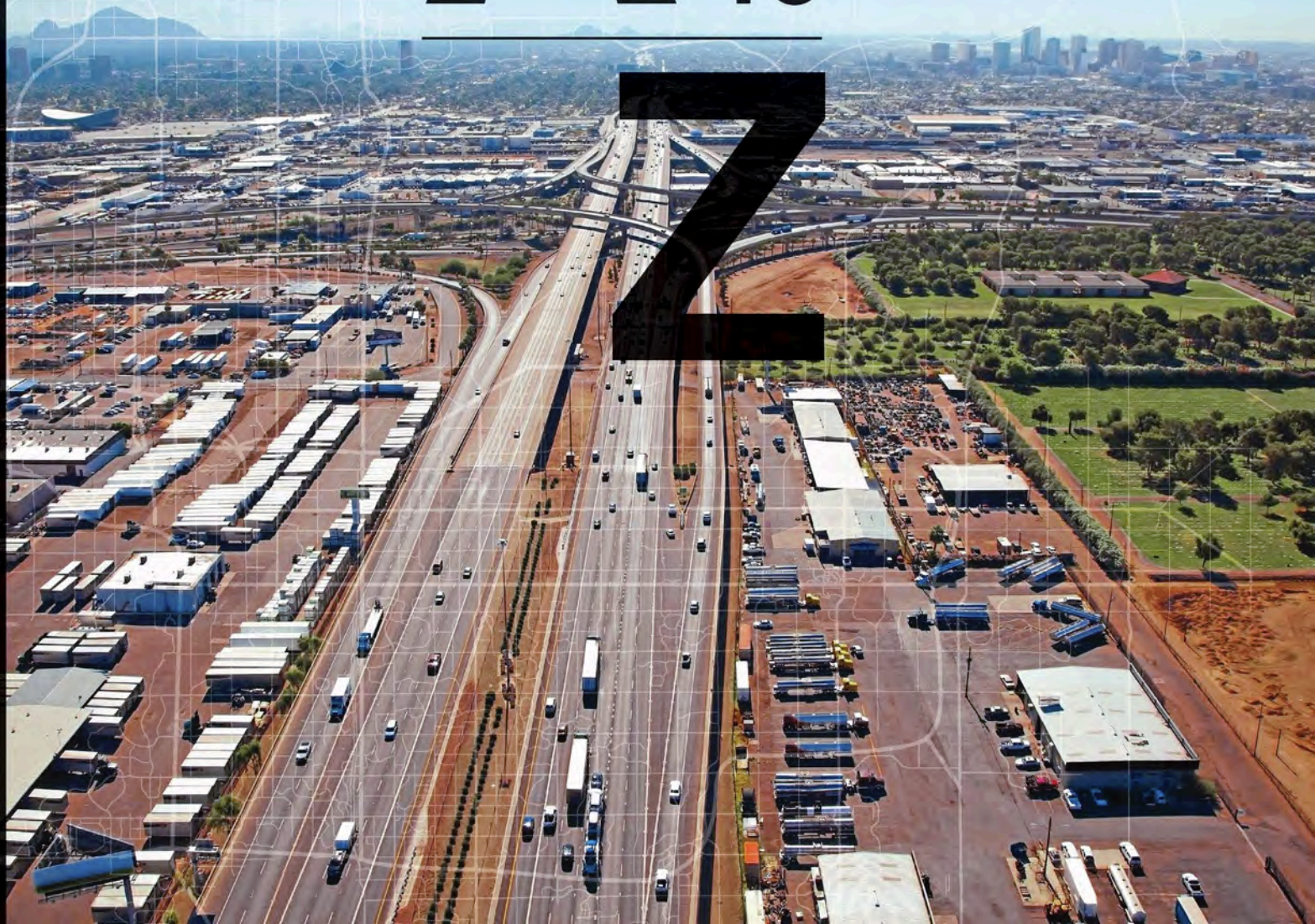
ADOT

Arizona State Freight Plan

A To Z



U.S. Department of Transportation
Federal Highway Administration

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November 15, 2017

In Reply Refer To:
(TRAP 42 – Freight, VSW, MFTax, BDR)
State Freight Plan
Federal Agency Comments on AZ State Freight Plan

Mr. Gregory Byres, Division Director
Multimodal Planning Division
Arizona Department of Transportation
Phoenix, Arizona 85007

Dear Mr. Byres:

The Federal Highway Administration ("FHWA") Arizona Division Office ("Division Office") has reviewed the Arizona Department of Transportation's A to Z Arizona State Freight Plan ("Plan") dated November 9, 2017 and received by the Division Office on November 9, 2017.

The Division Office finds that the Plan contains all elements required by 49 U.S.C. § 70202. The State has, therefore, met the prerequisite in 23 U.S.C. § 167(i)(4) that it develop a State Freight Plan in accordance with 49 U.S.C. § 70202 before it may obligate funds apportioned to the State under 23 U.S.C. § 104(b)(5). The State may now obligate such funds for projects that meet all National Highway Freight Program ("NHFP") eligibility requirements described in 23 U.S.C. § 167, and all other applicable Federal requirements.

Please be advised that the Division Office's finding that the Plan satisfies the requirements of 49 U.S.C. § 70202 and 23 U.S.C. § 167(i)(4) is not a determination that the projects listed in the freight investment plan component of the Plan required by 49 U.S.C. § 70202(b) meet all other NHFP eligibility requirements set forth in 23 U.S.C. § 167, or any other applicable Federal requirement.

If you have any questions regarding NHFP eligibility requirements, please contact Romare Truely at (602) 382-8978.

Sincerely,

Romare Truely

for Karla S. Petty
Division Administrator

Arizona State Freight Plan

This document is Arizona's five-year State Freight Plan and fulfills the federal requirements for state freight plans embodied in the Fixing America's Surface Transportation (FAST) Act. This Freight Plan, together with a series of technical working papers that informed development of the Freight Plan, also provides the Arizona Department of Transportation (ADOT) with a base of decision making knowledge and strategies to increase the prominence of freight in ADOT planning and programming.

Acknowledgements

ADOT thanks an outstanding CPCS (CPCS Transcom Inc.) team for its exemplary efforts in producing this Freight Plan. ADOT also expresses gratitude to the Technical Advisory Committee (TAC) and Freight Advisory Committee (FAC) for valuable advice throughout the development of the plan. Michael Demers, though no longer employed at ADOT, is acknowledged for managing the Plan developed for ADOT, while he served as ADOT Freight Planner. Heidi Yaqub, ADOT's current Freight Program Manager is also recognized for her efforts in completing the Final Plan document.

The Arizona State Freight Plan was prepared under the direction of the Arizona Department of Transportation (ADOT) by:

CPCS

In association with:

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American Transportation Research Institute, Inc.
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Table of Contents

1 Introduction

Key Messages

The State Freight Plan defines immediate and long-range investment priorities and policies that will generate the greatest return for Arizona's economy. It also fulfills federal requirements for state freight plans embodied in the Fixing America's Surface Transportation (FAST) Act.

Developed from 2015 to 2017, the Arizona State Freight Plan consolidates the strategies identified through its 11-phase development. The Freight Plan will serve as a guide to the strategies and actions that increase the prominence of freight in planning and programming statewide.

1.1 Purpose of the Freight Plan

The aims of the Arizona State Freight Plan (Freight Plan) are twofold:

- Establish a five-year Freight Plan, in line with federal requirements for state freight plans embodied in the FAST Act.
- Summarize knowledge to guide the Arizona Department of Transportation's (ADOT) decision-making to fulfill the core strategy of this plan, which is to increase the prominence (address the importance) of freight in the planning and programming activities of ADOT.

The Freight Plan identifies freight transportation facilities in Arizona that are critical to the state's economic growth and gives appropriate attention to investments in such facilities.

The Freight Plan provides Arizona with a guide for assessing and making sound investment and policy decisions that will yield outcomes consistent with the state's vision, goals, and objectives, and notably, promote regional competitiveness and economic growth.

1.2 The Economic Context for the Arizona State Freight Plan

Arizona's economic potential is supported by the state's transportation infrastructure, which connects sources of production to markets. When transportation infrastructure and related services are efficiently designed and competitively positioned, businesses benefit from lower transportation costs, faster and better transportation services, and increased reliability, which in turn contribute to their own competitiveness and growth, and to that of the broader region.

A more competitive freight transportation system also enables enhanced trade-related and value-added activity. As noted by the Arizona Trade and Corridor Alliance, "Businesses that 'export' goods and 'import' money are keys to bringing new wealth to Arizona."[1] This requires access to competitive freight transportation infrastructure and services. This is also one of the key foundations for long-term economic growth within the state.

Jurisdictions with access to competitive transportation infrastructure and services are at a competitive advantage in attracting investment, creating jobs, and realizing economic growth.

Arizona will need to balance economic competitiveness aims with other goals, including safety, state of good repair of infrastructure, and environmental sustainability. The Freight Plan should also recognize other goals such as those established in the FAST Act and in Arizona's Long-Range Transportation Plan (LRTP), among other state and regional plans.

Figure 1-1: Multiple Stakeholder Perspective

Freight Shippers: Faster, cheaper, more reliable

Consumers: Right price, right place, right time

Carriers: Maximize utilization of assets, profits

Society: Maximize benefits, minimize impacts

Government: Enable all of the above with limited resources and differing priorities

Moreover, the Freight Plan was designed to balance a range of stakeholder interests and objectives. Indeed, optimizing the state's freight transportation system means different things to different stakeholder groups, as summarized in Figure 1-1 above. An effective Freight Plan should provide ADOT with a guide for *enabling* many of these desired stakeholder outcomes.

Yet, Arizona faces a constrained fiscal environment in which transportation system investment needs exceed available funding. Arizona's LRTP (2016–2040) estimates the state's 25-year statewide transportation needs at $89.5 billion in constant 2016 dollars, with the majority share, or close to $62 billion, relating to preservation, modernization, expansion, and

[1] Transportation and Trade Corridor Alliance, The Roadmap, Arizona's Path to Global Market Expansion (2014).

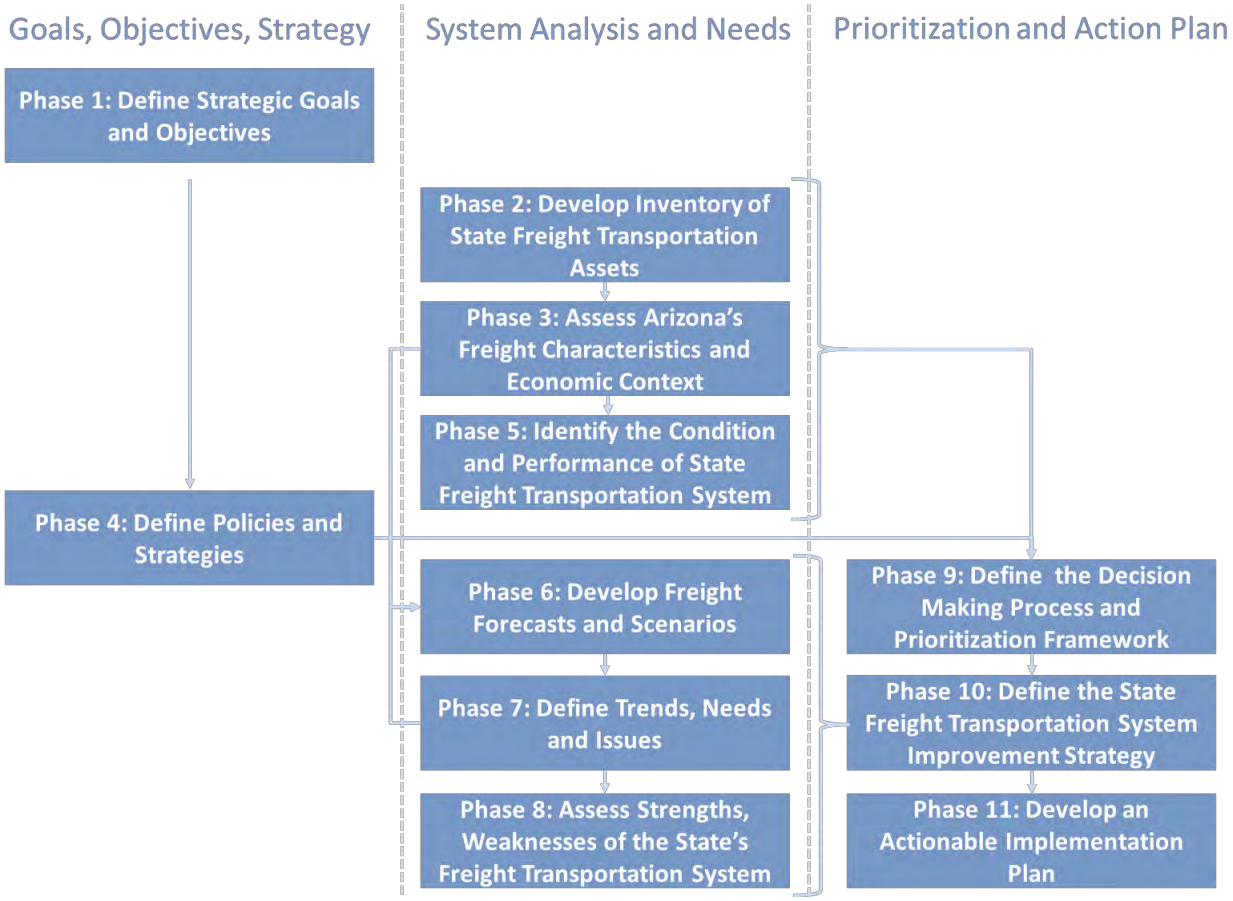
operations and maintenance of Arizona's state highways.[2] Arizona's current revenue base, not to mention increased uncertainty surrounding federal funding for surface transportation from the Highway Trust Fund, will not be sufficient to pay for these investments.

Fiscal realities are such that ADOT cannot address all transportation system needs. Rather, it must be strategic in defining and prioritizing its investments and improvements.

1.3 Freight Plan Development Phases

The Freight Plan was developed in 11 phases, organized under three overarching headings, as summarized in Figure 1-2. This document consolidates the findings of all 11 phases. Technical working papers associated with each Phase are available on the ADOT Freight Plan Website.

Figure 1-2: Phased Approach to the Development of Arizona's State Freight Plan



[2] *What Moves You Arizona: Arizona Long Range Transportation Plan Update Final Working Paper #3: Existing Conditions, Deficiencies and Future Needs*. Arizona Department of Transportation, 2017.

1.4 FAST Act Requirements for Freight Plans

Figure 1-3 illustrates the way in which the Arizona Freight Plan fulfills FAST Act requirements.

Figure 1-3: FAST Act Requirements in Arizona State Freight Plan

Required Elements	Addressed in Arizona State Freight Plan
1. An identification of significant freight system trends, needs, and issues with respect to the state.	• Chapter 7 outlines freight trends. • Chapter 8 identifies freight needs and issues.
2. A description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state.	• Chapter 3 outlines freight policies and strategies, grounded in the Freight Plan vision, goals, and objectives. • Chapter 5 presents the performance measures. • Chapter 9 applies a merit-based prioritization framework.
3. When applicable, a listing of— a. multimodal critical rural freight facilities and corridors designated within the state under section 70103 of title 49: National Multimodal Freight Network (NMFN). b. critical rural and urban freight corridors designated within the state under section 167 of title 23: National Highway Freight Program (NHFP).	• Chapter 10 contains a description of the critical rural freight corridor (CRFC) and critical urban freight corridors (CUFC) designated to date in Arizona. • The National Multimodal Freight Network has yet to be finalized, limiting the ability of the Freight Plan to present components of that system.
4. A description of how the plan will improve the ability of the state to meet the national multimodal freight policy goals described in section 70101(b) of title 49, United States Code and the NHFP goals described in section 167 of title 23.	• Chapter 3 explains how the Arizona State Freight Plan enables the state to meet the national multimodal freight policy goals and NHFP goals.
5. A description of how innovative technologies and operational strategies, including freight intelligent transportation systems (ITS), that improve the safety and efficiency of the freight movement, were considered.	• Chapter 7 implements Scenario planning, which considered technological advancements to define the potential future states affecting Arizona's transportation system. • Chapter 8 details operational strategies to resolve congestion, weather, and other issues affecting freight. • Chapter 10 proposes the use of ITS for solving freight issues outlined in the Freight Plan.
6. In the case of roadways on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of the roadways, a description of improvements that may be required to reduce or impede the deterioration.	• Chapter 6 summarizes trends and roadways used by to mining, agricultural, energy, and forestry industries and provides a link to supporting resources developed during the Freight Plan outlining the state's freight intensive industries. • Chapter 8 includes specific needs and issues related to these four industries, including the roadways. • Chapter 9 details improvements affecting these industries and uses tonnage as a variable to focus improvement on freight heavy truck routes.
7. An inventory of facilities with freight mobility issues, such as bottlenecks, within the state, and for those facilities that are state-owned or operated, a description of the strategies the state is employing to address those freight mobility issues.	• Chapter 5 identifies facilities with mobility issues, including bottlenecks. • Chapter 8 identifies the needs and issues associated with mobility problems. • Chapter 9 and 10 detail improvements and strategies.
8. Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay.	• Chapter 5 identifies congestion issues. • Chapter 9 details improvements to mitigate congestion or delay. • Chapters 10 and 11 detail additional strategies to address freight issues.
9. A freight investment plan that, subject to 49 U.S.C. 70202(c), includes a list of priority projects and describes how funds made available to carry out 23 U.S.C. 167 would be invested and matched.	• Chapter 10 and 11 detail Arizona's freight projects and Implementation Plan, including a constrained freight project list with details on NHFP fund investments and state match.
10. Consultation with the state Freight Advisory Committee (FAC), if applicable.	• All Freight Plan chapters were informed and reviewed by the Arizona FAC.

1.5 Freight Plan Development Process

The Freight Plan was developed through a combination of data analytics and consultations with industry and public sector stakeholders. On the analytical side, the best available data on regional economics, freight movement, and system performance were obtained and utilized to inform the Freight Plan. The outreach efforts included extensive consultations with industry and government stakeholders—including interviews, focus groups, and a scenario planning workshop. Through the course of the project, a series of Working Papers were developed to summarize interim findings of the ongoing work. This document distills the key findings and recommendations of this two-year process.

Two advisory bodies provided advice during the development of the Freight Plan: the Technical Advisory Committee (TAC) comprised of ADOT technical experts, and the Arizona Freight Advisory Committee (FAC), comprised of industry leaders and public stakeholders such as MPOs from across the state, which served as the overall steering group for the study. Chapter 10 includes an overview of future FAC involvement in Arizona Freight Planning.

2 Context of the Freight Plan within the ADOT Planning Process

Key Messages

The FAST Act provides freight-specific funding to states that develop a state freight plan in line with federal requirements. Yet, Arizona's State Freight Plan is much more than a short-term document that addresses federal requirements; the Plan is also a resource for statewide freight planning that will be integrated into the mainstream of ADOT transportation planning.

ADOT is integrating freight considerations into its Long-Range Transportation Plan (LRTP) process as well as the Planning to Programming (P2P) link leading directly into project programming:

- The LRTP is the planning effort that sets overall investment direction, identifies strategic investment areas, and establishes performance objectives. It is a policy plan that sets long-term priorities and objectives for the transportation system, based on performance. Freight Plan recommendations will be integrated into the 2017 LRTP update in line with its three major investment categories: preservation, modernization, and expansion.
- The P2P Link process enables ADOT to translate LRTP priorities into short-term (five-year) and 20-year programming goals. The findings of the Freight Plan will be integrated into the critical path of the P2P Link, including project nominations, prioritization, and the annual Statewide Transportation Improvement Program (STIP). The P2P Link is developed so that the ADOT Freight Plan will provide metrics and identification of strategic investment options to support ongoing freight performance measurement.

2.1 Linking Federal Requirements to State Planning Processes

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law on July 6, 2012. MAP-21 included the recommendation for freight to be included in the planning process. MAP-21 also established freight-related performance measures. On December 4, 2015, the Fixing America's Surface Transportation Act, or FAST Act, was signed into law. The FAST Act reinforced MAP-21, requiring state Departments of Transportation (DOT) to develop a Freight Plan in order to access freight-specific funding.

