrated development near transit stations. (See references 15, 16, 20, 22, and 23.) This type of development pattern often referred to as transit-oriented development (TOD), is evident in transit communities throughout New Jersey. Perhaps the leading and most extensive example of TOD in New Jersey is along the Hudson-Bergen Light Rail (HBLR) in Hudson County.

In this regard, the research team used the example of the HBLR to quantify how NJ TRANSIT services support growth and development. The research team used Geographic Information Systems (GIS) software and data from the U.S. Census Bureau and New Jersey Geographic Information Network (NJGIN) open data portal to calculate

population increase and the number of housing units constructed within a 0.5-mile buffer of the HBLR line since 2000, the year HBLR service began operating. We then compared these estimates to the proportion of Hudson County population and housing growth that occurred. Tables 3 and 4 show the results of this analysis. The study area analyzed is depicted in Figure 1.

Table 3 – Growth and development along the HBLR in Hudson County, NJ (2000-2020)

	Year	0.5-mile network distance of HBLR stations	0.5-mile buffer of HBLR line	Hudson County
Population	2000	175,817	299,068	608,975
	2010	183,893	309,369	634,278
	2011	185,434	311,194	636,776
	2012	186,245	312,385	639,220
	2013	188,517	315,551	645,330
	2014	191,244	319,755	653,862
	2015	195,291	325,899	665,188
	2016	198,657	331,567	676,080
	2017	203,370	337,730	684,907
	2018	208,133	343,255	691,717
	2019	212,535	348,053	696,968
2020	215,489	351,801	703,543	
Housing units	2000	73,240	122,610	240,618
	2010	84,934	139,124	270,676
	2011	85,678	140,044	271,987
	2012	86,059	140,644	273,278
	2013	87,064	142,165	276,171
	2014	88,315	144,150	280,068
	2015	90,195	147,040	285,275
	2016	92,114	149,834	290,360
	2017	94,842	153,014	294,545
	2018	97,735	156,111	297,777
	2019	99,946	158,363	300,196
2020	101,141	159,684	303,130	
Area (sq mile)		7.96	15.81	52

Data Sources: ESRI Business Analyst demographics, American Community Survey. Note: Data for 2000 were calculated manually in ArcGIS Pro. Data for 2010-2020 were automatically calculated by ESRI ArcGIS Business Analyst extension.

Table 4– Proportion of Hudson County, NJ growth along HBLR

	0.5-mile network distance of HBLR stations	0.5-mile buffer of HBLR	Hudson County Total	% within 0.5-mile HBLR station	% within 0.5-mile HBLR
Total population growth (2000-2020)	39,672	52,733	94,568	42.0%	55.8%
Population growth (2000 - 2010)	8,076	10,301	25,303	31.9%	40.7%
Population growth (2010 - 2020)	31,596	42,432	69,265	45.6%	61.3%
Total housing unit growth (2000-2020)	27,901	56,313	92,032	30.3%	61.2%
Housing unit growth (2000 - 2010)	11,694	35,753	59,578	19.6%	60.0%
Housing unit growth (2010 - 2020)	16,207	20,560	32,454	49.9%	63.4%

Data Sources: ESRI Business Analyst demographics, American Community Survey. Note: Data for 2000 were calculated manually in ArcGIS Pro. Data for 2010-2020 were automatically calculated by ESRI ArcGIS Business Analyst extension.

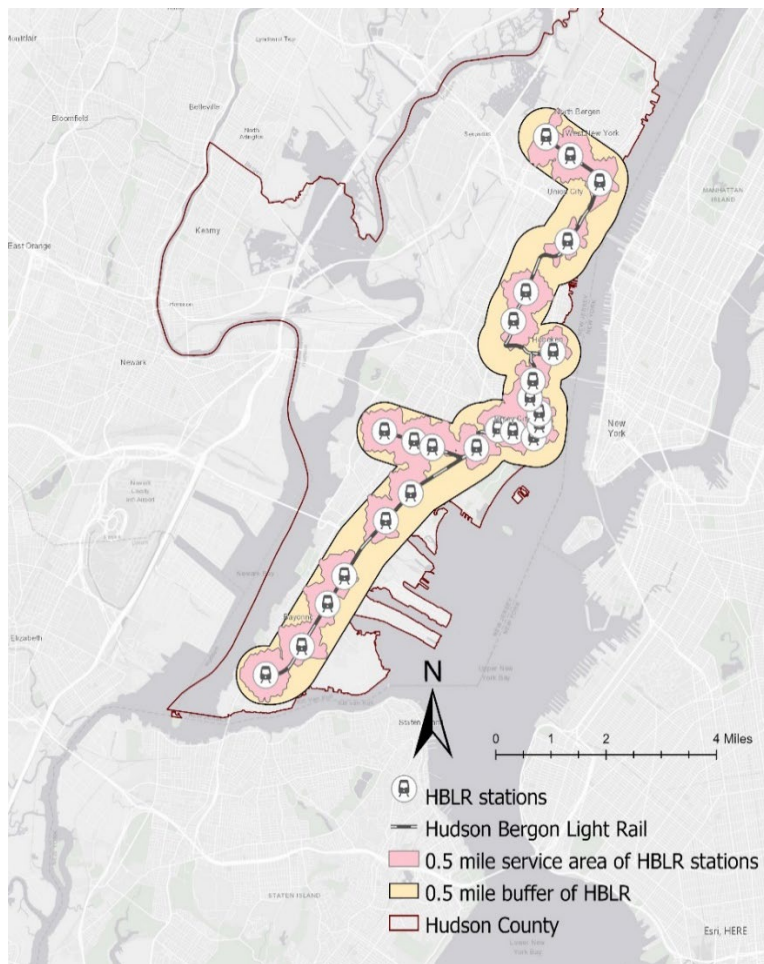


Figure 1. HBLR Study Area

As shown in Tables 3 and 4, in the twenty years since the HBLR started operating, approximately 56 percent of population growth and more than 61 percent of housing unit growth in Hudson County occurred proximate to the HBLR, most within 0.5 miles of one of the HBLR stations. This housing and population concentration pattern close to NJ TRANSIT stations accelerated over the last decade.

Impact on property values

High-quality, frequent transit service can have a positive effect on property value in areas served by transit, especially near transit stations. (See references 7, 8, 15, 16, and 22.) To estimate the effect of transit proximity on property values in New Jersey, the research team utilized GIS and statistical analysis software to analyze data from the NJGIN open data portal and data from the New Jersey Property Tax System/MOD-IV obtained from the New Jersey Division of Taxation. MOD-IV is "...the mechanism used to maintain and update all tax assessment records in the State of New Jersey." This data is compiled using the tax lists filed by municipal tax assessors with the County Boards of Taxation on or before January 10th of each year. These lists display "...all parcels of real property as delineated and identified on the municipality's official tax maps, as well as taxable values and descriptive data for each parcel." (57)

Data on three property classes were analyzed—Apartment, Commercial, and Residential. The analysis examined property value relative to proximity to NJ TRANSIT rail and light rail stations as follows:

- < 0.5-miles from NJ TRANSIT rail stations;
- 0.5 to 1.0-miles from a NJ TRANSIT rail station
- > 1.0-miles from a NJ TRANSIT rail station.

For the analysis of values by rail line, the > 1.0 miles from a NJ TRANSIT station study area was interpreted to include areas > 1.0-mile but less than 3.0-miles from a station. Parcels with a net taxable value of zero were removed from the dataset. As a result, data for 2,288,982 of New Jersey's 2,522,555 tax parcels were used for this analysis. To normalize the data for comparative purposes, equalized valuations were used. Property value per acre was calculated by dividing the property value identified in the MOD IV dataset by parcel area size. Average per acre property values by property class and proximity study area were then aggregated by municipality, county, and NJ TRANSIT rail line.

Table 5 presents the results of the analysis for NJ TRANSIT rail lines. Table 6 shows the analysis results for New Jersey counties, and Table 7 presents the analysis results for municipalities in Hudson County, New Jersey, as an example of municipal results. If there are no rail stations or properties for a particular property class within a given study area, the cell for that combination of conditions shows "NA."

While patterns of property valuation differed by rail line, county, and municipality, overall, the analysis showed a significant value premium associated with properties located closer to NJ TRANSIT rail stations. The results were consistent for apartment, commercial and residential properties. The following list summarizes observations from a review of the data:

- In the aggregate, proximity to NJ TRANSIT rail stations positively impacts property values along all of NJ TRANSIT's rail and light rail lines.
 - The average per-acre value of apartment, commercial, and residential properties located within 0.5-miles of NJ TRANSIT rail stations statewide ranged from 1.6 times greater for apartment properties to 2.3 times greater for residential properties to 3.3 times greater for commercial properties.
 - Statewide, average per-acre property values for apartment, commercial, and residential property combined were 2.4 times higher than the per-acre value of properties located further away.
- The lines associated with the greatest property value premium are the Northeast Corridor Line and the North Jersey Coast Line.
 - Per acre property values for apartments, commercial and residential properties located within 0.5-miles of rail stations are more than double the average per-acre value of properties located more distant from stations.
- The Newark Light Rail shows the least benefit associated with proximity to rail stations.
- Proximity to commuter rail stations appears to have a greater impact than proximity to light rail stations.
- Proximity to rail stations has the greatest impact on the value of commercial properties within 0.5-miles of a station.
- In the aggregate, property value premiums are present in every New Jersey county served by rail stations.
 - Except for apartment properties located within 0.5-miles of rail stations in Atlantic County, per acre property value premiums for all three classes of property range from 0.04 times greater for apartment properties in Bergen County up to 5.68 times greater for commercial properties in Ocean County.
- As is evidenced by the data for municipalities in Hudson County, the relationship between property value and proximity to rail stations can vary significantly by location and property class. In some municipalities, properties located near stations are valued higher and in others valued lower when compared to

properties located further from rail stations. This variation occurs within all three property classes.

More information on the methods used to conduct the property value analysis is included in the Phase 2 report from this study (dated September 8, 2021). See Volume II, Appendix C.

Table 5 – Property valuation and proximity to NJ TRANSIT rail stations by rail line

Rail Line	Average Per Acre Value - Apartment Properties				Value Ratio (<0.5 miles : Average)
	<0.5 mile	0.5-1.0 mile	>1.0-3.0 mile	Average	
Atlantic City Line	1,295,232	1,401,796	934,443	986,159	0.31
Bergen County Line	9,542,033	8,927,402	4,017,315	7,142,508	0.34
Hudson Bergen Light Rail	13,874,192	13,895,600	9,323,922	12,631,120	0.10
Main Line	9,761,350	9,342,009	3,998,996	7,155,393	0.36
Gladstone (Morris & Essex)	6,611,647	7,121,901	3,834,192	5,916,585	0.12
Morristown (Morris & Essex)	6,340,741	6,350,801	2,864,730	4,937,467	0.28
Montclair Boonton Line	6,985,274	7,473,929	2,740,139	5,078,248	0.38
Newark Light Rail	3,992,098	3,815,840	3,599,828	3,786,060	0.05
Northeast Corridor Line	8,029,581	6,169,353	1,849,876	3,048,620	1.63
North Jersey Coast Line	7,653,190	6,124,958	1,959,662	3,509,132	1.18
Pascack Valley Line	10,043,376	9,172,552	4,101,461	7,227,397	0.39
Raritan Valley Line	1,855,459	1,607,051	1,758,590	1,744,316	0.06
RiverLine	1,552,925	1,108,167	864,949	924,143	0.68
All Lines Combined	7,782,903	7,110,194	2,293,927	4,409,961	0.76
Average Per Acre Value - Commercial Properties					
	<0.5 mile	0.5-1.0 mile	>1.0-3.0 mile	Average	
Atlantic City Line	1,196,143	944,516	518,322	591,038	1.02
Bergen County Line	6,536,320	4,760,866	2,273,757	3,343,861	0.95
Hudson Bergen Light Rail	10,038,342	8,129,908	2,729,214	5,499,269	0.83
Main Line	6,649,276	4,749,344	2,156,342	3,312,445	1.01
Gladstone (Morris & Essex)	5,166,679	4,592,530	1,142,994	2,120,744	1.44
Morristown (Morris & Essex)	4,480,497	4,077,624	1,076,702	1,772,760	1.53
Montclair Boonton Line	4,760,662	4,421,571	1,216,084	1,941,940	1.45
Newark Light Rail	3,060,190	3,081,435	2,005,132	2,496,314	0.23
Northeast Corridor Line	5,763,217	4,098,809	1,520,469	2,207,586	1.61
North Jersey Coast Line	5,388,566	3,515,938	1,281,496	2,086,697	1.58
Pascack Valley Line	5,960,997	5,288,678	2,039,710	3,187,498	0.87
Raritan Valley Line	1,838,101	1,195,966	810,737	903,302	1.03
RiverLine	1,005,617	778,779	437,820	507,420	0.98
All Lines Combined	5,113,047	4,039,184	1,284,451	2,090,736	1.45
Average Per Acre Value - Residential Properties					
	<0.5 mile	0.5-1.0 mile	>1.0-3.0 mile	Average	
Atlantic City Line	1,183,704	1,091,321	559,259	632,716	0.87
Bergen County Line	5,445,616	3,875,270	1,870,521	2,588,902	1.10
Hudson Bergen Light Rail	11,535,496	11,073,006	6,421,858	9,540,612	0.21
Main Line	5,373,419	3,820,670	1,855,093	2,500,574	1.15
Gladstone (Morris & Essex)	4,290,412	3,236,665	1,381,353	1,980,561	1.17
Morristown (Morris & Essex)	4,392,265	3,393,158	1,329,407	1,900,236	1.31
Montclair Boonton Line	4,470,260	3,262,617	1,229,999	1,711,502	1.61
Newark Light Rail	2,715,729	2,611,472	2,670,935	2,659,917	0.02
Northeast Corridor Line	6,073,536	4,090,780	1,749,449	2,287,645	1.65
North Jersey Coast Line	5,004,756	3,742,860	1,739,722	2,311,890	1.16
Pascack Valley Line	5,457,658	4,069,612	2,151,638	2,849,963	0.91
Raritan Valley Line	1,473,179	1,285,629	893,819	943,578	0.56
RiverLine	1,225,609	1,060,449	858,211	913,948	0.34
All Lines Combined	4,792,398	3,478,942	1,446,925	2,016,053	1.38

