WhatMovesYouArizona

Long-Range Transportation Plan | 2010-2035

THE ARIZONA DEPARTMENT OF TRANSPORTATION
NOVEMBER 2011

WHAT MOVES YOU ARIZONA

A TRANSPORTATION PLAN FOR 2035

ARIZONA'S LONG-RANGE TRANSPORTATION PLAN

ARIZONA DEPARTMENT OF TRANSPORTATION

ADOPTED BY THE ARIZONA STATE TRANSPORTATION BOARD ON NOVEMBER 18, 2011

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1. EXECUTIVE SUMMARY

Arizona DOT faces a daunting challenge: prioritizing nearly $89 billion of transportation needs over the next 25 years with only $26 billion of expected revenue. Despite this, ADOT is moving toward becoming a multimodal transportation agency by committing increased funding to non-highway modes, providing expanded travel choice. ADOT has used a combination of technical information and public input to develop a fiscally-constrained Long-Range Transportation Plan Recommended Investment Choice that emphasizes infrastructure preservation and modernization while addressing system expansion, and travel choice needs.

What Moves You Arizona is the Arizona Department of Transportation's (ADOT) Long-Range Transportation Plan (LRTP). The LRTP, or "Plan," defines visionary, yet pragmatic, investment choices Arizona will make over the next 25 years to maintain and improve its multimodal transportation system. The Plan is not rigid or fixed. It is part of a continuous process of planning, implementation, operation, and preservation and will evolve over time to reflect and be responsive to future changes in needs, resources, and priorities. The Plan:

- Provides strategic direction to guide future investments in transportation -- it does not identify a specific list of projects for implementation;
- Documents existing conditions with an eye toward future trends that could influence both system performance and investment needs, as developed for the Plan's *Transportation in Arizona* (TIA) Report (May 2010) http://www.whatmovesyouarizona.gov/PDF/TIA_ExecSum_0610.pdf;
- Defines State transportation system goals, objectives and performance measures that reflect input from Arizona's stakeholders and transportation planning partners;
- Incorporates the comprehensive land use and 2050 vision developed in *Building a Quality Arizona (bqAZ)* as a framework for the State's desired future;

"What Moves You Arizona" is the State's new Long-Range Transportation Plan – it advances the bqAZ vision by defining a preferred investment strategy.

- Recognizes that ADOT's role is evolving from a traditional highway agency toward a more multimodal transportation department;
- Assesses future needs and anticipated revenues for the State's multimodal transportation network;
- Considers an array of outcome-based programmatic investment choices to illustrate likely future system performance under different investment mixes;
- Establishes ADOT'S preferred Recommended Investment Choice (RIC), which provides the Department with a capital investment strategy through 2035 while

meeting federal and State requirements for long-range statewide transportation planning;

- Is fiscally constrained – the RIC at baseline includes no new taxes and applies realistic, conservative revenue growth rates coupled with modest assumptions about inflation; and
- Focuses on implementation, not only through the development of the RIC, but also by acknowledging needed changes to mid- and long-range policies, planning and programming linkages, and interagency partnerships.

This Plan is strategic in nature, examining *investment types* for ADOT's capital program; it does not examine nor recommend any specific projects.

1.1 Plan Purpose

The Plan replaces *MoveAZ*, ADOT's previous LRTP completed in 2004. It addresses federal statutes, which require states to undertake statewide long-range transportation planning over at least a 20-year horizon, and satisfies Arizona Statutes, A.R.S. § 28-506, which requires that the investment strategy identified in the Plan reflect reasonably expected revenues. The LRTP's Recommended Investment Choice focuses on the State System; investment priorities for local facilities are beyond the scope of this effort.

ADOT's role is evolving from a traditional highway agency toward a more multimodal transportation department.

The Plan serves as both the principal high-level capital programming guide for ADOT and as documentation of broader statewide transportation investment needs. The fiscally-constrained element of the Plan applies to the Arizona State Highway System and other modes in which ADOT has interest. However, the Plan was developed in partnership with the State's transportation planning partners, which include Arizona's stakeholders, metropolitan planning organizations (MPOs), and councils of government (COGs). As such, information on multimodal needs, including local road spending, is included in investment levels beyond baseline.

1.2 Goals, Objectives, and Performance Measures

Establishing a meaningful strategic direction to drive system investment decisions is a critical part of the statewide transportation planning process. Plan goals and objectives define investment priorities and describe how ADOT will work with its transportation planning partners to achieve a shared transportation vision. Plan-level performance measures establish a means of determining how different investment strategies will contribute to achieving these goals and objectives, and provide a basis for establishing program and project-level measures to guide plan implementation. As

The Plan will guide ADOT's future capital programming.

such, these strategic LRTP elements were developed in coordination and collaboration with the State's transportation planning partners.

The *bqAZ* Vision and Guiding Principles provide broad guidance for transportation planning and implementation for all public agencies and private companies that deliver and/or influence transportation infrastructure and services throughout the State. In this way, the Vision and Guiding Principles served as the focal point for development of Plan goals and objectives. Likewise, performance measures that link directly to Plan goals and objectives were established and applied to understand the outcomes of transportation investments over the Plan horizon. A summary of the resultant eight goal areas and associated measures is shown in **Table 1-1**.

Table 1-1: Plan Goals and Performance Measures

Plan Goal	Performance Measures
Improve Mobility and Accessibility	Congestion, speed, and travel delay
Preserve and Maintain the State Transportation System	Pavement and bridge deficiencies; maintenance spending
Support Economic Growth	Congestion, speed, travel delay, and resources available for economic initiatives Job growth/job retention
Link Transportation and Land Use	Congestion, speed, travel delay, and improved access management
Consider Natural, Cultural, and Environmental Resources	Change in vehicle-related emissions, level of environmental certification
Enhance Safety and Security	Fatalities and serious injuries
Strengthen Partnerships	N/A – Focus on implementation policies
Promote Fiscal Stewardship	N/A – Focus on implementation policies

1.3 Long-Range Needs, Revenues, and Investment Levels

The statewide long-range planning process is about making choices regarding how Arizona should invest in transportation over the next 25 years. To inform these decisions, substantial analysis was undertaken to develop long-range needs and revenues.

The Plan recognizes the economic importance of Arizona's highways.

1.3.1 Needs

For the Plan, 25-year needs on the State's multimodal transportation system were assessed. These **Full State Needs** quantify the costs over the 25-year Plan timeframe required to address expected deficiencies and to achieve across-the-board acceptable performance on the State Transportation System. Full State Needs are estimated at $88.9 billion through 2035 as detailed in **Table 1-2**.

Table 1-2: 25-Year Full State Needs - Capital and Operating Costs (2009 $ Millions)

Mode	Capital Needs Estimate	Operations Estimate	Total
Highways	$41,905	$5,676	$47,581
Bridges	$1,434	$67	$1,501
Aviation	$10,390	N/A	$10,390
Freight Rail	$500	N/A	$500
Intercity Passenger Rail	$2,564	$2,098	$4,662
Transit	$16,034	$8,184	$24,218
Total	**$72,827**	**$16,025**	**$88,852**

- **Needs** are defined as the *amount of spending required to achieve defined performance benchmarks.* For the Plan, needs were developed consistent with current ADOT policies for system conditions and performance using "minimum tolerable (acceptable) conditions" to define a deficient (unacceptable) condition (like pavement condition, bridge condition, or congestion). Needs for the State Transportation System were aggregated over 25 years.
- The **State Transportation System** is the *multimodal transportation system* in the State. This includes the State Highway System, the system of State Routes, U.S. Highways, and Interstate Highways, which is owned and operated by ADOT, as well as transit, aviation and rail modes for which ADOT has an interest in advocating or supporting. The roles of ADOT were developed by considering the ability of ADOT to meet and/or influence Plan goals and objectives both today and over the Plan horizon.

Full State Needs includes estimates of capital investment costs for highways, aviation, freight rail, passenger rail, and transit, as well as maintenance and operations costs through 2035 for highways, transit, and passenger rail.

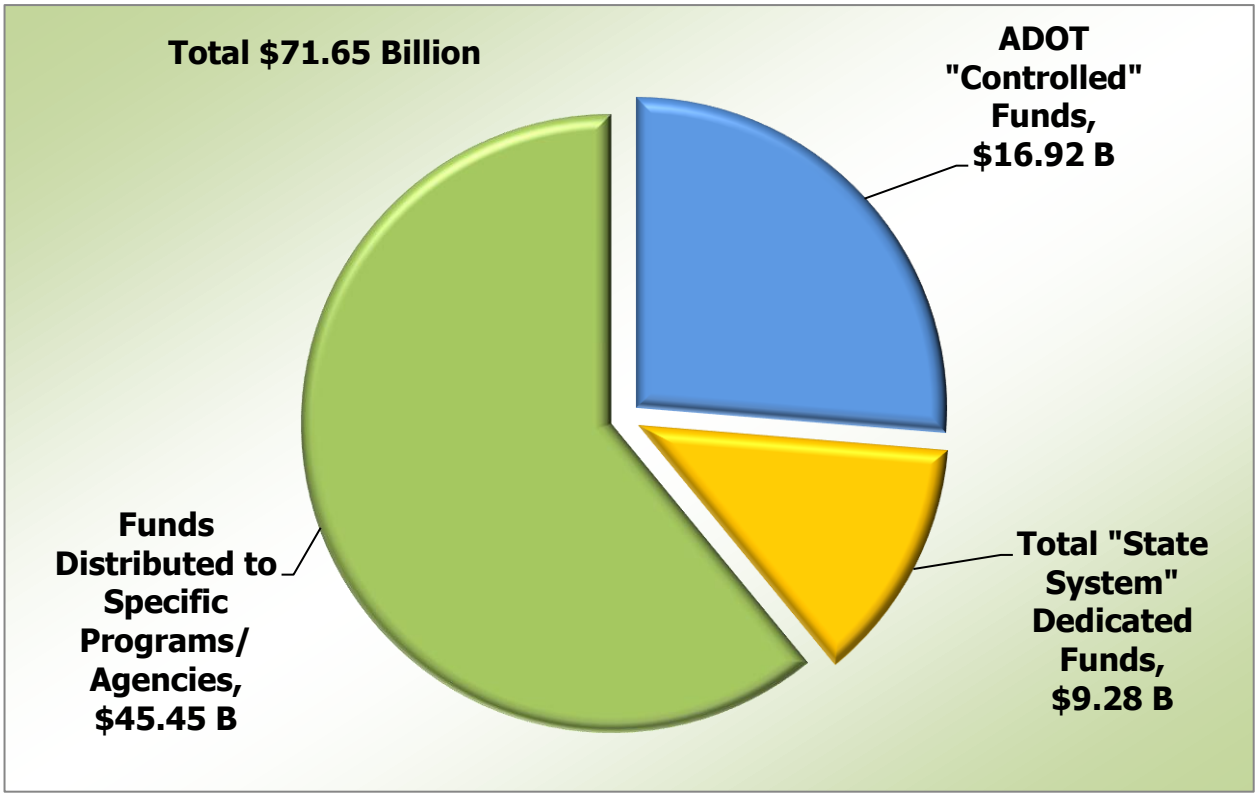
1.3.2 Revenues

If the 25-year Full State Needs define the upper limit of spending required to achieve an across-the-board well-performing State Transportation System, the baseline revenue forecast shows how close – or not – expected revenues might come to meeting Full State Needs. The baseline revenue forecast developed for the Plan, shown in **Figure 1-1**, assumes a continuation of existing transportation funding sources and no new funding sources or revisions to existing user fee rates over the 25-year planning horizon. (For additional baseline revenue information, please refer to **Table 5-6**.)

Figure 1-1 also details the budget for State Highway System investments from FY 2010 to FY 2035:

- More than 60 percent of expected revenues are "outside ADOT's control;" that is, they are allocated for ADOT maintenance or operations, distributed to local governments, or are available to other agencies (see **Table 5-6**);
- When considering all funds available for investment on the State Highway System, ADOT's total projected State transportation budget sums to $26.2 billion from 2010 through 2035;
- Of this total funding, $9.28 billion is available for investment on the State Highway System in the Maricopa Association of Governments (MAG) and Pima Association of Governments (PAG) regions only, leaving $16.92 billion in statewide discretionary revenues; and
- Of ADOT's $16.92 billion in discretionary funding, $13.54 billion is Federal funding available for federally-eligible projects, while $3.38 billion is from Arizona's Highway User Revenue Fund (HURF).

Figure 1-1: Plan Forecast State Transportation Funds (2009 $ Billions)



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

1.3.3 Investment Levels

To better understand the effects of the investment of anticipated revenues on meeting Full State Needs and advancing Plan goals and objectives, Alternative Investment Choices were developed and compared, and a Recommended Investment Choice was defined. These investment analyses were developed using baseline revenues.

- An **Alternative Investment Choice (AIC)** is a means of showing impacts of infrastructure investment mixes on system performance. For the Plan, AICs were defined at baseline revenue by considering investment mixes among preservation, modernization, and expansion improvements.
- The fiscally constrained **Recommended Investment Choice (RIC)** was also defined at baseline revenue. The RIC reflects ADOT's investment priorities given the availability of baseline revenues only.

Three Plan Levels are examined – Baseline, Full State Needs, and Vision.

Planning provides a course of action to better understand not only "what" should be done, but how much proposed investments will cost. For the purposes of comparison and in working toward the *bqAZ* 2050 vision, three planning level investment scenarios were considered in the Plan: the RIC at Baseline, a Vision level consistent with *bqAZ* implementation, and a "middle" level between the Baseline and Vision defined by Full State Needs.

- **Baseline**: This scenario defines the fiscally constrained RIC for ADOT. It provides a strategy for ADOT capital programming assuming no new funding sources or revisions to existing user fee rates over the Plan's 25-year horizon. The investments considered under this scenario are limited to a total of $26.2 billion.
- **Vision**: This scenario provides the needs, revenues, and outcomes "ceiling" by quantifying and qualifying the outcomes of implementing the first 25 years of the *bqAZ* 2050 vision. The total cost of implementing the *bqAZ* 2050 vision scenario over the 25-year Plan horizon is $250.1 billion in 2009 constant dollars, which includes both the State system and local roads.
- **Full State Needs**: This scenario provides a needs and revenue assessment *in between* Baseline and Vision and shows the impacts on system performance if ADOT were to implement all needed investments for the State Transportation System, or "needs," which total $88.9 billion over 25 years. Note that the State Transportation System includes all roads owned and operated by ADOT and excludes local roads.

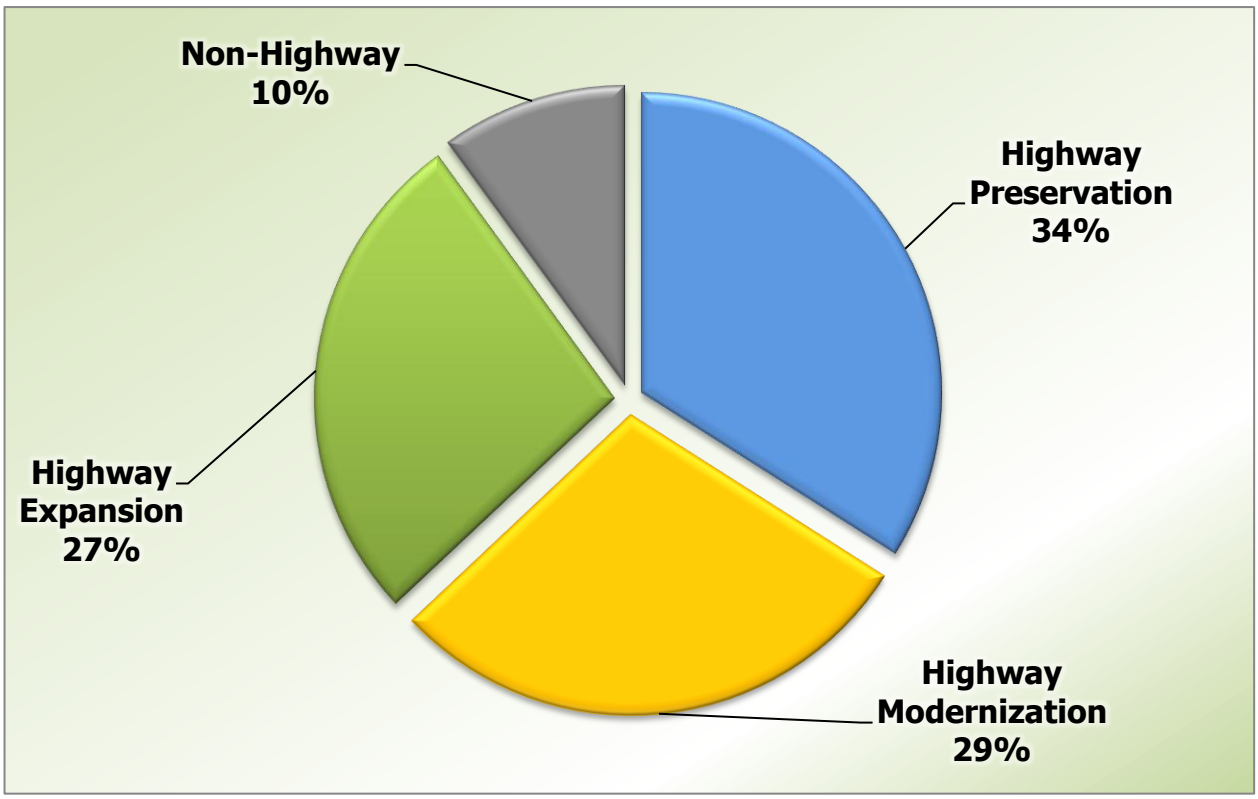
1.4 Recommended Investment Choice at Revenue Baseline

Figure 1-2 shows the Plan's Recommended Investment Choice which, at revenue baseline, provides the long-term implementation strategy developed in the Plan. The purpose of the RIC is to drive the allocation of resources and influence project selection, yet be flexible enough that ADOT can continue to accommodate changing and emerging priorities over time, both internally and with the State's planning partners.

The funding allocations defined under the RIC underscore ADOT's priorities to both preserve the current system and to expand travel choices for all Arizonans, while investing to create/retain jobs. In addition to the technical analysis and ADOT staff input, these priorities were developed using input received through stakeholder outreach, input from committees, and public questionnaires.

ADOT's priority for transportation is to preserve the integrity of the existing system.

Figure 1-2: RIC – Funding Distribution



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

A survey instrument used to solicit input about transportation investment priorities helped to finalize and reinforced the long-range investment decisions for the Plan. Survey responses focused on the following themes:

- Broad support for system preservation: nearly half of all respondents (44%) highlighted system preservation as their "number one" long-term transportation concern; and,
- Recognition of the need for increased travel choices: noted as the second most important planning concern of respondents.

The impact of the RIC on system performance is limited because of the realities of the diminishing long-range revenues. At the same time, the RIC allocations across categories and modes show the commitment of ADOT to:

- Preserve the State Highway System with few unmet highway preservation and rural transit needs;
- Improve mobility and accessibility through modest State Highway System expansion and funding support for mode choice, non-highway modes, and intermodal connectivity – despite limited funding, ADOT is making a strategic commitment to increased investment in the non-highway modes;
- Support economic development via rail and transit investment; and
- Increase safety and efficiency via system modernization.

Implementation of the Plan's Recommended Investment Choice (RIC) will be gradual and must recognize and appreciate differences between the RIC investment mix and the existing MAG and PAG Regional Transportation Plans (RTPs), which reflect voter-approved regional transportation taxes. In the short term there will be challenges implementing the Plan because of differences between the expansion-based MAG and PAG RTPs and ADOT's RIC. The current RTP for the MAG region includes significant funding for highway expansion and a lower level of funding for system preservation. As the MAG region transportation system ages, it is expected that future RTPs will include higher levels of funding for system maintenance and preservation. ADOT and the MAG and PAG Transportation Management Areas (TMAs) have pledged to continue to work together in a cooperative fashion to address these differences in the future as part of the updates of the RTPs and State LRTP.

RIC implementation must recognize the differences between the RIC and adopted MAG/PAG Regional Transportation Plans.

1.5 Investment Outcomes and Gap Analysis

1.5.1 Outcomes by Planning Level

The current baseline revenue forecast for Arizona falls well short of the estimated Full State Needs and Vision investment levels. These investment levels, detailed in **Table 1-3**, show the cost to advance Plan goals and objectives beyond revenue baseline.

Table 1-3: Planning Level Investment Outcomes and Policy Implications

Components	Summary Outcomes	Policy Implications
Recommended Investment Choice (RIC) 25-year Fiscally Constrained Cost: $26.2 billion		
Revenues available for: ▪ State Highway System and State-owned/operated freeways; ▪ Capital investment for rural transit, commuter rail, passenger rail, and freight rail; and ADOT investment, if applicable. State funds for system operations and maintenance are not included in RIC total of $26.2 billion as covered by mandated distributions from revenues (see Table 5-6). RIC allocation for State Highway System roads and bridges: ▪ Preservation $8.9 B ▪ Modernization $7.6 B ▪ Expansion $7.1 B ▪ Non-Highway modes $2.6 B ▪ Total $26.2 B	▪ Prioritizes asset preservation ▪ Moderate investment in system modernization, improving safety and efficiency ▪ Limited congestion mitigation ▪ Some funding support for mode choice and intermodal connectivity	Fiscally constrained scenario assumes no revenue increases over Plan horizon, prioritizes system preservation, and invests in non-highway modes
Full State Needs 25-year Cost: $88.9 billion		
Full State Needs cover: ▪ State Highway System and State-owned/operated freeways; ▪ Operations and maintenance for all State-owned/operated modes; ▪ Urban/rural capital transit needs for Preservation and Expansion; ▪ Passenger and freight rail; and ▪ Aviation capital needs. State Highway Needs allocation for State Highway System roads and bridges: ▪ Preservation $6.5 B ▪ Modernization $9.1 B ▪ Expansion $27.7 B ▪ Non-Highway modes $29.6 B ▪ Operations/Maintenance of new facilities/services $16.0 B ▪ Total $88.9 B	▪ Performance-based ▪ Brings the State Transportation System to acceptable performance standards as defined by ADOT criteria ▪ Job growth	Implementation requires significant funding beyond baseline; costs are based on both engineering and economic criteria and reflect system conditions and current trends
bqAZ Vision Level Needs 25-year Cost: $250.1 billion		
bqAZ Vision Level Needs cover: ▪ State Highway System and State-owned/operated freeways; ▪ Operations and maintenance for all State-owned/operated modes; ▪ Capital and operations needs for local roads and streets; ▪ Urban/rural capital transit needs for Preservation and Expansion; ▪ Passenger and freight rail; and ▪ Aviation capital needs. Vision level needs allocation: ▪ State Highway Preservation/Maintenance/Operations $17.1 B ▪ State Highway System Modernization/Expansion $127.7 B ▪ Local Roads $48.5 B ▪ Non-Highway modes $56.8 B ▪ Total $250.1 B	▪ Long-range land use and transportation scenario supports aggressive growth strategy for the State ▪ Job growth	Implementation requires significant funding beyond baseline; costs are based on bqAZ Vision

In considering the gap between Baseline, Full State Needs, and Vision investment levels:

- Arizona's Full State Needs total $88.9 billion. Baseline revenues to meet these needs are projected to be $26.2 billion from FY 2010 to FY 2035. The funding gap between Arizona's Full State Needs and baseline revenues under ADOT control is $62.7 billion.
- Arizona's 2035 Vision Level – primarily defined by *bqAZ* – has an approximate price tag of $250.1 billion. The funding gap between Arizona's Vision Level and baseline revenues under ADOT control is $223.9 billion, some of which would be the responsibility of other agencies, such as funds for local highway needs and transit operations.

1.6 Considerations for Plan Implementation

1.6.1 Advancing the RIC

Fewer than 30% of Arizona's transportation needs can be addressed with expected baseline revenues.

For the purposes of documentation and recommendations for the LRTP, policies for Plan implementation were explored by considering the advancement of Plan goals and objectives beyond the RIC via specific activities or "strategies." Strategies were developed to help ADOT look "beyond the RIC" to advance broader goals and objectives both within the Department and across the State.

Table 1-4 provides summary strategies considered to advance LRTP goals and objectives.

Table 1-4: Strategies by Plan Goal Area

Plan Goal Area	Potential Policies/Strategies
Mobility, Accessibility, and Connectivity	Access Management Complete Streets Methods, Models, and Data Research
Preservation and Maintenance	Expanded Maintenance and Operations Policy
Economic Development	Job creation/retention Access Management Complete Streets Demand Management System Modernization (Bottleneck Reduction, System Operations, Traffic Signal Timing)
Transportation and Land Use	Access Management
Natural, Cultural, and Environmental Resources	Context Sensitive Solutions Education and Outreach "Green" Certification
Safety and Security	System Modernization (Rural Safety)
Performance Measurement and Management	Methods, Models, and Data Research Reporting

High-productivity transportation investments can both enhance freight mobility to increase the global competitiveness of local businesses, and support the needs of the workforce and employers in moving to and from jobs. The result is a "win-win" outcome for the economy, where increased transportation spending leads to short term construction jobs and longer term economic health and vitality that both retains jobs and creates new jobs.

All policies and strategies reviewed for the Plan (detailed in Section 7) have merit when considering implementation across goals and objective over time; however, the following specific strategies were identified as a potential course of action for advancing Plan goals and objectives:

- **ADOT's Access Management Guidelines** introduces access management requirements for new development to both improve transportation-land use coordination and better support economic development. To further advance Plan objectives, retrofit access management guidelines will be considered.
- **Complete Streets, Context Sensitive Solutions (CSS)**, and other sustainability/livability concepts, have been or are being considered by ADOT and are important for Plan implementation.
- **Green Certification**: ADOT will explore the application of assessment methodologies that enable an agency to assess how well projects and programs comply with environmental best practices across a range of "green" considerations.
- **Transportation Demand Management (TDM):** Even with State and metropolitan programs already in place, there is a role for ADOT to advance a statewide TDM program designed to reduce congestion and enhance mobility.
- **Operations and Maintenance Policies for Expansion Projects:** The assessment of on-going maintenance and operations costs by ADOT and all planning partners over the long-term is necessary prior to project level programming for all expansion projects to ensure sustainable preservation funding over time.
- An effective **modernization** program should include a commitment to technology implementation via transportation system management and operations concepts.
- **Research:** A summary of peer practices regarding successes in Complete Streets, Context Sensitive Solutions, TDM, and other policy areas seen as "difficult" to implement agency-wide will be essential in making the case for broad implementation of these and/or similar policies.
- **Education and Outreach** provide an alternative to more formal polices. For example, safety education to increase seat belt usage and decrease distracted driving may be warranted. Additionally, outreach may help ADOT to better coordinate and collaborate with all planning partners, with ADOT taking the lead in educating partners on Plan goals and objectives, and on the RIC. For decisions that

are intrinsically local in nature (land use decisions, for example), ADOT will serve as a catalyst to bring the right stakeholders together and facilitate meaningful discussion.

Aside from the specific strategies identified to advance Plan goals and objectives beyond the RIC, it is important to note that Plan implementation over time will become more focused on the integration of community concerns into the planning process. Enhancements in local communities, where citizens can see their tax dollars at work, will be particularly important in building statewide support should ADOT consider revenue generating mechanisms in the future.

1.6.2 Next Steps

This Plan is designed as a living document that will evolve over time to inform and foster the public policy discussion concerning the role transportation will have as Arizona emerges from the current economic downturn and how future transportation investment decisions will be made. The Plan concludes that there will not be enough money to finance those investments Arizonans think are necessary to preserve the quality of the transportation system, provide the transportation choices that improve Arizona's quality of life, attract/retain jobs, and serve as the catalyst for recovery. The public outreach component of the Plan, which informed the policies and recommended investment choice, served to confirm the direction outlined in the Plan and underscore that Arizonans are supportive of a comprehensive approach to transportation investment, providing increased modal travel choices, and maintaining a high quality multimodal transportation system statewide.

