



# 2050 Long-Range Transportation Plan

**ADOT**

## Vision and Goals



*Connecting Arizona. Better Lives Through Better Transportation.*



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# 1 Introduction

## 1.1 Purpose of the Working Paper

This working paper establishes a foundation for the Arizona Department of Transportation 2050 Long-Range Transportation Plan (LRTP) with a focus on the various transportation systems, typical users, and how those will change over the next three decades. The purpose of the report is to present background information and establish the LRTP vision, goals, and objectives including performance management.

## 1.2 Project Description

The LRTP is a policy document that must be updated every five years to provide a current “roadmap” for the State transportation system over the next 25 years. This project will set the goals, objectives, and implementation strategies to support Arizona’s future transportation system based on identified needs and opportunities and stakeholder direction and input gathered during the study. The LRTP defines vision, goals, and objectives as well as a Recommended Investment Choice (RIC) which are used to guide ADOT’s future investment decisions.





## 2 State of the State

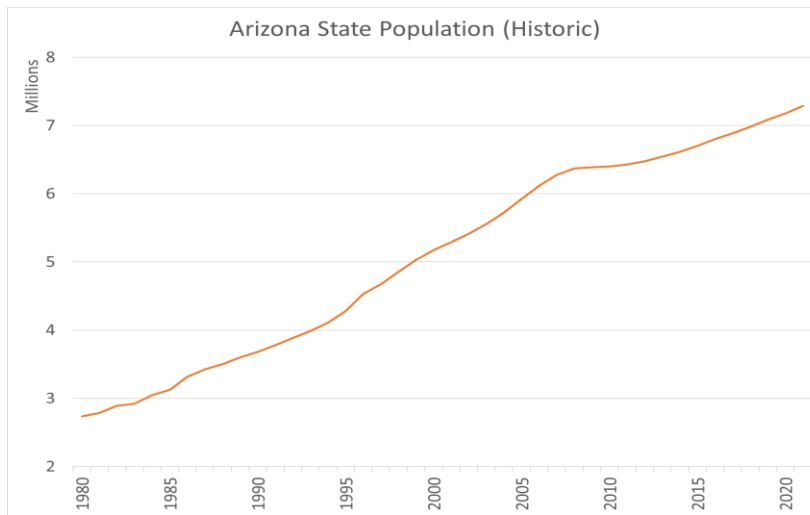
The Long-Range Transportation Plan is designed to support Arizona residents, businesses, and visitors. As such, it is important to understand the users of the transportation system, including the potential changes and growth anticipated over the next 25 years.

### 2.1 Population

The State of Arizona has long been a growth state benefiting from its location in the Southwest. The State is adjacent to major population centers in California to the west and Mexico to the south, has favorable weather with few natural disasters, and relatively inexpensive land costs. Based on data from the most recent US Census (2020), the population of Arizona is approximately 7,280,000 people. **Figure 1** illustrates the population growth of Arizona over the past several decades using data from the US Census and the Arizona Office of Economic Opportunity.

As shown by **Figure 1**, the State has consistently grown in population from 1980 to 2020 with a long-term average growth rate of 2.4 percent per year. The two highest annual growth years occurred in 1986 (6.2 percent) and 1996 (5.8 percent). The two lowest annual growth years were in 2009 (0.3 percent) and 2010 (0.2 percent) during a national recession.

**Figure 1. Arizona State Population (Historic)**



Source: AZ Commerce Authority, Historic Estimates 1980-2021 <https://www.azcommerce.com/oeo/population/population-estimates/>

By decade, the average annual growth rate has been:

- 1980s: 3.0 percent/year
- 1990s: 3.5 percent/year
- 2000s: 2.1 percent/year
- 2010s: 1.2 percent/year

Equally important to the state-level population totals is the spatial distribution of the population. Arizona comprises 15 counties with a wide range of population density. **Table 1** and **Figure 2** show the population and relative percentage of each

county in Arizona based on existing data. As shown, approximately 82% of the current population resides in just three counties – Maricopa, Pima, and Pinal.



**Table 1. Arizona Population by County (2021)**

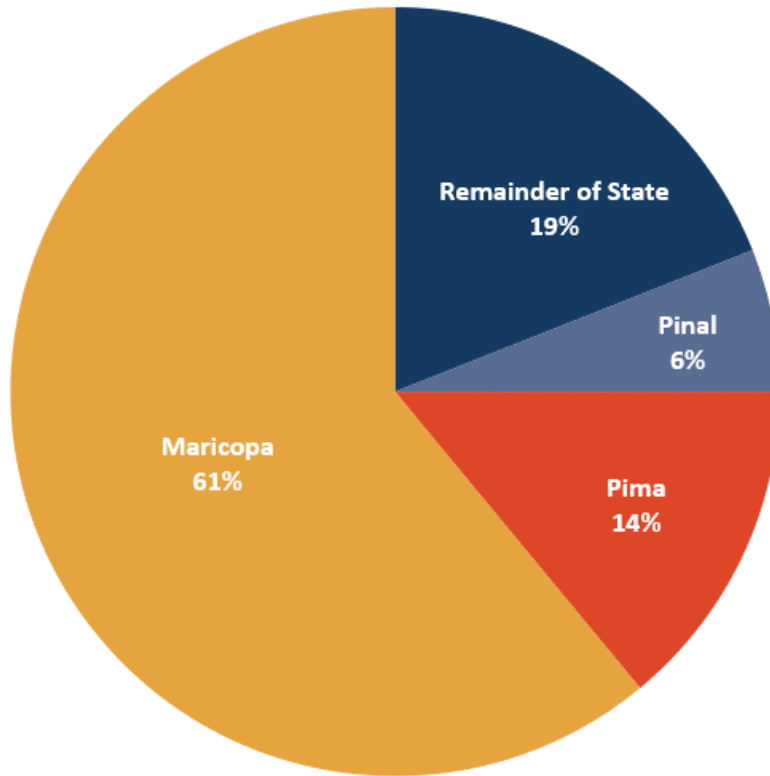
County	2021	
	Population	Percent
Apache	73,500	1%
Cochise	131,300	2%
Coconino	149,600	2%
Gila	55,200	1%
Graham	39,000	1%
Greenlee	10,700	0%
La Paz	22,000	0%
Maricopa	4,506,500	61%
Mohave	220,800	3%
Navajo	114,800	2%
Pima	1,059,200	14%
Pinal	479,200	6%
Santa Cruz	54,300	1%
Yavapai	236,800	3%
Yuma	235,000	3%
Arizona (Total)	7,387,900	100%

Source: AZ Commerce Authority, July 1, 2021, Arizona Population Estimates <https://www.azcommerce.com/oeo/population/population-estimates/>





Figure 2. Breakdown of Arizona Population by County (2021)



Source: AZ Commerce Authority, July 1, 2021, Arizona Population Estimates <https://www.azcommerce.com/oeo/population/population-estimates/>

**Population impact to LRTP**

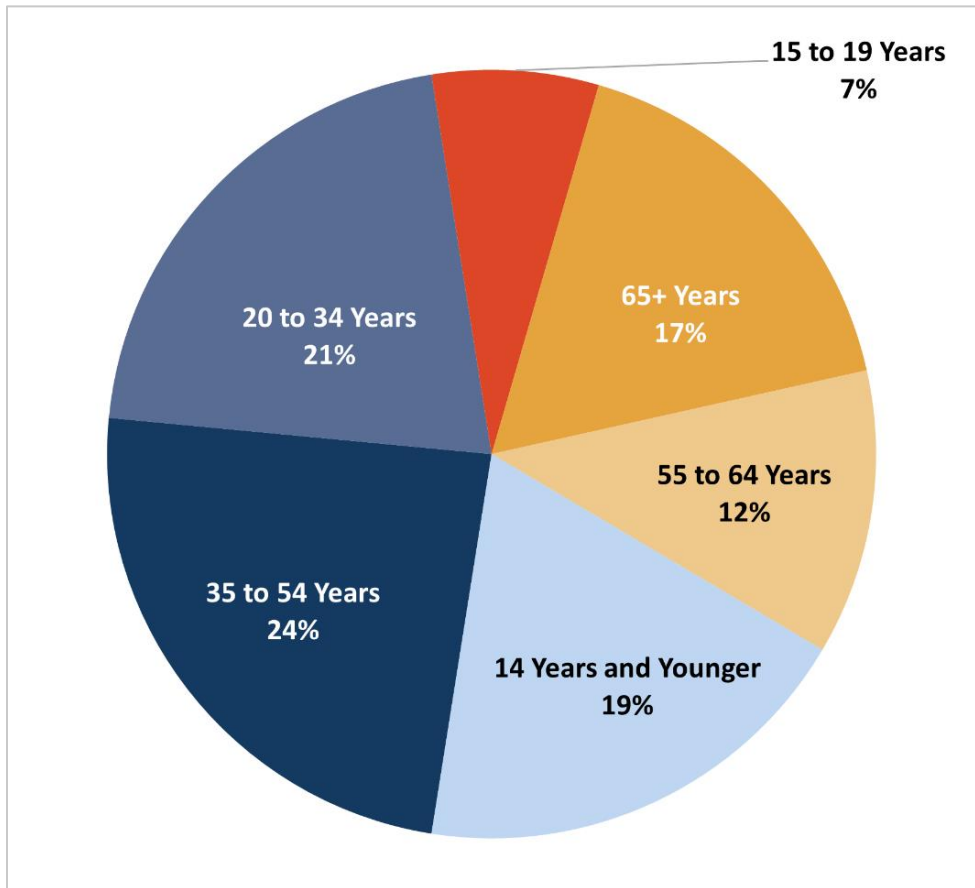
Population growth in the State has slowed recently in terms of annual percent growth but will likely continue to increase overall. The concentration of population in the urban metropolitan areas highlights the need for coordination with MPO partners (MAG and PAG) and may influence the future focus in terms of transportation options.



## 2.2 Demographics

According to 2020 US Census, 30% of Arizona’s population is 55 years or older, slightly above the National average of 29%. A majority of Arizona’s population is between 20 and 54 years with 45% of the population in the age group, below the national average of 47%. Arizona’s younger population represents the lowest portion of the state population with only 26% of the population being 19 years or younger, but still above the national average of 25%. **Figure 3** provides a graphic representation of the age group distribution.

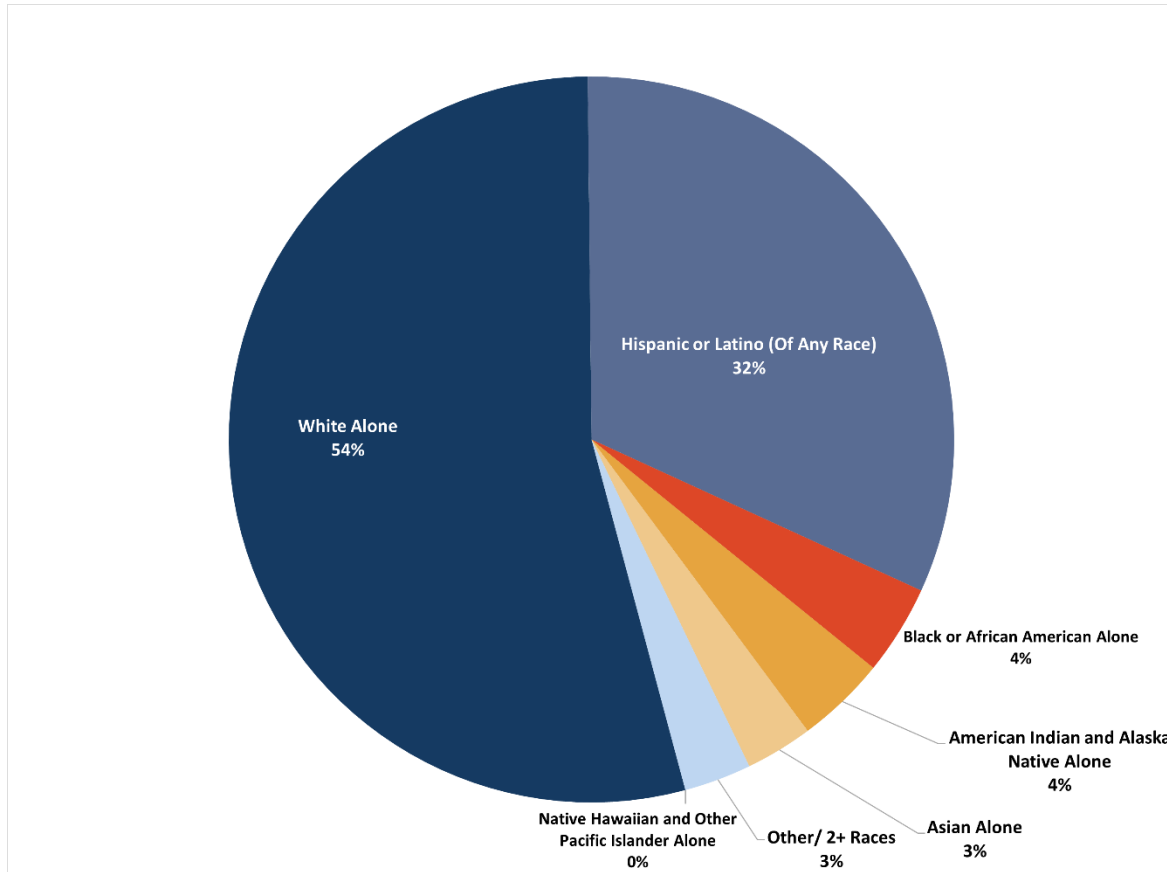
**Figure 3. Percent of Arizona’s Population by Age (2020)**