Data Sources: N.J. Department of Treasury, Division of Taxation

Table 6 – Property valuation and proximity to NJ TRANSIT rail stations, by county

County	Average Per Acre Value - Apartment Properties				Value Ratio (<0.5 miles : Average)
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Atlantic	475,054	1,680,655	775,483	821,870	(0.42)
Bergen	4,481,550	3,845,524	4,415,474	4,289,430	0.04
Burlington	1,249,626	747,257	799,232	813,193	0.54
Camden	1,215,465	972,698	809,108	831,898	0.46
Cape May	NA	NA	2,959,188	2,959,188	N/A
Cumberland	NA	NA	513,210	513,210	N/A
Essex	4,005,972	3,541,675	2,902,566	3,328,101	0.20
Gloucester	NA	NA	638,048	638,048	N/A
Hudson	13,518,200	13,461,529	8,828,471	12,284,554	0.10
Hunterdon	921,406	466,110	839,827	773,386	0.19
Mercer	1,816,585	2,174,338	938,157	970,523	0.87
Middlesex	4,307,783	2,321,073	1,517,164	1,612,861	1.67
Monmouth	2,546,495	2,979,614	1,320,159	1,536,048	0.66
Morris	2,098,759	1,658,843	1,087,996	1,165,112	0.80
Ocean	1,334,995	1,297,745	588,936	593,656	1.25
Passaic	3,785,374	3,601,859	2,453,592	2,797,377	0.35
Salem	NA	NA	376,066	376,066	N/A
Somerset	2,638,612	2,123,684	1,930,549	1,971,195	0.34
Sussex	NA	458,230	449,206	449,360	N/A
Union	3,263,098	2,715,783	1,651,177	2,211,248	0.48
Warren	1,886,661	1,203,620	569,363	587,505	2.21
New Jersey	4,634,873	3,738,956	1,371,782	1,780,470	1.60
Average Per Acre Value - Commercial Properties					
County	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Atlantic	1,203,754	1,374,265	232,886	260,842	3.61
Bergen	3,211,926	3,056,490	1,832,394	2,085,637	0.54
Burlington	805,831	569,479	338,632	349,030	1.31
Camden	1,191,335	736,185	486,273	533,358	1.23
Cape May	NA	NA	437,758	437,758	N/A
Cumberland	NA	NA	179,017	179,017	N/A
Essex	3,275,866	2,663,418	1,317,489	1,667,395	0.96
Gloucester	NA	NA	291,360	291,360	N/A
Hudson	9,923,359	8,073,032	2,849,051	5,825,892	0.70
Hunterdon	567,975	423,226	302,464	309,200	0.84
Mercer	1,719,539	1,821,798	720,122	775,387	1.22
Middlesex	4,086,628	2,495,677	1,112,373	1,267,516	2.22
Monmouth	2,975,637	1,738,134	676,787	791,849	2.76
Morris	1,711,473	1,563,557	725,445	798,199	1.14
Ocean	3,366,129	2,829,200	481,114	503,869	5.68
Passaic	3,237,253	2,770,115	1,398,894	1,584,149	1.04
Salem	NA	NA	108,612	108,597	N/A
Somerset	1,865,756	1,398,496	651,192	709,704	1.63
Sussex	560,081	388,675	128,077	128,527	3.36
Union	3,263,517	2,156,199	1,377,376	1,769,622	0.84
Warren	1,306,564	997,182	231,677	247,822	4.27
New Jersey	3,309,309	2,442,754	612,707	763,707	3.33
Average Per Acre Value - Residential Properties					
County	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Atlantic	659,017	670,270	292,766	300,747	1.19
Bergen	2,418,319	2,375,420	1,965,165	2,049,347	0.18
Burlington	1,178,012	913,016	488,842	508,034	1.32
Camden	1,468,543	1,288,015	617,778	679,593	1.16
Cape May	NA	NA	1,515,731	1,515,731	N/A
Cumberland	NA	NA	139,067	139,067	N/A
Essex	2,788,228	2,653,271	1,994,180	2,195,299	0.27
Gloucester	NA	NA	360,339	360,339	N/A
Hudson	11,444,670	10,599,675	5,433,194	8,786,269	0.30
Hunterdon	708,696	470,038	204,544	209,883	2.38
Mercer	1,329,646	1,498,655	812,638	832,524	0.60
Middlesex	2,271,968	2,181,094	1,496,198	1,546,975	0.47
Monmouth	3,079,946	2,851,566	924,350	1,062,371	1.90
Morris	1,538,227	1,561,435	629,194	697,592	1.21
Ocean	4,583,118	3,913,459	1,181,811	1,213,942	2.78
Passaic	2,353,808	2,331,958	1,089,535	1,188,551	0.98
Salem	NA	NA	136,871	136,871	N/A
Somerset	1,261,047	1,036,457	668,806	692,602	0.82
Sussex	925,719	677,092	186,843	187,667	3.93
Union	2,388,568	2,414,304	2,035,104	2,160,173	0.11
Warren	1,149,722	842,902	215,602	223,139	4.15
New Jersey	2,788,574	2,356,774	747,848	856,186	2.26

Data Sources: N.J. Department of Treasury, Division of Taxation

Table 7 – Property valuation and proximity to NJ TRANSIT rail stations, Hudson County

Municipality	Apartment				Value Ratio (<0.5 miles : Average)
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Bayonne	6,973,553	6,770,560	1,685,078	6,444,000	0.08
East Newark Borough	NA	5,725,234	NA	5,725,234	N/A
Guttenberg	NA	NA	11,515,097	11,515,097	N/A
Harrison	5,703,766	7,210,613	8,171,681	6,951,716	(0.18)
Hoboken	30,468,109	31,766,674	NA	30,946,975	(0.02)
Jersey City	12,982,191	14,630,536	14,582,700	13,974,776	(0.07)
Kearny	NA	4,657,150	6,061,866	5,731,374	N/A
North Bergen Township	4,287,211	4,682,787	8,148,352	7,490,841	(0.43)
Secaucus	7,765,663	NA	4,902,175	5,715,756	0.36
Union City	9,065,888	11,170,646	10,486,208	10,455,774	(0.13)
Weehawken Township	12,733,345	13,964,619	NA	13,531,405	(0.06)
West New York	13,921,850	13,249,126	13,184,888	13,378,261	0.04
Hudson County	13,518,200	13,461,529	8,828,471	12,284,554	0.10
	Commercial				
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Bayonne	5,907,983	6,163,872	1,498,629	5,541,336	0.07
East Newark Borough	244,280	4,087,060	NA	3,888,380	(0.94)
Guttenberg	NA	NA	9,146,457	9,146,457	N/A
Harrison	4,601,925	7,115,446	12,335,297	6,085,558	(0.24)
Hoboken	35,148,122	37,817,966	134,960	29,655,997	0.19
Jersey City	8,529,410	5,786,425	1,339,730	5,375,210	0.59
Kearny	NA	4,511,503	3,218,894	3,249,058	N/A
North Bergen Township	3,437,961	3,592,318	3,032,361	3,118,431	0.10
Secaucus	8,723,462	9,173,836	2,956,122	3,509,265	1.49
Union City	12,787,708	10,265,076	10,923,265	10,982,289	0.16
Weehawken Township	10,529,205	5,141,666	14,089,381	8,119,727	0.30
West New York	10,963,733	10,981,104	9,500,339	10,789,087	0.02
Hudson County	9,923,359	8,073,032	2,849,051	5,825,892	0.70
	Residential				
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Bayonne	5,943,381	6,083,355	6,644,069	6,011,056	(0.01)
East Newark Borough	4,866,467	6,309,672	NA	6,302,759	(0.23)
Guttenberg	NA	NA	17,334,710	17,334,710	N/A
Harrison	7,374,414	5,886,774	8,383,764	6,220,881	0.19
Hoboken	104,607,283	86,851,286	NA	95,585,041	0.09
Jersey City	7,515,291	8,202,149	7,570,732	7,882,316	(0.05)
Kearny	NA	4,989,030	4,128,673	4,143,246	N/A
North Bergen Township	5,184,903	6,041,728	5,502,403	5,495,701	(0.06)
Secaucus	NA	NA	3,167,057	3,167,057	N/A
Union City	8,989,542	9,902,566	8,490,810	9,131,240	(0.02)
Weehawken Township	10,432,127	10,634,722	11,477,180	10,591,091	(0.02)
West New York	9,601,677	9,478,579	9,704,371	9,561,974	0.00
Hudson County	11,444,670	10,599,675	5,433,194	8,786,269	0.30

Data Sources: N.J. Department of Treasury, Division of Taxation

Impact on local tax revenue

In New Jersey, local property taxes support a range of local services, including public schools, emergency services, refuse collection, libraries, senior and youth services, infrastructure construction, operations and maintenance, and other facilities and services depending on the municipality. As noted in the previous section, proximity to NJ TRANSIT rail stations is associated with increased value for properties near transit in many places in New Jersey.

To estimate the property tax benefit associated with increased value, the research team first calculated the difference in equalized value per acre for properties within 0.5-miles of a rail station compared to properties in the same class located within the municipality but greater than that 0.5-miles of a station. This difference was then multiplied by municipality-specific tax rates to estimate the net tax benefit realized by local governments annually based on the increased valuation of apartment, commercial, and residential properties in the municipality. Municipality-specific tax rates were obtained from the New Jersey Department of Treasury, Division of Taxation. Negative value differences were not subtracted from the benefit total.

Table 8 – Local tax benefit from increased valuations near rail stations

County	Incremental tax benefit to municipalities for increased valuation near transit (\$)			
	Apartment	Commercial	Residential	Total
Atlantic	12,648	2,491,990	2,691,550	5,196,188
Bergen	1,827,687	15,639,397	16,358,441	33,825,525
Burlington	736,000	2,953,903	8,555,686	12,245,588
Camden	60,640	6,347,859	3,196,800	9,605,299
Cape May	NA	NA	NA	NA
Cumberland	NA	NA	NA	NA
Essex	2,074,184	26,100,559	19,581,919	47,756,662
Gloucester	NA	NA	NA	NA
Hudson	1,216,676	27,806,383	10,575,087	39,598,146
Hunterdon	NA	450,271	3,159,787	3,610,057
Mercer	600,753	3,542,168	2,575,655	6,718,576
Middlesex	85,837	15,513,373	5,018,739	20,617,950
Monmouth	16,350	2,956,492	8,441,862	11,414,705
Morris	2,138	7,942,315	8,714,964	16,659,417
Ocean	NA	447,686	17,608	465,294
Passaic	450,973	4,920,106	2,741,585	8,112,664
Salem	NA	NA	NA	NA
Somerset	85,698	5,122,666	8,815,675	14,024,039
Sussex	NA	52,714	9,810	62,524
Union	34,758	24,911,108	3,612,356	28,558,222
Warren	2,000	397,895	730,431	1,130,326
New Jersey	7,206,342	147,596,885	104,797,955	259,601,182

Data Sources: NJ Department of Treasury, Division of Taxation. Note: See Volume II, Appendix C a for more information on the data sources and methods used to derive these estimates

As shown in Table 8, New Jersey municipalities collect approximately \$260 million in additional property tax revenue annually from properties located within 0.5-miles of NJ TRANSIT rail stations because property values near transit are higher than in areas further from transit. These additional property tax revenues support local services and contribute to community quality of life in the municipalities served by NJ TRANSIT rail stations.

Improved business access to consumer and labor markets

There are many ways to measure the potential benefits of transit to businesses and workers. One important measure is the extent to which public transit services provide businesses with access to consumer and labor markets. In many parts of New Jersey, public transit service is a conduit that connects businesses with customers and workers. To quantify these benefits, the research team used ESRI ArcGIS Business Analyst software to calculate the:

- Number of business establishments located close to NJ TRANSIT services;
- Business revenue/sales reported by these establishments;
- Number of jobs located close to NJ TRANSIT services; and
- Number of residents living close to NJ TRANSIT services.

For this analysis, “close to” transit was defined as within a 0.5-mile network distance of NJ TRANSIT rail and light rail stations and a 0.25-mile buffer of a NJ TRANSIT bus route. Table 7 shows the results of these analyses.

Table 9 – Businesses and workers served by NJ TRANSIT services

Performance Measure	Estimate
Business establishments located close to NJ TRANSIT services	203,882
- Percent of total New Jersey businesses	64.2%
Total revenue/sales reported by establishments located close to NJ TRANSIT services	\$526,400,081
- Proportion of all New Jersey business revenue/sales	62.4%
Jobs located close to NJ TRANSIT services	2,682,365
- Proportion of all New Jersey jobs	64.8%
Households living close to NJ TRANSIT Services	1,767,291
- Proportion of all New Jersey households	53.4%
Residents living close to NJ TRANSIT services	4,837,799
- Proportion of all New Jersey residents	53.2%
Working age residents (ages 16-64) living close to NJ TRANSIT services	2,796,385
- Proportion of all New Jersey residents	48.0%

Data Source: ESRI Business Analyst

Connections to regional and national markets

In addition to providing New Jersey residents and businesses with improved access to customers and jobs inside the State, NJ TRANSIT services connect residents and

businesses to regional and national markets and destinations such as employment centers, government offices, healthcare facilities, and others. For example, NJ TRANSIT trains and buses travel into and out of New York City and Philadelphia and connect to Newark-Liberty International Airport. NJ TRANSIT train stations at Newark Penn Station, Metropark, New Brunswick, Princeton Junction, and Trenton Transit Center are all served by Amtrak with service between Boston, MA and Washington, DC., and connecting services to many other cities throughout the United States. To demonstrate these connections, the research team collected ridership and station boarding data to quantify the number of travelers making these connections each year. Table 10 summarizes a range of statistics related to business access, regional and national destinations and markets.

