FUTURE MOBILITY IN RHODE ISLAND:

Meeting the State's Need for Safe and Efficient Mobility

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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, construction and finance; labor unions; and organizations concerned with an efficient and safe surface transportation network.

Executive Summary

Rhode Island's system of roads, highways, bridges and public transit provides the state's residents, visitors and businesses with a high level of mobility. As the backbone that supports the Ocean State, Rhode Island's surface transportation system provides for travel to work and school, visits with family and friends, and trips to tourist and recreation attractions while simultaneously providing businesses with reliable access for customers, suppliers and employees. Rhode Island must improve its system of roads, highways, bridges and public transit to foster economic growth, keep business in the state, and ensure the safe, reliable mobility needed to improve quality of life in Rhode Island.

As Rhode Island looks to rebound from the current economic downturn, the state will need to enhance its surface transportation system by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient and reliable mobility for residents, visitors and businesses. With unemployment in Rhode Island more than doubling from 5.4 percent in August 2007 to 11.8 percent in August 2010, making needed improvements to the state's roads, highways, bridges and transit could provide a significant boost to the state's economy by creating jobs and stimulating long-term economic growth as a result of enhanced mobility and access.

Over the next ten years, Rhode Island faces a transportation funding shortfall of more than $4.5 billion. Without a substantial increase in transportation funding at the local, state and federal level, the state will be unable to complete numerous projects, leading to deteriorated road and bridge conditions, increased urban congestion and lost opportunities for economic growth.

- The Rhode Island Department of Transportation (RIDOT) projects that over the next ten years, the state will face a transportation funding shortfall of more than $4.5 billion. This lack of sufficient state transportation funding will lead to deteriorated road and bridge conditions, increased urban congestion, a lack of desirable safety features and lost opportunities for economic recovery and growth.

- A lack of available transportation funding in the future is projected to lead to more deteriorated state-maintained roadways. While 44 percent of state-maintained roads are currently in good condition, by 2020 only 31 percent will be in good condition.

- TRIP estimates that Rhode Island's roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state's drivers approximately $978 million annually in the form of traffic crashes, additional vehicle operating costs and congestion-related delays.

- TRIP estimates that roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions, cost the average Providence area motorist $1,298 annually. The report contains a breakdown of the three components of the cost to motorists.

- To ensure that federal funding for highways and bridges in Rhode Island and throughout the nation continues beyond the expiration of SAFETEA-LU, Congress needs to approve a new long-term federal surface transportation program by December 31, 2010.

- The American Recovery and Reinvestment Act (ARRA) provides approximately $137.1 million in stimulus funding for highway and bridge improvements and $29.6 million for public transit improvements in Rhode Island.

- ARRA funding can serve as a down payment on needed road, highway, bridge and transit improvements, but it is not sufficient to allow the state to proceed with numerous projects needed to modernize its surface transportation system. Meeting Rhode Island's need to modernize and maintain its system of roads, highways, bridges and transit will require a significant, long-term boost in transportation funding at the federal, state or local levels.

Despite the current economic downturn, population increases and economic growth in Rhode Island over the past two decades have resulted in increased demands on the state's major roads and highways.

- Rhode Island's population reached nearly 1.1 million in 2009, an increase of five percent since 1990. The state's population is expected to increase 14 percent by 2030.

- Vehicle travel in Rhode Island increased 17 percent from 1990 to 2008 – from seven billion vehicle miles traveled (VMT) in 1990 to 8.2 billion VMT in 2008.

- By 2025, vehicle travel in Rhode Island is projected to increase by another 15 percent.

- From 1990 to 2008, Rhode Island's gross domestic product, a measure of the state's economic output, increased by 34 percent, when adjusted for inflation.

Nearly a quarter of state-maintained roads in Rhode Island are in poor or mediocre condition, providing motorists with a rough ride.

- According to RIDOT, a total of 24 percent of Rhode Island's state-maintained roads are rated in poor or mediocre condition. Six percent of state-maintained roads are in poor condition, while 18 percent are in mediocre condition

- Pavement conditions are projected to worsen under current funding conditions. While 44 percent of state-maintained roads are currently in good condition, by 2020 only 31 percent will be in good condition.

