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MAKING THE GRADE IN NEVADA:

**An Analysis of the Ability of Nevada's Transportation System
to Meet the State's Need for Safe and Efficient Mobility**

March 2007

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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 highway transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe highway transportation network.

Executive Summary

Nevada’s extensive system of roads and bridges provides the state’s 2.4 million residents and its visitors with a high level of mobility. The state’s extensive highway transportation system enables the state’s residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

It is critical that Nevada develop and maintain a modern transportation system that can accommodate future growth in population, vehicle travel and economic development. This report looks at the condition, traffic congestion levels, traffic safety rates and the unmet funding needs of major roads and highways in Nevada. The deficiencies cited in this report are not a reflection of the effectiveness of state and local transportation agencies, but of a lack of adequate funding.

TRIP has assigned the following letter grades to the components comprising Nevada’s highway system. An explanation of how grades are assigned can be found in Appendix A.

	GRADE	COMMENT
Roads	B	<i>Approximately 10 percent of Nevada’s major roads and highways have pavements in poor or mediocre condition. Pavement conditions in the state are expected to worsen because the state’s pavement repair program since 2004 has not been adequate to keep pace with pavement deterioration.</i>
Bridges	B	<i>Bridge conditions in Nevada are in acceptable condition. Three percent of Nevada’s bridges are rated as structurally deficient and nine percent are functionally obsolete.</i>
Congestion	D	<i>Vehicle travel in Nevada more than doubled between 1990 and 2005, increasing by 103 percent, the fastest rate of travel growth in the nation. Forty-four percent of Nevada’s urban Interstates and other highways or freeways are considered congested, because they carry a level of traffic that is likely to result in delays during peak travel hours. With a 125 percent increase in vehicle travel anticipated in the state by 2030, traffic congestion will get worse unless the state significantly improves its transportation system.</i>
Safety	F	<i>There were 427 traffic fatalities in Nevada in 2005, 35 percent higher than in 2001, when 314 people were killed in traffic accidents in Nevada. In 2005, Nevada had a traffic fatality rate of 2.06 traffic fatalities per 100 million vehicle miles of travel – the seventh highest state level and 42 percent higher than the national average. Roadway safety features such as widened lanes, added or improved medians, improved intersection design, paved shoulders and added rumble strips, where appropriate, can reduce the number of traffic fatalities and serious accidents.</i>
Funding	F	<i>A Blue Ribbon Task Force created by Nevada’s State Transportation Board of Directors found in December, 2006 that the state faces a \$3.8 billion shortfall in funding through 2015 for highway projects needed to accommodate significant traffic growth in the state. Since last increased in 1992, the buying power of Nevada’s 17.65 cents-per-gallon motor fuel tax dedicated to state highway repairs has decreased by 31 percent.</i>

CONGESTION

Nevada's vehicle travel and population are increasing at the fastest rate in the nation, leading to increasing levels of traffic congestion that will likely get significantly worse unless the state's transportation system is improved.

- Nevada's population has doubled since 1990, increasing to 2.4 million in 2005 – an increase of 101 percent and the fastest rate of population growth in the country.
- Nevada's population is expected to increase by another 60 percent to 3.8 million people by 2030.
- Nevada had the fastest rate of vehicle travel growth in the nation from 1990 to 2005. Vehicle travel on Nevada's major highways more than doubled between 1990 and 2005, increasing by 103 percent -- jumping from 10.2 billion vehicle miles traveled in 1990 to 20.7 billion vehicle miles traveled in 2005.
- Vehicle travel in the state is expected to increase by another 125 percent by 2030.
- From 1990 to 2005, total lane miles of highways in Nevada increased by 12 percent.
- From 1990 to 2005, vehicle travel in Nevada increased at a rate approximately nine times greater than new highway lane capacity was added.
- Forty-four percent of Nevada's urban Interstates and other highways or freeways are considered congested, because they carry a level of traffic that is likely to result in delays during peak travel hours.

SAFETY

On average, 377 people were killed each year in crashes on Nevada's roads from 2001 to 2005. Nevada's traffic fatality rate in 2005 was 42 percent higher than the national average. Improving safety features on Nevada's roads and highways would likely result in a decrease in traffic fatalities in the state. Roadway design is an important factor in approximately one-third of fatal and serious traffic accidents.

- A total of 1,885 people were killed in Nevada in traffic accidents from 2001 to 2005.
- Nevada's traffic fatality rate in 2005 was 2.06 fatalities per 100 million vehicle miles of travel, 42 percent higher than the national traffic fatality rate in 2005 of 1.45.

- Highway improvements such as removing or shielding obstacles, adding or improving medians, adding rumble strips, widening lanes, widening and paving shoulders, upgrading roads from two lanes to four lanes and installing better road markings and traffic signals, where appropriate, can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion.
- 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.