Table 10 – Ridership statistics for select NJ TRANSIT facilities and services

Performance Measure			Estimate
Travel into and out of New York City, NY ¹			
Annual NJT Interstate Bus Ridership			106,357,420
Annual NJT Interstate Rail Ridership			55,169,660
Total New York City Ridership (Bus + Rail)			161,527,080
Travel into and out of Philadelphia, PA			
Annual NJT Interstate Bus Ridership ²			4,915,133
Annual NJT Interstate Rail Ridership ³			338,544
Total Philadelphia Ridership (Bus + Rail)			5,253,677
Average Annual Newark Airport Station Boardings ⁴			2,950,429
Annual Amtrak Ridership by Station ⁵	<u>Riders On</u>	<u>Riders Off</u>	<u>Total</u>
Newark Penn Station	365,271	366,457	731,728
Newark Airport Station	93,308	71,431	164,739
Metropark	193,463	190,577	384,040
New Brunswick	1,498	2,808	4,306
Trenton Transit Center	<u>216,462</u>	<u>218,375</u>	<u>434,837</u>
Grand Total	870,002	849,648	1,719,650

Data Sources: NYMTC Hub-Bound Travel, Quick Reference Data (<https://www.nymtc.org/Data-and-Modeling/Transportation-Data-and-Statistics/Publications/Hub-Bound-Travel>), NJ TRANSIT, Amtrak. Notes: 1) Persons entering and leaving the NYC Hub on a Fall business day by mode and sector in 2019. Interstate Bus assumes all riders using NJ TRANSIT operated or supported bus services from New Jersey to NYC. Annual ridership estimates were derived by multiplying average Fall business day ridership by 260 business days per year. Estimates DO NOT include weekend ridership. 2) Annual interstate bus ridership estimates based on pre-Covid data provided by NJ TRANSIT for 2017-2019. 3) Annual rail ridership estimates based on pre-Covid data provided by NJ TRANSIT for the period 2016-2018. The Atlantic City Line was out of service for part of 2018 and 2019 due to Positive Train Control equipment installation. 4) Average annual boardings at Newark Airport Station based on pre-Covid data provided by NJ TRANSIT for 2017-2019. 5) Annual Amtrak ridership based on pre-Covid data provided by Amtrak for March 2019 through February 2020.

Benefits to tourism and tourism-related businesses

There are many entertainment destinations, cultural attractions, performing arts venues, stadiums, arenas, historic sites, parks, beaches, and boardwalks throughout the region that are accessible by public transit. NJ TRANSIT bus and rail services support tourism and tourism-related businesses by connecting New Jersey residents and visitors to sites and venues within New Jersey and destinations in New York City and Philadelphia. NJ TRANSIT services also connect residents and visitors from adjacent states to New Jersey destinations.

A recent study conducted by researchers at Rutgers University estimated that more than 130,000 weekend riders use NJ TRANSIT's North Jersey Coast Line each summer to access destinations along the Jersey Shore for recreational purposes. Many of these riders reside in New York City. Using survey data, the researchers estimated that recreational transit riders spent an estimated \$16 million over the course of 15 summer weekends on hotels, restaurants, bars, shopping, and amusement. ⁽¹³⁾ Further south in Atlantic City, casinos, restaurants, bars, shops, entertainment venues, and other businesses benefit from NJ TRANSIT access. More than 410,000 travelers get on and off trains at NJ TRANSIT's Atlantic City Convention Center station each year, many for recreational and leisure purposes.

It's not just the Jersey Shore that benefits from NJ TRANSIT services either. Many Newark visitors use NJ TRANSIT services to travel to the Performing Arts Center and Prudential Center for shows, concerts, hockey games, and other events. These customers spend money not just on transit but also at the venue and nearby businesses. For example, Rutgers researchers estimated that hockey fans that use NJ TRANSIT to get to games at the Prudential Center spend more than \$7.5 million during one hockey season alone. Survey data also revealed that NJ TRANSIT customers traveling to just one concert at the Prudential Center spent an estimated \$200,000. ⁽¹³⁾ Finally, every year more than 400,000 residents and visitors use NJ TRANSIT rail services to access sporting and other events at the Meadowlands Sports and Entertainment District. NJ TRANSIT runs special train and bus service for large events in the Meadowlands. This special service reduces the demand for parking and helps relieve congestion on surrounding roadways on event days. Table 11 summarizes these tourism and recreational transit use statistics.

Table 11 – Tourism and recreational transit use statistics

Performance Measure	Estimate
Weekend riders using NJ TRANSIT’s North Jersey Coast line each summer to access destinations along the Jersey Shore	130,000
Dollars spent by weekend riders over one 15-week summer	\$16,000,000
Annual riders using NJ TRANSIT Atlantic City Convention Center station	410,000+
Dollars spent by hockey fans using NJ TRANSIT to access games during one season at the Prudential Center in Newark	\$7,500,000
Dollars spent by NJ TRANSIT riders attending one concert at the Prudential Center in Newark	\$200,000
Number of riders using NJ TRANSIT rail and bus services to access games and events at the Meadowlands Sports and Entertainment District	400,000+

Data Sources: Pre-Covid ridership statistics provided by NJ TRANSIT. Tourism-related travel statistics were obtained from Deka, Devajyoti. (2014). Impact Analysis of Recreational Transit Services on Local Community Economic Development, Employment, and Spending. New Jersey Department of Transportation. Report No. FHWA-NJ-2014-017.

Sustainability and Environment Benefits

Traffic and congestion

Hundreds of thousands of New Jersey commuters travel into and out of New York City each day. In the absence of public transit services, traffic and congestion at the Lincoln and Holland Tunnels and the George Washington Bridge would be extreme. Traffic reduction and congestion relief at the trans-Hudson crossings were estimated to show the number of additional private passenger vehicles trips that would be generated if NJ TRANSIT service (i.e., commuter rail, buses directly operated by NJ TRANSIT, and NJ TRANSIT-owned buses operated by private carriers) did not exist. The analysis includes only travel to the Manhattan Central Business District (aka NYC Hub), which includes all of Manhattan south of 60th Street.

Table 12 – Estimated number of people traveling from NJ to the NYC HUB

	Between 8 and 9 am			Between 7 and 10 am			In a 24-Hour Period		
	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail
Lincoln Tunnel	4,071	24,487		12,307	50,101		64,164	95,054	
Holland Tunnel	3,071	1948		9,208	3,629		50,844	7,674	
George Washington Bridge	10,789	3,008		30,041	5,378		188,266	18,123	
Amtrak/NJ TRANSIT Tunnels			25,171			51,846			88,361
Total	17,931	29,443	25,171	51,556	59,108	51,846	303,274	120,851	88,361

Note: * includes passengers traveling via NJ TRANSIT buses and private carrier buses supported by NJ TRANSIT.

Table 13 – Estimated NYC-bound auto trips in the absence of NJ TRANSIT services

	Between 8 am and 9 am			Between 7 am and 10 am			In a 24-Hour Period		
	Original Autos	Deviated from transit	Total Autos	Original Autos	Deviated from transit	Total Autos	Original Autos	Deviated from transit	Total Autos
Lincoln Tunnel	2,974	22,063	25,037	9,239	46,902	56,141	47,525	84,257	131,782
Holland Tunnel	2,540	5,177	7,717	7,787	10,900	18,687	41,717	18,434	60,151
George Washington Bridge	7,875	13,262	21,137	22,587	26,717	49,304	139,456	54,057	193,513

Table 14 – Percent increase in inbound auto trips in the absence of NJ TRANSIT services

	Between 8 am and 9 am	Between 7 am and 10 am	In a 24-hour period
Lincoln Tunnel	742%	508%	177%
Holland Tunnel	204%	140%	44%
George Washington Bridge	168%	118%	39%

As shown in Table 12, more than 200,000 people use NJ TRANSIT services to travel from New Jersey into Manhattan’s central business district on an average weekday. More than half of those that use NJ TRANSIT services travel between 7 am-10 am, the morning peak commuting period. If NJ TRANSIT rail and bus services did not exist, an estimated additional 26,717 private passenger vehicles trips would be needed to accommodate commuters during 7 am-10 am (See Table 13). The addition of vehicles during this period would increase traffic at the Holland and Lincoln tunnels by 140 to more than 500 percent respectively. Traffic at the George Washington Bridge would more than double. Table 14 shows the percent increase in traffic estimated at each crossing in the absence of NJ TRANSIT trans-Hudson commute modes.

Vehicle miles traveled and greenhouse gas emissions

The sustainability and environmental benefits of public transit service can be measured in a variety of ways. One way is to consider how people would travel if public transit did not exist and what impact new travel patterns might have on the environment. NJ TRANSIT services accommodate nearly 270 million passenger trips each year. In the absence of NJ TRANSIT services, many New Jersey residents would need to travel by private passenger vehicle. Private passenger vehicle travel increases the number of vehicle miles traveled each year which increases greenhouse gas (GHG) emissions. As such it can be argued that NJ TRANSIT services provide environmental benefits by reducing the number of private passenger vehicles on the road, which in turn reduces VMT and GHG emissions.

The research team used NJ TRANSIT ridership statistics reported in the NTD and data from the National Household Travel Survey (NHTS) to estimate the number of additional

private passenger vehicles that would be needed to accommodate travel by NJ TRANSIT customers that currently use NJ TRANSIT services if those services did not exist. The annual VMT that would result from more private passenger vehicles being used was estimated using data from the Bureau of Transportation Statistics. The research team used multipliers made available from the Environmental Protection Agency to estimate additional GHG emissions generated from the additional VMT. The results of these calculations are presented in Table 15.

Table 15 – Sustainability impacts if NJ TRANSIT services did not exist

Impact Measure	Estimate
Number of additional private passenger vehicles operating year-round on New Jersey roadways	+120,000 to 137,000
Additional private passenger vehicle trips annually	+133 to 151 million
Increase in annual VMT	+1.53 to 1.67 billion
Increase in annual GHG emissions	+567 to 644,000 metric tons or +1.2 to 1.4 billion pounds

To make these numbers more relatable, the research team used the United States Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator to convert estimated GHG emissions to energy and environmental benefit equivalents. The calculator helps to translate emissions estimates into everyday terms that the general public understands. Complete documentation of the calculation methodologies used in the EPA’s equivalency calculator are on the EPA website. ⁽⁵⁹⁾ Table 16 summarizes the equivalencies generated by the online tool for the emissions benefits estimated in Phase 1 of the study.

Table 16 – GHG benefits and equivalencies associated with NJ TRANSIT service

Performance Measure	Estimate	
	Low	High
GHG/CO ₂ reduction associated with NJ TRANSIT ridership (metric tons)	-567,000	-644,000
Gallons of gasoline consumed	63,801,058	72,465,399
Tanker trucks worth of gasoline	7,506	8,525
Barrels of oil consumed	1,312,725	1,490,996
Acres of U.S. forest needed to sequester annual CO ₂ emissions	694,676	789,014
Number of urban tree seedlings needed to be grown for ten years to sequester annual CO ₂ emissions	9,375,465	10,648,676

Source: USEPA

To convert acres of forest needed to sequester annual CO₂ emissions to terms relatable to New Jersey residents, the research team performed additional calculations based on the geographic size of places familiar to residents. Table 17 shows the size of New Jersey counties. An area of forest roughly the size of Bergen, Essex, Hudson, Middlesex, Passaic, and Somerset counties combined (768,460 acres) would be needed to sequester the annual CO₂ emissions saved because NJ TRANSIT services exist.

Analogously, an area the size of 936 Central Parks would be required. Central Park is 843 acres in size.

Table 17 – Geographic area of New Jersey counties

County	Square Miles	Acres
Atlantic	555.70	355,648
Bergen	233.01	149,126
Burlington	798.58	511,091
Camden	221.26	141,606
Cape May	251.42	160,909
Cumberland	483.70	309,568
Essex	126.21	80,774
Gloucester	322.00	206,080
Hudson	46.19	29,562
Hunterdon	427.82	273,805
Mercer	224.56	143,718
Middlesex	308.91	197,702
Monmouth	468.79	300,026
Morris	460.18	294,515
Ocean	628.78	402,419
Passaic	184.59	118,138
Salem	331.90	212,416
Somerset	301.81	193,158
Sussex	519.01	332,166
Union	102.85	65,824
Warren	356.92	228,429

Source: U.S. Census Bureau, data file from Geography Division based on the TIGER/Geographic Identification Code Scheme (TIGER/GICS). Note: Conversion from square miles to acres based on 640 acres/square mile.

Pavement and pollution

Another negative environmental impact of increased automobile use is increased pavement area and non-point source (NPS) pollution caused by stormwater runoff from pavement. According to the EPA, “NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and groundwater.”⁽⁶⁰⁾ Roadways and parking lots contribute to urban stormwater runoff. Runoff often includes pollutants such as sediment (soil, sand, gravel, and stone); oil, grease, and other petroleum residues from motor vehicles and pavement sealants; heavy metals and toxic chemicals from motor vehicles; and road salts. (See references 60, 61, 62, and 63.) Roadways and parking lots also absorb thermal energy from the sun. Retained energy contributes to hotter air and surface temperatures that can be 2-8 degrees warmer in urban areas due to stored heat.⁽⁶¹⁾

To quantify the potential pollution reduction benefits of NJ TRANSIT services, the research team estimated the additional parking area likely needed to accommodate new private passenger vehicles needed to transport NJ TRANSIT customers absent transit services. The pavement estimates were based on the average number of parking spaces needed to accommodate the vehicles multiplied by the average size of parking spaces in the United States. Because research on this topic varies, the research team produced a range of estimates based on available sources. (63,64)

As shown in Table 18, the average number of parking spaces required to accommodate private passenger vehicles in the United States ranges from 2.2 to 4 parking spaces per vehicle. Based on these multipliers, the research team estimated an additional 308,000 to 560,000 parking spaces would be required to accommodate the 140,000 new cars necessary to meet the travel needs of New Jersey residents absent NJ TRANSIT services. This number of parking spaces translates to approximately 1,000 to 2,000 acres of additional parking in New Jersey.