The Arizona State Freight Plan provides the performance-driven link for identifying freight-specific project improvements and addressing MAP-21 and FAST Act provisions. However, the

Freight Plan is much more than a short-term document that addresses federal requirements; the Freight Plan is also a resource for statewide freight planning that will be integrated into the mainstream of ADOT transportation planning. These actions help fulfill the Freight Plan Policy to "increase the prominence of freight in ADOT planning and programming," as is envisioned in this Arizona State Freight Plan.

How does ADOT achieve this integration of freight considerations into planning and programming? This is accomplished through the LRTP as well as the P2P link leading directly into project programming.

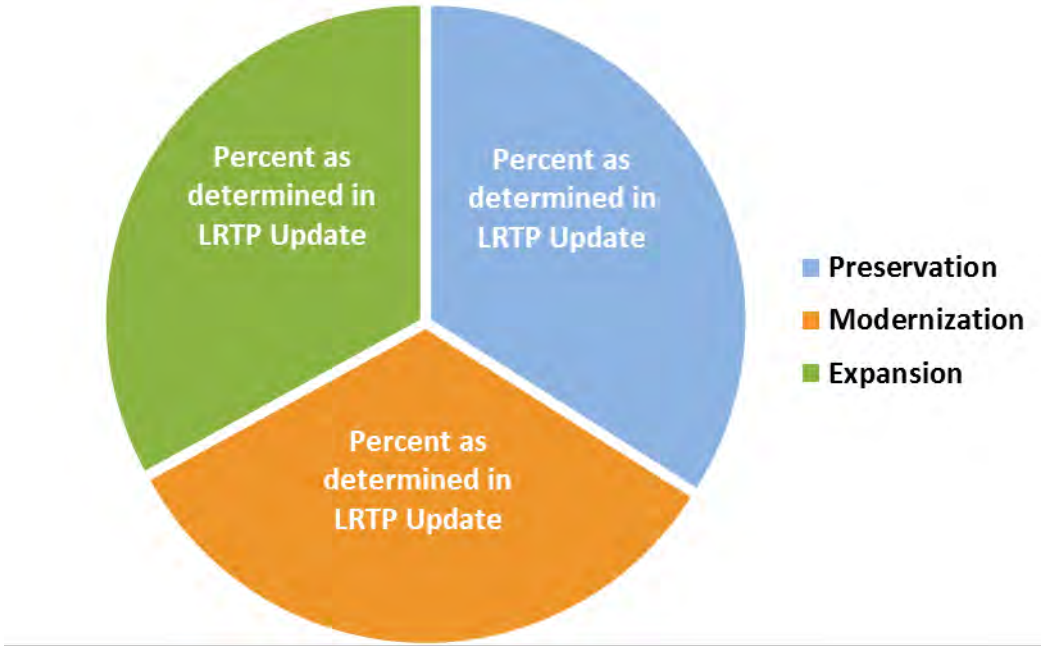
2.2 Statewide Long-Range Transportation Plan

The LRTP is the planning effort that sets overall investment direction, identifies strategic investment areas, and establishes performance objectives. It sets long-term priorities and objectives for the transportation system, based on performance.

The 2035 LRTP identified investment categories, goal areas, and potential performance measures. The 2035 LRTP update was also the starting point for P2P Link, but the approach and scope of the statewide plan in the FY 2018 update (2040 LRTP) provide the overall system planning basis for P2P Link. A specific performance emphasis is necessary to fully comply with existing and future expectations for the transportation system. The FY 2018 update is incorporating MAP-21, FAST Act, and other performance metrics, as well as addressing P2P Link direction on how system priorities are set. As part of the FY 2018 LRTP update, further clarity and definition are being provided for all key aspects of ADOT planning and programming, including the integration of Freight Plan recommendations, to ensure the full benefit of P2P Link can be realized.

The FY 2018 LRTP update is not project-specific; it is a policy plan. It is providing recommended investment levels to meet prioritized 25-year needs for the major investment categories of preservation (roadway pavement and bridges), modernization (safety, technology, and other upgrades), and expansion (new roads and interchanges, road widening, and other capacity increases). With regard to freight, it is envisioned freight needs could fall into any of the three major investment categories. (See Figure 2-1.) Project programming follows within the investment parameters of the LRTP, through the P2P process.

Figure 2-1: Investment Categories for LRTP Investment Recommendation

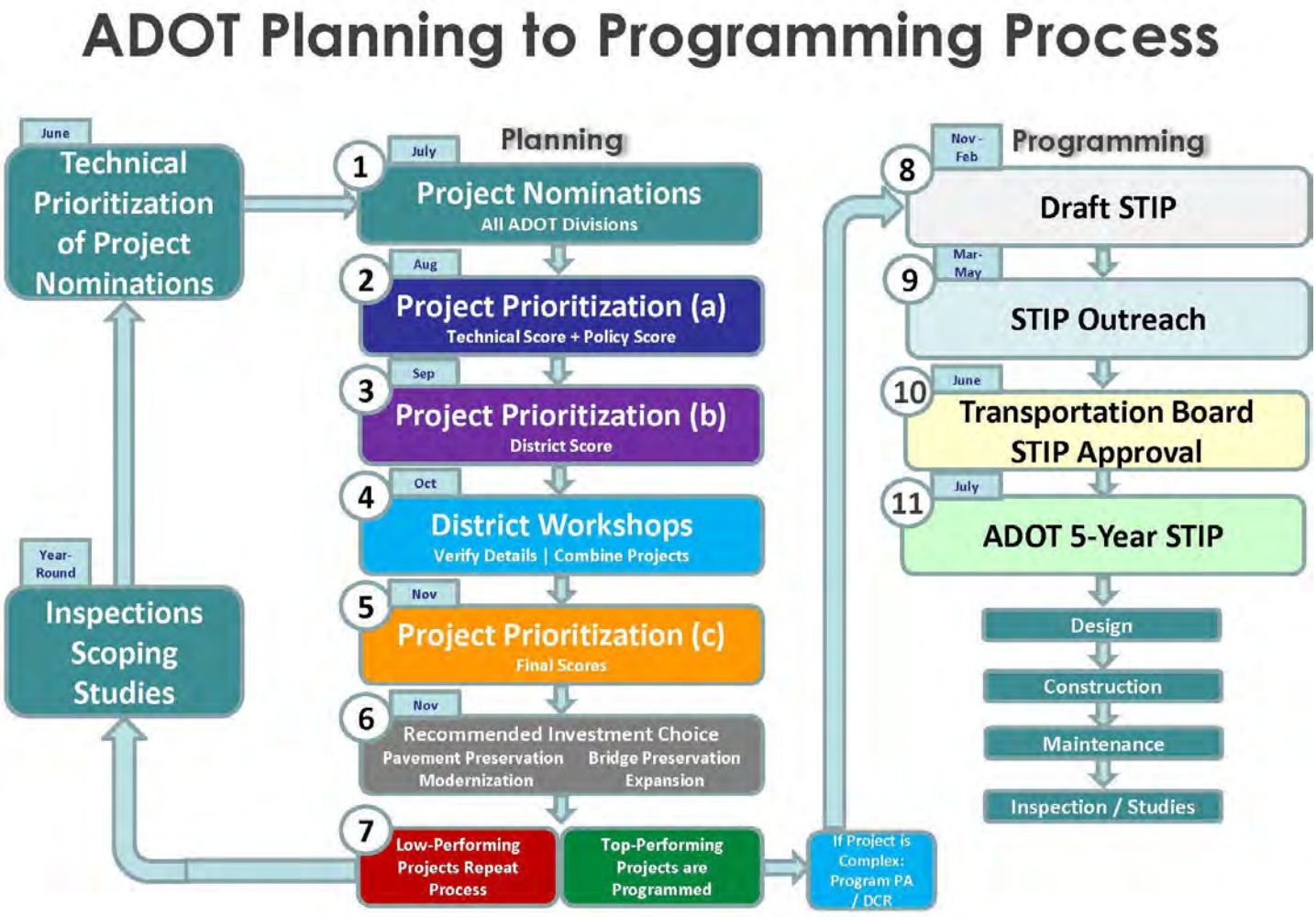


2.3 Planning to Programming Link

Central to P2P Link is a planning process that evaluates the level of performance that will be provided by different planning scenarios and the level of performance that will be delivered by the implementation of funded plans and programs. This requires ADOT to be able to assess and communicate predicted performance over the next five, ten, and twenty years and verify progress toward performance targets. This monitoring effort will rely on planning and program documents such as the LRTP and the annual program updates.

Fundamental steps involved in the P2P process are outlined in Figure 2-2. P2P is an annual process that involves coordination between and among ADOT's Multimodal Planning Division (MPD), Infrastructure Development and Operations Division, Transportation Systems Management and Operations Division, and others.

Figure 2-2: ADOT P2P Fundamental Process



Following from the process outline presented in Figure 2-2 above, the basic steps of the P2P process are outlined below, although updates to the process are continually under consideration to promote continuous improvement:

1.) Nominations

a. **Call for Project Nominations – July 1:** MPD issues a call for projects to all ADOT Divisions and Districts.

b. **Technical Group Project Nominations – Due August 15:** Technical Group Managers and District Directors/Engineers engage in early coordination and then submit project nominations to MPD.

2.) **Initial Project Prioritization by Planning – Due August 31:** MPD applies technical scores (provided by technical groups) and policy scores (provided by MPD) to each project. The policy score includes evaluation of economic, mobility, and safety criteria. The safety criteria may be broken out separately and applied to all nominated projects.

3.) **Project Prioritization by Districts – Due September 30:** ADOT Districts rank projects based on their technical expertise and professional judgment. This is the District score.

4.) **District Workshops to Refine Project Prioritization – October:** Workshops are held in the Districts to update project details, refine and combine projects as appropriate, discuss project prioritization and develop a consensus prioritization of projects. These workshops include District personnel, technical managers, MPD staff, and others as appropriate.

5.) **Revised Project Prioritization by MPD**

   a. **Preliminary Revised Prioritization – Due November 15:** Based on the results of the District Workshops, MPD revises the prioritized project list.

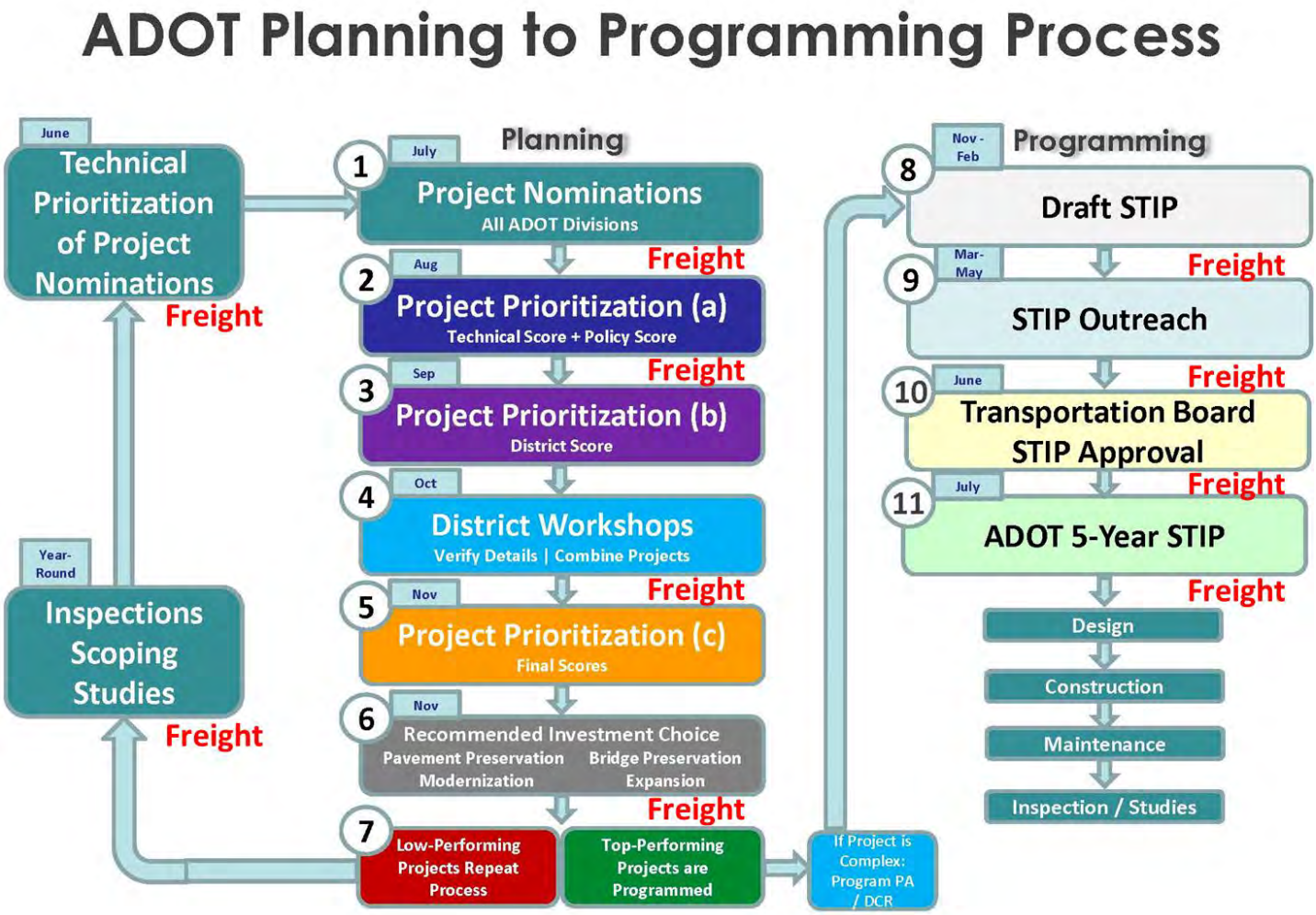
   b. **Final Revised Prioritization – Due February 14:** From November 15 to February 14, the projects identified in the Preliminary Revised Prioritization will undergo a Planning Level Scoping (PLS) process to better define the project components and refine the cost estimates. Thus, the Final Revised Prioritization will be informed by and based on the PLS results. The following program development activities (Steps 6 and 7, below) will begin November 15 and proceed concurrent with the PLS process but will only proceed to final program development after the PLS is done and MPD Planning delivers the Final Revised Prioritization to MPD Programming.

6.) **Identify Investment Category for each project – Due November 30:** Using the investment categories set forth by the Statewide Long-Range Transportation Plan, MPD places the projects into the categories in priority order, subject to available funding for each category.

7.) – **11.) Prepare Five-Year Program and STIP – December through June:** MPD leads the development of the Program and Statewide STIP, working together with other key ADOT Divisions and Districts, and submits the Program and STIP to ADOT Leadership for recommendation to the State Transportation Board for ultimate approval.

How will ADOT freight be considered more prominently in the ADOT P2P process? Projects with freight-related benefits are, and will continue to be, appropriately considered throughout the ADOT planning and programming processes. Figure 2-3 below helps illustrate specific points in the ADOT P2P process (highlighted in red font) where freight needs and projects can be considered more prominently, benefitting from the Arizona State Freight Plan findings, recommendations, and project listings. –

Figure 2-3: ADOT P2P Fundamental Process – Opportunities to Consider Freight Projects



Of course, projects identified and prioritized in the Freight Plan are considered eligible for the dedicated freight funding apportioned to Arizona under the FAST Act. P2P Link is developed so that the ADOT Freight Plan will provide metrics and identification of strategic investment options to support measuring freight performance.

3 Freight Plan Goals, Objectives, Policies, and Strategies

Key Messages

The development of the Arizona State Freight Plan started with the definition of a vision, supported by goals and objectives. The vision, goals, and objectives guided decision-making in order to ensure consistency throughout the development of the Plan. The Freight Plan vision statement is:

Arizona's freight transportation system enhances economic competitiveness and quality growth through effective system performance and management

To achieve this vision, the Freight Plan is guided by three foundational goals: 1) Enhance Economic Competitiveness; 2) Increase System Performance; and 3) Improve System Management. Each of these three overarching goals is complemented by supporting objectives, which are closely aligned with national freight goals of the FAST Act, and the Guiding Principles outlined in *Building a Quality Arizona (*bqAZ) and the related goals of Arizona's LRTP.

To translate the vision, goals, and objectives into action, the Freight Plan establishes a policy and strategies. The single, simple policy is:

To increase the prominence of freight in ADOT planning and programming

This policy will better reflect the role of freight in enhancing the competitiveness and growth of Arizona's economy. The following strategies will enable ADOT to achieve the goals and objectives of the Freight Plan: 1) Merit-based prioritization; 2) Preservation, Modernization, Expansion; 3) Key Commerce Corridors; 4) Improve Freight Information; 5) Coordination, Partnerships, Communication; and 6) Sustainable Freight Funding.

3.1 Vision

The Freight Plan defines immediate and long-range investment priorities that will generate the greatest return for Arizona's economy, while also advancing other key transportation system goals, including the national freight goals outlined in the FAST Act.

Since the Freight Plan is focused primarily on enabling economic competitiveness and growth of the state's goods movement sectors, it follows a simple vision statement focused directly on these ends:

***Vision:** Arizona's freight transportation system enhances economic competitiveness and quality growth through effective system performance and management.*

3.2 Goals and Objectives

The Freight Plan is guided by three foundational goals. The first goal – to enhance economic competitiveness – is an output goal and built on the other two overarching goals – system performance and system management – which serve as a necessary foundation to increase the economic competitiveness of the state's goods movement sectors.

Each of the three foundational goals is complemented by supporting objectives, which are closely aligned with national freight goals set out in the FAST Act, the Guiding Principles outlined in bqAZ, and the related goals of Arizona's LRTP.

Goal 1 - Enhance Economic Competitiveness: To enhance economic competitiveness and quality growth of Arizona's key goods movement sectors, leading to an increase in the state's economic activity and outputs.

Specific supporting objectives are:

1.1 Increase Economic Activity, Investment, and High Paying Jobs: Strengthen the contribution of Arizona's freight transportation system to the economic competitiveness of the state's goods movement sectors leading to quality economic growth and high paying jobs in the state.

1.2 Increase Trade: Enable Arizona's goods movement economic sectors to increase exports to global markets, more fully participate in global trade, and become better connected to key trading partners.

Goal 1 focuses on addressing the transportation-related barriers to the competitiveness of key Arizona goods movement economic sectors. Transportation-related improvements should also be assessed in concert with broader economic policies.

Goal 2 - Increase System Performance: To reduce freight transportation cost, travel time and improve system reliability from the perspective of shippers and carriers, while minimizing negative externalities relating to freight transportation in the state.

Specific supporting objectives are:

2.1 Improve Mobility and Multimodal Accessibility: Expand access to competitive, multimodal transportation options to improve connectivity, reliability, and system resiliency, including the strategic development of highway and rail connections with regional trading partners.

2.2 Increase System Efficiency: Increase freight transportation system productivity, resulting in lower transportation costs, reduced travel times, and increased system reliability.

2.3 Increase Safety and Security: Continue to improve transportation system safety and security to protect people, cargo, and infrastructure.

2.4 Minimize Negative Social and Environmental Impacts: Be a good steward of Arizona's natural, cultural, and environmental resources while improving and maintaining the transportation system.

Goal 3 - Improve System Management: To increase the effectiveness of system planning, investment, and management, including the use of innovative technologies.

Specific supporting objectives are:

3.1 Ensure System Preservation and Maintenance: Maintain, preserve, and extend the service life of existing and future state freight transportation infrastructure.

3.2 Ensure Good Fiscal Stewardship: Provide a sound financial base for Arizona's freight transportation system through the responsible and accountable management of public assets and resources, along with the identification and implementation of funding strategies to ensure balanced long-term investment in the state's freight transportation system.

3.3 Link Transportation and Land-Use: Achieve greater value from the state's freight 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.

