

2004 Arizona Infrastructure Report Card

Transportation

SUMMARY

Subject	Grade	Comments	Outlook and Recommendations
Roads	C	Although Arizona does relatively well in pavement quality for both urban and rural areas, the state – and Phoenix in particular – are amongst the worst in the nation for safety. Roadway (freeway) construction in the Phoenix area has kept up with growth, thanks to the 1985 tax initiative; however, congestion is a growing concern in other areas of the state (especially Tucson), where funding has struggled to keep pace with rapid growth. Recent passage of Proposition 400 should provide funding to keep pace with development in Maricopa County	<p>Outlook = Challenged: Although roadway funding in Maricopa County is secure, with the recent passage of Prop 400, funding in other areas of the state, and especially Tucson, is uncertain. More and / or better initiatives to improve safety need to be considered and implemented, locally and statewide.</p> <p>Recommendations:</p> <ol style="list-style-type: none"> 1. Work harder to improve safety. Although roadway safety is heavily influenced by “non-infrastructure” elements, e.g. alcohol use and law enforcement, the state’s current rating of one of the most unsafe in the nation should be a concern for all Arizonans. 2. Actively support roadway funding initiatives at all levels. Reliance on traditional federal and state sources of funding will not be adequate to address roadway needs of this rapidly growing state. Local initiatives, e.g. Prop 400 in Maricopa County, are a necessity.
Bridges	A-	Arizona’s bridges are amongst the newest and best maintained in the nation. The number of Arizona NHS (National Highway System) and non-NHS bridges which are either Structurally deficient or Functionally Obsolete total only 7.1% and 11.9% respectively, compared with national averages of 21% and 29%. One source calculates that Arizona has the lowest percentage of deficient bridges in the nation. Adequate funding for bridge maintenance and repair is a concern going forward, as >50 bridges per year are added to the state’s bridge inventory, and funding for maintenance and inspection has remained flat.	<p>Outlook = Okay: Although flat funding for bridge maintenance is a concern in a state that adds >50 bridges per year, the newness of the bulk of our bridges, and our rather benign climate should help keep our bridges amongst the best in the nation.</p> <p>Recommendations:</p> <ol style="list-style-type: none"> 1. Work to keep bridge maintenance funding at adequate levels. This funding must be increased to keep pace with the number of bridges added to our inventory each year. 2. Assure functionality of bridges as user demand increases. Rapid growth in the state will result in agencies trying to push more traffic through existing bridge geometrics.
Transit	C+	Providing adequate transit capacity for Phoenix, Tucson, and other growing areas of the state is a challenge due to rapid growth of the metropolitan areas. The “automobile culture” which is common to the West continues to hamper public perception and support of transit. Nonetheless, Phoenix made the Top 10 “Most Improved List” for its service, and has done well in bringing advanced technology to transit. More than 40 percent of the bus fleet is powered by alternative fuels. Rapidly growing urban areas outside of Phoenix struggle to plan and implement transit systems ahead of growth. And Prop 400 will significantly increase funding for Transit, including light rail, in the Phoenix-metro area.	<p>Outlook = Good: The transit agencies in Phoenix and Tucson have done a respectable job of increasing ridership and improving service. Struggles for funding in Tucson and other developing areas of the state will keep maintaining good service a challenge. Planning and development in other, emerging urban areas will be a concern due to rapid population growth in many areas. Phoenix funding is secure with passage of Prop 400.</p> <p>Recommendations:</p> <ol style="list-style-type: none"> 1. Support tax initiatives in Phoenix and Tucson areas. Passage of Prop 400 in Maricopa County and a planned sales tax initiative in Pima County will provide badly needed, assured and significant cash flow for transit agencies. 2. Push for consideration of alternative transit modes (commuter rail, BRT, high-speed inter-city rail). 3. Encourage planning for transit systems in the state’s emerging urban areas. Although several of these areas, e.g. Flagstaff, have or are planning transit systems, there should be more comprehensive support for planning, implementation and funding of transit in emerging areas.
Aviation	B-	Arizona is generally well served by the number, location and service provided by the state’s airports. Current pavement condition is excellent. Capacity at our commercial service airports is a growing concern, and 25% of our airports are currently operating near or above FAA recommended levels. Securing adequate funding for further development of airport infrastructure, in the face of the state’s rapid growth, is a major concern.	<p>Outlook = Fair: Funding for most aviation facilities in the state is insecure, while continual maintenance and upgrade will be needed to keep pace with rapid growth in the state.</p> <p>Recommendations:</p> <ol style="list-style-type: none"> 1. Push for funding above current levels. The aviation industry is important to Arizona, for mobility of goods and services, medical transport, and special services, such as forest fire fighting. Additional funding is needed to keep pace with growth. 2. Provide additional planning in key growth areas of the state. Proper planning is vital to assure adequate airport facilities are provided to accommodate future capacity demands. Better planning will also assure that limited funding is allocated in the best manner possible.

ISSUES BRIEF 1: ROADWAYS

REPORT GRADE: C

Definition of the Issue

The issue brief for Roadways is based on:

- Condition (Pavement)
- Need vs. Capacity (Congestion)
- Safety
- Funding

The grading is based – as much as possible – on national data from recognized sources, e.g. USDOT. Detailed excerpts from those sources are included in the table accompanying this write-up. In order to make the information more useful for Arizonans, grades have been provided for the Phoenix and Tucson metro areas, as well as the entire state. In many cases this information is one to two years old. For the purposes of grading, “C” is adopted as average.

Grade

Although Arizona ranks high in Pavement Quality and does okay in Congestion, the final grade (C-) is low due to the fact that Arizona ranks very poorly on Safety, with Phoenix having one of the highest fatality rates of any city in the nation.

Condition (Pavement): B+

The condition of Arizona Urban and Rural pavements ranks pretty well nationally. This may be to the relatively benign climate in much of the state. Urban pavement quality benefits from the extensive amount of recent freeway construction in the Phoenix area.