> *"What Moves You Arizona" is intended to inform the public dialogue on transportation choices.*

What Moves You Arizona can serve as a strategy and investment tool to aid local officials in public dialogue on transportation that ultimately involves State officials, local government leaders, tribal governments, and the myriad of stakeholders and interest groups that make Arizona such a great place to live. These decision-makers will ultimately have to determine the timing and extent of the next transportation initiative in Arizona.

2. PLAN DEVELOPMENT

Development of the long-range transportation plan is built upon an exceptional array of previous work, including bqAZ. The final Plan is technically-based, includes an extensive public outreach effort, and is designed to surpass State and federal requirements for statewide transportation planning.

Core terms for the reader to understand include:

- *Baseline revenue forecast;*
- *Transportation need;*
- *Alternative investment choice; and*
- *Recommended investment choice.*

ADOT also developed a long-range plan decision-making structure that included three separate committees, each with representation from regional planning partners and sister state agencies, plus participation from the Federal Highway Administration.

What Moves You Arizona is the update for the existing statewide long-range transportation plan (LRTP), *MoveAZ*, completed in 2004. The new Plan satisfies both State and federal requirements for statewide long-range transportation planning and serves as a guide for Arizona's transportation planning and capital delivery programs through 2035. The 25-year Plan meets the requirements within the Arizona Revised Statutes for developing a fiscally-constrained Plan that is based on a realistic baseline revenue forecast, which assumes modest revenue growth only.

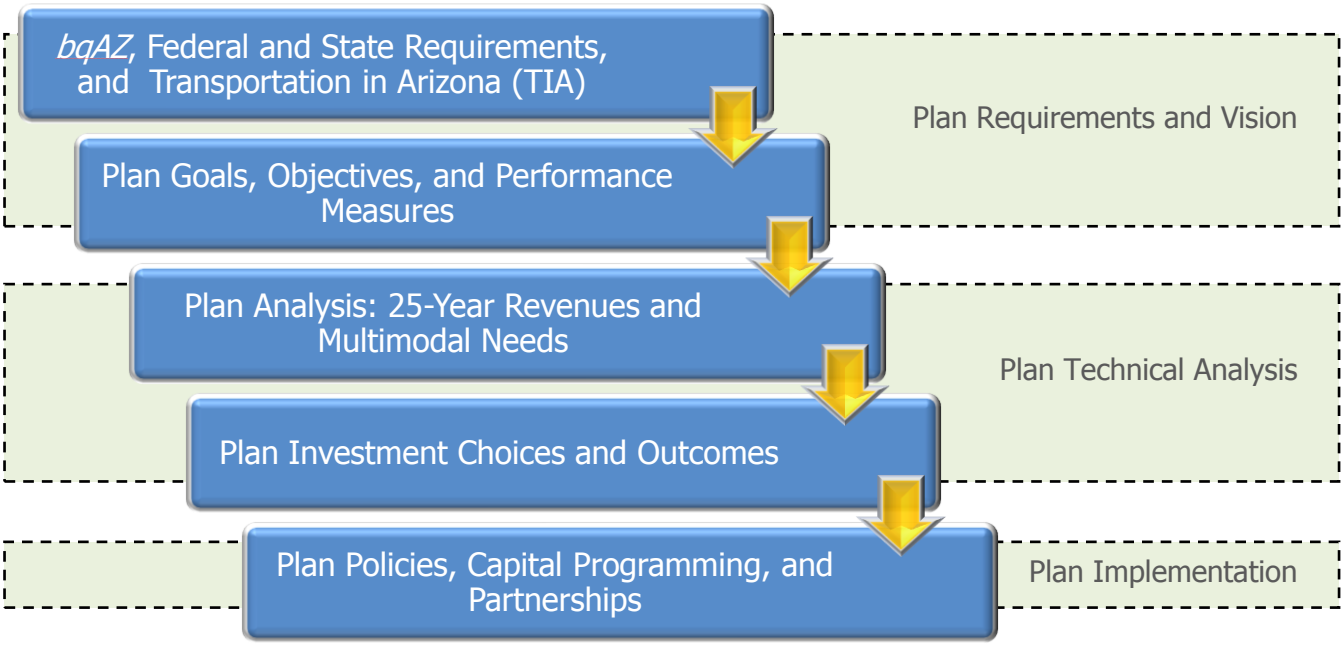
"What Moves You Arizona" is the State's new Long-range Transportation Plan – it advances the bqAZ vision by defining a preferred investment strategy.

The Plan was developed to advance ADOT's efforts toward the comprehensive multimodal transportation vision developed in *Building a Quality Arizona (bqAZ)*. This section describes the process for Plan development, from defining the "building blocks" of the LRTP – including the aggregation of Plan requirements and existing conditions through technical and implementation analyses (the Plan "assessment" levels) to better define the steps toward implementing *bqAZ*. It also describes the opportunities for stakeholder input and outreach, including stakeholders within ADOT, planning partners in the State, and the public.

2.1 Plan Building Blocks

Figure 2-1 shows the "building blocks" of the LRTP. It is important to note that each step toward Plan completion also included extensive public and stakeholder outreach as described in Section 2.4.

Figure 2-1: Plan Building Blocks



The Plan building blocks can be organized by recognizing three basic steps targeted at building on and advancing Arizona's planning and partnership efforts to date:

- **Plan Requirements and Vision:** Section 2.2 summarizes the LRTP's initial activities, recognizing that transportation planning requires the acknowledgement of previous and concurrent plans, federal and state requirements, and existing conditions as developed for the Plan's *Transportation in Arizona* (TIA) report, finalized in May 2010. Initial activities also included the development of collaborative Plan goals, objectives, and performance measures, which are discussed in Section 3. Development of Plan goals and objectives included stakeholder and public outreach and involvement while the performance measures included close collaboration within ADOT and planning partners.
- **Plan Technical Analysis:** To define ADOT's direction for long-range transportation planning and programming, 25-year baseline revenues were estimated, along with multimodal transportation needs. These activities were conducted using ADOT-specific criteria and recognize national policy trends. Using the projected available revenues and 25-year multimodal needs as a base, investment choices were developed and considered by ADOT and were vetted thoroughly via the Plan committee structure and through extensive stakeholder and public contact. Plan performance measures were used to compare the outcomes of Plan implementation over time. These technical activities are presented in Section 5: Multimodal Needs, Section 6: Transportation Revenues, and Section 7: Investment Choices and Outcomes.

- **Plan Implementation:** Implementing the LRTP will occur incrementally over time and will require commitment to adjusting and delivering a capital program that is responsive to Plan recommendations, as well as commitments from the State's transportation planning partners. Section 7 details strategies and policies for Plan implementation.

2.2 Plan Requirements and Vision

2.2.1 Building a Quality Arizona (bqAZ)

In 2008 and 2009, ADOT worked with organizations, stakeholders, and Arizonans across the State to develop the *bqAZ* Statewide Transportation Planning Framework, a shared vision for Arizona's transportation future. The *bqAZ* process was designed to gather input from residents and stakeholders on critical issues related to how the State should direct growth, consider the environment, ensure safety and security, and promote economic vitality while moving people and goods throughout Arizona.

The *bqAZ* process considered three transportation future scenarios: Personal Vehicle Mobility, Transit Mobility, and Focused Growth. As a result of extensive public and stakeholder outreach and involvement, the recommended framework presented a multimodal transportation system that recognized and strengthened the relationship between land use and transportation by connecting activity and employment centers statewide. The comprehensive vision, which incorporated elements of all three scenarios, was accepted by the State Transportation Board in January 2010 and provided the foundation for the LRTP update.

As the State's transportation vision, *bqAZ* defined:

- Growth choices and scenarios through 2050;
- Needs for State, regional, and local systems to support chosen growth scenarios; and
- Fiscally unconstrained multimodal investments for State, regional, and local needs.

Within the constraints and requirements of both federal and State long-range transportation planning, ADOT's Plan *at revenue baseline* focuses on:

- 25-year needs on the State Transportation System as well as in areas where ADOT has a vested financial interest (local system needs are not included); and,
- Fiscally constrained multimodal investments to pay for needs on the State Transportation System.

Beyond revenue baseline, analyses for the Plan considered the "ceiling" of investments for 25-year implementation of *bqAZ*, or Vision level, as well as a "middle" investment level of Full State Needs. These investment levels are described in more detail in Section 2.3.2: Plan Investment Levels.

2.2.2 Federal and State Requirements

The Plan was developed under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and meets all federal and State requirements.

The idea of fiscal constraint is important to understand when comparing *bqAZ* to ADOT's LRTP and MPO Regional Transportation Plans (RTPs). By federal requirements, fiscal constraint need not apply to a non-project-specific statewide LRTP; however, according to Arizona statute, ADOT's Plan must be fiscally constrained, whereas *bqAZ* provides an unconstrained vision.

For the Plan, fiscal constraint was applied by forecasting revenues available for investment in the State's multimodal transportation system assuming no significant increases in State or federal transportation funding.[1] As such, the Plan's Recommended Investment Choice (RIC) applies ADOT's 25-year investment priorities to constrained transportation revenues.

2.2.3 Existing Conditions – Transportation in Arizona

ADOT's 25-year Plan was developed to provide a step toward meeting the needs identified in *bqAZ*. This, of course, includes understanding today's system, today's needs, and ADOT's priorities in conjunction with realistic growth, population, and system condition projections. The TIA report documents these existing conditions.[2] The TIA provides details of the State's existing multimodal transportation system (summarized in **Table 2-1**) and outlines considerations for the State's transportation future, including concerns related to system demand, condition and performance, and revenue shortfalls. The TIA can be found on the Plan website at http://www.whatmovesyouarizona.gov/PDF/TIA_ExecSum_0610.pdf.

The "TIA" Report provides details of the State's multimodal transportation system.

The TIA also highlights issues and key considerations critical for Plan development and implementation, including the following transportation challenges:

- **Preservation:** Arizona, like most states, is tasked with maintaining an aging State Transportation System. Many of Arizona's highways and bridges were constructed during the 1960s and will soon require significant rehabilitation. Over time, pavement rehabilitation and bridge needs will continue to grow without significant additional investment.

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[1] Arizona utilizes a Risk Analysis Process (RAP) to develop official forecasts for HURF and RARF revenues. The RAP process relies on the judgments of a panel of 15 economic and financial experts – the RAP Panel. The official forecast results from September 2010 provided the growth rates for the HURF and RARF for the Plan as detailed in Section 5.

[2] The TIA report and executive summary are available at *www.whatmovesyouarizona.gov* under "library" and provide all citations for the table and summary shown in Section 2.2.3 of the LRTP. The TIA provides a summary of the existing conditions for Plan development with data available through May 2010.

Table 2-1: Transportation in Arizona*

People	6.4 million (2010) Travel 63 billion vehicle miles annually 75 percent of population live in Tucson and Phoenix metro areas 13 percent of all Arizonans are 65 or older 300,000 visitors living in Arizona in winter months
Highways	129,780 total lane miles 19,912 lane miles operated and maintained by ADOT 1,170 lane miles of interstates: I-10, I-40, I-17, I-8, and I-19 Good or better pavement conditions on most roads >70 percent of investment used to expand current system (2006-2010 ADOT investment patterns)
Bridges	7,348 structures 2,040 bridges operated and maintained by ADOT Currently most bridges in acceptable or better condition
Transit	40 transit systems Transit use increased more than 50 percent (2002-2009) Riders concentrated in metro areas of Phoenix, Tucson, and Flagstaff >200,000 passengers per day ride Valley Metro in Phoenix ADOT provides elderly, disabled, and rural transit funds Amtrak: Sunset Limited and Sunset Chief cross-state routes
Cross-border	Six international border crossings with Mexico (the largest at Nogales) 13,000 vehicles and 13,000 pedestrians cross at Nogales daily
Freight	557 million tons move through Arizona annually 75 percent (by weight) on Arizona Highways, including I-10 and I-40 25 percent (by weight) by rail (BNSF and UP) >1 percent (by weight) via air
Air	12 commercial airports 71 reliever and general aviation airports serve non-commercial air Access to commercial airports is largely 1-hour driving time or less Passenger boardings total more than 23 million enplanements annually 8.5 million visitors arrive in Arizona by air annually
Non-motorized	Bike and pedestrian travel primarily for recreation Safety is of great concern for bicyclists and pedestrians Important for livable communities, health, and quality of life

**Existing conditions as detailed in the TIA report, May 2010.*

- **Transportation Choices:** The transportation system must also provide for increases (and changes) in the State's population and accompanying increases in traffic volumes. Congestion will continue to increase, especially in the Sun Corridor that includes an area that stretches from Central Yavapai County to Nogales and Sierra Vista, as the State's population is projected to increase to more than 11 million by 2035 – more than a 70 percent increase from today's 6.4 million Arizonans. Maricopa County will see the largest growth in population, adding 2.8 million people. Arizonans 65 and older will increase from 13 to 20 percent of the total population, adding another layer of transportation challenges, including safety needs and the desire for public transportation options to access services, recreation, and health care.

- **Shrinking Revenues:** The national recession reduced available revenues and created fiscal constraints that will limit Arizona's ability to fund future transportation infrastructure improvements. Thus, Arizona is in a fiscally challenging situation, and action is required to keep State, local, and regional communities competitive and prosperous. Of particular concern is the State's ability to maintain and operate new facilities and services, including transit, funded by project-specific revenue sources that do not include a continuing stream of revenue to support associated future preservation, maintenance, or operations.

2.3 Plan Technical Components and Assessment Levels

2.3.1 Defining Needs, Revenues, and Investment Choices

Sections 4, 5, and 6 document technical activities and outcomes related to the development of 25-year Full State Needs, estimated revenues, and investment choices. Because these technical components are important for all Plan activities and are discussed throughout this document (including references in the goals and objectives, performance, and implementation sections), definitions are provided below, with more detail available in each respective technical section:

- **Need:** Amount of spending required to achieve defined performance benchmarks. For the Plan, needs were developed consistent with current ADOT policies for system conditions and performance using "minimum tolerable conditions[3]." Needs for the State Transportation System were aggregated over 25 years. As detailed in Section 4.1.3: Needs Categories, three improvement categories were used to aggregate capital multimodal transportation needs in the State: preservation, modernization, and expansion.
- **Baseline Revenue Forecast:** Revenue projection that assumes a continuation of existing transportation funding sources and no new funding sources or revisions to existing user fee rates over the planning horizon. For the Plan, the 25-year baseline revenue forecast was compared with the 25-year needs to determine the funding "gap" between needs and revenues.
- **Alternative Investment Choice (AIC):** Means of showing impacts of infrastructure investment on system performance. For the Plan, AICs were defined at revenue baseline by considering investment mixes between preservation, modernization, and expansion improvements.

Different ways of allocating capital revenues are presented through "Alternative Investment Choices."

[3] Minimum acceptable conditions for transportation system condition and performance were defined by ADOT for all technical assessments.

- **Recommended Investment Choice (RIC):** Reflects ADOT's investment priorities given the availability of baseline revenues only. The purpose of the RIC is to drive the allocation of resources and influence project selection, yet be sufficiently general to allow ADOT to continue to accommodate changing and emerging priorities over time, both internally and with the State's planning partners.

2.3.2 Plan Investment Levels

The RIC provides ADOT's priorities for multimodal system investment given the availability of baseline revenues. Planning, of course, should provide a course of action to better understand not only *what* should be done, but *how much* it might cost. The following planning levels – or scenarios – were developed and applied to quantify and qualify Plan outcomes if new revenues become available:

- **Baseline:** This scenario defines the fiscally-constrained RIC for ADOT. It provides a strategy for ADOT capital programming assuming a baseline revenue forecast with no new funding sources or revisions to existing user fee rates over the Plan's 25-year horizon.
- **Full State Needs:** This planning level scenario provides a needs and revenue assessment between the baseline and *bqAZ* needs. The Full State Needs investment level shows the impacts on system performance if ADOT were to implement all needed investments for the State Transportation System, as described in more detail in Section 5.
- **Vision:** This scenario provides the needs, revenues, and outcomes "ceiling" by quantifying and qualifying the outcomes of implementing the first 25 years of the 2050 *bqAZ* vision on both the State system and local roads.

Three Plan levels are examined: Baseline, Full State Needs, and Vision Level.

2.4 Opportunities for Input and Outreach

2.4.1 Committees and Decision Structure

This decision-making structure for Plan development is shown in **Figure 2-2**. Responsibilities were delegated to committees and individuals as follows:

- **Project Management Team (PMT):** The PMT provided day-to-day oversight and management of the long-range transportation planning process. Membership included the internal ADOT team with representatives from ADOT Multimodal Planning Division (MPD), ADOT Communication and Community Partnerships Division (CCP), two of the State's MPOs, and the Plan's consultant team.

Figure 2-2: Plan Decision Structure

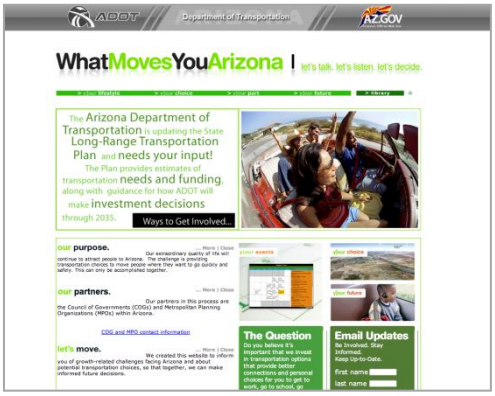
- **Technical Advisory Committee (TAC):** The TAC provided input and feedback on technical issues and topics. The TAC included ADOT staff, MPOs, and the FHWA. TAC involvement facilitated multi-agency support and will support implementation of the Plan.
- **Steering Team:** The Steering Team ensured that the Plan development process had broad-based support and a commitment to multi-agency implementation. As a working group, the Steering Team provided the primary link between ADOT and its planning partners. In addition to responsibility for reviewing and recommending content for the Plan, the Steering Team provided oversight of the overall planning process. Membership included ADOT management level staff, one executive level staff member from each COG and MPO, as well as the FHWA.

The decision-making structure for "What Moves You Arizona" involved federal, state, and local partners.

- **Policy Committee:** The Policy Committee deliberated and endorsed key strategic decisions required to complete and implement the LRTP, including the LRTP goals and objectives, revenue assumptions, performance measures, investment alternatives, and investment allocations for non-highway modes. Membership included the Steering Team plus a State Transportation Board member, the ADOT Executive Leadership Team, Statewide and Valley Project Management, one elected official policy board member from each COG and MPO, other State agencies, and the FHWA Division Administrator.
- **ADOT Executive Team:** This team served as needed for policy-level discussions and included ADOT Director John Halikowski and key ADOT executive staff.
- **State Transportation Board**: Arizona's State Transportation Board is responsible for final the review, approval, and adoption of the Plan.

Additional information regarding these committees can be found in the LRTP Public Involvement Plan available on the Plan website under "library" at http://www.whatmovesyouarizona.gov/PDF/FINAL_PP.pdf.

2.4.2 Stakeholder and Public Outreach



In accordance with federal and State regulations and ADOT procedures, a comprehensive LRTP outreach program was designed and implemented to encourage participation from stakeholders and the public throughout the LRTP process. ADOT utilized the input, opinions, and suggestions obtained through this process to develop the Plan. Full details on the outreach and involvement activities and input received are available in the study library at the project website: *www.whatmovesyouarizona.gov*.

A Participation Plan was developed in May 2009 that outlined the approach for ensuring effective communication and education and detailed how stakeholders and public would be engaged in Plan development. In May 2009, an e-newsletter was distributed to 5,549 individuals to prompt review and comment. The e-newsletter announced that ADOT would be examining those transportation and community planning choices with the launch of the Arizona LRTP, called *What Moves You Arizona*, and that the draft Participation Plan had been posted online and placed in public repositories across the State for a 45-day public comment period.

In addition to providing additional background, the e-newsletter indicated that the LRTP would identify transportation investments that Arizona will make over the next 25 years based on available funding. The public was invited to visit *www.whatmovesyouarizona.gov* to review the Participation Plan and provide written comments to ADOT. ADOT placed print and online advertisements with 30 publications across Arizona and distributed copies of the Participation Plan to 139 locations, including public libraries, Councils of Governments (COGs), Metropolitan Planning Organizations (MPOs), and ADOT District offices. Comments were accepted online, in writing, by phone, fax, or email to provide the most opportunity for people to comment. In total 32 comments were received regarding the Participation Plan and were responded to by the study team.

> *ADOT developed an extensive outreach program to involve Arizona's citizens in developing the Plan.*

After working with the COGs and MPOs on a collaborative decision-making structure, the Participation Plan was finalized and posted to the project website in June 2010. The Participation Plan guided the public involvement efforts through the LRTP process and focused on the two main technical work phases:

- Goals and Objectives (Summer/Fall 2010); and,
- Alternative Investment Choices (Spring 2011).

In addition to the Plan committees defined in **Figure 2-2**, the public and stakeholder participation program included the following elements:

- Videos;
- Email campaigns;
- ADOT Facebook page;
- Meeting-in-a-Box and surveys;
- Advertising campaigns;
- Workshops; and
- Presentations.

Outreach Videos

ADOT produced three videos for the LRTP, made all three available at *www.whatmovesyouarizona.gov*, and widely publicized their availability. The second and third videos also were accompanied by surveys that gathered input for the Goals and Objectives and Investment Choices phases, respectively.

- The first video was produced in late 2009 and provided a link between the conclusion of the *bqAZ* Statewide Transportation Planning Framework and the Plan kick-off. The video used images from the past to show how much change occurred in the past 40 years to provide a perspective about the importance of looking 40 years into the future. The video was used at the concluding public events for *bqAZ* and ended with a call to action for the LRTP.
- The second video was developed specifically to introduce "What Moves You Arizona," and featured ADOT Public Information Officers from across the State and scenes of Arizona's diverse communities. It described the challenges that the State faces as it grows and how transportation is an integral part of everyday life, the State's economy, and the State's future. The video also included a call to action for viewers to be involved in long-range planning as a legacy for future Arizona generations.
- The third video was developed specifically to inform stakeholders and the public about the anticipated gap between transportation needs and anticipated revenues so viewers could better understand the tough choices that ADOT must make with regard to transportation investments. In addition to being available online at the project website and on ADOT's YouTube channel, ADOT reached out to television stations across the State to air the LRTP video and played it at the Investment Choice Workshops. The video was available in DVD format in both English and Spanish. More than 2,500 people viewed the video online and a total of 66 DVD requests were fulfilled during the Investment Choices comment period.

Email Campaigns

Table 2-2 details the e-newsletters that were developed and distributed during LRTP development.

Table 2-2: Outreach e-Newsletters

Date	Distribution	Description
May 6, 2009	5,549	Announced study and encouraged review of participation plan
July 20, 2010	5,987	Encouraged viewing of video and participation in goals and objectives survey
December 4, 2010	6,157	Documented goals and objectives for study
March 23, 2011	Approximately 37,000	Encouraged viewing of the Investment Choices video and completion of the accompanying survey
April 13, 2011	Approximately 37,000	Encouraged viewing of the Investment Choices video and completion of the accompanying survey
April 18, 2011	Approximately 37,000	Encouraged viewing of the Investment Choices video and completion of the accompanying survey

Facebook

On its official Facebook page, ADOT posted a link to the Investment Choices video and a call to action for Arizonans to fill out the short survey.

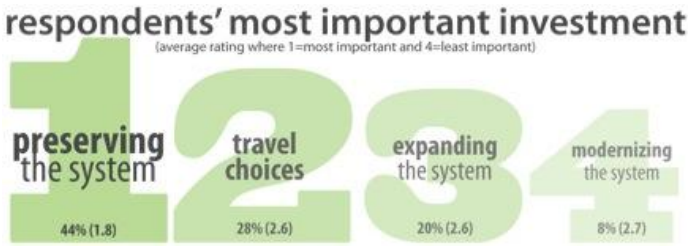
Meeting-in-a-Box and Surveys

A "meeting-in-a-box" kit was used to encourage local community groups to conduct their own meeting to provide input into the study. The kits were designed to gather input on the draft Plan goals and objectives. In total, 12 kits were distributed and one completed kit was returned. In conjunction with the kits, a brief survey was developed to receive comments on the goals and objectives. In total, 412 people responded to the survey.

In March 2011, a second survey was distributed to accompany the third video asking for input on the investment choices. This second round of advertising was intended to guide Arizonans to the website to view the video and complete the survey. There were 2,385 responses to the survey.

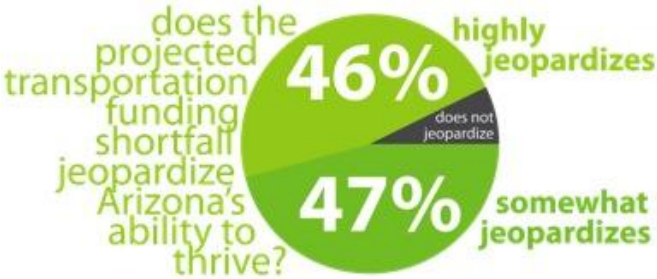
These responses helped finalize the long-range investment decisions developed for the Plan and included the following themes:

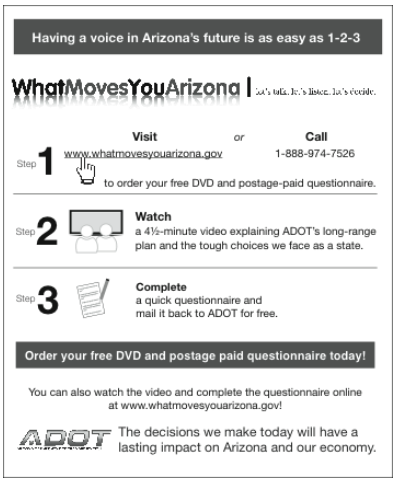
- Broad support for system preservation: nearly half of all respondents (44%) highlighted system preservation as their "number one" long-term transportation concern;



- A recognition of the need for travel choices: noted as the second most important planning concern of respondents;

- An understanding of the importance of non-motorized movements in conjunction with efforts to reduce traffic congestion; and
- An understanding of the economic importance of transportation investments: more than 90 percent of all respondents noted that the projected transportation funding shortfall may jeopardize Arizona's ability to thrive.





Advertising Campaigns

ADOT placed 30 newspaper advertisements running in publications statewide between May 5, 2009 and May 13, 2009. The intent of this initial advertising campaign was to announce the availability of the draft Participation Plan, encouraging review and comments. ADOT placed 26 newspaper advertisements in publications statewide between March 20, 2011 and March 24, 2011. Additionally, ADOT placed radio advertisements on 23 stations statewide between March 21, 2011 and March 25, 2011. The intent of this advertising campaign was to announce the availability of a video describing the investment types identified by the study and survey. Participants were encouraged to contact the study team to request a video and survey or to visit the study website.

Common Interest Group Workshops on Goals and Objectives

In accordance with federal guidelines, stakeholder groups representing tribal, economic, and other interests were invited to participate in workshops focused on a discussion of goals and objectives and, in a separate set of workshops, future investment strategies.

As detailed in **Table 2-3**, ADOT hosted eight special interest group workshops with a total attendance of 91 participants to review and receive comments on the draft goals and objectives prepared for the study. Workshops were held over a period of two days. Invitations to the workshops were distributed electronically to a total of 765 individuals on July 2, 2010.