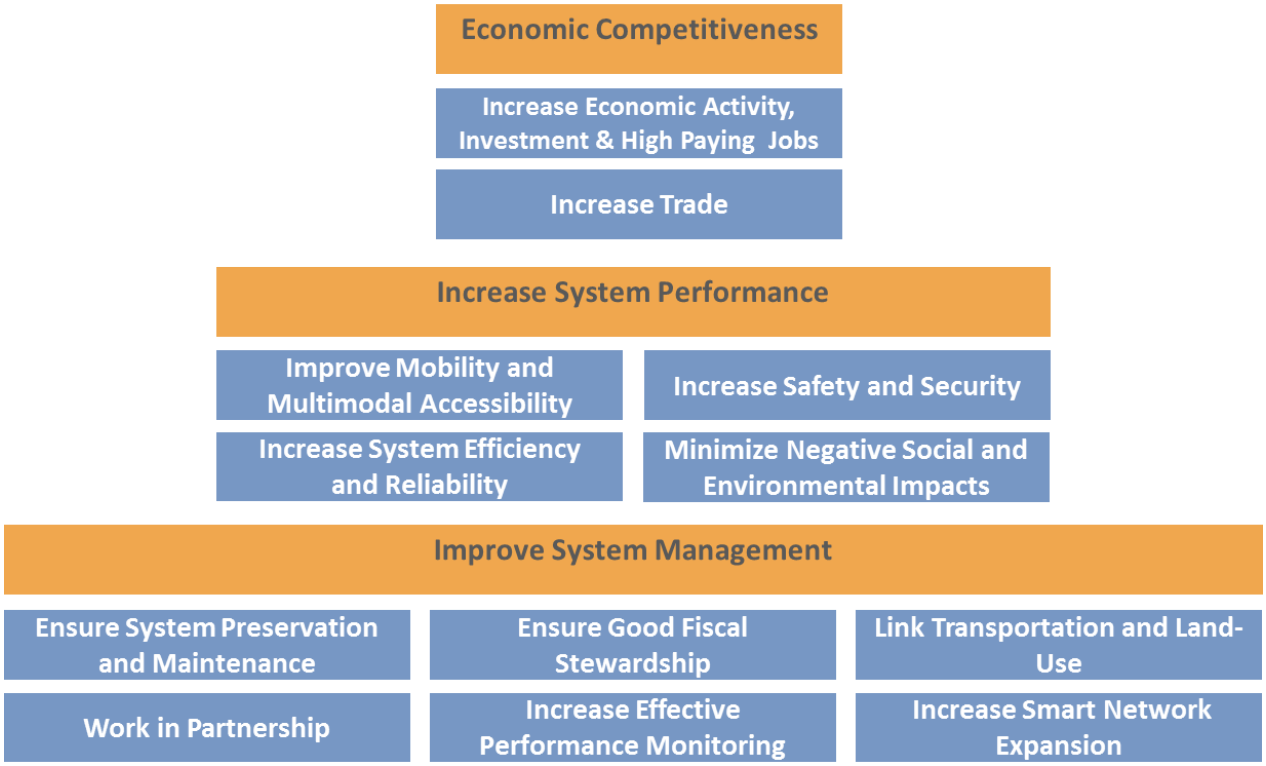
3.4 Work in Partnership: Develop and nurture partnerships that support the coordination and integration of ADOT's investment in the state's transportation infrastructure with public and private organizations, tribal governments, and agencies responsible for transportation, land use, conservation and environmental planning, and freight infrastructure.

3.5 Increase Effective Performance Monitoring: Make informed decisions on the basis of sound performance monitoring and evaluation of the performance and needs of the freight transportation system, and in line with national freight transportation system performance measures.

3.6 Increase Smart Network Expansion: Make investments in the strategic expansion of system capacity and connectivity, where existing infrastructure cannot otherwise be optimized to meet demand.

Figure 3-1 displays the relationship between the three foundational goals and provides a simplified representation of the Freight Plan goals and supporting objectives.

Figure 3-1: Arizona State Freight Plan Goals and Objectives



Source: CPCS

3.3 Relationship to National Freight Policy Goals

The freight provisions of the FAST Act are designed to enhance freight movement throughout the U.S. Specifically, the FAST Act requires state freight plans to describe how they advance the National Multimodal Freight Policy (NMFP) goals and the National Highway Freight Program (NHFP) goals.

The NMFP goals are focused on the National Multimodal Freight Network (NMFN), which has yet to be finalized by the United States Department of Transportation (USDOT). Regardless, the Freight Plan accomplishes the goals of the NMFP by analyzing all modes of transportation, which will cover future elements of the NMFN. The NHFP generally applies to the National Highway Freight Network (NHFN), which is defined in Chapter 10.

The Arizona State Freight Plan vision statement, associated goals, and objectives are in line with and will advance the NHFP and NMFP goals. Figure 3-2 presents the NHFP and NMFP goals, along with their alignment to the Freight Plan. The Freight Plan goals inform each step of the freight planning process, ensuring Freight Plan alignment with NMFP and NHFP goals is consistent throughout the analysis and final recommendations.

Figure 3-2: Freight Plan Alignment with FAST Act Goals

NHFP and NMFP Goals	NHFP	NMFP	Arizona State Freight Plan Goals and Objectives	Discussion
Invest in infrastructure improvements and to implement operational improvements on highways/NMFN that:	1	1	**Goal 1 - Enhance Economic Competitiveness:** Arizona's freight transportation system to enhance economic competitiveness and quality growth of Arizona's key goods movement sectors, leading to an increase in the state's economic activity and outputs. **Obj. 1.1 - Increase Economic Activity, Investment, and High Paying Jobs:** Strengthen the contribution of Arizona's state freight transportation system to the economic competitiveness of goods movement sectors leading to economic growth and high-quality jobs. **Obj. 1.2 - Increase Trade:** Enable Arizona's goods movement economic sectors to increase exports to global markets and more fully participate in global trade. **Goal 2 - Increase System Performance:** To reduce freight transportation cost, travel time and improve system reliability from the perspective of shippers and carriers, while minimizing negative externalities relating to freight transportation. **Obj. 2.1 - Improve Mobility and Multimodal Accessibility:** Expand access to competitive, multimodal transportation options to improve connectivity, reliability, and system resiliency, including the strategic development of highway and rail connections with regional trading partners. **Obj. 2.2 - Increase System Efficiency:** Increase freight transportation system productivity, resulting in lower transportation costs, reduced travel times, and increased reliability.	Both the Arizona State Freight Plan and FAST Act goals recognize that the freight transportation system is an enabler of (or foundation for) economic competitiveness, and system improvements should aim to enhance state and national economic competitiveness. The Arizona State Freight Plan Goal 2 objectives are consistent with FAST Act goals but are more explicit about how improved mobility, accessibility, and efficiency are to be achieved. The Arizona State Freight Plan objectives are also broader in scope and address other system performance aims, including connectivity, multimodal access, reliability, travel time, and transportation cost. The Arizona State Freight Plan objectives are consistent with the FAST Act goals relating to economic outcomes, although more explicit about trade, and specific to goods movement sectors (which generate freight movements).
Strengthen the contribution of the NHFN/NMFN to the economic competitiveness of the United States	1(A)	1(A)		
Reduce congestion and bottlenecks on the NHFN/NMFN	1(B)	1(B)		
Reduce the cost of freight transportation	1(C)	-		
Improve the reliability of freight transportation	1(D)	6		
Increase productivity, particularly for domestic industries and businesses that create high-value jobs	1(E)	1(C)		
Improve the safety, security, efficiency, and resiliency of freight/multimodal transportation	2	2	**Obj. 2.2 - Increase System Efficiency:** Increase freight transportation system productivity, resulting in lower transportation costs, reduced travel times and increased system reliability. **Obj. 2.3 - Increase Safety and Security:** Continue to improve transportation system safety and security to protect people, cargo, and infrastructure.	The Arizona State Freight Plan Goal 2 objectives, with respect to safety and security, are consistent with FAST Act goals, but go further by addressing safety and security of people and infrastructure.
Improve the state of good repair of the NHFN/NMFN	3	3	**Obj. 3.1 - Ensure System Preservation and Maintenance:** Maintain, preserve, and extend the service life of existing and future state freight transportation infrastructure.	The Arizona State Freight Plan recognizes the importance of maintaining and preserving existing infrastructure and extending the value of these existing assets, as possible.

NHFP and NMFP Goals	NHFP	NMFP	Arizona State Freight Plan Goals and Objectives	Discussion
Use innovation and advanced technology to improve the safety, efficiency, and reliability of the NHFN/NMFN	4	4	**Goal 3 - Improve System Management:** To increase the effectiveness of system planning, investment, and management, including the use of innovative technologies. **Obj. 3.6 - Increase Smart Network Expansion:** Make investments in the strategic expansion of system capacity and connectivity, where existing infrastructure cannot otherwise be optimized to meet demand.	This Arizona State Freight Plan goal seeks to improve the management of the freight transportation system. There are some parallel goals in FAST Act, but the Arizona State Freight Plan goes further by defining system management goals and objectives
Improve the efficiency and productivity of the NHFN/NMFN	5	5	**Goal 2 - Increase System Performance:** To reduce freight transportation cost, travel time and improve system reliability from the perspective of shippers and carriers, while minimizing negative externalities relating to freight transportation in the state.	Both the Arizona State Freight Plan and FAST Act have freight transportation system performance as key aims. The Arizona State Freight Plan goals are more explicit about what increased performance entails.
Improve the flexibility of states to support multi-state corridor planning and the creation of multi-State organizations to increase the ability of States to address highway freight connectivity	6	8	**Obj. 3.4 - Work in Partnership:** 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, tribal governments, and agencies responsible for transportation, land use, conservation and environmental planning, and freight infrastructure.	All aspects of the Freight Plan were developed in consultation with the TAC and the FAC, which are comprised of public and private sectors representatives. Additionally, the sector papers, identification of freight needs, identification of CRFCs and CUFCs, prioritization framework and qualitative performance measures relied on public and private sector outreach.
Reduce the environmental impacts of freight movement on the NHFN/NMFN	7	9	**Obj. 2.4 - Minimize Negative Social and Environmental Impacts**: Be a good steward of Arizona's natural, cultural, and environmental resources while improving and maintaining the transportation system.	The Arizona State Freight Plan objectives are consistent with FAST Act goals with respect to the environment but go further by including social impacts as well.
Improve the short- and long-distance movement of goods that:	-	7	**Obj. 2.1 - Improve Mobility and Multimodal Accessibility:** Expand access to competitive, multimodal transportation options to improve connectivity, reliability and system resiliency, including the strategic development of highway and rail connections with regional trading partners.	The Arizona State Freight Plan Goal 2 objectives are consistent with FAST Act goals but more explicit about how improved mobility, accessibility, and efficiency are to be achieved. The Arizona State Freight Plan objectives are also broader in scope and address other system performance aims, including connectivity, multimodal access, reliability, travel time, and transportation cost.
Travel across rural areas between population centers	-	7(A)		
Travel between rural areas and population centers	-	7(B)		
Travel from the Nation's ports, airports, and gateways to the National Multimodal Freight Network	-	7(C)		
Pursue the goals described in this subsection in a manner that is not burdensome to State and local governments	-	10	**Obj. 3.4 - Work in Partnership:** 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, tribal governments, and agencies responsible for transportation, land use, conservation and environmental planning, and freight infrastructure.	The integration of the comments and needs of state and local transportation stakeholders, as well as the identification of existing approaches, ensures that recommendations are not burdensome, are realistic and in line with stakeholder priorities.

3.4 Policies

The vision, goals, and objectives of the Freight Plan informed every aspect of the Freight Plan's development and will continue to guide its implementation. To translate the vision, goals, and objectives into action, the Freight Plan establishes a policy and strategies. Three considerations must be reflected in the policy and strategies of the Freight Plan:

- They should provide a clear and practical framework for achieving the Plan's vision, goals, and objectives.
- They should appropriately reflect other relevant policies and strategies at the federal, state, and regional levels, including Arizona's LRTP and the P2P Link process.
- They should recognize the roles, interests, and constraints of the stakeholders that influence the freight transportation system in Arizona, including public and private sector infrastructure owners and service providers.

ADOT's LRTP and P2P Link approach to prioritizing programs and projects needs to lend sufficient weight to the importance of freight, and the potential for freight transportation system investments to enhance the competitiveness and growth of Arizona's economy. This is exemplified by the limited profile of freight in the P2P Link evaluation criteria. The Arizona State Freight Plan provides an opportunity to address this need.

To reflect the role of freight in enhancing the competitiveness and growth of Arizona's economy, the Freight Plan follows a single, simple policy:

***Freight Plan Policy:** To increase the prominence of freight in ADOT planning and programming.*

3.5 Strategies

The following six strategies will enable ADOT to achieve the goals and objectives of the Freight Plan. These six strategies are in line with federal, state, and regional goals and objectives, reflect the roles and interest of freight transportation system stakeholders, and borrow from best practices in freight planning efforts elsewhere in the U.S. and internationally. Figure 3-3 displays the Freight Plan's policy and accompanying strategies.

Figure 3-3: Summary of Proposed Arizona State Freight Plan Policy and Strategies

Source: CPCS

3.5.1 Strategy 1: Merit-Based Prioritization

Freight transportation system improvements to be prioritized on the basis of merit, in line with the goals and objectives of the Arizona State Freight Plan.

Freight transportation system improvements should be evaluated and prioritized using an objective, transparent, and a broadly accepted set of criteria directly linked to the economic competitiveness and system performance goals and objectives of the Arizona State Freight Plan.

All identified freight transportation investment options are initially screened on qualitative merits vis-a-vis these goals and objectives, with subsequent more detailed business case and benefit-cost assessments of those projects passing this initial screening process.

Project Merits Should Look Beyond Freight Benefits

Because much of the freight transportation system is shared with passengers (notably highways), broader transportation system benefits should also be considered in prioritizing improvement projects. The practical implication for the Freight Plan is that recognition of broader transportation system benefits may result in a different prioritization of freight improvement projects.

3.5.2 Strategy 2: Preservation, Modernization, Expansion

Freight transportation system investments to prioritize asset preservation first, modernization to optimize the existing system second, and network expansion third.

The foundational goal of the Freight Plan is improving system management. Maintaining existing assets in a state of good repair is a basic principle of good system management and can ensure the continued performance of existing facilities while minimizing the cost of these assets over their lifecycle.

Beyond preserving existing assets, the Freight Plan should prioritize system modernization investments that provide cost-effective means of optimizing the performance of existing assets. This can be done by leveraging technologies and other innovations such as ITS, by implementing improved system management and operational strategies such as Transportation Demand Management, and by better enabling the performance of all modes, for example by improving access to multimodal facilities or support for road/rail grade separations.

New infrastructure construction is generally the most expensive solution to addressing transportation system performance issues and should be considered as a last resort. Transportation system expansion, where required, should be linked to land use at the Metropolitan Planning Organization (MPO), county, and municipal levels.

This policy of preservation, modernization, and expansion is also consistent with the LRTP and P2P Link investment categories.

3.5.3 Strategy 3: Key Commerce Corridors

Freight transportation system improvements to bolster the performance of Key Commerce Corridors.

The overarching goal of the Arizona State Freight Plan is to enhance Arizona's economic competitiveness and growth, including through increased trade. ADOT has already identified Key Commerce Corridors (KCC) "where improvements to the transportation infrastructure supports the greatest potential commercial and economic benefits."[3] The Freight Plan should prioritize system improvements, including incremental improvements that will bolster the performance of these KCCs and strategic linkages to key Arizona economic clusters. The scope of potential improvements to KCCs should be multimodal, including modal interconnection points. Related improvements should also be linked to land use, as appropriate.

[3] Arizona Key Commerce Corridors, p. 1.

3.5.4 Strategy 4: Improve Freight Information

Freight transportation system management to be informed on the basis of solid research, data and system performance monitoring.

To be effective, transportation policies, strategies, and improvements must be well informed and supported by facts. Freight transportation policies, strategies, and improvements should be underpinned by ongoing research, current data sources, and performance measures that provide sufficient insight on the performance needs of Arizona's goods movement economy. To this end, a freight data strategy should leverage existing available data, and seek to address priority data gaps based on ADOT's freight system information needs.

Although often difficult due to challenges in obtaining data, particularly where data is deemed commercially sensitive, ADOT should seek to expand performance monitoring and evaluation processes to improve its understanding of the freight transportation system's performance. This should go beyond the traditional measures of system performance (e.g. congestion, capacity, speed) to provide greater insight on the transportation performance requirements of freight system users (e.g. travel time, reliability, logistics cost), particularly along KCCs. This can be accomplished progressively over time.

Where data are unavailable, or otherwise difficult to obtain, qualitative performance measures, informed by the research and consultation with freight system users can provide useful insights (as a proxy for performance indicators) into the performance of the freight transportation system.

3.5.5 Strategy 5: Coordination, Partnerships, Communication

System planning and improvements to be coordinated with all stakeholders that have a role in enabling the goals and objectives of the Arizona State Freight Plan.

This strategy will be accomplished through regular engagement with freight transportation system stakeholders, including but not limited to public and private organizations, tribal governments, and agencies responsible for transportation, land use, conservation, environmental planning, and freight infrastructure.

Central to this strategy is the recognition that freight transportation system improvements should be closely coordinated with land use. This is a strategy best employed at the MPO or municipal level. Expansion projects, for example, should consider connectivity to the clusters/nodes and associated land uses that generate major freight flows on the key corridors as well as related first/last mile connectivity issues to KCCs.

The goals, objectives, policies, and strategies of the Arizona State Freight Plan should also be broadly communicated to build awareness and support for the process. Consistent with best practices, ADOT should identify a freight transportation champion to lead partnerships, stakeholder engagement, and communications.

3.5.6 Strategy 6: Sustainable Freight Funding

Priority freight projects to have access to dedicated and sustainable sources of funding and seek to leverage partner funding and private capital, where appropriate.

Dedicated funding for freight transportation system improvements, whether a separate freight fund or otherwise separate funding for freight programs and projects, is generally regarded as a best practice by the freight community, though not necessarily by state transportation agencies that generally value funding flexibility to meet wide ranging needs with limited funding. Dedicated freight funding can sometimes lend greater purpose and credibility to freight planning and prioritization efforts, such as this Freight Plan, and can galvanize stakeholder participation (including that of the FAC) and bolster broader interest, participation, and collaboration in identifying and prioritizing freight transportation system improvements.

Equally important is that such funding is sustainable over time and respond as priorities evolve and as the Freight Plan is updated. Existing and alternative funding sources and models should be considered, as well as related terms, conditions, and appropriate funding levels.

As appropriate, collaborative funding (and possibly financing) opportunities should also be considered where improvements are beyond the capabilities and interest of one party to fund alone. Public Private Partnership (P3) opportunities for project delivery and financing should also be considered, where they can demonstrate a return on investment.

4 Arizona's Freight System

Key Messages

Arizona's multimodal freight transportation system includes highways, railways, air cargo airports, pipelines, and border crossings. For the most part, the freight transportation system in Arizona has ample capacity and performs well. More than 65 percent of freight tonnage moved in the state uses the highway system, with rail handling the largest share of the balance.

The Interstate highway system supports the greatest volumes of freight measured by tonnage and value. More than 74 percent of all freight—measured by value—is moving *through* the state. A significant component of this is traffic moving between the Ports of Los Angeles and Long Beach and inland markets, particularly along the I-40 and I-10 corridors. Other highways connect Arizona markets to regional and international trading partners. Arizona's six border crossing locations include nine Land Ports of Entry (LPOE), with the highest volume freight crossing of Mariposa at Nogales.

The Arizona freight rail system consists of more than 2,000 track miles. Over three-quarters of Arizona rail tonnage is moving *through* the state—mostly between the Ports of Los Angeles and Long Beach and major rail hubs in Chicago and Dallas over BNSF's Transcon and UPRR's Sunset Route. Short line carriers provide local service to rail-dependent industries like mining and provide connections to the Class I network.

While Arizona has multiple airports that handle freight, nearly all air cargo originating or terminating in Arizona is moved through Phoenix Sky Harbor International Airport (nearly 90 percent) and Tucson International Airport (nearly 10 percent). Arizona's pipeline system is another critical component of the freight system, especially in moving retail petroleum oil to market.