- Roads in need of repair cost each Rhode Island motorist an average of $467 annually in extra vehicle operating costs – $350 million statewide. Costs include accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.

- In the Providence metropolitan area, where 28 percent of major roads are rated in poor condition and 30 percent are rated in mediocre condition, driving on roads in need of repair costs motorists $421 each year in extra vehicle operating costs. This is one component of the $1,298 that Providence motorists lose each year as a result of deficient roads.

- The functional life of Rhode Island's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. It is critical

that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.

- This report contains a list of the most deteriorated sections of roadways in the state that are in need of significant repair or rehabilitation.

Nearly half of the bridges in Rhode Island showed significant deterioration or do not meet current design standards.

- Twenty-one percent of Rhode Island's bridges were structurally deficient in 2010. 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, school buses and emergency services vehicles.

- Twenty-seven percent of Rhode Island's bridges were functionally obsolete in 2010. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

- Bridges that are structurally deficient or functionally obsolete are safe for travel and are monitored on a regular basis by the organizations responsible for maintaining them.

- This report contains a list of state-maintained bridges that have the lowest sufficiency rating and are in need of replacement or rehabilitation.

Rhode Island's rural traffic fatality rate is more than three times higher than the fatality rate on all other roads in the state. Improving safety features on Rhode Island's roads and highways would likely result in a decrease in traffic fatalities in the state. Roadway characteristics are likely a contributing factor in approximately one-third of all fatal and serious traffic accidents.

- Between 2004 and 2008, 385 people were killed in traffic accidents in Rhode Island, an average of 77 fatalities per year.

- Rhode Island's traffic fatality rate was 0.79 fatalities per 100 million vehicle miles of travel in 2008, lower than the national average of 1.25 fatalities per 100 million vehicle miles of travel.

- The traffic fatality rate in 2008 on Rhode Island's non-Interstate rural roads was 2.34 traffic fatalities per 100 million vehicle miles of travel, which is more than three times the traffic fatality rate of 0.70 on all other roads and highways in the state.

- Several factors are associated with vehicle accidents that result in fatalities, including driver behavior, vehicle characteristics and roadway design.

- TRIP estimates that roadway characteristics, such as lane widths, lighting, signage and the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers and pedestrian or bicycle facilities, are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.

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

- The cost of serious traffic crashes in Rhode Island in 2008, in which roadway design was likely a contributing factor, was approximately $238 million; in the Providence area, the annual cost was approximately $311 per driver. This is one component of the $1,298 that Providence motorists lose each year as a result of deficient roads. The costs of serious crashes include lost productivity, lost earnings, medical costs and emergency services. .

- The Federal Highway Administration has found that every $100 million spent on needed highway safety improvements will result in 145 fewer traffic fatalities over a 10-year period.

Traffic congestion levels are rising as a result of population and economic growth, leading to increasing travel delays in Rhode Island's urban areas.

- In 2008, 37 percent of Rhode Island's urban Interstates and other highways or freeways were considered congested, carrying a level of traffic that is likely to result in significant delays during peak travel hours.

- The average rush hour trip in the Providence metro area takes approximately 17 percent longer to complete than during non-rush hour.

- According to a report by the Reason Foundation, by 2030, unless additional highway capacity is added, traffic delays in the Providence area will more than double, with the average rush hour trip taking 36 percent longer to complete than during non-rush hour. This level of traffic delay is equivalent to what is currently experienced in Phoenix, Dallas-Fort Worth and Baltimore.

- The statewide cost of traffic congestion in lost time and wasted fuel is approximately $390 million annually. Drivers in the Providence area lose $566 each year due to congestion. . This is one component of the $1,298 that Providence motorists lose each year as a result of deficient roads.

The efficiency of Rhode Island's transportation system, particularly its highways, is critical to the health of the state's economy. Businesses are increasingly reliant on an efficient and reliable transportation system to move products and services. Expenditures on highway repairs create a significant number of jobs.

