CONDITIONS AND SAFETY OF NEW YORK’S
ROADS AND BRIDGES

MARCH 2015

TRIP
a national transportation research group
202-466-6706
tripnet.org

Founded in 1971, TRIP ® of Washington, DC, is a nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway and transit engineering and construction; labor unions; and organizations concerned with efficient and safe surface transportation.
Executive Summary

New York’s extensive system of roads, bridges and highways provides the state’s residents, visitors and businesses with a high level of mobility, while acting as the backbone that supports the state’s economy. New York’s transportation system enables the state’s residents and visitors to travel safely to work and school, visit family and friends, and frequent tourist and recreation attractions while providing businesses with reliable access to customers, materials, suppliers and employees.

However, the state’s locally and state-maintained roads, highways and bridges face a significant challenge in the need to improve conditions and traffic safety. As New York works to retain its quality of life, maintain its level of economic competitiveness and achieve further economic growth, the state will need to preserve, maintain and modernize its roads, highways and bridges by improving the physical condition and safety of its transportation network, thus enhancing the system’s ability to provide efficient and reliable mobility for motorists and businesses. Making needed improvements to New York’s roads, highways and bridges could also provide a significant boost to the state’s economy by creating jobs in the short term and stimulating long term economic growth as a result of reduced vehicle operating costs, improved safety and enhanced mobility.

Meeting New York’s need to modernize and maintain its system of roads, highways and bridges will require significant local, state and federal funding.

The federal government is a critical source of funding for New York’s surface transportation system. In July 2014, Congress approved an eight-month extension of the federal surface transportation program, MAP-21 (Moving Ahead for Progress in the 21st Century Act), which provides states with road, highway, bridge and transit funding through May 31, 2015.

New York’s major roads have significant deterioration which provides motorists a rough ride and increases the cost of operating a vehicle. Repairing roads and highways while they are in good or fair condition greatly reduces long-term preservation costs because of the high cost of repairing roads in poor condition.

- More than a third – 37 percent – of New York’s major locally and state-maintained urban roads and highways have pavements in poor condition. An additional 43 percent of the state’s major urban roads have pavements in mediocre or fair condition, and the remaining 20 percent are in good condition.

- The following chart details the percentage of major locally-and state-maintained roads and highways in poor, mediocre, fair and good condition in each of the state’s largest urban areas.
Roads in good condition can be maintained by preventive maintenance, which costs approximately $85,000 per lane mile; roads in mediocre or fair condition require resurfacing, which costs approximately $575,000 per lane mile; and roads in poor condition require reconstruction to repair the surface and the base under the road, which costs approximately $1,625,000 per mile – 19 times greater than the cost of preventive maintenance.

Roads rated in poor condition may show signs of deterioration, including rutting, cracks and potholes. In some cases, poor roads can be resurfaced, but often are too deteriorated and must be reconstructed.

Driving on rough roads costs all New York motorists a total of $6.3 billion annually in extra vehicle operating costs (VOC). Costs include accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear.

The following chart details the annual extra vehicle operating costs per motorists as a result of driving on rough roads in each of the following urban areas.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Poor</th>
<th>Mediocre</th>
<th>Fair</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>25%</td>
<td>26%</td>
<td>27%</td>
<td>22%</td>
</tr>
<tr>
<td>Buffalo</td>
<td>12%</td>
<td>20%</td>
<td>15%</td>
<td>53%</td>
</tr>
<tr>
<td>New York City</td>
<td>43%</td>
<td>30%</td>
<td>11%</td>
<td>16%</td>
</tr>
<tr>
<td>Rochester</td>
<td>21%</td>
<td>16%</td>
<td>24%</td>
<td>40%</td>
</tr>
<tr>
<td>Syracuse</td>
<td>28%</td>
<td>17%</td>
<td>15%</td>
<td>40%</td>
</tr>
</tbody>
</table>

More than one-third – 39 percent — of locally and state-maintained bridges (20 feet or longer) in New York show significant deterioration or do not meet current design standards often because of narrow lanes, inadequate clearances or poor alignment.