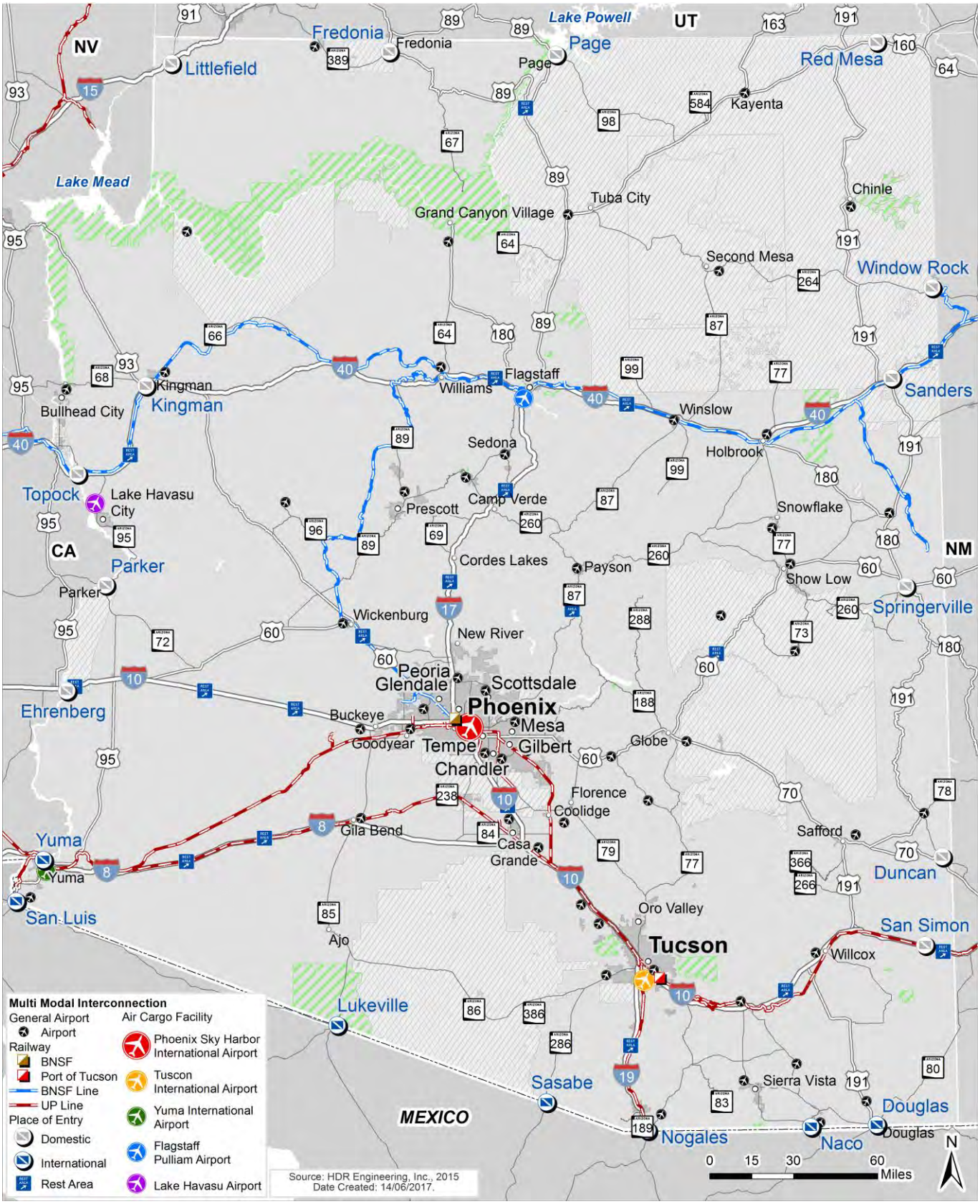
The transportation system ties together major freight clusters throughout the state, the greatest concentration of which are located along the I-10 corridor in Phoenix and Tucson, including freight activity clusters located at Tolleson, Sky Harbor Airport, Chandler, and the Port of Tucson.

4.1 Freight System Overview

The objective of this chapter is to provide an overview of the assets and facilities that comprise Arizona's freight transportation system.

Arizona's freight system consists of highways, railroads, air cargo terminals, pipeline, and land port of entry facilities. By volume, over three-quarters of the state's freight moves along the state's roadway network. Rail handles the largest share of the balance. Figure 4-1 provides a statewide map of the multimodal freight transportation system.

Figure 4-1: Arizona Multimodal Freight Transportation System



4.2 Freight Highway System

There are over 66,000 highway miles in Arizona. The access-controlled Interstate Highway System – comprising the core components of the state's highway freight network – makes up two percent of total highway miles in the state or 1,168 miles, and is the most intensively utilized freight infrastructure in Arizona. The Interstate Highway System is:

- **Interstate 8 (I-8)** – East-to-west corridor connecting Casa Grande to San Diego, California. I-8 provides a direct connection to Yuma and Southern California.
- **Interstate 10 (I-10)** – East-to-west corridor connecting California to Florida through Arizona's largest metropolitan areas, Phoenix and Tucson. I-10 is the southernmost transcontinental highway in the Interstate Highway System.

I-10 is Key Arizona Link to Global Markets

Interstate Highway 10 is the key Interstate link between the Ports of L.A./Long Beach and Phoenix. Despite its importance and the considerable growth of Southern California, the capacity of the Arizona section of the I-10 corridor to Phoenix has remained largely unchanged since the 1970s – at four lanes (two in each direction).[4] I-10 is also a critical link to markets east of Arizona.

- **Interstate 40 (I-40)** – East-to-west freight corridor connecting California to North Carolina through northern Arizona, passing through Kingman, Flagstaff, Winslow, and Holbrook. I-40 is the third-longest Interstate Highway in the United States, after Interstates 90 and 80.
- **Interstate 17 (I-17)** – North-to-south corridor located entirely within the State of Arizona, connecting Phoenix, at I-10, with its northern terminus in Flagstaff, at I-40. I-17 gains more than a mile in altitude between Phoenix (at 1,117 feet) and Flagstaff (at 7,000 feet).
- **Interstate 15 (I-15)** – North-to-south corridor located in the northwestern corner of Arizona, connecting Nevada and Utah and serving several Arizona communities. Because of the geography of the Grand Canyon, I-15 is not directly accessible from other routes within Arizona.
- **Interstate 19 (I-19)** – North-to-south corridor connecting the U.S.-Mexico port of entry at Nogales with Tucson. Like I-17, I-19 is located entirely within Arizona.

In addition to the Interstates, several major highways link internal Arizona trade centers together and connect to out-of-state and international markets. These include:

- **US 93/US 60** – This corridor connects Phoenix and Las Vegas via Wickenburg and Kingman.

[4] *Arizona's Key Commerce Corridors Final Report.* Arizona Department of Transportation, 2014.

- **SR 85** – This corridor provides a critical north-south connection between I-10 and I-8 from Buckeye to Gila Bend, effectively allowing some long-distance trucks utilizing the I-10 corridor to bypass the Phoenix metropolitan area.
- **US 89** – This corridor between Flagstaff and Page facilitates freight movement in northern Arizona and provides an alternative link (to US 93/US 60/I-15) between Phoenix and Utah.
- **US 163 / US 160** – This corridor connects northern Arizona with markets in southeastern Utah and western Colorado. Major commodities being transported along these routes include forestry, energy, manufacturing, and agricultural products.
- **US 70** – This corridor is a critical east-west route in eastern Arizona, supporting, for example, movements of mining materials between Globe and Safford.
- **US 191** – This corridor is a north-south route in eastern Arizona that connects to the U.S.-Mexico port of entry at Douglas, the second busiest border crossing for freight in Arizona.
- **SR 189** – This corridor connects I-19 to the U.S.-Mexico Border at Nogales, State Route (SR) 189 plays a major role as a freight corridor. Mexico is Arizona's largest international trading partner and Nogales is a fresh produce gateway into the U.S.
- **SR 69** – This corridor connects the Prescott Valley to I-17, providing connection and access to the rest of the state.

A significant share of this is traffic moving between the Ports of Los Angeles and Long Beach and inland markets, particularly along the I-40 and I-10 corridors. Figure 4-2 and Figure 4-3 illustrate the shares of traffic by tonnage and value.

Figure 4-2: Annual Statewide Freight Flow by Tonnage (2013)

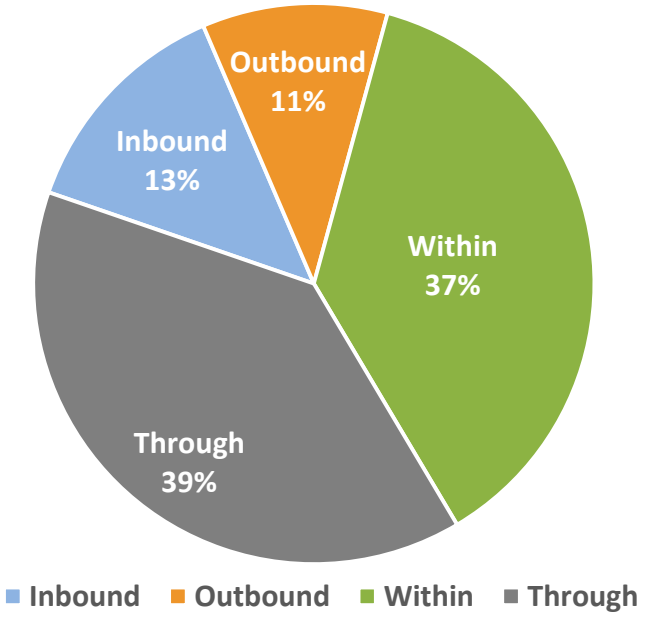
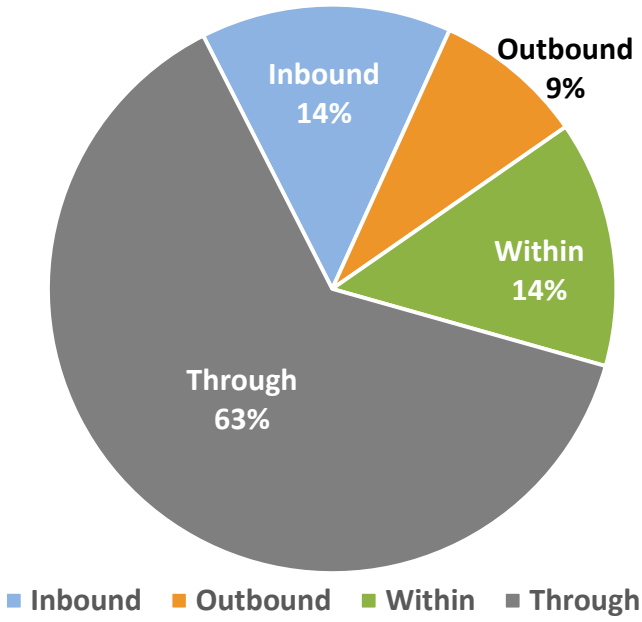


Figure 4-3: Annual Statewide Freight Flow by Value ($) (2013)



Source: TRANSEARCH (2013)

Freight movements on the Arizona highway system are characterized by their high share of through traffic – that is, neither originating or destined to Arizona – accounting for 39 percent of total flows by volume and 63 percent of flows by value.

Congestion, which impacts travel time, reliability, and transportation costs, is mostly experienced within the state's urban areas, including the Greater Phoenix and Tucson metropolitan areas, and to a lesser degree in the vicinity of Flagstaff, Prescott, and Yuma. Delays at the U.S.-Mexico border crossing in Nogales are also common. Beyond these exceptions, highway level of service (LOS) throughout the state can generally be described as high (LOS C or better).

4.3 Freight Rail System

Arizona's freight rail system covers nearly 2,000 route miles and links Arizona industries and consumers with domestic and global trading partners. As documented in the 2011 Arizona State Rail Plan prepared by ADOT, the state's freight rail system consists of two Class I railroads and 13 short line (or Class III)[5] and terminal railroads. Figure 4-5 shows Arizona's Class I railroads, the locations of the state's active short line railroads, and major intermodal terminals.

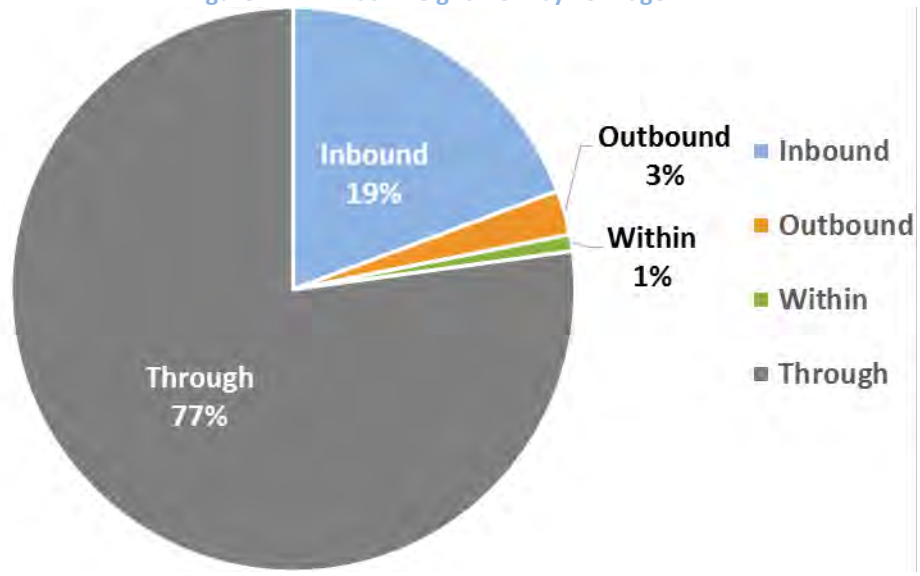
Class I carriers BNSF Railway and Union Pacific Railroad (UPRR) operate 1,465 miles, or 73 percent of Arizona's rail network, and intermodal transfer facilities in Phoenix and Tucson. Short line carriers provide local service to rail-dependent industries like mining and provide connections to the Class I network. Arizona's active short line railroads operate 529 miles of track equivalent to approximately 23 percent of the route miles of the state's overall freight rail system. Several key intermodal and bulk terminals provide railroad access to Arizona shippers and consumers.

Over three-quarters of Arizona rail tonnage is moving through the state—mostly between the Ports of Los Angeles and Long Beach and major rail hubs in Chicago and Dallas over BNSF's Transcon and UPRR's Sunset Route.

Figure 4-4 shows the majority of freight tonnage is moving through Arizona. Arizona has two major transcontinental rail corridors traveling through the state, a major driver of the proportion of through traffic via rail.

[5] Short line or Class III railroads operate within relatively short distances (under 350 route miles) and with low annual operating revenues (less than $40 million).

Figure 4-4: Annual Freight Flow by Tonnage



Source: TRANSEARCH 2013

Arizona's Transcontinental Rail Corridors

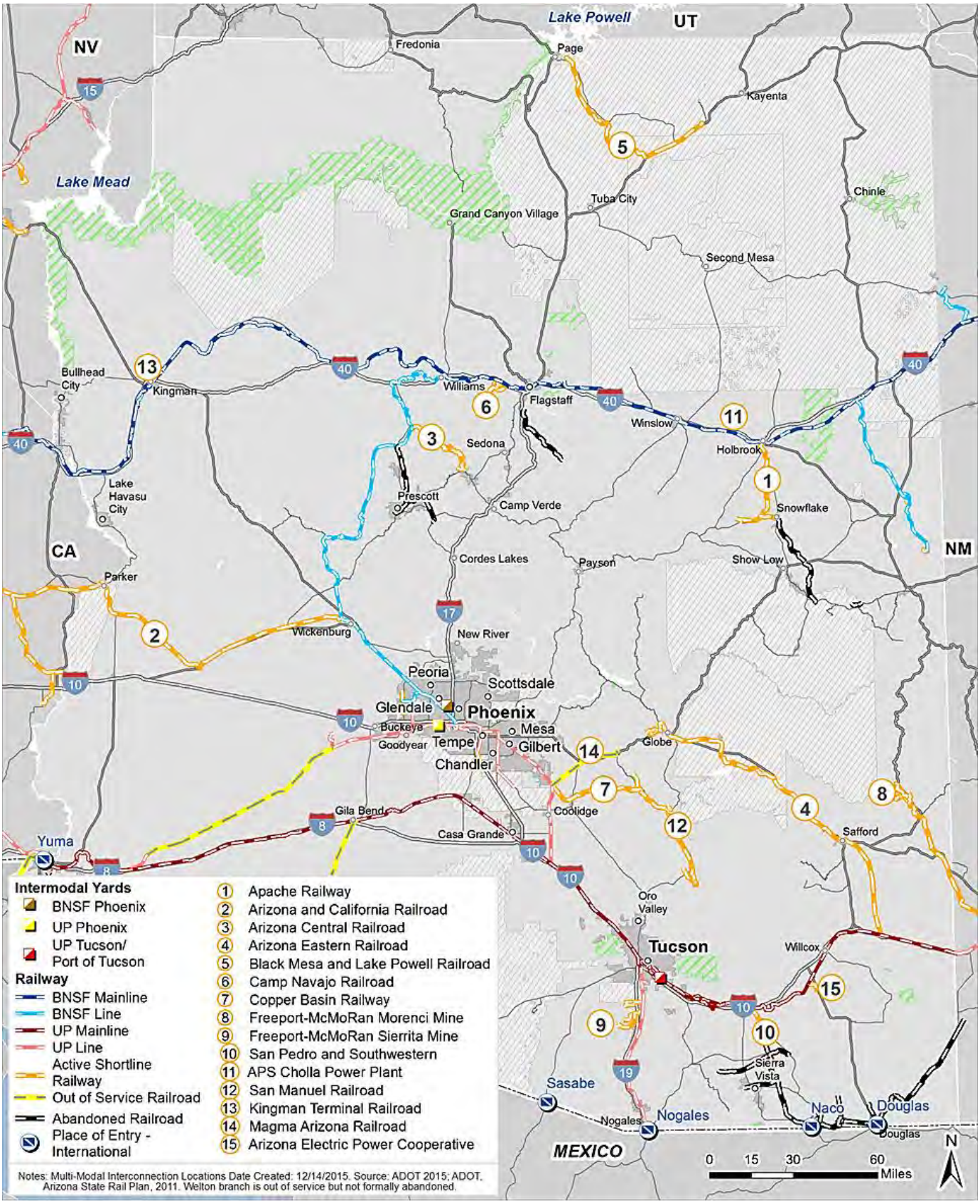
Arizona's Class I railroad systems support two distinct types of operations: Transcontinental movements that pass through the state without stopping (except for train crew changes, refueling, and/or inspections), and regional movements that provide branch line service primarily into and out of Phoenix. Two of the nation's four transcontinental rail corridors traverse Arizona: BNSF's Transcon Corridor, and UPRR's Sunset Route both link Southern California—including the Ports of Los Angeles and Long Beach – to Chicago and Dallas, respectively. These routes each serve as a 'land bridge' to convey trade by rail between Asia and the Eastern United States (in lieu of the Panama Canal). Other transcontinental corridors include UPRR's Overland Route, which roughly follows I-80 from California to Chicago, and BNSF's Great Northern Corridor, which connects Seattle and Chicago along the I-90/I-94 corridor.

The BNSF Transcon connects Southern California with Kansas City, Chicago, and points in the Midwest and Northeast U.S. and runs along the I-40 corridor in Arizona.

UPRR's Sunset Route connects Southern California and Arizona to El Paso, Dallas, and points in the Southeast U.S. and runs along the I-10 and I-8 corridors in Arizona.

Photos: Clay Gilliand, 2013, Creative Commons

Figure 4-5: Arizona's Class I Railroads, Branch Lines, and Short Line Railroads



4.4 Air Cargo System

While Arizona has multiple airports that handle freight, nearly all air cargo originating or terminating in Arizona is moved through Phoenix Sky Harbor International Airport (nearly 90 percent) and Tucson International Airport (nearly 10 percent).

Integrators such as FedEx and UPS have increasingly expanded their market share in the movement of air cargo. In 2013, only 13 percent of air cargo in Arizona was carried on passenger aircraft.

While estimates suggest no new on-airport cargo infrastructure will be needed until 2031, highway access to air cargo facilities at Phoenix Sky Harbor International Airport, especially the South Air Cargo complex, will need to be addressed.[6]

4.5 Pipeline System

Two major pipelines – both operated by Kinder Morgan – supply Arizona with petroleum products. The "West Line" supplies products from the Los Angeles basin to Phoenix while the "East Line" originates in El Paso, Texas and connects to both Tucson and Phoenix. Liquid products are typically delivered to the end user by tanker truck from distribution terminals. Given the limited oil and gas production in the state, there are effectively no gathering pipelines in Arizona.