Need vs. Capacity (Congestion): C

Keeping up with exploding population growth and roadway usage has been a challenge for Arizona. Phoenix’ roadway network has managed to keep pace with this growth thanks to the 1985 ½-cent sales tax which funded construction of hundreds of miles of freeways. The Tucson area has struggled to fund road improvements, and congestion is significantly worse there than for most other similar sized cities. Congestion in other parts of the state, especially in rapidly developing areas such as Prescott and Yuma, is a concern.

Safety: D

Perhaps the single most important finding of this study is that Arizona Roadways are among the deadliest in the nation. Arizona routinely ranks in the top 15 states in fatality rates, and Phoenix is the worst (2002 data) for auto and pedestrian fatality rates of any of our largest cities, with fatality rates nearly twice the national average for large cities. Tucson is only slightly better.



Funding: B

Funding for Roadway improvements in Arizona has been hit-and-miss. The Phoenix area has benefited tremendously from the 1985 transportation sales tax, and will benefit from recently passed Proposition 400. Meanwhile, Tucson and Pima County have struggled to keep pace with growth in that area. Some other areas of the state, e.g. Yavapai County, have also passed transportation funding initiatives, but the state overall continues to be a “donor” state nationally, i.e. contributing more to the Federal Highway Trust Fund than it receives.

RECOMMENDATIONS

- 1. Find new solutions on safety.** The fact that Arizona has some of the highest fatality rates in the nation should be a concern for all Arizonans. And although safety, and fatality rates, may have more to do with non-infrastructure elements such as alcohol use and speeding, any and all options for improving safety – and saving lives – should be investigated.
- 2. Actively support transportation planning and funding initiatives.** Arizona remains one of the fastest growing states in the nation, and can meet its transportation needs only through timely, competent planning and adequate financing of transportation programs. Recent passage of Prop 400 in Maricopa County is vital to meeting growing transportation needs in the Phoenix-metro area. A similar transportation funding initiative is currently being developed for Pima County, and deserves vigorous support.

ROADWAY REPORT CARD

	Phoenix / Maricopa County	Tucson / Pima County	Rest of State	AZ Overall
Condition	<p>Grade = B+</p> <p>Summary: Arizona ranks in top 20% for pavement smoothness for urban areas, and Phoenix area has benefited from extensive freeway construction program. Also, ADOT program to overlay freeways with rubberized asphalt may improve smoothness.</p> <ol style="list-style-type: none"> 1. Arizona ranks in top 20% for pavement smoothness for urban areas. (7) 2. AZ ranks #10 nationally for urban pavement quality.(8) 	<p>Grade = B-</p> <p>Summary: Although better than many metro areas across US, Tucson road surfaces are not as good as Phoenix due to lack of funding.</p> <ol style="list-style-type: none"> 1. Arizona ranks in top 20% for pavement smoothness for urban areas. (7) 2. Tucson suffering some due to lack of funding for road and street improvements. (CO) 3. AZ ranks #10 nationally for urban pavement quality. (8) 	<p>Grade = B+</p> <p>Summary: Federal data indicates that AZ rural highways and interstates are in generally good condition.</p> <ol style="list-style-type: none"> 1. Arizona ranks in top 10% for pavement smoothness for rural areas. (ref 7) 2. ADOT has an aggressive program for pavement management. 3. AZ has 0% (none) Rural interstate pavement in "poor" condition, (8) 4. AZ ranks #11 in "Rural Other Principal Arterial" pavement condition. (9) 	<p>Grade = B+</p> <p>Summary: All data indicate that AZ rural and urban pavements are in some of the best condition in the nation. Phoenix area has benefited from extensive freeway construction program.</p> <ol style="list-style-type: none"> 1. AZ ranks in top 10% in pavement smoothness in rural areas and top 20% for urban areas. (ref. 1)

ROADWAY REPORT CARD

	Phoenix / Maricopa County	Tucson / Pima County	Rest of State	AZ Overall
Need vs. Capacity (Congestion)	<p>Grade = C+</p> <p>Summary: Congestion in Phoenix area is about average for cities of its size, as significant investments into regional freeway system has allowed the metro area road system to keep up with rapid growth.</p> <ol style="list-style-type: none"> AZ ranks #13 amongst states for Average Daily Traffic Per Lane (2002), on <u>Urban</u> Principal Arterials. (ref. 2) Phoenix ranking in Annual Delay per Person (#15) amongst urban areas is slightly lower than the rank in population (#12) Number of rush hours per day (7.8) is similar to that of cities of similar size. (ref. 3) Rank in % of Congested Travel (#14) is significantly worse than for cities of similar size. Costs of congestion ranks about equal for cities of similar size. (ref. 3) Phoenix % of roadways which are "freeways" are similar to that of cities of similar size (ref. 3) Phoenix-Mesa "% of Total Miles Serving as Freeways" (1.8) and "% of Total DVMT Served by Freeways" (36.0) is near average of similar size US cities. (10) 	<p>Grade = D</p> <p>Summary: Although Tucson motorists typically experience less congestion than in Phoenix, the level of congestion for Tucson is significantly worse than for US cities of similar size. This is especially reflected in the number of Rush Hours per Day, and the Rank in % of Congested Travel.</p> <ol style="list-style-type: none"> AZ ranks #13 amongst states for Average Daily Traffic Per Lane (2002), on <u>Urban</u> Principal Arterials. (ref. 2) Tucson ranking in Annual Delay per Person (#43) amongst urban areas is higher than the rank in population (#48). (ref. 3) Number of rush hours per day (7.0) is significantly worse than average of cities of similar size. (ref. 3) Rank in % of Congested Travel (#25) is significantly worse than rank in population (#48). (ref.3) Costs of congestion ranks about equal for cities of similar size. (ref. 3) Tucson % of roadways which are "freeways" is significantly less than cities of similar size. (ref. 3) Tucson "% of Total Miles Serving as Freeways" (1.1) and "% of Total DVMT Served by Freeways" (16.8) is significantly worse than for similar sized US cities. (10) 	<p>Grade = C-</p> <p>Summary: Congestion in rapidly growing towns in rural areas of the state should be a concern as growth is often ahead of funding for roadway improvements.</p> <ol style="list-style-type: none"> AZ ranks #24 amongst states for Average Daily Traffic Per Lane (2002), on Rural Principal Arterials. (ref. 2) 	<p>Grade = C</p> <p>Summary: Congestion in AZ should be a major concern going forward due to the rapid growth in many areas of the state and limited funding for roadway improvements. Sales tax initiatives in Phoenix and Tucson areas, if passed, will help significantly in those areas. Other emerging areas in the state, e.g. Prescott, Flagstaff, should consider similar funding initiatives to keep pace with growth.</p> <ol style="list-style-type: none"> AZ ranks #12 amongst states of Average Daily Traffic Per Lane (2002), on All (Rural and Urban) Principal Arterials. (ref. 2)