Table 18 – Parking and pavement estimates

New vehicles required to accommodate travel absent NJ TRANSIT services	140,000	
	Parking and Pavement Estimates	
	Low Range	High Range
Average parking spaces per vehicle	2.2	4
Estimated parking spaces required	308,000	560,000
Average parking space size in the United States (sq. ft.)	154.8	154.8
Sq. ft. of parking required for additional vehicles	47,678,400	86,688,000
Square miles parking required	1.7	3.1
Acres of parking required	1,095	1,990

Source: Average parking space size from <https://www.dimensions.com/element/parking-spaces> Note: Conversion based on 27,878,400 sq. ft./sq. mile and 43,560 sq. ft./acre.

As noted above, parking lots are a significant source of NPS water pollution. A review of academic and applied literature identified a published peer-reviewed study that modeled the pollution impacts associated with approximately 1,397 acres of parking. This amount of parking is in the middle of the range estimated to be needed to accommodate an additional 140,000 vehicles in New Jersey. Davis et al. used the Long-Term Hydrologic Impact Assessment (L-THIA) model to estimate the pollution impacts of two scenarios: 1) land area occupied by parking lots, and 2) runoff of the same land area that was assigned ecosystem classes (e.g., wetlands, forests, agriculture, and grassland) in the proportion existing in the non-urban parts of the study area. As shown in Table 19, the estimated pollution impacts of 1,397 acres of parking are significant.

Table 19 – Pollution from parking results: Average annual runoff impacts

Indicator	Estimate
Acres of parking in the study area	1,397
Volume of runoff	
Acre-feet *	1,900
Gallons	619,117,721
Oils and grease (pounds)	46,545
Heavy metals - Lead, Copper, Zinc, Cadmium, Chromium, Nickel (pounds)	1,187
Suspended solids (pounds)	287,030

Notes: * One acre-foot equals 326,000 gallons. Source: Davis, A.Y. et al. (2010) The environmental and economic costs of sprawling parking lots in the United States. Land Use Policy 27, 255-261

Mobility, Accessibility, and Social Benefits

The research team collected and analyzed various data related to who uses NJ TRANSIT services and how NJ TRANSIT services impact the mobility, accessibility, and well-being of NJ TRANSIT customers and others. The following sections summarize these data and analyses.

Who uses NJ TRANSIT services?

One way to assess the impact and benefits of NJ TRANSIT's services is to profile who uses the agency's services. NJ TRANSIT regularly surveys its customers to track utilization and better understand how satisfied customers are with the services they receive. The NJ TRANSIT Customer Satisfaction Survey collects data from Bus, Rail, Light Rail, and Access Link customers regarding their satisfaction with over 40 service attributes. The survey also gathers origin, destination, and demographic information about the customers participating in the survey. ⁽⁶⁵⁾ Table 20 presents a demographic profile of NJ TRANSIT's customer base.

Table 20 – Demographic characteristics of NJ TRANSIT customers

Characteristic	System	Bus	Rail	Light Rail	Access Link
Annual Household Income					
Lower income (<\$35,000)	26.3%	37.4%	8.1%	20.1%	60.6%
Middle income (\$35,000-\$99,999)	32.7%	34.6%	27.8%	38.9%	30.6%
Higher income (>\$100,000)	41.0%	28.1%	64.1%	41.1%	8.7%
Age					
Under 18 years	1.3%	1.9%	0.4%	1.8%	0.2%
18-34 years	33.5%	36.9%	29.4%	37.0%	23.7%
35-54 years	39.6%	39.6%	37.5%	39.2%	21.1%
55-64	17.5%	15.2%	21.3%	16.3%	24.1%
65 and over	7.8%	6.0%	11.5%	5.6%	30.6%
Gender					
Female	52.3%	56.7%	44.8%	53.1%	58.6%
Male	47.7%	43.3%	55.2%	46.9%	41.4%
Disability Status					
No	94.3%	94.6%	96.8%	94.4%	15.3%
Yes	5.7%	5.4%	3.2%	5.6%	84.7%
Race					
American Indian or Alaska Native	0.8%	1.1%	0.3%	0.9%	0.1%
Asian or Pacific Islander	12.0%	12.1%	12.5%	10.8%	3.3%
Black or African American	19.4%	26.2%	9.1%	15.5%	28.6%
Mixed Race	11.8%	14.6%	6.9%	14.0%	7.8%
Other Race	10.0%	1.6%	0.2%	0.1%	0.5%
White	55.0%	44.4%	71.0%	58.7%	59.8%
Hispanic Origin					
No	79.3%	73.8%	89.7%	71.3%	89.5%
Yes	20.7%	26.2%	10.3%	28.7%	10.5%

Source: NJ TRANSIT Customer Satisfaction Survey, Analysis of Fall 2019 survey data provided by Susan O'Donnell.

Household transportation expenditures

Research on the benefits of public transit has consistently found that households that use public transit spend less on transportation than households where no one uses public transit. The difference in household transportation expenditures results from households spending less on car ownership and operating costs. Studies consistently find that the costs of using transit are cheaper than alternatives such as owning and driving a car. (See references 1, 7, 8, 16,25, 38, and 66.)

The research team analyzed microdata from the U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES) to investigate whether public transit use in New Jersey saves families money. The CES collects data via interviews as well as travel

diaries. The specific data files analyzed for this study are the family files, which are derived from interviews. These were used because the files contain household-level information. The research team combined data for 24 months to create a database suitable for this analysis. The data spans the period from the fourth quarter of 2017 through the third quarter of 2019. Table 21 shows the number of observations (households) found in the combined 24-month dataset.

Table 21 – Number of consumer units (i.e., households) in the CES data

Quarter	United States		New Jersey	
	Frequency	Percent	Frequency	Percent
Q4 2017	5,916	13.2	118	15.1
Q1 2018	5,899	13.1	124	15.9
Q2 2018	5,773	12.9	118	15.1
Q3 2018	5,571	12.4	119	15.2
Q4 2018	5,623	12.5	0	0.0
Q1 2019	5,493	12.2	110	14.1
Q2 2019	5,337	11.9	93	11.9
Q3 2019	5,248	11.7	100	12.8
Total (N)	44,860	100.0	782	100.0

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Readers should note that the CES includes a small sample size for any given quarter. In addition, because of the way the survey is conducted, certain quarters lack data for some states (e.g., New Jersey in 2018_4). For these reasons, BLS recommends using quarterly data for national and regional-level analysis. State-level analyses required data to be combined from multiple quarters to obtain a reasonable sample size. The combined dataset used here includes eight quarters of data for the United States and seven quarters for New Jersey because households in New Jersey were not included in the fourth quarter 2018 national sample.

CES data are primarily about household expenditures. They do not include variables on travel patterns or trips, just money spent on transportation. Consequently, to distinguish households whose members take public transit, it is necessary to examine whether they spent any money on public transport. Two variables show public transit expenditures: TRNTRPPQ and TRNOTHPQ. The first includes spending on all public transportation, including inter-regional trips by train, air, etc. The second includes only local public transport. The research team used the second variable to distinguish households that use public transit from those that do not. The variable on total transportation expenditure is TRANSPQ was also used. This variable includes all transportation expenditures, including private vehicle purchase (new and old), leasing, insurance, maintenance, gas, etc., and public transit expenditures.

The CES includes two household income variables. One for household income in the past 12 months before tax and the other for the past 12 months after tax. The research team used the variable on income before tax (FINCBTAX). It was necessary to categorize the respondents by income quintiles (i.e., five equal categories, each containing 20 percent of the households) to compare households' total transportation expenditure for those using transit and those not by income group. The research team estimated income cut-off points separately for the U.S. and New Jersey because New Jersey's mean income is substantially higher than the U.S. Table 22 shows the income cut-off points of the U.S. and New Jersey samples.

Table 22 – Income cut-off points for quintiles

Percentile	US cut-off income	NJ cut-off income
20%	\$12,648	\$23,976
40%	\$33,020	\$47,520
60%	\$60,000	\$85,162
80%	\$106,600	\$148,078

Table 23 shows the U.S. and New Jersey sample sizes by income quintile. To complete the analysis, the research team had to remove records that reported transportation expenditures for the quarter as \$0. The elimination of households with \$0.00 transportation expenditure reduced the size of the New Jersey sample from 782 to 745 (i.e., 527+218) observations.

Table 23 – Sample size (N) for the estimation of mean transportation expenditure

Annual income quintile	United States		New Jersey	
	No transit household	Transit household	No transit household	Transit household
Lowest 20%	5,418	1,185	92	40
20% to 40%	6,243	983	110	33
40% to 60%	6,659	912	115	39
60% to 80%	6,612	1,294	115	40
Highest 20%	5,943	1,843	95	66
Total	30,875	6,217	527	218

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Table 24 shows the mean quarterly transportation expenditure of transit and no transit households in the U.S. The table also shows the difference in mean transportation expenditure between transit and no transit households. The table shows that mean transportation expenditures for all but the highest income quintile is greater in households where no one uses public transit. Lower-income households experience the most

significant savings in quarterly transportation expenditures. For the lowest income quintile, mean transportation expenditure is almost 31 percent lower for households where at least one person uses public transit versus households where no one uses transit.

Table 24 – Mean quarterly household transportation expenditure in U.S.

Annual income quintile	No transit household	Transit household	Difference	
			Absolute	Percent
Lowest 20%	\$1,321	\$918	-\$403	-30.5%
20% to 40%	\$1,090	\$789	-\$302	-27.7%
40% to 60%	\$1,512	\$1,355	-\$157	-10.4%
60% to 80%	\$2,030	\$1,888	-\$143	-7.0%
Highest 20%	\$2,954	\$3,031	\$76	2.6%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Table 25 shows the mean quarterly transportation expenditure of transit and no transit households in New Jersey. The table shows that Low-and middle-income transit households spend less on transportation when compared to no transit households, a pattern similar to that observed at the national level. However, the distribution differs from the U.S. distribution in two ways: 1) the difference is more for middle-income households than lower-income households, and 2) transit households in the second-highest income quintile (60 to 80 percent) spend more on transportation than the highest quintile households. Importantly, these data show that low- and middle-income households in New Jersey where at least one person uses public transit spend 20 to 30 percent less on transportation than households where no one uses transit.

Table 25– Mean quarterly household transportation expenditure in NJ

Annual income quintile	No transit household	Transit household	Difference	
			Absolute	Percent
Lowest 20%	\$1,053	\$801	-\$252	-23.9%
20% to 40%	\$1,059	\$786	-\$273	-25.8%
40% to 60%	\$2,072	\$1,374	-\$698	-33.7%
60% to 80%	\$1,363	\$2,464	\$1,101	80.8%
Highest 20%	\$1,819	\$2,268	\$450	24.7%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

In addition to examining variation in total transportation expenditures alone, the research team also considered variation in combined housing plus transportation (H+T) expenditures. The CES includes two variables on housing expenditure. HOUSPQ, which counts all expenses related to housing, including furniture, etc., and SHELTPQ, which counts only the costs for mortgage or rent, interest, building maintenance, home

insurance, etc. For this analysis, the research team used the latter variable to create a new H+T expenditure variable by adding SHELTPQ and TRANSPQ. Table 26 shows the H+T expenditure distribution for income quintiles for the U.S. The table shows that H+T expenditure is lower for transit households versus no transit households only in the lowest income quintile. Even in this case, the difference is slight. One explanation for this result is the spatial heterogeneity of U.S. households (i.e., the aggregation of urban, suburban, rural households living in places as diverse as New York City and rural Kansas). Households in rural areas spend a lot less on housing than households in urban areas.

Table 26 – Mean quarterly H+T expenditure in the U.S.

Annual income quintile	No transit household	Transit household	Difference	
			Absolute	Percent
Lowest 20%	\$2,916	\$2,812	-\$105	-3.7%
20% to 40%	\$2,370	\$2,504	\$134	5.3%
40% to 60%	\$3,040	\$3,562	\$521	14.6%
60% to 80%	\$4,000	\$4,662	\$662	14.2%
Highest 20%	\$6,000	\$7,351	\$1,351	18.4%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Table 27 shows the H+T expenditures of New Jersey households. The table shows that transit-using households in the two lowest income quintiles spend less, whereas those in the two highest quintiles spend substantially more. An important observation from the New Jersey analysis is that low-income transit households pay nearly 40 percent less on H+T than no transit households.

Table 27 – Mean quarterly H+T expenditure in NJ

Annual income quintile	Transit non-user household	Transit user household	Difference	
			Absolute	Percent
Lowest 20%	\$4,115	\$2,486	-\$1,629	-39.6%
20% to 40%	\$3,340	\$3,081	-\$259	-7.8%
40% to 60%	\$4,438	\$4,466	\$28	0.6%
60% to 80%	\$4,563	\$6,230	\$1,666	36.5%
Highest 20%	\$6,615	\$9,377	\$2,761	41.7%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Access to opportunity

The focus groups conducted as part of Phase 1 of this study showed that New Jersey residents, business owners, and elected officials all understand that NJ TRANSIT services provide significant accessibility benefits in places where NJ TRANSIT services are available. Focus group participants intuitively understood that NJ TRANSIT services

were essential for residents with no or limited access to private vehicles to meet their transportation needs. Participants also understood that transit could connect people to jobs, shopping, healthcare, recreation, and other essential destinations.