- Annually, $29 billion in goods are shipped from sites in Rhode Island and another $28 billion in goods are shipped to sites in Rhode Island, mostly by trucks.

- Seventy-nine percent of the goods shipped annually from sites in Rhode Island are carried by trucks and another 18 percent are carried by parcel, U.S. Postal Service, or courier services, which use trucks for part of the deliveries.

- A 2007 analysis by the Federal Highway Administration found that every $1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy.

Sources of information for this report include the Rhode Island Department of Transportation (RIDOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census, The Bureau of Transportation Statistics (BTS), the American Association of State Highway and Transportation Officials (AASHTO), the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI). All data used in the report is the latest available.

Introduction

Rhode Island's roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping and recreation.

With unemployment in Rhode Island more than doubling from 5.4 percent in August 2007 to 11.8 percent in August 2010, the modernization of Rhode Island's surface transportation system is crucial to providing safe and efficient mobility while improving the economic livelihood of the state and accommodating future growth.[1]

As the nation looks to rebound from the current economic downturn, improving Rhode Island's transportation system could play an important role in boosting the state's economic well being by providing critically needed jobs in the short term and enhancing the productivity and competitiveness of the state's businesses in the long term.

As Rhode Island faces the challenge of preserving and improving its roadways, bridges and transit systems, the future level of local, state and federal highway funding will be a critical factor in whether the state's residents, businesses and visitors continue to enjoy access to a safe and efficient transportation network.

This report examines the condition, use and safety of Rhode Island's roads, highways, bridges and public transit systems and the state's transportation funding needs and future mobility needs. Included in the report are lists of highway and bridge projects that will require significant state or federal funding to proceed.

Sources of information for this report include the Rhode Island Department of Transportation (RIDOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census, The Bureau of Transportation Statistics (BTS), the American Association of State Highway and Transportation Officials (AASHTO), the National Highway Traffic Safety

Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI). All data used in the report is the latest available.

Population, Travel and Economic Trends in Rhode Island

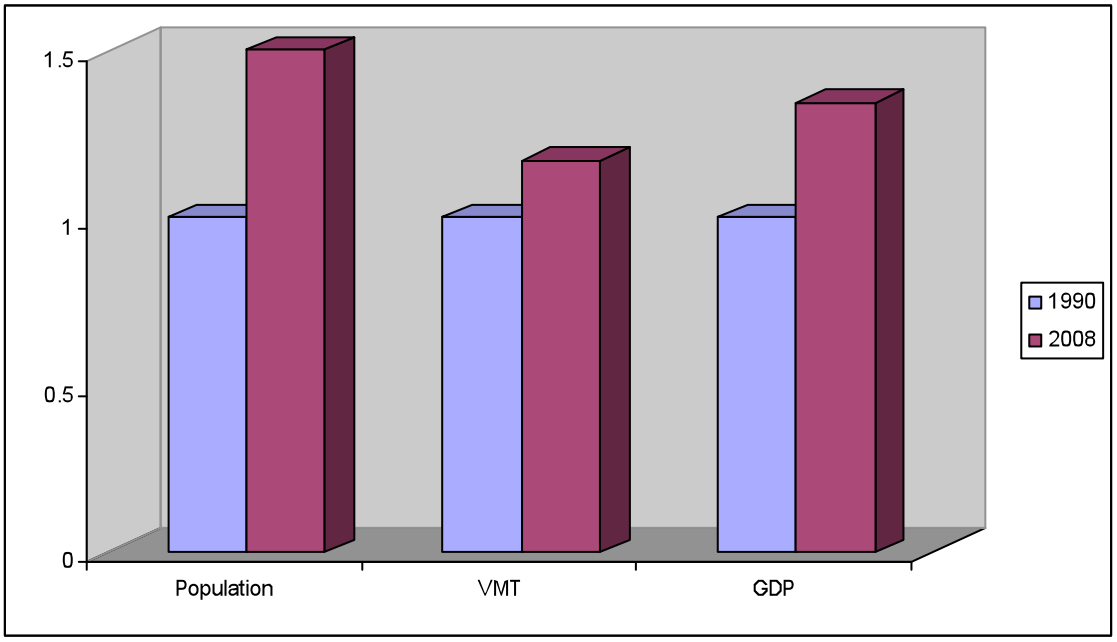
Rhode Island residents and businesses require a high level of personal and commercial mobility. Despite the current economic downturn, population increases and economic growth in the Ocean State over the past two decades have resulted in an increase in the demand for mobility, resulting in an increase in vehicle miles of travel (VMT). To foster a high quality of life in Rhode Island, it will be critical that the state provide and preserve a safe and modern transportation system that can accommodate future growth in population, vehicle travel and economic development.