Source: U.S. 2020 Census and Arizona Commerce Authority <https://www.azcommerce.com/oeo/population/demographics-census-data/>



**Figure 4. Percent of Arizona’s Population by Race and Ethnicity (2020)**



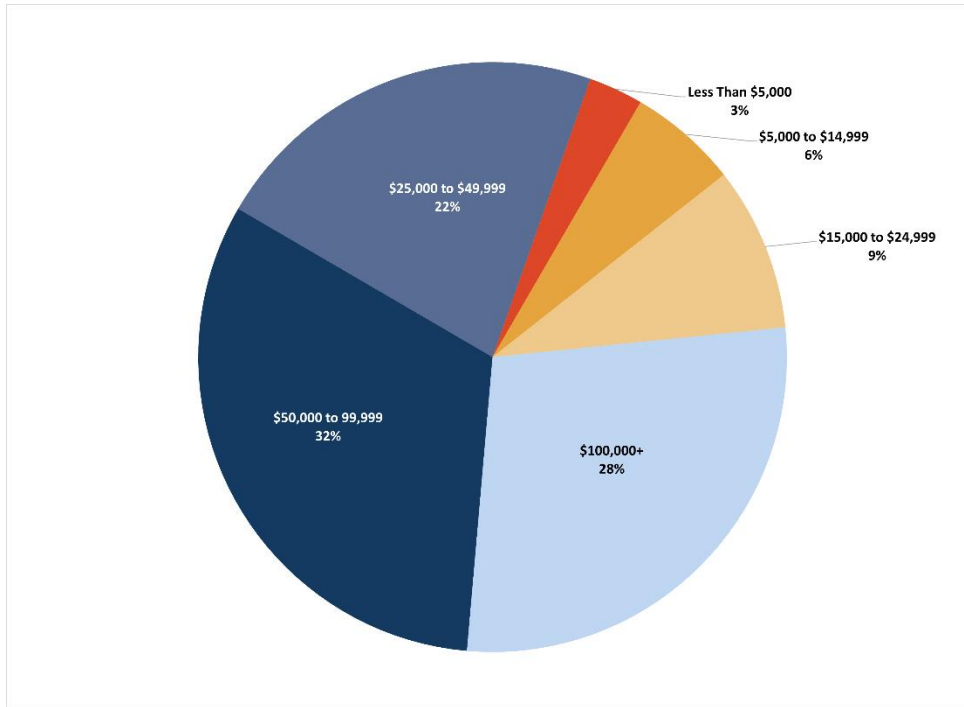
Source: U.S. 2020 Census and Arizona Commerce Authority <https://www.azcommerce.com/oeo/population/demographics-census-data/>

According to the 2020 US Census, 54% of Arizonan’s identify as being white alone which is below the national average of 60%. The second largest ethnic group in Arizona is Hispanic or Latino which make up 32% of the State, significantly above the national average of 18.2%. Additionally, Arizona’s American Indian, and Alaskan Native population represents 4% of the total population of the State, 6 times greater than the national average of 0.6%. **Figure 4** provides a graphic representation of the racial and ethnic distribution.

According to the Arizona Office of Economic Opportunity, 14.1% of Arizonans were below the poverty line in 2020 with 18% of Arizona households making less than \$25,000 annually. This is a lower percentage than nationally where 16.0% are considered below poverty. **Figure 5** provides a graphic representation of the household income distribution for Arizona.



**Figure 5. Arizona Household Income Distribution**



Source: U.S. 2020 Census and Arizona Commerce Authority <https://www.azcommerce.com/oeo/population/demographics-census-data/>

**Demographics impact to LRTP**

**Arizona citizens, compared to the general US average, are older and more diverse. These population segments may influence the future focus in terms of transportation options (alternatives to single occupancy driver) and traffic safety concerns (drivers unfamiliar with rules, language, or requiring increased reaction times).**

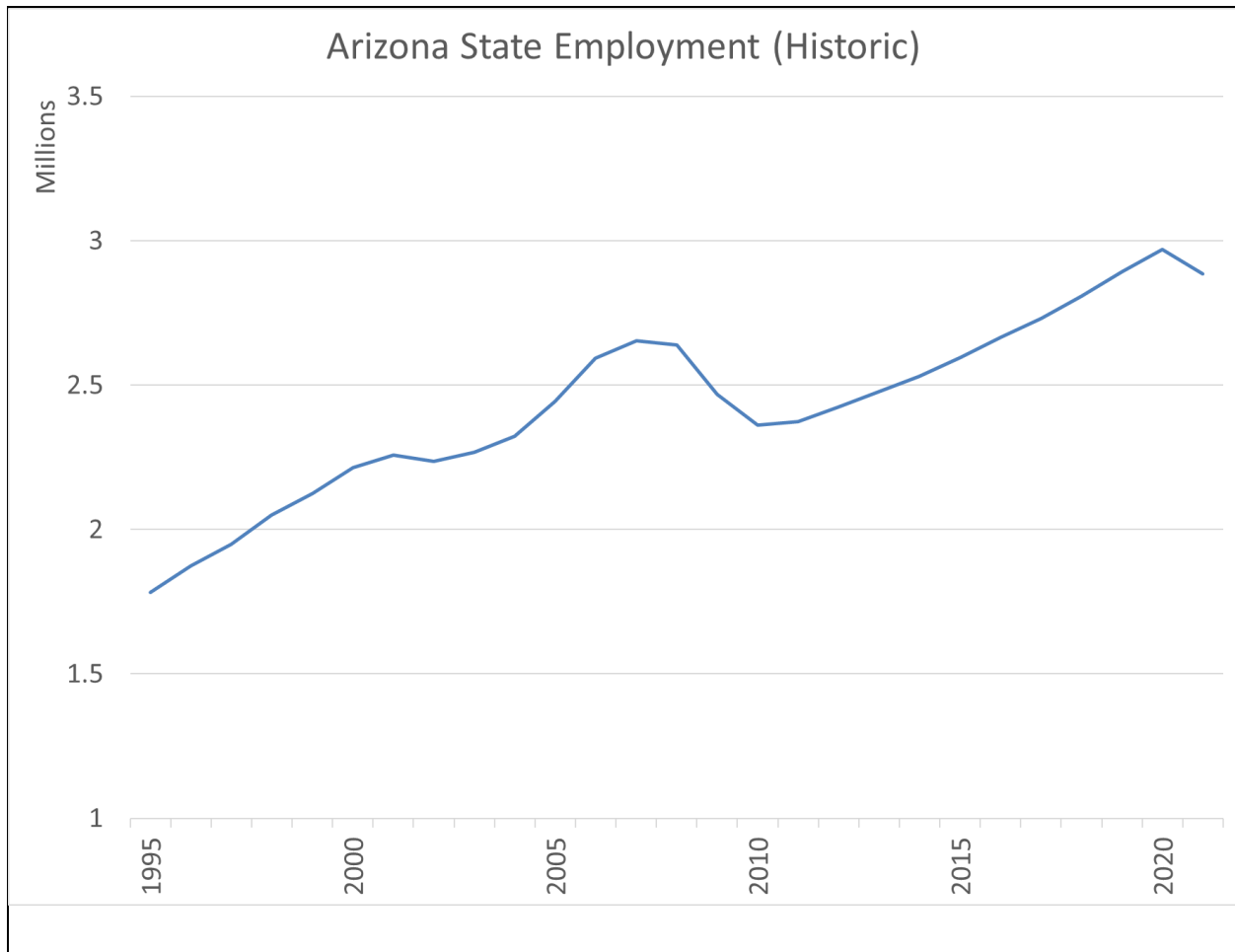


### 2.3 Economy

Arizona’s economy is driven by many of the same factors as the population – abundance of natural resources, low cost of development, open space, and close proximity to other large economies. Based on data from the US Department of Commerce Bureau of Economic Analysis, the gross domestic product (GDP) of Arizona was \$411,192 million in 2021. This represented an average annual increase of over 4.6 percent each year since 2011. Of the GDP estimates, 68 percent is generated in the Phoenix-Mesa-Chandler MSA and another 11 percent in the Tucson MSA.

Growth in the economy, as measured by number of jobs, has risen each year since the mid-1990’s except for the 2008-2010 recession as shown in **Figure 6**.

**Figure 6. Arizona State Employment (Historic)**



Source: AZ Commerce Authority <https://www.azcommerce.com/oeo/labor-market/industry-employment/>

The distribution of jobs (not revenue) within the various employment sectors is shown in **Table 2**. Trade/Transportation/Utilities is the largest industry in terms of jobs followed by Educational/Health Services and Professional/Business Services.

A review of 2010 and 2021 employment data indicates that the construction industry experienced the largest percent increase in employment while the government sector showed the largest percent decrease.



**Table 2. Arizona Employment by Industry (2021)**

Industry	Total Employment	
	Number (Thousands)	Percent
Trade, Transportation, and Utilities	583.8	19.70%
Educational and Health Services	464.5	15.70%
Professional and Business Services	44.8	15.00%
Government	406.4	13.70%
Leisure and Hospitality	303.9	10.30%
Financial Activities	245.7	8.30%
Manufacturing	180.8	6.10%
Construction	177.5	6.00%
Other Services	91.9	3.10%
Information	47.4	1.60%
Natural Resources and Mining	12	0.40%
Arizona (Total)	2,958	

Source: AZ Commerce Authority <https://www.azcommerce.com/oeo/labor-market/employment-projections/>

**Economy impact to LRTP**

**Arizona’s economy tracks closely with the population growth. In terms of value and employment, the Arizona economy is heavily weighted to the metropolitan areas highlighting the need to coordinate with MPO partners (MAG and PAG). In addition, recent industry growth has favored construction and trade which requires a focus on freight movement.**



## 2.4 Growth Trends

Future growth, in terms of magnitude and location, will depend on land use. Arizona is one of the top states in terms of public land ownership with privately held land only accounting for 18% of surface acreage. **Table 3** shows the ownership breakdown for the state.

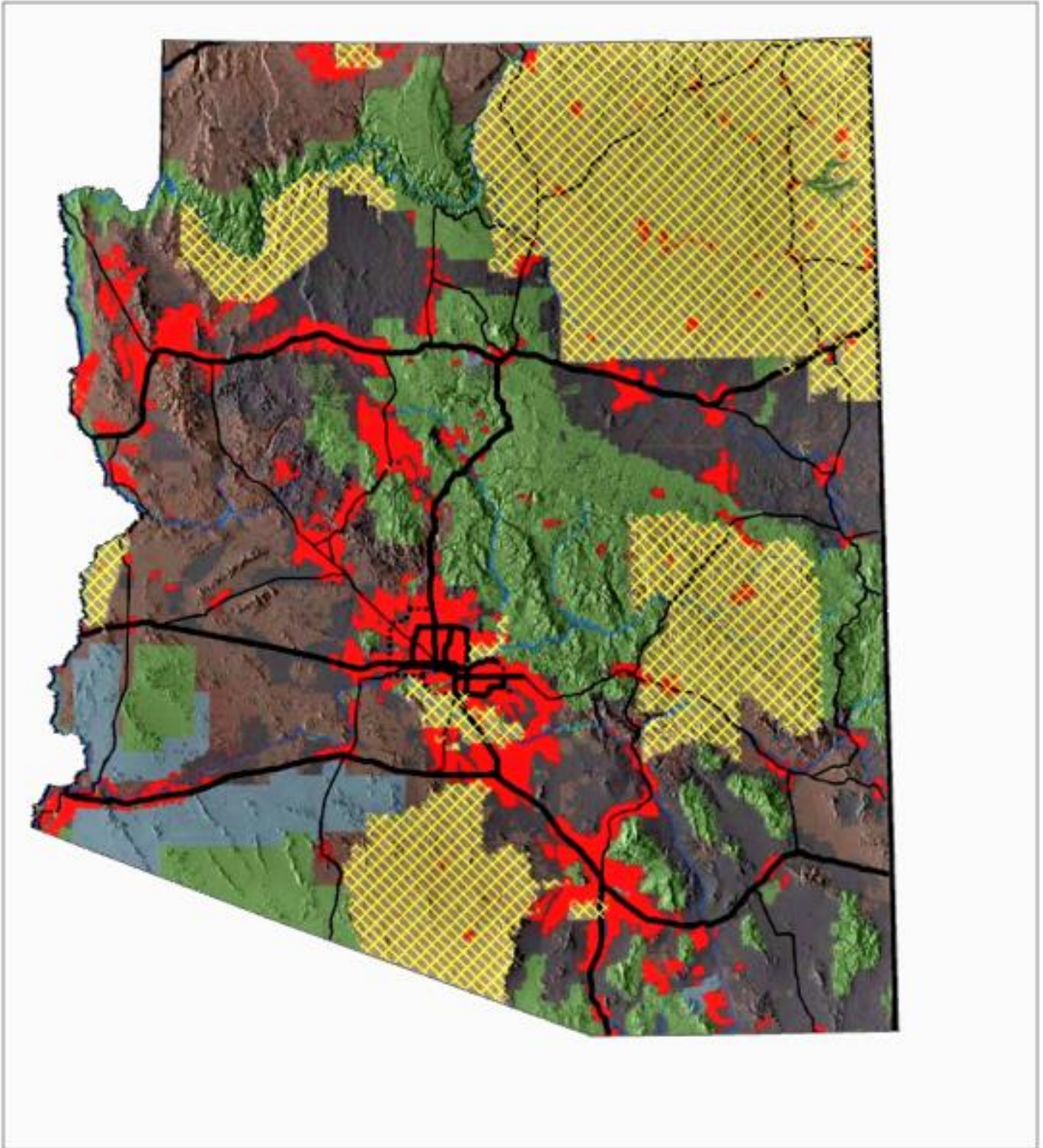
**Table 3. State Land Ownership (2021)**

Industry	Total Land	
	Acres (Millions)	Percent
Federal	30.3	41%
BLM	12.1	16%
FS	11.1	15%
FWS	1.7	2%
NPS	2.7	4%
DOD	2.7	4%
Bureau of Indian Affairs	20.2	28%
State Trust Land	9.3	13%
Other (Incl. Private)	13.1	18%
<b>Total</b>	<b>72.9</b>	

Source: Arizona Surface Management Agencies <https://azgeo-open-data-agic.hub.arcgis.com/datasets/azgeo::arizona-surface-management-agencies-blm/explore?location=35.999007%2C-109.790700%2C9.00>

Developable lands tend to be concentrated around existing population centers and where State Trust Lands have the potential to transition to private use. A map of the future focus areas is provided in **Figure 7**.