One way to quantify the benefits of NJ TRANSIT service is to report various system characteristics. For example, NJ TRANSIT's service area covers 5,325 square miles, an area 17 times larger than the size of all five boroughs of New York City combined. NJ TRANSIT services are available in more than two-thirds of New Jersey municipalities. There are more than 19,000 bus stops, 165 commuter rail stations, and 62 light rail stations in the State. NJ TRANSIT is the largest statewide transit system and the third largest transit system in the country, providing an average of more than 944,000 trips each weekday. Table 28 provides additional statistics regarding the NJ TRANSIT system and its service characteristics.

Table 28 – NJ TRANSIT system characteristics

Performance Measure	Estimate
NJ TRANSIT Service Area (square miles)	5,325
- Proportion of New Jersey land area served	72%
Average daily weekday trips	944,000
New Jersey municipalities served by local bus service	386
- Number of bus routes	251
- Number of bus stops	19,000
- Proportion of municipalities serviced by local bus	68%
New Jersey municipalities served by commuter rail service	116
- Number of rail lines	12
- Number of rail stations	165
New Jersey municipalities served by light rail services	22
- Number of light rail lines	3
- Number of light rail stations	62

Source: NJ TRANSIT data for 2019

Another way to quantify the benefits of NJ TRANSIT services is to estimate the potential accessibility of the system by connecting residents to opportunities such as jobs, goods, essential services, and other destinations. In this regard, the research team used ESRI ArcGIS Business Analyst software to estimate the number of households and residents living close to NJ TRANSIT services. In terms of resident access to transit service, the team derived separate estimates for low-income households, households with no access to a personal vehicle at home, and residents living close to high-frequency, direct service into New York City. Regarding access to needed destinations, the team estimated the number of jobs and businesses close to transit, including hospitals, health service businesses, and food stores.

Once again, “close to” transit was defined as within a 0.5-mile network distance of NJ TRANSIT rail and light rail stations and a 0.25-mile buffer of a NJ TRANSIT bus route.

High-frequency bus routes were defined as 12-minute headways in urban counties and 22-minute headways in other counties. Table 29 reports the results of the analyses.

Table 29 – Potential origins and destinations located close to NJ TRANSIT services

Performance Measure	Estimate
Business establishments located close to NJ TRANSIT services	203,882
- Proportion of total New Jersey businesses	64%
- Proportion of hospitals	80%
- Proportion of health service businesses	65%
- Proportion of food stores	75%
Jobs located close to NJ TRANSIT services	2,682,365
- Proportion of all New Jersey jobs	65%
Households living close to NJ TRANSIT services	1,767,291
- Proportion of all New Jersey households	53%
- Proportion of low-income households	71%
- Proportion of zero-vehicle households	50%
Residents living close to NJ TRANSIT services	4,837,799
- Proportion of New Jersey residents	55%
Residents living close to high-frequency transit providing direct service into NYC	2,649,413
- Proportion of New Jersey residents	29%

Data Source: ESRI Business Analyst

Services for older adults and people with disabilities

According to NJ TRANSIT, 100 percent of the agency’s bus fleet includes accessibility features such as lift-equipped and kneeling buses. In addition, all buses have public address systems, and the agency’s bus operators must make bus stop announcements. Many NJ TRANSIT rail stations are accessible by elevator, ramp, mini high-level platform, or portable lift. ⁽⁶⁷⁾ Older adults (62 years of age and older) and people with disabilities are eligible to use NJ TRANSIT's reduced fare program. The program provides a 50 percent discount on the regular fare. ⁽⁶⁸⁾

NJ TRANSIT also operates Access Link, which provides federally-required ADA complementary transit services for people with disabilities who cannot use local bus services. Qualified riders can use Access Link if their pick-up and drop-off points are within a 0.75 miles of an eligible bus route or light rail station. ⁽⁶⁹⁾ Access link’s fleet includes more than 400 vehicles operating throughout the State. In 2019, Access Link customers used the service to take nearly two million trips. ⁽⁷⁰⁾

Finally, NJ TRANSIT distributes approximately \$20 million each year to New Jersey counties to support community transportation services for older adults and people with disabilities. County-operated community transportation fleets include nearly 1,000 vehicles statewide. Community transportation services operated by counties connect residents to medical appointments, jobs, recreation, school and training, shopping, friends

and family, and other needed destinations. In 2019, New Jersey residents made nearly three million trips using NJ TRANSIT-supported community transportation services operated by counties. The agency directs another \$24 million in federal grant funds to local governments and not-for-profit organizations. These funds support local shuttle buses, transportation to day programs, nutrition programs, job access programs, travel instruction, etc. Funds also support vehicle purchases. ⁽⁷¹⁾

Services for students, military personnel, and veterans with disabilities

NJ TRANSIT offers several programs that provide discounted fares for students traveling to college classes, parochial or public schools. The MyTix Student Pass program allows students attending a partner college or university, an accredited elementary or secondary school, or a post-secondary education program to purchase a reduced fare student pass. The pass provides a 25 percent discount on the standard fare. Students can also choose the FlexPass program, which provides a 20 percent discount for less frequent use. There are currently 62 partner colleges and universities participating in the program. ⁽⁷²⁾

Military personnel and their dependents may use the one-way reduced fare Senior/Disabled ticket upon presenting their valid military or military-dependent I.D. cards. The reduced fare program provides a discount of 50 percent off the regular fare. Active duty, reserve, National Guard, and those with official "Retired" status from the Army, Navy, Air Force, Marines, or Coast Guard qualify for the program. Veterans with service-connected disabilities may present a valid Veterans Affairs (V.A.) identification card that indicates "service-connected" to use the reduced fare ticket option. ⁽⁷³⁾

Safety benefits associated with transit use

NJ TRANSIT services accommodate millions of passenger trips each year. In the absence of NJ TRANSIT services, many New Jersey residents would need to travel by other means, including by private passenger vehicles. As noted in the literature review section, research shows that transit use is safer than driving per mile of travel. To quantify the potential impact of NJ TRANSIT services on roadway safety, the research team analyzed data on annual miles of travel by various modes and crash data for the past ten years to estimate the number of additional crashes that might occur on New Jersey roadways if NJ TRANSIT services did not exist. Cost savings associated with avoided crashes was also estimated.

To facilitate this analysis, the first set of measures selected for estimation were additional vehicle trips and vehicle miles traveled (VMT) that would be generated in New Jersey in the absence of NJ TRANSIT services (all modes).

Table 30 – Annual unlinked passenger trips and miles by NJ TRANSIT riders, 2017

Agency Name	Agency Status	Mode	Service	Unlinked passenger trips (UPT)	Passenger miles traveled (PMT)
New Jersey Transit Corporation	Active	CR	DO	88,578,277	2,077,067,508
New Jersey Transit Corporation	Active	DR	PT	1,610,072	9,898,392
New Jersey Transit Corporation	Active	LR	DO	5,531,921	12,379,497
New Jersey Transit Corporation	Active	LR	PT	15,476,385	60,426,164
New Jersey Transit Corporation	Active	MB	DO	143,878,120	1,113,473,813
New Jersey Transit Corporation	Active	MB	PT	10,574,069	42,682,026
New Jersey Transit Corporation	Active	VP	PT	727,002	27,415,332
New Jersey Transit Corporation	Active	YR	PT	2,713,160	39,719,834
Total				269,089,006	3,383,062,566
Avg. trip length (miles)					12.57

Source: National Transit Database

The relevant source for transit trip data is the National Transit Database (NTD), which includes data on annual Unlinked Passenger Trips (UPT) and Passenger Miles Traveled (PMT). Table 30 shows these data. Data on VMT and person miles traveled (PRMT) was assembled from the 2017 National Household Travel Survey (NHTS).

The New Jersey sample of the NHTS data, included 1,165 responses representative of the state population. When weighted by the variable provided by the NHTS, the sample is representative of the state’s total population of 8,953,794 (or 8.9 million). The summary data on PRMT and VMT from the NHTS for the U.S. and New Jersey is shown in Table 31.

Table 31 – PRMT and VMT for U.S. and NJ, 2017

	United States	New Jersey
Annual Person Miles Traveled (PRMT)	3,968,056,772,972	138,202,609,857
Annual Person Trips (PRT)	371,151,971,524	11,288,982,646
Annual Vehicle Miles Traveled (VMT)	2,105,881,711,626	62,633,215,357
Annual Vehicle Trips (VT)	220,413,541,184	6,315,769,184
VMT/PRMT ratio	0.53	0.45
VT/PRT ratio	0.59	0.56

Source: National Household Travel Survey

To convert NJ TRANSIT PMT data to VMT, two assumptions were made:

- 1) Passenger Miles Traveled (PMT) = Person Miles Traveled (PRMT)
- 2) $PMT \times (VMT/PRMT) = VMT$

According to the first assumption, 10 people riding 20 miles by transit generates 200 passenger miles, which is also equal to 200 person miles. According to the second assumption, a given portion of the PRMT is VMT, whereas the remaining miles are generated by non-automobile modes. Table 2 shows that 45 percent of the New Jersey PRMT is VMT, whereas the remaining 55 percent is by other modes. For the U.S. as a whole, 53 percent of the PRMT are VMT whereas the remaining 47 percent are by other modes. When the VMT/PRMT ratio of 45 percent is applied to the NJ TRANSIT’s

annual PMT of 3,383,062,566 (3.38 billion miles), the resultant VMT is 1,533,198,877 (or 1.53 billion miles).

Over the past decade, there were more than 2.85 million vehicle crashes on New Jersey roadways. More than 18,000 crashes were fatal or involved suspected serious injuries. Table 32 shows the frequency and severity of crashes in New Jersey over the past ten years, based on the crash severity definitions displayed in Table 33.

Table 32 – Crash Frequency and Severity in New Jersey (2010-2019)

Crash Severity	Number of Crashes	Percentage
Fatal Injury	5,690	0.21%
Suspected Serious Injury	12,556	0.44%
Suspected Minor Injury	116,960	4.14%
Possible Injury	492,316	17.21%
No Apparent Injury	2,223,409	78.00%
Total	2,850,931	100.00%

Source: New Jersey crash query database maintained by the New Jersey Department of Transportation

Table 33 – Crash severity definitions

Crash Severity	Definition	Other Names	KABCO Scale
Fatal Injury	The victim is deceased.	Killed	K
Suspected Serious Injury	The victim has a non-fatal injury. Cannot walk, drive or normally continue the activities that they could perform before the motor vehicle crash.	Incapacitated	A
Suspected Minor Injury	An evident injury, other than fatal and incapacitating. Injury is visible, such as a lump on head, abrasion, bleeding or lacerations.	Moderate Injury	B
Possible Injury	A reported or claims of injury that is not fatal, incapacitating or moderate. Injury is not visible to the investigating officer.	Complaint of Pain	C
No Apparent Injury	Only damage of properties.	Property Damage Only	O

Source: KABCO Injury Classification and Scale and Definitions, National Safety Council (NSC)

Additional crashes generated in the absence of NJ TRANSIT services would be the product of the additional VMT times the crash rate (Total additional crashes = Crash rate × additional VMT). To estimate the number of additional crashes in each severity level from an additional 1.53 billion VMT annually, four assumptions were made:

- 1) Added VMT = Total PRMT × (VMT/PRMT)
- 2) Crash Rate = Number of Crashes/Million VMT
- 3) Total Crashes = Crash Rate × Million VMT
- 4) Crash Frequency (for each severity level) = Total Crashes × Severity Proportion

As shown in Table 34, based on data for 2017, there were 62.633 billion VMT and 277,671 crashes in New Jersey. The resulting crash rate, which is the ratio of the number of crashes per one million VMT, was estimated to be 4.55 per million VMT.

Table 34 – NJ crash frequency and VMT, 2017

Year	Annual VMT	VMT/PRMT	Annual Crashes	Crash Rate (Crashes/Million VMT)
2017	62,633,215,357	0.45	277,671	4.55

Sources: National Household Travel Survey; New Jersey crash query database maintained by the New Jersey Department of Transportation

As explained above, there are estimated to be approximately 1.53 billion fewer vehicle miles traveled on New Jersey roadways annually because people make trips using NJ TRANSIT services. Based on the above assumptions, the research team estimated that an additional 1.53 billion VMT could result in nearly 7,000 additional crashes annually, including an additional 45 +/- fatal and serious injury crashes.

Table 35 – Estimated additional crashes, if NJ TRANSIT customers did not use transit

Crash Severity	Percentage	Number of Crashes
Fatal Injury	0.21%	15
Suspected Serious Injury	0.44%	30
Suspected Minor Injury	4.14%	287
Possible Injury	17.21%	1,192
No Apparent Injury	78.00%	5,403
Total	100.00%	6,927

Crashes result in significant societal costs. The Federal Highway Administration provides national estimates of the costs of crashes based on their severity level. These cost estimates vary from state to state based on the per capita income (PCI) ratio of a particular state to the national PCI. The unit cost of any crash is the product of the national comprehensive crash cost per crash in each severity level and the PCI ratio for each individual state. Table 36 lists the comprehensive crash costs for each severity level in New Jersey over the past ten years.