Table 2-3: Common Interest Group Workshops - Plan Goals and Objectives

Date	Location	Time	Groups	Participants	Invitations Distributed
Wednesday, July 21, 2010	ADOT – Human Resource Development Center 1130 N. 22nd Avenue Phoenix, AZ 85009	10 a.m. to noon	Economic Development/ Underserved Populations	17	119
				8	89
		1 p.m. to 3 p.m.	Tribal Communities/ Major Freight Users	18	111
				6	182
Thursday, July 22, 2010	Hilton Garden Inn Airport North 3838 E. Van Buren Street Phoenix, AZ 85008	10 a.m. to noon	Resource Agencies/ Sustainable Planning Professionals	10	51
				14	73
		1 p.m. to 3 p.m.	Natural Resources/ Development Community	4	83
				14	57
			Total:	**91**	**765**

The format for the workshops included a brief presentation followed by a facilitated dialogue structured around Plan goals and objectives. Discussion focused on:

- Congestion and traveler expectations;
- ADOT's role in transit services;
- Highway preservation and maintenance needs;
- Economic development and related investments; and
- Participant concerns on environmental impacts.

Investment Choice Workshops

To solicit comments on the investment types identified in the Plan, ADOT hosted 12 Investment Choice workshops (**Table 2-4**) with a total attendance of 121 participants. Workshops were held statewide in six cities: Flagstaff, Lake Havasu City, Payson, Phoenix, Tucson, and Yuma. A total of 2,207 initial email invitations were distributed electronically on March 1, 2011. A follow-up email was distributed on March 17, 2011 to remind invitees to register. These workshops were targeted to tribal communities, stakeholders, special interest groups, and elected officials.

Table 2-4: Investment Choice Workshops

Date	Location	Time	Group	Participants
Wednesday, March 23, 2011	Best Western Inn 801 N. Beeline Highway Payson, AZ 85441	4:30 p.m. to 6:30 p.m.	Tribal/ Stakeholder/ Elected Official (combined group)	8
Thursday, March 24, 2011	Pima County Public Works Department 201 N. Stone Avenue Conference Room C Tucson, AZ 85701	10 a.m. to noon	Tribal	8
		1:30 p.m. to 3:30 p.m.	Stakeholder	13
		4:30 p.m. to 6:30 p.m.	Elected Official (combined group)	2
Tuesday, March 29, 2011	Yuma City Hall One City Plaza Room 190 Yuma, AZ 85364	1:30 p.m. to 3:30 p.m.	Tribal/ Stakeholder/ Elected Official (combined group)	8
Monday, April 4, 2011	Hilton Garden Inn Phoenix North Airport 3838 E. Van Buren Street Phoenix, AZ 85009	10 a.m. to noon	Tribal	14
		1:30 p.m. to 3:30 p.m.	Stakeholder	25
		4:30 p.m. to 6:30 p.m.	Elected Official	5
Thursday, April 7, 2011	Aquatic Center 100 Park Avenue Lake Havasu City, AZ 86403	1:30 p.m. to 3:30 p.m.	Tribal/ Stakeholder/ Elected Official (combined group)	8
Wednesday, April 13, 2011	Aquaplex 1702 N. 4th Street Flagstaff, AZ 86004	10 a.m. to noon	Tribal	8
		1:30 p.m. to 3:30 p.m.	Stakeholder	16
		4:30 p.m. to 6:30 p.m.	Elected Official	6
			Total Participants:	**121**

Investment Choice Workshops were organized to provoke discussion on the gap between long-range transportation needs and anticipated revenues. A facilitated *World Café* exercise was conducted, whereby a series of simultaneous conversations is encouraged in response to predetermined questions. Participants changed tables during the process, visiting a total of four tables, each focused on two of the eight goals. The main focus of the exercise was to better understand participant reactions to investment types and their impact on Plan goals and objectives.

Presentations

During the LRTP process, ADOT had multiple opportunities to present information regarding LRTP interim analysis and recommendations. The following organizations requested and received presentations:

- American Planning Association Arizona Chapter;
- Arizona Rural Transportation Summit 2011;
- American Council of Engineering Companies (ACEC) Arizona Roads and Streets Conference 2011; and,
- Arizona Airports Association 2010 Fall Conference.

3. Goals, Objectives, and Performance Measures

Transportation planning begins by establishing a set of goals and objectives. The six bqAZ guiding principles were adopted as bedrock goals; goals for system preservation, partnership, and fiscal stewardship were added as ADOT priorities. Modal objectives were developed for each goal area and high-level performance measures identified. This performance-based planning framework is the foundation for ADOT's accountability to its partners, stakeholders, and the public. The high-level performance measures identified in the Plan will serve as the basis for defining program and project–level measures that will help link capital programming and project selection to the Plan, and support monitoring and reporting of improvements in the transportation system performance.

This section outlines ADOT's new role in each mode: as an owner, partner, or participant (or in a few areas, having no role). By identifying a strong role in all modes, ADOT is taking decisive steps toward becoming a true multimodal transportation agency.

Establishing meaningful strategic direction to drive system investment decisions and approaches to program implementation is a critical part of the planning process. Plan goals and objectives help define investment priorities and describe how the State will work together with its partners to achieve a shared transportation vision.

The Plan describes ADOT's responsibilities for supporting the implementation of the *bqAZ* Vision. The goals, objectives, and performance measures developed for the LRTP serve as both the Plan's foundation and the path forward for directly linking the *bqAZ* Vision to the implementation of transportation improvements and services. Similarly, Plan goals, objectives, and performance measures detailed in this section include *outcome-based objectives*, which reflect the measureable improvements in transportation that ADOT will strive to achieve, and *process-based objectives*, which reflect commitments to new processes and improved partnerships needed to achieve those outcomes.

An important objective of the Plan was to expand the use of performance measurement in Arizona's planning processes. A set of high-level measures were established for the Plan to support selection of the Recommended Investment Choice by providing a means to quantify plan outcomes and compare the likely trade-offs between the Alternative Investment Choices. The performance measures are intended to provide a framework for better integrating plan goals and objectives into ADOT's capital programming activities and for improving tracking and reporting on Plan implementation.

3.1 Development Process

3.1.1 Goals and Objectives

The *bqAZ* Vision and Guiding Principles provided broad guidance for transportation planning for all public agencies and private companies that provide and influence transportation infrastructure and services throughout the State. In this way, the Vision and Guiding Principles served as the focal point for development of Plan goals, objectives, and performance measures.

The Plan outlines ADOT's roles and responsibilities to implement *bqAZ*. The *bqAZ* Guiding Principles, therefore, were used as the starting point for the creation of the Plan goals and objectives. Draft Plan goals and objectives were directly based on *bqAZ* language and concepts, and influenced by consideration of goals and objectives from both recent and prior ADOT plans, and strategic frameworks in long-range plans from other states.

The Plan's Vision and Goals used bqAZ as a focal point.

The original draft goals and objectives – and ADOT's role in delivering these goals and objectives – were reviewed and modified based on comments from the Project Management Team and the Steering Team, as well as stakeholder and public comment. Draft goals and objectives were modified in response to comments received during each review cycle. The final eight Plan goals listed below were reviewed, vetted, and approved by the Policy Committee and include a summary of the objectives and the Plan performance metrics recommended for each goal:

- **Improve mobility and accessibility**
  - Implement critical and cost-effective investments in infrastructure to expand access to transportation and optimize mobility and reliability in the transportation of passengers and freight.
  - *Summary performance measures:* Apply quantitative performance measures for the areas of congestion, speed, and delay.
- **Preserve and maintain the system**
  - Maintain, preserve, and extend the service life of existing and future State Transportation System infrastructure.
  - *Summary performance measures:* Measure pavement and bridge deficiencies, maintenance spending, and ability of investments to meet urban and rural needs.
- **Support economic growth**
  - Develop and operate a State Transportation System that provides for the reliable movement of people and freight throughout the State to create/retain jobs and support a competitive and thriving economy for Arizona.
  - *Summary performance measures:* Assess how well the State is facilitating and promoting economic growth via metrics related to job growth/retention, congestion, speed, and travel delay.

- **Link transportation and land use**
  - Protect the capacity of the State Transportation System by developing policies and partnerships that strengthen the coordination of transportation and land use planning and the implementation of associated policies and activities.
  - *Summary performance measures:* Measure congestion, speed, travel delay, and improvements in access management as indicators of the relationship between land use and congestion/travel delay.
- **Consider natural, cultural, and environmental resources**
  - Be a good steward of Arizona's natural, cultural, and environmental resources while improving and maintaining the transportation system.
  - *Summary performance measures:* Vehicle-related emissions and resources available for economic initiatives.
- **Enhance safety and security**
  - Continue to improve transportation system safety and ensure the security of the transportation system.
  - *Summary performance measures:* Reduce fatalities and serious injuries.
- **Strengthen partnerships**
  - Develop and nurture partnerships that support the coordination and integration of ADOT's investment in the State's transportation infrastructure with public and private organizations and agencies responsible for transportation, land use, conservation and environmental planning, and freight infrastructure.
  - *Summary performance measures:* Develop and implement policies to coordinate and collaborate with the State's planning partners.
- **Promote fiscal stewardship**
  - Provide a sound financial base for Arizona's transportation system through responsible management of public assets and resources and identification and implementation of funding strategies to ensure long-term balanced investment in the State Transportation System.
  - *Summary performance measures:* Compare the benefits of investment choices to better understand benefits and costs of programmatic investment mixes.

3.1.2 Performance Measures

Plan performance measures were established in conjunction with the development of the goal areas and associated objectives and are included in the description of the goals in the previous section. Performance measures for the Plan were built on current ADOT measures and included significant interaction with ADOT staff, PMT, TAC, and the Steering Team to gain input on potential measures. Key considerations that influenced the selection of measures included:

- State statutory requirements for specific measurement categories;
- Experiences and approaches used in other states;
- An emphasis on measuring system performance changes that are influenced by plan-level resource allocation decisions (as opposed to program and project-level decisions);
- The need to use "indirect" or "proxy" measures in some areas due to the inability to conduct or support direct measurement of outcomes and impacts; and
- A focus on system results where ADOT can have a direct impact or influence.

Performance measures help agencies determine if their investments have the desired effect on system quality.

Table 3-1 summarizes the Plan performance measures developed during the review process. These measures will evolve over time to reflect changes in policies, priorities, data availability, and resources. Performance measures were established to address the outcome-oriented objectives for each of the first six goal areas. The last two goal areas, Strengthen Partnerships and Promote Fiscal Stewardship, are process-oriented, and are thus not directly affected by decisions about the allocation of resources to different types of investment. Similarly, measures were not developed to cover process-oriented objectives under the first six goal areas. During Plan implementation, measures will be developed to both track progress on the process-oriented objectives and to inform program and project-level decisions. This effort may include development of measures that assess the specific safety, environmental impacts, and other considerations of individual project decisions, as well as broad-based efforts to assess qualitative considerations (e.g., through regular partner surveys).

The use of some performance measures requires the identification of benchmarks to classify values into a small set of easily understood categories, such as acceptable/unacceptable or good/fair/poor. Others require identifying target values. However, for all performance measures more important than the absolute value is the trend defined by successive values. Trends help to answer the important question of whether implemented strategies and policies have led to system conditions moving in the right direction and progress being made in meeting goals and objectives.

3.2 ADOT Interest Areas

3.2.1 Linking Goals to bqAZ

A priority for the development of the Plan goals was to establish a transparent link to *bqAZ*. Five of the eight Plan goals are drawn directly from the *bqAZ* Guiding Principles. The language of the goals has been adjusted – in some cases narrowed and in others broadened – to reflect ADOT's direct accountability as an owner/operator of the State Transportation System. In addition, many of the Plan objectives are based directly on portions of the *bqAZ* strategies.

Three goals that were not included in *bqAZ* have been added to the Plan to highlight ADOT's priorities:

Table 3-1: Performance Measures by Plan Goal Area

Improve Mobility and Accessibility
- Percentage of roadway miles at acceptable congestion levels – Applies volume to capacity ratios (V/C) to different road functional classes to assess how well the overall highway system will accommodate current and future travel demand - an unacceptable congestion level may be one where mobility has been degraded to the point where the user no longer feels comfortable, safe, and satisfied with the transportation service provided
- Average speed during peak periods in urban areas – Assesses of the quality of travel in urban areas
- Total annual (or average daily) hours of delay – Provides an indication of how well the system is being operated (particularly in urban areas)
- Amount of rural highways "improved" – Provides a means to compare how different investment strategies will lead to improved transportation system access
System Preservation and Maintenance
- Percentage of State System lane miles with "fair" or better pavement conditions – describes anticipated pavement conditions for the overall systems based on widely accepted engineering standards
- Number of structurally deficient bridges – Identifies how many bridges on the State Highway System cannot be maintained above a specified federal condition standard
- Percent of required maintenance spending – Assesses the degree to which current maintenance levels will be sustained under different system expansion assumptions
- Percent of rural transit preservation needs met – Provides an output-based assessment of how future spending will meet estimated needs
Support Economic Growth
- Number of jobs created/retained
- Percentage of roadway miles at acceptable congestion levels
- Average speed during peak periods in urban areas
- Total annual (or average daily) hours of delay
- Amount of rural highways "improved"
- Resources available to support economic initiatives
Link Transportation and Land Use
- Percentage of roadway miles at acceptable congestion levels
- Average speed during peak periods in urban areas
- Total annual (or average daily) hours of delay
- Level of improved access management
Consider Natural, Cultural, and Environmental Resources
- Change in vehicle-related emissions
- Level of environmental certification
Enhance Safety and Security
- Number of fatalities, by mode
- Number of crashes, by mode
Strengthen Partnerships
(Quantitative performance measures are not applicable to this goal area. Measures associated with project/program implementation will be established to determine how well ADOT is achieving the partnership objectives.)
Promote Fiscal Stewardship
- Relative benefits of investment choices
(Implementation measures will be established to determine how well ADOT is achieving the partnership objectives.)

- **System Preservation and Maintenance:** This additional goal highlights an important component of ADOT's mission.
- **Strengthen Partnerships:** Since *bqAZ* is a multi-agency vision, ADOT does not have lead responsibility for the implementation of all of the Guiding Principles. However, ADOT can support bqAZ implementation where it is not the lead agency through effective coordination with the State's transportation planning partners and other State and federal agencies.
- **Promote Fiscal Stewardship:** Neither the 2050 *bqAZ* vision nor the Plan can be implemented without a strong financial foundation. The Fiscal Stewardship goal for the Plan reflects the importance of responsible management of existing resources and the need to identify new funding and financing strategies to support Arizona's transportation system in the long term.

3.2.2 ADOT Roles and Interest Areas

Table 3-2 provides a comparison of the final Plan goals and objectives with those developed in *bqAZ*. Since implementation of *bqAZ* is the responsibility of many public and private partners, work completed for the Plan articulates the role ADOT expects to have for both highway and non-highway modes over the 25-year Plan horizon (also shown in **Table 3-2**). ADOT's role is defined in terms of both decision-making and funding responsibility. The roles reflected in the Plan are not necessarily the role that ADOT has in 2011; rather, they are roles ADOT will undertake by 2035 to implement the Plan.

Four distinct roles were identified:

- **Owner-Operator:** ADOT is responsible for maintaining, operating, and enhancing infrastructure to achieve the goal and related objectives.
- **Partner:** ADOT will partner with others and will share a role in funding and decision-making to achieve the goal and related objectives.
- **Participant:** ADOT will support public and private transportation delivery entities by providing policy support, guidelines, and/or complementary and opportunistic funding to advance the goals and objectives of the Plan.
- **None:** ADOT does not participate in funding or decision-making and will not engage in this over the life of the Plan.

Table 3-2: *bqAZ* Goals, Plan Goals, and ADOT's Role

***bqAZ* Guiding Principle**	**Plan Goal**	**ADOT's Role**
Improve Mobility and Accessibility	**Improve Mobility and Accessibility**	
Develop a multimodal system, moving people and freight that offers transportation choices and connects all of Arizona, while linking the State nationally and globally. Reduce traffic delay to enhance economic activity and provide more time for our families and enjoying other pursuits.	Implement critical and cost-effective investments in infrastructure to expand access to transportation and optimize mobility and reliability in the transportation of passengers and freight.	Highways: Owner/Operator Urban Transit: Participant Rural Transit: Partner Passenger Rail: Participant Freight Rail: Participant Air: Participant Bicycle/Pedestrian: Partner
System Preservation and Maintenance	**System Preservation and Maintenance**	
	Maintain, preserve, and extend the service life of existing and future State Transportation System infrastructure.	Highways: Owner/Operator Urban Transit: None Rural Transit: Partner Passenger Rail: None Freight Rail: None Air: Participant Bicycle/Pedestrian: None
Support Economic Growth	**Support Economic Growth**	
Build a seamless transportation system that moves people and goods to ensure that Arizona's economy is competitive and thriving. Work toward an integrated system of roads, transit, passenger rail, non-motorized modes, aviation, and freight options to ensure Arizona's economic vitality.	Develop and operate a State Transportation System that provides predictable freight and people movement throughout the State to create/retain jobs and support a competitive and thriving economy for Arizona.	Highways: Owner/Operator Urban Transit: Participant Rural Transit: Participant Passenger Rail: Participant Freight Rail: Participant Air: Participant Bicycle/Pedestrian: Participant
Promote a Development Pattern that Links Transportation and Land Use	**Link Transportation and Land Use**	
Develop a multimodal transportation system that recognizes and strengthens the relationship between land use and transportation and connects activity and employment centers statewide. Population growth, community development, economic diversification, and transportation are directly related, and a comprehensive transportation system can be achieved by working with communities to provide suitable mode choices.	Protect the capacity of the State Transportation System by developing policies and partnerships that strengthen the coordination of transportation and land use planning and implementation.	Highways: Owner/Operator All Transit: Participant Passenger Rail: Participant Freight Rail: Participant Air: Participant Bicycle/Pedestrian: Participant

bqAZ Guiding Principle	Plan Goal	ADOT's Role
Consider Arizona's Environment and Natural Resources	**Consider Natural, Cultural, and Environmental Resources**	
Being responsible to Arizona's citizens, provide access to transportation options that are sensitive to the environment and help reduce congestion. Ensure that the environment is an integral component of transportation planning and development.	Be good stewards of Arizona's natural, cultural, and environmental resources while improving and maintaining the transportation system.	Highways: Owner/Operator All Transit: Partner Passenger Rail: Participant Freight Rail: Participant Air: Participant Bicycle/Pedestrian: Partner
Ensure Safety and Security	**Enhance Safety and Security**	
Design, build, operate, and maintain a transportation system that promotes safety and security, reducing the risk of injury and property damage on or near transportation facilities.	Continue to improve transportation system safety and ensure the security of the transportation system.	Highways: Owner/Operator Urban Transit: Participant Rural Transit: Partner Passenger Rail: Participant Freight Rail: Participant Air: Participant Bicycle/Pedestrian: Partner
Partnerships	**Strengthen Partnerships**	
	Develop and nurture partnerships that support coordination and integration of ADOT's planning and investment in State transportation infrastructure with public and private organizations and agencies responsible for land use, conservation and environmental planning, and freight infrastructure.	ADOT will work with the appropriate agencies or private parties to advance the Partnership objectives.
Fiscal Stewardship	**Promote Fiscal Stewardship**	
	Provide a sound financial base for Arizona's transportation system through responsible management of public assets and resources and identification and implementation of funding strategies to ensure long-term balanced investment in the State Transportation System.	ADOT will work with the appropriate agencies or private parties to advance the Fiscal Stewardship objectives.

3.3 Future Implications and Next Steps

The performance measures developed as part of this Plan provide a strategic level assessment of how different investment choices will likely affect system performance. However, not all of the measures will be directly applicable to capital programming and project-level decisions; additional measures will need to be developed as part of Plan implementation to help ensure shorter-term, more tactical level decisions align with Plan goals and objectives. For example, measuring total vehicle-related emissions will not help ADOT assess how project selection decisions and different design options will influence performance for environmental considerations related to water runoff, habitat protection, and noise mitigation. Adequately considering these issues during the programming and project development processes will require ADOT to establish specific measures that address them. Similarly, there are several areas where qualitative measures will be required to assess ADOT performance. The Department will explore ways to track performance in these areas by developing mechanisms such as annual partner surveys.

4. MULTIMODAL NEEDS

Arizona's State Highway System is in very good condition now, but over time conditions will worsen without sufficient investment. In addition portions of the system are now experiencing unacceptable levels of congestion, which impacts transportation efficiency, safety, health, and the State's ability to attract and retain jobs. Including new facilities, ADOT's 25-year multimodal transportation needs total nearly $89 billion, including $73 billion for capital improvements and $16 billion for operations costs.

Implementing the bqAZ 2050 vision requires much more revenue. The analysis shows that state and local needs to implement the first 25 years of bqAZ total $250 billion.

This section details Arizona's 25-year State Transportation System needs and provides a basis for understanding the long-range funding gap between needs, improvements, and available revenues.

4.1 Existing Conditions

4.1.1 State Highway System

There are 60,465 centerline miles and 129,780 lane miles of highways across the State, of which 6,953 centerline miles and 19,912 lane miles are operated and maintained by the ADOT and comprise the State Highway System[4]. **Table 4-1** shows that these highways are generally in "good" condition for travelers, with 99 percent of rural interstates and 97 percent of urban interstates and expressways defined as being in "acceptable" or better condition.[5] Arizona has 7,348 bridges and other structures and ADOT maintains 2,040 bridges on the State system.

Arizona's population is concentrated in the State's largest metropolitan areas, largely in the Sun Corridor; however, the State has a vast and diverse rural culture and corresponding vast and diverse transportation needs. Forty-two percent of Arizona's land is federally owned non-Indian land, and nearly 28 percent is Indian Reservation land. The federal government maintains 22 percent of the roads in Arizona through its Federal Lands and Highways Program due to the large number of national parks and federal lands. There are 22 federally recognized American Indian Tribes and Native Nations with reservation land in Arizona. This tribal land encompasses 27,736,000 acres and includes 1,324 centerline miles of highways. Tribal governments have jurisdictional decision-making authority over non-State owned roads and improvements on their

[4] Mileages differ slightly from those reported in the TIA Report, as the TIA Report used Highway Statistics tables from the FHWA, whereas the HERS-ST analysis used a modified version of the HPMS data that was not submitted to the FHWA. The newer version of the HPMS dataset captured recent transfers of mileage responsibility and categorization, including the addition of E-ramps and crossings of state highway facilities, which are under ADOT responsibility.

[5] Roads are designated as "rural" in areas with populations of less than 5,000 for federal reporting purposes.

reservation land, as well as any proposed projects to accommodate and improve regional traffic circulation.

Table 4-1: Condition of State-Maintained Roadways

Federal Functional Classification	Centerline Miles	Centerline Miles in Acceptable or Better Conditions
Rural Interstate	981	974
Rural Principal Arterial	1,132	1,082
Rural Minor Arterial	1,156	1,141
Rural Major Collector	2,361	2,297
Urban Interstate	188	182
Urban Expressway	172	167
Urban Principal Arterial	446	397
Urban Minor Arterial	350	317
Urban Collector	169	138
Total: All State-Maintained Roads	**6,953**	**6,695**

Source: ADOT's HERS-ST database dated November 13, 2009; numbers may not add due to rounding

4.1.2 Non-Highway Modes

Transit

The 2008 National Transit Database identifies 90 public transportation operators in Arizona's urban and rural areas. Arizona's transit services are primarily focused in the State's largest urbanized areas of Phoenix and Tucson, as well as in the Flagstaff and Yuma metropolitan areas. To understand existing transit use in the State, **Table 4-2** provides a comparison of transit and highway travel for the work commute.

Table 4-2: Commuter Mode Choice Profile

	Phoenix	Tucson	Yuma
Drove alone	74.8%	75.2%	74.4%
Carpooled	14.3%	12.2%	15.3%
Public transportation	2.3%	2.6%	1.8%
Taxicab	0.1%	0.0%	0.1%
Motorcycle	0.4%	0.5%	0.5%
Bicycle	0.7%	1.2%	0.3%
Walked	1.8%	2.9%	3.9%

2000 U.S. Census, Journey to Work

Although significant transit usage is limited to a few locations, including the major travel corridors leading to downtown Phoenix, the use and importance of transit is growing. Between 2002 and 2007, transit ridership increased 48 percent across the State and added another 9 percent in 2008. Transit will continue to be important Arizona's demographics and transportation needs evolve. Today, driving and carpooling are the most used travel modes for the commute trip.

Passenger and Freight Rail

Intercity passenger rail services are currently provided by Amtrak, and ADOT is looking to these services to provide an important travel alternative – as is the nation as a whole. Amtrak's Sunset Limited route traverses 1,995 miles between New Orleans, Tucson, and Los Angeles. The route crosses the southern tier of Arizona on the Sunset Route of the Union Pacific (UP) Railroad with stations in Benson, Tucson, Maricopa, and Yuma. The Southwest Chief route travels 2,256 miles between Chicago, Flagstaff, and Los Angeles. The route crosses the north-central tier of Arizona on the Transcontinental Route of the Burlington Northern Santa Fe Railway (BNSF). There are four stations in Arizona served by the Southwest Chief: Winslow, Flagstaff, Williams Junction (connection to the Grand Canyon Railroad discussed below), and Kingman. Valley Metro plans to implement commuter rail services to provide travel choice within the MAG metropolitan region.

Aviation and Air Travel

There are 12 major commercial airports in Arizona offering flights to 110 out-of-state destinations, including 16 international destinations. The largest commercial service airports in the State are Phoenix Sky Harbor International and Tucson International. Commercial service airports also support general aviation activity; additionally, there are another 71 general aviation airports in the State providing air access for privately owned planes. Collectively, Arizona's commercial airports record 23 million deplanements/enplanements annually (arriving or departing passengers). In 2008, 8.5 million out-of-state visitors traveled to Arizona by air, accounting for roughly 25 percent of all overnight visitor travel in Arizona. Underscoring aviation's importance to tourism and Arizona's economy is the fact that more than half of all travel spending by visitors to Arizona is attributable to visitors who traveled by air and that the State owns and operates Grand Canyon National Park Airport, a major tourist flight destination.

Non-motorized

Arizona's bicycle and pedestrian facilities accommodate a range of activities, from recreational outings to everyday commuting to travel back and forth from work and school. While bicycle and pedestrian improvements are implemented primarily by local governments, major construction and reconstruction highway projects in the State consider provisions for bicycle travel per design guidelines, and local agencies may fund the incorporation of bicycle lanes on the State Highway System.

ADOT has begun development of a statewide bicycle and pedestrian plan to consider strengthening existing provisions, determine needs and funding, as well as recommended policies associated with non-motorized travel in the State. "Complete Streets" concepts – supporting highways that are safe and accommodating for all users – may be explored to accommodate all users of the State Highway System, with a focus on bicycle and pedestrian safety.

4.1.3 Needs Categories

For the Plan's multimodal needs assessment, three general categories of capital investments were considered: preservation, modernization, and expansion, as defined below. The aviation mode uses slightly different terminology to express these same concepts:

- **Preservation:** Activities that protect transportation infrastructure by sustaining asset condition or extending asset service life; preservation includes regular maintenance and resurfacing of pavements, replacing aged transit vehicles, upgrading rail track, and airport runway rehabilitation.
- **Modernization:** Highway improvements that upgrade efficiency, functionality, and safety without adding capacity; examples of modernization activities include widening of narrow lanes, access control, bridge replacement, hazard elimination, lane reconstruction, aviation upgrades, and bus system upgrades.
- **Expansion:** Improvements that add transportation capacity through the addition of new facilities and or services; expansion activities include adding new highway lanes, expanding bus service, construction of new highway facilities, and adding rail passenger service or facilities.