**Figure 7. Arizona Statewide Growth Areas**



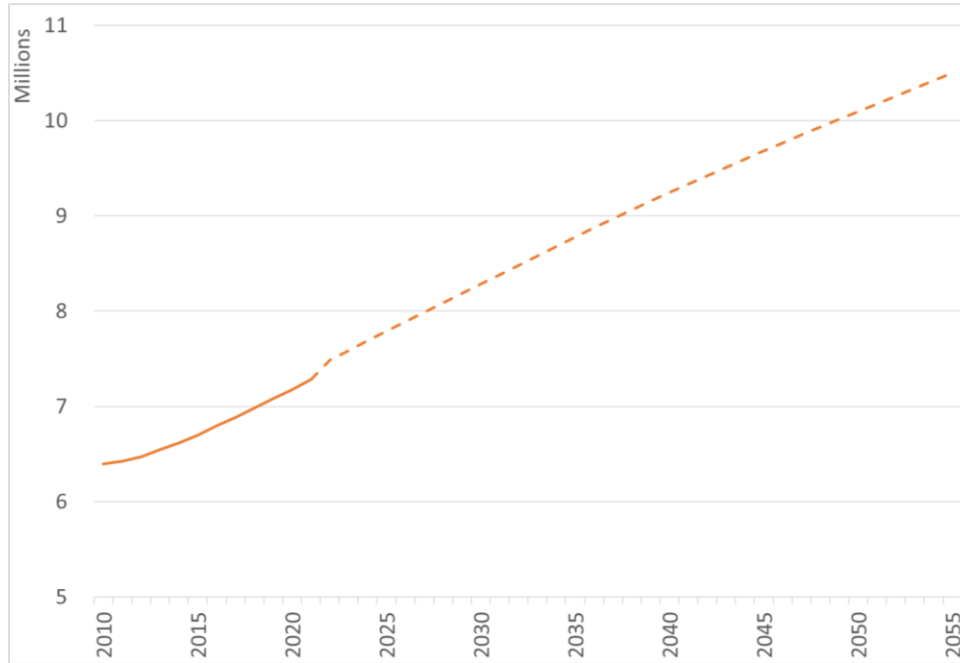
Projection Source: Maricopa Association of Governments, Building a Quality Arizona





Future population growth, as projected by the Arizona Office of Economic Opportunity, is anticipated to increase an average of 1.1% annually over the next several decades resulting in a future 2055 population of 10.5 million. **Figure 8** illustrates the population projections of Arizona over the next several decades.

**Figure 8. Arizona State Population (Projection)**



Source: AZ Commerce Authority <https://www.azcommerce.com/oeo/population/population-projections/>

By 2055, Pinal County is expected to significantly increase thereby shifting the percentage within the Maricopa/Pima/Pinal counties to nearly 85% of the future population. **Table 4** illustrates the future distribution of population by County.



**Table 4. Arizona Population by County (Projection)**

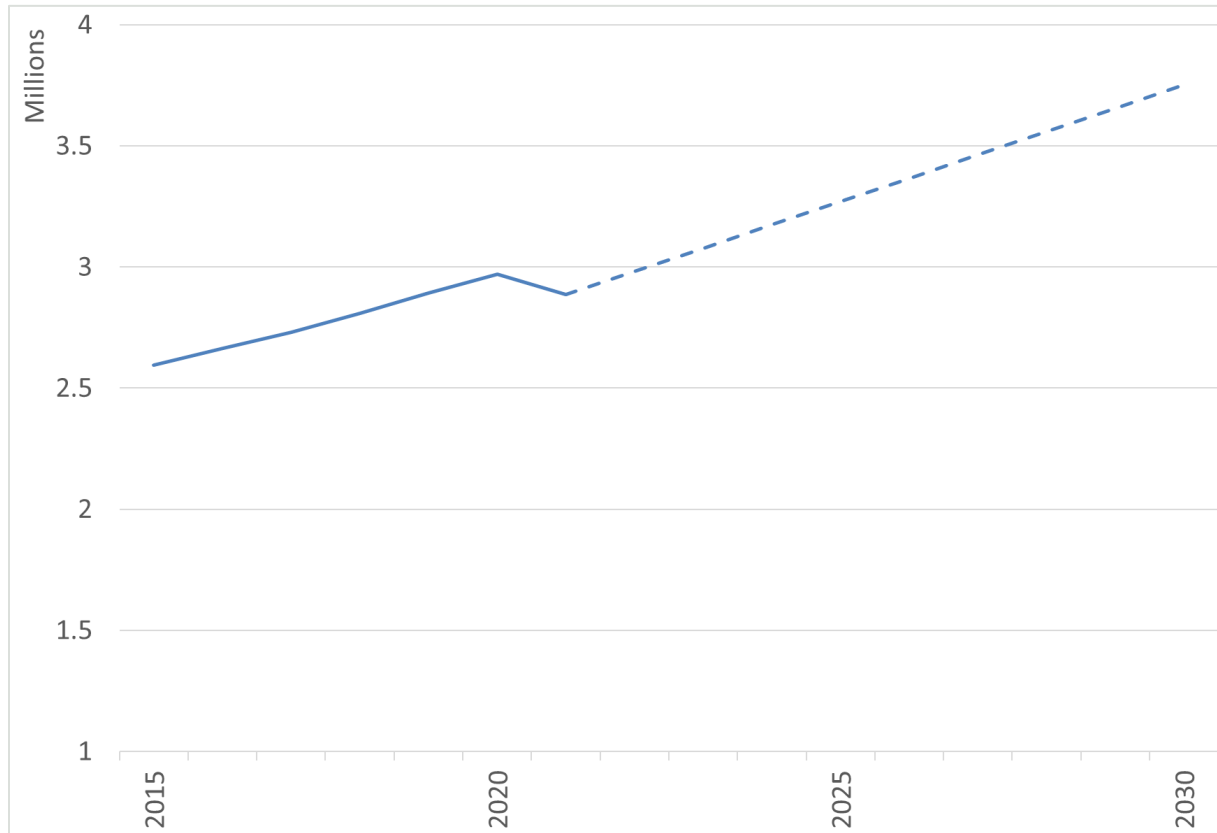
County	2055	
	Population	Percent
Apache	63,200	1%
Cochise	130,400	1%
Coconino	163,100	2%
Gila	53,300	1%
Graham	48,900	0%
Greenlee	12,400	0%
La Paz	21,900	0%
Maricopa	6,414,100	61%
Mohave	306,000	3%
Navajo	115,200	1%
Pima	1,277,100	12%
Pinal	1,181,000	11%
Santa Cruz	66,300	1%
Yavapai	311,600	3%
Yuma	340,200	3%
Arizona (Total)	10,504,700	

Source: AZ Commerce Authority <https://www.azcommerce.com/oeo/population/population-projections/>

Future employment growth, as projected by the Arizona Office of Economic Opportunity, is anticipated to increase an average of 2.2% annually over the next several decades resulting in a future 2030 employment of 3.75 million. **Figure 9** illustrates the employment projections of Arizona over the next several decades.



Figure 9. Arizona State Employment (Projection)



Source: Az Commerce Authority <https://www.azcommerce.com/oeo/labor-market/employment-projections/>

**Growth Trends impact to LRTP**

**Arizona’s future growth will take place largely near existing metropolitan areas due to land ownership. This will further concentrate transportation to larger cities and increase demands/needs on existing networks. The “Sun Corridor” continues to have a potential for significant growth in population and economy.**

**2.5 Future Challenges/Opportunities**

The growth trends described in Section 2.4 are based on publicly available data and represent the current consensus on the State’s future. However, actual growth will largely depend on the State’s ability to maintain critical natural resources and adapt to an ever-changing environment. The following subsections highlight some of the major issues facing the State, including climate, water, technology, and social equity.



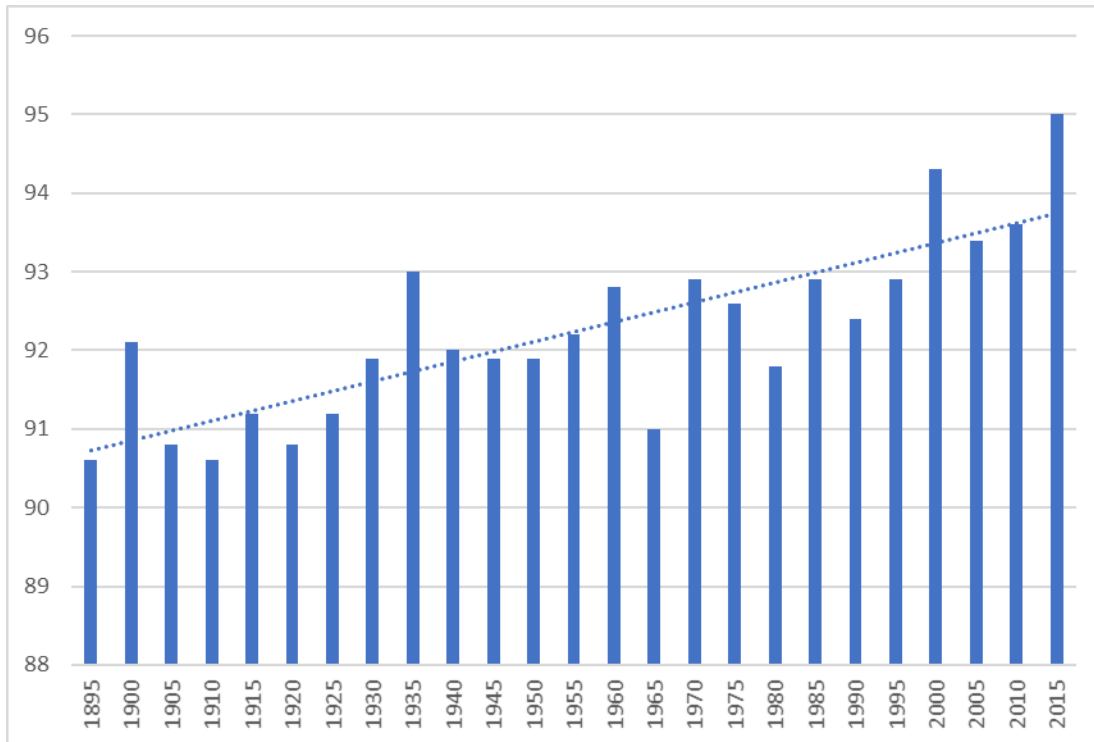
### 2.5.1 Climate

The State of Arizona has historically been a warmer environment with seasonally higher temperatures than other parts of the country. The National Oceanic and Atmospheric Administration (NOAA) National Center for Environmental Information identified three key future climate impacts for Arizona within their 2022 State Climate Summary for Arizona:

- Increasing temperatures
- Longer periods of drought
- Highly variable monsoon rainfall

Annual average temperatures in Arizona have already risen 2.5 degrees F since the beginning of the 20<sup>th</sup> century and are expected to continue, resulting in historically unprecedented temperatures for the state. **Figure 10** shows how the maximum summer temperature for the State has increased since the early 1900's.

**Figure 10. Maximum Summer Temperature (Historic)**



NOAA National Centers for Environmental Information; State Climate Summaries 2022: Arizona <https://statesummaries.ncics.org/chapter/az/>

Additionally, there is a higher potential for extended periods of drought which can decrease the availability of water for environmental, agricultural, and social systems. Another resulting impact of extended droughts is the increased likelihood of large wildfires.

Much of Arizona’s rains come within relatively short periods of monsoonal weather. While monsoon rains provide much needed water for Arizona ecosystems, future trends for monsoon rainfall are predicted to be highly variable. While monsoons are typically in the summer months, it is also projected that precipitation from the spring season will greatly decrease in the state.