ROADWAY REPORT CARD

	Phoenix / Maricopa County	Tucson / Pima County	Rest of State	AZ Overall
Safety	<p>Grade = D</p> <p>Summary: Phoenix has more of the highest accident, fatality, and pedestrian fatality rates in the nation.</p> <ol style="list-style-type: none"> Phoenix has the highest fatality rate (16.9 / 100k population) of any city over 500,000 population in the nation. Phoenix fatality rate for pedestrians (~4 / 100k population) is approximately 2 times the national average of cities. (11) Other MAG cities (Mesa, Chandler, Glendale, Tempe, Scottsdale) have fatality rates comparable to cities of similar size. (11) Based on their data, State Farm Insurance states that in 2001 Phoenix had 2 of the 10 most dangerous intersections in the US and the 3 most dangerous in Arizona. 	<p>Grade = D+</p> <p>Summary: Tucson has slightly better accident and fatality rates than Phoenix. Overall, Arizona has one of the highest fatality rates of any state in the nation.</p> <ol style="list-style-type: none"> Tucson fatality rate (11.3 / 100k population) is slightly worse than the average for similar and larger size cities. (11) 	<p>Grade = D</p> <p>Summary: Arizona typically has fatality rates in the top 10-20% of states in the nation. Fatality rates in counties outside of Phoenix and Tucson typically are significantly higher than in the metro areas.</p> <ol style="list-style-type: none"> Fatality rates in counties outside Maricopa and Pima are generally higher than in those counties. (13) AZ ranks amongst Top 10 in Total Fatality Rate amongst states (ref. 5) 	<p>Grade = D</p> <p>Summary: Although Fatality Rates are heavily influenced by non-infrastructure causes, such as alcohol and speeding, Arizona has consistently ranked amongst the worst states for Fatalities. Presumably some of this could be attributed to the condition of roadway infrastructure; indeed, accident rates on some routes, e.g. US 93 and SR 85, and the number of "dangerous intersections" in the Phoenix area are well recognized safety concerns.</p> <ol style="list-style-type: none"> AZ ranks amongst Top 10 in Total Fatality Rate amongst states (ref. 5) AZ ranks #9 in % of Highway Intersection Fatalities (2001). (ref. 6) AZ is significantly above national average for Fatality Rates per 100M VMT (2.18 vs. 1.50) and Fatality Rate per 100k population (20.47 vs. 14.85). (NHTSA for 2002)

ROADWAY REPORT CARD

	Phoenix / Maricopa County	Tucson / Pima County	Rest of State	AZ Overall
Funding	<p>Grade = A</p> <p>Summary: The Phoenix area / Maricopa County has positioned itself better for good roads than any other area of the state by way of the 1985 Regional Area Road Fund, and recently passed Prop 400.</p> <ol style="list-style-type: none"> 1. 1985 Regional Area Road Fund Election poured \$billions into Maricopa County freeways, essentially building the current regional freeway system. 2. Other Phoenix-area municipalities, e.g. Glendale and Phoenix, have passed significant transportation initiatives. 3. In November 2004, Maricopa County voters passed Proposition 400, a 20-year plan which will provide \$9 billion for freeway construction and \$1.4 billion for street and intersection improvements. 4. Even with passage of Prop 400, Maricopa planners expect freeway / street congestion to worsen over the next 20 years, and population in the county will nearly double. 	<p>Grade = C-</p> <p>Summary: The Tucson area has struggled for years to pass significant transportation funding initiatives. Most recent voter rejection of a City of Tucson initiative (by nearly 2-1 margin) is indicative of problems getting transportation funding program in Tucson / Pima County. Nonetheless, the area continues to grow at a rapid rate.</p> <ol style="list-style-type: none"> 1. Inability of Tucson / Pima County Governments to win significant funding initiatives is taking its toll. 2. Exception: Pima County bond election of late 1990's – effectively allocated significant portion of County general funds toward transportation projects. 	<p>Grade = C</p> <p>Summary: Although some areas of the state have passed significant transportation funding initiatives, e.g. Yavapai County and Flagstaff, roadway improvement in most areas lags rapid development.</p>	<p>Grade = C+</p> <p>Summary: Funding for transportation improvements across the state has been hit-and-miss. Phoenix-Maricopa County have benefited greatly from the 1985 freeway tax, while other areas, most notably Tucson-Pima County, struggle constantly for funds. Arizona overall continues to be a “donor” state nationally, annually contributing more toward federal funding than we receive.</p> <ol style="list-style-type: none"> 1. AZ is a donor state – receiving approximately \$.91 for every \$1 that it has contributed to the national road fund over the past several years. 2. AZ has benefited by regional initiatives to fund roadway improvements including in Maricopa County, and some outlying counties / municipal areas.

Other Considerations / General Comments:

- 1) AZ – especially ADOT – should be given some credit for use of new delivery processes, e.g. design-build, which have speeded delivering of projects to highway users and, in some cases, saved significant money.
- 2) AZ – again ADOT – should receive credit for introducing rubberized asphalt pavement in urban areas to reduce noise and possibly improve safety (through improved visibility), and provide a smoother pavement surface.
- 3) ADOT and several municipal agencies are experimenting w/ traffic handling techniques, e.g. roundabouts, to improve safety.
- 4) Regarding Safety – it is noted that several non-infrastructure related causes contribute to fatalities on highways – most notably Alcohol and Speeding. In Arizona, a high number of seasonal visitors and a generally highly transient population are believed by the authors to contribute to higher fatality rates. When adjustments are made for Alcohol and Speed related fatalities, Arizona still ranks in the top 20 for Fatality Rates.