4.2 Capital Highway and Bridge Needs

4.2.1 Analysis Tools

HERS-ST

The Highway Economic Requirements System - State Version (HERS-ST) model, developed by FHWA, was used to determine 25-year State Highway System needs. HERS-ST is a performance-based highway investment model that considers engineering principles, system deficiencies, and economic criteria to determine required statewide improvements. A roadway condition database known as the Highway Performance Monitoring System (HPMS) provides the input information for this analysis. ADOT updates Arizona's component of the HPMS annually and provides it to FHWA.

NBIAS

Bridge needs were analyzed with the National Bridge Investment Analysis System (NBIAS) model. NBIAS is an analysis tool developed by the FHWA that estimates bridge maintenance, improvement, and replacement needs. Much like HERS-ST, the NBIAS model forecasts bridge performance and identifies improvements based on economic indicators. The 2009 National Bridge Inventory (NBI) database was used as an input – along with various other policy and cost variables specific to Arizona and as identified by ADOT – to identify structurally deficient and/or functionally obsolete bridges.

New Facilities and Other Capital State Highway System Needs

The Full State Needs assessment includes expansion needs that will be met as new roadways are built on new rights of way. These needs cannot be considered in HERS-ST, which only assesses conditions and needs on existing roadways. To identify a group of facilities that would advance Plan goals and objectives and could be constructed within the 25-year timeframe of the Plan, the *bqAZ* study, regional long-range transportation plans from the State's MPOs, and other planning sources were reviewed.

Aside from new facilities, the HERS-ST analysis is not all-inclusive in terms of estimating roadway needs. The development of non-HERS needs, for example routine maintenance, is documented in Section 4.4.

4.2.2 Needs on the Existing State Highway System

The 25-year capital needs on the existing State Highway System total $22.6 billion (in constant 2009 dollars), or roughly $900 million per year over the 25-year Plan horizon.[6] These needs are shown in **Table 4-3**.

Table 4-3: Capital Needs on Arizona's Existing State Highway System (2009 $ Millions)

Need Type	Total Urban	Total Rural	Total (Rural + Urban)
Preservation	$4,047	$2,373	$6,420
Modernization	$1,363	$2,861	$4,224
Expansion	$9,089	$2,833	$11,922
Total	**$14,499**	**$8,067**	**$22,566**

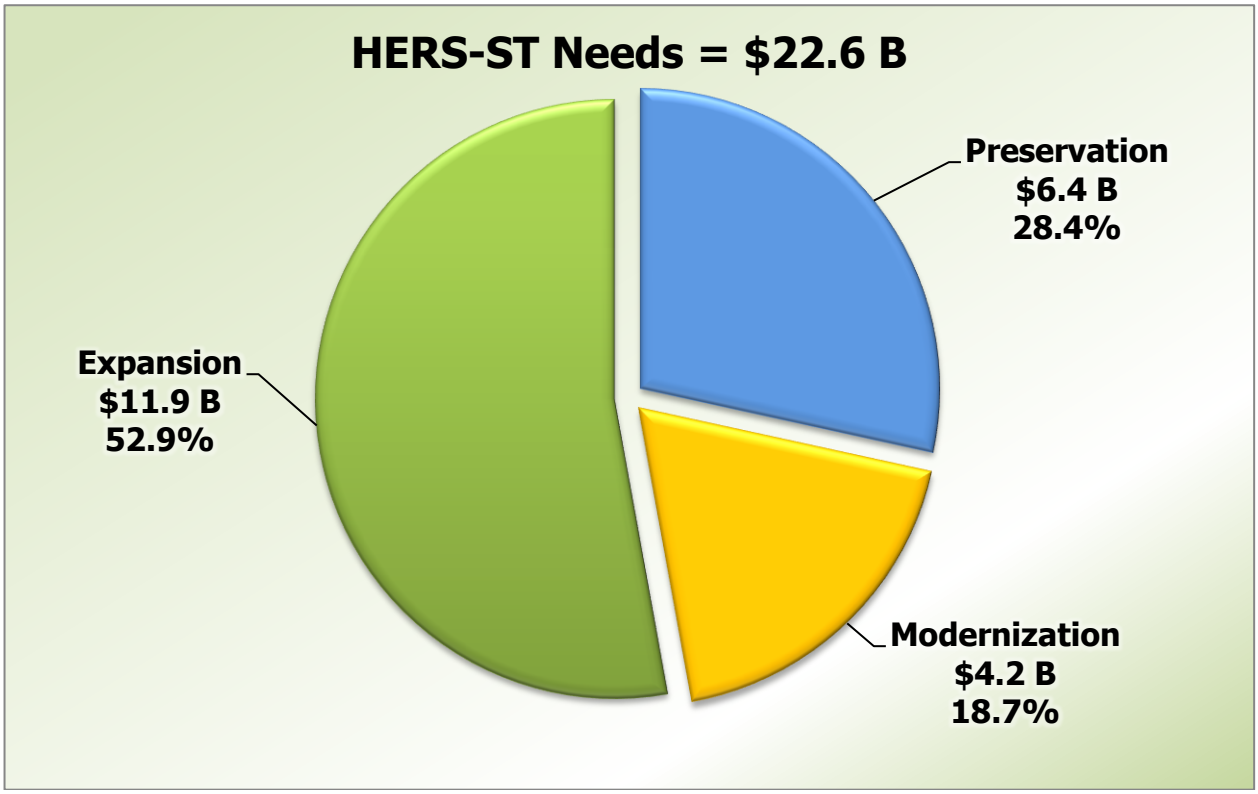
Source: Wilbur Smith Associates for ADOT's 2035 LRTP; roads are designated as "rural" in areas with populations of less than 5,000 for federal reporting purposes.

Figure 4-1 illustrates the improvement costs for each of the three investment categories. Of the estimated $22.6 billion in needs on existing facilities:

- Preservation needs total $6.4 billion, or approximately 28 percent of total needs on the existing system;
- Modernization needs total $4.2 billion, or 19 percent of the total existing State Highway System needs; and,
- Expansion needs/adding lanes on the existing system account $11.9 billion, or 53 percent of existing State Highway System needs.

[6] Estimated of Full State Needs were developed by Wilbur Smith Associates for the ADOT LRTP. The Full State Needs technical memo provides documentation of all data sources and model inputs used in the development of Full State Needs.

Figure 4-1: Highway Investment Needs (Existing System) by Category (2009 $ Billions)



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

4.2.3 Highway Needs for "New" Facilities

Needs for "new" facilities are defined as additions to the highway network on new rights-of-way that meet Plan goals and objectives. The HERS-ST model does not identify expansion needs for new facilities on new location. Therefore, to develop a 25-year forecast of needs for new facilities, the following State and metropolitan plans and capital programs were reviewed and new roadways consistent with Plan goals and objectives were identified as "needed" within 25 years:

- Arizona State Transportation Improvement Program Fiscal Years 2010-2013, Arizona Department of Transportation, 2009;
- ADOT's Statewide Transportation Investment Strategy, Arizona Department of Transportation, 2008;
- Building a Quality Arizona, Statewide Transportation Planning Framework Final Report, Arizona Department of Transportation, 2010;
- Regional Transportation Plan, Central Yavapai Metropolitan Planning Organization, 2006;

- Draft Regional Transportation Plan, Maricopa Association of Governments (MAG), 2010;
- 2040 Regional Transportation Plan, Pima Association of Governments, 2010;
- 2010-2033 Regional Transportation Plan, Yuma Metropolitan Planning Organization, 2010;
- Flagstaff Pathways 2030 Regional Transportation Plan (Draft for Public Release), Flagstaff Metropolitan Planning Organization, 2009;
- Building a Quality Arizona, Regional (Northern, Western, Eastern, and Central) Framework Studies, Arizona Department of Transportation, 2008-2010;
- Interstate 10 - Hassayampa Valley Roadway Framework Study, Arizona Department of Transportation, 2007; and
- Interstate 8 and Interstate 10 Hidden Valley Transportation Framework Study, Arizona Department of Transportation, 2009.

For the Plan, only major facilities identified in these studies, such as potential new freeways, were considered. In reviewing planned projects consistent with Plan goals and objectives, new location highway needs totaling $15.8 billion were identified (listed in Appendix A). Facilities in rural areas account for $5.6 billion of the total, with the remaining $10.2 billion accounting for facilities in urbanized areas.

Other Highway Needs

In addition to the improvement costs that could be calculated from HERS-ST and review of current regional and corridor study plans, other methodologies were developed to estimate capital costs related to the following activities

- Intelligent Transportation Systems (ITS) and traffic management systems;
- Interchange improvements and minor rehabilitation; and,
- Safety.

The projected capital costs of these activities, amounting to $3.6 billion, are shown in **Table 4-4**.

Table 4-4: Projected Capital Costs for ITS, Interchange Improvements, and Safety Needs (2009 $ Millions)

Activity	Cost
Traffic Management, ITS, Rest Area Upgrades, Interchange Rehabilitation, etc.	$1,675
Safety	$1,875
Total for Other Highway Capital Needs	**$3,550**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

4.2.4 Bridge Needs – State Highway System

Arizona's bridge needs on the State Highway System total $1.4 billion over the 25-year Plan horizon. As shown in **Table 4-5**, improvements for 893 bridges were identified, including 604 bridge replacements and 195 bridge widenings, which cost $1.2 billion and $44.0 million respectively.

Table 4-5: Improvement Costs and Number of Bridges Improved (2009 $ Millions)

Improvement Category	Number of Bridges	Cost
Replacement	604	$1,227.3
Raising	0	$0
Widening	195	$44.0
Strengthening	94	$59.3
Maintenance (MR&R)	N/A*	$103.8
Total	**893**	**$1,434.4**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP;
**NBIAS does not provide the number of bridges needing maintenance, repair, and rehabilitation (MR&R), only dollar amounts.*

4.2.5 Highway and Bridge Needs Summary

The 25-year State Highway System needs described in the previous sections are summarized in **Table 4-6**. Arizona's State Highway System needs – including needs on existing roads, costs of new facilities, bridge needs, and other safety and ITS capital needs – total $43.3 billion over the 25-year Plan horizon.

Table 4-6: Cost Estimate of Total Highway and Bridge Needs by Functional Area (2009 $ Millions)

Area/Type	Preservation	Modernization	Expansion	Total
Existing State Highway System	$6,420	$4,224	$11,922	$22,566
New State Highway System	$0	$0	$15,789	$15,789
Other Capital Needs	$0	$3,550	$0	$3,550
Bridge Needs	$104	$1,330	$0	$1,434
Total Highway/Bridge	**$6,524**	**$9,104**	**$27,711**	**$43,339**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

4.3 Capital Needs – Non-Highway

ADOT's current primary area of responsibility is to own, manage, and operate the State Highway System. To support the *bqAZ* multimodal transportation vision, this Plan describes new roles for ADOT in non-highway modes. Depending on the specific mode over the 25-year timeframe of the Plan ADOT's role will change into either a participant or a partner, with the difference in these being the amount of decision-making authority and funding participation the Department will have. As such, non-highway needs on the State System are described in this section; over time, and if new revenues become available, ADOT intends to strengthen its responsibilities and investments in non-highway modes.

4.3.1 Public Transportation

The public transportation (transit) needs assessment includes the following:

- **Urban preservation** needs (or "state-of-good-repair" needs): These needs include bus and light rail vehicle replacement and rehabilitation, as well as the maintenance and rehabilitation of supporting infrastructure; these needs were estimated by considering Arizona's share of transit assets in relationship to the 2010 Federal Transit Administration's (FTA) *National State-of-Good-Repair Study* and the needs-based 2008 *AASHTO Bottom Line Report.* Urban preservation needs for transit may involve both capital and operational expenditures, which are funded through separate revenue streams.
- **Urban expansion** aggregated from all metropolitan-area LRTPs in the State, along with the 2008 Arizona Statewide Transportation Investment Strategy[7].
- **Rural preservation and expansion** needs as detailed in ADOT's 2008 *Rural Transit Needs Study.*

Transit - Urban Preservation Needs

The 2010 Federal Transit Administration's *National State-of-Good-Repair Study* (SGR) serves as the foundation for understanding the nation's – and Arizona's – transit needs. The study provides ratings for all transit assets, as well as the funding levels required to attain a "good" or better condition rating by increasing transit investments over a 20-year period. The FTA SGR study found that a 20-year investment of nearly $10 billion annually in preservation and modernization expenditures would bring all transit assets in the U.S. to good or better condition or to a state-of-good-repair. This information was used to develop a prorated estimate of Arizona's existing system preservation needs over the 25-year Plan horizon, along with factors and other key data from the *2008 AASHTO Bottom Line Report* and the *FTA National Transit Database*.

[7] Derived from "Statewide Transportation Investment Strategy," Arizona Department of Transportation, Transmittal Letter from Victor Mendez to State Transportation Board, State of Arizona, May 16, 2008.

The 25-year state-of-good-repair transit needs were estimated at $5.3 billion for Arizona, of which $4.3 billion is for urban bus system preservation needs. These preservation needs are shown in **Table 4-7**.

Table 4-7: Preservation Needs for Urban Transit Systems (2009 $ Millions)

	Bus	Light Rail	Total
Estimate of 25-Year State of Good Repair (SGR) Needs for Arizona	$4,254	$1,066	$5,321

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Transit - Urban Expansion Needs

To develop the urban expansion needs for the Plan, the RTPs from all MPO areas in the State were analyzed along with the 2008 Arizona Statewide Transportation Investment Strategy. Expansion needs were aggregated to include the following:

- High capacity transit corridor service to link intra-urban activity centers such as Bus Rapid Transit (Express Bus);
- Expanded light rail service; and,
- Additional regular bus service to fill gaps and to link to other services.

From the review of these sources, total urban transit expansion needs are estimated at $10.1 billion over the 25-year planning period. As shown in **Table 4-8**, urban expansion needs estimates for the Maricopa Association of Governments and the Pima Association of Governments represent more than $9.7 billion. Needs for other urban areas of the State were derived largely from the Connecting Communities and Enhancing Public Transportation elements of the Investment Strategy document, as well from the Central Yavapai, Yuma, and Flagstaff MPO plans.

Table 4-8: Urban Transit Expansion Needs Estimate (2009 $ Millions)

Agency	Cost
Maricopa Association of Governments	$5,411
Pima Association of Governments	$4,265
Other	$414
Total	**$10,090**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Transit – Rural Preservation and Expansion Needs

ADOT's 2008 *Rural Transit Needs Study* identifies current and future unmet transportation needs for the low-income, age 60 and over, and disabled populations in rural areas. The study concluded that the existing van and small bus fleet in Arizona would need to increase from nearly 400 vehicles in 2007 to 1,750 by 2016. The study cites a gradual increase of new vehicle

purchases for system expansion as well as purchases for normal replacement when vehicles reach the end of their useful lives, and the report recommends a total vehicle purchase estimate of 3,250 over the 10-year period. The scenario reaches a cost of $133 million by year 10. The study does not provide 10-year costs, but these costs are estimated to be $183 million in 2006 dollars, or approximately $194 million in 2009 dollars. The 25-year rural transit preservation and expansion needs estimates are shown in **Table 4-9.** Total needs are estimated at $623 million, of which more than 83 percent is allocated to normal replacement of the expanded system of vans and small buses.

Table 4-9: Rural Transit Needs Estimate (2009 $ Millions)

Investment	Cost
Expansion	$105
Preservation (SGR)	$518
Total	**$623**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

4.3.2 Freight and Passenger Rail

This assessment of freight and passenger rail needs draws from recently completed studies, including the 2009 Multimodal Freight Analysis, *bqAZ* and the framework studies, including the Statewide Rail Framework Study (2010).

The State's railroads, while not owned or operated by ADOT, are a critical part of Arizona's multimodal and intermodal transportation system and, likewise, an important part of the statewide and national economies. Goods moving on freight railways typically require truck transport on either or both ends of the trip, making highways the necessary enabler for freight rail transport. Both the Burlington Northern Santa Fe Railway Company and Union Pacific have significant intermodal operations in Arizona; because of the State's proximity to Mexico, many of the State's jobs depend on rail freight, freight movements, and foreign trade.

Passenger rail serves multiple purposes. "Amtrak-type" passenger rail provides intercity service from areas outside of Arizona; regional light rail services are being implemented in the MAG metropolitan area to provide a mode choice for residents of the region. Over the longer term, there may be support for implementation of an interregional commuter rail service, for example between Phoenix and Tucson, to provide long distance commuters an alternative to driving. Currently, Amtrak is the only provider of intercity passenger rail in the State and additional investments in passenger rail will probably require the coordination and cooperation of Amtrak, the private freight companies operating in the State, and ADOT and its public sector partners. ADOT will continue to work with both the public and private sectors on freight and passenger rail issues and opportunities.

Freight Rail Needs

The Plan freight rail needs analysis is based upon the Class I and Short Line carriers in Arizona, where Class I railroads are those with operating revenues of at least $378.8 million in 2009. The needs analysis focuses on the following:

- Attaining a state-of-good-repair for freight rail assets;
- Improving functionality and safety by modernizing the system; and,
- Expanding the system to serve anticipated growth.

The following sources were used to summarize long-term freight rail investment needs in the State:

- *bqAZ;*
- *Arizona State Rail Plan* Draft;
- ADOT's 2009 Railroad Inventory and Assessment;
- *Multimodal Freight Analysis Study;* and,
- Follow-up discussions with the railroads.

The multimodal transportation system in Arizona includes two Class 1 Railroads, BNSF and UP. Needs for these Class 1 Railroads and additional general needs of short line railroads are summarized as follows:

- BNSF has begun triple-tracking through New Mexico and will pursue triple-tracking through Arizona when the economy recovers. Additionally, facility access, elimination of grade crossings, and realignments of the rail bed were cited as potential needs in Flagstaff in the 2009 *Multimodal Freight Analysis Study*. The improvements would improve the operational efficiency and safety of rail operations there.
- UP's primary asset in Arizona is its east-west Sunset Route. The UP Railroad is planning to improve the Sunset Route into a high-capacity route (double-tracked throughout Arizona), which will increase its use in the future. Double-tracking the line potentially would triple its practical capacity.
- For Arizona's short lines, the primary need is for track and structure upgrades to allow for heavier carloads. The *2007 Railroad Inventory and Assessment* cited four Arizona short lines with the need for track and structure upgrades to handle 286,000 pound rail cars.

For freight rail, asset preservation and capacity investments are handled by the private rail companies who own the tracks and the rail cars in the State. However, using the available sources to estimate freight rail needs results in a total of approximately $500 million through 2035. Under the Plan, ADOT might consider complementary and opportunistic funding partnerships with private freight rail carriers where it helps to advance the goals and objectives of the Plan.

Passenger Rail Needs

The passenger rail needs analysis for the Plan focuses on state-of-good-repair, modernization, and expansion as detailed in the following sources:

- The Federal Railroad Administration's 2009 *High Speed Rail Strategic Plan;*
- 2010 *Statewide Rail Framework Study;*
- MAG *Commuter Rail Strategic Plan* (2008); and,
- Amtrak *Report on Accessibility and Compliance with the Americans with Disabilities Act of 1990* (2009) and internal route performance initiative.

Passenger rail in Arizona can be further divided by exploring needs for Amtrak, interregional commuter rail, and regional commuter rail, as described below:

- Amtrak currently provides intercity passenger rail service nationwide and, in Arizona, operates the Southwest Chief on the BNSF's Transcon Line and the Sunset Limited on UP's Sunset Route. There are eight Amtrak stations in Arizona: four served by the Southwest Chief and four by the Sunset Limited. For purposes of the Plan, Amtrak needs were summarized by considering station and safety needs as cited in Amtrak reports and by ADOT.
- The need for improved interregional rail service between Phoenix and Tucson has been documented by the *2008 High Speed Passenger Rail Strategic Plan* and the *2010 Statewide Rail Framework Study*. ADOT is beginning an Alternatives Analysis/Environmental Impact Study for this project. A cost of $2.0 billion is estimated for construction and rolling stock to implement an intercity rail service between Phoenix and Tucson. The benefits of the service would be increased mobility and travel options for Sun Corridor residents.
- Regional commuter rail options are under study for both Phoenix and Tucson. Maricopa Association of Governments' 2008 *Commuter Rail Strategic Plan* investigated the feasibility of commuter rail on the BNSF Peavine Line, on UP's Phoenix Subdivision, and on UP and other branch lines in the Phoenix area. The services would move riders from suburban residential areas to downtown Phoenix and – in the case of the UP lines – to Mesa and Tempe work centers as well. The report cited implementation costs in the range of $50 to $400 million.[8]

Passenger rail continues to garner support at both the national and state levels; however, for the Plan, it is necessary to define which corridors are not only desired for passenger rail service, but also have the projected passenger demands to make passenger rail investment cost-

[8] Costs cited are based on a 2008 commuter rail report conducted for the Maricopa Association of Governments. The 2010 MAG Grand Avenue Commuter Rail Development Plan cited three potential service levels with progressively higher capital costs: Phase A ($434.3 M), Phase B ($599.6 M) and Phase C (700.9 M).

beneficial. With this requirement considered, passenger rail estimated needs are $2.6 billion through 2035, as shown in **Table 4-10**.

Table 4-10: Estimated Passenger Rail Needs (2009 $ Millions)

Passenger Rail Priority	Cost
Phoenix-Tucson Interregional Service	$2,000.0
Phoenix Regional Commuter Rail Service	$400.0
Amtrak Support	$164.2
Total	**$2,564.2**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

4.3.3 Aviation

ADOT's role in aviation includes encouraging and advancing the safe and orderly development of aviation in the State. ADOT also provides administrative and funding support for the State's public airports and operates one airport in the State's aviation system.

SASP Related Needs

The 2008 Arizona State Airports System Plan (SASP) identifies costs to improve the State's airport system and to enable individual airports in the system to fulfill their designated roles. The SASP is a 20-year plan. Through 2030, the approximate annual average cost to meet SASP recommendations for airport improvements would be at least $124 million, or $2.49 billion through 2030. Since the Plan extends to 2035 rather than 2030, the Plan needs assessment assumed that SASP the same level of SASP recommended investment for the period 2020-2030 would be needed for the last five years of the Plan (2030-2035). The result is a total Plan aviation need of $2.98 billion for 2010-2035.

Additional Airport-related Improvements

In addition to the projects identified in the SASP, airport-specific capital projects and costs are identified in each airport's master plan, many of which have been updated in the last five years. Additional system costs include the construction and maintenance of new airports, development and maintenance of the Automated Weather Observing System (AWOS) Network Center, and future State system planning needs. Additional funding needs based on airport Capital Improvement Programs (CIP), ADOT's current CIP, airport master plans, and additional system costs amount to a total of $7.41 billion through 2035.

Summary of Aviation Needs

Table 4-11 shows the total aviation needs through 2035 as the sum of the SASP related implementation costs and the costs associated with implementing the State CIP and Airport Master Plans, as well as the additional system costs detailed above. The total of all aviation needs through 2035 is estimated at $10.4 billion (in 2009 dollars), with an average annual investment need of $416 million.

Table 4-11: Total Airport Needs 2010-2035
(2009 $ Millions)

Category	Near-Term 2010-2014	Mid-Term 2015-2019	Long-Term 2020-2035	Total
SASP Implementation Needs	$947.8	$550.5	$1,484.6	$2,982.9
Additional System Needs	$89.2	$25.1	$87.6	$201.9
Other State CIP Needs	$511.9	$0.0	$0.0	$511.9
Other Master Plan Needs	$1,259.8	$1,875.0	$3,559.0	$6,693.8
Total Needs	**$2,808.7**	**$2,450.6**	**$5,131.2**	**$10,390.5**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

For the near-term alone (2010-2014), approximately $2.8 billion has been identified for projects from all sources. This indicates that in addition to the $947 million identified to meet system plan recommendations, an additional $1.9 billion could be needed to meet all airport needs through 2014.

4.4 Multimodal Operating Costs

Multimodal operating costs represent the day-to-day costs of system operations for highway and public transportation over the Plan timeline. More specifically, operating costs include the following:

- **Highways:** Non-capital system traffic management operations, other facility operations, other programs, and routine maintenance;
- **Bridges:** Facility operation and routine maintenance; and,
- **Public transportation:** Labor and driver wages, facility operation, and routine maintenance.

For the Plan, operating cost estimates for highways, bridges, and transit are based on data provided in the *bqAZ* Statewide Transportation Planning Framework. Additional State Highway System costs were estimated to cover Arizona's share of funding for other programs, such as Safe Routes to School, recreational trails, and transportation enhancements programs as well as State planning and research activities. These programs and activities were estimated at $3.9 billion for the 25-year period. **Table 4-12** shows the resulting 25-year multimodal operating costs, which total $16.0 billion.

Table 4-12: Surface Passenger Transportation Operating Costs
(2009 $ Millions)

Mode	Cost
Highways	$5,676
Bridges	$67
Passenger Rail	$2,098
Transit	$8,184
Total	**$16,025**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

4.5 Full State Needs Summary

Table 4-13 summarizes the 25-year transportation capital and operating needs by mode, expressed in base year 2009 dollars, totaling **$88.9 billion** for Arizona's Full State Needs.

25-year Full State Needs are estimated to cost $88.9 billion.

Table 4-13: 25-Year Full State Needs - Capital and Operating Costs (2009 $ Millions)

Mode	Capital Needs	Operating Costs	Total Needs
Highways	$41,905	$5,676	$47,581
Bridges	$1,434	$67	$1,501
Aviation	$10,390	N/A	$10,390
Freight Rail	$500	N/A	$500
Passenger Rail	$2,564	$2,098	$4,662
Transit	$16,034	$8,184	$24,218
Total	**$72,827**	**$16,025**	**$88,852**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

The Full State Needs analysis includes estimates of capital investment needs for the State Highway System, State Bridge System, aviation, freight rail, passenger rail, and transit, as well as maintenance and operating costs for the surface passenger transportation system through 2035 for highways, bridges, transit, and passenger rail. The Full State Needs assessment is broken down as follows:

- Needs for preservation, modernization, and expansion total $72.8 billion; and
- System operating and maintenance costs total $16.0 billion (operating and maintenance costs for new construction only). Operating and maintenance costs for the existing system are already accounted for in the revenue baseline.

4.6 Plan "Vision" Level Needs Assessment

The Plan Vision needs assessment quantifies the cost required to implement the first 25 years of the 2050 *bqAZ* vision. The Plan's Vision assessment provides a planning target that can be used for comparison with the other assessment levels (Baseline and Full State Needs). To make the comparison as meaningful as possible, the *bqAZ* information was augmented to add missing or incomplete technical "pieces" as detailed in the following sections:

- Costs for operating the various modes/facilities;
- Bicycle/pedestrian needs;
- Aviation needs;
- Freight rail needs;

- Preservation needs for the State Highway System; and,
- Local jurisdiction highway preservation needs.

Based on this review, Arizona's 25-year Vision is estimated to cost $250.1 billion (2009 dollars) as shown in **Table 4-14**. This greatly exceeds the $88.9 billion Full State Needs (**Table 4-13**) since the Vision covers higher levels of funding for expansion and includes local roads, as discussed in Section 4.6.2. A summary comparison of Full State and Vision Level needs is provided in **Table 4-15**.