Rhode Island's population grew five percent between 1990 and 2009, reaching nearly 1.1 million residents in 2009.[2] The state's population is projected to increase 14 percent by 2030.[3]

Rhode Island also experienced moderate economic growth since 1990. From 1990 to 2008, Rhode Island's gross domestic product (GDP), a measure of the state's economic output, increased by 34 percent, when adjusted for inflation.[4]

From 1990 to 2008, annual vehicle miles of travel in Rhode Island increased 17 percent, from seven billion miles traveled annually to 8.2 billion miles traveled annually.[5] Based on population and other lifestyle trends, TRIP estimates that travel on Rhode Island's roads and highways will increase by 15 percent by 2025, to approximately 9.4 billion miles of travel.[6]

Chart 1: Rhode Island's population, Vehicle Travel and GDP increase 1990-2008. 1 = 1990 level (Population figure is for 2009.)



Source: TRIP analysis of federal data

The Funding Needs of Rhode Island's Surface Transportation System

The construction, repair and upkeep of Rhode Island's roads, bridges, highways and public transit systems are paid for by local, state and federal governments. However, the amount of state transportation funding will increase only very slightly in the coming years, while transportation needs continue to grow. The state will have to stretch available dollars or postpone needed projects until additional funding is available.

Over the next ten years, Rhode Island faces a significant shortfall between the amount of funding available for road, highway and bridge repairs and improvements and the amount that would be needed to improve state road, highway and bridge conditions and make needed improvements to enhance traffic safety, relieve congestion and spur economic development. RIDOT projects that, under

current funding conditions, the state will face a transportation funding shortfall of more than $4.5 billion over the next ten years.

Chart 2. Rhode Island transportation funding shortfall, 2010 - 2020.

Year	Available	Needed	Shortfall
2010	$296,290,733	$639,000,000	$342,709,267
2011	$297,781,631	$651,780,000	$353,998,369
2012	$292,242,608	$664,815,600	$372,572,992
2013	$292,573,864	$678,111,912	$385,538,048
2014	$293,864,132	$691,674,150	$397,810,018
2015	$294,979,891	$705,507,633	$410,527,743
2016	$296,139,878	$719,617,786	$423,477,908
2017	$296,154,971	$734,010,142	$437,855,171
2018	$301,841,615	$748,690,344	$446,848,729
2019	$300,954,788	$763,664,151	$462,709,363
2020	$301,261,115	$778,937,434	$477,676,319
		TOTAL SHORTFALL	$4,511,723,928

Source: RIDOT response to TRIP survey.

Without additional transportation funding, many needed transportation projects will not move forward, leading to increasingly deteriorated roads and bridges, increased congestion, a lack of desirable safety features and missed opportunities for economic recovery and growth.

The current long-range federal surface transportation program, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), originally scheduled to expire on September 30, 2009, now expires on December 31, 2010 following five short-term extensions. The level of funding and the provisions of a future federal surface transportation program will have a significant impact on future highway and bridge conditions and safety as well as the level of transit service in Rhode Island.

The crafting of a new federal highway and transit program is occurring during a time when the nation's surface transportation program faces numerous challenges, including significant levels of

deterioration, increasing traffic congestion, and a decline in revenues going into the Federal Highway Trust Fund.