Footnotes / References:

“CO” = Committee Observation

- 1) USDOT HS2002 – table HM-47.
- 2) USDOT HS2002 – table HM-62.
- 3) TTI 2003 Urban Mobility Data
- 4) TTI 2003 Urban Mobility Data
- 5) NHTSA 2002 Traffic system safety info ex. 1 – Table 1
- 6) NHTSA 2001 State Data for Fatalities
- 7) USDOT HS 2002 table HM-47, HM-63& HM-64
- 8) David T. Hartgen, “The Looming Highway Condition Crisis: Performance of State Highway Systems, 1984-2002”, 13th Annual Report, University of North Carolina at Charlotte, Table 10
- 9) David T. Hartgen, “The Looming Highway Condition Crisis: Performance of State Highway Systems, 1984-2002”, 13th Annual Report, University of North Carolina at Charlotte, Table 11
- 10) USDOT HS2002 – table HM-72.
- 11) USDOT Traffic Safety Facts 2002, Table 121
- 12) www.statefarm.com, information dated 6-27-2001 (Note: State Farm rankings are based on data compiled by State Farm Insurance)
- 13) AZ Crash Facts 2000, 2001

ISSUES BRIEF 2: BRIDGES

REPORT GRADE: A-

1. Introduction and Overview

Bridge Inventory – Arizona has 6,955 bridges in its inventory as defined by the National Bridge Inventory (NBI), 2003. Within this inventory 3,765 are actually culvert type structures that are classified as bridges. NBI's definition of a bridge is as follows:

“A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between under-copings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.”

The bridge inventory can be further broken down into bridge ownership categories, state, local, private or federal. Currently Arizona has 4,394 bridges that are state maintained, 2,213 maintained by local governments, 3 are privately maintained and 345 are maintained by the federal government.

In terms of route importance and bridges, Arizona's bridge inventory includes 2,492 bridges that are part of the National Highway System (NHS). NHS is defined as roadways important to the nation's economy, defense, and mobility. When looking at the condition and ratings of bridges, the NHS bridges will be looked at separately since they are of a higher importance and function on a national level.

2. Inspection Frequency/Methods

All Arizona Bridges are inspected on a reoccurring frequency in accordance with the National Bridge Inspection Standards (NBIS). Inspection data for all bridges is compiled in a consistent manner with and entered into the NBI. This data is used as the basis for grading of Arizona Bridges.

3. NBIS Rating System

The NBIS provides guideline for rating and document the condition and general attributes of a bridges structure. Standard condition evaluations are documented for individual bridge components as well as ratings for the functional aspects of the bridge. These ratings weighted and combined into an overall Sufficiency Rating for the bridge on a 0-100 scale. This rating can be used to make general observations on the condition of a bridge or an inventory of bridges.

The factors considered in determining a sufficiency rating are: S1 - Structural Adequacy and Safety (55% maximum), S2 - Serviceability and Functional Obsolescence (30% maximum), S3 - Essentiality for Public Use (15% maximum), and S4 - Special Reductions (detour length, traffic safety features, and structure type - 13% maximum).

In addition to the sufficiency rating the NBIS provides criteria to define a bridge as deficient or obsolete, which triggers the need for remedial action:



Structurally Deficient - A bridge that is structurally deficient (SD) is safe to carry traffic loads but is approaching the condition where replacement or rehabilitation will be necessary.

Functionally Obsolete - A bridge that is functionally obsolete (FO) is safe to carry traffic but has less than the desirable geometric conditions required by current standards.

The sufficiency ratings and the number of bridges determined to be functionally obsolete or structurally deficient will be used as a basis for grading Arizona bridges.

4. Condition Assessment of the Arizona Bridge Inventory

The number of Arizona bridges listed as either structurally deficient or functionally obsolete since 1992 is shown below. Results are shown for NHS and non-NHS bridges.

Arizona							
NHS HIGHWAY BRIDGES							
Year	Total # of Bridges	Structurally Deficient		Functionally Obsolete		Total of Both	
		#	%	#	%	#	%
1992	2,901	25	0.86%	251	8.65%	276	9.51%
1993	2,946	22	0.75%	255	8.66%	277	9.40%
1994	2,955	28	0.95%	244	8.26%	272	9.20%
1995	2,962	30	1.01%	256	8.64%	286	9.66%
1996	2,727	49	1.80%	211	7.74%	260	9.53%
1997	2,378	32	1.35%	152	6.39%	184	7.74%
1998	2,379	27	1.13%	146	6.14%	173	7.27%
1999	2,410	32	1.33%	147	6.10%	179	7.43%
2000	2,349	24	1.02%	150	6.39%	174	7.41%
2001	2,423	22	0.91%	149	6.15%	171	7.06%
2002	2,461	19	0.77%	163	6.62%	182	7.40%
2003	2,492	17	0.68%	161	6.46%	178	7.14%

Arizona							
NON-NHS HIGHWAY BRIDGES							
Year	Total # of Bridges	Structurally Deficient		Functionally Obsolete		Total of Both	
		#	%	#	%	#	%
1992	3,437	131	3.81%	302	8.79%	433	12.60%
1993	3,485	118	3.39%	288	8.26%	406	11.65%
1994	3,581	126	3.52%	275	7.68%	401	11.20%
1995	4,069	141	3.47%	348	8.55%	489	12.02%
1996	4,067	182	4.48%	302	7.43%	484	11.90%
1997	4,407	165	3.74%	313	7.10%	478	10.85%
1998	4,474	180	4.02%	319	7.13%	499	11.15%
1999	4,180	165	3.95%	307	7.34%	472	11.29%
2000	4,362	172	3.94%	349	8.00%	521	11.94%
2001	4,495	172	3.83%	392	8.72%	564	12.55%
2002	4,594	168	3.66%	400	8.71%	568	12.36%
2003	4,463	153	3.43%	379	8.49%	532	11.92%

The results show that the percentage of Arizona deficient or obsolete bridges has remained relatively steady since 1992, while the size of the inventory has been increasing. National averages for NHS and non-NHS bridges either deficient or obsolete are 21% and 29% respectively, well above Arizona's numbers.