Most of the last mile gasoline deliveries in Arizona rely on truck deliveries which are made via Arizona's petroleum product terminals. Because Arizona lacks petroleum refineries, petroleum terminals provide retail gasoline and diesel statewide via local delivery trucks. Of note, ethanol is also mixed with gasoline at the terminals, but because ethanol cannot be shipped by pipeline, it is delivered to the terminals by truck (e.g. from the ethanol plant near Maricopa). Natural gas is distributed to end users by pipeline.

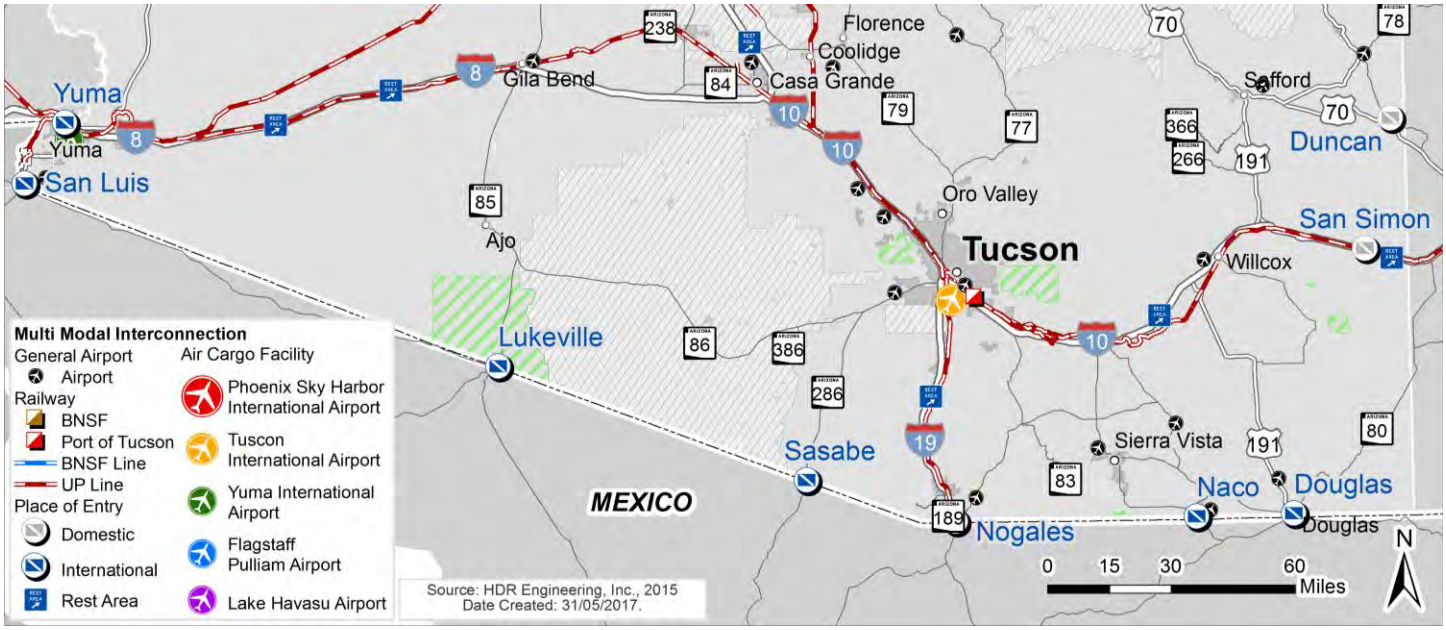
Because pipelines are controlled by private businesses, information on their performance is difficult to ascertain.

4.6 Borders and International Freight Gateways

Arizona and the State of Sonora, Mexico share approximately 360 miles of international border. There are six border crossing locations along Arizona's border with Mexico (Figure 4-6).

[6] *Phoenix Regional Air Cargo Planning Study.* City of Phoenix, 2014.

Figure 4-6: Border Crossing Locations on the Arizona-Sonora Border



Arizona's six border crossing locations are host to nine Land Ports of Entry (LPOE). A LPOE is an official location for the entry of goods and people, along with the enforcement of duties and laws. The border crossing location of San Luis-San Luis Rio Colorado features two LPOEs while the location of Nogales-Nogales features three LPOEs.

There are four types of flows that LPOEs on the Arizona-Sonora border may process: pedestrians, passenger vehicles, commercial vehicles, and rail. The type of flow processed by a specific LPOE depends on the infrastructure and staffing characteristics of each entry point. The complete list of LPOEs located on the Arizona-Sonora border, along with their location and the type of flows processed, is provided in Figure 4-7.

Figure 4-7: Land Ports of Entry in Arizona

LPOE	Border Crossing Location	Type of Flows Processed
San Luis I	San Luis, Arizona	Passenger vehicles and pedestrians
San Luis II	San Luis, Arizona	Commercial vehicles
Lukeville	Lukeville, Arizona	Commercial vehicles, passenger vehicles, and pedestrians
Sasabe	Sasabe, Arizona	Commercial vehicles, passenger vehicles, and pedestrians
Mariposa	Nogales, Arizona	Commercial vehicles, passenger vehicles, and pedestrians
DeConcini	Nogales, Arizona	Passenger vehicles, pedestrians, and rail
Morley Gate	Nogales, Arizona	Pedestrians
Naco	Naco, Arizona	Commercial vehicles, passenger vehicles, and pedestrians
Douglas	Douglas, Arizona	Commercial vehicles, passenger vehicles, and pedestrians

Source: Arizona-Sonora Border Master Plan

During 2014, more than $437 billion worth of goods moved through the U.S.-Mexico border using land transportation modes (truck, rail, and pipeline). Of this value, $359 billion, or 82 percent, corresponded to goods moved by truck. The DeConcini LPOE, located in Nogales, Arizona, is the only crossing for rail. Historically, Naco and Douglas LPOEs had railroad crossings, but these lines have since been abandoned.

The LPOEs in Arizona processed approximately $30 billion, or seven percent of the total goods that traveled between the U.S. and Mexico using land transportation modes.

Of the $30 billion processed by Arizona border crossings, approximately $20 billion (or two-thirds) crossed the border by truck, $10 billion crossed by rail and a negligible amount was moved by pipeline.[7]

For freight entering Arizona from Mexico, a greater percentage of volume/value travels by rail than for other southern border states, but trucking still comprises the largest portion of trade between Arizona and Sonora.

Land-based border flows are heavily concentrated at two border crossings:

- Over 85 percent of exports and 88 percent imports from or to Arizona use the Nogales-Nogales border crossing.
- Over ten percent of exports and imports from or to Arizona uses the Douglas-Agua Prieta border crossing.

Recent improvements to LPOEs in the region have reduced congestion; however, stakeholders expect continued growth in border volumes, suggesting the need for continued planning and investment in border infrastructure.

[7] *North American Transborder Freight Data Set.* Bureau of Transportation Statistics.

4.7 Freight Clusters

Freight clusters are concentrations of freight-dependent businesses, often engaged in warehousing or industrial activities and frequently supported by nearby intermodal transfer terminals, airports, or pipeline terminals which facilitate the movement of goods between modes.

In Arizona, the greatest concentration of freight activity is located along the I-10 corridor in Phoenix and Tucson, and includes clusters located at Tolleson, Sky Harbor Airport, Chandler, and the Port of Tucson. Outside the two largest metropolitan areas, Phoenix and Tucson, clusters are notably located in Casa Grande, Yuma, Prescott Valley, Flagstaff, Lake Havasu City, Bullhead City, Sierra Vista, and the border city of Nogales. Chapter 6 provides additional information on the clustering of freight activity in Arizona.

Arizona's freight clusters are generally well connected to the multimodal transportation system, although some experience congestion and delays.

Port of Tucson

The Port of Tucson is a privately owned intermodal rail facility located on I-10 and the Union Pacific Sunset Route near Tucson International Airport. The Port:

- Is an inland port providing international intermodal shipments in the Southwest.
- Has 1.8 million square feet of warehousing, distribution and manufacturing facilities and is a designated Foreign Trade Zone.
- Is the hub of Mexican beer distribution to entire Southwest U.S. given its strategic location.

Source: CPCS

5 Freight System Condition and Performance

Key Messages

To track performance over time, the Freight Plan establishes a series of performance measures. The measures provide a baseline for comparing future system performance. The measures are grounded in the Freight Plan goal of "Increasing System Performance" and include the following:

- **Truck Travel Time Index,** which monitors truck mobility, and supports the objective of Improving Mobility and Multimodal Accessibility
- **Daily Hours of Truck Delay** and **Truck Planning Time Index**, which monitor efficiency and reliability, respectively and support the objective of Increasing System Efficiency and Reliability
- **Truck accidents per 100 million vehicle miles of travel**, which monitors safety and supports the objective to Increase Safety And Security

Overall, Arizona's freight system is in good condition and provides reliable goods movement, with 86 percent of KCCs rated good on Truck Travel Time Index (TTTI) and 85 percent of KCCs rated good on Truck Planning Time Index (TPTI).

In addition to quantitative measures, the Freight Plan used a stakeholder survey to monitor the conditions and trends affecting Arizona's freight transportation system. The first poll, conducted in 2015, established "qualitative performance measures" that provided additional context to quantitative performance measures developed in the Freight Plan. Stakeholders indicated a generally decreasing trend in system performance relative to the previous five years in 2015. This is consistent with the quantitative performance measures which also suggest that the system is performing well, but performance is generally decreasing relative to five years ago. Additionally, specific locations have performance issues, especially urban areas which experience worse performance relative to rural areas on TTTI and TPTI.

5.1 Introduction: Freight System Condition and Performance

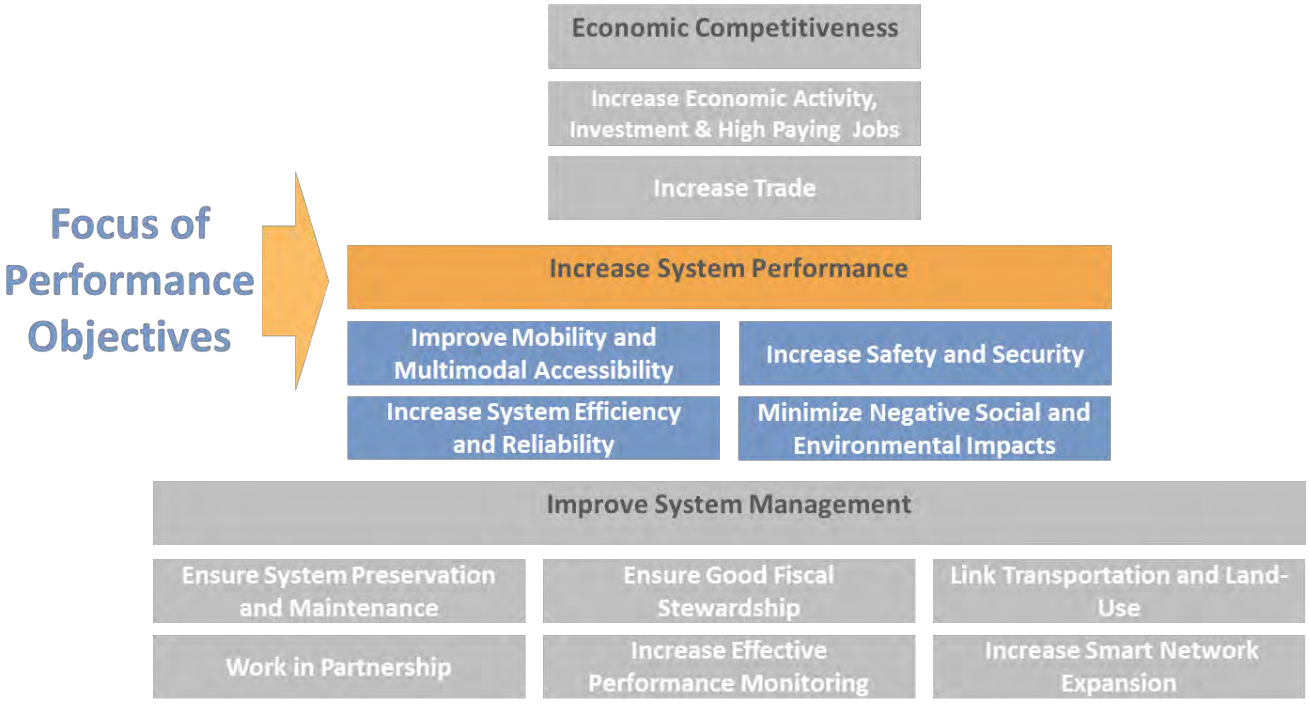
The assessment of condition and performance includes a combination of quantitative and qualitative performance measures. The assessment of condition and performance informs the identification and prioritization of freight transportation system improvements in the Freight Plan. The condition and performance assessment also establishes a baseline to compare freight transportation system performance over time.

The freight transportation system performance measures focused on the following four principles for development:

1. Are tied directly to the goals and objectives of the Arizona State Freight Plan, specifically the system performance objectives;
2. Can practically be measured, updated and tracked on a rolling basis;
3. Provide insights about the performance of the freight system, in line with the performance needs of its users (e.g. shippers, carriers); and
4. Build on existing ADOT data collection and performance monitoring and evaluation.

In line with the first principal of the selection of performance measures, Figure 5-1 illustrates the goals and objectives of the Freight Plan and highlights that the performance measures target the goal of Increasing System Performance. The Freight Plan uses the performance measures to identify issues on the transportation network. Once issues are identified, the Freight Plan applies the goal of Improve System Management to inform the solution proposed, the prioritization criteria, and in turn, the projects selected.

Figure 5-1: Focus of the Arizona State Freight Plan's Performance Measures



The link between Improve System Management and Increasing System Performance in turns advances the goal of economic competitiveness by providing a transportation system that performs in line with user needs. The focus on Increasing System Performance highlights that economic competitiveness is an outcome of Increasing System Performance.

In order to advance the other principles of performance measures, the quantitative measures utilize data collected by ADOT. By utilizing data already collected by ADOT, the Freight Plan

makes future development of performance measures practical and does not require ADOT to spend resources on new data. In addition to the quantitative performance measures, qualitative measures were used to assess the needs of transportation system users.

5.2 Freight Performance Measures

Figure 5-2 displays the four system performance objectives and the associated quantitative and qualitative performance measures. The quantitative performance measures use ADOT data and are supplemented by qualitative measures, which provide insight into topics for which little or no data are available and extend the usefulness of quantitative performance measures.

The qualitative performance measures were compiled from a survey of ADOT's FAC, which asked survey respondents to compare current performance relative to performance five years ago. This provides a baseline for the general trend of Arizona's freight transportation system, i.e. performance is getting better, declining, or staying the same.

Figure 5-2: System Performance Objectives and Associated Quantitative and Qualitative Performance Measures

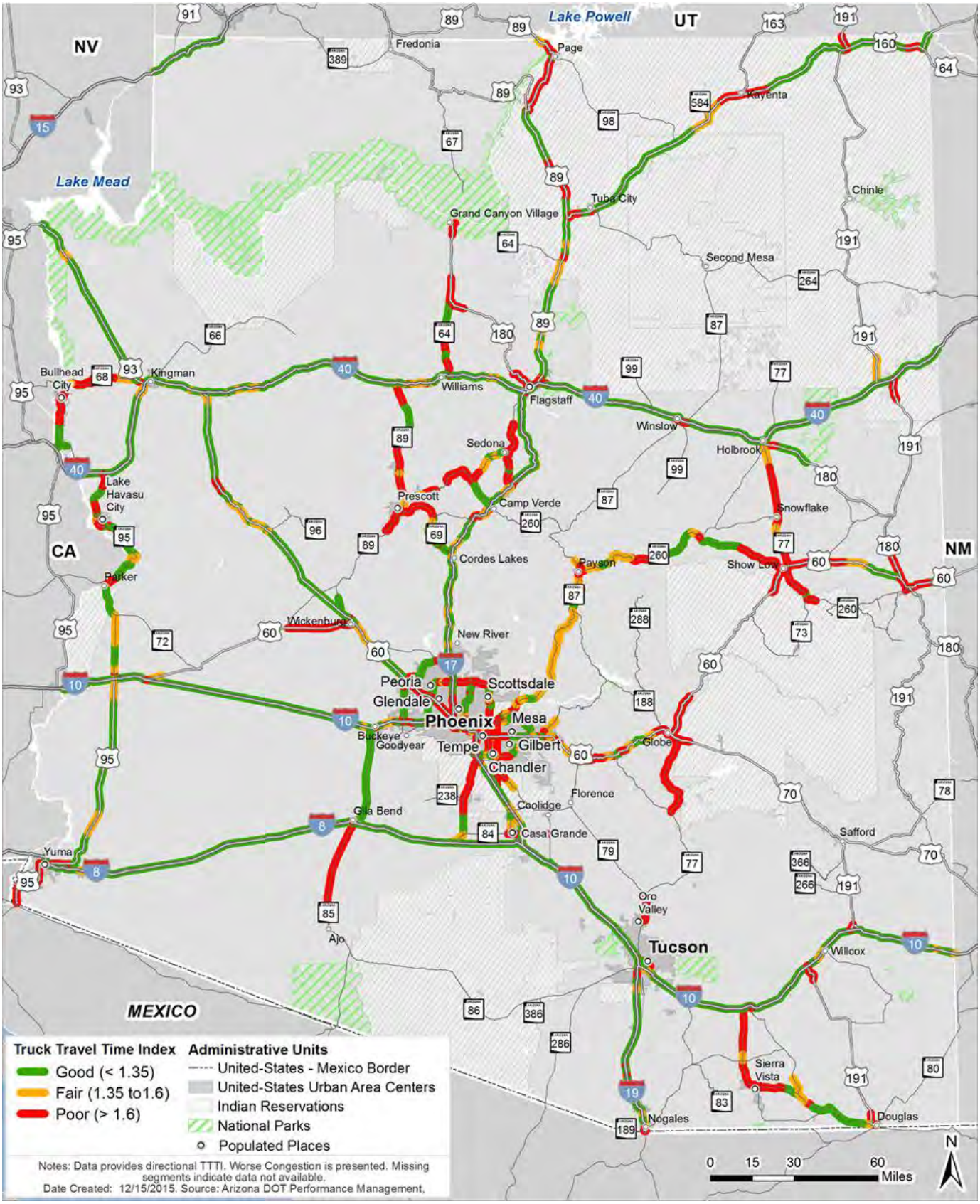
Freight Transportation System Objectives	Quantitative Performance Measure	Qualitative Performance Measures
Improve Mobility and Multimodal Accessibility	**Mobility:** Truck Travel Time Index	**Mobility:** How have freight travel times changed in the last five years? **Multimodal Accessibility:** How have multimodal options (ability to ship by truck, rail, air) changed relative to five years ago?
Increase System Efficiency and Reliability	**Efficiency:** Daily hours of truck delay **Reliability**: Truck Planning Time Index	**Efficiency:** How have logistics costs due to system inefficiencies changed in the last five years? **Reliability:** How has on-time delivery changed in the last five years?
Increase Safety and Security	**Safety:** Truck accidents per 100 million vehicle miles of travel **Safety:** Total societal cost of accidents	**Safety:** How have incidents and close calls changed in the last five years? **Security:** How has freight security changed in Arizona relative to five years ago?
Minimize Negative Social and Environmental Impacts	**N/A**	**Environmental/Social:** Have negative environmental externalities relating to freight activity and transportation decreased relative to the previous period?

5.2.1 Mobility

Figure 5-3 and Figure 5-4 display the performance of Arizona's freight transportation system based on measures representing truck mobility using Truck Travel Time Index (TTTI). TTTI measures truck related recurring delay primarily due to peak period congestion. TTTI evaluates the difference in travel time between 'free flow' and congested flow conditions. The speed-based TTTI is calculated using the following formula:

$$\text{Truck Travel Time Index} = \frac{\text{Free Flow Truck Speed}}{\text{Observed Average Peak Period Truck Speed}}$$

Figure 5-3: Truck Travel Time Index



As shown in Figure 5-4, both the urban and rural segments of the KCCs are operating in 'good condition', with rural corridors performing slightly better than urban conditions (87 percent versus 80 percent rated as good, respectively).