The American Recovery and Reinvestment Act provides approximately $137.1 million in stimulus funding for highway and bridge improvements and $29.6 million for public transit improvements in Rhode Island, a total of approximately $166.7 million. This funding can serve as a down payment on Rhode Island's needed road, highway, bridge and transit improvements, but it is still not sufficient to allow the state to proceed with numerous projects needed to improve and enhance its surface transportation system.

Rhode Island Pavement Conditions

The life cycle of Rhode Island's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. The pavement condition of the state's major roads is evaluated and classified as being in poor, mediocre, fair or good condition.

Currently, about a quarter of state-maintained roads are in either poor or mediocre condition. Six percent of Rhode Island's state-maintained roads are in poor condition and an additional 18 percent are in mediocre condition.[7] A lack of available transportation funding in the future is projected to lead to more deteriorated state-maintained roadways. While 44 percent of state-maintained roads are currently in good condition, by 2020 only 31 percent will be in good condition.[8]

Chart 3. Pavement conditions on state-maintained roadways. Future conditions based on projected funding levels.

	GOOD		FAIR		MEDIOCRE		POOR		TOTAL
Year	Miles	%	Miles	%	Miles	%	Miles	%	MILES
2005	560	51%	309	28%	140	13%	91	8%	1100
2010	**487**	**44%**	**345**	**31%**	**198**	**18%**	**70**	**6%**	**1100**
2015	414	38%	381	35%	256	23%	49	4%	1100
2020	341	31%	417	38%	314	29%	28	3%	1100

Source: RIDOT response to TRIP survey.

Roads rated poor 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. Roads rated in mediocre condition may show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

Pavement failure is caused by a combination of traffic, moisture and climate. 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 times more than resurfacing them.[9]

As Rhode Island's roads and highways continue to age, they will reach a point 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.

The following chart lists the most deteriorated sections of roadways in the state that are in need of significant repair or rehabilitation.

Chart 4. Roads or highways in Rhode Island that are most in need of significant repair or rehabilitation (ADT = Average Daily Traffic)

	Route Name	County or Closest City	From	To	Length(Mi.)	ADT
1	Route 3	Coventry	Arizona St	Reservoir Ave.	1.5	23,300
2	Route 116	Smithfield	Route 44	Route 5	3	6,200
3	Route 114 (Hope St.)	Bristol	Washington Street	Ferry Road	1.5	9,500
4	Route 44	Smithfield	Austin Avenue	Danecroft Avenue	1	12,100
5	Post Road	North Kingstown	Franklin Road	School Street	1	19,500
6	Route 165	Exeter	Route 3	Connecticut State Line	7.2	4,400
7	Peckham Road	Little Compton	West Main Road	Colebrook Road	2.5	1,200
8	West Main Road	Portsmouth	Locust Avenue	Route 24	2	5,800
9	I-95	West Greenwich, East Greenwich	Weaver Hill Road	Route 4	13	72,800
10	Route 102	Coventry, West Greenwich	Scituate Townline	Route 3	9.8	5,600
11	Elm St., Beach St., Railroad Ave.	Westerly			2.5	7,600
12	Old Route 102	Burrillville	Mapleville Main St.	East Avenue	1.7	5,800
13	Route 37	Warwick, Cranston	Post Road	Natick Road	3.5	151,100
14	Apponaug Circulator	Warwick	Post Road	Veterans Memorial Drive	1	25,400
15	Route 138	South Kingstown	Route 108	Route 2	3	11,000
16	Route 1A	Charlestown, South Kingstown	Route 1 (S.K.)	Route 1 (Charlestown)	2.1	3,800
17	Route 1	Narragansett, South Kingstown	Route 108	Route 110	5.5	14,000
18	Elmwood Avenue	Providence	Harbor Jct. Bridge #131	Broad Street	2.3	13,700
19	Post Road	Warwick	Warwick Ave.	South Atlantic Ave.	0.5	28,400
20	Dunn's Corner Road	Westerly	Route 1	Route 91	2.2	5,800
21	Route 44	Glocester	Tourtellotte Hill Road	Route 102	0.7	15,500
22	Railroad Street	Lincoln	Main Street	Old River Road	1.1	5,200
23	Reservoir Avenue	Cranston	Park Avenue	New London Ave. Poplar Dr.	1.5	27,000
24	Route 2	East Greenwich, North Kingstown	Rout 102	Route 4	0.7	11,600
25	Route 107	Burrillville	Route 100	Union Avenue	1	6,800

Source: RIDOT response to TRIP survey.