Table 4-14: Vision Level Needs Estimate, FY 2011 to FY 2035 (2009 $ Billions)

Vision Element	Expansion/ Modernization Capital Needs	Maintenance/ Operating Costs	Preservation Capital Needs	Total Needs
State Highway System	$127.7	$10.7	$6.4	$144.8
Local Roads	$34.4	$1.8	$12.3	$48.5
Bus and Passenger Rail	$17.9	$22.1	$5.8	$45.8
Freight Rail		$0.5		$0.5
Aviation		$10.4		$10.4
Bicycle-Pedestrian		$0.1		$0.1
Total	**$180.0**	**$45.6**	**$24.5**	**$250.1**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Table 4-15: Summary Comparison of Full State Needs and Vision Level Needs (2009 $ Billions)

Mode	Full State Needs	Vision Level Needs
State Highway System, incl. Bridges, Bicycle-Pedestrian	$49.1	$144.9
Local Roads	N/A	$48.5
Aviation	$10.4	$10.4
Freight Rail	$0.5	$0.5
Bus and Passenger Rail	$28.9	$45.8
Total	**$88.9**	**$250.1**

4.6.1 bqAZ

The *bqAZ* effort was an intense multi-year planning effort led by ADOT that identified a long-term planning vision for Arizona. The development of the 2050 *bqAZ* planning vision took into consideration quality of life, aggressive population growth assumptions, and the desire of Arizonans to have additional mobility options.

The Vision Level, implementing the first 25 years of the 2050 bqAZ vision, will cost $250 billion.

Arizona's future multimodal transportation needs to the year 2050 were identified in *bqAZ* and an action plan for moving forward was established. The *bqAZ* Statewide Transportation Planning Framework provides a cost estimate and a list of representative projects to 2030 for the State Highway System ("high capacity roadways"), local highways ("principal arterials"), public transit, and passenger rail.

4.6.2 Vision Components

bqAZ identifies transportation improvements for two time horizons: 2030 and 2050. bqAZ, along with mode-specific *bqAZ* documents, such as MAG's *Regional Transit Framework*, the *Arizona Transit Needs Study*, and the *Rail Framework Study,* were used to define and identify estimated costs for Arizona's future multimodal transportation Vision Level. The development of costs for achieving the Plan Vision, based on the *bqAZ* framework, is summarized in the following sections.

State Highway System – Vision Needs

The *bqAZ* Statewide Transportation Planning Framework provides a cost estimate of $108.5 billion for "high-capacity roadways" improvements (interstate highways, other freeways, and other State highways) through 2030.

The expansion/modernization and maintenance costs included in the *bqAZ* Statewide Transportation Planning Framework were included in the Vision Level needs estimate[9]. The maintenance/operating cost estimate for the Vision Level includes costs to maintain the future Vision Level improvements ($6.8 billion estimated from the *Statewide Planning Framework*) and costs to cover State funding for Safe Routes to School, recreational trails, enhancements, and State planning and research activities, etc. ($3.9 billion estimated for the LRTP needs analysis). The Vision Level does not include maintenance and operating costs of the existing transportation system. Maintenance of the existing State Highway System is covered in ADOT's operating budget as part of the baseline revenue forecast.

For preservation, the cost estimate for backlog and accruing needs from the LRTP needs analysis ($6.4 billion) was used in place of the estimate from the *bqAZ* Statewide Transportation Planning Framework to ensure preservation of the existing system was covered in the Vision assessment.

It is assumed that the average annual level of investment identified in *bqAZ* through 2030 will continue through 2035. Therefore, the annual average of the *bqAZ* estimate to 2030 was applied for 2031 through 2035. A conversion was also made to estimate the costs in 2009 dollars to be consistent with the LRTP.

[9] For consistency with bqAZ, expansion and modernization cost estimates are reported together.

Local Highways – Vision Needs

The *bqAZ* Statewide Transportation Planning Framework provides an expansion/modernization needs estimate of $29.1 billion for "principal arterials" for system development through 2030. These arterials are defined in *bqAZ* as "the most important roads that are not part of the State Highway System and the local roadways that were modeled for the study." That estimate was adapted for the Vision Needs estimate through 2035. This resulted in the expansion/ modernization needs of $34.4 billion.

An estimate of preservation needs ($12.3 billion) was based on the number of existing lane-miles of local paved and unpaved roadways, preservation cycle assumptions and local unit costs for preservation. Although not specified in the *bqAZ* Statewide Transportation Planning Framework, it is assumed that the cost estimate for local highways (principal arterials) included 5 percent for general maintenance, as with the State Highway System (high capacity roadways). This resulted in a maintenance cost estimate of $1.8 billion through 2035.

Bus and Passenger Rail – Vision Needs

The *bqAZ* Statewide Transportation Planning Framework provides a needs estimate to 2030 of $24.7 billion for transit and rail (expansion and modernization), including operating costs and general maintenance (2008 constant dollars). This estimate also includes a 20 percent development cost for planning and design, environmental, right-of-way acquisition, and utility relocation. The November 22, 2010 *bqAZ* memorandum "Preliminary Planning-Level Cost Estimates for Recommended 2050 Statewide Transportation Scenario" provides capital costs and annual operating and maintenance costs by service element for improvements to 2050.

Assuming a constant level of annual effort and considering only the estimate provided in the *bqAZ* Statewide Framework, it is assumed that the $24.7 billion for transit and rail (expansion and modernization as published in the *bqAZ* document in 2008 year of expenditure dollars), which includes operating costs and general maintenance, would be approximately $31 billion in 2008 *constant* dollars. If extended to cover through 2035 (approximately $1.2 billion per year). This total (converted to 2009 dollars) was used only as a guide of the magnitude of investment that is appropriate for Vision Level for bus and passenger rail. Total capital costs ($17.9 billion in constant 2009 dollars) were taken from the November 22, 2010 *bqAZ* cost memorandum and converted from 2008 to 2009 constant dollars. Implementation assumptions were then applied to the annual operating and maintenance costs in the November 22, 2010 cost memorandum and a conversion from 2008 to 2009 dollars was made to arrive at $22.1 billion total operating cost in constant 2009 dollars.

Preservation needs for urban and rural transit were estimated for the LRTP needs analysis. Urban preservation needs, estimated at $5.3 billion, include bus and light rail vehicle replacement and rehabilitation, as well as the maintenance and rehabilitation of supporting infrastructure. Rural preservation needs, which were estimated by reviewing and analyzing ADOT's 2008 *Rural Transit Needs Study,* total $518 million over the Plan timeframe.

Aviation – Vision Needs

Aviation needs were taken from the Plan's Full State Needs analysis. The total aviation need to 2035 is estimated at $10.4 billion (converted to 2009 dollars), with an average annual investment need of $416 million. This includes costs to meet the recommendations identified in the *Arizona State Airports System Plan* (SASP), airport Capital Improvement Programs (CIP), ADOT's current CIP, airport master plans, and some additional airport-specific needs.

Bicycle/Pedestrian – Vision Needs

Bicycle/pedestrian needs estimates were taken from the *Transportation in Arizona* report, which was completed as part of the Plan. In addition to numerous road widening projects, which have the potential to improve conditions for cyclists, the tentative construction program for the next five-year period includes funds for the following Roadside Facilities Improvements:

- National Recreational Trails - $1.286 million annually;
- Recreational Trails Program, State Parks match - $322,000 annually; and
- Safe Routes to School - $2.5 million annually.

To arrive at a Vision Level estimate of $102.7 million for bicycle networks and pedestrian systems needs, these annual amounts were applied over the 25-year Vision timeframe.

5. Transportation Revenues

It is projected that over the next 25 years ADOT will have $26 billion to address its $89 billion in transportation needs once "distributions," set-asides, pass-through funding, revenues targeted for local governments, and inflation are taken into account. The result is a shortfall of $63 billion. The section shows estimated revenue that could be generated from potential new or expanded sources, including sales, income, property and excise taxes, impact fees, and other non-traditional sources. The sources presented herein are a menu of candidate options, not recommendations.

This section details the development of the fiscally constrained baseline revenue forecast and provides revenue assessments and potential strategies to provide funding needed to support the Full State Needs and Vision planning levels.

5.1 Revenue Sources

5.1.1 Highway Revenues

Revenues for investment in the State Highway System are provided through a combination of federal, state, and regional funding mechanisms.

Federal Highway Funds

The distribution of FY 2009 Federal Highway Funds is shown in **Table 5-1**.

SAFETEA-LU provided funding for highways, highway safety, and public transportation of $244.1 billion through FY 2009 and, as a result of seven continuing resolutions, continued through FY 2011 at 2009 levels. ADOT was allocated (or apportioned) $734.7 million in FY 2009 through SAFETEA-LU, which includes all federal highway aid available to the State.

Should federal revenues increase or decline appreciably, the Plan's revenue forecasts will be re-evaluated and the Plan will be updated.

The LRTP assumes continuation of the federal transportation program and conservative revenue growth. Should federal revenues increase or decline appreciably, the Plan's revenue forecasts will be re-evaluated and the Plan will be updated to reflect these important changes.

Highway User Revenue Fund (HURF) – State Highways

The State of Arizona taxes motor fuels and collects fees related to the registration and operation of motor vehicles. These revenues are deposited into the Highway User Revenue Fund (HURF) for distribution to the State Highway Fund, as well as to Arizona's cities, towns, and counties as follows:

Table 5-1: FY 2009 Apportionment to Arizona by Federal Program (2009 $ Millions)

Program/Category	2009 Apportionment	% of Total Apportionment	Apportionment After Equity Bonus Distribution	% of Total Apportionment After Equity Bonus Distribution
Interstate Maintenance	$107.1	14.6%	$154.1	21.0%
National Highway System	$129.6	17.6%	$186.5	25.4%
Surface Transportation Program	$123.2	16.8%	$177.3	24.1%
Bridge Replacement and Rehabilitation	$19.5	2.7%	$28.0	3.8%
Congestion Mitigation and Air Quality	$37.5	5.1%	$53.9	7.3%
Recreational Trails	$1.6	0.2%	$1.6	0.2%
Metropolitan Planning	$5.9	0.8%	$5.9	0.8%
Safety	$24.4	3.3%	$35.2	4.8%
Rail-Highway Crossings	$2.7	0.4%	$2.7	0.4%
Border Infrastructure Program	$10.2	1.4%	$10.2	1.4%
Safe Routes to School	$3.6	0.5%	$3.6	0.5%
Equity Bonus	$269.6	36.7%	$75.8	10.3%
Total	**$734.7**	**100.0%**	**$734.7**	**100.0%**

Source: http://www.fhwa.dot.gov/legsregs/directives/notices/n4510697.htm; numbers may not add due to rounding

- 50.5 percent to the State Highway Fund, with sub-allocations to Maricopa and Pima counties;
- 27.5 percent to cities and towns;
- 3 percent to cities with more than 300,000 in population, with formulas dependent on both population and fuel tax sales; and,
- 19 percent to counties.

HURF is ADOT's largest source of state-generated revenues to finance transportation improvements throughout Arizona. HURF revenues totaled $1.2 billion in FY 2009, which was a 7.1 percent reduction from FY 2008. This was the second consecutive year of negative growth. According to the HURF FY 2009 Year-End Report, the Arizona economy has declined annually since FY 2007. The downward trend sharply accelerated in FY 2009. Both the Arizona and national economies were in a recession during FY 2009. All major economic indicators in Arizona, including employment, population, personal income, and current gross domestic product posted slower or negative growth rates for a second straight year.

Historically, HURF revenues in current dollars grew by 3.4 percent from FY 1991 to FY 2009, but when accounting for inflation, the growth is reduced to 0.8 percent. Between FY 2005 and FY 2009, total HURF revenues in current dollars grew 0.1 percent, but when accounting for inflation HURF revenues realized a negative growth of 2.3 percent.

The 19-cent per gallon State Gas Tax (which includes a 1 cent-per-gallon Underground Storage Tank fee)[10] provides the most revenue to HURF, followed by the Vehicle License Tax. **Table 5-2** shows the percentage of HURF collections by revenue category for 2009 in 2009 dollars. According to the HURF FY 2009 Year-End Report, the percentage of HURF collections by major revenue category has varied somewhat over the years due to legislation, fuel efficiency, and inflation.

Table 5-2: FY 2009 HURF Receipts (2009 $ Millions)

Program/Category	Total Receipts	Percent of Total Receipts
State Gas Tax	$456.8	37%
Use Fuel Tax	$173.9	14%
Motor Carrier Fees	$40.5	3%
Vehicle License Tax	$357.5	29%
Vehicle Registration	$167.6	13%
Other	$52.3	4%
Total	**1,248.6**	**100%**

Source: Highway User Revenue Fund Fiscal Year 2009 Year-End Report

Regional Area Road Fund (RARF) – Maricopa County Freeways and Arterials

The Maricopa County Transportation Excise Tax, commonly referred to as the "½-cent Sales Tax," generates revenue from retail sales, contracting, utilities, rental of real and personal property, restaurant and bar receipts, and other activities in Maricopa County.

Proposition 400, which became effective January 1, 2006, extended the ½-cent Sales Tax through December 31, 2025 from Proposition 300, which originally established the tax through December 31, 2005. Under Proposition 400, the sales tax extension must be used for the construction of new freeways, widening of existing freeways and highways, improvements to the arterial street system, regional bus service, and high-capacity transit services, such as light-rail service.

RARF funds can be spent only in Maricopa County.

The Maricopa County transportation excise tax monies collected under Proposition 400 may only be spent in Maricopa County and are distributed across modes as follows:

[10] The Underground Storage Tank Program provides approximately $30 million annually from the one cent-per-gallon fuel tax to prevent, detect, and clean up releases of petroleum and other hazardous substances from underground storage tanks into groundwater, surface soils, and subsurface soils.

- Freeways: 56.2 percent;
- Arterial Streets: 10.5 percent; and,
- Public Transportation Fund: 33.3 percent.

Funds for freeways and arterial streets are deposited into the Maricopa County Regional Area Road Fund (RARF) and are administered by ADOT; however, these funds are programmed by MAG. The remaining one-third of the Maricopa County ½-cent Sales Tax revenues are administered by the Regional Public Transportation Authority for transit investments in Maricopa County.

FY 2009 Maricopa County Transportation Excise Tax collections totaled $328.2 million. Historically, RARF collections grew by 6.1 percent annually from FY 1991 to FY 2009, but when accounting for inflation the growth was reduced to 3.4 percent annually (constant 2009 dollars). Between FY 2005 and FY 2009, total RARF revenues in current dollars grew by 0.9 percent annually, but total RARF revenues realized a negative annual growth rate of 1.5 percent when analyzing the collections in 2009 constant dollars.

5.1.2 Revenues for Non-Highway Modes

Federal Transit Funds

Depending on the program, federal transit funds are provided to state Departments of Transportation and/or directly to local transit providers. For example, the Urbanized Area Formula Program (49 U.S.C. Section 5307) is distributed directly to local transit providers and the Non-urbanized Area Formula Program (49 U.S.C. Section 5311) is distributed to ADOT. Some transit funds are distributed by formula, congressional earmarks, flexing highway programs, and/or competitive grants.

In FY 2009, $196.1 million in FTA apportionments were made to Arizona through SAFETEA-LU. Additionally, $20.5 million of Arizona Federal Highway funds were allocated for transit, specifically Surface Transportation Program (STP) Flex Funds and a portion of Congestion Mitigation and Air Quality (CMAQ). Together, these sources provided $216.6 million in FY 2009 to fund transit in Arizona.

RARF – Public Transportation for Maricopa County (33.3 % of RARF)

As previously noted, 33.3 percent of RARF funds are allocated to public transportation totaling $109.3 million in FY 2009. These funds are used to operate the MAG Regional Public Transportation Authority as well as for public transportation service and improvements in Maricopa County.

Federal Aviation Funds

Federal Aviation Administration monies are allocated on a project basis, rather than being appropriated on a formula basis by airport. Therefore annual expenditures are an appropriate surrogate for anticipated federal revenues for the purposes of the revenue baseline and

forecast. Federal discretionary funds are awarded based on priority ratings assigned by FAA to proposed projects. Between FY 2007 and the first six months of FY 2009, the discretionary funding for Arizona airports from the FAA Western Pacific Region was more than $94 million.

5.2 Baseline Revenue Forecast

The revenue baseline was established for forecasting future transportation funds for ADOT. Fiscal Year 2009 federal and State funds were examined by mode and by historic funding trends between FY 1991 and FY 2009 and were analyzed using current dollars and constant 2009 dollars. The baseline revenue forecast:

The Plan's Baseline Revenue Forecast is conservative, assumes no new taxes, and respects existing agreements.

- Applies conservative growth rates for both state and federal resources;
- Assumes no changes in how Arizona's generates State funds for transportation investment;
- Adds together funds available for State Transportation System improvements; and,
- Respects all existing agreements between ADOT and local agencies.

5.2.1 2009 Revenue Summary and Projected Growth

The 2009 revenue receipts for Arizona's State Transportation System are detailed in Section 5.1 and summarized in **Table 5-3**, which also provides the growth rates applied for each revenue category for developing the baseline revenue forecast. Numbers in **red** show negative growth in the period specified.

Historic revenues for each transportation revenue category were examined to determine appropriate growth rates to use for the baseline revenue projection. **Figure 5-1** shows the growth in these revenue categories between FY 1991 and FY 2009. Compound annual growth rates for each revenue source were derived from the annual revenue data shown in **Figure 5-1**. The compound annual growth rate for the last five years (FY 2005 through FY 2009) was also calculated for each revenue category indentified. The growth rates by category that were selected for the 25-year baseline revenue forecast are identified in **Table 5-3**, with more detail by revenue category provided in the sections that follow.

It is important to note that a significant difference in actual revenues and projected revenues would impact the accuracy of the revenue baseline and projections for the Plan. Since the Arizona LRTP is updated every five years, changes in funding levels would be addressed at the time of the next update.

Table 5-3: 2009 Revenues and Growth Rates for Baseline Forecast by Program Category

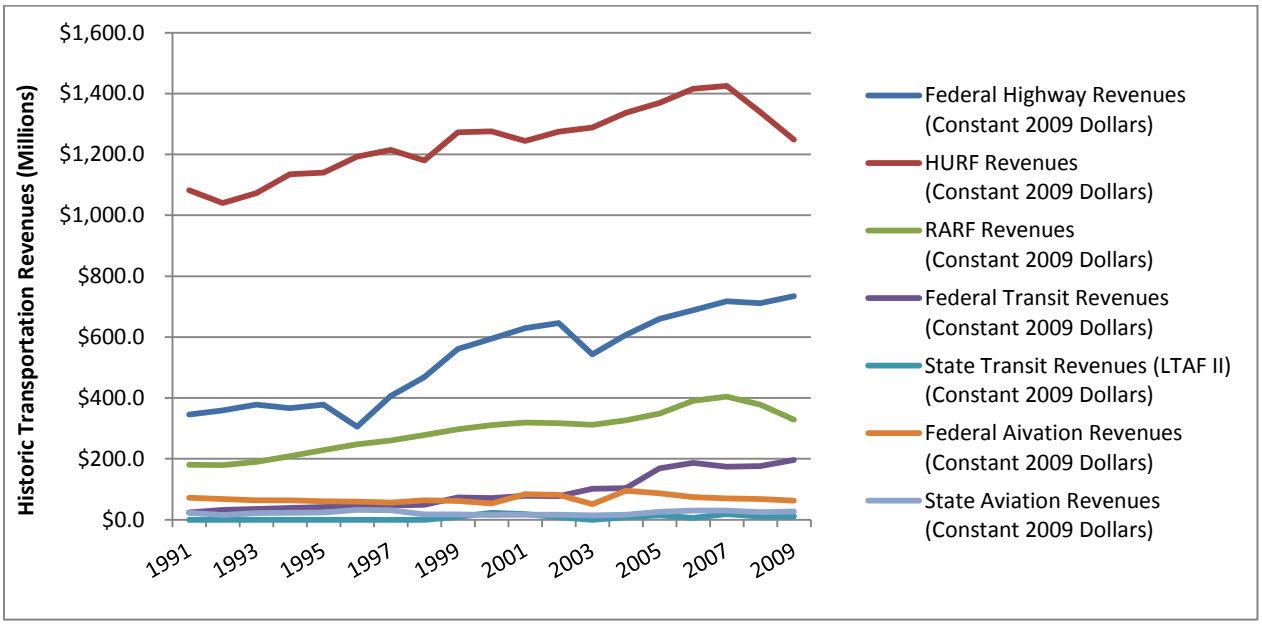
(2009 $ Millions)

Revenue Source	2009 Revenues	Compound Annual Growth Rate (based on Current Year Dollars) 1991-2009	2005-2009	Annual Growth Rate Selected for Baseline Forecast
Federal Highway Revenues (Apportionments)	$734.7	7.0%	5.19%	2.00%
State Highway Revenues (HURF)	$1,248.6	3.44%	0.06%	3.40%
RARF for Freeways and Arterials for Maricopa County	$210.6	3.80%	-9.15%	5.80%
RARF for Regional Public Transportation Authority/MAG	$8.6	2.30%	2.62%	2.50%
RARF for Public Transportation for Maricopa County (33.3% of RARF)	$109.0	28.70% (2006-2009)	28.70% (2006-2010)	5.80%
Federal Transit Revenues*	$196.1	10.75%	4.45%	3.50%
Federal Aviation Revenues	$63.0	1.84%	-5.52%	1.00%
State Aviation Revenues	$26.7	3.64%	2.68%	1.00%
Total 2009 State Transportation Revenues	**$2,597.3**			

**New Starts were excluded from Historic Federal Transit Revenues for the purpose of determining growth rates and the baseline projection.*

Source: Revenues from ADOT, HURF Year-End Reports, RARF Year End Reports, FTA, Arizona's State Airports System Plan; growth rates by Wilbur Smith Associates for ADOT's 2035 LRTP

Figure 5-1: Historic State and Federal Transportation Revenues by Mode, FY 1991-2009



Wilbur Smith Associates for ADOT's 2035 LRTP

Federal Revenues

Upon examining the five-year and 19-year (includes ISTEA, TEA-21, and SAFETEA-LU) growth rates and recognizing the economic uncertainties at the national level regarding the federal policies for domestic spending, a conservative annual growth rate of 2 percent was selected to forecast federal-aid highway revenues. Due to shifting interest to increase the role of transit in the national transportation agenda – and the aging population needing increased mobility options in the future – federal-aid transit revenues were forecasted using a 3.5 percent annual growth rate.

Although there has been a significant decline in federal aviation revenues during the past five years, over the 19-year period there was only a modest decline of -0.8 percent. Because some moderate increase in federal aviation funding can be expected over the Plan horizon due to increases in the State's general aviation, an annual growth rate of 1 percent was used to project federal aviation funding.

State Revenues

Arizona utilizes a Risk Analysis Process (RAP) to develop official forecasts for HURF and RARF revenues. The RAP process relies on the judgments of a panel of economic and financial experts – the RAP Panel. The RAP Panel represents public, private, and academic sectors to examine key factors that influence future HURF tax revenues, as listed in **Table 5-4**.

Table 5-4: HURF and RARF Economic Indicators

HURF Indicators	RARF Indicators	
Arizona real income growth per capita	Maricopa County real income growth per capita	Sky Harbor Airport passenger traffic growth
Arizona population growth	Maricopa County population growth	Prime interest rate
Arizona wage, salary, and employment	Maricopa County construction employment growth	Phoenix Consumer Price Index (CPI)
Arizona real gross domestic product	U.S. housing growth	Maricopa County non-farm employment growth
Arizona real fuel price growth		

Sources: Arizona Highway User Revenue Fund Forecasting Process and Results FY 2010-2019, Maricopa County Transportation Excise Tax Forecasting Process and Results FY 2010-FY 2019

Data and information gathered from the panelists serve as input to an economic forecasting model to produce the official ADOT forecasts for the HURF and the RARF. The official forecast results from September 2010 provided the growth rates for the HURF and RARF for the Plan:

- HURF, FY 2010-2019: 3.4 percent annually; and,
- Maricopa County Transportation Excise Tax/RARF, FY 2010-FY 2019: 5.8 percent annually.

State aviation revenues grew 1 percent annually over past 19 years. This historic trend of a 1 percent annual growth rate for State funds is expected to continue into the future. Therefore, a 1 percent growth rate was used for forecasting State aviation revenues for the baseline.

5.2.2 Baseline Revenue Forecast Summary

Arizona statute requires a fiscally constrained scenario for the LRTP as defined by the baseline revenue forecast. As such, ADOT's Recommended Investment Choice is developed based on these reasonably anticipated revenues as shown in **Table 5-5**.

Table 5-5: Revenue Baseline – Arizona State Revenues (Constant 2009 $ Millions)

Revenue Source	2010-2035 Forecast
Federal Highway Revenues (Apportionments)	$18,851.5
State Highway Revenues (HURF)	$35,788.4
RARF for Freeways and Arterials for Maricopa County	$7,788.0
RARF for Regional Public Transportation Authority/MAG	$233.9
RARF for Public Transportation for Maricopa County (33.3 percent of RARF)	$4,004.6
Federal Transit Revenues	$2,959.9
Federal Aviation Revenues	$1,419.8
State Aviation Revenues	$601.2
Total 2035 Forecasted State Transportation Revenues	**$71,647.2**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP; numbers may not add due to rounding

To enable the comparison of current versus future buying power, the revenues by category in **Table 5-5** are presented in 2009 dollars, which were developed using a 2.1 percent inflation rate. This rate was selected because it is the average change per year that resulted from converting 1991-2009 year of expenditure dollars to constant 2009 dollars using Bureau of Labor Statics (BLS) Consumer Price Indices (CPI). The CPI was used instead of other indices because it has less volatility due to the variations in energy prices. USDOT has indicated that the use of CPI is acceptable for the development of revenue forecasts for the long-range planning process.

Net available Baseline Revenues (2009 $) to ADOT are estimated at $26.2 billion over 25 years.

The total forecasted transportation revenues in constant 2009 dollars are shown in **Table 5-5**. (All calculations for the baseline revenue forecast in both current and constant 2009 dollars can be found in the LRTP Technical Memorandum: *2009 Base Revenue, Historical Trends, and Baseline Projection*.)

5.2.3 ADOT Discretionary Revenues

The majority of the baseline revenues expected through FY 2035 (shown in **Table 5-5**) will not be available for investment at the discretion of ADOT. This is because these funds are already

committed under State statutes and/or federal program categories and can be shown by examining the FY 2009 revenue distributions by category. **Table 5-6** shows these allocations and the estimated FY 2010 to FY 2035 revenue distributions by category.

In **Table 5-6**, **green** numbers reflect transportation funds dedicated for modes and/or programs outside ADOT's responsibility. Thus, these funds are subtracted from the total revenues available for ADOT investment, and in many cases, these funds simply "pass through" ADOT to State planning partners or go directly to the local government or agency (FAA funds go directly to the airports). Conversely, **blue** numbers reflect HURF and RARF funds dedicated for use on the State Highway System; however, these funds are likely to be programmed by MAG and PAG per HURF and RARF statute. The remainder, shown in black, is available for ADOT's discretionary use.

The percent shares of disbursements were based on the current allocations and the following assumptions:

- Federal-aid Highway Program "set-asides" (for example, transportation enhancement and Safe Routes to School revenues) would continue at 6.9 percent of total Federal highway revenues (prior to SAFETEA-LU Equity Bonus distribution) over the Plan horizon.
- Likewise, revenues for Congestion Mitigation and Air Quality were estimated as 4.71 percent of total Federal highway revenues (prior to SAFETEA-LU Equity Bonus distribution) through FY 2035.
- New CAFE standards will be implemented that will significantly reduce fuel use. As part of the revenue baseline, the impact to Arizona Federal highway revenues due to this change was estimated to be $1.22 billion (constant 2009 dollars). Consultation with ADOT indicated that the new CAFE standards will have negligible impact on HURF and RARF revenues through 2035.
- $2.96 billion in FTA funds are projected to be available between FY 2010 and FY 2035, and $1.42 billion in FAA funds are estimated to be available during the same time period. It is assumed that these funds are not controlled by ADOT; these funds would pass through ADOT to other local jurisdictions.
- To estimate the total HURF that would be available for future ADOT discretionary investment, HURF revenues were held constant through FY 2012, largely due to the recessionary economy. Future revenues were forecasted assuming an annual growth rate.