Table 36 – Comprehensive crash cost in NJ, 2010-2019

Severity	National Comprehensive Cost Units	NJ PCI Ratio	New Jersey Comprehensive Cost Units	Crash Frequency	Total Comprehensive Crash Cost
K	\$11,295,400	1.25009	\$14,120,266.59	5,690	\$80,344,316,874
A	\$655,000	1.25009	\$818,808.95	12,556	\$10,280,965,176
B	\$198,500	1.25009	\$248,142.865	116,960	\$29,022,789,490
C	\$125,600	1.25009	\$157,011.304	492,316	\$77,299,177,140
O	\$11,900	1.25009	\$14,876.071	2,223,409	\$33,075,590,146
Total				2,850,931	\$230,022,838,827

Source: Federal Highway Administration

The following assumptions were made to estimate the crash costs associated with additional vehicle crashes which result from higher VMT in the absence of NJ TRANSIT services:

- 1) Crash Cost = Total Crashes X Comprehensive Unit Crash Cost
- 2) Present Cost of Crash = Total Crash Cost X Consumer Price Index Ratio

The monetized safety benefits associated with NJ TRANSIT services are shown in Table 37. As shown in the table, the costs associated with an additional 7,000 crashes that might occur in the absence of NJ TRANSIT services is estimated to be \$632.6 million annually.

Table 37 – Additional crash costs in the absence of the NJ TRANSIT services, 2017

Severity	Percentage	Crash Frequency	NJ Comprehensive Unit Crash Cost	Total Crash Cost
K	0.21%	15	\$14,120,266.59	\$211,803,999
A	0.44%	30	\$818,808.95	\$24,564,269
B	4.14%	287	\$248,142.87	\$71,217,002
C	17.21%	1,192	\$157,011.30	\$187,157,474
O	78.00%	5,403	\$14,876.07	\$80,375,412
Total		6,927		\$575,118,156
CPI inflation ratio= 1.1		Comprehensive Crash Cost (2020)		\$632,629,972

The reader should note that the calculated crash costs were based on the crash costs published by the FHWA guideline in 2016. These cost estimates were indexed to the year 2020 by applying the Consumer Price Index (CPI) inflation rate.

More information on the methods used to conduct the safety benefits analysis is included in the Task 7 Technical Memorandum: Safety Benefits of NJ TRANSIT Services (dated April 1, 2021) prepared by Mohammad Jalayer, Ph.D. and Ahmed Sajid Hasan, Department of Civil and Environmental Engineering, Rowan University. See Volume II, Appendix D.

Transit Benefits Marketing Framework

Based on the literature review results and the input received from focus group participants, the research team developed a marketing framework to communicate the benefits of NJ TRANSIT services in New Jersey. The marketing framework includes a logo, a series of storylines and facts, and a set of infographics and social media artwork that can be used to implement the recommended public information campaign.

Branding and logo

Today, people are inundated with an incredible amount of information and advertising about a host of topics, products, issues etc. It is difficult to attract a viewer's attention unless it is deemed worthwhile for their attention. If a person is intrigued by a "Did You Know?" fact, message, or infographic and found it useful, they will be drawn to a similar piece of information if they see it in the future. To generate a connection to the information being communicated, the campaign should utilize a unique and identifiable "Did You Know?" logo on all campaign materials. This will create and reinforce a brand identity for the campaign. Figure 2 presents a set of 'Did You Know?' logos that can be used as part of the proposed marketing campaign. All the logo options were designed to be consistent with the agency's existing brand identity system. The materials prepared as part of this study utilize various color versions of logo option eight.

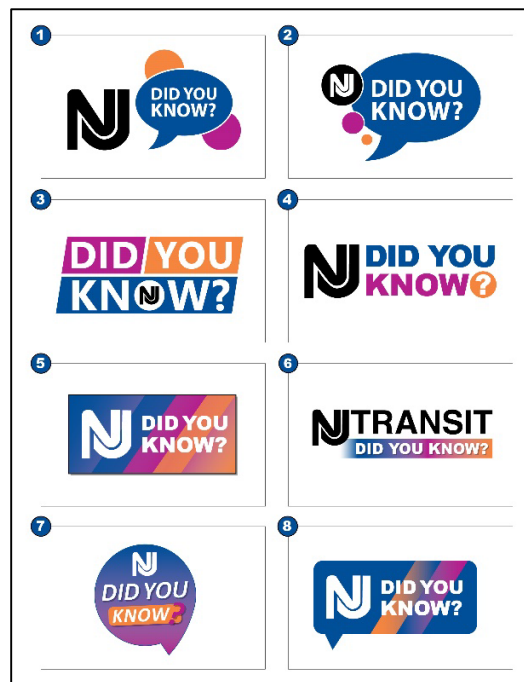


Figure 2. "Did You Know?" campaign logos

Storylines and Messaging

Phase 1 focus group participants overwhelmingly agreed that NJ TRANSIT services provide benefits to New Jersey residents and businesses. Although, the participants represent just a small sample of the State's population, the positive sentiment expressed at the focus group sessions suggests that individuals and stakeholders in New Jersey will be receptive to information and data that quantifies the benefits of transit in a substantive way. Consequently, the research team focused on "telling the story" of transit services and benefits rather than obtaining buy-in to the fundamental idea that transit is beneficial. Toward this end, the research team developed three headlines and 20 storylines that communicate more than 75 facts about NJ TRANSIT services and the benefits provided by those services. These are presented in Figures 3-24.

Transit is good for the ECONOMY



- **NJ TRANSIT means JOBS**
 - NJ TRANSIT provides jobs for **11,000** people, most of them New Jersey residents
 - State spending on NJ TRANSIT construction, operations and maintenance generates another **19,000** jobs in other businesses and companies



NJ TRANSIT EMPLOYS OVER 11,000 PEOPLE

STATE SPENDING ON NJ TRANSIT GENERATES AN ADDITIONAL 19,000 JOBS

TO LEARN MORE, VISIT: www.njtransit.com/benefits

Figure 3. NJ TRANSIT means JOBS

Transit is good for the ECONOMY



- **NJ TRANSIT generates ECONOMIC ACTIVITY**

- NJ TRANSIT spending generates **\$5 billion** in economic activity each year
- Every **\$1** NJ TRANSIT invests in public transportation generates **\$2** in economic activity in New Jersey

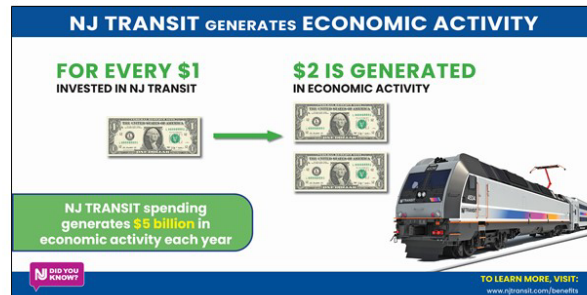


Figure 4. NJ TRANSIT generates ECONOMIC ACTIVITY

Transit is good for the ECONOMY



- **NJ TRANSIT supports COMMUNITY DEVELOPMENT**

- For example, in Hudson County, more than **28,000 housing units** have been constructed along the Hudson Bergen Light Rail line since it opened in 2000
 - Areas within walking distance of light rail stations have grown the most, especially in Jersey City and Hoboken
- **In fact, 50 percent** of Hudson County's **population growth** between 2010 and 2018 occurred near HBLR stations



Figure 5. NJ TRANSIT supports COMMUNITY DEVELOPMENT

Transit is good for the ECONOMY



- **NJ TRANSIT increases PROPERTY VALUES**

- The average per acre value of residential and commercial properties located within ½ mile of NJ TRANSIT rail stations statewide is **2.4 times higher** than the per acre value of residential properties located further away
- This property value premium generates **\$260 million** in local taxes collected by local governments. These funds support local services and contribute to community quality of life



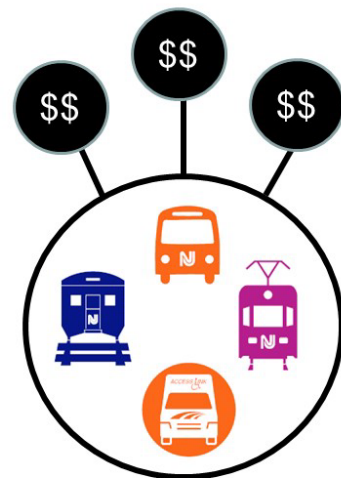
Figure 6. NJ TRANSIT increases PROPERTY VALUES

Transit is good for the ECONOMY



- **NJ TRANSIT supports BUSINESS**

- NJ TRANSIT services allow **customers** to reach businesses and **employees** to travel to work by transit.
- **64%** of New Jersey businesses are located close to transit.¹
- These businesses employ more than **2.6 million** people, **65%** of the New Jersey's jobs.
- **62%** of all business sales in the State happen at business located close to transit.



(Notes: 1 – "Close to" transit = ½ mile of a rail station or ¼ mile of bus route)

Figure 7. NJ TRANSIT supports BUSINESS

Transit is good for the ECONOMY



- **NJ TRANSIT connects New Jersey to the REGION and WORLD**
 - NJ TRANSIT services connect New Jersey residents to **jobs, entertainment, and other important destinations** throughout the State as well as to destinations in New York City and Philadelphia
 - More than **78+ million** riders use NJ TRANSIT operated or supported trains and buses to travel into and out of Manhattan annually
 - More than **5.2+ million** riders use NJ TRANSIT operated or supported trains and buses to travel between New Jersey and Philadelphia annually

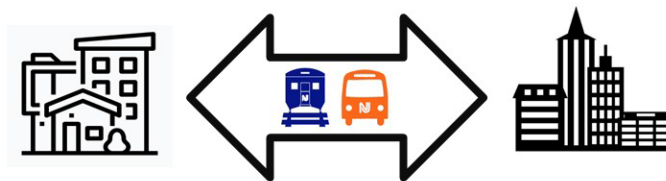


Figure 8. NJ TRANSIT connects NJ to the REGION and World, NYC and Philadelphia

Transit is good for the ECONOMY



- **NJ TRANSIT connects New Jersey to the REGION and WORLD**
 - Nearly **3 million** travelers annually use NJ TRANSIT's Newark Airport Station on their way to destinations far and wide
 - More than **1.7 million** travelers each year use NJ TRANSIT stations to access AMTRAK trains for business and personal travel



Figure 9. NJ TRANSIT connects NJ to the REGION and World, Newark International Airport and AMTRAK

Transit is good for the ECONOMY

- **NJ TRANSIT supports TOURISM and related businesses**

- In addition to providing residents access to **arts, culture, and entertainment** destinations in New York City and Philadelphia, NJ TRANSIT connects residents and visitors to the **Jersey Shore**

- A recent study conducted by researchers at Rutgers University estimated that more than **130,000 weekend riders** use NJ TRANSIT's North Jersey Coast line each summer to access destinations along the Jersey Shore for recreational purposes
- Recreational riders spent an estimated **\$16 million** over the course of 15 summer weekends on hotels, restaurants, bars, shopping, and amusements



Figure 10. NJ TRANSIT supports TOURISM and related business, Jersey Shore

Transit is good for the ECONOMY

- **NJ TRANSIT supports TOURISM and related businesses**

- And, it's not just the Jersey Shore that benefits from transit
- Many visitors to the **Performing Arts Center** and **Prudential Center in Newark** use NJ TRANSIT services travel to the Newark for shows, concerts, hockey games and other events

- These customers spend money not just on transit but also at the venue and nearby businesses
- Hockey fans that use NJ TRANSIT to get to the games spend more than **\$7.5 million over the course one hockey season alone**
- NJ TRANSIT customers traveling to the Prudential Center spent an estimated **\$200,000 at just one concert**



Figure 11. NJ TRANSIT supports TOURISM and related business, Newark

Transit is good for the ECONOMY



- **NJ TRANSIT supports TOURISM and related businesses**

- More than **400,000** residents and visitors each year use the NJ TRANSIT rail services to access sporting and other events at the Meadowlands Sports and Entertainment District
- Atlantic City casinos, restaurants, bars, shops, entertainment venues, and other business benefit from transit access as well
 - More than **410,000** riders get on and off trains at NJ TRANSIT's Atlantic City Convention Center station each year, many for recreational and leisure purposes



Figure 12. NJ TRANSIT supports TOURISM and related business, Meadowlands and Atlantic City

Transit is good for the ENVIRONMENT



- **NJ TRANSIT reduces TRAFFIC Congestion**

- There are **140,000** fewer vehicles regularly using NJ roadways because people ride NJ TRANSIT instead of driving
- NJ TRANSIT services eliminate **150 million** vehicle trips each year
- There are **1.5 billion** fewer vehicle miles of travel each year because people ride NJ TRANSIT
 - That's the equivalent of driving from New York to Los Angeles **537,000** times!
 - All those miles means more hours spent traveling on New Jersey's roadways, **2.7 million** hours more, in fact. These added hours would contribute to highway travel delays



Figure 13. NJ TRANSIT reduces TRAFFIC Congestion, Vehicles and VMT

Transit is good for the ENVIRONMENT



- **NJ TRANSIT reduces TRAFFIC Congestion**

- If NJ TRANSIT customers that travel into New York City for work each morning decided to drive instead, every weekday, traffic would increase by:

- **500%** at the Lincoln Tunnel,
- **140%** at the Holland Tunnel, and
- **120%** on the George Washington Bridge



Figure 14. NJ TRANSIT reduces TRAFFIC Congestion, Hudson River Crossings

Transit is good for the ENVIRONMENT



- **NJ TRANSIT saves ENERGY and reduces GREENHOUSE GAS emissions**

- NJ TRANSIT services eliminate **644,000 metric tons** of greenhouse gas emissions every year

- That is equivalent to **72 million fewer gallons** of gas consumed

- It would require over **840,000 acres** of U.S. forests to absorb that much pollution. That size is the equivalent of:

- Hudson, Union, Essex, Passaic, Bergen, Somerset, and Middlesex Counties combined or **1,000** central parks