Current condition of Arizona bridges in terms of actual sufficiency ratings are shown below. The majority of the inventory is rated above 80, signifying an inventory that is in very good condition and provides high serviceability:

Arizona		
SUMMARY OF BRIDGE SUFFICIENCY RATINGS		
Rating Range	# of Bridges	Percent of Inventory
80-100	5,425	78%
70-80	918	13%
60-70	417	6%
50-60	98	1.5%
<50	97	1.5%

In addition to the general NBI rating information, it should be noted that Arizona has taken steps to ensure that its bridges are safe from natural hazards. Seismic and waterway scour are the main natural hazards for Arizona bridges. The Department of Transportation has concluded its seismic retrofit program of bridges in the higher risk areas in southwestern and north central areas of the state. The scour retrofit program is still ongoing, but high risk scour vulnerable bridges have been identified and received remedial action.



5. Summary

General - In comparison to the rest of the nation, Arizona bridges are in relatively good condition, with significantly less deficient and obsolete bridges than the national average. Although, the relatively benign desert environment contributes the low deterioration rates seen in the inventory. Arizona has done well to decrease its number of obsolete and deficient bridges on the NHS systems and maintain the relative percentage of obsolete and deficient bridges of the non-NHS inventory. The current percentage of deficient bridges in the NHS inventory is <1%. This illustrates the fact that the inventory has very few physical condition problems.

Sufficiency Rating Conclusions – the summary of sufficiency ratings shown above depict an inventory with the majority of its bridges rated on the high end of the sufficiency rating scale – 90% are over 70. This indicates a healthy and functional inventory that in general should not require major rehabilitation efforts until the majority of the ratings begin trend lower.

Other Information: In his February 10, 2004 publication entitled “The Looming Highway Condition Crisis: Performance of State Highway Systems, 1984-2002”, David T. Hartgen of the University of North Carolina at Charlotte states that “...Arizona reported the lowest percentage of deficient bridges, 5.04 percent...” (p. 11) This earned Arizona the #1 ranking for Deficient Bridges in the US (Table 13).

Funding Outlook and Need - Arizona’s Bridge Inventory has grown by approximately 500 over the past 10 years. The Department of Transportation estimates that the statewide inventory will grow by 60-80 bridges per year for the next several years. Arizona’s ability to fund and maintain this inventory must be able to keep pace with the growth. Funding for bridges in Arizona has remained relatively flat and will likely remain this way into the future.

6. The Grade and Outlook

Based on the NBI data presented here, trends and the bridge repair and rehabilitation funding outlook, the following grades were given for Arizona Bridges:

NHS Structures – A

Non-NHS Structures – B+

Overall Grade: A-

Looking forward, Arizona’s will have two key challenges in maintaining the high quality of its bridge inventory:

1. Keeping the inventory in its present high quality condition in the face of large growth without an equivalent funding increase.
2. Maintain the functionality of the inventory with increasing user demand spurred by growth within the state.

ISSUES BRIEF 3: TRANSIT

REPORT GRADE: C+

Definition of the Issue

The issue brief for Transit is based on:

- System Performance
- Age of Fleet
- Funding
- Accessibility

The grading is based – as much as possible – on national data from recognized sources. Detailed excerpts from those sources are included in the table accompanying this write-up. In order to make the information more useful for Arizonans, grades have been provided for the Phoenix and Tucson metro areas, as well as the entire state. In many cases this information is one to two years old. For the purposes of grading, “C” is adopted as average.

Grade

In general, transit agencies have been struggling to keep up with the rapid growth of our state. Public acceptance and use of transit is hampered by the “automobile culture” of the West. Nonetheless, ridership is generally increasing, and advanced technology and programs are being adopted and should improve the public’s perception of Transit.

System Performance: C

Although ridership in both cities has increased significantly in recent years, Phoenix and Tucson still rank below cities of similar size in transit ridership and service. In general, the explosive growth in the state continues to outpace the abilities of communities to provide adequate transit service.

Age of Fleet: C

Phoenix transit fleet is relatively young with an average age of ~ 6 years, compared to a national average of 9.4 years. The Tucson fleet is about average. Transit vehicles in most other areas of the state are older.

Funding: B

Phoenix system is probably the strongest in the state with significant funding measures by four local communities and a farebox recovery ratio of ~28%, about average for larger cities. Recent passage of Prop 400 in Maricopa County will further strengthen transit funding outlook in the Phoenix-metro area. Tucson funding is less, and the farebox recovery ratio is only ~18%. Funding in other areas of the state is limited to federal assistance and state lottery funds, which can be jeopardized during state funding crises.

Accessibility: C-

This is defined as how accessible the transit system is to people who might want to use it. All areas of the state struggle with this, as rapid development and growth have outpaced communities’ abilities to provide transit services.



RECOMMENDATIONS

- 1. Actively support major transportation (including transit) initiatives in Maricopa and Pima Counties.** These initiatives include recently passed Prop 400 in Maricopa County and a planned Spring 2006 initiative in Pima County will significantly increase funding for transit systems. Funding for transit elements of Prop 400 could be in jeopardy if ridership levels do not achieve goals.
- 2. Explore alternative transit modes such as commuter rail, bus rapid transit, and high-speed inter-city rail.** Of these only BRT, in Phoenix, is being implemented – and with notable success. While these technologies may not be viable in many locations, decision makers should be aware of the cost and benefits they pose.
- 3. Provide a facility for proper planning and implementation of transit systems in emerging urban areas.** Many of Arizona’s small cities and towns, e.g. Prescott, Yuma and Sierra Vista, are developing at a rapid pace. Proper planning and implementation of appropriate transit systems will improve mobility and livability in these areas.