Table 5-6: Baseline Revenue Forecast with Disbursements (Constant 2009 Dollars)

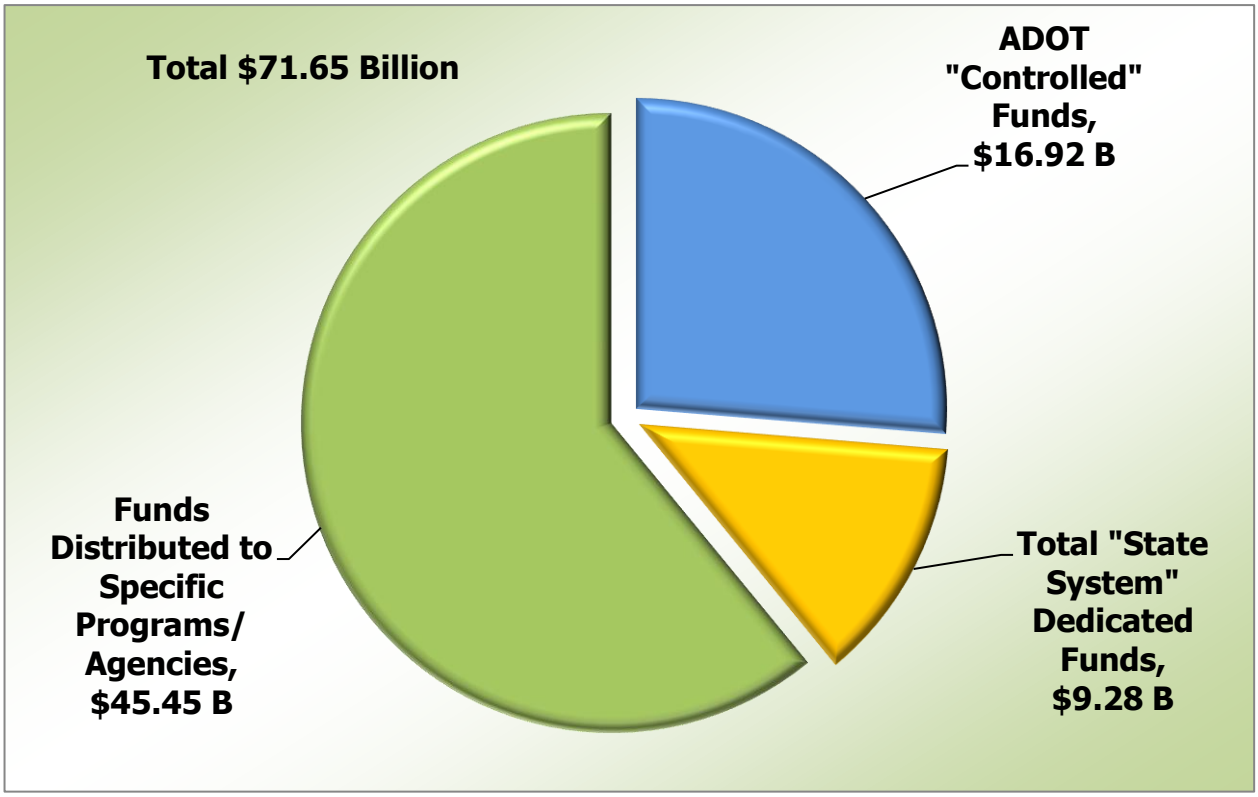
Revenue Category	2009 Funding Level ($ Millions)	2010-2035 Forecast ($ Billions)
Total 2035 Forecasted State Transportation Revenues	**$2,607.99**	**$71.65**
Total Distributions	**($1,664.07)**	**($45.45)**
Dedicated Federal Funds to MAG and PAG (STP sub allocations)	*($74.20)*	*($1.90)*
*Dedicated Federal Funds for Metropolitan CMAQ**	*($37.50)*	*($0.89)*
Federal Highway Program Set-asides	*($50.69)*	*($1.30)*
Reduction to Federal Funds due to increased CAFE Standards	*N/A*	*($1.22)*
Arizona statutory and budgetary appropriations distributions from HURF (State Highway) Revenues (includes ADOT operating budget)	*($590.00)*	*($12.27)*
HURF for Cities, Towns, and Counties	*($578.60)*	*($17.47)*
RARF for Regional Public Transit/MAG Planning	*($8.56)*	*($0.23)*
RARF for local roads and local arterials	*($31.59)*	*($1.17)*
RARF for Public Transit for Maricopa County (33 % statutory)	*($109.02)*	*($4.00)*
Federal aviation	*($63.00)*	*($1.42)*
Federal transit	*($94.23)*	*($2.96)*
State aviation (controlled by ADOT, distributed by the STB)	*($26.68)*	*($0.60)*
Subtotal	**$943.92**	**$26.20**
Total "State System" Dedicated Revenues	**($258.22)**	**($9.28)**
HURF for MAG and PAG (on-system)	*($79.20)*	*($2.66)*
RARF for Freeways and Arterials (MAG only)	*($179.02)*	*($6.62)*
Total "Discretionary" ADOT Revenues	**$685.70**	**$16.92**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP; numbers may not add due to rounding.
**Does not include SAFETEA-LU Equity Bonus Distribution.*

- ADOT operating budget appropriations were projected assuming a 3 percent annual growth after FY 2012. Distributions to the Motor Vehicle Department (MVD) and third parties (for the collection of the Vehicle License Tax) were projected assuming a 2 percent annual growth rate (which does not include FY2012 legislative changes for distributions to MVD and DPS).

Figure 5-2 shows the budget for State Highway System investments from FY 2010 to FY 2035.

Figure 5-2: Plan Forecast State Transportation Funds (2009 $ Billions)



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

- More than 60 percent of expected revenues are "outside ADOT's control;" that is, they are allocated for ADOT maintenance or operations, distributed to local governments, or are available to other agencies (as detailed in **Table 5-6**).

> *More than 60% of expected revenues are not available to ADOT for capital investment.*

- When considering all funds available for investment on the State Highway System, ADOT's total projected State transportation budget sums to $26.2 billion from 2010 through 2035 in constant 2009 dollars.
- $9.28 billion of these funds are available for investment on the State Highway System in the MAG and PAG regions, leaving $16.92 billion in discretionary revenues available for investment statewide.
- Of this $16.92 billion, $13.54 billion are Federal Highway Funds available for federally eligible projects statewide and $3.38 billion are State HURF Funds.

5.3 Bridging the "Needs versus Revenue" Gap`

5.3.1 Full State Needs and Vision Needs versus Revenue Gap

The current revenue baseline forecast for Arizona falls well short of the current estimate of Full State Needs and Vision Level Needs:

- Arizona's Full State Needs total $88.9 billion. Included in this total are Arizona's needs to 2035 identified as part of the Plan process for the State Highway System, transit bus, passenger rail, freight rail, and aviation. Local roads and streets needs are not included in Full State Needs because ADOT does not participate in any decisions for these improvements. Baseline revenues are projected to be $26.2 billion from FY 2010 to FY 2035. The gap between Arizona's Full State Needs and baseline revenues is $62.7 billion.

> *The Baseline Revenue forecast falls well short of providing adequate funding for transportation.*

- Arizona's Vision Level needs total $250.1 billion. This includes needs for the State Highway System, local highways, transit and intercity bus, passenger rail, freight rail, and aviation to the year 2035, which were identified as part of the *bqAZ* process and reconciled with the LRTP process. Baseline revenues are projected to be $26.2 billion from FY 2010 to FY 2035. The gap between Arizona's total Vision needs and baseline revenues under ADOT control is $223.9 billion. Of the $250.1 billion in total Vision Level needs, $144.8 billion are for the State Highway System (for expansion, modernization, maintenance, and preservation), which is ADOT's responsibility. The $144.8 billion of Vision Level needs are:
  - $100.2 billion above the $44.6 billion of State Highway System needs included in "Full State" needs, as identified in the LRTP; and
  - $118.6 above the $26.2 billion in projected revenues available for ADOT's use on the State Highway System over the LRTP timeframe.

The following 2035 revenue projections are also included in the baseline revenue forecast. These funds could meet some of Arizona's $88.9 billion in Full State Needs or $250.1 billion in Vision needs:

- $1.90 billion Dedicated Federal Funds to Maricopa Association of Governments (MAG) and Pima Association of Governments;
- $0.89 billion Dedicated Federal Funds for Metropolitan CMAQ;
- $1.30 billion Federal-aid Highway Program set-asides (SRTS, TE, etc.);
- $17.47 billion HURF for cities, towns, and counties;
- $0.23 billion RARF for regional public transit/MAG planning;
- $1.17 billion RARF for local roads and local arterials;
- $4.00 billion RARF for public transit for Maricopa County (33 percent statutory);

- $1.42 billion FAA revenues;
- $2.96 billion FTA revenues; and,
- $0.60 billion State aviation revenues.

5.3.2 Generating Revenues from Existing Sources

If Arizona is going to address the Full State Needs and/or the Vision Needs, which exceed the projected available revenue, a combination of additional funding options would likely be necessary. National Cooperative Highway Research Program (NCHRP) Report: *Future Financing Options to Meet Highway and Transit Needs* identifies a variety of potential strategies that states can use to fill the gap between needs and existing revenues. Using these strategies as potential opportunities for Arizona, **Table 5-7** and the subsequent section identify a menu of candidate revenue options that could close the gap between the baseline revenue forecast and the Full State and/or Vision needs.

The potential revenue-generating options presented herein are not Plan recommendations, rather potential candidates among many options that could be explored to generate revenue.

Table 5-7: Options for Revenue-Generating Mechanisms and Potential Net Revenues (2009 $ Billions)

Revenue Generating Options	Description	Est. Revenues Generated FY 2011-2035
1 percent New Vehicle Sales Tax	12 states charge sales tax on new vehicle purchases dedicated for transportation.	$1.4
$0.01 increase in Motor Fuel Tax	From 1997-2009, 15 states increased Motor Fuel Taxes -- IA, MD, AR and CT are considering Motor Fuel Tax increases for 2012.	$0.7
Index fuel tax to AZ GDP in 2013	FL, IA, KY, ME, NE, NC, PA, and WI index state Motor Fuel Taxes.	$13.7
Increase Vehicle Registration Fee from $8.00 to $16.00	All states use vehicle registration fees to generate revenue for transportation.	$1.0
10 percent increase to Vehicle License Tax	All states use vehicle license fees to generate revenue for transportation.	$2.9
1 percent increase in Statewide Privilege Tax	Historically used at the local, regional and state levels to fund transportation -- 9 states have State Sales Tax on motor fuels. Recently, MA and KS have increased state sales taxes, directing revenues to transportation.	$31.1
1 percent increase in State Income Tax	Maryland's Blue Ribbon Commission on Transportation Funding has recommended an increase in State Corporate Income Tax to be used for transportation. Currently under consideration.	$21.0
State Property Tax at $0.01 per $100	Other than property tax on vehicles in CA, KS and VA, these funds are not dedicated to transportation by states. This revenue source is commonly used by local governments.	$0.3

Sources: Wilbur Smith Associates and ADOT for ADOT's 2035 LRTP; http://www.transportation1.org/tif4report/state_local.html; Transportation & Infrastructure Finance, Council of State Governments, 2008; NCHRP Web-Only Report 102 Future Financing Options to Meet Highway and Transit Needs, 2006; Transportation Governance and Finance – A 50-State Review of State Legislature and Departments of Transportation, AASHTO and NCSL, 2011; How States Fund transportation and Territories Fund Transportation, NGA, 2009; Note: These options were quantified using estimates originally developed by ADOT.

5.3.3 Non-Traditional Revenue Sources

The "non-traditional" techniques for generating transportation revenues, presented in **Table 5-8**, also present potential opportunities for Arizona. These mechanisms would require more detailed analysis to determine the magnitude of additional revenues that could be generated over the Plan timeframe. As with the traditional techniques presented in the previous section, these are not Plan recommendations, but candidate options for consideration.

The traditional and non-traditional revenue generating options presented here could help to close the gap between forecasted revenues and needs. Additional funding would address deficiencies on the State Transportation System, providing improved safety, mobility and accessibility for Arizonians. Also, a better maintained system in terms of surface treatment and bridge deficiencies will decrease costs for all users of the transportation system. Increasing investment in the transportation system would support economic competitiveness and growth by improving the reliability of people and freight movements throughout the State. A full state needs level investment would also provide for additional opportunities to better link land use and transportation.

Generating the additional revenue necessary to implement vision needs would go beyond addressing expected deficiencies and achieving acceptable performance of the transportation system. Beyond full state needs, vision needs include operation of the various modes, facilities, bicycle/pedestrian needs, aviation needs, freight rail needs, preservation needs for the state highway system and local jurisdiction highway preservation needs. Meeting these additional needs would provide Arizonians with a more efficient multimodal transportation system, with increased safety, mobility, accessibility, and economic benefit over the RIC and full state needs.

Table 5-8: Non-traditional Options for Revenue-Generating Mechanisms

Non-traditional Revenue Generating Options	Description
Indexing	Motor fuel tax rates can be indexed to the price of fuel, consumer price index or the Construction Cost Index at the state or national level. States that index include FL, IA, KY, ME, NE, NC, PA and WV.
Mileage-based Fee	Fees could be charged based on Vehicle Miles Traveled (VMT); OR, IA, NV, and MN have studied this concept to various degrees.
Public-Private Partnerships (P3) & Toll Facilities	AZ legislation allows ADOT to use public-private partnerships (P3) and provides the State with tolling authority. About half the states currently toll roads and bridges.
Variable Tolls on the Interstate System	Tolling fees could vary based on the level of congestion. The federal interstate tolling pilot program enables three states opportunities for tolling existing interstates.
Tire Taxes	A state tax could be placed on the purchase of new and replacement tires, with different rates for different vehicle types. Currently only the federal government has a tire tax.
Cordon Pricing	Vehicles could be charged for entry into a congested area during some portion of the day. Although not currently used in the U.S., the United Kingdom, Norway, and Sweden have operated successful cordon pricing systems for years.
Demand Management	Incentives can be offered to manage state highway system demand. Sample programs mix telecommuting funding and incentives with state rideshare data bases and programs to encourage non-SOV commuters. These types of programs are currently available to states and local governments.
Innovative Finance	Project financing, such as bonds and loans, could be used to supplement traditional and non-traditional revenue generating strategies. All states are eligible for federal innovative financing programs.
Transportation Intensity Fee	A value-added tax could be charged based on the degree to which transportation adds value to commodities and goods that are transported or where firms rely on transportation for either vehicular access for freight, workers, or consumers. CA, FL, OR and NY are examples of states using this type of revenue enhancement.

6. INVESTMENT ALTERNATIVES AND OUTCOMES

Arizona's financially-constrained Recommended Investment Choice (RIC) is the Department's 25-year capital investment strategy. The RIC emphasizes preserving and modernizing the existing highway system, with limited investment in new facilities (expansion), and allocating 10% for expanded travel choice (non-highway modes). The RIC is a significant departure from historic spending patterns in its emphasis on preservation. Implementation of the RIC must also recognize and appreciate the differences between existing approved Regional Transportation Plans and the RIC investment mix.

The State Highway System is one of Arizona's most significant capital assets; as the steward for this asset ADOT must place a high priority on ensuring that the system is cared for long term. Allocating a significant portion of available discretionary funding to travel choice is also an important shift from past spending patterns. By emphasizing travel choice, ADOT is identifying with the new role required to support implementation of bqAZ, as well as responding to public sentiment for expanded travel choices.

Implementation of the Plan's Recommended Investment Choice (RIC) will be gradual and must recognize and appreciate differences between the RIC investment mix and the existing MAG and PAG Regional Transportation Plans (RTPs), which reflect voter-approved regional transportation taxes. In the short term there will be challenges implementing the Plan because of differences between the expansion-based MAG and PAG RTPs and ADOT's RIC. The current RTP for the MAG region includes significant funding for highway expansion and a lower level of funding for system preservation. As the MAG region transportation system ages, it is expected that future RTPs will include higher levels of funding for system maintenance and preservation. ADOT and the MAG and PAG Transportation Management Areas (TMAs) have pledged to continue to work together in a cooperative fashion to address these differences in the future as part of the updates of the RTPs and State LRTP.

6.1 Introduction to Alternative Investment Choices

Alternative Investment Choices (AICs) are defined as discrete options for allocating the State's 25-year transportation revenues to various investment types. The AICs are a framework for considering a range of options for future State System capital investments. For the Plan, broad categories of investments were assessed along with the likely performance and policy

implications of these options. Through several rounds of discussion and assessment the Recommended Investment Choice (RIC) was developed.

The AICs provide different ways of prioritizing needs and allocating limited resources over the 25-year Plan horizon. The consequences of the AIC on transportation system performance are defined through the application of performance measures that are directly linked to the Plan's goals and objectives. AICs considered and assessed for the Plan were developed based on the technical and policy inputs from ADOT staff, the State's planning partners, the public, and other transportation stakeholders.

The Baseline AICs assume that the transportation funding available for investment is that defined by the baseline revenue forecast. In this way, the baseline revenue forecast sets the funding "ceiling" for the AICs and assumes that there are no significant changes to the existing transportation revenue stream.

AICs were developed to show a scorecard of performance outcomes defined by allocating baseline revenues within the categories of preservation, modernization, and expansion, defined in Section 4.1.3. These categories reflect multimodal improvements that are not project specific; however, **Table 6-1** summarizes the types of improvements that might be implemented within each category. When the plan refers to "multimodal", a non-highway investment is implied, without reference to any specific bus, aviation, rail or non-motorized project.

Table 6-1: Sample Components of Alternative Investment Choices

	Highway	Non-Highway
Preservation	Pavement resurfacing; bridge deck rehabilitation	Transit vehicle replacement; airport runway rehabilitation
Modernization	Roadway reconstruction; roadway lane widening; resurfacing; adding/widening roadway shoulders; bridge replacement; ITS and operations enhancements; intersection improvements	Aviation facility upgrades; bus system upgrades; rail vehicle and equipment replacement
Expansion	Adding lanes to existing roadways; construction of new roadways on new rights of way	New transit service; new rail lines

The analysis of the AICs against goals, 25-year needs, performance measures, ADOT priorities, and stakeholder discussions resulted in the Recommended Investment Choice that is ADOT's Long-Range Transportation Plan.

The AICs allocate baseline revenues across the three investment types – preservation, modernization, and expansion – to emphasize alternative Plan objectives; however, the AICs do not address the specific projects that ADOT's budget should fund. Rather, the Plan sets a broad framework for ADOT capital programming. Specific projects in each investment type can then be considered, where the realities of economic growth and community preferences can properly establish the need for – and desirability of –

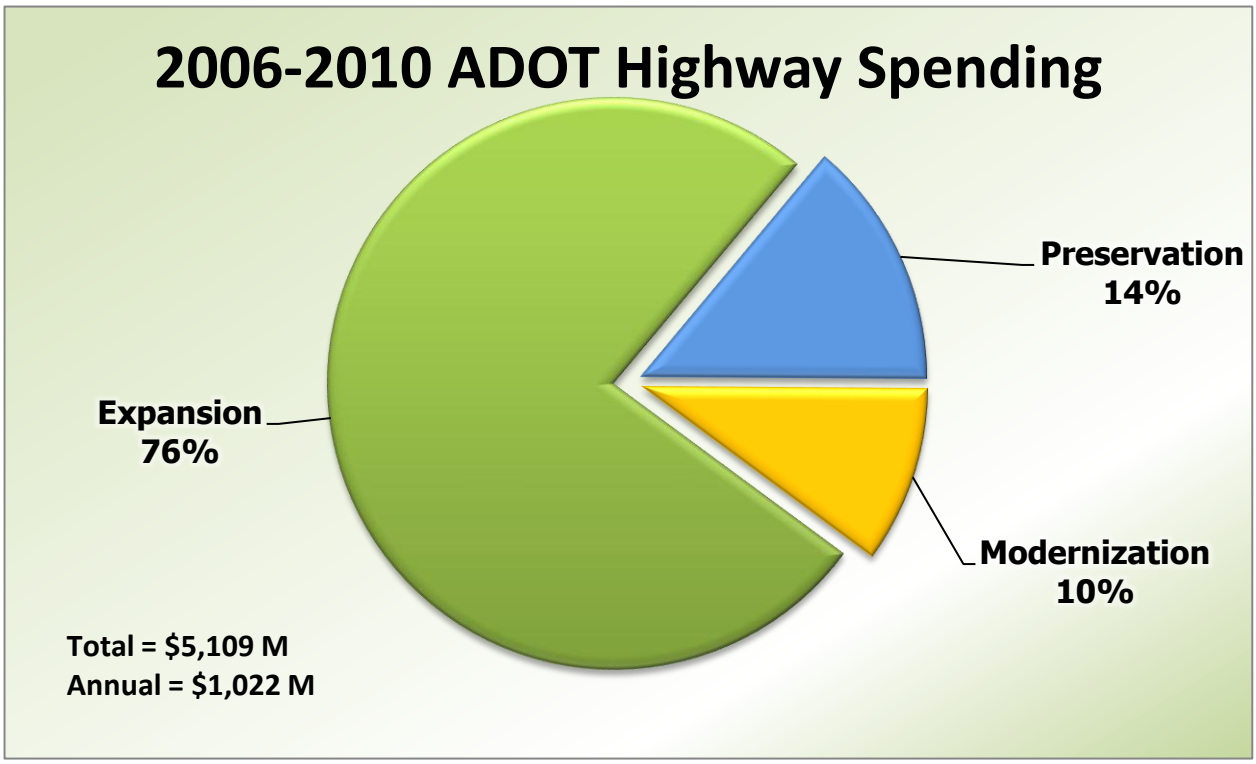
individual projects. It is important to note that the allocation of investments in the Plan AICs reflects the economic conditions in Arizona and the nation during the Plan development process. The AICs also reflect the stewardship responsibilities for the State Highway System that will age and require maintenance and reconstruction over the 25-year Plan horizon.

The analysis of the AICs against goals, 25-year needs, performance measures, ADOT priorities, and stakeholder discussions resulted in the Recommended Investment Choice that is ADOT's Long-Range Transportation Plan.

6.2 Expenditure Patterns and Investment Priorities

ADOT's historical spending across the three investment types – preservation, modernization, and expansion – can be described as ADOT's historical capital spending commitment, which is shown in **Figure 6-1** and **Table 6-2**. (Funding for aviation, transit, and freight rail modes are funded directly from federal sources without State matching funds and are not shown in **Table 6-2**.)

Figure 6-1: ADOT Highway Spending, 2006-2010



Source: Arizona Department of Transportation, 2011

Table 6-2: Five-Year ADOT Expenditures by Improvement Category (Constant 2009 $ Millions)

Investment Category	5-Year Historic Funding	Average Annual Funding	5-Year Historic Funding
Highway Preservation	$711	$142	14%
Highway Modernization	$518	$104	10%
Highway Expansion	$3,879	$776	76%
Total	**$5,108**	**$1,022**	**100%**

Source: Arizona Department of Transportation, 2011

More than three-quarters of the $5.1 billion spent on the State Highway System over the past five years has been allocated to expansion improvements. Between 2000 and 2010, Arizona grew from 5.1 to 6.4 million people, reflecting a net population increase of 25.5 percent; therefore, an expansion-oriented capital program was required.

Approximately 28 percent of all State Highway System expansion occurring between 2006 and 2010 was funded for by the ½-cent Sales Tax dedicated to the RARF. This tax was approved by Maricopa County voters in 1985 through 2005, and again in 2005 for 20 additional years, with revenues dedicated for the development of controlled-access highways and transit in the MAG region. As shown in **Figure 6-2**, during Fiscal Years 2006-2010 the RARF was dedicated almost exclusively to freeway expansion, with only 8 percent of RARF funds used for preservation and modernization activities.

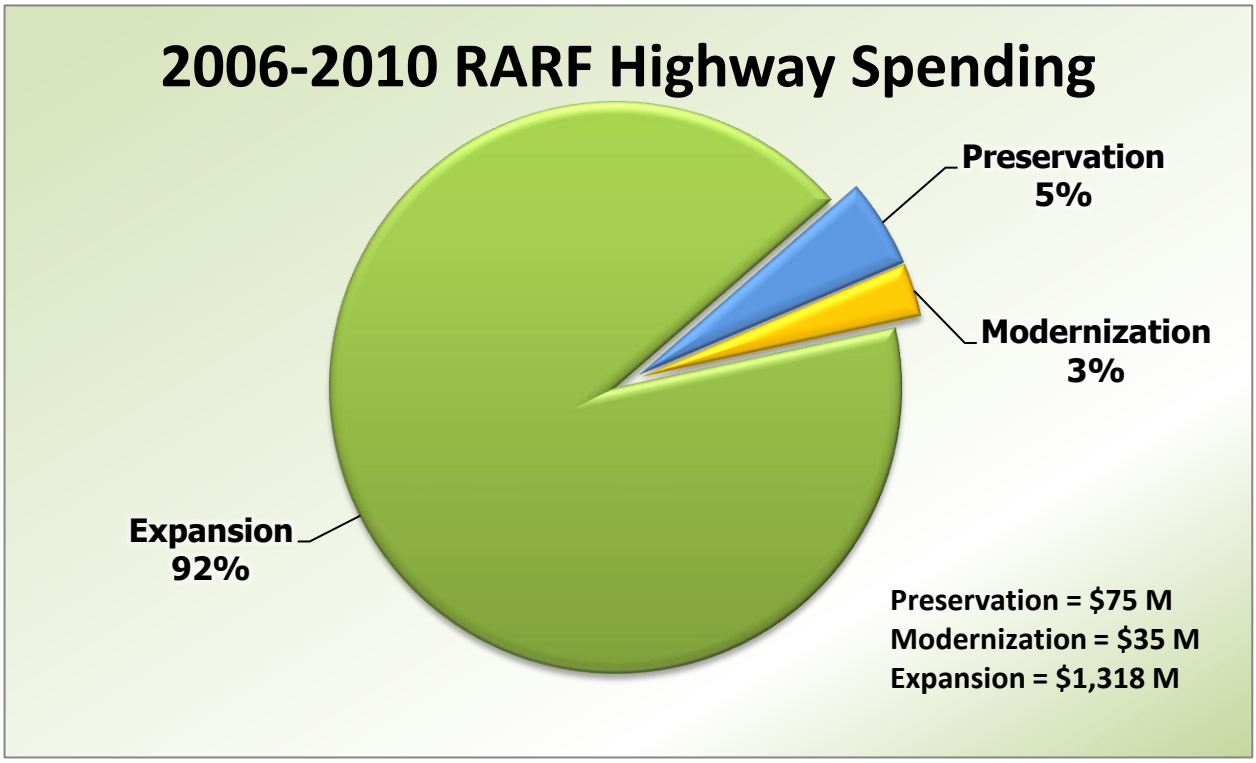
These expenditure patterns reflect the priorities of the recent past; however, these priorities are changing.