Twelve percent of New York’s bridges are structurally deficient. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges are often posted for lower weight or closed to traffic, restricting or redirecting large vehicles, including commercial trucks and emergency services vehicles.
Twenty-seven percent of New York’s bridges are functionally obsolete. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

The following chart details the percentage of bridges in each of the following urban areas that are structurally deficient or functionally obsolete.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Structurally Deficient</th>
<th>Functionally Obsolete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>Buffalo</td>
<td>9%</td>
<td>27%</td>
</tr>
<tr>
<td>New York City</td>
<td>9%</td>
<td>48%</td>
</tr>
<tr>
<td>Rochester</td>
<td>9%</td>
<td>33%</td>
</tr>
<tr>
<td>Syracuse</td>
<td>14%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Improving safety features on New York’s roads and highways would likely result in a decrease in traffic fatalities and serious crashes. It is estimated that roadway features are a contributing factor in approximately one-third of all fatal and serious traffic crashes.

- Between 2009 and 2013 a total of 5,892 people were killed in traffic crashes in New York, an average of 1,178 fatalities per year.

- New York’s overall traffic fatality rate of 0.92 fatalities per 100 million vehicle miles of travel in 2013 is lower than the national traffic fatality rate of 1.09.

- The fatality rate on New York’s rural non-Interstate roads was 2.15 fatalities per 100 million vehicle miles of travel in 2013, more than three-and-a-half times higher than the 0.61 fatality rate on all other roads and highways in the state.

- The following chart indicates the average number of people killed annually from 2011 to 2013 in the following urban areas.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>2011-13 Ave. Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>27</td>
</tr>
<tr>
<td>Buffalo</td>
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<td>New York City</td>
<td>663</td>
</tr>
<tr>
<td>Rochester</td>
<td>40</td>
</tr>
<tr>
<td>Syracuse</td>
<td>28</td>
</tr>
</tbody>
</table>

- Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median
barriers and intersection design. The cost of serious crashes includes lost productivity, lost earnings, medical costs and emergency services.

- Several factors are associated with vehicle crashes that result in fatalities, including driver behavior, vehicle characteristics and roadway features. TRIP estimates that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes.

- Where appropriate, highway improvements can reduce traffic fatalities and crashes while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; improved lighting; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.

- Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A 2012 report by the Texas Transportation Institute (TTI) found that improvements completed recently by the Texas Department of Transportation that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior). TTI estimates that the improvements on these roads are likely to save 880 lives over the next 20 years.

The efficiency of New York’s transportation system, particularly its highways, is critical to the health of the state’s economy. Increased deterioration of New York’s roads and bridges and the lack of needed transportation improvements to serve economic development threaten the state’s economic vitality.

- New York’s population reached approximately 19.6 million in 2013, a nine percent increase since 1990. New York had 11,248,617 licensed drivers in 2012.

- Vehicle miles traveled (VMT) in New York increased by 21 percent from 1990 to 2013 – from 107 billion VMT in 1990 to 130 billion VMT in 2013. By 2030, vehicle travel in New York is projected to increase by another 10 percent.

- From 1990 to 2013, New York’s gross domestic product, a measure of the state’s economic output, increased by 46 percent, when adjusted for inflation.

- Annually, $550 billion in goods are shipped from sites in New York and another $597 billion in goods are shipped to sites in New York, mostly by truck. Seventy-two percent of the goods shipped annually from sites in New York are carried by trucks and another 22 percent are carried by courier services or multiple mode deliveries, which include trucking.

- Increasingly, companies are looking at the quality of a region’s transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.
Highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2013 survey of corporate executives by Area Development Magazine.

A 2014 report by the Oregon Department of Transportation (ODOT) concluded that allowing its state’s major roads, highways and bridges to deteriorate would result in significant reduction in job growth and reduced state gross domestic product (GDP) as a result of reduced economic efficiency. The report found that the cost of making needed road, highway, and bridge improvements is far less than the potential loss in state economic activity caused by a lack of adequate road, highway and bridge preservation.

- The ODOT report used a sophisticated model that integrates transportation, land use and economic activity to compare how an economy operates when a transportation system is well-maintained versus when it is allowed to deteriorate. The report found that deteriorated pavements, which result in a rougher and slower ride for vehicles, and deteriorated bridges, which need to be closed to heavy trucks, reduce economic productivity by increasing transportation costs.

- The report found that allowing roads and bridges to deteriorate reduces business productivity by increasing vehicle operating costs as a result of driving on rough roads, reducing travel speeds and increasing travel times because of route detours necessitated by weight-restricted bridges.

- As road and bridge conditions deteriorate, transportation agencies are likely to shift resources from preservation projects, which extend the service life of roads and bridges, to more reactive maintenance projects, which results in higher lifecycle costs, the report found. Transportation agencies are also likely to respond to increased road and bridge deterioration by shifting funds from modernization projects, which relieve congestion and increase business productivity, to maintenance projects.