TRANSIT REPORT CARD

	Phoenix	Tucson	Rest of State	AZ Overall
System Performance	<p>Grade = C+</p> <p>Summary: Statistically, Phoenix ranks below cities of similar size in transit ridership and service. However, the outlook is positive for improved transit service.</p> <ol style="list-style-type: none"> 1. "Mobility Data" indicates that Public Transit saves the average commuter 1.7 hours peak period delay 2. Of the total Vehicle Miles traveled daily, travel on Transit represents less than 1% per year of total miles traveled, however, the funds spent on transit is about 1% of the total funds spent on the automobile each year. 3. National Transit Summaries indicates Phoenicians travel 182 million miles per year on public transit, significantly below the average for cities of similar size. Denver is 356 million miles per year and Portland is 447 million miles per year. 4. The National Average for Passengers per Vehicle Revenue Mile is 3, Phoenix is at 1.89. 5. 2 to 3% of commuters are riding transit during peak hours. 6. From 1986 to FY 2000, ridership has increased over 37%. 7. From 1998 – 2001, Revenue miles have decreased as new buses were added to expand service to new parts of the valley, due to this, boardings have increased. 8. Successfully introduced RAPID commuter bus service one year ago, most buses filled to capacity. 	<p>Grade = C-</p> <p>Summary: Tucson ranks below cities of similar size in transit ridership and service. Given the lack of high-speed freeways for motorists, opportunities exist in the Tucson metro area for transit expansion.</p> <ol style="list-style-type: none"> 1. "Mobility Data" indicates that Public Transit saves the average commuter 1.1 hours peak period delay. 2. Of the total Vehicle Miles traveled daily, travel on Transit represents less than 1% per year of total miles traveled, however, the funds spent on transit is about 1% of the total funds spent on the automobile each year. 3. National Transit Summaries indicates Tucsonans travel 58 million miles per year on public transit, comparable to Cities of similar size. El Paso is 68 million miles per year and Albuquerque is 22 million miles per year. 4. The National Average for Passengers per Vehicle Revenue Mile is 3, Tucson is 1.80. 5. 7% of Tucson's population are making trips on transit daily. 6. Ridership has increased 6.5% over the past year (SunTran). 7. Tucson is proud to consider itself a bicycle-friendly community. This coupled with the lack of a freeway system should open the door for improved transit service. 	<p>Grade = D</p> <p>Summary: Much of rural Arizona is covered with Dial-a-Ride type service around small towns and some reservations. Transit agencies and local links for Counties and Cities historically have been operating at a constant level with small increases, while the populations of these small towns have grown more rapidly. Towns like Prescott, Florence, Coolidge, Flagstaff, and the Grand Canyon will be underserved as rapid growth occurs.</p>	<p>Grade = C</p> <p>Summary: While recent improvements to transit statewide have increased their public exposure in recent years, the explosive growth in our state continues to outpace the capacity of the existing transit system.</p>



TRANSIT REPORT CARD

	Phoenix	Tucson	Rest of State	AZ Overall
Age of Fleet	Grade = B	Grade = C	Grade = N/A	Grade = C+
	National Average for Age of Fleet = 9.4yrs Phoenix Age of Fleet = 6 yrs	National Average for Age of Fleet = 9.4yrs Tucson Age of Fleet = 9 yrs		

TRANSIT REPORT CARD

	Phoenix	Tucson	Rest of State	AZ Overall
Funding	<p>Grade = A</p> <p>Summary: Phoenix has been able to successfully obtain funding for big transit projects, such as the proposed light rail system. Local governments seem to be very supportive of transit funding.</p> <ol style="list-style-type: none"> Total funding for regional transit operations increased by 103 percent from FY 1999 to FY 2000. As members of RPTA, each municipally must spend all or some of their Local Transportation Assistance Funds (LTAF) on public transportation. E.g. Phoenix with a population of 300,000 or more must spend all of their LTAF money on transit services. Funding is ahead of projected use: 77% Federal 23% Local. 27.8% Recovery Ratio (Fare Revenue/Operating Funds Expended). This Recovery Ratio is close to cities of similar size with newer transit systems, such as Denver and Portland. Phoenix, Tempe, Glendale, and Mesa successfully passed transit funding initiatives within the past 8 years. The Central Phoenix/East Valley Light Rail Starter Segment received a Federal Full Funding Agreement for the next fiscal year. Passage of Prop 400 in Maricopa County will provide >\$5 billion for transit and light-rail over the next 20 years. 	<p>Grade = D</p> <p>Summary: Tucson and Pima County have been unable to generate a local dedicated funding mechanism for transit. Past initiatives have been defeated by voters. Funding is heavily dependent on outside sources.</p> <ol style="list-style-type: none"> Tucson transit is highly dependent on Federal funding – not much local match money, 83% Federal and 17% local. Compared to cities of similar size, Tucson has a lower Recovery Ratio due to its high operating costs, only 18.3%. Adequate funding of the system remains a challenge. From 1995 to 2000 Annual operating cost increased by 34% while ridership remained relatively unchanged, owing largely to increased labor and fuel costs. ½-cent sales tax is under development in the Tucson area, but no plan prepared yet. 	<p>Grade = D</p> <p>Summary: Funding for rural transit agencies will remain a challenge as the rural areas of Arizona continue to grow rapidly.</p> <ol style="list-style-type: none"> ADOT has not been given any funding other than for highways. The Highway Users Revenue Fund (HURF) has to go to roadways only as stated in the State Constitution. Funding could come from an increased gas tax, but that requires a 2/3 vote in the legislature. This tax is currently based on the number of gallons purchased, not the price of gas, therefore as vehicles become more fuel efficient, the amount of funds brought in through this tax decreases. Extra funds from Arizona State Lottery and the vehicle licenses tax go into the LTAF fund that directly supports transit statewide. This provides approximately \$23 million statewide for transportation distributed based on population, however, statewide budget shortfalls have jeopardized the funding from this source in the past. 	<p>Grade = C-</p> <p>Summary: Phoenix should continue to serve as a model for the rest of the state for transit funding and community support.</p>