**Climate impact to LRTP**

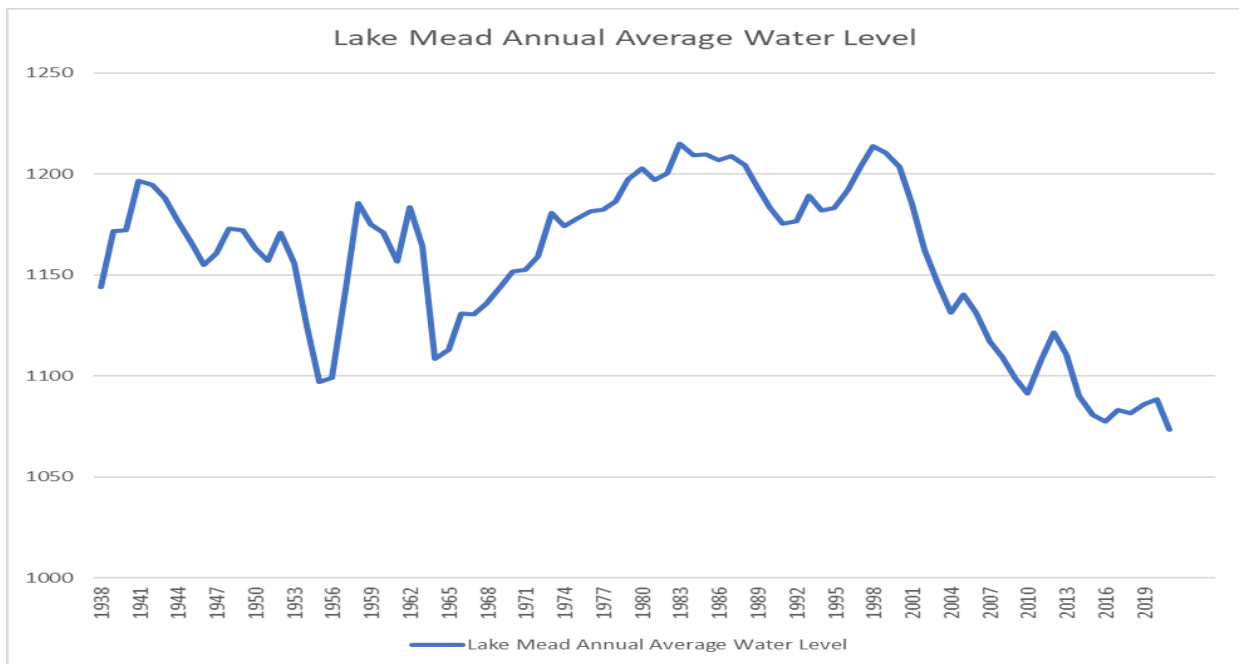
**Changing climate can impact the transportation network through more frequent wildfires, flooding, dust storms, and other natural events. These events will require increased focus on resiliency to ensure that transportation options remain available, safe, and efficient.**

**2.5.2 Water**

Water availability tracks closely with similar topics related to climate – drought and monsoon rainfall. Extended drought, decreased rainfall, and reduced snowpack all have the potential to strain Arizona’s already depleting water resources. Recent lack of rains has resulted in historically low water levels in some of Arizona’s key water reservoirs – Lake Mead (Figure 11) and Lake Powell. Arizona has prepared for water shortages and the Arizona Department of Water Resources (ADWR) has identified that Arizona has 3 trillion gallons of water stored in case for future water shortages.

While the Colorado River currently supplies 36% of Arizona’s water, this resource is rapidly decreasing, and water availability will need to be considered in how it will impact future growth and development. According to the ADWR, high drought conditions over the last decade and a half has led to major shifts in availability of Arizona’s water supply.

**Figure 11. Lake Mead Water Levels**



Source: Bureau of Reclamation, Lake Mead at Hoover Dam, <https://www.usbr.gov/lc/region/q4000/hourly/mead-elv.html>



**Water impact to LRTP**

**Water availability will largely have an impact on the magnitude and sustainability of population and economic growth. These impacts are assumed to be included in the state’s official projections and will be used as input to the development of transportation needs.**

**2.5.3 Technology**

Technology has been a major factor in progress and changes within the early 21<sup>st</sup> century and will continue to impact society in many ways over the coming years. Several major factors that may impact Arizona’s growth are remote work, technology employment, and electric vehicles.

The recent COVID pandemic resulted in widespread “work from home” and new methods for companies to accommodate staffing restrictions. While novel at the time, many of these accommodations continue after the pandemic effects have receded. The percentage of people working remotely has significantly increased over the past decade. This advancement may continue to impact people’s commuting needs/patterns and may ultimately impact long-term choices related to housing location and need for transportation services.

Electric vehicles are significantly more widespread now than the previous LRTP and are envisioned to continue to advance due to government incentives to consumers (ownership) and mandates on the manufacturers (fleet volume). While electric and other alternate fuel vehicles still make up only a small percentage of registered vehicles in Arizona, adoption rates are increasing, and the industry is continually expanding the necessary charging infrastructure. ADOT is currently underway on a study of the needs and opportunities to implement a National Electric Vehicle Infrastructure program focused on improving charging infrastructure and utility capacity to support electric vehicles.

In terms of the overall technology industry, Arizona has drawn a significant number of technology companies to the State and continues to foster growth in the sector. Semi-conductor and related trades are growing in Maricopa County and major investments are likely to continue as the State becomes a center for technology and innovation. This sector may require new transportation infrastructure, either in terms of location or options, as the campuses are often centralized, large, and clustered in urban areas.

**Technology impact to LRTP**

**Rapid changes in technology can change the needs within the LRTP as well as the available improvement options. As such, the LRTP will need to remain flexible to respond to changes in work habits (remote working), changes in industries (increased manufacturing), and changes in vehicle types (electrification). Technology advances will also lead to new opportunities in operational changes and options for modernizing the transportation modes/networks.**



### 2.5.4 Social Equity

Social equity refers to the distribution of benefits and costs and whether they are considered fair and appropriate. Transportation policy and planning decisions have significant equity impacts. They affect the allocation of public resources, people’s quality of life and economic opportunities, and the external costs that travelers impose on their communities.

Under the latest emphasis on equity and equality, plans and projects are expected to be prioritized in areas that house the most disadvantaged and to consider their needs and concerns. Under current practice, a traditional planning approach without context-sensitive consideration of equity may exacerbate problems rather than solve them. With that in mind, methods and approaches should be developed to evaluate a plan or project’s potential to generate equitable outcomes.

Some approaches could include:

- Measuring accessibility or the ease with which one can reach a destination and the number of desired destinations, such as grocery stores, schools, banks, and parks, that can be reasonably reached by a particular mode. Roadways or bikeways or bus routes, for example, can be classified according to their level of safety/comfort for a particular user.
- Qualitative field work can be used to assess the quality of the transportation infrastructure and network and the surrounding environment.

Qualitative interviews, focus groups and/or community engagement events can be used to understand local needs and concerns. Ongoing communication is critical to understanding and resolving equity issues.

#### **Social Equity impact to LRTP**

**Incorporating equity into plans, projects, and policies can ensure ADOT is equipped to create transportation alternatives that serve society fairly by elevating the priority of needs of the most disadvantaged members of our communities.**



### 3 Transportation Systems

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The State of Arizona includes a wide variety of transportation options and systems that interconnect and provide residents options for travel. This chapter provides a summary of the various transportation systems within the State that provide the major backbone infrastructure for mobility. Most of the information is provided by prior statewide efforts conducted by ADOT including the following documents:

- Arizona State Freight Plan, A to Z (2017)
- Arizona State Aviation System Plan Update (2018)
- Arizona State Rail Plan Update (2021)
- ADOT Bicyclist Safety Action Plan Update (2018)
- ADOT Pedestrian Safety Action Plan (2017)

#### 3.1 Major Modes

##### 3.1.1 Roadways

The Federal Highway Administration classifies roadways based on their function (or position) within the overall transportation network – using a Functional Classification System. This system defines seven (7) functional classifications for roadways:

1. Interstates
2. Other Freeways and Expressways
3. Other Principal Arterial
4. Minor Arterial
5. Major Collector
6. Minor Collector
7. Local

Arizona has nearly 67,000 miles of roadways as shown in **Table 5**. The Arizona Department of Transportation owns and operates approximately 10% of total roadway miles in Arizona (6,844 miles) but owns 100% of all Interstate miles and 84% of all Principal Arterial Roads miles (Interstates + Freeways and Expressways + Other Principal Arterials). These higher functional classification roadways serve as the primary corridors within and between urban areas.

Vehicle Miles Traveled (VMT) within each functional classification depends on the number of miles of roadway and the average daily traffic volume on each. While the Principal Arterial Roads (Interstates + Freeways and Expressways + Other Principal Arterials) make up approximately 5% of the system, they carry approximately 50% of the VMT as seen in **Table 6**.





**Table 5. Owner and Functional Classification for Arizona Roads (2020)**

Ownership Breakdown	ADOT	County	Town	City	Tribal	Federally Owned	Other	Total
Interstate	1,169	0	0	0	0	0	0	1,169
Other Freeways/ Expressway	262	4	0	5	0	0	0	271
Other Principal Arterial	1,547	107	53	404	0	7	0	2,117
Minor Arterial	2,101	592	290	1,690	0	45	8	4,725
Major Collector	1,207	2,046	449	1,725	0	674	54	6,155
Minor Collector	308	2,096	416	1,601	0	1,019	187	5,628
Local	249	13,072	2,702	13,303	3,772	13,237	568	46,903
<b>Total</b>	<b>6,844</b>	<b>17,916</b>	<b>3,909</b>	<b>18,729</b>	<b>3,772</b>	<b>14,982</b>	<b>817</b>	<b>66,968</b>

Source: ADOT HPMS 2020 Ownership Report

**Table 6. Arizona Vehicle Miles Traveled (Millions) (2020)**

Ownership Breakdown	Urban	Rural	Total	Percent
Interstate	7,211	6,765	13,976	21%
Other Freeways/ Expressways	7,624	100	7,724	12%
Other Principal Arterial	7,323	3,468	10,791	16%
Minor Arterial	14,737	1,983	16,720	25%
Major Collector	5,391	1,649	7,040	11%
Minor Collector	2,430	555	2,985	5%
Local	5,275	1,248	6,523	10%
<b>Total</b>	<b>49,990</b>	<b>15,768</b>	<b>65,758</b>	<b>100%</b>

Source: FHWA Highway Statistic Series 2020 VMT

**Table 7** shows that nearly 60% of all roadway miles in Arizona are located in rural areas – including nearly 80% of the total Interstate System. Outside of rural areas, the majority of roadway miles in Arizona are located in the two major metropolitan areas of Phoenix and Tucson. A map of the statewide system is provided in **Figure 12**.



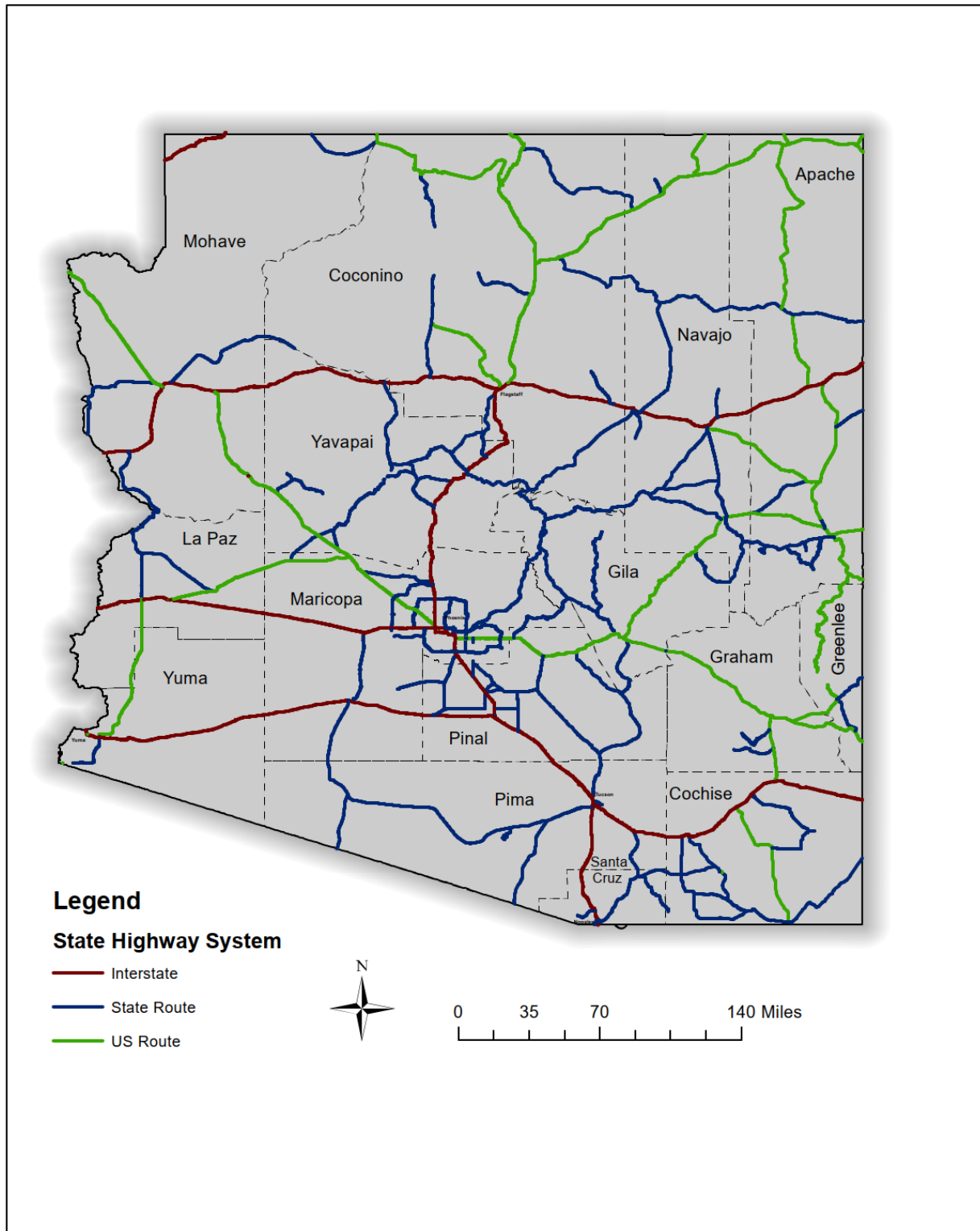
**Table 7. Road Miles by Region (2020)**