Figure 5-4: Arizona Key Commerce Corridor TTTI Performance

Corridor	Length (miles)	Rural/Urban and Performance	Miles by Area Type	Good Rating (% miles)	Fair Rating (% miles)	Poor Rating (% miles)
Key Commerce Corridor	1,375	Rural	1210	87%	10%	3%
		Urban	165	80%	10%	10%
Overall Key Commerce Corridor (Urban and Rural Combined)				86%	10%	4%

When surveyed, the overwhelming majority (71 percent) of respondents suggested that mobility is getting worse. Overall, respondents cited I-10 from SR 51 to SR 101 west, I-10 from Phoenix to Los Angeles, I-40's general condition, and I-17 congestion following an accident as specific issues affecting mobility. Overall, the qualitative performance on mobility suggests that mobility has been getting worse over the past five years.

5.2.2 Reliability

Reliability is measured through non-recurring delay which refers to unexpected delay caused by closures or restrictions resulting from crashes, inclement weather, and construction activities. Non-recurring delay is measured using the Truck Planning Time Index (TPTI).

TPTI represents the amount of time over and above the expected travel time that should be planned to make an on-time delivery 95 percent of the time. For example, a TPTI of 1.5 means that if a trip takes 30 minutes in free-flow traffic a truck driver should plan for it to take 45 minutes to ensure on-time arrival 95 percent of the time. Speed-based TPTI is calculated using the following formula:

$$\text{Truck Planning Time Index} = \frac{\text{Free Flow Truck Speed}}{\text{Observed 5th Percentile Lowest Truck Speed}}$$

Figure 5-5 and Figure 5-6 summarize the performance of Arizona roadways according to TPTI. Data indicate that both the urban and rural segments of the KCCs are performing well. Overall, 16 percent of urban corridors have a poor rating, while three percent of the rural areas have a poor rating. Large portions of the Arizona's roadways and the overwhelming majority of the KCCs are performing well against these measures.

Figure 5-5: Truck Planning Time Index

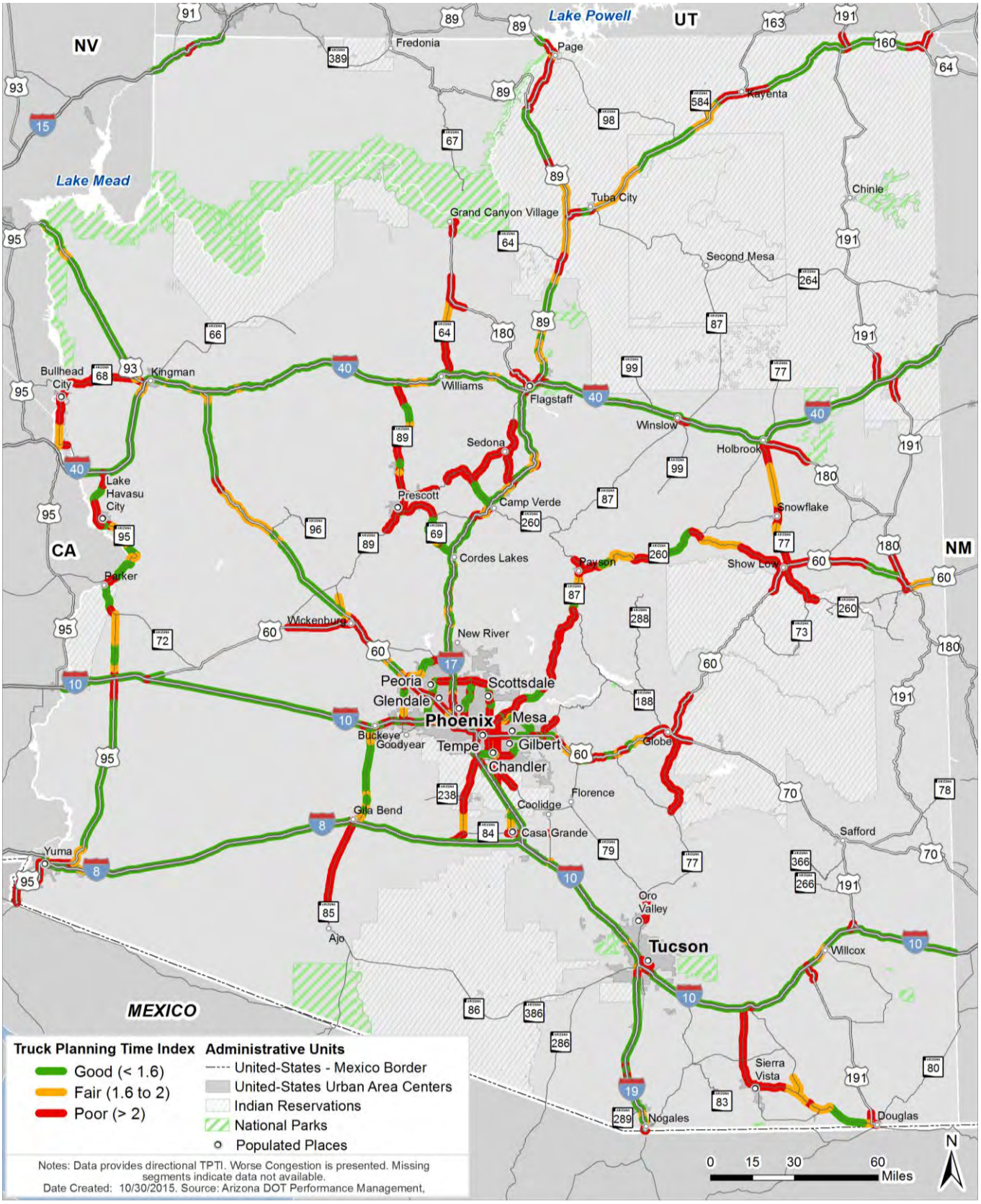


Figure 5-6 Arizona Key Commerce Corridor TPTI Performance

Corridor	Length (miles)	Rural/Urban and Performance	Miles by Area Type	Good Rating (% miles)	Fair Rating (% miles)	Poor Rating (% miles)
Key Commerce Corridor	1,375	Rural	1210	87%	10%	3%
		Urban	165	76%	8%	16%
Overall Key Commerce Corridor (Urban and Rural Combined)				85%	10%	5%

Similar to TTTI, stakeholders suggested that the reliability of the transportation system is getting worse, but respondents provided a greater distribution of responses (across the different groups consulted) compared to the mobility measure. The only reason provided to explain the decrease in reliability was regarding inspections by state agencies at border crossings and on corridors to and from ports of entry. Respondents who indicated that reliability is unchanged suggested that rail is becoming a more reliable option through high-tech visibility/traceability and that shippers and carriers must adjust work schedules or pay overtime to change reliability.

5.2.3 Multimodal Accessibility

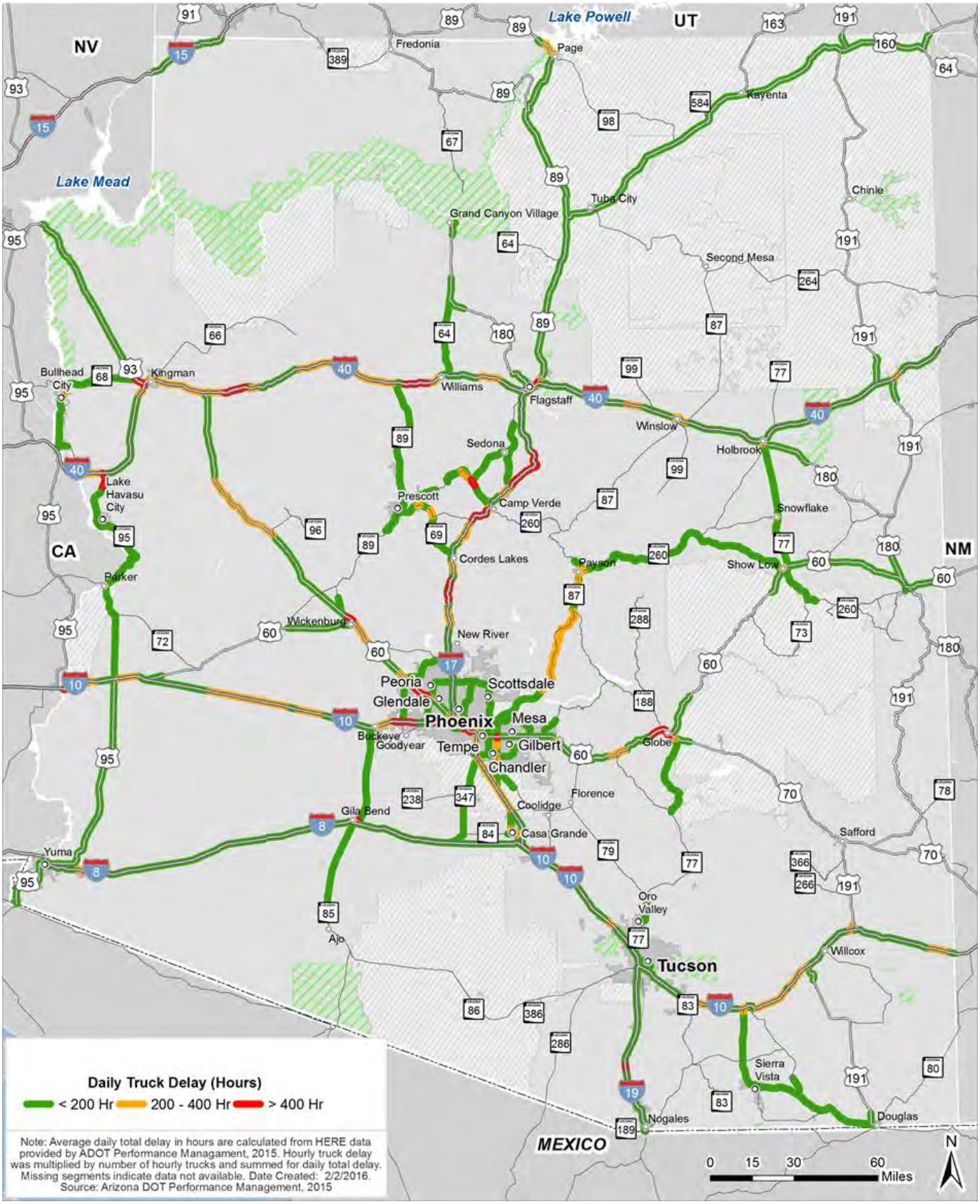
Qualitative performance measures were used to assess multimodal accessibility. When asked about multimodal accessibility, stakeholders most frequently suggested that multimodal options have increased or stayed the same compared to five years ago. Survey responses included examples of both increasing and decreasing multimodal access. For example, one respondent cited ocean containers at Tucson as an example of increasing access. Conversely, another respondent cited trailer on flatcar from Phoenix and Los Angeles/Long Beach (LA/LB) as an example of decreasing accessibility. Similarly, another respondent expressed the desire to use rail but is limited by the short shelf life of goods and the need for reliable transportation.

5.2.4 Efficiency

Annual hours of truck delay is designed as a measure of traffic congestion and delay on the overall transportation system, which directly affects truck efficiency. Annual hours of truck delay captures both characteristics of slower speed and longer trip times and is a primary indicator of freight performance.

Delay per truck was calculated at a segment level based on speed data. Using truck distributions and counts, cumulative total daily hours of delay is calculated by multiplying segment delay with the number of trucks by segment. Figure 5-7 displays the daily total hours of truck delay by roadway segment. Both truck volumes and operating delay are accounted for while calculating total hours of daily truck delay.

Figure 5-7: Arizona Daily Hours of Truck Delay



Rural corridors experience truck delay during nighttime, which is largely a function of driving conditions (lack of lighting, grades, lack of passing and climbing lanes, combined with adverse environmental and weather conditions), and not necessarily a function of congestion or traffic volume. In urban areas, delay is mostly due to peak period congestion when the overall traffic volume is high. When asked to assess how the efficiency of the transportation system has changed over time, nearly every stakeholder suggested that it is getting worse.

5.2.5 Safety and Security

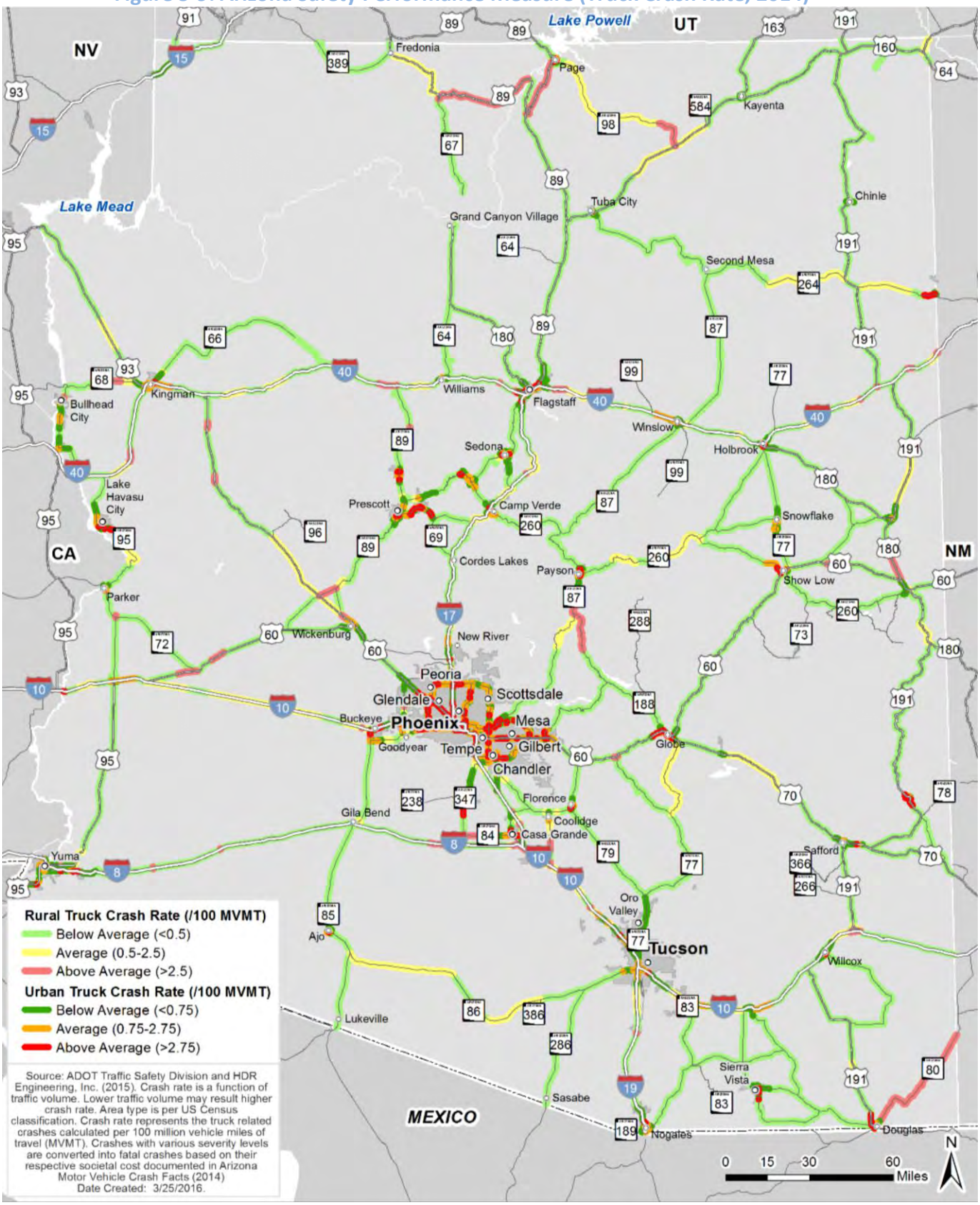
Safety is assessed by defining the number, weighted by severity, of crashes involving trucks per 100 million Vehicle Miles Traveled (VMT) by all traffic. Severity is weighted using ADOT's Annual Motor Vehicle Crash Facts (Figure 5-8), providing an estimate of the lifetime economic costs to society.

Figure 5-8: Lifetime Economic Costs to Society by Crash Type (2014)

Crash Type	Lifetime Economic Costs to Society (per crash)
Fatal	$1.53 million
Incapacitating	$76,398
Non-incapacitating	$24,480
Possible injury	$13,872
Property damage only	$9,486

Truck-involved crashes with various injury levels are converted into equivalent fatal crashes using the societal cost (as a proportion). While Arizona has a good safety record, truck safety remains a significant state, regional and local transportation system concern. Figure 5-9 displays crash rates by road segment, categorized into one of three categories: below average, average, or above average (based on characteristics exhibited statewide on respective rural or urban highway sections).

Figure 5-9: Arizona Safety Performance Measure (Truck Crash Rate, 2014)



In response to the safety and security qualitative performance measures, stakeholders suggested that these factors are largely unchanged, with some suggesting that performance has gotten worse. The only reason provided for their answer on the safety and security questions was to suggest that traffic is causing safety to get worse.

5.2.6 Social and Environmental Impacts

Transportation officials found it difficult to comment on broad trends relating to social and environmental impacts, as these issues are addressed primarily through land use planning, or environmental processes. Additionally, none of the other benchmarked state freight plans included social impacts performance measures and only a third of recently completed state freight plans included an environmental performance measure. Air quality nonattainment areas, which are areas that do not meet air quality standards defined by the U.S. Environmental Protection Agency, are used as a proxy for environmental impacts. Transportation is not the sole cause of air quality nonattainment. Other sectors such as mining (for example, Hayden and Miami), agriculture and land development also impact air quality. Seven counties in Arizona are classified as nonattainment areas for various pollutants by the U.S. Environmental Protection Agency.

5.3 Overall Performance

Both the quantitative and qualitative performance measures lead to the conclusion that the freight system is performing well, with some exceptions, including:

- **Recurring congestion and bottlenecks in and around urban centers, particularly Phoenix:** Peak congestion and associated bottlenecks were identified by virtually all freight sectors as problematic, and as a barrier to transportation system performance and sector competitiveness.
  Relevant objectives: System Efficiency and Reliability; System Mobility and Multimodal Accessibility
- **Non-recurring congestion and bottlenecks:** Although less frequently cited as an issue, several stakeholders – across most sector groups – noted non-recurring congestion and road closures as hindering the reliability of their transportation operations. Cited causes included road construction-related lane closures, crashes, and weather events, amongst others.
  Relevant objectives: System Efficiency and Reliability; System Mobility and Multimodal Accessibility

In addition, the survey of stakeholders (to establish baseline qualitative performance measures) observed a generally decreasing trend in system performance relative to five years ago.

6 Economic Context of Freight Movement in Arizona

Key Messages

Arizona's economy continues to rebound from the "Great Recession", yet growth rates are still slightly behind national levels. Several other trends, including seasonal variation in agriculture and tourism activity, affect freight demand in Arizona. In addition, cross-border manufacturing plays an important role in freight demand.

The role of the Freight Plan is to identify issues and solutions to transportation mobility for Arizona's freight-dependent industries to enable long-term economic competitiveness and quality growth. The expected outcomes include increasing GDP growth, attracting greater private investment, and growing trade and exports—all resulting in more, higher paying, high-quality jobs in Arizona.

The most important freight-dependent sectors in the state include Wholesalers and Retailers, Food and Beverage, High-Tech, General Manufacturing, Transportation Equipment, Mining, Agriculture, Forestry, Energy, and Transportation and Logistics. These industries rely on the Arizona multimodal transportation system, in particular on I-10 and to a lesser degree on I-17, I-40, and I-19, to reach external markets. Improvements to those facilities and other supporting freight infrastructure will help Arizona businesses to compete for markets outside Arizona and to attract investment to Arizona.