6.3 Baseline Alternative Investment Choices

At revenue baseline, two 25-year investment choices (AIC A and AIC B) were developed and assessed by ADOT staff, the PMT, TAC, and the Steering Team. These baseline AICs were designed to compare and contrast the outcomes of the allocation of funds across the Plan's three investment types (preservation, modernization, and expansion). Each AIC held to a constrained budget of $26.2 billion, which corresponds to the Plan's baseline revenue forecast.

The AICs – AIC A and AIC B – were designed to provide ADOT two starkly different investment choices and performance outcomes:

Figure 6-2: RARF Highway Spending, 2006-2010
(2009 $ Millions)



Source: Arizona Department of Transportation, 2011

- **AIC A – Highway Focus:** AIC A reflects a preservation-oriented investment approach with limited system expansion. For comparison purposes, the objective of this AIC is to protect ADOT's State Highway System investments that will have increased over the plan timeframe due to aging infrastructure. Thus, funding under AIC A is directed to highway preservation and modernization investments. Expansion funding is scaled back in comparison with past ADOT trends but is still substantial under AIC A. In this way, AIC A anticipates continued economic growth challenges and seeks to preserve existing State Highway System assets instead of responding only to economic development opportunities and growth pressures. It is also balanced in comparison with AIC B in terms of its funding allocation across rural and urban roadways and interstate versus lower functional class roadways. AIC A also dedicates minimal funding to non-highway investments such as transit, rail, aviation and other modes.
- **AIC B – Expanded Travel Choices:** AIC B shifts funding from preservation to expansion and provides some non-highway funding to non-highway investments such as transit, rail, aviation and other modes. Again, for comparison purposes, the objective of this AIC is to fund expansion

AIC B provides funding for non-highway investments.

improvements to support, encourage economic growth and respond to growth and development throughout Arizona. Shifting funding to expansion improvements reduces preservation funding, and pavement performance overall is expected to degrade. Under AIC B, highway investments are focused on the interstate system, and approximately 10 percent of all State funding is allocated to other transportation choices, such as transit and passenger rail. In fact, 45 percent of available "flex funds" are allocated for other transportation choices. Flex funds are a portion of federal STP funds that can be spent on either auto or non-auto modes.

Figures 6-3 and **6-4** show the funding distributions of AIC A and AIC B.

6.4 Recommended Investment Choice

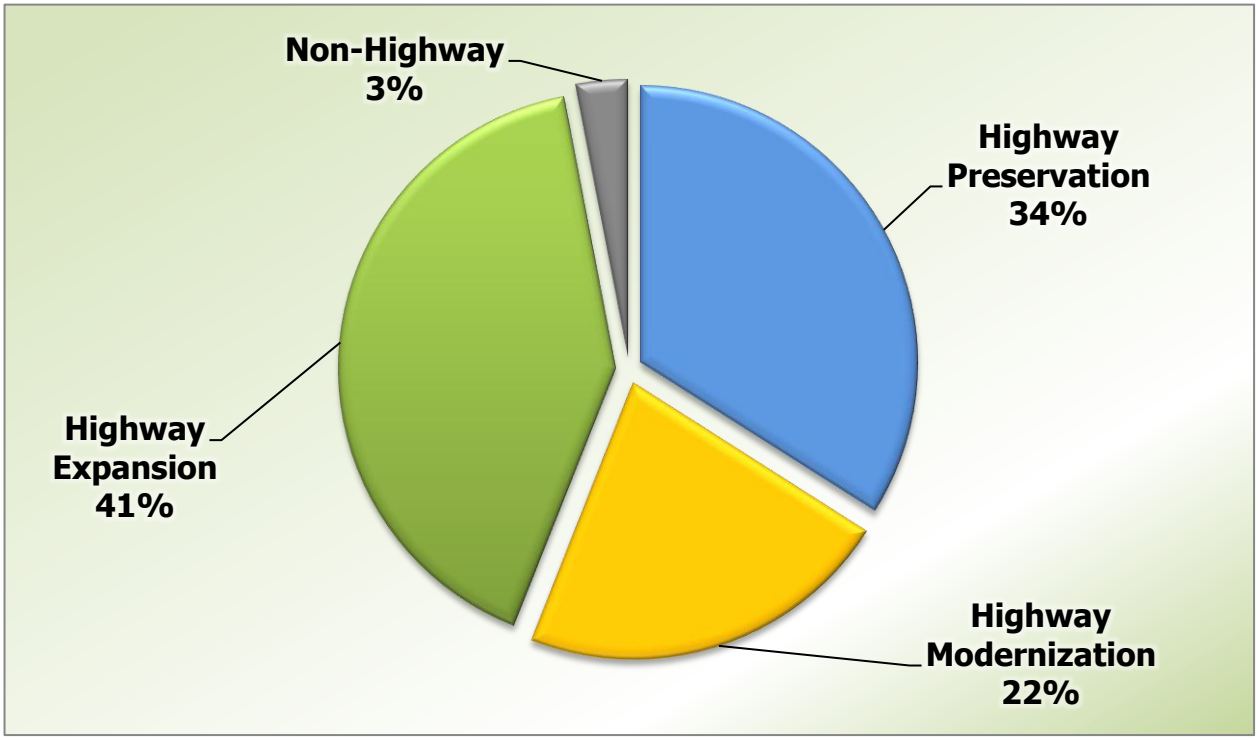
6.4.1 Funding Allocations

The Recommended Investment Choice provides the long-term implementation strategy developed in the Plan. The purpose of the RIC is to drive the allocation of resources and influence programming, yet be flexible enough that ADOT can continue to accommodate changing and emerging priorities over time, both internally and with the State's planning partners. The RIC was developed in consultation with ADOT staff, the PMT, TAC, and the Steering Team.

ADOT's top priority is to preserve the integrity of the existing highway system.

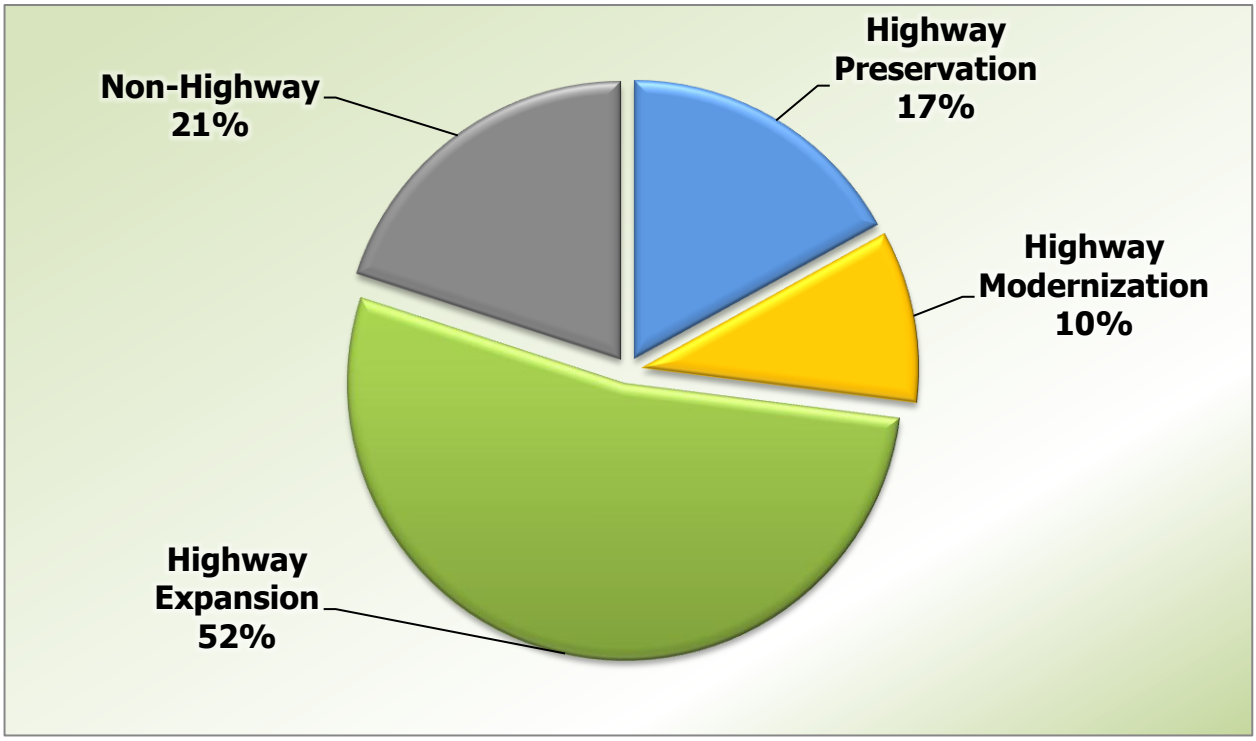
Figure 6-5 shows the distribution of funding of the RIC. This RIC represents ADOT's consensus on the most preferable programmatic investment choices at revenue baseline. Thus, the RIC combines elements from AIC A and AIC B and seeks to satisfy ADOT's goals to preserve the current system and to expand travel choices for all Arizonans. Like AIC A, the RIC emphasizes State Highway System preservation and modernization. The intent of the RIC is to meet as many bridge and pavement needs as possible, which will preserve the State Highway System. Like AIC B, funding is shifted from highway expansion to non-highway modes (i.e., rail and transit) to provide mobility options.

Figure 6-3: AIC A – Funding Distribution



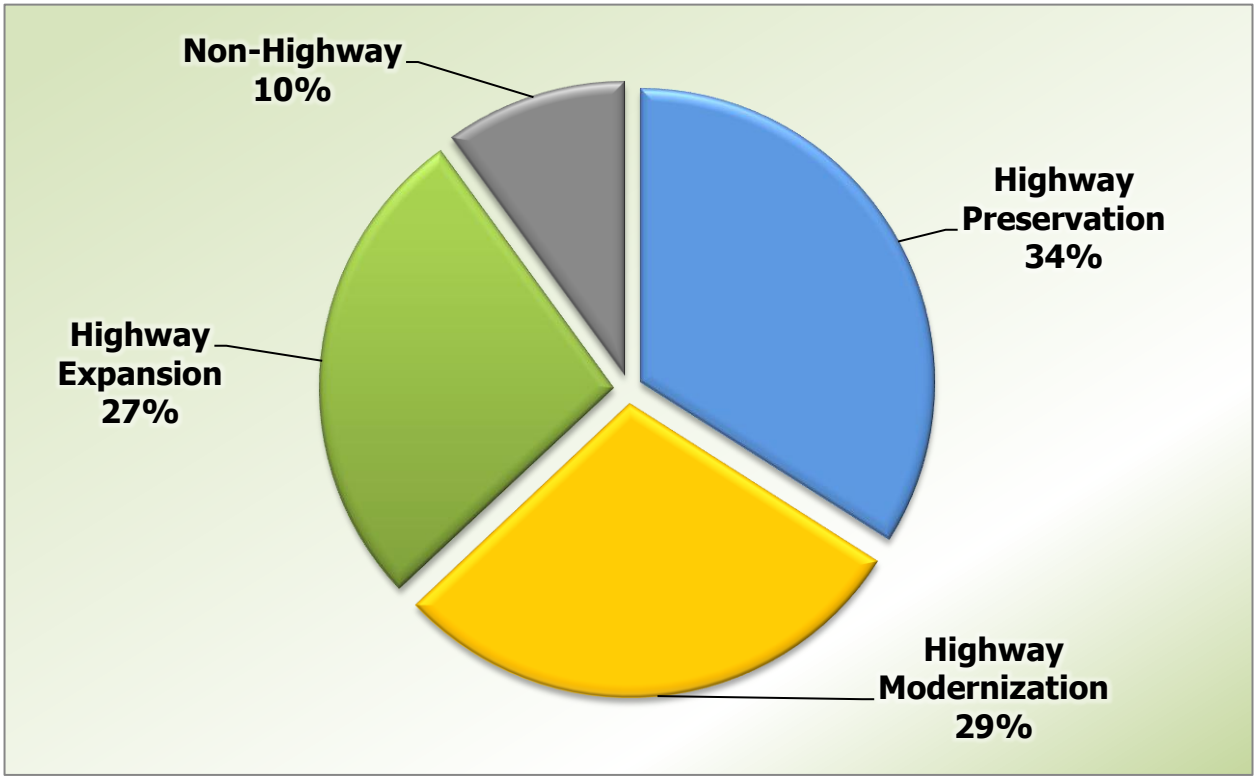
Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Figure 6-4: AIC B – Funding Distribution



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Figure 6-5: RIC – Funding Distribution



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

The RIC:

- Matches AIC A highway preservation funding (34 percent);
- Provides some funding for modal options (10 percent); and,
- Allocates similar amounts to the remaining categories of modernization (29 percent) and expansion (27 percent).

Implementation of the Plan's Recommended Investment Choice (RIC) will be gradual and must recognize and appreciate differences between the RIC investment mix and the existing MAG and PAG Regional Transportation Plans (RTPs), which reflect voter-approved regional transportation taxes. In the short term there will be challenges implementing the Plan because of differences between the expansion-based MAG and PAG RTPs and ADOT's RIC. The current RTP for the MAG region includes significant funding for highway expansion and a lower level of funding for system preservation. As the MAG region transportation system ages, it is expected that future RTPs will include higher levels of funding for system maintenance and preservation. ADOT and the MAG and PAG Transportation Management Areas (TMAs) have pledged to continue to work together in a cooperative fashion to address these differences in the future as part of the updates of the RTPs and State LRTP.

RIC implementation must recognize the differences between the RIC and adopted MAG/PAG Regional Transportation Plans.

6.4.2 Performance Summary

AIC A and AIC B provide a means of reaching an important statewide policy decision about the RIC. The RIC development process was iterative, entailing several definitions and evaluations of AIC A and AIC B. Preliminary evaluations focused on summary performance indicators of the AICs and the analysis of the advancement of Plan goals and objectives.

Table 6-3 shows an assessment of the respective "grades" by goal area for each AIC and for the RIC. These grades represent the quantitative grade each investment choice receives based on how the resource allocation meets each Plan goal area. Identifying the grades for each goal area included significant interaction with ADOT staff, PMT, TAC, and the Steering Team.

Table 6-3: AIC "Grades"

Goal Area	ADOT Existing Investment Strategy	AIC A	AIC B	RIC
Improve Mobility/Accessibility	B	D	C+	C-
Preserve and Maintain System	B+	A	D	A-
Support Economic Development	C+	D	B-	C-
Link Transportation and Land Use	C-	C-	B	C+
Consider the Environment and Natural Resources	B-	B-	B+	B+
Enhance Safety and Security	C+	C-	B-	B-
Investment in Non-Highway Modes	D	D	C+	C

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

The *ADOT Existing Investment Strategy* column reflects ADOT's most recent investments, which reflect a relatively well-funded capital program in the past five years. Grades for AIC As and B reflect the impact of reduced revenues on goal achievement. Grades across most goal areas show an overall decline, with the exception of AIC A's grade for system preservation. This is not a surprise, as the State's expected revenues allow ADOT to address less than one-third of State Full Needs. In fact, the only goal area that shows a significant difference between the AIC A and AIC B allocations is the Preserve and Maintain the System goal. This indicates that increasing preservation performance comes at the expense of the Improving Mobility and Accessibility goal, which is essentially tied to expanding the highway system. Additionally, without new revenue sources, Arizona's investment choices are extremely limited. The State Highway System is Arizona's largest and most essential capital asset, and as the steward of that system, its long-term viability is ADOT's greatest priority.

The Plan goals and objectives for transportation, land use, and the environment are more program/project related and are not useful for comparing 25-year Plan level outcomes. At the

long-range planning level, these goals are better advanced via ADOT policies and are addressed in more detail in Section 7.

Similar to AIC A and AIC B, system performance under the RIC is limited because of the financial realities of the diminishing baseline revenue forecast. At the same time, the RIC funding allocation across investment types and modes shows ADOT's commitment to the following:

- Preserving the State Highway System with few unmet highway preservation and rural transit needs;
- Increasing mobility and accessibility through some State Highway System expansion and funding support for non-highway modes and intermodal connectivity;
- Supporting economic development by investing in rail and transit initiatives; and,
- Increasing safety by modernizing the State Transportation System.

Policy changes and their relationship to project-specific investment choices will influence the outcomes of ADOT's capital program and can be applied more broadly to advance Plan goals and objectives. For example, ADOT understands that progress toward achieving broader stewardship goals in the areas of environment and land use may require increased coordination with regional and local partners.

6.5 Performance Assessment at Revenue Baseline

6.5.1 Funding Allocations

Funding distributions for AIC A, AIC B, and the RIC are summarized in **Table 6-4**. In addition to the allocations shown here, AIC A, AIC B, and the RIC each allocate $3.4 billion ($2009) for new operations and maintenance activities and some funding for special programs, such as enhancement programs.

Table 6-4: AIC and RIC Funding Distribution by Category

Improvement Category	AIC A Funding	AIC B Funding	RIC Funding
Highway Preservation	34%	17%	34%
Highway Modernization	22%	10%	29%
Highway Expansion	41%	52%	27%
Non-Highway Improvements	3%	21%	10%
Total	**100%**	**100%**	**100%**

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

6.5.2 Quantitative Performance Comparisons

For the Plan, the likely performance of the Alternative Investment Choices was evaluated using a number of qualitative and quantitative factors. This evaluation included the consideration of the Full State Needs level of investment, which was described in Section 5. The objectives of

Full State Needs investments are to achieve a state of good repair, attain greater equity in modal investments and promote growth through more aggressive capacity investments in transit, rail, aviation and other programs.

Comparing AIC A and AIC B to the Full State Needs described in Section 4 is an important step towards formulating the RIC and helps to understand the trade-offs between the choices considered. The 25-year Full State Needs total $88.9 billion; specific funding sources to pay for Full State Needs were not identified.

Formulating AIC A, AIC B, and the RIC grades for each goal area included significant interaction with ADOT staff, the PMT, TAC, and the Steering Team to gain input and buy-in. The following performance indicators were used to assess AIC A, AIC B, and the RIC:

- Pavement Performance: deficient roadway segments by Pavement Serviceability Rating (PSR);
- User Cost: costs incurred per thousand vehicle miles travelled (VMT);
- Travel Delay: hours per thousand VMT and deficient roadway segments by volume to capacity (V/C) Ratio; and,
- Bridge conditions and performance.

The outcomes of the investment choices as defined by these performance metrics are summarized in the following sections.

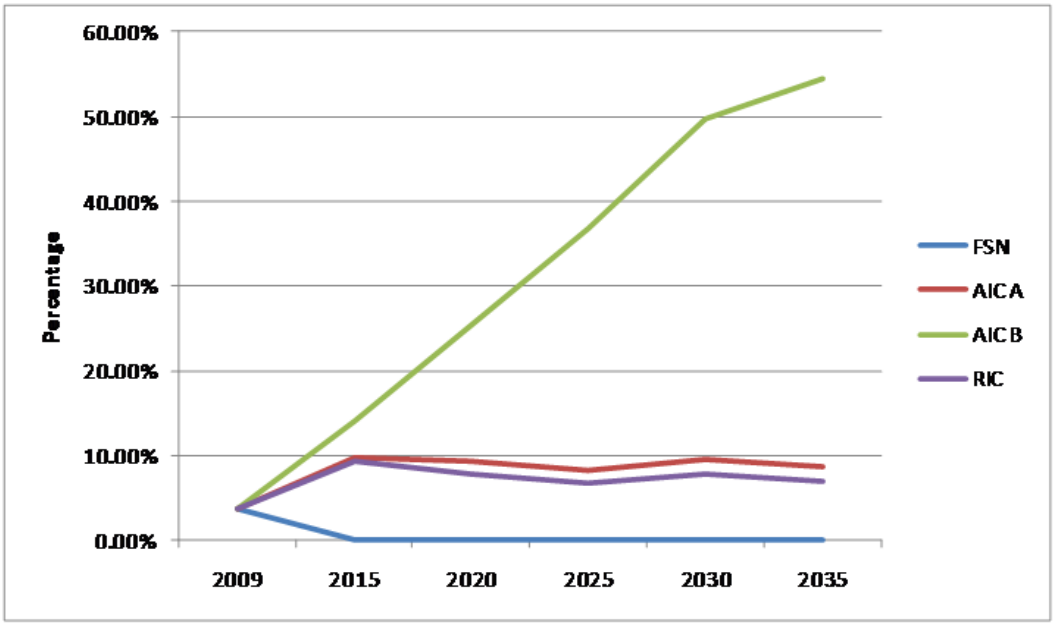
Pavement Performance

Figure 6-6 shows the 25-year pavement performance of AIC A, AIC B, RIC, and the Full State Needs (labeled as FSN). The performance is measured by the percentage of roadway mileage below good pavement thresholds as measured by the Pavement Serviceability Rating (PSR). PSR describes pavement condition and the ride quality of roadways. These thresholds were developed in consultation with ADOT engineering staff.

Comparing AIC A, AIC B, and the RIC to the Full State Needs provides the following results:

- AIC A and the RIC produce very good pavement conditions through 2035;
- AIC B shows a steady deterioration of pavement conditions, with 55 percent of mileage below good condition by 2035;
- The RIC addresses pavement surface and sub-surface condition and will save money in roadway maintenance by limiting reconstruction cycles, which will reduce the need for routine resurfacing and will reduce user costs; and
- Full State Needs investments address all pavement needs early in the analysis period, and maintain superior performance from 2015-2035.

Figure 6-6: Percentage of ADOT Roadway Miles below "Good" Pavement Threshold (PSR)



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

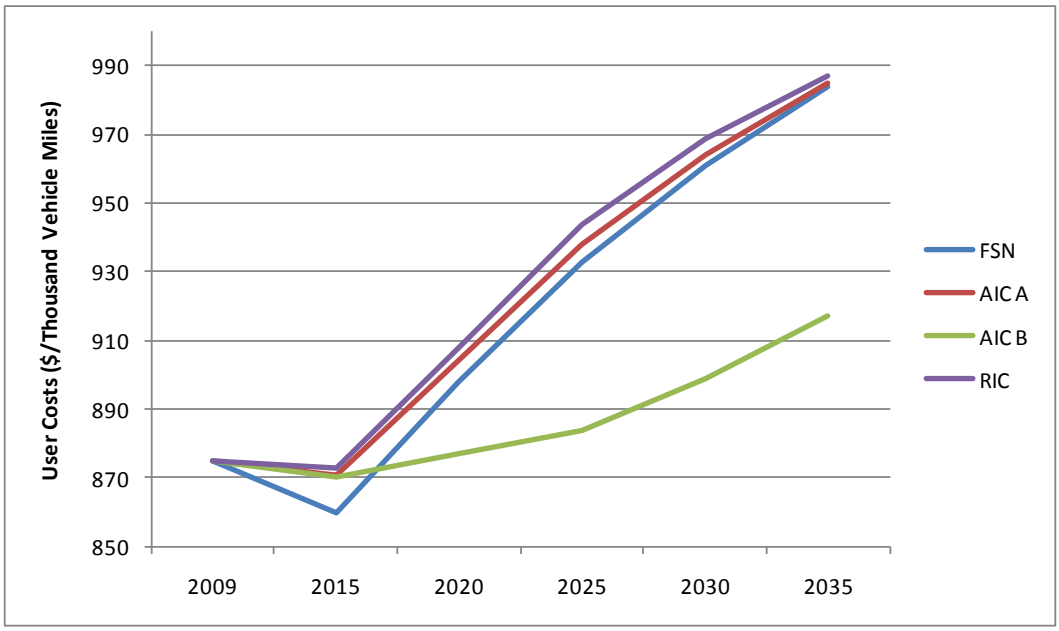
User costs, or the costs incurred by State Highway System travelers, can be estimated by considering a combination of travel time costs, operating costs, and crash costs. The cost of operating and maintaining a vehicle, the value of time, and the value of injury due to vehicular crashes is averaged by the number of miles driven on the State Highway System.

For comparison across investment choices, estimated users costs from 2010 through 2035 are shown in **Figure 6-7**. AIC B shows the lowest future user cost. This is due to the capacity funding allocation directed at urban interstate facilities and expressways, which carry a high percentage of total travel in the State roadway system. By 2035, it is estimated to be $917 per thousand VMT, while other scenarios are around $985 per thousand VMT. The difference is derived largely by the travel time savings for urban trips.

Travel Delay

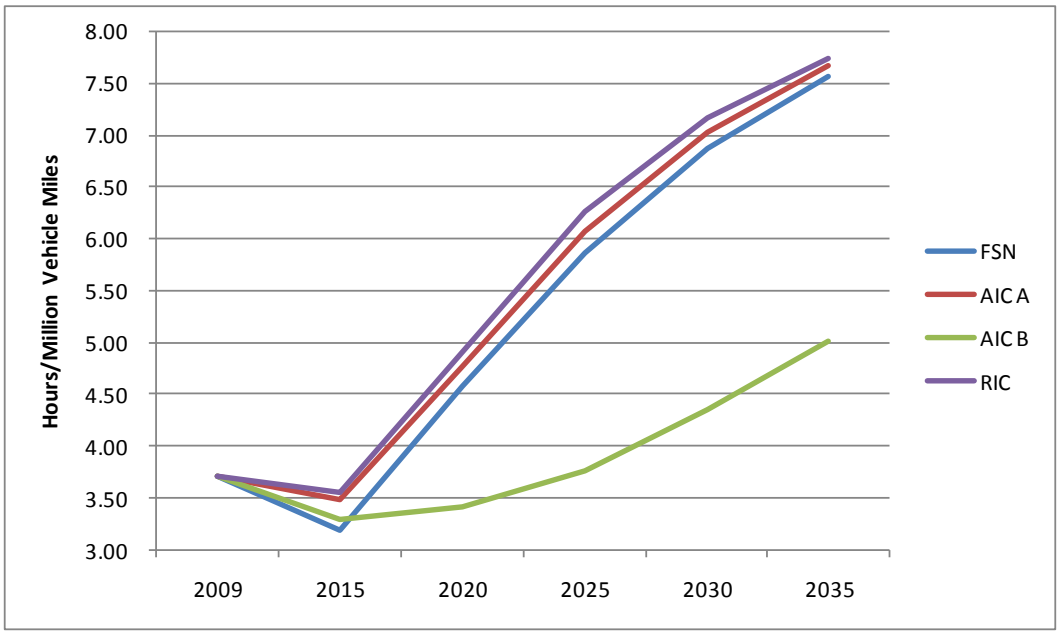
Delay is the primary determinant of travel time costs. Delay is defined as the traveler's total hours spent in traffic at less than free flow speeds per 1,000 VMT. As shown in **Figure 6-8**, the hours of delay closely resemble the trends of the user costs shown in **Figure 6-7**. AIC B shows the lowest levels of delay among all investment choices. The reason for this is the same as for the user benefit outcome – a significant component of available capacity funding allocation is directed at urban interstate facilities and expressways.