Ownership Breakdown	Phoenix - Mesa Area	Tucson	Other Major Urban	Small Urban	Rural	Total
Interstate	71	44	67	70	916	1,168
Other Freeways/ Expressways	221	4	27	0	19	271
Other Principal Arterial	373	190	116	176	1,262	2,117
Minor Arterial	1,597	288	381	274	2,185	4,725
Major Collector	1,301	384	509	620	3,342	6,156
Minor Collector	1,406	348	394	518	2,961	5,627
Local	5,275	2,848	6,230	2,776	29,703	46,832
<b>Total</b>	<b>12,791</b>	<b>4,106</b>	<b>7,724</b>	<b>4,442</b>	<b>40,391</b>	<b>66,898</b>

Source: ADOT Extent and Travel Report 2020



Figure 12. Arizona State Highway System (2020)



Source: AZ Open Geo Data, ESRI



### 3.1.2 Bridges

Bridges serve a vital role in the State Highway System by allowing roadways to go over waterways, canyons, rail, and other features. According to data from the National Bridge Inventory (NBI) there were over 8,497 bridges in Arizona, with 4,849 (57%) of Arizona bridges being owned by ADOT. The NBI lists three bridge conditions (good, fair, and poor) based on various performance measurements. In 2022, nearly all of ADOT’s bridges were in good or fair conditions with only 29 bridges (0.6%) being listed as being in poor condition as shown in **Table 8**.

**Table 8. Arizona Bridge Conditions (2022)**

Owner	Bridge Count			
	Total	Good Condition	Fair Condition	Poor Conditions
State	4,849	3,154	1,666	29
City	1,611	1,071	529	11
County	1,220	742	460	18
Tribal	513	163	303	47
Town	274	180	92	2
Other	30	24	6	0
<b>Total</b>	<b>8,497</b>	<b>5,334</b>	<b>3,056</b>	<b>107</b>

Source: National Bridge Inventory (2022) Condition by Owner <https://www.fhwa.dot.gov/bridge/nbi/no10/owner22.cfm#az>

### 3.1.3 Freight (Trucks)

Freight delivered by trucks account for 70% of total freight tonnage in the state and 44.9% of total freight value. The Interstate Highway System is the most heavily utilized freight infrastructure in the state and supports freight traffic moving between California ports and Mexico ports of entry and markets further inland. According to the State Freight Plan, 73% of all freight value is moved through the state (primarily along the I-10 and I-40 corridors) without a local destination while 51% of freight tonnage is moved through the state without a local destination. While there is no single designation or source of Arizona’s freight highway network, the following sources help define the freight network:

1. ADOT Key Commerce Corridors
2. Designated Truck Routes
3. Primary Freight Network
4. MAP-21 Critical Rural Freight Corridors
5. Congressional High-Priority Corridors

The total statewide truck freight data by tonnage, value, and destination is provided in **Table 9**.



**Table 9. Arizona Truck Freight by Tonnage and Value**

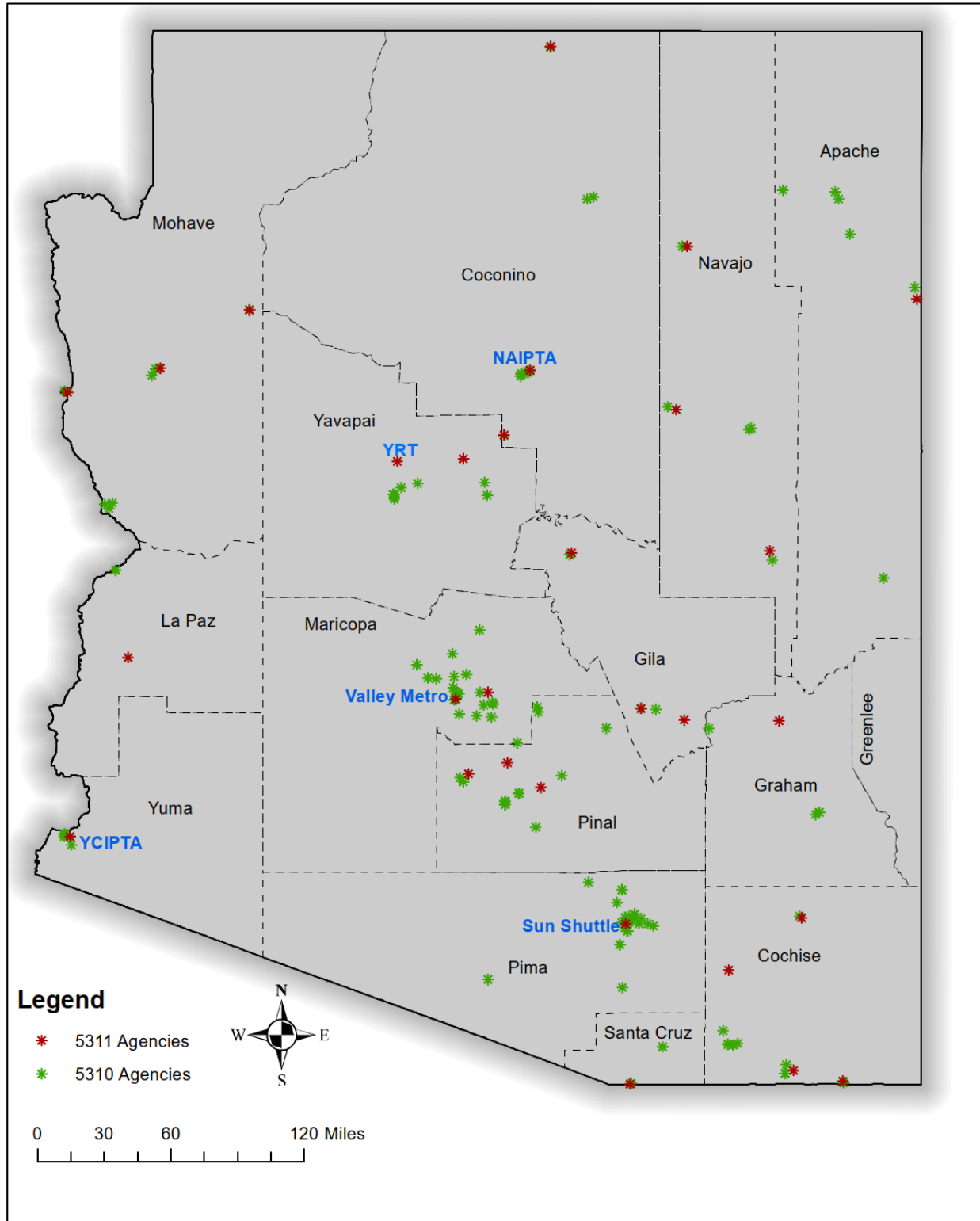
Category	Outbound (AZ to Other)	Inbound (Other to AZ)	Internal (AZ to AZ)	Through (Other to Other)	Total
Tonnage (Thousands)	22,650	35,552	118,170	108,565	284,937
Value (Million - USD)	25,099	72,120	58,218	239,795	395,231

Source: ADOT State Freight Plan 2022 Table 14

### 3.1.4 Transit

Arizona has two (2) urban transit systems (Phoenix and Tucson), five (5) small urban transit systems (Yuma, Flagstaff, Avondale-Goodyear, Sierra Vista, Lake Havasu), and 29 rural transit systems operating in smaller municipalities or rural areas. ADOT has been designated by the Governor of Arizona as the principal authority and designated recipient (DR) for administering Federal Transit Administration (FTA) programs within the state except for the 5310 programs for the MAG region, for which the City of Phoenix is the DR, and small-urban and urbanized area transit programs and tribal transit programs for which others are DRs. Urban transit systems receive direct funding from the FTA as well as 5307 apportionments from the state. The 29 rural transit systems are funded by 5311 transit funds from the state. **Figure 13** shows the locations of the public transit providers as well as additional communities served by a provider.

Figure 13. Arizona Transit



Source: ADOT, ESRI



### 3.1.5 Aviation

According to the 2018 State Aviation System Plan, there are 67 public use airports in Arizona providing air travel for business and personal uses. Eleven (11) of these airports are classified as Part 139 airports which are airports that have operating certificates for air carrier services. The distribution of commercial air carrier service is largely concentrated to the urban areas with 88% of total commercial air travel at Phoenix Sky Harbor, 7% at Tucson International, and 3% at Phoenix Mesa Gateway, and 2% at other airports as seen in **Table 10**. **Figure 14** shows the locations of the airports within the state.

**Table 10. Arizona Airport Passengers (2019)**

Airport	Passengers (Thousands)
Phoenix Sky Harbor	21,892
Tucson International	1,840
Phoenix-Mesa Gateway	869
Laughlin Bullhead	117
Yuma	99.6
Flagstaff Pulliam	97.6
Prescott	27.7
Other	3.4
Total	24,949

Source: US DOT Bureau of Transportation Statistics State Transportation statistics U.S Airline Traffic by Airport <https://www.bts.dot.gov/browse-statistical-products-and-data/state-transportation-statistics/us-airline-traffic-airport>

According to the State Freight Plan, air freight makes up only 0.1% of total freight in the state by tonnage but makes up 6.6% of total freight by value in the state. Arizona’s State Freight Plan states that Phoenix Sky Harbor International Airport makes up nearly 90% of air cargo and Tucson International Airport makes up nearly 10% of total air cargo in the State. The very small amount left goes to three other airport Yuma International Airport, Flagstaff Pulliam Airport, and Lake Havasu City Airport. FedEx and UPS make up the majority of air cargo operations and have their own dedicated facilities separated from commercial and passenger aircraft at Phoenix and Tucson airports. The total statewide air freight data by tonnage, value, and destination is provided in **Table 11**.

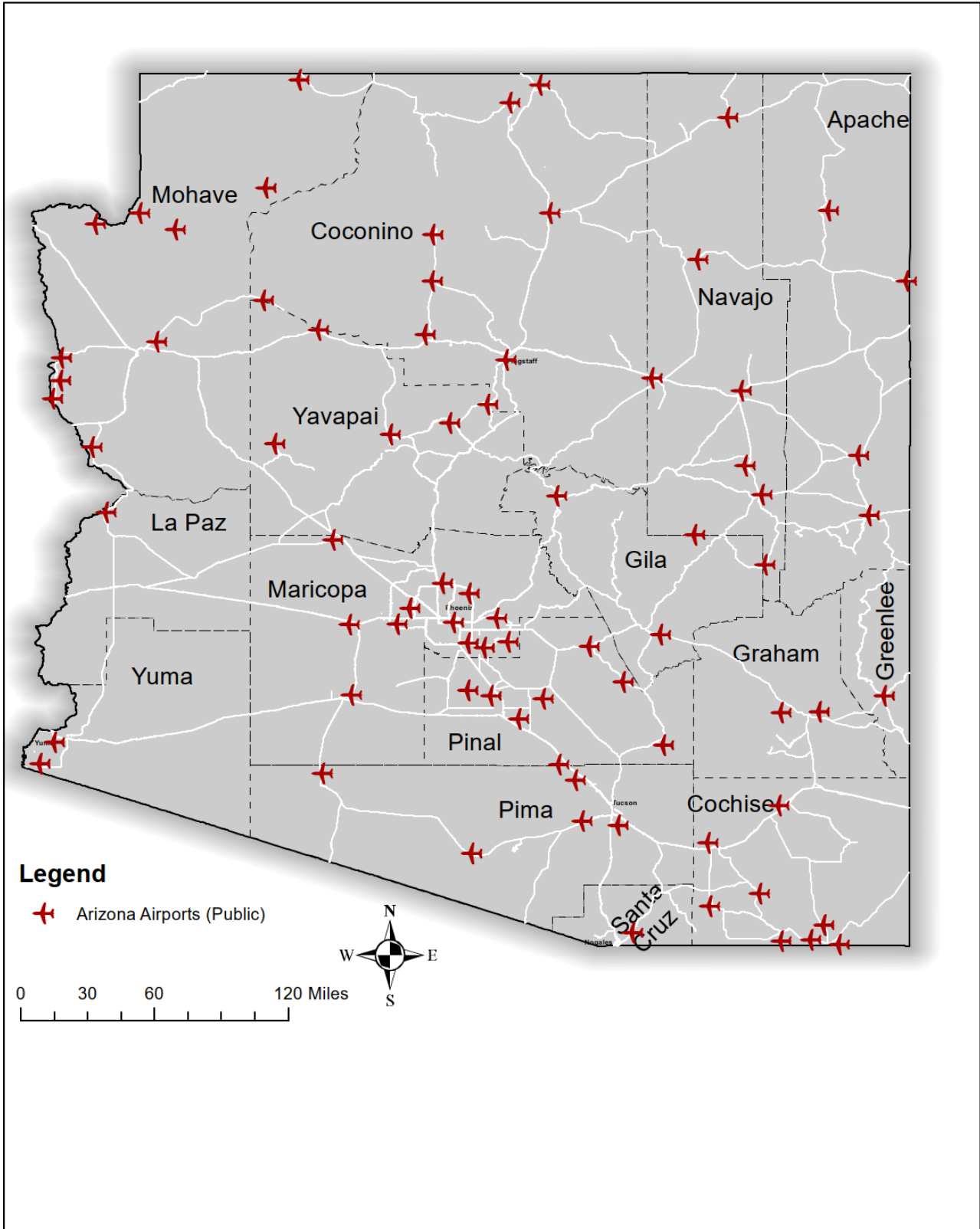
**Table 11. Arizona Air Freight by Tonnage and Value**