6.1 Wider Economic Trends

Prior to the 2008/09 recession, Arizona achieved gross domestic product (GDP),[8] employment and population growth above national averages. Since the recession, Arizona's recovered at a rate slightly behind the national average and nearby states. In 2014, residential housing starts in Arizona were still less than a third of pre-recession levels and were still at levels not seen in the pre-recession period since 1991. As shown in Figure 6-1, Arizona's GDP growth continued to be lower than the U.S. in 2014. More recently, Arizona's GDP growth rate has surpassed the national rate, but Arizona's compound annual growth rate from 2006-2016 (0.1 percent) still

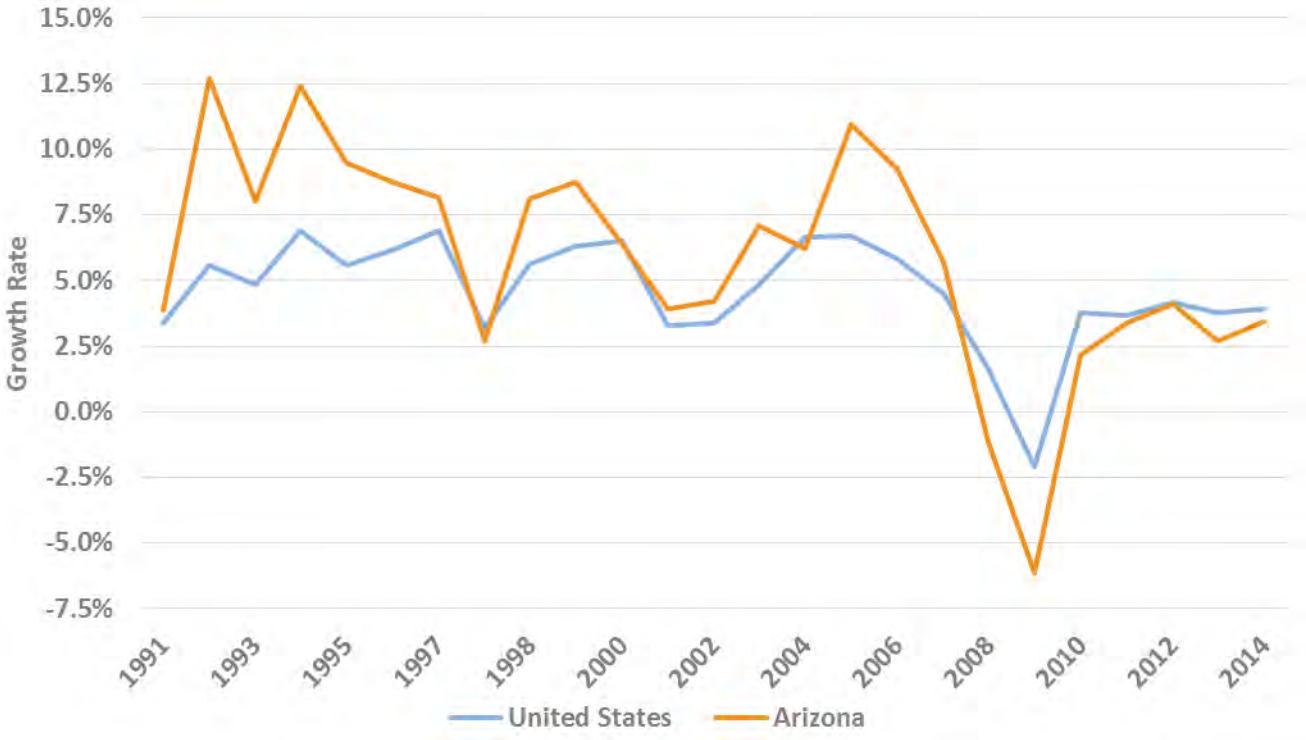
[8] GDP is a measure of the goods and services produced in a given year and in a specified geography.

lags behind the U.S. rate (1.1 percent), showing the historic impact of the recession on the state's economy.[9]

Arizona's economy and transportation trends are also driven by seasonal trends such as increases in agricultural activity and tourism during the winter months. Employment and agricultural flows tend to follow cyclical trends based on these factors.

Strong increases observed in Mexican manufacturing and agricultural imports into the U.S. have impacted Arizona and other border states. Border flows from Mexico have increased at the quickest pace through Texas, with smaller increases achieved in other border states including Arizona. The increase in Mexican manufacturing activity and agricultural imports is expected to continue to impact Arizona.

Figure 6-1: Arizona versus United States Nominal GDP Growth, 1991-2014



Source: CPCS Analysis of Bureau of Economic Analysis Regional Accounts: GDP by state (current dollars)

6.2 Role of Freight in the Arizona Economy

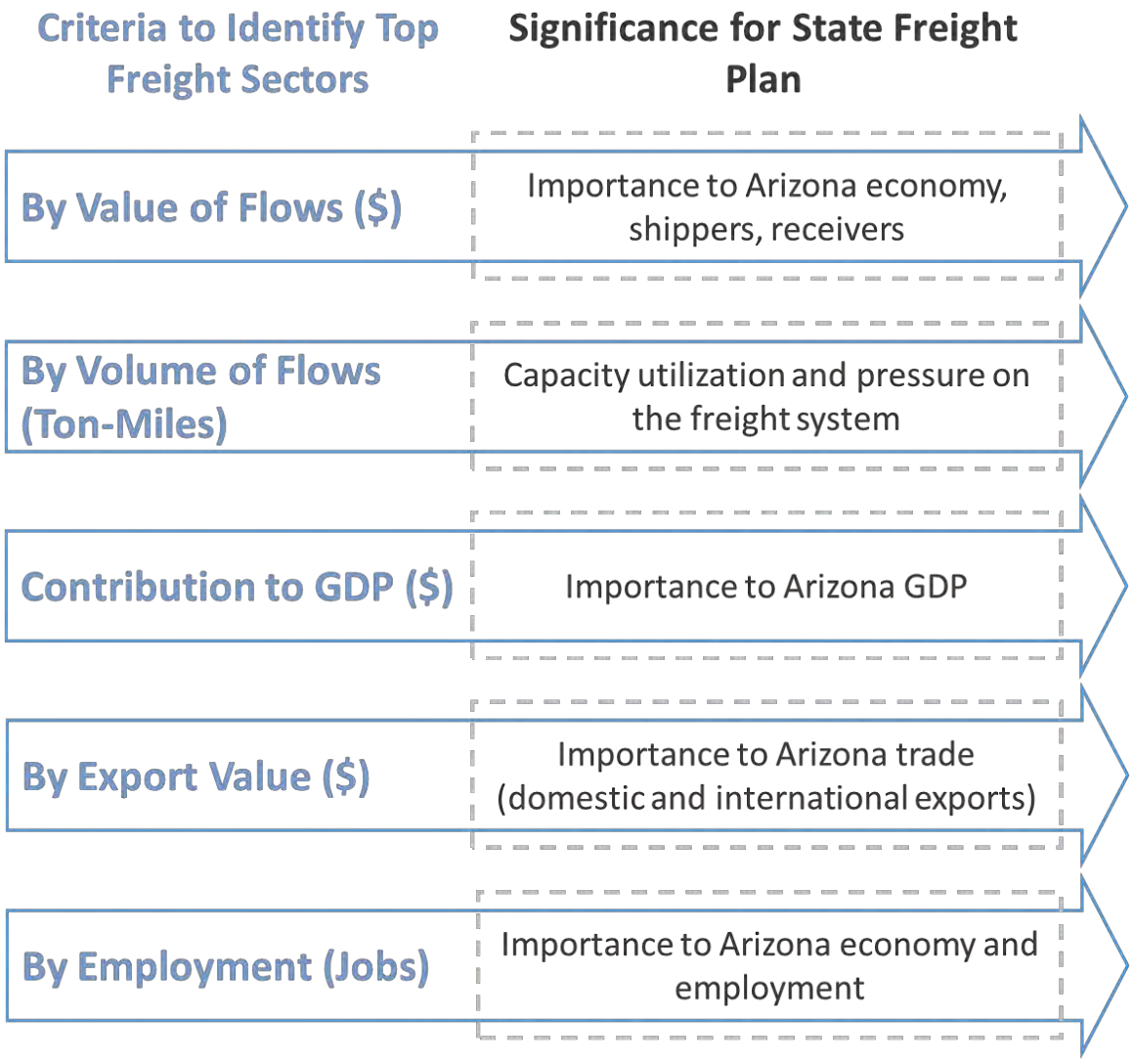
To enhance Arizona's economic competitiveness and quality growth, the Arizona State Freight Plan focuses on addressing the transportation performance needs of the freight sectors that drive Arizona's economic activity and growth. Long-term economic competitiveness and quality growth – the primary goals of the Arizona State Freight Plan – means increasing GDP, attracting greater private investment, growing trade and exports all resulting in more high-paying, high-

[9] *Arizona.* Bureau of Economic Analysis, 2017.

quality jobs in Arizona. Figure 6-2 presents the criteria used to select Arizona's top ten economic sectors.

The top ten freight sectors in Arizona are: Wholesalers and Retailers, Food and Beverage, High-Tech Manufacturing, General Manufacturing, Transportation Equipment Manufacturing, Transportation and Logistics, Mining (except oil and gas), Energy (oil and gas), Agriculture, and Forestry. These sectors cover most freight industry and flows in Arizona. The Freight Plan is informed in large part by ten individual economic sector working papers, available separately on ADOT's website: www.azdot.gov/freight.

Figure 6-2: Criteria for Identifying Arizona's Top Ten Economic Sectors



Arizona's top ten freight sectors can generally be grouped into four freight sector groups sharing similar transportation characteristics: consumer goods sectors, manufacturing sectors, natural resources sectors, and the transportation and logistics sector (Figure 6-3).

Figure 6-3: Freight Sector Groups and their Characteristics

Sector Groups	Top Ten Sector	Market Demand	Sourcing and Production	Competition	Role of Transportation
Consumer Goods *(Orange)*	• Wholesalers and Retailers • Food and Beverage	Predominantly tied to local consumption	Varied – Local to Global	Predominantly for the Arizona market (end consumers)	Varied, depending on nature of products
Manufacturing *(Green)*	• High-Tech • General • Transportation Equipment	Important focus outside Arizona, incl. global	Arizona, though supply chains extend beyond	Arizona US Global	Market access Supply chain integration
Natural Resources *(Blue)*	• Mining • Agriculture • Forestry • Energy	Important focus outside Arizona, incl. global	Arizona US (Energy)	Price takers, driven by commodities prices	Market access Focus on low cost
Transportation and Logistics *(Brown)*	• Transportation and Logistics	Predominantly tied to Arizona freight sectors' needs	Local	Predominantly for the Arizona market (shippers)	Service

Source: CPCS

The role of each freight sector group in achieving these ends will differ, and so too does the emphasis placed on addressing sector transportation performance needs and issues in the Arizona State Freight Plan.

As shown in Figure 6-4, in absolute terms, consumer goods sectors are by far the greatest contributor to Arizona's economy among freight sector groups, in terms of GDP, GDP growth, employment, income, and taxes. The contributions of Arizona's manufacturing and natural resources sectors are smaller than those of consumer goods sectors, but generate the greatest share of exports and a significant share of Arizona's direct investment – key drivers of quality, high-paying jobs and investment in the state.

To most effectively contribute to enhancing Arizona's economic competitiveness and quality growth, the Arizona State Freight Plan is oriented to addressing the needs of the sectors of the economy that:

- **Compete for markets *outside* Arizona**. The exports generated by these sectors bring dollars to Arizona, which in turn can stimulate employment and economic activity in the state.
- **Attract investment to Arizona**. Direct investment, and in particular investment coming from outside the state, will directly contribute to Arizona's GDP, employment in the state, and taxes, which in turn can be used to reinvest in the state's future growth and prosperity.

The manufacturing and natural resources sectors both meet these criteria. The consumer goods and transportation and logistics sectors, though larger, tend to be oriented towards local consumption, suggesting that the growth of these sectors is perhaps more constrained (i.e. by

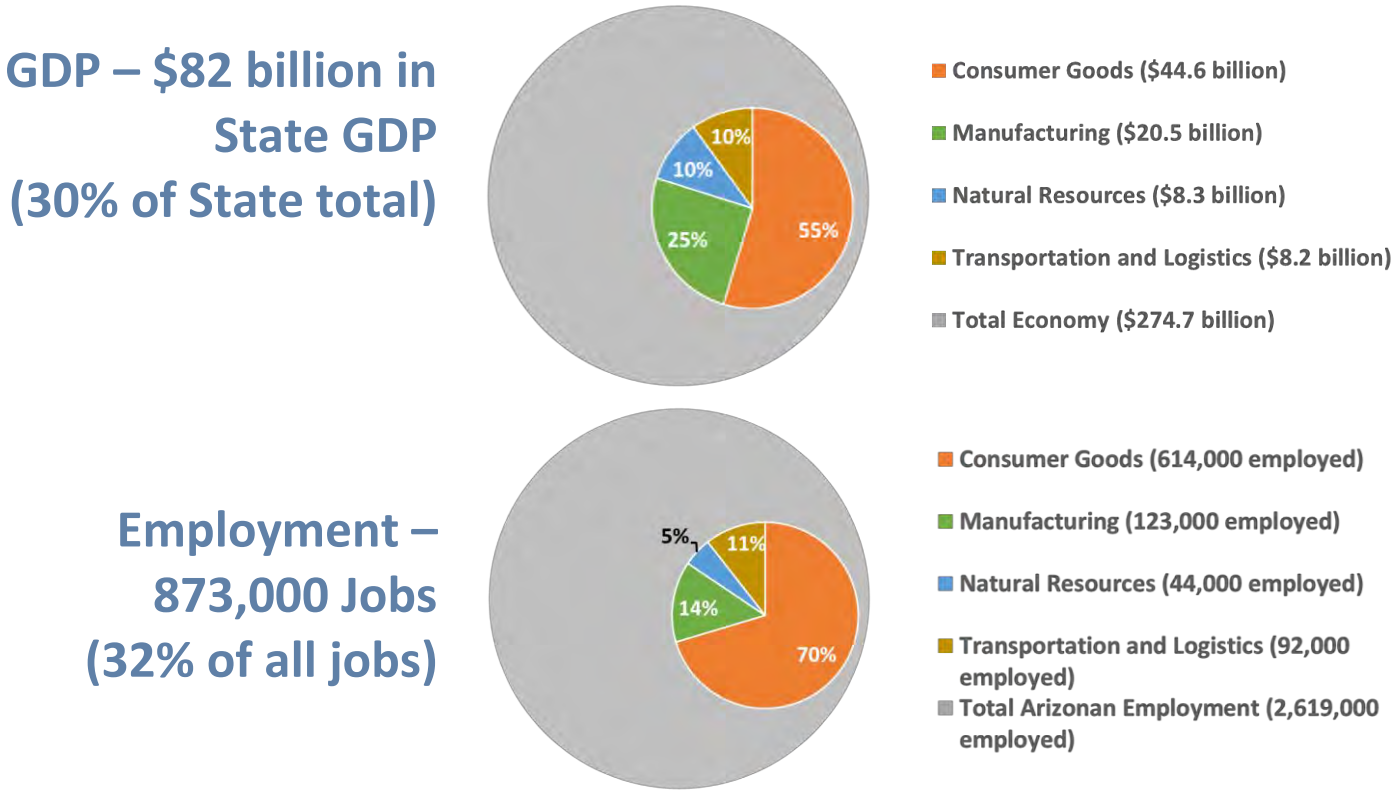
local population growth and consumption patterns) than those selling *outside* Arizona, such as the manufacturing and natural resources sectors.

These findings suggest that a particular emphasis on addressing the transportation performance needs of the manufacturing and natural resources sectors, since transportation improvements are most likely to affect an increase in the competitiveness of these sectors, will in turn, enhance Arizona's economic competitiveness and growth.

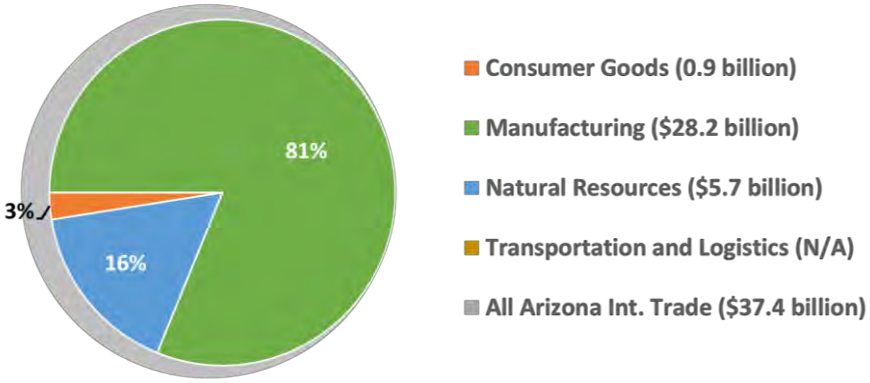
Also of critical importance to the State Freight Plan is the fact that many freight sector groups use the same transportation infrastructure and also share this infrastructure with passenger vehicles – for instance, the Interstate Highway System. Addressing common freight sector transportation challenges can both enhance economic competitiveness and growth, and improve the quality of life of Arizona's residents.

Figure 6-4 presents the significant contribution that the top freight sectors make to Arizona's economy, as well as the individual proportion of the total freight sector moves for each sector:

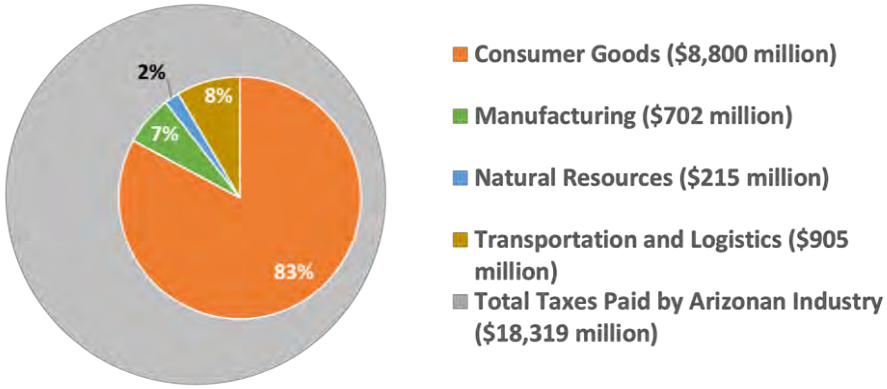
Figure 6-4: Relative Economic Importance of Top Freight Sectors to the State of Arizona



International Trade Flows – $35 billion (93% of total)



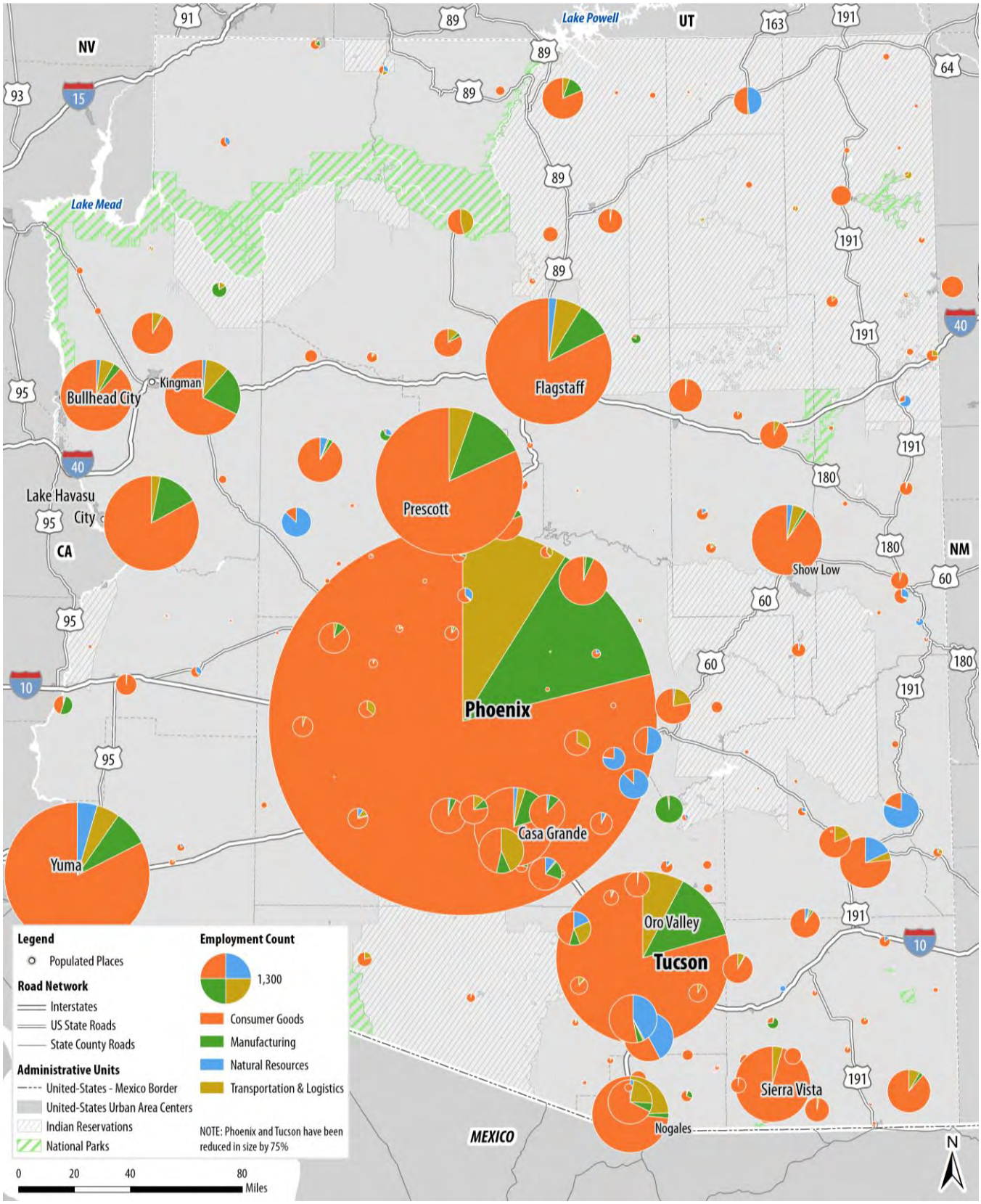
Taxes on Production and Imports – $11 billion (58% of total)



Source: CPCS Analysis of the Bureau of Economic Analysis Regional Accounts for the State of Arizona (GDP, Employment and Taxes for 2013) and United States Census Bureau's Trade Data Online (2012 data)

Figure 6-5 displays the geographic distribution of freight sector employment in Arizona. Phoenix and Tucson are Arizona's freight activity centers for consumer goods, manufacturing, and transportation and logistics clusters, owing in large part to the size the consumer market and labor pool in these regions. Natural resources sectors are clustered around sources of production, including the Southeast (mining), Southwest (agriculture), and North and Northeast (forestry).