Figure 6-7: Estimated User Costs



Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Figure 6-8: Estimated Travel Delay

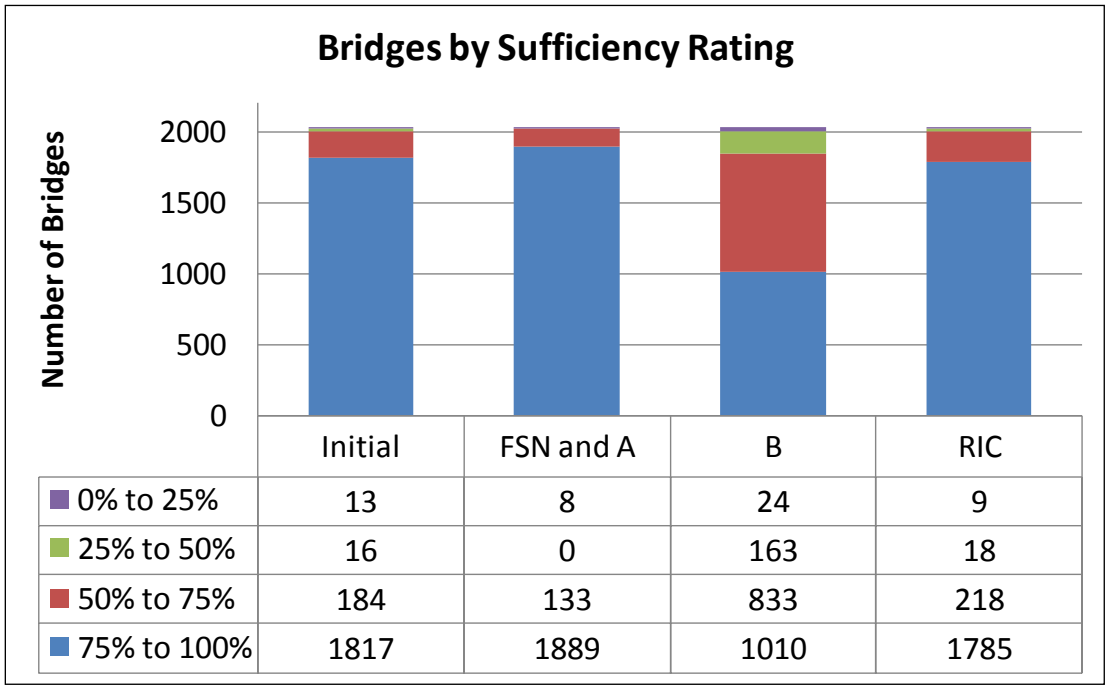


Source: Wilbur Smith Associates for ADOT's 2035 LRTP

Bridge Performance

Figure 6-9 presents the performance of the State Bridge System over the 25-year Plan horizon. A sufficiency rating is a summary measure (with a range of 0-100, with 100 the best) that encompass a bridge's level of deterioration, tolerance for current and forecast loads, compatibility with current design guidelines, and other factors. Bridges with ratings below 50 are eligible for improvement using federal bridge replacement funds.

Figure 6-9: Bridge Conditions



	Initial	FSN and A	B	RIC
0% to 25%	13	8	24	9
25% to 50%	16	0	163	18
50% to 75%	184	133	833	218
75% to 100%	1817	1889	1010	1785

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

There are 2,040 bridges on the State Bridge System. (Note that this analysis only considers bridges within this system; Arizona has 7,348 bridges and other structures, and ADOT maintains 2,040 bridges in the State.) The Full State Needs and AIC A, which provide the same level of funding for bridge investments, produce bridge conditions that are superior to initial (current) conditions, with eight bridges under a rating of 50. AIC B produces 187 bridges with ratings under 50 and is the worst-performing investment choice in terms of bridge performance. The RIC produces 27 bridges with low sufficiency ratings, near the performance of AIC A and Full State Needs.

6.6 Comparison of RIC with Full State and Vision Levels

Table 6-3 showed an assessment of the "grade" by goal area for the Recommended Investment Choice with funding constrained over the 25-year planning horizon to the baseline revenue of $26.2 billion in constant 2009 Dollars available for investment on the State Highway System. **Table 6-5** compares these grades with an assessment of grades that may result if

funding were unconstrained and reached levels identified for Full State Needs ($88.9 billion) and Vision Level Needs ($250.1 billion). Note that the grades for the Full State Needs are intended to assess impacts on the State Highway System, whereas the grades for the Vision level funding reflect impacts on both State and local roads.

Table 6-5: Comparison of Goal Area Grades by Funding Level

	Funding Level		
Goal Area	**Baseline RIC**	**Full State Needs**	**Vision**
Improve Mobility/Accessibility	C-	A	A-
Preserve and Maintain System	A-	A+	A+
Support Economic Development	C-	A-	A
Link Transportation and Land Use	C+	B+	A
Consider the Environment and Natural Resources	B+	A	A+
Enhance Safety and Security	B-	A	A
Investment in Non-Highway Modes	C	B+	A

Source: Wilbur Smith Associates for ADOT's 2035 LRTP

7. Considerations for Plan Implementation

Implementation of Arizona's LRTP, including the Recommended Investment Choice, will require new thinking, policies, and ways of doing business at ADOT. The Department is advancing toward becoming a true multimodal agency by taking a strong financial and advocacy role in certain modes. ADOT is committed to developing its capital program with a strong linkage to the Plan. The Plan's findings make a strong case for considering an increase in transportation revenues following a healthy public dialogue.

Implementation of the Plan will require a series of new and/or enhanced policies in areas such as access management, context sensitive solutions, and complete streets as well as enhanced data, technical methods, and processes to reflect the increased emphasis on preservation and modernization of the transportation system. This section describes these and other policy changes, and discusses the difference they could bring to Arizona's transportation system, economy, and quality of life.

Implementing ADOT's Plan will require changes to the way ADOT conducts its business internally, as well as externally through coordination and cooperation with stakeholders, transportation delivery partners, the legislature and elected officials, and the public. Similarly, policy considerations for implementation of the LRTP include internal agency policies, policies that are adopted and communicated with the public and/or require a change in State requirements, and policies for monitoring implementation of the Plan over time.

ADOT intends to have a stronger role in all modes in the future.

For the purposes of documentation and recommendations for the LRTP, policies for Plan implementation were explored by considering the advancement of Plan goals and objectives beyond the RIC. The RIC provides a base for the direction of ADOT's programming strategy. Assuming ADOT will program projects at revenue baseline, strategies and ideas presented in this section advance broader goals and objectives beyond those acknowledged by the RIC.

7.1 Benefits of Implementation

Spending on transportation infrastructure is often looked to as a means for creating jobs and stimulating the economy. What is important to understand is that these job creation benefits come in a variety of forms, and vary in the duration of their impacts.

"High-productivity transportation investments increase connectivity and reduce congestion; by doing so they improve economic well-being."
Dr. Marty Wachs, Rand Corporation

In terms of immediate impacts, it is estimated that a billion dollars of transportation infrastructure investment will create over 30,000 new jobs. The

most obvious source of this employment is from simply spending more money on transportation. These expenditures foster engineering, construction, and other types of employment that directly result from the increased spending. In addition, there is a multiplier effect from increased public spending. When money is spent on a public works project, the people who are paid to design and construct the project spend their earnings to buy goods and services – meals, dishwashers, automobile insurance, etc. As a result, an additional dollar spent on road construction ends up having more than a dollar's worth of impact.

While building roads and buying transit buses create jobs, it would be a mistake to interpret that immediate employment is the primary economic contribution of transportation spending. Over the longer term, infrastructure improvements foster longer-term economic growth by making the transportation system more efficient and reliable, promote improved productivity, and in turn create higher-paying jobs across the entire economy. Moreover, high-productivity transportation improvements can both enhance freight mobility to increase the global competitiveness of local businesses, and support the needs of the workforce and employers in moving to and from jobs. The result is a "win-win" outcome for the economy, where increased transportation spending leads to short term construction jobs and longer term economic health and vitality that both retains jobs and creates new jobs.

7.2 Advancing Plan Goals and Objectives

A policy survey was provided to the Plan's Technical Advisory Committee and Project Management Team to collect ideas concerning Policies for Plan Implementation by goal area. The survey provided an opportunity for TAC and PMT feedback on advancing Plan goals, objectives, and system performance through new or revised ADOT policies and/or through better cooperation and coordination with the State's planning partners.

The policy survey and corresponding TAC and PMT responses provided input for the development of the specific strategies considered in the Plan, which may be adopted by ADOT. Additionally, inputs from interviews conducted with ADOT staff to discuss policies and strategies for safety, non-motorized transportation modes, access management and land use, environment, agency governance and partnerships, and engineering design considerations were integrated into the survey findings to develop policies and strategies by Plan goal area.

Table 7-1 provides summary strategies identified from these activities to advance LRTP goals and objectives. Detailed assessments of individual strategies are provided in the sections following the table.

Table 7-1: Strategies by Plan Goal Area

Plan Goal Area	Potential Policies/Strategies
Mobility, Accessibility, and Connectivity	Access Management Complete Streets Methods, Models, and Data Research
Preservation and Maintenance	Expansion Maintenance and Operations Policy
Economic Development	Job creation/retention Access Management Complete Streets Demand Management System Modernization (Bottleneck Reduction, System Operations, Traffic Signal Timing)
Transportation and Land Use	Access Management
Natural, Cultural, and Environmental Resources	Context Sensitive Solutions Education and Outreach "Green" certification
Safety and Security	System Modernization (Rural Safety) Education (Distracted Driving, Seat Belt Usage)
Performance Measurement and Management	Methods, Models, and Data Research

7.2.1 Access Management

Access management techniques include a host of engineering design treatments (sometimes redesign or retrofit treatments) that improve highway mobility, safety, and productivity. Techniques are most often applied to highway arterials and targeted toward management of vehicular access points to land parcels.

FHWA's access management guidelines note that access management can result in better traffic flow and fewer crashes, thereby reducing congestion and supporting economic health. Frequent access and closely spaced signals increase congestion on major roads. Well-managed arterials can operate at speeds well above poorly managed roadways – up to 15 to 20 miles per hour faster. Local businesses benefit through exposure (more vehicles passing the travel route) and convenience.

ADOT policies restrict construction of access points to or from any State highway and from or to property abutting a State highway without the express permission of ADOT. ADOT is in the process of developing Access Management Guidelines (AMG) that better define specific requirements such that permits may be issued only when an application is found to comply with the AMG. The AMG introduces access management requirements for *new development* and access standards for eight access categories including freeway access, arterial access, urban/rural highway access, and service/frontage road access.

7.2.2 Complete Streets

Complete Streets is the brand name of transportation treatments that ensure that the highway system is safe, equitable, and convenient for all users and can enhance Plan mobility,

connectivity, accessibility, and economic development goals. "Users" are defined as motorists, transit users, bicyclists, and pedestrians. Complete Streets concepts offer increased safety, mobility, and accessibility for non-motorized transportation movements; long-term safety and cost savings to state transportation and public health agencies; and financial benefits to property owners, businesses, and investors.

In 2010, ADOT worked internally to develop a mainstreamed Complete Streets policy. The scope of the policy noted that Complete Streets and its application should vary by context and that the degree to which any State highway is designed to accommodate all users should, likewise, vary by context. While a Department Complete Streets policy has not yet been adopted, ADOT continues to explore strategies for a transportation system that serves all users.

7.2.3 Context Sensitive Solutions

The context of all projects and activities is a key factor in reaching decisions and is considered for all State transportation and support facilities when defining, developing, and evaluating options; however, ADOT does not currently have a mainstreamed CSS policy. When considering transportation context, issues such as funding feasibility; maintenance feasibility; traffic demand; impact on alternate routes; impact on safety; relevant laws, rules, and regulations; and environment/land use concerns should all be addressed to ensure that CSS is applicable across an array engineering decisions.

7.2.4 Green Certification

In the last few years, FHWA and a few states have begun efforts to develop certifications programs for environmental sustainability. These programs work much like the Leadership in Energy and Environmental Design (LEED) building certification program, where projects and even programs can be evaluated against a set of standards/best practices for a wide range of green considerations, then given a score, such as silver, gold or "evergreen." These efforts are still in the pilot stage, and the viability of using them needs to be further investigated, but they could provide a means to help ADOT make better project and program-level decisions from an environmental perspective.

7.2.5 Demand Management

Transportation Demand Management (TDM) can significantly increase mobility, connectivity, and accessibility when applied to both work- and non-work trips. In fact, TDM applications often consider connectivity beyond that of the transportation system to include access to broadband internet, which is particularly important to rural areas.

ADOT, in coordination with the Arizona Department of Administration, is currently developing a summary of TDM applications in the State, with particular attention to the Phoenix and Tucson metropolitan areas. While the MAG and other MPOs have implemented TDM programs, ADOT as an agency has not been directly involved in TDM funding and administration. In some cases,

state involvement in TDM particularly in the corridor or metropolitan levels has been shown to reduce congestion by 5 percent or more – for example, in the Washington State Department of Transportation's (WSDOT) $1,000,000 demand management program. This is quite a large reduction in congestion for a modestly funded program.

7.2.6 Safety

Highway safety is always of great concern, especially in rural areas; however, Arizona's efforts to improve highway safety have paid dividends. There has been a steady decline in the fatality, injury, and property damage crash rates in the State since 2006. Between 2006 and 2008, fatalities from crashes decreased by 28 percent, from 1,300 to 937. The nation seems to be following suit; according to 2010 data from the National Highway Transportation Safety Administration (NHTSA) the national highway crash fatality rate – deaths per 100 million miles driven – fell from 1.13 in 2009 to 1.09, the lowest since the government started tracking in 1949.

While the fatality rates have declined, traffic fatalities still devastate far too many of Arizona's residents and families. Driver inattention is a leading factor in many crashes, and cell phone use and texting are some of the most common driver distractions. Seven states (California, Connecticut, Delaware, Maryland, New Jersey, New York, and Oregon), Washington, D.C., and the US Virgin Islands prohibit all drivers from using handheld cell phones while driving. Except for Maryland, all laws are primary enforcement; an officer may cite a driver for using a handheld mobile phone without any other traffic offense taking place. School bus drivers in 18 states, including Arizona, and in D.C. may not use a cell phone when passengers are present. 30 states have bans on text messaging for all drivers; an additional eight states prohibit text messaging by novice drivers.

Increased use of safety belts via education campaigns have proven that reducing traffic fatalities is possible. While Arizona does have a child restraint law, rear seat preference is not specified; infants and children are safer in proper back-seat restraints during crashes.

7.2.7 Expansion Operations and Maintenance (O&M)

In developing the Plan, a key concern of ADOT is the ability to preserve the State highway network. Prior to the development of RIC for Plan implementation, ADOT expenditures for pavement preservation totaled $100 million annually alone, which has led to generally good pavement conditions in many areas of the State. Likewise, bridge conditions, on average, are better than that of the nation as a whole.

Arizona faces a growing backlog of bridge and pavement preservation needs. Additionally, long-term preservation for expansion projects in the MAG and PAG regions will continue to place heavy burdens on the state-maintained system. While project-specific tax increases provided funding for many of these projects, these revenue-generating mechanisms often fail to realize the long-term system preservation needs and associated costs. Moreover, many of these

preservation needs are not even estimated until they are "due," since they are not a part of fiscal constraint regulations. This is because only projects using federal funds and/or projects linking to the NHS are required in TIPs and STIPs; some preservation activities are supported by federal funds via the Interstate Maintenance program, but for the most part, preservation of the NHS over time is a state responsibility. In developing the Plan, it has become apparent that, at the very least, analysis of long-term preservation costs is needed before expansion projects are programmed both at the statewide and metropolitan levels.

7.2.8 System Modernization

A commitment to modernization in the RIC will increase safety and mobility by ensuring that the ADOT system meets current engineering standards; however, modernization implies much more than just engineering design. ADOT's commitment to modernization includes the areas of active traffic management, traveler information, traffic signal timing, bottleneck reduction via ramp, and other transportation system management and operations (TSMO) techniques that provide lower-cost modernization strategies that have proven effective in enhancing mobility, accessibility, and economic development by reducing congestion. These techniques provide specific strategies for advancing Plan goals and objectives in the areas of accessibility, mobility, and economic development.

7.2.9 Data, Methods, Models, and Research

In some areas, the link between policy and goal achievement is easy to make. Safety legislation, for example, has been proven as the most effective means for encouraging motorists to buckle up and has significantly reduced the number of alcohol-related traffic fatalities, as all states now have 0.08 blood alcohol limits.

For other areas, particularly those related to system performance outcomes, a focus on data, methods, models, and research is needed. For example:

- Plan performance measures were applied to the RIC to quantify the different system outcomes at baseline investment. To implement the Plan over time and to understand the implications of Plan implementation, these measures establish a platform for monitoring, reporting, and adjusting strategies to meet Plan goals and objectives. At the same time, the application and reporting of these metrics is unclear; more work remains to better understand how data can and should influence planning and programming decisions.
- Transportation, land use, environmental concerns, and energy usage are intrinsically linked; however, there is much work to be done to best plan for reductions in carbon emissions and energy use that support mobility, accessibility, and economic activity. ADOT will continue to work to understand how best to realize long-term goals in these areas via research and/or by better understanding applications from other states.

7.2.10 Education and Outreach

Education and outreach provides an effective implementation mechanism, especially in areas where ADOT seeks to advance goals and objectives without complete implementation control. Safety provides an example of a goal area where education and outreach is critical. ADOT's Safe Routes to School program shows the effectiveness of ADOT's efforts to educate and connect local officials with transportation professionals and the public to increase safety for children. ADOT will continue to use education and outreach as a tool for Plan implementation across goal areas.

7.3 Implementation Strategies

All policies and strategies reviewed for the Plan have merit when considering implementation across goals and objective over time. At the same time, the types of actions required for implementation may vary depending on the complexity of the strategy itself. **Table 7-2** summarizes specific actions for Plan implementation, which range from formal rulemaking to ADOT-led education and research programs. The recommendations for each policy area are detailed below:

- **ADOT's Access Management Guidelines** introduces access management requirements for new development. To further Plan objectives, retrofit access management guidelines will be considered.
- **Complete Streets, Context Sensitive Solutions**, and other sustainability/livability "policies" have been/are being considered by ADOT (and are being implemented by MAG). ADOT will work to define specific strategies and applications in these areas and advance them as "best practices" for Plan implementation.
- **Transportation Demand Management (TDM):** ADOT as an agency will approach TDM more directly. Even with State and MPO programs already in place, there is a role for ADOT to advance a statewide TDM program designed to reduce congestion and enhance statewide mobility and accessibility.
- **Operations and Maintenance Policies for Expansion Projects:** ADOT will work to strengthen its ability to coordinate, collaborate, and partner to advance the RIC over the Plan horizon via its role on MPO/COG policy boards. The assessment of on-going maintenance and operations costs over the long-term is necessary prior to project level programming for all expansion projects to ensure sustainable preservation funding over time. A stronger stance at the State level (perhaps via rulemaking) may be needed so that new facilities are not constructed unless an on-going funding source for all preservation, maintenance, and operations activities is identified.

Table 7-2: Plan Policies - Considerations for Implementation

Policy	Message	Action
Access Management	- Adopt Access Management Guidelines for new facilities - Consider Access Management Guidelines for retrofit - Develop best-practices for off-system implementation	- Undertake rulemaking required for Access Management Guidelines; however, rulemaking is currently banned through FY 2011 - Guidelines can be developed via research and/or engineering programs and marketed as "best practices"
Complete Streets	- Focus on components to meet the needs of all users - Allow flexibility based on location, need, and funding - Link to specific needs of local communities	- Department Directive to consider specific enhancements, community needs, and funding sources prior to new facility design and construction may be needed for broad implementation - "How to" guide for districts and local governments detailing funding sources in conjunction with definitions (including CSS) is needed
Context Sensitive Solutions (CSS)	- Consider CSS policy focused on comprehensive project context - Include funding feasibility; maintenance feasibility; traffic demand; impact on alternate routes; impact on safety; relevant laws, rules, and regulations; and environment/land use concerns	- Department Directive to consider CSS on all projects may be needed for broad implementation - Definitions and program explanation necessary for internal acceptance
Demand Management	- MPOs/COGs have implemented demand management programs - ADOT role might include funding and/or technical support	- Target a percentage of Plan modernization enhancements at State TDM program - Program administered by ADOT in coordination/collaboration with the Arizona Department of Administration and State MPOs/COGs
Expansion O&M	- ADOT priorities underscore the need for on-going preservation - Enable Plan implementation through ADOT representation on MPO/COG policy boards; however, stronger guidance may be needed to ensure long-term preservation of the State Highway System	- Adoption of Best Expansion Practices to include comprehensive evaluation of long-term O&M costs may be warranted, especially if MPO Plans continue to focus on expansion - Best practices can be taken to rulemaking after moratorium expires
System Modernization	- Enhance safety for all users through modernization - Include a focus on traffic management and technology implementation	- Include a percentage of Plan modernization enhancements targeted toward technology in Capital programming - "Mainstream" technology enhancements in the longer term
Data, Methods, Models, and Research	- Performance measures and data collection as well as advances in "softer" goal areas like livability, sustainability, and environment - Of key concern are data collection and management for long-term performance reporting and metrics for accessibility and mobility	- Research program targeted to Plan policies - Research program to include development peer practices for successes in Complete Streets, CSS, Demand Management, and other areas seen as "difficult" to implement agency-wide

- **Modernization** will include a commitment to technology implementation for all modes. A modernization program that includes transportation system management and operations strategies and activities along with focus on rural safety will be not only support ADOT in stretching scarce resources, it will also help the Department meet Plan goals and objectives across these areas.
- **Research**, particularly in the areas of data needs and use, methods, and models, will advance Plan goal areas where ADOT's role is less defined in advancing key objectives. Applied research is recommended. For example, peer practices showing successes in Complete Streets, CSS, Demand Management, and other policy areas seen as "difficult" to implement agency-wide will be considered in making the case for broad implementation of these and/or similar policies.
- **Education and outreach** provide an alternative to more formal polices. Safety education to increase seat belt usage and decrease distracted driving is warranted. Additionally, ADOT will work to better coordinate and collaborate with all planning partners and will educate partners on Plan goals and objectives and on the RIC. For decisions that are intrinsically local in nature (land use decisions, for example), ADOT will serve as a catalyst to bring the right stakeholders together and facilitate meaningful discussion.

Aside from the specific strategies identified to advance Plan goals and objectives beyond the RIC, it is important to note that Plan implementation over time will become more focused on the integration of community concerns into the planning process. In considering the large gap between available revenues and needs, ADOT will explore strategies designed to engage the public in the transportation delivery process. Enhancements and investments in local communities, where citizens can see their tax dollars at work, will be particularly important in building statewide support should ADOT consider revenue generating mechanisms in the future. The incorporation of these broader community concerns has gained traction at the national level with federal funding programs to support the development of sustainable, livable communities and will be integrated into ADOT's capital program over time.

APPENDIX A

EXAMPLES OF SIGNIFICANT TRANSPORTATION INFRASTRUCTURE PROJECTS

Examples of Significant Transportation Infrastructure Projects

Based on a review of State and metropolitan plans and capital programs, new roadways consistent with Plan goals and objectives were identified as "needed" within 25 years. The plans and programs reviewed included:

- Arizona State Transportation Improvement Program Fiscal Years 2010-2013, Arizona Department of Transportation, 2009;
- ADOT's Statewide Transportation Investment Strategy, Arizona Department of Transportation, 2008;
- Building a Quality Arizona, Statewide Transportation Planning Framework Final Report, Arizona Department of Transportation, 2010;
- Regional Transportation Plan, Central Yavapai Metropolitan Planning Organization, 2006;
- Draft Regional Transportation Plan, Maricopa Association of Governments (MAG), 2010;
- 2040 Regional Transportation Plan, Pima Association of Governments, 2010;
- 2010-2033 Regional Transportation Plan, Yuma Metropolitan Planning Organization, 2010;
- Flagstaff Pathways 2030 Regional Transportation Plan (Draft for Public Release), Flagstaff Metropolitan Planning Organization, 2009;
- Building a Quality Arizona, Regional (Northern, Western, Eastern, and Central) Framework Studies, Arizona Department of Transportation, 2008-2010;
- Interstate 10 - Hassayampa Valley Roadway Framework Study, Arizona Department of Transportation, 2007; and
- Interstate 8 and Interstate 10 Hidden Valley Transportation Framework Study, Arizona Department of Transportation, 2009.

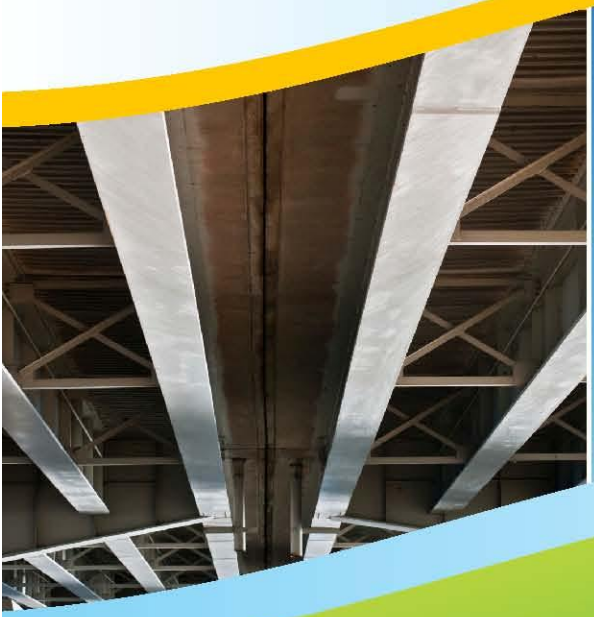
For the Plan, only major facilities identified in these studies, such as potential new freeways, were considered. In reviewing planned projects consistent with Plan goals and objectives, new location highway needs totaling $15.8 billion were identified. Facilities in rural areas account for $5.6 billion, with the remaining $10.2 billion accounting for facilities in urbanized areas.

These projects, listed in **Table A-1**, provide some insight into the information used to construct the 25-year cost estimate for highway expansion needs. These projects are not intended to be definitive but to guide the Department towards a reasonable long-range transportation plan highway needs cost estimate.

Table A-1: Potential New State Roads

County	Facility	From-To	Length (Miles)	Estimated Cost (2009 $Millions)	Lanes
Coconino	SR-89 Bypass	I-40 to north of Townsend-Winona Road.	3	$55	4
Maricopa	Hassayampa Freeway	White Tank Freeway to I-10 (Buckeye)	19	$861	6
Maricopa	Hassayampa Freeway	White Tank Freeway to US-93	35	$1,624	6
Maricopa	SR 202L (So. Mountain)	I-10 West to I-10 East	24	$1,920	8
Maricopa	SR 303L	SR 801 to I-17	39	$1,797	4
Maricopa	SR 303L	Hassayampa Fwy to SR 801	31	$691	4
Maricopa	SR 801	SR-303L to SR-202L (S Mountain)	14	$1,582	4
Maricopa	SR 801	SR-303L to SR-85	10		4
Maricopa	SR-74	US-60 to Hassayampa Freeway	45	$584	4
Maricopa	White Tank Freeway	Hassayampa Fwy to US-60/SR-303L	17	$931	6
Maricopa/Pinal	SR 802	SR-202L (Santan) to Pinal N-S FWY	9	$513	8
Mohave	SR 95 Bypass	I-40 – SR68	29	$888	4
Pima	SR 210 Extension	Palo Verde Rd to I-10	5	$409	4
Pinal	Montgomery Freeway	Hassayampa Fwy to I-8	10	$284	4
Pinal	Pinal N-S Corridor	US-60 to I-10	6.9	$365	8
Pinal	SR 238	Hassayampa Fwy to SR 347	15	$426	8
Pinal	SR 303S	Hassayampa Fwy to I-8	24	$337	6
Yavapai	Western Bypass	I-40-US-89	35	$1,079	4
Yavapai	Great Western Extension	SR 89A to SR-89 at Route 5	9	$216	4
Yavapai	Chino Valley Extension	Outer Loop Road to SR-89	11	$265	4
Yavapai	Fain Road Extension	SR-169 to Fain Road	24	$193	4
Yavapai	Fain Road Extension II	I-17 to Fain Road	8	150	4
Yuma	East Yuma Freeway	SR-195 – CA State Line	25	$619	4
TOTAL			**448**	**$15,789**	

Sample Projects



SCHOOL BUS
DISTRICT SCHOOLS