- The ODOT report estimated that the road, highway and bridge deterioration anticipated over the next 20 years will result in Oregon creating 100,000 fewer jobs and generating $9.4 billion less in state GDP.

- Oregon could avoid losing 100,000 jobs and $9.4 billion in GDP through 2035 by spending an additional $810 million more on road, highway and bridge repairs – nearly a 12-to-1 return on investment, according to the ODOT report.

Without additional transportation funding at the local, state and federal level, the condition and safety of New York’s roads, highways and bridges will deteriorate.

- The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of $5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety,
reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.

- Signed into law in July 2012, MAP-21 (Moving Ahead for Progress in the 21st Century Act), has improved several procedures that in the past had delayed projects, MAP-21 does not address long-term funding challenges facing the federal surface transportation program.

- In July 2014, Congress approved the Highway and Transportation Funding Act of 2014, an eight-month extension of the federal surface transportation program, on which states rely for road, highway, bridge and transit funding. The program, initially set to expire on September 30, 2014, will now run through May 31, 2015. In addition to extending the current authorization of the highway and public transportation programs, the legislation will transfer nearly $11 billion into the Highway Trust Fund (HTF) to preserve existing levels of highway and public transportation investment through the end of May 2015.

- If Congress decides to provide additional revenues into the federal Highway Trust Fund in tandem with authorizing a new federal surface transportation program, a number of technically feasible revenue options have been identified by the American Association of State Highway and Transportation Officials (AASHTO).

- A significant boost in investment on the nation’s roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation’s transportation needs, concluded a new report from AASHTO. The 2015 AASHTO Transportation Bottom Line Report found that annual investment in the nation’s roads, highways and bridges needs to increase from $88 billion to $120 billion and from $17 billion to $43 billion in the nation’s public transit systems, to improve conditions and meet the nation’s mobility needs.

- The 2015 AASHTO Transportation Bottom Line Report also found that the current backlog in needed road, highway and bridge improvements is $740 billion.

*Sources of information for this report include the Federal Highway Administration (FHWA), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the American Association of State Highway and Transportation Officials (AASHTO), the Texas Transportation Institute (TTI), and the National Highway Traffic Safety Administration (NHTSA). All data used in the report is the latest available.*
Introduction

New York’s roads, highways and bridges form vital transportation links for the state’s residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Today, with the Empire State striving to support quality of life and economic competitiveness, it is critical that the condition and safety of New York’s roads, highways and bridges be improved.

As the U.S. and New York work to sustain long-term economic growth, the preservation and modernization of the state’s transportation system could play an important role in retaining New York’s economic competitiveness and improving its economic well-being by providing needed jobs in the short term and by improving the productivity, traffic safety and competitiveness of the state.

However, New York faces numerous challenges in providing a transportation system that is safe, well-maintained, efficient and adequately funded. As New York faces the challenge of preserving and modernizing its transportation system, the future level of federal, state and local transportation funding will be a critical factor in whether the state’s residents and visitors continue to enjoy access to a safe, well-maintained and efficient transportation network. Meeting New York’s need to modernize and maintain its system of roads, highways and bridges will require significant local, state and federal funding.

Population, Travel and Economic Trends in New York

New York’s residents and businesses require a high level of personal and commercial mobility. Population increases and economic growth in the state have resulted in an increase in
the demand for mobility as well as an increase in vehicle miles of travel (VMT). To foster quality of life and spur economic growth in New York, it will be critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, recreation and vehicle travel.

New York’s population grew to approximately 19.6 million residents in 2013, a nine percent increase since 1990.¹ New York had 11,248,617 licensed drivers in 2012.² From 1990 to 2013, New York’s gross domestic product (GDP), a measure of the state’s economic output, increased by 46 percent, when adjusted for inflation.³

From 1990 to 2013, annual VMT in New York increased by 21 percent, from approximately 107 billion miles to 130 billion miles.⁴ Based on population and other lifestyle trends, TRIP estimates that travel on New York’s roads and highways will increase by another 10 percent by 2030.⁵

**Condition of New York’s Roads**

The life cycle of New York’s roads is greatly affected by the state and local government’s ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

More than a third – 37 percent – of New York’s major locally and state-maintained urban roads and highways have pavements in poor condition. An additional 43 percent of the state’s major urban roads have pavements in mediocre or fair condition, and the remaining 20 percent are in good condition.⁶
The following chart details the share of major roads and highways in poor, mediocre, fair and good condition in each of New York’s largest urban areas.\(^7\)