Category	Outbound (AZ to Other)	Inbound (Other to AZ)	Internal (AZ to AZ)	Total
Tonnage (Thousands)	142	131	2	277
Value (Billions)	14.5	12.3	.27	28

Source: ADOT State Freight Plan Appendix 1-1 and 1-3 <https://azdot.gov/sites/default/files/2019/08/arizona-state-freight-plan-110917.pdf>



Figure 14. Arizona Airports



Source: AZ Open Geo Data, ESRI





### 3.1.6 Rail

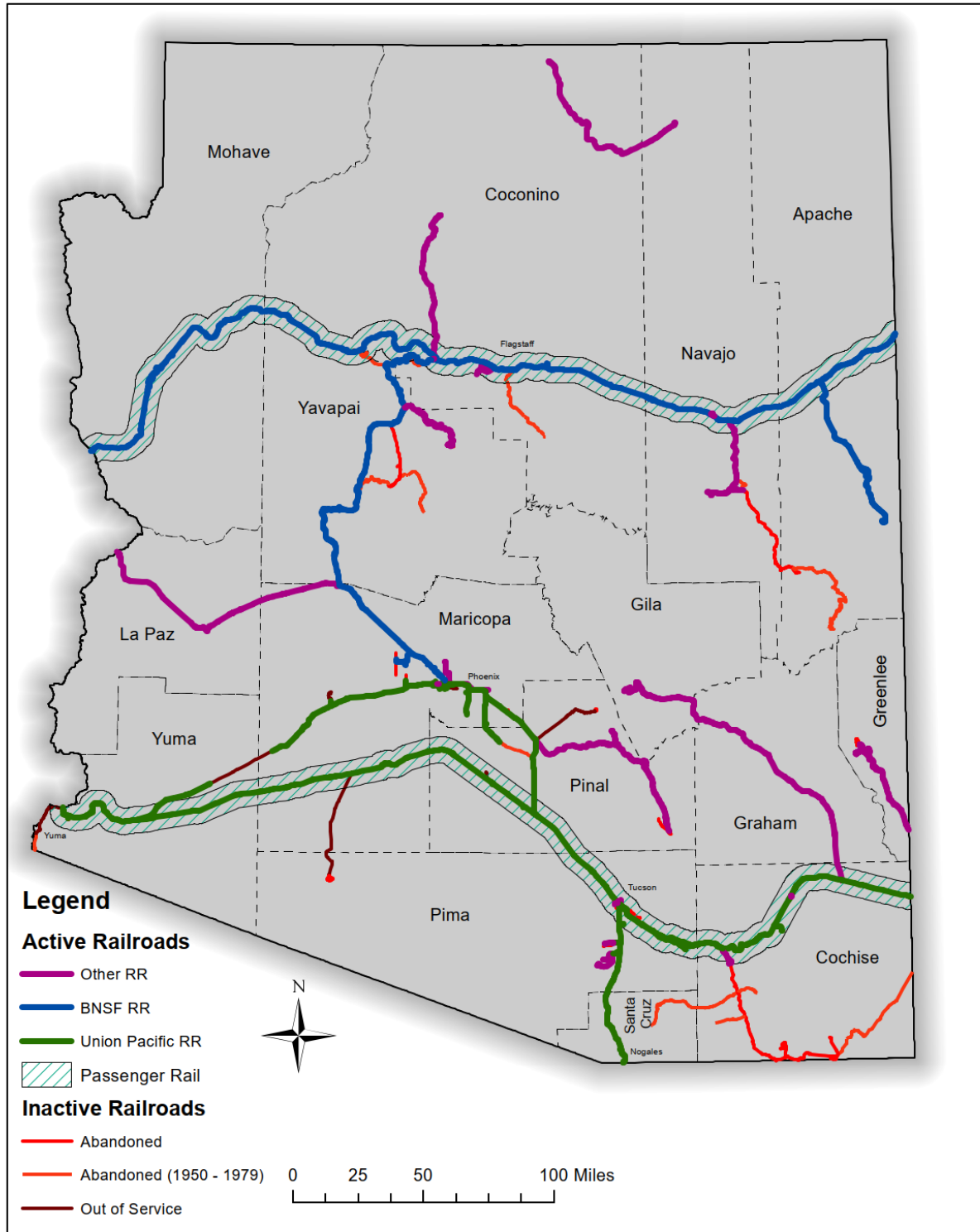
Railroads are categorized into three separate classes by the US Surface Transportation Board:

- Class I: line haul railroads with more than \$457.9 million in annual operating revenue
- Class II: line haul railroads with less than \$457.9 million in annual operating revenue but more than \$36.6 million in annual operating revenue—also known as regional railroads
- Class III: local railroads with less than \$36.6 million—also known as short line or switching railroads

The Arizona Rail network is comprised of two major railroad operators – BNSF Railway (BNSF) and Union Pacific Railroad (UPRR) - both of which are both class 1 rail lines. Arizona also contains nine Class III rail lines, eight of which are active short line railroads and one inactive. **Figure 15** shows the locations of the railroad routes within the state.



Figure 15. Arizona Railroads



Source: AZ Open Geo Data, ESRI

Currently, BNSF’s Transcon Line runs across the northern Arizona Through Flagstaff and Kingman and connects Southern California to Kansas City and Chicago. According to the State Rail Plan, the Transcon Line currently carries over 100 trains per day. Additionally, BNSF has an additional rail line which connects to Phoenix. In total, BNSF has approximately 690 miles of track in Arizona.



Union Pacific Railroad is the other Class I rail in the statewide network and operates its Sunset Route which serves the southern part of the state and connects Los Angeles to Houston. According to the State Rail Plan, the Sunset Route currently handles 20% of the railroad's total traffic. Union Pacific Railroad also has lines that run to both Phoenix and Nogales. In total, UPRR has approximately 690 miles of track in Arizona.

The statewide rail network also consists of 8 active short line railroads and 1 inactive short line railroad, which in total operate 478 miles of rail as shown in **Table 12**.

**Table 12. Arizona Short line Railroads**

Short line Railroad	Miles of Operation in Arizona
Apache Railway	46
Arizona and California Railroad Co.	164
Arizona Eastern Railway Co.	135
Black Mesa and Lake Powell Railroad	Not Active
Clarkdale Arizona Central Railroad, Inc.	38
Copper Basin Railway, Inc.	68
Drake switching Company, LLC	4
Kingman Terminal	3
San Pedro and Southwestern Railroad	20
<b>Total</b>	<b>478</b>

Source: State Rail Plan Table 1

Similarly, 77% of rail tonnage is moving through the state, connecting Southern California ports to Chicago and Dallas through BNSF and UPRR railroads. As shown in **Table 13**, the majority of local freight rail traffic in the state is inbound traffic. This is a result of Arizona being a consumer economy with little production of products.

Rail freight accounts for about one third (30%) of total freight tonnage in the state, and accounts for the largest portion of freight value in the state accounting for 48.5% of freight value. The total statewide rail freight data by tonnage, value, and destination is provided in **Table 13**.

**Table 13. Arizona Rail Freight by Tonnage, Direction, and Value**

Direction	Tons (Thousands)	Value (Billions)	Traffic Share
Outbound (AZ to Other)	3,200	\$66.7	2.5%
Inbound (Other to AZ)	24,500	\$98.4	19.3%
Internal (AZ to AZ)	1,200	\$72.3	0.9%
Through (Other to Other)	98,000	\$676.8	77.3%
<b>Total</b>	<b>126,900</b>	<b>\$914.2</b>	<b>100%</b>

Source: ADOT State Freight Plan Appendix 1-2 and 1-3

Amtrak also serves Arizona with two passenger rail routes - the Southwest Chief which operates using BNSF's line in the northern part of the state, and the Sunset Limited operating on the UPRR track in the southern part of the state. During the Federal Fiscal Year 2018, boardings and



alighting’s in the state totaled 107,287, with over half of these being in Flagstaff or Tucson as shown in **Table 14**. No passenger rail lines serve the Phoenix area - the closest station being in Maricopa about 45 miles south of Phoenix.

**Table 14. Arizona Amtrak Station Boardings and Alighting’s**

Station	Total Boardings and Alighting’s
Flagstaff	43,412
Tucson	28,163
Maricopa	11,744
Kingman	9,065
Yuma	4,525
Winslow	4,345
Williams	2,032
Benson	1,939
Total	105,245

Source: State Rail Plan table 15.

### 3.1.7 Non-Motorized (Bicycle and Pedestrian)

Non-motorized facilities are important aspects of the transportation system and provide connectivity for short trips and for residents with reduced access to vehicles. The 2020 American Community Survey Data shows how that 58,666 people walked to work, and 23,235 people biked to work in Arizona. The 2013 ADOT Bicycle and Pedestrian Plan outlines the current assets owned by ADOT that accommodate bicycle and pedestrian transportation:

- 2,853 miles of paved shoulders along the State Highway System with width of four feet or greater.
- 319.2 miles of sidewalk along the State Highway System, and 48 pedestrian grade separations over state highways.
- 19.6 miles of shared use paths along the State Highway System to accommodate both pedestrians and cyclists.

### 3.1.8 Ports of Entry

There are nine (9) ports of entry (POE) locations along the Arizona/Mexico border which are responsible for accommodating, monitoring, and controlling the movement of people and goods across the U.S.- Mexico border. There are 14 non-international ports of entry which are responsible for monitoring and checking all commercial traffic entering Arizona from neighboring states of California, Nevada, Utah, New Mexico, and Colorado. **Table 15** lists each of the state’s international POE locations and the types of flow processed.

In 2014, there were \$437 billion worth of goods moved through the US- Mexico border with 82% (\$359 billion) moved by truck. Of this amount, \$30 billion of goods were processed by Arizona border crossings with 66.7% (\$20 billion) moved by trucks. Within Arizona, 88% of international imports occurred at the Nogales border crossing which is the only Arizona port of entry to also have a crossing for rail.



**Table 15. International Port of Entry Locations in Arizona (West to East)**

POE	Arizona Population Center	Mexico Population Center	Type of Flows Processed
San Luis I	San Luis	San Luis Rio Colorado	Passenger Vehicles and Pedestrians
San Luis II	San Luis	San Luis Rio Colorado	Commercial Vehicles
Lukeville	Lukeville	Sonoyta	Commercial Vehicles, Passenger Vehicles, and Pedestrians
Sasabe	Sasabe	El Sasabe	Commercial Vehicles, Passenger Vehicles, and Pedestrians
Mariposa	Nogales	Nogales	Commercial Vehicles, Passenger Vehicles, and Pedestrians
DeConcini	Nogales	Nogales	Rail, Passenger Vehicles, Pedestrians,
Morley Gate	Nogales	Nogales	Pedestrians
Naco	Naco	Naco	Commercial Vehicles, Passenger Vehicles, and Pedestrians
Douglas	Douglas	Agua Prieta	Commercial Vehicles, Passenger Vehicles, and Pedestrians

Source: Arizona Sonora Border Master Plan

### 3.2 Travel Patterns

Travel behavior of Arizona residents provides insight into the available systems as well as the preferences of the users. As part of the US Census, surveys are conducted related to commute travel between home and place of work. The survey is limited in detail but provides a high-level overview of the principal mode of travel for workers above the age of 16 during a typical week. **Table 16** shows that the vast majority (85%) travel by car with only 1.6% using public transit.