FUNDING

A Blue Ribbon Task Force created by Nevada’s State Transportation Board of Directors found in December, 2006 that the state faces a \$3.8 billion shortfall in funding through 2015 for highway projects needed to accommodate significant traffic growth in the state. The declining buying power of the state’s motor-fuel tax has reduced Nevada’s ability to fund needed transportation projects.

- The report recommended that by 2015 Nevada complete the following 10 projects:

Southern Nevada

- Widening I-15 from Tropicana to the Spaghetti Bowl
- Widening I-515/US 95 from the Spaghetti Bowl to Foothill Boulevard
- Widening I-15 from the Spaghetti Bowl to Apex
- The Boulder City Bypass
- Widening US 95 from Craig Road to Kyle Canyon
- Widening I-15 from St. Rose Parkway to Tropicana Avenue
- Improve Beltway interchanges at US 95, I-15 and Summertime Parkway

Northern Nevada

- Widening I-80 from Robb Drive to Vista Boulevard
- Widening US 395 from the Spaghetti Bowl to Stead
- Improvements to Pyramid Highway
- The buying power of Nevada’s 17.65 cents-per-gallon motor fuel tax dedicated to state highway repairs has decreased by 31 percent since it was last increased in 1992. This has reduced Nevada’s state’s motor-fuel tax dedicated to highway repairs to the equivalent of 12.2 cents-per-gallon in 1992 dollars.

ROADS

Ten percent of the state's major roads and highways have pavements in poor or mediocre condition. The continued lack of funding for ongoing pavement maintenance is expected to result in a significant decline in pavement quality.

- Ten percent of Nevada's major roads are rated in poor or mediocre condition. This includes Interstates, highways, connecting urban arterials, and key urban streets that are maintained by state, county or municipal governments.
- Roads rated in poor and mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in poor or mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.
- Pavement conditions in Nevada are expected to worsen because the state since 2004 has been unable to fund a pavement preservation program adequate to keep up with pavement deterioration rates. From 2004 to 2009, Nevada is expected to spend \$506 million dollars on pavement preservation, but needs to spend \$1.27 billion to maintain pavement conditions in their current condition – a \$768 million shortfall.

BRIDGES

Twelve percent of Nevada's bridges are structurally deficient or functionally obsolete. This includes all state, local and municipal bridges 20 feet and longer.

- Three percent of Nevada's bridges are rated as structurally deficient, showing significant deterioration to decks and other major components.
- Nine percent of Nevada's bridges are functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.
- Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate clearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.

Sources of information for this study include the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), and the Nevada Department of Transportation (NDOT).

Introduction

Nevada's system of roads and bridges provides the state's 2.4 million residents and its visitors with a high level of mobility. As the backbone of Nevada's surface transportation system, roads and bridges play a central role in the state's economy and enable residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

The continued modernization of Nevada's roads, bridges and public transit systems is crucial to providing a safer, more efficient transportation system, while improving the economic livelihood of the state and accommodating future growth. Projects designed to improve traffic and commuting flow and to make driving safer and more efficient, ultimately improve the state's level of mobility. As travel on Nevada's surface transportation system becomes more efficient, personal and commercial productivity will increase, boosting economic development statewide.

Nevada's extensive highway transportation system is maintained by state, local and municipal agencies. The deficiencies cited in this report are not a reflection of the effectiveness of state and local transportation agencies, but of a lack of adequate funding.

This report looks at the condition, use, safety and funding of Nevada's roads and bridges, as well as the state's ability to meet future mobility and traffic safety needs. Sources of information for this study include the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Texas Transportation Institute (TTI), and the Nevada Department of Transportation (NDOT).

Population and Travel Trends in Nevada

Nevada residents enjoy modern lifestyles that rely on a high level of personal and commercial mobility. Significant increases in both the state's population and the rate of travel of its residents have created a tremendous increase in the demand on Nevada's transportation system, particularly its key highways and roads. It is critical that Nevada develop and maintain a modern transportation system that can accommodate future growth in population, vehicle travel and economic development.

Nevada's population reached 2.4 million in 2005, essentially doubling since 1990, when the state's population was 1.2 million.¹ The 101 percent increase in Nevada's population from 1990 to 2005 was the fastest rate of growth of any state during the same period. Nevada's population is expected to increase another 60 percent to 3.8 million residents by 2030.²

Significant population and economic growth in Nevada have resulted in a steep increase in vehicle travel in the state. From 1990 to 2005, annual vehicle miles of travel (VMT) in Nevada increased by 103 percent, from 10.2 billion annual VMT to 20.7 billion VMT, the fastest rate of vehicle travel growth in the nation.³ During the same period, Nevada's total lane miles of highways (limited-access roadways, including all Interstates) increased by only 12 percent.⁴ As a result, vehicle travel in Nevada since 1990 has increased at a rate approximately nine times greater than new highway capacity was added.