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. Roads in poor condition – which may include potholes, rutting or rough surfaces – increase the cost to operate and maintain a vehicle. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repairs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs borne by Rhode Island motorists as a result of driving on roads in poor condition is $350 million annually -- approximately $467 per motorist.

Driving on major roads in need of repair in the Providence metro area, where 28 percent of major roads are rated in poor condition and 30 percent are rated in mediocre condition, cost local

motorists an additional $421 a year.[10] This is one component of the $1,298 that Providence motorists lose each year as a result of deficient roads.

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.[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 2010 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.[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 Rhode Island

Rhode Island'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. According to RIDOT, 48 percent of Rhode Island's

bridges (20 feet or longer) were rated as structurally deficient or functionally obsolete in 2010.[13] Bridges that are structurally deficient or functionally obsolete are safe for travel and are monitored on a regular basis by the organizations responsible for maintaining them.

Twenty-one percent of the state's bridges are rated as structurally deficient.[14] 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 bridges were rated functionally obsolete.[15] 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.

Chart 5. Past, current and projected conditions of Rhode Island bridges.

Year	Structurally Deficieint		Functionally Obsolete		Total Bridges
2005	180	22%	230	29%	802
2010	171	21%	216	27%	802
2015	160	20%	205	26%	802
2020	150	19%	190	24%	802

Source: RIDOT response to TRIP survey

Bridges are rated using a formula defined in Federal Highway Administration's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. This rating is indicative of a bridge's sufficiency to remain in service. The formula places 55 percent value on the structural condition of the bridge, 30 percent on its serviceability and obsolescence, and 15 percent on its essentiality to public use.[16] The bridge's rating provides an overall measure of the bridge's condition. Bridges are considered structurally deficient if significant load carrying elements are found to be in poor condition due to deterioration. Major components of the bridge, such as the deck, substructure and superstructure are also rated on a sale from 0-9. If any component is rated from 0-4, the bridge is rated as structurally deficient. The following chart describes the rating scale applied to bridge components.

Chart 6. Bridge component rating scale description

0	Failed condition
1	Imminent failure condition
2	Critical condition
3	Serious condition
4	Poor condition
5	Fair condition
6	Satisfactory condition
7	Good condition
8	Very good condition
9	Excellent condition

Source: Federal Highway Administration

Lack of sufficient transportation funding in Rhode Island will prevent the state from addressing needed bridge rehabilitation or replacement projects. The following chart lists the state's 25 bridges (carrying at least 5,000 vehicles per day) with the lowest sufficiency ratings.

Chart 7. Rhode Island bridges (carrying at least 5,000 vehicles per day) with the lowest sufficiency rating. (ADT = Average Daily Traffic)