**Chart 1. Pavement Conditions by Urban Area.**

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Poor</th>
<th>Mediocre</th>
<th>Fair</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>25%</td>
<td>26%</td>
<td>27%</td>
<td>22%</td>
</tr>
<tr>
<td>Buffalo</td>
<td>12%</td>
<td>20%</td>
<td>15%</td>
<td>53%</td>
</tr>
<tr>
<td>New York City</td>
<td>43%</td>
<td>30%</td>
<td>11%</td>
<td>16%</td>
</tr>
<tr>
<td>Rochester</td>
<td>21%</td>
<td>16%</td>
<td>24%</td>
<td>40%</td>
</tr>
<tr>
<td>Syracuse</td>
<td>28%</td>
<td>17%</td>
<td>15%</td>
<td>40%</td>
</tr>
</tbody>
</table>

*Source: TRIP analysis if Federal Highway Administration data*

Pavement failure is caused by a combination of traffic, moisture, climate, and other factors. Moisture often works its way into road surfaces and the materials that form the road’s foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four to five times more than resurfacing them.\(^8\) As roads and highways continue to age, they will reach a point of deterioration where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

Repairing roads and highways while they are in good or fair condition greatly reduces long-term preservation costs because of the high cost of repairing roads in poor condition. Roads in good condition can be maintained by preventive maintenance, which costs approximately $85,000 per lane mile; roads in mediocre or fair condition require resurfacing, which costs approximately $575,000 per lane mile; and roads in poor condition require reconstruction to
repair the surface and the base under the road, which costs approximately $1,625,000 per mile – 19 times higher than the cost of preventive maintenance.9

The Costs to Motorists of Roads in Inadequate Condition

TRIP has calculated the additional cost to motorists of driving on roads in poor or unacceptable condition. When roads are in poor condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs borne by New York motorists as a result of poor road conditions is $6.3 billion annually.10

The following chart indicates the average annual extra vehicle operating costs paid annually by motorists in the state’s largest urban areas.


<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Annual VOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>$504</td>
</tr>
<tr>
<td>Buffalo</td>
<td>$294</td>
</tr>
<tr>
<td>New York City</td>
<td>$694</td>
</tr>
<tr>
<td>Rochester</td>
<td>$402</td>
</tr>
<tr>
<td>Syracuse</td>
<td>$477</td>
</tr>
</tbody>
</table>

Source: TRIP

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on
vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.\textsuperscript{11}

The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

TRIP’s additional vehicle operating cost estimate is based on taking the average number of miles driven annually by a motorist, calculating current vehicle operating costs based on AAA’s 2014 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs paid by drivers as a result of substandard roads.\textsuperscript{12} Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP’s vehicle operating cost methodology.

**Bridge Conditions in New York**

New York’s bridges form key links in the state’s highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles.

More than one-third – 39 percent -- of New York’s locally and state-maintained bridges (20 feet or longer) are currently rated as structurally deficient or functionally obsolete.\textsuperscript{13} Structurally deficient bridges are safe for travel, though they often need maintenance or improvements to correct obsolete features.
Twelve percent of New York’s locally and state maintained bridges are rated as structurally deficient. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.

Twenty-seven percent of New York’s locally and state-maintained bridges are rated functionally obsolete. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment with the approaching roadway.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, insuring that a facility has good drainage and replacing deteriorating components. But most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

The following chart details the share of bridges that are rated either structurally deficient or functionally obsolete in each of the state’s largest urban areas.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Structurally Deficient</th>
<th>Functionally Obsolete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>Buffalo</td>
<td>9%</td>
<td>27%</td>
</tr>
<tr>
<td>New York City</td>
<td>9%</td>
<td>48%</td>
</tr>
<tr>
<td>Rochester</td>
<td>9%</td>
<td>33%</td>
</tr>
<tr>
<td>Syracuse</td>
<td>14%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Source: TRIP analysis of Federal Highway Administration data
Traffic Safety in New York

A total of 5,892 people were killed in motor vehicle crashes in New York from 2009 through 2013, an average of 1,178 fatalities per year.¹⁷


<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>1,156</td>
</tr>
<tr>
<td>2010</td>
<td>1,200</td>
</tr>
<tr>
<td>2011</td>
<td>1,169</td>
</tr>
<tr>
<td>2012</td>
<td>1,168</td>
</tr>
<tr>
<td>2013</td>
<td>1,199</td>
</tr>
<tr>
<td>Total</td>
<td>5,892</td>
</tr>
</tbody>
</table>

Source: National Highway Traffic Safety Administration

The following chart details the average number of traffic fatalities in the state’s largest urban areas from 2011 to 2013.