**Table 16. Arizona Commuter travel by Mode**

County	Commute Mode							Total
	Car, Truck, or Van		Public Transportation	Worked from Home	Walked	Biked	Other	
	Drove Alone	Carpooled						
Apache	14,458	1,341	267	1,557	738	43	316	18,720
Cochise	37,189	4,286	236	2,833	1,439	169	1,133	47,285
Coconino	45,084	6,866	1,062	4,443	5,443	1,025	549	64,472
Gila	14,658	2,507	21	1,239	298	29	108	18,860
Graham	10,320	1,956	24	552	187	0	142	13,181
Greenlee	3,385	493	0	43	65	0	25	4,011
La Paz	4,937	672	1	145	188	124	28	6,095
Maricopa	1,548,339	225,164	37,081	206,869	31,145	14,037	38,237	2,100,872
Mohave	56,941	8,537	643	3,763	809	218	1,801	72,712
Navajo	25,484	3,391	414	2,320	1,621	170	539	33,939
Pima	337,360	44,206	8,821	34,778	9,553	6,110	7,725	448,553
Pinal	126,644	19,004	385	13,154	2,270	636	2,361	164,454
Santa Cruz	14,114	1,788	186	776	205	87	442	17,598
Yavapai	67,120	9,079	182	7,023	3,113	343	1,357	88,217
Yuma	63,937	9,983	1,436	2,839	1,592	244	988	81,019
<b>Total</b>	<b>2,369,970</b>	<b>339,273</b>	<b>50,759</b>	<b>282,334</b>	<b>58,666</b>	<b>23,235</b>	<b>55,751</b>	<b>3,179,988</b>

Source: American Community Survey Table B08301 2020: ACS Five Year Estimates

### 3.3 Vehicle Ownership/Use

According to the Arizona Motor Vehicle Department, there are over 7.7 million vehicles registered in the State as of July 2022. Removing those registrations associated with trailers results in 6.55 million registered motorized vehicles. On a per household basis, the average number of vehicles per household is approximately 2.1. On a per capita basis, the average number of vehicles per person over the age of 16 is approximately 1.1.

In recent years, adoption of alternate fuel vehicles is becoming more mainstream, particularly with electric vehicles. Alternate fuel vehicles comprise 63,147 vehicles of the total registered vehicles with electric vehicles being 40,964 of those. **Table 17** lists the number of registered vehicles, drivers’ licenses, vehicle miles traveled, and fuel used over the past five years.



**Table 17. Arizona Vehicle Ownership and Use Data**

	2016	2017	2018	2019	2020
Vehicle Registration	5,677,208	5,843,368	6,009,850	6,167,481	6,356,220
Drivers Licenses	5,135,262	5,221,403	5,308,307	5,375,341	5,772,928
VMT (Millions)	65,786	65,070	66,145	70,281	65,758
Fuel Use (Thousands of Gallons)	3,781,430	3,814,730	3,909,428	3,778,246	3,710,234

Source: ADOT 2020 Crash Facts Table 1-2 FHWA Highway Statistic Series Table VM-2 FHWA Highway Statistic Series Table MF-21

### 3.4 Safety

Federal regulations require all states to have a Strategic Highway Safety Plan (SHSP) that provides a comprehensive framework for reducing fatalities and serious injuries on public roadways. In Arizona, ADOT leads development of the SHSP in cooperation with local, state, federal and other safety stakeholders. Under the most recent Arizona SHSP (titled Strategic Transportation Safety Plan – STSP), the goal is that all highway safety programs in the state can be leveraged and coordinated to address transportation safety issues.

The STSP was developed in consultation with a broad array of transportation safety stakeholders throughout the state representing each of the 4 Es of Safety: Engineering, Education, Enforcement and Emergency Medical Services. Ultimately, the STSP’s vision is to eliminate all traffic fatalities and serious injuries. **Table 18** illustrates the historic crash types and severities that were evaluated as part of the STSP. As shown, fatalities have generally increased annually since 2014 in both total and per 100 million VMT.



**Table 18. Arizona Crash Fatality and Injury Data**

Year	Vehicle		Pedestrians		Pedalcyclist		Total Fatalities
	Serious Injuries (Per 100M VMT)	Fatalities (Per 100M VMT)	Injuries	Fatal	Injuries	Fatal	
2009	4,808 (81)	569 (1.29)	1,304	122	1,643	25	806
2010	4,600 (83)	588 (1.27)	1,236	155	1,583	19	762
2011	4,570 (83)	648 (1.38)	1,253	154	1,604	23	825
2012	4,471 (82)	672 (1.37)	1,354	131	1,755	18	821
2013	4,305 (83)	656 (1.39)	1,356	158	1,679	30	844
2014	3,910 (81)	589 (1.24)	1,347	157	1,466	28	774
2015	4,117 (82)	705 (1.38)	1,236	161	1,276	29	895
2016	4,570 (86)	728 (1.45)	1,458	193	1,350	31	952
2017	4,112 (85)	742 (1.54)	1,510	226	1,371	32	1,000
2018	3,729 (80)	741 (1.53)	1,537	245	1,182	24	1,010
2019	3,561 (76)	732 (1.40)	1,697	220	1,259	30	982
2020	3,080 (63)	789 (1.61)	1,351	235	812	33	1,057
2021	3,819 (70)	878 (1.60)	1,535	257	1,005	45	1,180

Source; ADOT AZ Crash Facts Annual Reports





## 4 Policy Requirements and Guidance

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The ADOT Long-Range Transportation Plan must meet or exceed all federal and state laws, policies, and regulations relevant to the development of a statewide long-range plan. In addition, the plan must be developed in accordance with non-discrimination principles, including, but not limited to, those outlined in:

- Title VI of the Civil Rights Act of 1964 - “No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.”
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which established environmental justice and protection as a federal government priority.
- Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities, which defines the term “equity” as the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.

### 4.1 Federal Regulations and Guidance

Federal regulations relevant to the development, planning process, and scope of Statewide Long-Range Transportation Plans are laid out in the Code of Federal Regulation Title 23 Part 450. Per the Code of Federal Regulation:

“The State shall develop a long-range statewide transportation plan, with a minimum 20-year forecast period at the time of adoption, that provides for the development and implementation of the multimodal transportation system for the State. The long-range statewide transportation plan shall consider and include, as applicable, elements and connections between public transportation, non-motorized modes, rail, commercial motor vehicle, waterway, and aviation facilities, particularly with respect to intercity travel.” In addition, this section also requires the Long-range statewide transportation plan to include considerations of the role that intercity buses may play in reducing congestion, pollution, and energy consumption (23 CFR 450.216).

It also requires the statewide transportation planning process to address the following 10 factors: (23 CFR 450.206)

1. Support the economic vitality of the United States, the States, metropolitan areas, and nonmetropolitan areas, especially by enabling global competitiveness, productivity, and efficiency.
2. Increase the safety of the transportation system for motorized and non-motorized users.
3. Increase the security of the transportation system for motorized and non-motorized users.
4. Increase accessibility and mobility of people and freight.
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.



6. Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight.
7. Promote efficient system management and operation.
8. Emphasize the preservation of the existing transportation system.
9. Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
10. Enhance travel and tourism.

## 4.2 State Regulations and Guidance

The Long-Range Transportation Plan process is directed by the Arizona Revised Statutes which define the requirements for the LRTP, and the responsibilities of the parties involved in the following statutes.

- Statewide Transportation Policy Statement (ARS 28-306) - Requires the Statewide Transportation Board to develop a statewide transportation policy statement that provides guidance to the department in developing a comprehensive and balanced statewide highway system. The statement should include the performance expectations for the statewide transportation system over the next twenty years using the performance measures developed pursuant to section 28-504.
- Long-Range Statewide Transportation Plan - Board Duties (ARS 28-307)- Requires the State Transportation Board to develop a statewide transportation plan. The plan should facilitate, rather than direct, future development in the state, and to the greatest extent possible, the plan must reflect the future transportation needs of the various areas of the state. Requires that the dollar estimates in the plan be updated every two years with the certification required by section 28-335. It also requires that the board consider local, regional, and tribal transportation plans.
- Long-Range Statewide Transportation Plan - Division Duties (ARS 28-506)- Requires MPD to develop the Long-Range Transportation Plan with the requirements of:
  - Including all anticipated critical state highway system needs for the next 20 years
  - Developed using the planning practices and the performance-based planning process adopted by the board
  - Reflecting local and county land use plans
  - Developed every five years for review and approval by the board

## 4.3 Regulations on Performance Measures

In order to assess the quality of the system and progress toward achieving the identified program goals, a performance program that measures individual criteria and compares them to established targets must be developed. ADOT has been measuring system performance for a long time. In the 2050 LRTP, there are additional considerations that need to be incorporated into the program to comply with regulations and ensure progress toward desirable outcomes.

### 4.3.1 Federal Regulations

The Code of Federal Regulations requires states to describe the performance measures used in assessing the performance of the statewide transportation system. In general, these performance measures must align with the seven National Goals laid out in 23 U.S.C 150 (b).

1. Safety—To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.



2. Infrastructure Condition—To maintain the highway infrastructure asset system in a state of good repair.
3. Congestion Reduction—To achieve a significant reduction in congestion on the National Highway System.
4. System Reliability—To improve the efficiency of the surface transportation system.
5. Freight Movement and Economic Vitality—To improve the National Highway Freight Network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
6. Environmental Sustainability—To enhance the performance of the transportation system while protecting and enhancing the natural environment.
7. Reduced Project Delivery Delays—To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

#### 4.3.2 State Regulations

Per ARS 28-506, the LRTP must be developed using the planning practices and performance-based processes adopted by the State Transportation Board. These performance measures, as outlined in ARS 28-504, include the following:

1. The estimated number of individuals transported
2. The estimated amount, by weight or volume, of freight transported
3. The number of miles traveled
4. The number of vehicles and the estimated capacity of those vehicles
5. The estimated cost per individual moved per mile



## 5 L RTP 2050 Vision and Goals

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The vision statement is designed to set the direction for the L RTP and will guide the stakeholders in the development of the plan. It is a statement of how ADOT, regional stakeholders, and the people of Arizona “see” the transportation system of the future and its many possible evolutionary paths. The goals provide a framework for implementing the plan and provide guidance for what ADOT strives to achieve with respect to both the transportation system and how the agency conducts business to deliver a successful transportation program.

### 5.1 Vision and Goals Background

The development of the 2050 L RTP vision and goals should be based on current guidance and direction from both Federal and State level so that the 2050 L RTP aligns with expectations and requirements of the plan. The following sections provide key topics and/or requirements of the L RTP at each level – Federal, State, and Agency.

#### 5.1.1 Federal Guidance

Federal guidance for the development of L RTP documents includes key focus areas and technical requirements that can be incorporated into vision and goals. These include:

- Integration and Connectivity
- Safety and Security
- Mobility, Accessibility, and Reliability
- Preservation
- Resiliency
- Economic Vitality

#### 5.1.2 State Guidance

State guidance for the development of L RTP documents includes key focus areas and technical requirements that can be incorporated into vision and goals. These include:

- Future Needs
- Performance Measurements
- Dollar Estimated

#### 5.1.3 Agency Visions and Goals

ADOT has developed several visions for the agency and the prior L RTP that can serve as input for the 2050 L RTP vision development. These include:

- Current ADOT Agency Vision: *“To safely connect people and empower our economy”*
- Current ADOT Agency Mission: *“We provide highway infrastructure and transportation services”*
- 2040 L RTP Vision: *“Moving AZ to become the most reliable transportation system in the nation.”*



The vision statements for the agency and the 2040 LRTP are effectively the same with a focus on reliability. The 2040 LRTP incorporates broader topics in the goal statements that supplement the vision. These include:

- Improve mobility, reliability, and accessibility
- Promote fiscal stewardship
- Enhance safety
- Strengthen partnerships
- Preserve and maintain the system
- Make effective investment decisions

## 5.2 2050 Vision

To realize the vision, Arizona has identified seven priority goal areas (**Figure 16**) to guide state and regional transportation planning and decision-making in the years ahead. These take their lead from the 2040 LRTP and expand on them to accommodate updated requirements and expectations.



Figure 16. 2050 LRTP Vision and Goals



The approach for the 2050 LRTP vision was to bring more of the key elements/goals into the vision statement. It is designed to provide a broader foundation for the goals and objectives that will follow and increases reference to key elements in federal and state guidelines such as:

- Equity and equality
- Resilience
- Climate responsiveness
- Sustainability
- Multimodal emphasis

The 2050 LRTP vision is based on the current ADOT vision and mission statements and input received from ADOT and MPOs and COGs. *Vision:*

**“Connecting Arizona. Better Lives Through Better Transportation.”**



### 5.3 2050 LRTP Goals/Objectives

As the transportation environment has evolved over the past decade, some aspects of the overall transportation program have now taken on additional significance such as new technologies, climate impacts, equity, resiliency planning, etc. These will require defining the 2050 LRTP goals to incorporate the new elements but will remain closely compatible with previous statements. The below goals and objectives for the LRTP focus on issues that affect the condition and performance of the Arizona transportation system, such as enhancing system resiliency to human- and climate change-related disruptions.

Each goal must consist of objectives that define how the goal can be achieved. The objectives for each goal must lead to a more complete understanding of the intent behind the goal. The objectives must also permit breaking down the broad goal statement into manageable components that lend themselves to measurable outcomes.

The goals are not designed to be mode-specific, but each modal element needs to be categorized and presented to allow access to mode-specific funds for maximum benefit.