	Route Carried	Couty or Closest City	Route or feature intersected	ADT	Year Built	Sufficiency Rating	Deck Rating	Superstructure Rating	Substructure Rating
1	RI 122 Hamlet Ave.	Woonsocket	Blackstone River	19,900	1959	18	5	6	3
2	I-295 Southbound	Cranston	RI 14 Plainfield Pike	38,600	1969	20	6	3	6
3	RI 114 Dmnd. Hill Rd.	Cumberland	E. Branc Sneech Brook	9,900	1926	23.5	6	5	6
4	RI 113 East Ave.	Warwick	I-295	21,700	1966	31	6	3	5
5	Hawkins St.	Providence	West River	6,900	1900	31.1	4	3	5
6	Simmonsville Ave.	Johnston	Simmons Brook	5,900	1948	31.3	4	4	5
7	RI 146 Southbound	North Smithfield	RI 104 Farnum Pike	13,000	1958	33.1	N	3	6
8	US 1 Towe Hill Rd.	North Kingstown	RI 138	41,200	1969	34.4	6	4	5
9	RI 152 Newman Ave.	East Providence	Ten Mile River	8,900	1934	34.6	4	4	4
10	RI 37 Eastbound	Warwick	Jefferson Blvd.	23,800	1966	36	6	5	3
11	RI 12 Scituate Ave.	Cranston	I-295 NB & SB	8,600	1969	37.6	4	3	5
12	Old Danielson Pike	Foster	Dolly Cole Brook	8,500	1924	38.6	5	5	6
13	I-95	Warwick	Jefferson Blvd.	156,400	1966	39	6	3	5
14	I-95	Providence	Amtrak	159,200	1964	41	6	3	5
15	RI 12 Park Ave.	Cranston	Amtrak	17,712	1906	43.7	5	4	6
16	Dean St.	Providence	Woonasquatucket River	39,800	1973	44.4	6	5	4
17	US 1 NB Post Rd.	South Kingstown	Pond St.	17,350	1963	45.1	7	6	3
18	RI 114	Bristol	MT HP BY,N SEC RR.	17,700	1929	45.3	6	3	5
19	Factory St.	West Warwick	Mill Tail Race	14,600	1956	46.5	N	3	4
20	RI 113 East Ave.	Warwick	I-95	21,700	1965	46.6	5	4	6
21	RI 138	Jamestown	E. Passage Narr. Bay.	21,550	1969	46.6	5	5	7
22	RI 126 Old River Rd.	Lincoln	I-295 NB & SB	8,700	1969	47.5	6	4	4
23	RI 5 Greenshich Ave.	Warwick	I-95	9,200	1965	47.6	6	5	5
24	RI 107 East Ave.	Burrillville	Pascoag River	10,100	1902	47.8	N	4	4
25	RI 112 RM TN HS Rd.	Richmond	Pawcatuck River	5,500	1947	48.1	6	5	4

Source: RIDOT response to TRIP survey.

Traffic Congestion in Rhode Island

Traffic congestion in Rhode Island is a growing burden in key urban areas and threatens to impede the state's economic development. Congestion on Rhode Island's urban highways is growing as a result of increases in vehicle travel and population.

In 2008, 37 percent of Rhode Island's urban Interstates and other highways or freeways were congested, carrying traffic volumes that result in significant rush hour delays.[17] Highways that carry high levels of traffic are also more vulnerable to experiencing lengthy traffic delays as a result of traffic accidents or other incidents.

Traffic congestion in Rhode Island's largest urban areas is likely to worsen significantly unless the state is able to improve its transportation system. The average rush hour trip in the Providence metro area takes approximately 17 percent longer to complete than during non-rush hour.[18]

According to the Reason Foundation, by 2030, unless additional highway capacity is added, traffic congestion delays will more than double, with the average rush hour trip in the Providence metro area taking 36 percent longer to complete than during non-rush hour.[19] This level of traffic delay is equivalent to what drivers currently experience in Phoenix, Dallas-Fort Worth and Baltimore.

The statewide cost of traffic congestion in lost time and wasted fuel is approximately $390 million annually and drivers in the Providence area lose $566 each year due to congestion.[20] This is one component of the $1,298 that Providence motorists lose each year as a result of deficient roads.

Traffic Safety in Rhode Island

A total of 385 people were killed in motor vehicle accidents in Rhode Island from 2004 through 2008, an average of 77 fatalities per year.[21]

Rhode Island's traffic fatality rate was 0.79 fatalities per 100 million vehicle miles of travel in 2008, lower than the national average of 1.25 fatalities per 100 million vehicle miles of travel.[22]

Chart 8. Traffic fatalities in Rhode Island from 2004 – 2008.