Vehicle travel in Nevada is expected to increase by another 125 percent by 2030 to approximately 47 billion annual VMT.⁵

Traffic Congestion in Nevada

Traffic congestion in Nevada is a growing burden in key urban areas and threatens to impede the state's economic development. Congestion on Nevada's urban highways is growing as a result of increases in vehicle travel and population, without a corresponding increase in highway capacity or efficiency.

In 2004, the latest year for which data is available, 44 percent of Nevada's urban highways were congested, carrying traffic volumes that result in significant rush hour delays.⁶

These routes are considered congested because the levels of traffic they carry are likely to cause delays during peak travel hours. Highways that carry high levels of traffic are also more vulnerable to experiencing significant traffic delays as a result of traffic accidents or other incidents.

From 1990 to 2005, total lane miles of highways increased by 12 percent. Thus, from 1990 to 2005, vehicle travel in Nevada increased by a rate approximately nine times greater than new highway lane capacity was added.⁷

Condition of Nevada's Roads

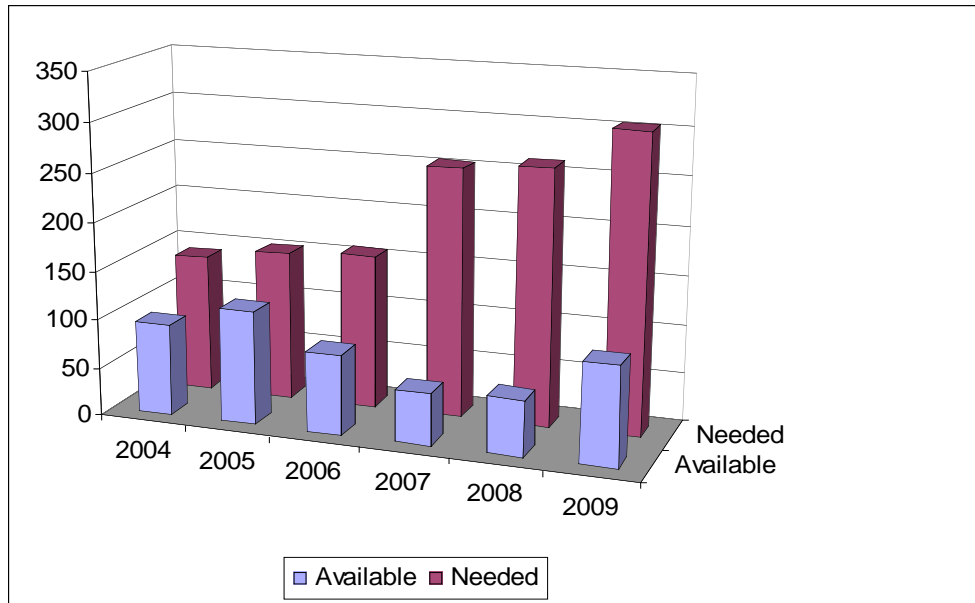
The lifecycle of Nevada's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. The pavement condition of the state's major roads are evaluated and classified as being in poor, mediocre, fair or good condition.

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.⁸

In 2005, 10 percent of Nevada's major roads were rated in poor or mediocre condition.⁹ Roads rated in poor or mediocre condition may show signs of significant wear and may also have some visible pavement distress. Most pavements in poor or mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

The pavement condition of Nevada's key roads and highways is likely to worsen because the state has not been able in recent years to fund its pavement preservation program at a level that would keep overall pavement conditions from deteriorating. Since 2004, the Nevada Department of Transportation (NDOT) has been unable to fund pavement repairs at a level that would keep overall conditions from getting worse. In 2006, for example, NDOT estimated that the state needed to spend \$158 million on projects to maintain current pavement conditions on the state's most critical roads and highways, but was only able to fund \$83 million. From 2004 to 2009, NDOT estimates that the state needs to spend \$1.27 billion on pavement repairs on its most critical roads and highways to keep them in their current condition, but will only be able to fund \$506 million during this period – leaving a \$768 million shortfall.

Chart 1. Needed versus available funding for pavement repairs in Nevada, 2004-2009 (in millions)



Source: Nevada Department of Transportation, 2007

Bridge Conditions in Nevada

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

In 2006, twelve percent of Nevada's bridges were rated deficient, either because they were structurally deficient or functionally obsolete. Three percent of the state's bridges (20 feet or longer) were rated structurally deficient.¹⁰ 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.