The 2050 LRTP goals and objectives include:

#### 5.3.1 Preserve and maintain the system.

To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services

*Objectives*

- Achieve and maintain a state of good repair of transportation assets within available resources
- Cost-effectively maintain, operate, and upgrade assets to maximize useful life
- Incorporate resiliency, adaptability, and redundancy in the transportation network, systems management, and operation

#### 5.3.2 Enhance safety and security.

To provide for and improve the safety and security of transportation customers and the transportation system

*Objectives*

- Reduce the number of lives lost and injuries sustained on Arizona’s transportation network, striving for zero
- Foster a community and workplace culture of safety first
- Reduce vulnerability from various threats; protect physical assets, cyber assets, and transportation systems
- Prepare for and implement efficient coordinated response and recovery to emergency and disaster events



### 5.3.3 Improve mobility, reliability, and accessibility

Improve the predictable movement of goods and people throughout Arizona with expanded travel choice and application of state-of-the-practice system designs and technologies

*Objectives*

- Advance access and connectivity between modes
- Support accessible and equitable modal options for the movement of people
- Mitigate travel delays and alleviate congestion to provide predictable, reliable travel times
- Leverage technology, communications, and management strategies to maximize safety and operational efficiency of existing systems and keep up with of major travel trends
- Identify and close redundancy gaps in the network to support continued mobility in the event of disasters or other disruptions

### 5.3.4 Promote Environmental and Health Stewardship

To enhance Arizona’s quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment while improving the quality, resilience, effectiveness, and efficiency of the transportation system

*Objectives*

- Create opportunities for safe physical activity, equitable transportation choice, and community engagement
- Support flexible and adaptable measures to the transportation system to accommodate anticipated climatic changes and potentially severe climatic events over time
- Plan, develop, and maintain transportation facilities in a manner that protects the natural, historic, and cultural environment and avoids or minimizes adverse impacts
- Pursue community-supportive transportation outcomes
- Strive for cleaner, more efficient, and sustainable energy sources for transportation operations and facilities

### 5.3.5 Support Equitable Access to the State Highway System

To support all Arizonans in equitable and convenient access to the statewide transportation network to facilitate access to jobs, education, healthcare, services, recreation, and other destinations.

*Objectives*

- Improve access and choices for all Arizona residents by supporting transportation system access to job opportunity and training, health care, food availability, and recreation
- Support transportation system accessibility to underprivileged populations without damaging community culture or neighborhood integrity
- Identify & mitigate transportation burdens for low-income communities, communities of color, people with disabilities, and other disadvantaged groups





### 5.3.6 Strengthen partnerships

Develop and nurture partnerships that support coordination, integration, and preservation of ADOT's investment.

#### *Objectives*

- Look for opportunities to partner with the private sector to stretch public funds through public-private partnerships or coordinated program development
- Work with appropriate specialists/experts during project development, design, and construction to optimize safety, community health, and climate responsiveness

### 5.3.7 Support economic vitality

To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a diverse and prosperous economy

#### *Objectives*

- Pursue transportation asset and operational improvements that will expand access to economic opportunities, jobs, and core services
- Improve transportation connectivity to established and emerging activity centers and tourist destinations
- Strengthen partnerships throughout the State to encourage and support existing and new opportunities as the demographic base expands
- Create and enlarge competitive advantage for Arizona supply chains through higher productivity and reliability in the state freight system, supporting economic growth, and strengthening economic resilience
- Coordinate transportation systems with land use for efficient and sustainable use of resources

While the policy goals are shared statewide, the implementation strategies and actions to make the goals/objectives a reality may vary across the State. There is some degree of overlap among the transportation goals/objectives, and some strategies may help to achieve more than one goal/objective.



## 6 Performance Management

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### 6.1 National Performance Measures and Targets

At the Federal level, Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21) identified six (6) national transportation system goal areas – safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, and environmental sustainability. The rulemaking also established seventeen (17) performance measures that form the basis of State-level performance-based transportation planning and programming of transportation projects. Each State must establish multi-year targets for each measure – safety targets are established annually based on a 5-year average while the remaining targets are established for 2- and/or 4-years periods. The performance measures, listed below, will be used in the LRTP Needs Working Paper.

#### Safety targets (based on a five-year rolling average)

- Number of Fatalities
- Rate of Fatalities/100 million Vehicle Miles Travelled
- Number of Serious Injuries
- Rate of Serious Injuries/100 million Vehicle Miles Traveled
- Number of Non-motorized Fatalities and Serious Injuries

#### Bridge Targets

- Percent of National Highway System (NHS) Bridges classified in good condition based on deck area
- Percent of NHS Bridges classified in poor condition based on deck area

#### Pavement Targets

- Percent of Interstate Pavements in good condition
- Percent of Interstate Pavements in poor condition
- Percent of Non-Interstate NHS Pavements in good condition
- Percent of Non-Interstate NHS Pavements in poor condition

#### System Performance Targets

- Freight Reliability on the Interstate (Truck Travel Time Reliability Index)
- Percent of person-miles that have reliable travel times on the Interstate
- Percent of person-miles that have reliable travel times on the Non-Interstate NHS

#### Air Quality Emissions Targets (Kilograms per day)

- Volatile Organic Compounds
- Carbon Monoxide
- Nitrogen Oxides
- Particulate Matter (< 10 microns)
- Particulate Matter (< 2.5 microns)



## 6.2 ADOT Asset Management

In an effort to manage the State’s assets and develop a performance-based approach to maintaining a State of Good Repair (SOGR), ADOT has developed a Transportation Asset Management Plan (TAMP). The primary focus of the TAMP is to develop a 10-year planning approach that fits between the ADOT LRTP and the STIP. Currently, the ADOT TAMP includes only pavement (23,067 lane miles) and bridges (5,052) but will eventually add other assets once the inventory and condition data is fully developed. The Arizona Commerce Authority created the Statewide Broadband Middle-Mile Strategic Plan which establishes initiatives for future Broadband infrastructure in the state, including right of way access along state highways. According to the Broadband Study, there is consideration to include broadband as an asset in the future.

The TAMP effort includes a historic analysis of asset conditions and recommends future lifecycle planning scenarios to meet the SOGR targets for bridges and pavements. Input and analysis to the lifecycle planning uses the AASHTOWare BrM 6.0 bridge management system and the Deighton dTIMS pavement management system. These TAMP efforts will be used in the LRTP Needs Working Paper.

## 6.3 Additional Recommended Performance Measures

Over the past decade, additional elements have become important in understanding the full measure of the state transportation system performance. While many of the goals of the LRTP are already well covered by current metrics, there are some new targets that will need to be incorporated into the performance program. Many are already part of an ongoing data collection effort though not yet fully integrated into the transportation system performance program. The following are examples of additional performance measures.

### To address goal to “Support Equitable Access to the State Highway System”

- Access to destinations by income quintile and race
- Transportation and housing cost burden by income quintile and race
- Number of communities and community-based organizations (CBO) meaningfully engaged in development of plans and projects
- Air quality in low income and disadvantaged communities
- Access to active modes in low income and disadvantaged communities

### To address “Improve Mobility, Accessibility and Reliability”

- Percent of travel by non-single occupancy vehicles
- Percent of person-miles traveled on the Interstate Highway System that are reliable
- Percent of person-miles traveled on the non-Interstate NHS that are reliable
- Annual hours of peak-hour excessive delay per capita
- Access to destinations by mode
- Access to destinations by travel cost
- Households with access to transit service
- Average on-time performance for transit and intercity rail

### To address “Support Economic Vitality”

- Truck Travel Time Reliability (TTTR) Index
- Annual twenty-foot equivalent units (TEUs) imported & exported through Arizona ports of entry
- Annual Employment Growth of high-quality jobs

Evaluation of these performance measures and the required data will be included in the LRTP Needs Working Paper.



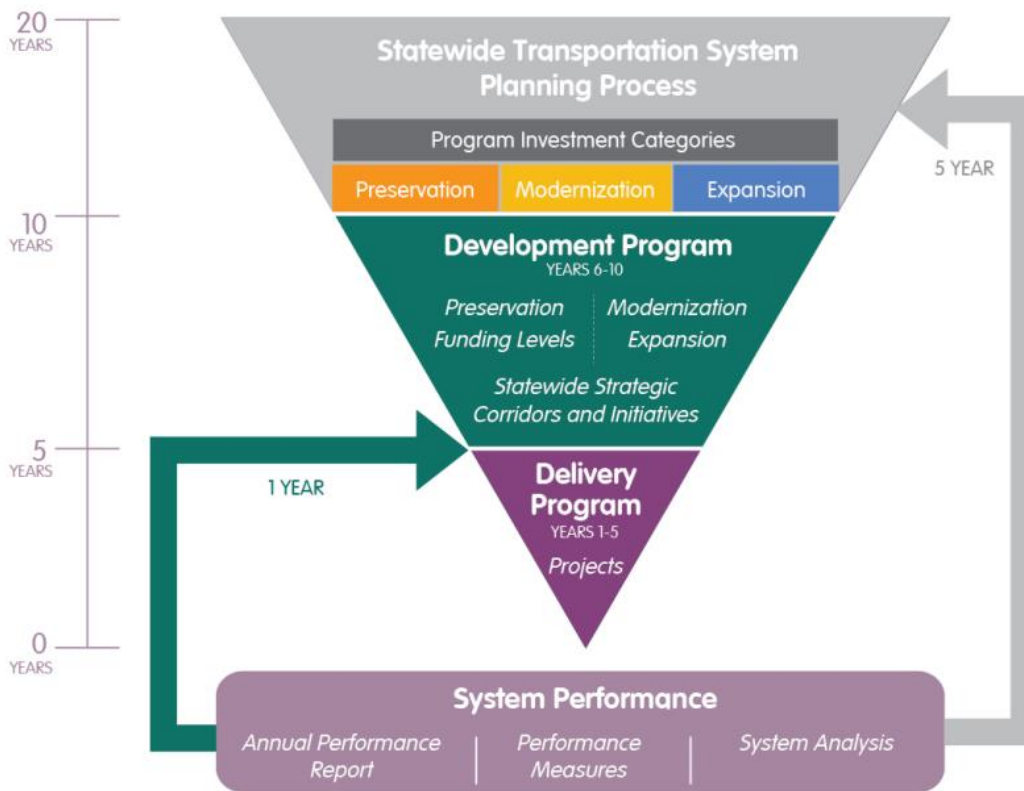
### 6.4 Planning to Programming Process

ADOT has developed an internal process entitled “Planning to Programming (P2P)” to link the Long-Range Transportation Plan to the Five-Year Construction Program. The P2P effort utilizes the Recommended Investment Choice from the LRTP to prioritize investments within the three categories of Preservation, Modernization, and Expansion. The annual effort surrounding the P2P process is documented in the *Linking the Long-Range Plan and Construction Program, P2P Link Methodologies and Implementation Plan* (June 2014, ADOT).

From the above documentation, P2P is a “performance-based approach to planning, programming, and financial decision making that ensures available funds are used in the most productive way to meet overall transportation system performance objectives.” Furthermore, the objective of P2P is to provide “a transparent, logical, defensible, understandable, and reproducible methodology to efficiently preserve and improve the Arizona transportation system.”

A graphic showing the relationship between the LRTP, and the 5-year project programming is shown in **Figure 21**. The P2P process provides the transition between the Development Program (green) and the Delivery Program (purple) on a continuous 1-year cycle.

Figure 17. P2P Program



Currently, P2P has developed a structured evaluation process to prioritize project nominations by scoring technical, safety, policy, and district criteria. While the process starts with an open “call-for-projects”, the evaluation process categorizes projects into the LRTP investment categories prior to evaluation. Any changes to the LRTP must consider potential impacts to the P2P process, particularly with the categorization of projects. Any new categories or significant changes to existing



categories will require changes to the P2P scoring and evaluation framework and potentially new data or new weighting factors



## 7 Summary

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As the LRTP defines the “blueprint” for Arizona’s State Transportation System, the Vision of the LRTP informs how current and future transportation plans, policies, and initiatives can help to guide that blueprint. This Vision and Goals Document identifies the impact and current needs of the transportation system and provides strategies to support further system preservation and growth. This vision and its supporting goals allow Arizona residents to understand the foundation of how ADOT makes system decisions. They also help to build trust in the process and provide a level of confidence that citizens can rely on Arizona’s future transportation program.

This LRTP builds on the work completed in the last LRTP, which was finalized in 2018. Some goals are the same, but there are new goals along with objectives and strategies that have been updated to reflect how conditions have evolved since the last long-range plan. Climate change, technological advancements, the need for redundancy and reliability, and social equity concerns have all contributed to how the LRTP will help shape ADOT’s decisions over the next 30 years. Much of the process will remain the same but will be expanded to incorporate the additional considerations that have become an essential part of transportation policy and programming.

Through the goals and objectives presented in this 2050 LRTP, ADOT will prioritize the needs of the transportation system to best serve the people that depend on it. These goals and objectives are designed to actively support system resilience, safety, reliability, environmental health, equity, partnerships, and fuel Arizona’s economic vitality as well as provide a basis for ongoing performance monitoring and improvement. The LRTP Vision for Arizona’s transportation system identifies a pathway to achieve a transportation system that supports all Arizona residents, visitors, and businesses.

**Connecting Arizona. Better Lives Through Better Transportation.**