TRANSIT REPORT CARD

	Phoenix	Tucson	Rest of State	AZ Overall
Accessibility	<p>Grade = C-</p> <p>Summary: Although transit service in the city center is extensive, many people who live on the fringes of the city are without any service. The rapid growth of outlying areas is a challenge for accessibility.</p> <ol style="list-style-type: none"> 1. Based on 2000 census data, the percent of the population of Phoenix living within ¼ mile of a bus route is 54.5%. 2. In five years, population of Phoenix grew by 18%; service was expanded by 15%. 3. Currently, there are 4 full-service Park and Rides and 7 Transit centers in the region. The RTP includes 38 new Park and Ride lots served by high capacity transit and/or light rail. 4. Routes currently do not extend into “hotspots” of commuting workers: far east Valley, far west Valley (Buckeye), Pinal County. 5. Transit accessibility for visitors to the Phoenix area is very low. Only two east-west bus routes serve Sky Harbor Airport. 	<p>Grade = C-</p> <p>Summary: Transit service in Tucson has remained consistent throughout the years. Tweaks to the system schedule and localized shuttles help accessibility. But the rapid housing growth outside of the city center, especially in Northwest Tucson, Oro Valley, and Southeast Tucson, leave many people without any transit service.</p> <ol style="list-style-type: none"> 1. 59% of the Tucson Metropolitan area has transit service. 2. From 1995-2000, population grew by 10% in Tucson, service expanded only 5%. 3. Transit accessibility for visitors to Tucson is low. Although SunTran has frequent service to the airport, the route runs to downtown and does not connect the airport with other tourist destinations around the city. 4. Tucson does very well with public awareness and publicity for its transit system. It was named the 2004 Outstanding Transit Organization by the Arizona Transit Organization. 	<p>Grade = D</p> <p>Summary: Transit services in rural Arizona are primarily on-demand (Dial-a-Ride) types of services.</p> <ol style="list-style-type: none"> 1. 23 rural towns/ reservations have some type of transit service. 2. In Pinal County, transit serves limited areas, but unmet need exists. 	<p>Grade = C-</p>

TRANSIT REPORT CARD

<p>Transit Overall: C+</p>	<ul style="list-style-type: none"> Phoenix made the Top 10 “Most Improved List” for its service. Providing adequate transit capacity for Phoenix, Tucson, and other growing areas of the state is a challenge due to rapid growth and the metropolitan areas. The “automobile culture” which is common to the West continues to hamper public perception and support of transit. Phoenix had done well in bringing advanced technology to transit. More than 40 percent of the bus fleet is powered by alternative fuels. 	<p>Outlook with Recommendations: B</p>
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Recommendations:

- **Maricopa County greatly improved its ability to provide transit services to the public when Proposition 400, the ½ cent sales tax to fund the RTP, passed in November 2004. With expansion included in the RTP, 22% increase in the number of jobs within 1/2 mile of transit is expected over the next 20 years. The new service will be express, high capacity, high service routes with a larger ridership.**
- **Alternative transit modes, such as commuter rail, bus rapid transit, and high speed intercity rail, need to be considered in transit planning statewide.**
- **Tucson will need to pursue and secure a funding initiative for transportation in order to improve transit services in the area. The exploration of a streetcar in the downtown area is a positive step in the right direction.**
- **Prescott, Pinal County, and other fast growing areas need to begin studying their transit needs for the next 20 years.**
- **With more roadway congestion, ridership and expansion opportunities will continue to develop statewide. These transit opportunities need to be identified and funded to better serve the citizens of Arizona.**

References:

Source documents considered in the development of this Transit Report Card include the following:

- 2001 National Transit Database
- 2002 National Transit Summaries and Trends
- Maricopa County Regional Transportation Plan, Maricopa Association of Governments (MAG)
- Regional Transit System Service Status FACT SHEET, Valley Metro
- ADOT, Transportation Planning Division, Transit Team

ISSUES BRIEF 4: AVIATION

REPORT GRADE: B-

Definition of the Issue

The issue brief for Aviation is based on:

- Capacity
- Accessibility
- Pavement Condition
- Minimum Development Standards
- Funding

The grading is based – as much as possible – on national data from recognized sources. Detailed excerpts from those sources are included in the table accompanying this write-up. Grades are provided for the following categories of airports:

- Commercial Service (12 airports)
- Other Primary Airports (47 airports)
- Secondary Airports (23 airports)

In many cases this information is one to two years old. For the purposes of grading, “C” is adopted as average.

Grade

In general, Arizona is pretty well served by its airports. Funding has historically been allocated efficiently to maintain reasonable accessibility and quality facilities. However, the current funding outlook is not adequate to maintain the system as it is today.

Capacity: B-

25% of the states large airports are operating near or above the FAA-recommended 60% capacity level, and planning of additional runways is being undertaken at several airports. However, it is anticipated that the rapid growth of the state will continue to outpace capacity improvements.

Accessibility: A-

Overall access to the state’s airport system is good, with 47 of the state’s 51 largest towns / cities within reasonable driving distance of a commercial service airport. Access to affordable commercial service in areas outside of Phoenix and Tucson needs to be improved.



Pavement Condition: A

The weighted pavement quality metric (PCI) for all of Arizona airports is in the “Excellent” range (79).

Meets Minimum Standards: D

Although Commercial airports meet 70% of standards, across all Arizona airports, only 51% of state and federal development standards are met.

Funding: C-

Projected future revenues for airport maintenance and improvements is expected to be only at 75% of what is estimated to be required to maintain the existing level of service, and only about 40% of what will be required to bring all airports to minimum guidelines.

RECOMMENDATIONS

- 1. Funding above current level is required.** The aviation industry is vital to the Arizona economy and serves important community functions such as medical transport and forest fire-fighting. Current projected funding levels do not maintain airports at their current level of service.
- 2. Additional planning is needed in key growth areas of the state.** Good planning is vital to ensure that adequate airport facilities are constructed to accommodate rapid growth and development.