Approximately nine percent of Nevada’s bridges (20 feet or longer) were rated as functionally obsolete in 2006.¹¹ Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

Chart 2. Bridge Conditions in Nevada

BRIDGE CONDITION	NUMBER OF BRIDGES	PERCENTAGE OF BRIDGES
Structurally Deficient	50	3%
Functionally Obsolete	146	9%
Total Deficient Bridges	196	12%
Total Number of Bridges	1,630	

Source: National Bridge Inventory

Traffic Safety in Nevada

On average, 377 people were killed each year in motor vehicle accidents in Nevada from 2001 through 2005, according to the National Highway Transportation Safety Administration.¹² Nevada had a traffic fatality rate of 2.06 fatalities per 100 million vehicle miles of travel in 2005

(the latest year for which data is available), which is 42 percent higher than the national traffic fatality rate in 2005 of 1.45.

Chart 3. Traffic fatalities in Nevada from 2001 – 2005

Year	Fatalities
2001	314
2002	381
2003	368
2004	395
2005	427

Source: Nevada Department of Transportation.

The three major factors associated with fatal vehicle accidents are: driver behavior, vehicle characteristics and roadway design. It is estimated that roadway design is an important factor in one-third of fatal and serious traffic accidents. Improving safety on Nevada’s roads and highway system 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. 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, where appropriate, could reduce the severity and occurrences of serious traffic crashes. 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.¹³

Roads with poor geometry, insufficient clear distances, without turn lanes, inadequate shoulders for the posted speed limits, or 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:

Chart 4. Reduction in fatal accident rates after roadway improvements¹⁴

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

Funding

In June, 2005, Nevada’s State Transportation Board of Directors created a Blue Ribbon Task Force to review the state’s need for future roadway improvement projects to provide traffic congestion relief , enhance economic development, improve traffic safety and maintain the condition of the state’s roads, highways and bridges. Released in December, 2006, the Blue Ribbon Task Force’s report found that the state faced a \$3.8 billion shortfall in funding through 2015 for highway projects needed largely to accommodate the significant traffic growth in Nevada. The report found that Nevada needs to spend \$11 billion on road, highway and bridge improvements through 2015, but only anticipates having \$7.2 billion available for these projects under current funding plans.

The Blue Ribbon Task Force recommended completing 10 “Super and Mega Projects” by 2015, completing needed widenings of existing two-lane highways, and maintaining the current condition of Nevada’s roads, highways and bridges.

The 10 recommended large projects are:

Southern Nevada

- Widening I-15 from Tropicana to the Spaghetti Bowl
- Widening I-515/US 95 from the Spaghetti Bowl to Foothill Boulevard
- Widening I-15 from the Spaghetti Bowl to Apex
- The Boulder City Bypass
- Widening US 95 from Craig Road to Kyle Canyon
- Widening I-15 from St. Rose Parkway to Tropicana Avenue
- Improve Beltway interchanges at US 95, I-15 and Summertime Parkway

Northern Nevada

- Widening I-80 from Robb Drive to Vista Boulevard
- Widening US 395 from the Spaghetti Bowl to Stead
- Improvements to Pyramid Highway

The declining buying power of the state's motor fuel tax dedicated to highway repairs has reduced Nevada's ability to fund needed transportation projects. Since last increased in 1992, the buying power of Nevada's 17.65 cents-per-gallon motor fuel tax dedicated to state highway repairs has decreased by 31 percent to the equivalent of 12.2 cents-per-gallon in 1992 dollars.

Conclusion

It is critical that Nevada develop and maintain a modern transportation system that can accommodate the state's tremendous growth in population, vehicle travel and economic development. Further modernization of Nevada's system of roads, bridges and public transit is

crucial to providing a safer, more efficient transportation system, while improving the quality of life and economic livelihood of the state's residents. Projects designed to improve traffic flow, make driving safer, and help the state accommodate increasing levels of vehicle travel, ultimately improve the state's level of mobility. As travel on Nevada's surface transportation system becomes more efficient, personal and commercial productivity will increase, boosting economic development and quality of life statewide.

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Endnotes

¹ U.S. Census data.

² Blue Ribbon Task Force to Evaluate Nevada Department of Transportation Long-Range Projects, 2008 – 2015. State of Nevada, 2006. P. 4.

³ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004.

⁴ TRIP analysis of Federal Highway Administration data. See Highway Statistics 1990 and 2005, HM-60.

⁵ TRIP estimate based on analysis of FHWA data.

⁶ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004

⁷ Federal Highway Administration, Highway Statistics, 1990 and 2005. Charts HM-60 and VM-2.

⁸ Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.

⁹ TRIP analysis of U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004.

¹⁰ Federal Highway Administration – National Bridge Inventory.

¹¹ Ibid.

¹² U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 1999-2004
www.fhwa.dot.gov and www-fars.nhtsa.dot.gov.

¹³ Highway Safety Evaluation System, 1996 Annual Report on Highway Safety Improvement Programs, U.S. Department of Transportation.

¹⁴ Highway Safety Evaluation System; 1996 Annual Report on Highway Safety Improvement Programs; U.S. Department of Transportation.