Year	*Fatalities*
2004	83
2005	87
2006	81
2007	69
2008	65
Total	**385**

Source: National Highway Traffic Safety Administration

Rhode Island's rural, non-Interstate roads have a fatality rate that is more than three times higher than the rate on all other roads in the state. The traffic fatality rate in 2008 on Rhode Island's non-Interstate rural roads was 2.34 traffic fatalities per 100 million vehicle miles of travel.[23] The traffic fatality rate per 100 million vehicle miles of travel on all other roads and highways in the state was 0.70 in 2008.[24]

The cost of serious traffic crashes in Rhode Island in 2008, in which roadway design was likely a contributing factor, was approximately $238 million. Such traffic crashes in the Providence area cost each driver approximately $311. This is one component of the $1,298 that Providence motorists lose each year as a result of deficient roads. The costs of serious crashes include lost productivity, lost earnings, medical costs and emergency services. [25]

Three major factors are associated with fatal vehicle accidents: driver behavior, vehicle characteristics and roadway characteristics. TRIP estimates that roadway characteristics, such as lane widths, lighting, signage and the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers and pedestrian or bicycle facilities, are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.

Improving safety on Rhode Island'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.

Where appropriate, the severity of serious traffic crashes could be reduced through roadway improvements 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, with inadequate shoulders for the posted speed limits, or those that have poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

The following chart shows the correlation between specific needed road improvements and the reduction of fatal accident rates nationally.[26]

Chart 9. Reduction in fatal accident rates after roadway improvements.

Type of Improvement*	Reduction in Fatal Accident Rates after Improvements
New Traffic Signals	53%
Turning Lanes and Traffic Signalization	47%
Widen or Modify Bridge	49%
Construct Median for Traffic Separation	73%
Realign Roadway	66%
Remove Roadside Obstacles	66%
Widen or Improve Shoulder	22%

Source: TRIP analysis of U.S. Department of Transportation data

Importance of Transportation to Economic Growth

Many industries have contributed to boosting the Ocean State's gross domestic product by 34 percent from 1990 to 2008 (when adjusted for inflation).[27] Rhode Island's businesses are dependent on an efficient, safe, and modern transportation system that will foster continued business diversification and opportunity throughout the state. Today's business culture demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. The advent of modern national and global communications and the impact of free trade in North America

and elsewhere have resulted in a significant increase in freight movement. Consequently, the quality of a region's transportation system has become a key component in a business's ability to compete locally, nationally and internationally.

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 by accepting customer orders through the Internet. 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.

Highways are vitally important to continued economic development in Rhode Island. As the economy recovers, 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, $29 billion in goods are shipped from sites in Rhode Island and another $28 billion in goods are shipped to sites in Rhode Island, mostly by trucks.[28] Seventy-nine percent of the goods shipped annually from sites in Rhode Island are carried by trucks and another 18 percent are carried by parcel, U.S. Postal Service or courier services, which use trucks for part of the deliveries. [29]

A 2007 analysis by the Federal Highway Administration found that every $1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy. [30]

Conclusion

As it looks to enhance and build a thriving, growing and dynamic state, it will be essential that Rhode Island is able to provide a 21st Century network of roads, highways, bridges and public transit that can accommodate the mobility demands of a modern society.

Rhode Island has an immediate need to move forward with numerous rehabilitation, expansion and transit projects, but without a substantial level of local, state and federal funding, the state will be unable to fund dozens of vital projects. Completing critical, unfunded projects would increase mobility, better support commerce and growth, enhance economic development, and improve traffic safety statewide, boosting the quality of life for residents and visitors alike.

As the nation looks to rebound from the current economic downturn, the U.S. will need to modernize its surface transportation system, improve the physical condition of its transportation network and enhance the system's ability to provide efficient and reliable mobility for motorists and businesses. Making needed improvements to Rhode Island's surface transportation network 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 enhanced mobility and access.

The federal stimulus package has provided a helpful down payment on an improved transportation system. However, without substantial state and federal surface transportation funding, numerous needed projects to improve Rhode Island's surface transportation system will not move forward, hampering the state's ability to enhance not only mobility, but also economic development statewide. Rhode Island's transportation system must be adequately funded at the local, state and federal level if the state is to reap the benefits of a modern surface transportation system.

# # #

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