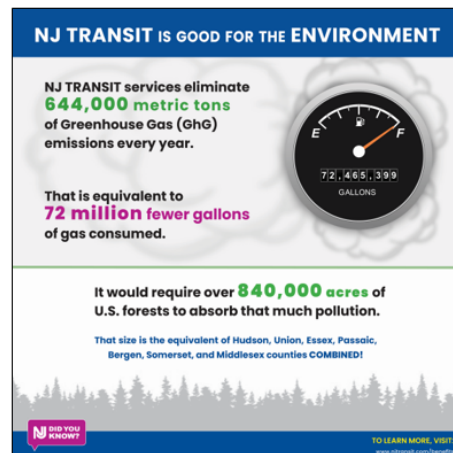


Figure 15. NJ TRANSIT saves ENERGY and reduces GREENHOUSE GAS emissions

Transit is good for the ENVIRONMENT



- **NJ TRANSIT means less PAVEMENT and less POLLUTION**

- If everyone that uses transit today were to start driving tomorrow, we would need more lanes of roadway and **30,000 to 50,000** more parking spaces to accommodate the additional cars
- That many parking spaces is equal to approximately **1,400 acres** of additional pavement
- More pavement means more water pollution. When it rains contaminants including gas, oil, and chemicals are washed into streams, rivers, bays, and the ocean

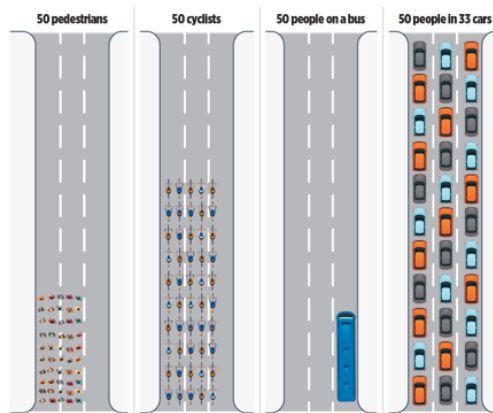


Image credit: Philadelphia Inquirer, Jared Whalen, Staff Artist

Figure 16. NJ TRANSIT means less PAVEMENT and less POLLUTION, Pavement

Transit is good for the ENVIRONMENT



- **NJ TRANSIT means less PAVEMENT and less POLLUTION**

- **1,400 acres** of additional parking results in nearly **620 million** gallons for storm water runoff each year
- This runoff contains pollution, including an estimated:
 - **46,000** pounds of **oil and grease**
 - **1,200** pounds of **heavy metals** like lead, copper, zinc, cadmium, chromium and nickel
 - **287,000** pounds of **trash** and floatable solids
- Pavement also **increases nearby temperatures** because it traps the energy from the sun.
 - The surrounding air temperature in areas with lots of pavement can be **2 degrees warmer** because of pavement



Figure 17. NJ TRANSIT means less PAVEMENT and less POLLUTION, Water pollution

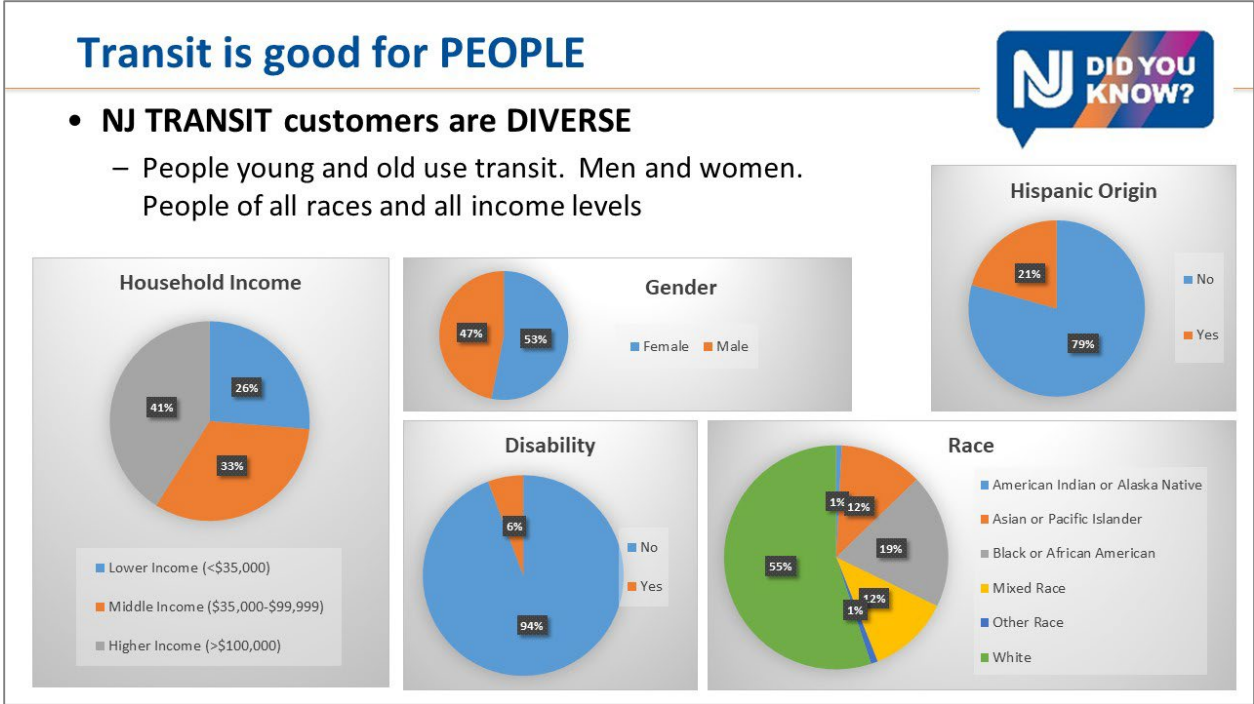


Figure 18. NJ TRANSIT customers are DIVERSE

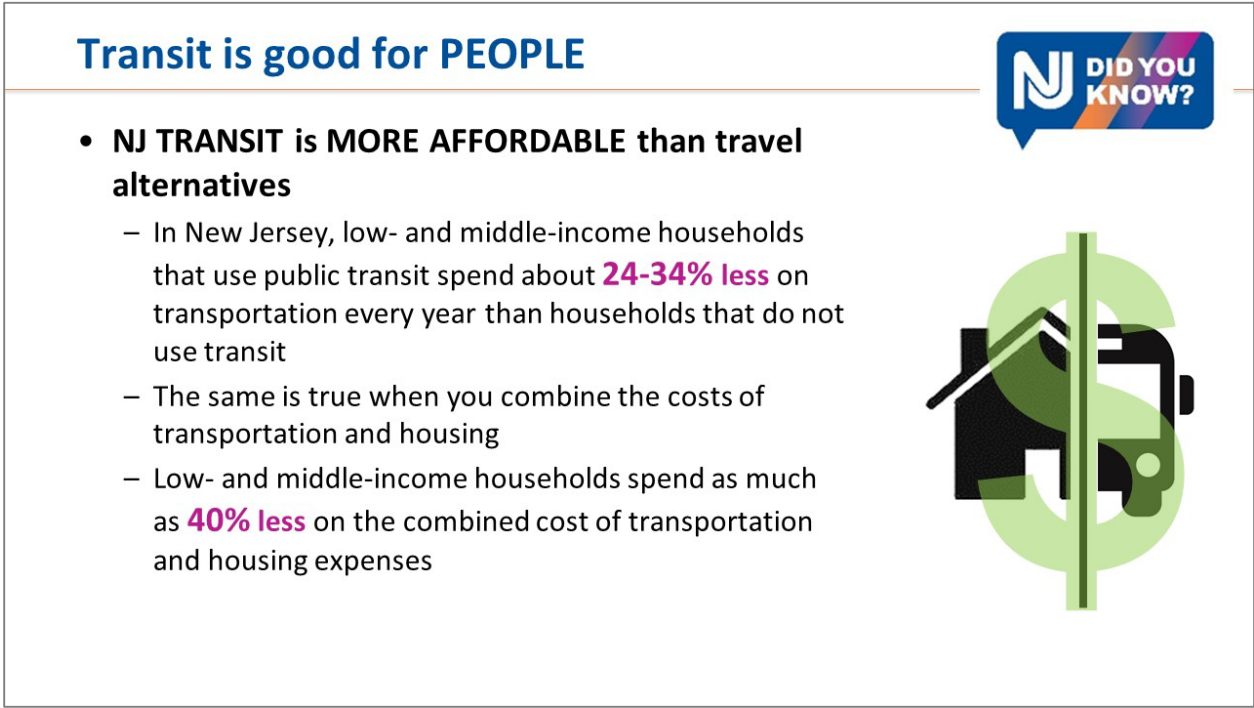


Figure 19. NJ TRANSIT is MORE AFFORDABLE than travel alternatives

NJ TRANSIT is good for PEOPLE



• NJ TRANSIT provides ACCESS TO OPPORTUNITY

- NJ TRANSIT’s system provides more than **944,000 trips** each weekday on 251 bus routes, three light rail lines, 12 commuter rail lines and through Access Link paratransit services
- NJ TRANSIT has a service area of **5,325 square miles** with bus service to 386 NJ municipalities, rail service to 116 NJ municipalities and Light Rail service to 22 NJ municipalities
 - NJ TRANSIT service area is more than **17x** the size of New York City and **77x** bigger than Washington DC
- NJ TRANSIT is the **largest statewide transit system in the country** with **165** rail stations, **62** light rail stations and more than **19,000** bus stops linking major points in New Jersey, New York and Philadelphia

Figure 20. NJ TRANSIT provides ACCESS TO OPPORTUNITY

NJ TRANSIT is good for PEOPLE



• NJ TRANSIT helps OLDER ADULTS and PEOPLE WITH DISABILITIES get around

- NJ TRANSIT distributes approximately **\$20 million** each year to New Jersey counties to support community transportation services for older adults and people with disabilities
 - County operated community transportation fleets include nearly **1,000 vehicles** statewide
 - Community transportation services operated by counties connect residents to medical appointments, jobs, recreation, school and training, shopping, to visit friends and family and other important destinations
 - In 2019, New Jersey residents made nearly **3 million trips** using NJ TRANSIT supported community transportation services operated by counties
 - NJ TRANSIT directs another **\$24 million** in Federal grant funds to local governments and not-for-profit organizations each year to support a range of local transportation, including shuttle buses, transportation to day, nutrition, job access programs, travel instruction and others. Funds are also used to purchase vehicles

Figure 21. NJ TRANSIT helps OLDER ADULTS and PEOPLE WITH DISABILITIES get around

NJ TRANSIT is good for PEOPLE



- **NJ TRANSIT supports COLLEGE STUDENTS**
 - College students can save **25%** on NJ TRANSIT Monthly Passes if their school participates in our University Partnership Program
 - 85 colleges currently participate
 - Visit [LINK](#) to see if your college participates
- **NJ TRANSIT supports SENIORS, PEOPLE WITH DISABILITIES and MILITARY VETERANS**
 - Did you know, **seniors, people with disabilities, and military personnel** and their dependents save **50% or more** on one-way fare ticket
 - Eligible military personnel include Active Duty, Reserve and National Guard, and those with official “Retired” status from the Army, Navy, Air Force, Marines or Coast Guard
 - When purchasing your ticket select ‘Senior/Disabled’ to obtain the discounted fare. Military personnel must show military ID

Figure 22. NJ TRANSIT supports COLLEGE STUDENTS, SENIORS, PEOPLE WITH DISABILITIES and MILITARY VETERANS

NJ TRANSIT is good for PEOPLE



- **NJ TRANSIT improves SAFETY by reducing CRASHES**
 - Taking public transit is safer than driving. There are fewer **vehicle crashes** each year because people use public transportation
 - In fact, if all NJ TRANSIT customers stopped using transit and started to drive instead, there would be approximately **7,000** more crashes each year on New Jersey roadways.
 - The cost of crashes, includes property damage, personal injury, loss of productivity and unfortunately in some cases death.
 - While it is difficult to quantify these costs, researchers estimate that 7,000 additional crashes each year would result an additional **\$632 million** in crash-related costs and an additional **15 deaths**



Figure 23. NJ TRANSIT improves SAFETY by reducing CRASHES

NJ TRANSIT is good for PEOPLE



- **NJ TRANSIT customers are MORE ACTIVE, which can provide HEALTH BENEFITS**

- Survey data has shown that commuters living near train stations in New Jersey walk more
 - Transit commuters walk and average of **10-20 minutes** more per day
 - They average **30 percent** more steps per day and are **4x more likely** to walk 10,000 steps—the equivalent of meeting physical activity health recommendations, when compared to people living farther away from transit
- Walking more results in health benefits, such as lower rates of obesity, which reduces health care costs
 - National studies have found that higher rates of physical activity among transit users saves an average **\$5,500** per person in annual health care costs



Figure 24. NJ TRANSIT customers are MORE ACTIVE, which can provide HEALTH BENEFITS

Infographics

An infographic is the combination of information and a graphic. The reason for creating an infographic is to more effectively communicate data\information that may be difficult for others to understand, or something that is not well known. Based on the experience of other transit agencies nationally that have undertaken similar campaigns and feedback from the focus groups, infographics was selected as the appropriate method to communicate transit benefit information and data in a format that the general public can understand and appreciate.

There are numerous ways to design an infographic and infographic design is an important component of effective communication. Infographics are meant to simplify the data as much as possible to enhance communication. An infographic is not a list of questions; it is a visualization of the answers. The following preferences, as expressed by focus group participants, guided infographic development:

- Use the infographics to communicate a clear and concise message with short and specific titles.
- Do not overcrowd the infographic with too much small-sized text.
- Use bold color when highlighting key messages and statistics.
- Avoid heavy use of the color red.
- Present information in an easy to follow manner, communicating facts that readers would not have difficulty visualizing and understanding.

- Provide a way for viewers to obtain more information about the statistics and how they were calculated through a QR code or a link to more information.