AVIATION REPORT CARD

	Commercial Service (12 Airports)	Other Primary Airports (47 Airports)	Secondary (23 Airports)	AZ Overall
Capacity¹	<p style="text-align: center;">Grade = C</p> <p>25% of airports operating near or above 60% capacity level. FAA recommends planning for additional runway capacity when activity approaches 60% of the annual service volume.</p>	<p style="text-align: center;">Grade = B</p> <p>13% of airports operating near or above 60% capacity level.</p>	<p style="text-align: center;">Grade = A</p> <p>No airports operating above 60% capacity level.</p>	<p style="text-align: center;">Grade = B-</p> <p>Planning for runway expansion is being undertaken at several airports. However, it is anticipated that the rapid growth of our state will continue to outpace the capacity improvements.</p>
Accessibility¹	<p style="text-align: center;">Grade = B-</p> <p>Convenient access to an airport providing scheduled commercial service is generally considered to be within the range of 60 minutes driving time of the airport or 90 minutes of a major metropolitan airport. 51 cities with a population of 5000 or more exist in the state. 47 of these meet the criteria. Although commercial service is available outside of Phoenix and Tucson, the relatively high cost may be prohibitive to many potential users.</p>	<p style="text-align: center;">Grade = A-</p> <p>Convenient access to an airport providing Instrument Meteorological Conditions (IMC) capabilities and facilities that can accommodate business-type aviation aircraft is generally considered to be within the range of 30 minutes driving time of the airport. 20 communities with a population of 15,000 or more exist in the state. 18 of these meet the criteria. The two communities that don't meet the criteria have an airport but do not have IMC capability.</p>	<p style="text-align: center;">Grade = A</p> <p>Convenient access to an airport providing general aviation service is generally considered to be within the range of 30 minutes driving time of the airport. GA airports provide services for law enforcement, rescue, medical aid, air cargo, and air ambulance. No communities with populations greater than 1,000 fell outside the 30 minute service area.</p>	<p style="text-align: center;">Grade = A-</p> <p>Overall access to the state's airport system appears to be good. However, access to affordable commercial service in areas outside of Phoenix and Tucson needs to be improved.</p>
Pavement Condition³	<p style="text-align: center;">Grade = A</p> <p>The average (non-area weighted) PCI value for the group is 84. This correlates to a pavement condition in the "excellent" range.</p>	<p style="text-align: center;">Grade = A</p> <p>The average (non-area weighted) PCI value for the group is 80. This correlates to a pavement condition in the "excellent" range.</p>	<p style="text-align: center;">Grade = None</p> <p>No data available.</p>	<p style="text-align: center;">Grade = A</p> <p>The area weighted PCI value is calculated from samples from all airports and weighted based on the PCI and its associated pavement area. The weighted PCI value for all of AZ's airports is 79, which correlates to pavement in the "excellent" range.</p>

AVIATION REPORT CARD

	Commercial Service (12 Airports)	Other Primary Airports (47 Airports)	Secondary (23 Airports)	AZ Overall
Meets Minimum Standards¹ (See Note 1)	<p>Grade = C-</p> <p>70% of state and federal development standards are met.</p>	<p>Grade = D-</p> <p>56% of state and federal development standards are met.</p>	<p>Grade = F</p> <p>35% of state and federal development standards are met.</p>	<p>Grade = D-</p> <p>Across all airports, only 51% of state and federal development standards are met.</p>
Funding¹	<p>Grade = C-</p> <p>For 10-yr planning period, 396 million is needed to maintain existing level of service. 756 million is needed to bring all airports to minimum guidelines (See Note 1 in the note section below for minimum guideline requirements). Current investment is 242 million.</p>	<p>Grade = D</p> <p>For 10-yr planning period, 605 million is needed to maintain existing level of service. 1.06 billion is needed to bring all airports to minimum guidelines. Current investment is 323 million.</p>	<p>Grade = C</p> <p>For 10-yr planning period, 26 million is needed to maintain existing level of service. 46 million is needed to bring all airports to minimum guidelines. Current investment is 18 million.</p>	<p>Grade = C-</p> <p>Future revenue (funding) for all airports in the state (including private) is estimated to be 760 million. This level is not adequate to maintain existing level of service. For 10-yr planning period, an additional 276 million is needed to maintain existing level of service and an additional 1.12 billion is needed to bring all airports to minimum guidelines.</p>

References:

1. State Aviation Needs Study (SANS) 2000, Arizona Department of Transportation Aeronautics Division.
2. The Economic Impact of Aviation in Arizona, Arizona Department of Transportation Aeronautics Division
3. Arizona Airport Pavement Management System, Arizona Department of Transportation Aeronautics Division

Notes:

1. The condition of each airport facility was compared to basic design guidelines and standards appropriate to the airport's status. Deficiencies were noted and costs were identified to bring each airport to the minimum guidelines. The Arizona Department of Transportation Aeronautics Division developed these minimum guidelines based on FAA planning and design advisory circulars with modifications relative to conditions specific to the State of Arizona. These minimum standards include such items as approach aids, buildings, terminal facilities, design clearances, land area, airport lighting, parking aprons, tie-down spaces, runways, and taxiways. Across all airports, only 51% of state and federal development standards are met.

Summary:

1. Arizona Department of Transportation Aeronautics Division should receive credit for their efforts in identifying the needs of the state's airport system and prioritizing projects based on critical needs and their limited budget for project funding.
2. Arizona Department of Transportation Aeronautics Division is aggressively monitoring the quality of the pavement at each of the state's airports and performing pavement preservation where needed as part of their statewide Pavement Preservation Project. These efforts should improve and maintain the quality of the state's airport infrastructure. Again, ADOT should be given credit for their efforts.
3. Additional funding above the current level is required to maintain the state's aviation system. Without it, the level of service of the system will decline. The importance of a solid aviation industry in Arizona is demonstrated by its annual economic impact to the state. In 2002 this impact was estimated to be 38.5 billion dollars.²
4. Continued planning needs to occur to identify key growth areas of the state. It is vital to ensure that adequate airport facilities are constructed to accommodate the future capacity demands that are generated. In addition the planning will enable funding to be allocated as appropriate.