<table>
<thead>
<tr>
<th>Urban Area</th>
<th>2011-13 Ave. Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Syracuse</td>
<td>28</td>
</tr>
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</table>


Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design.
New York’s overall traffic fatality rate of 0.92 fatalities per 100 million vehicle miles of travel in 2013 is lower than the national average of 1.09.\textsuperscript{18} But, the fatality rate on New York’s non-Interstate rural roads was 2.15 fatalities per 100 million vehicle miles of travel in 2013, more than three-and-a-half times higher than the fatality rate of 0.61 on all other roads and highways in the state.\textsuperscript{19}

Improving safety on New York’s roadways can be achieved through further improvements in vehicle safety; improvements in driver, pedestrian, and bicyclist behavior; and a variety of improvements in roadway safety features.

The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, such as adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, widening and paving shoulders, improving intersection layout, and providing better road markings and upgrading or installing traffic signals.

Roads with poor geometry, with insufficient clear distances, without turn lanes, having inadequate shoulders for the posted speed limits, or poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A 2012 report by the \textit{Texas Transportation Institute} (TTI) found that improvements completed recently by the Texas Department of Transportation that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior). TTI estimates that the improvements on these roads are likely to save 880 lives over the next 20 years.\textsuperscript{20}
Transportation Funding

Without a boost in transportation funding at the local, state and federal level, the condition, efficiency and safety of New York’s transportation system will be threatened.

The federal government provides funding for the state and local transportation system largely as part MAP-21 (Moving Ahead for Progress in the 21st Century Act), the current two-year federal surface transportation program, which expires on May 31, 2015.

The federal government is a critical source of funding for New York’s roads, highways, bridges and transit systems.

Federal funds for highway and transit improvements in New York are provided through the federal Highway Trust Fund, which raises revenue through federal user fees, largely an 18.4 cents-per-gallon tax on gasoline and a 24.4 cents-per-gallon tax on diesel fuel. Since 2008 revenue into the federal Highway Trust Fund has been inadequate to support legislatively set funding levels so Congress has transferred approximately $53 billion in general funds and an additional $2 billion from a related trust fund into the federal Highway Trust Fund.21

Signed into law in July 2012, MAP-21 has improved several procedures that in the past had delayed projects. MAP-21 does not address long-term funding challenges facing the federal surface transportation program. In July 2014, Congress approved the Highway and Transportation Funding Act of 2014, an eight-month extension of the federal surface transportation program on which states rely for road, highway, bridge and transit funding. The program, initially set to expire on September 30, 2014, will now run through May 31, 2015. In addition to extending the current authorization of the highway and public transportation programs, the legislation will transfer nearly $11 billion into the Highway Trust Fund (HTF) to
preserve existing levels of highway and public transportation investment through the end of May 2015.

If Congress decides to provide additional revenues into the federal Highway Trust Fund in tandem with authorizing a new federal surface transportation program, a number of technically feasible revenue options have been identified by the American Association of State Highway and Transportation Officials (AASHTO).

A significant boost in investment on the nation’s roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation’s transportation needs, concluded a new report from the American Association of State Highway and Transportation Officials.

The 2015 AASHTO Transportation Bottom Line Report found that annual investment in the nation’s roads, highways and bridges needs to increase from $88 billion to $120 billion and from $17 billion to $43 billion in the nation’s public transit systems, to improve conditions and meet the nation’s mobility needs.²²

The 2015 AASHTO Transportation Bottom Line Report also found that the current backlog in needed road, highway and bridge improvements is $740 billion.²³ The backlog includes a $392 billion backlog for road and highway rehabilitation, a $112 billion backlog in needed bridge rehabilitation and a $237 billion backlog in needed highway capacity additions.²⁴

**Importance of Transportation to Economic Growth**

Today’s culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. Global communications
and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement, making the quality of a region’s transportation system a key component in a business’s ability to compete locally, nationally and internationally.

A lack of adequate access, roadway safety features or road and bridge repairs can impede the development of economic growth in the state by reducing productivity. Limited road and highway access, safety or preservation can reduce the efficiency of businesses, shippers and manufacturers, by increasing transportation costs.

Reduced access and mobility can reduce the attractiveness of a location to a company to consider expansion or even to locate a new facility. And, the costs associated with delays as well as increased vehicle operating costs due to a deficient transportation system can increase overall costs for trucking and shipping companies, leading to revenue losses, lower pay for employees, and higher consumer costs.

Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and e-commerce. The result of these changes has been a significant improvement in logistics efficiency as firms move from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation’s trucks literally becoming rolling warehouses. This practice makes traffic operations and time delay a critically important factor in economic development.

Highways are vitally important to continued economic development in New York, particularly to the state’s agriculture, manufacturing, tourism, mining, finance and health care sectors. As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities
of goods to market to meet this demand, a process that adds to truck traffic on the state’s highways and major arterial roads.

Every year, $550 billion in goods are shipped from sites in New York and another $597 billion in goods are shipped to sites in New York, mostly by trucks.\textsuperscript{25} Seventy-two percent of the goods shipped annually from sites in New York are carried by trucks and another twenty-two percent are carried by courier services or multiple-mode deliveries, which include trucking.\textsuperscript{26}

The cost of road and bridge improvements are more than offset by the reduction of user costs associated with driving on rough roads, the improvement in business productivity, the reduction in delays and the improvement in traffic safety. The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of $5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.\textsuperscript{27}

Local, regional and state economic performance is improved when a region’s surface transportation system is expanded or repaired. This improvement comes as a result of the initial job creation and increased employment created over the long-term because of improved access, reduced transport costs and improved safety. In fact, highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2013 survey of corporate executives by Area Development Magazine.\textsuperscript{28}

Increasingly, companies are looking at the quality of a region’s transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.
A 2014 report by the Oregon Department of Transportation (ODOT) concluded that allowing the state’s major roads, highways and bridges to deteriorate would result in significant reduction in job growth and reduced state gross domestic product as a result of reduced economic efficiency.

The ODOT report used a sophisticated model which integrates transportation, land use and economic activity to compare how an economy operates when a transportation system is well-maintained versus when it is allowed to deteriorate. The report found that deteriorated pavements, which result in a rougher and slower ride for vehicles, and deteriorated bridges, which need to be closed to heavy trucks, reduce economic productivity by increasing transportation costs.

The report found that allowing roads and bridges to deteriorate reduces business productivity by increasing vehicle operating costs as a result of driving on rough roads, reducing travel speeds and increasing travel times because of route detours necessitated by weight-restricted bridges and reducing the ability of transportation agencies to fund needed highway modernization projects to improve access.\(^{29}\)

As road and bridge conditions deteriorate, transportation agencies are likely to shift resources from preservation projects, which extend the service life of roads and bridges, to more reactive maintenance projects, which results in higher lifecycle costs, the report found.\(^{30}\) Transportation agencies are also likely to respond to increased road and bridge deterioration by shifting funds from modernization projects, which relieve congestion and increase business productivity, to maintenance projects.

The ODOT report estimated that the road, highway and bridge deterioration anticipated over the next 20 years will result in Oregon creating 100,000 fewer jobs and generating $9.4
billion less in state gross domestic product (GDP).\textsuperscript{31} Oregon could avoid losing 100,000 jobs and $9.4 billion in GDP through 2035 by spending an additional $810 million more on road, highway and bridge repairs – nearly a 12 to 1 return on investment.\textsuperscript{32}

\textbf{Conclusion}

As New York works to build and enhance a thriving, growing and dynamic state, it will be critical that it is able to provide a 21\textsuperscript{st} Century transportation system that can accommodate the mobility demands of a modern society.

Making needed repairs and safety improvements to New York’s roads, highways and bridges could provide a significant boost to the state’s economy by creating jobs in the short term and stimulating long term economic growth as a result of reduced vehicle operating costs, improved safety and enhanced mobility.

Without substantial and reliable federal, state and local transportation funding, numerous projects to improve the condition and expand the capacity of New York’s transportation system will not be able to proceed, hampering the state’s ability to improve the condition of its roads, highways and bridges and to enhance safety, quality of life and economic development opportunities in the state.

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Endnotes

3. TRIP analysis of Bureau of Economic Analysis data.
5. TRIP calculation based on U.S. Census and Federal Highway Administration data.
8. Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.

10. TRIP calculation

14. Ibid.
15. Ibid.
16. Ibid.
18. Ibid.
19. Ibid.
24. Ibid.
26. Ibid.
27. FHWA estimate based on its analysis of 2006 data. For more information on FHWA’s cost-benefit analysis of highway investment, see the 2008 Status of the Nation’s Highways, Bridges, and Transit: Conditions and Performance.

30. Ibid.
31. Ibid.