Based on these preferences, the research team prepared:

- 20 full-page 8.5”x11” fact sheets that can be used as handouts in briefing packets, leave-behinds at events, and as seat drops. These can also be enlarged for use as posters, signage etc. and may be combined into one or more “storybooks” if desired.
- 14 social media artwork images –1080x1080 layout for posting via Instagram and 1200x600 layout for posting via Facebook and LinkedIn.

Figure 25 shows a sample fact sheet and Figure 27 shows two sample graphics for posting via social media.

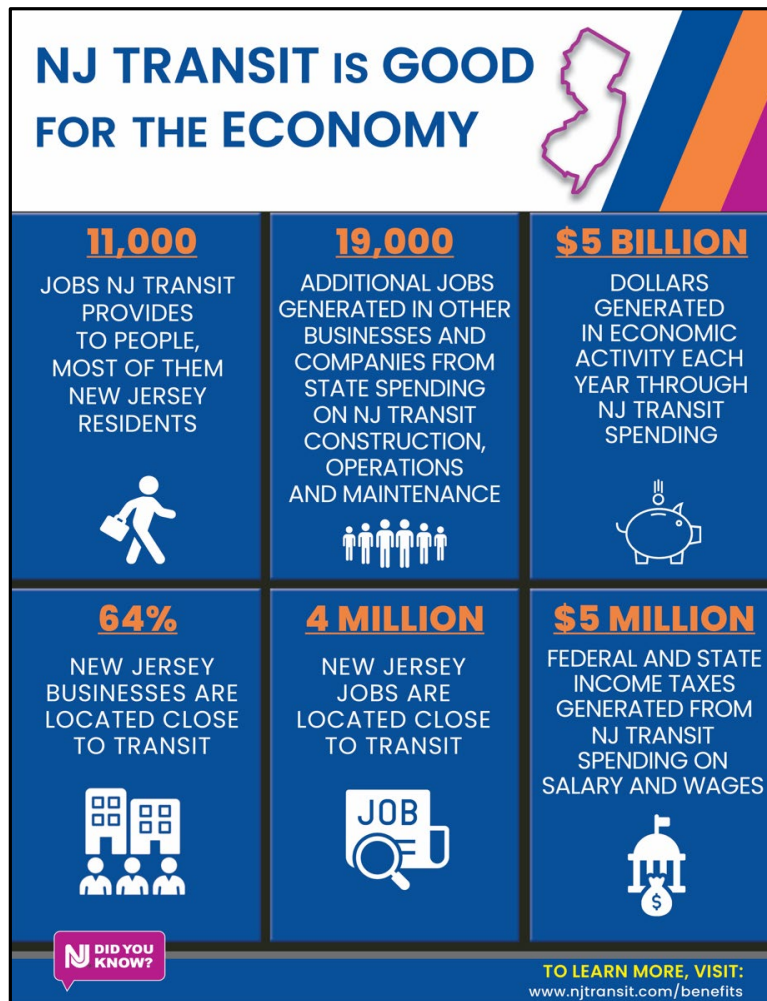


Figure 25. Sample Fact Sheet – NJ TRANSIT is GOOD for the ECONOMY

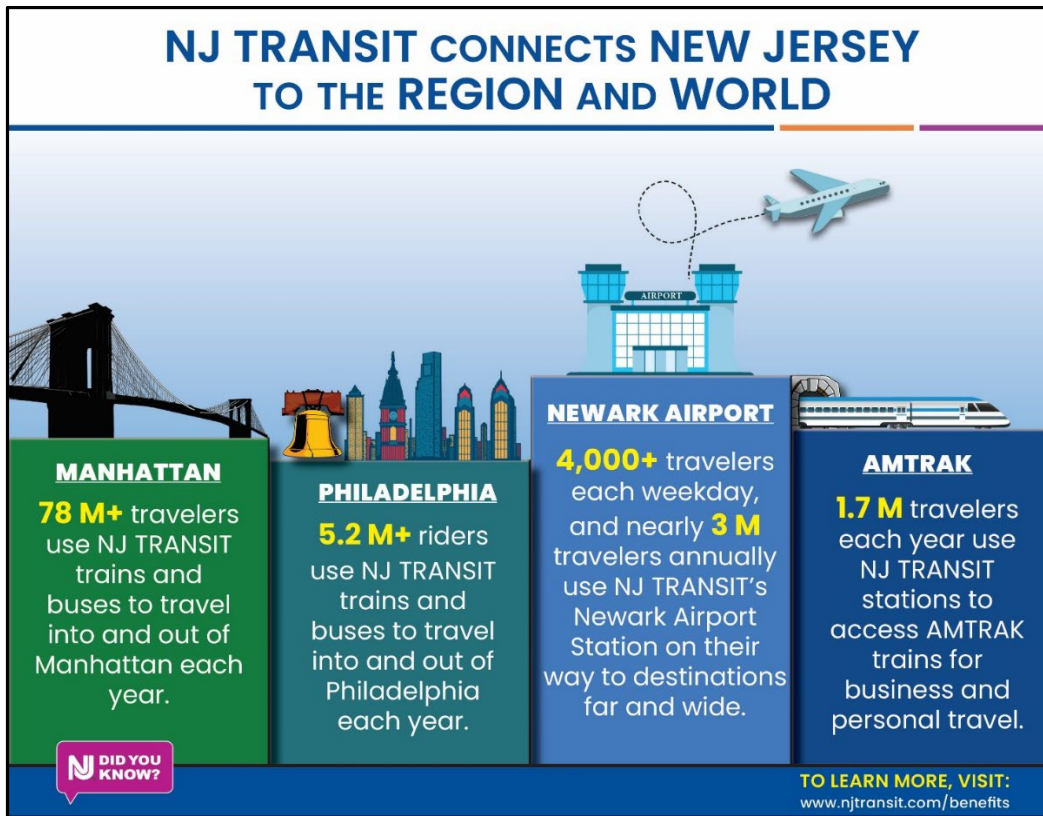


Figure 26. Sample Fact Sheet – NJ TRNSIT supports TOURISM

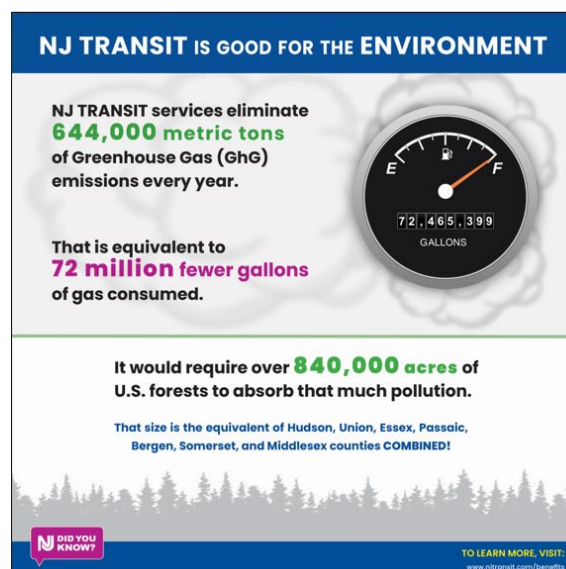


Figure 27. Sample Social Media Artwork

These infographics and 17 others were tested via a second round of focus group meetings and revised based on focus group input. A summary of the round two focus group discussions is included in Volume II, Appendix E. The full suite of infographics prepared for this study are presented in Volume II, Appendix F. The individual graphics are available for download in multiple file formats on NJ TRANSIT's website at the following URL: www.njtransit.com/benefits.

CONCLUSION AND RECOMMENDATIONS

As noted above, the research team recommends creating and implementing a “Did You Know?” campaign that utilizes the branding, storylines, and infographics prepared as part of this study. These can be supplemented, as needed, based on NJ TRANSIT's needs and available resources. The campaign should be geared toward three primary audiences:

1. The general public, both existing NJ TRANSIT customers and people that do not currently use NJ TRANSIT services,
2. Elected officials at the state and local levels, and
3. Businesses and the development community.

The campaign should regularly and consistently share information and data about the benefits that NJ TRANSIT services provide residents and businesses in the State. It should also be used to share information on NJ TRANSIT services and programs that may not be well known. The campaign is an opportunity to change the public narrative about NJ TRANSIT away from service delays, train cancelations, and ad-hoc human-interest stories towards something strategically focused and consistently positive.

The suite of collateral marketing materials prepared for this study were prepared to support the launch and initial implementation of the campaign. However, the materials should not be constraining. The infographics format is a friendly, accessible, customer-focused way to share information. This format can and should be replicated to communicate new information over time. Examples of additional messages and information that might be shared include, but need not be limited to information and data related to:

- How NJ TRANSIT is keeping people safe during the pandemic;
- How NJ TRANSIT transports essential workers to their jobs;
- The role NJ TRANSIT services play during natural disasters and other emergencies;
- On-time performance;
- Capital projects that are planned and under construction; and even
- Employment opportunities at NJ TRANSIT.

As suggested above, the initial phase of the campaign should be organized around three overarching headlines:

- Transit is good for the economy.
- Transit is good for people.
- Transit is good for the environment.

Currently, NJ TRANSIT uses a variety of digital, mobile, print and other communication methods to share information with its customers and other constituencies. Table 38 presents 12 communication methods that NJ TRANSIT should consider when implementing the campaign. Focus group participants most frequently suggested communicating via social media, television, and radio. Other commonly suggested methods included hyperlocal media, billboards, online news outlets, and municipal resources such as websites, elected official email lists, and newsletters.

Table 38 – Potential communication strategies

NJ TRANSIT website and social media	Municipal resources (websites, social media)
Briefing packets for government officials and others	Public information sessions/events convened by NJ TRANSIT
In-vehicle and in-station print signage	Community events convened by others
Bus wraps	Billboards
Statewide/regional news media (online and print)	Television and radio
Hyperlocal news media	Short videos

NJ TRANSIT already maintains a corporate website and mobile app. The agency also generates regular stream of content via social media and promotes its services via printed advertisements inside of its fleet of buses and rail vehicles, and throughout transit facilities. The proposed “Did You Know?” campaign should be integrated into these existing activities as a new branded element of the agency’s regular communications and marketing:

- **Website** – It is likely that the materials produced as part of this research will be of interest and useable by a range of audiences. As such, the materials should be made available to the public via an online portal that includes sharing the materials in a range of formats and instructions that suggest ways to use the materials, graphics, etc. as part of outreach and engagement efforts. NJ TRANSIT should create a dedicated webpage for the campaign where infographics, other published materials, and documentation regarding how the benefits were calculated can be reposed and accessed by the public. The research team recommends using a simple URL such as: www.njtransit.com/benefits.
- **Social media** – The storyline content presented above and infographics prepared for the study should be translated into a regular schedule of “Did You Know?” facts disseminated via all NJ TRANSIT social media channels. For example, a new fact could be disseminated every week and/or coincide with a specific date of importance such as an environmental fact on Earth Day.

- **In-vehicle and in-station print signage** – NJ TRANSIT’s vehicle fleet, bus shelters, station buildings, and platforms provide many advertising opportunities. Advertisement opportunities should be systematically explored to advance the marketing campaign. Infographic ads displayed on bus shelters, station platforms, station interiors, etc. can draw immediate attention from the public walking down the street, waiting for the bus or train, or driving by. Similar opportunities exist inside both rail cars and buses.

IMPLEMENTATION AND TRAINING

It is expected that NJ TRANSIT will take the lead in using the results of this research. However, because the data and work products produced as part of this study will have wide application, other audiences are likely to also find the materials useful as well. In addition to NJ TRANSIT, the audience for this research includes: NJ Department of Transportation and other allied agencies, Governor’s office representatives, state, county and municipal officials, a range of civic and advocacy organizations, policy advocates from a range of fields (planning, public health, transportation, economic development, social equity and others), developers of transit-oriented development, and the general public.

To make the most use of the materials developed as part of this study, in addition to implementing the marketing campaign recommended above, NJ TRANSIT should:

- 1. Create a “buzz”** – There are numerous venues for disseminating the results of this research. To create a “buzz” about the research, members of the research team and representatives from NJ TRANSIT should find opportunities to present the research at professional conferences, trade association meetings, chamber of commerce meetings, NJ League of Municipalities, etc. In addition, NJ TRANSIT should establish and implement a media strategy that includes press advisories, Opinion/Editorial articles, press interviews, etc. timed with the launch of the marketing campaign.
- 2. Prepare and deliver webinar(s)** – Once the final report and other work products are approved and made available, NJ TRANSIT should develop, promote, and deliver one or more webinars to showcase the findings of the research. The webinar can also showcase the resources available on the transit benefits website.
- 3. “Tell the story” of transit benefits whenever possible** – NJ TRANSIT leadership and senior managers are frequently called upon to make presentations and to give talks at various meetings and gatherings. These talks are an opportunity to “tell the story” of how NJ TRANSIT benefits New Jersey. The storylines, facts and graphics prepared for this study should be shared widely with NJ TRANSIT’s senior managers with instructions on how to incorporate the information in their remarks and presentations whenever appropriate.

4. Cultivate a network of champions – Finally, NJ TRANSIT should consider cultivating and coordinating a “network of champions” to reach a broader audience and to amplify the campaign, especially through social media likes, reposts, retweets, etc. This type of collaboration is common in social cause marketing. Potential partners include but should not be limited to:

- Allied agencies such as the NJ Department of Transportation, NJ Department of Environmental Protection, and others,
- North Jersey Transportation Planning Authority,
- Delaware Valley Regional Planning Commission,
- South Jersey Transportation Planning Organization,
- Regional Plan Association,
- NJ FUTURE,
- Tri-State Transportation Campaign,
- Environmental organizations,
- Educational institutions,
- Veterans groups,
- Disability advocates and older adult organizations,
- Legislators, county commissioners, mayors and other municipal elected officials
- Chambers of commerce, and
- Large employers.

To be most effective, NJ TRANSIT should share the infographics prepared for this study freely with partnering organizations.

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