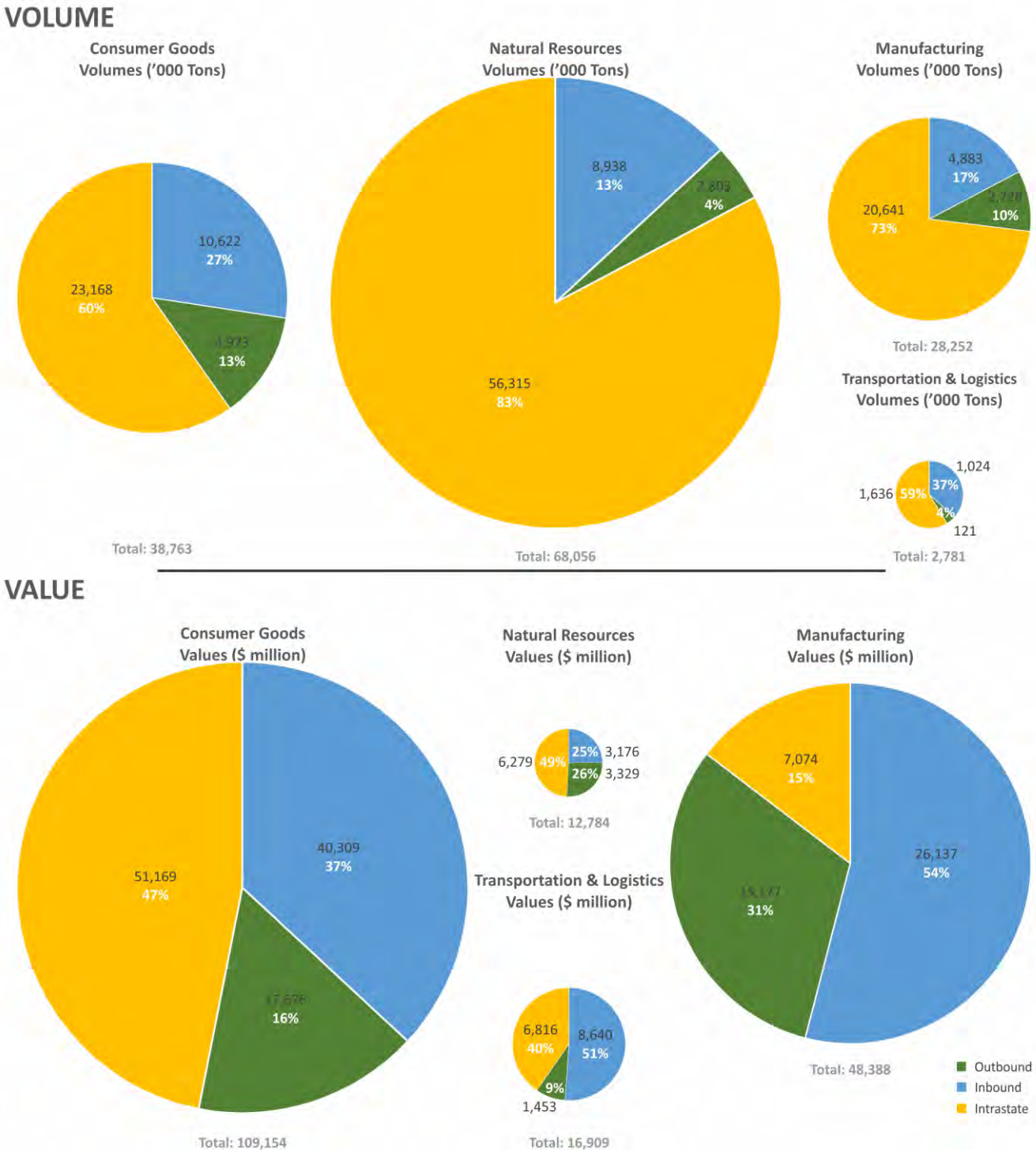
Figure 6-5: Freight Sector Employment Clusters (2013)



Source: County Business Patterns, U.S. Census Bureau

In line with their importance to Arizona's GDP, Figure 6-6 displays the volume and value of freight moved by Arizona's top ten freight sectors.

Figure 6-6: Volumes and Values of Freight Flows to, from and within Arizona Organized by Freight Sector Groups (2012)



Source: CPCS Analysis of 2012 Commodity Flow Survey Data

Over 137 million tons in freight flows are generated by Arizona's top ten freight sectors, of which 18 percent are inbound to Arizona, 8 percent are outbound from Arizona, and 74 percent are intrastate flows within the borders of Arizona. Natural resources sectors contribute 49 percent of these flows, by volume (2012).

Over $188 billion in freight flows are generated by Arizona's top ten freight sectors, of which 41 percent is inbound to Arizona, 21 percent is outbound from Arizona, and 38 percent are intrastate flows within the borders of Arizona. Consumer goods sectors represent 58 percent of these flows, by value (2012).

Figure 6-7 displays the inbound and outbound freight tonnage by trading partner for Arizona's top freight sector groups. California, Texas, and Mexico are the predominant inbound and outbound freight markets, by volume. Major trade lanes include inbound consumer goods and transportation and logistics sector flows from California, bi-directional manufacturing flows to and from Mexico and California, and bi-directional natural resources flows to and from Mexico.

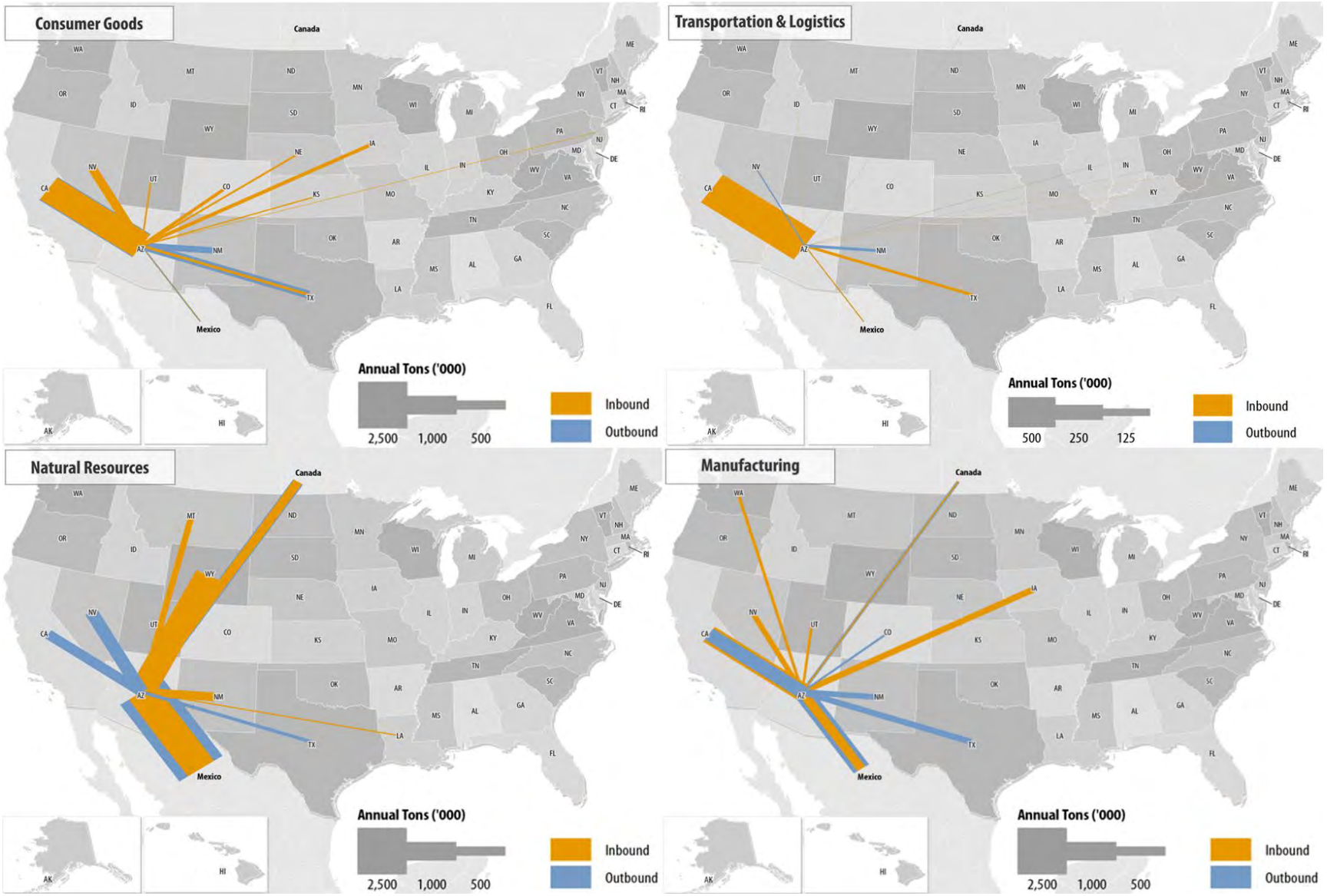
Figure 6-8 displays freight flows assigned to Arizona's roadway network. The map also breaks down freight flows by Arizona's top freight sectors aggregated into freight sector groups. The analysis removed all through traffic to focus on flows supporting Arizona jobs or consumption.

I-10 is Arizona's most heavily used freight corridor.

The I-10 corridor is dominated by traffic flows generated by manufacturing, consumer goods, and transportation and logistics sectors, highlighting the importance of trade with California for these sectors.

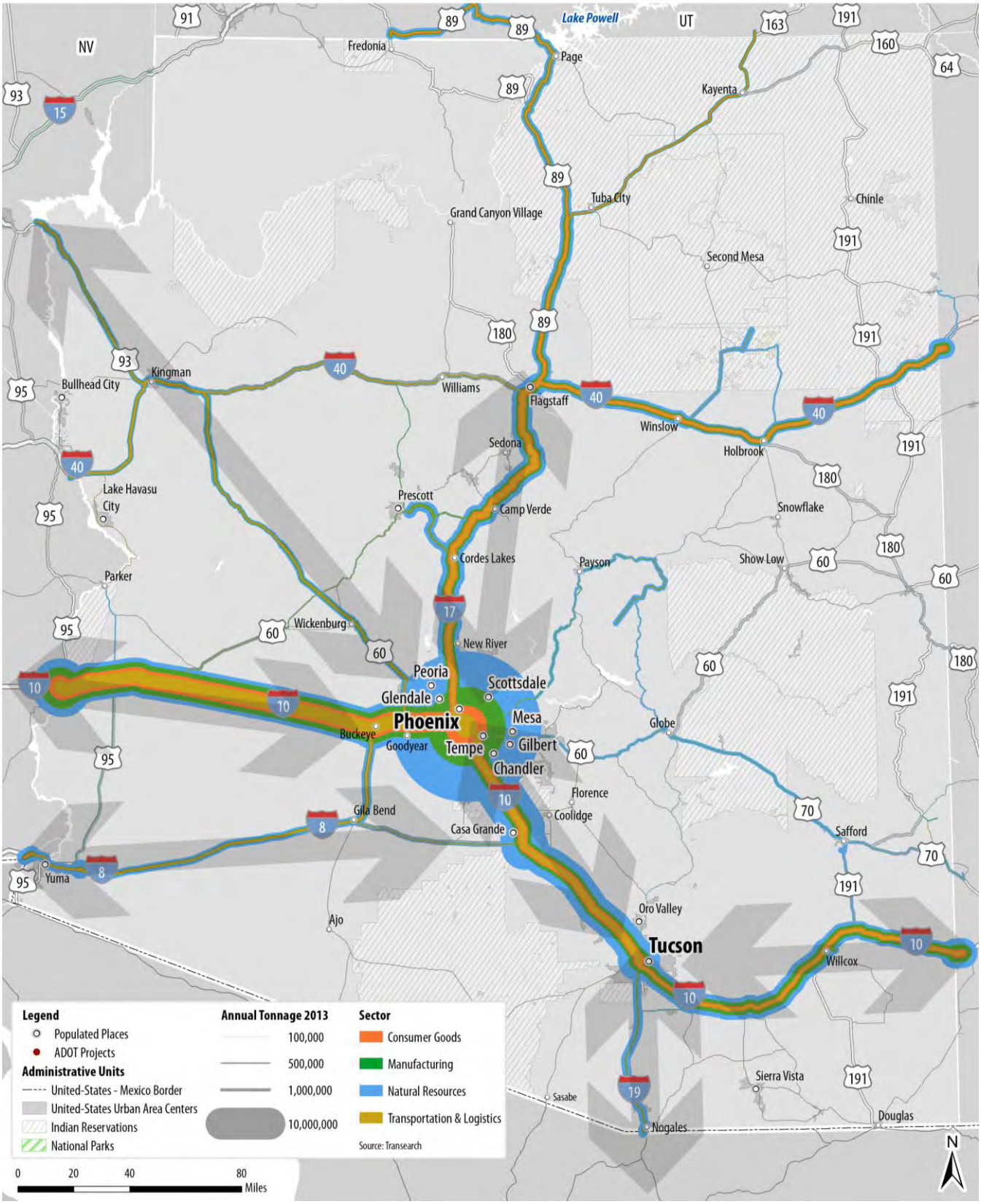
I-19 to Mexico is another important corridor, particularly for natural resources sectors and manufacturing sectors.

Figure 6-7: Inbound and Outbound Freight Flows, by Volume (Tons, 2012)



Source: CPCS Analysis of 2012 Commodity Flow Survey Data

Figure 6-8: Freight Sector Flows (Inbound, Outbound, and Intra) on Arizona's Key Commerce Corridors (2013)



Source: CPCS Analysis of 2013 TRANSEARCH Data, Key Commerce Corridors (arrows)

7 Trends Affecting Arizona Freight Transportation

Key Messages

Several trends affect Arizona's freight transportation, with implications for planning and preparedness:

- **Uneven population growth**, concentrated in the Phoenix and to a lesser extent Tucson metro areas, has the dual impact of generating more truck trips to serve local demand while also increasing pressure from passenger vehicles on area roads.
- **The gradual and continuing economic recovery** will also lead to more truck trips on roads in major urban centers. A rebound in trade will place pressure on some Key Commerce Corridors.
- **Scarce funding for freight projects** will continue to be a challenge, even with new FAST Act freight dedicated funds.
- Though more difficult to predict, climate change has been associated with a greater number of **extreme weather events**, which may disrupt supply chains.

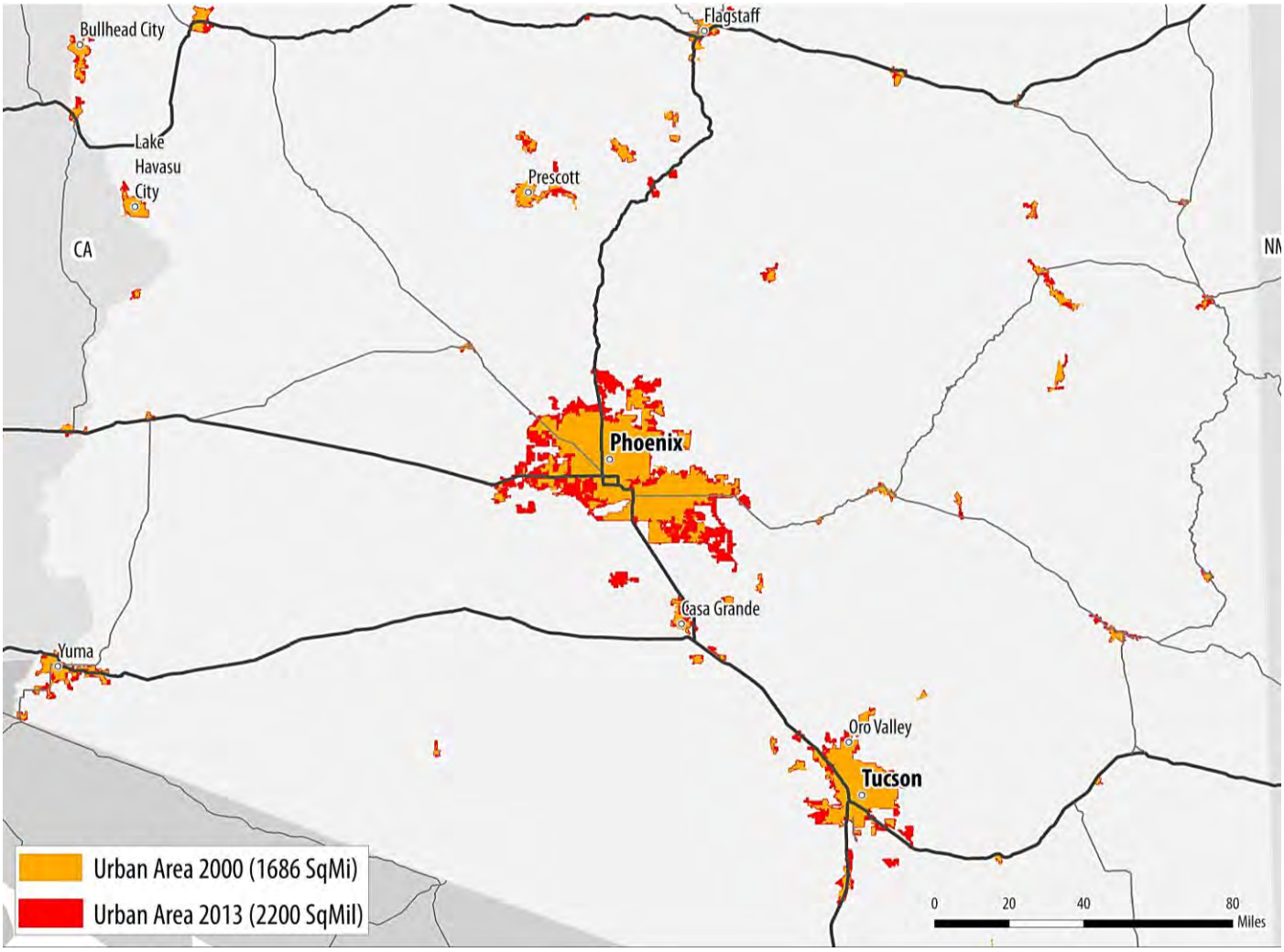
Four freight-specific scenarios: **Base Case, Domestic Bliss, #Urbanizona, and SOBO** (South of the Border) were developed by over 50 participants in a workshop to help ADOT prepare for a range of potential futures.

7.1 Summary of Trends Affecting Arizona's Freight Transportation System

The trends which have important implications for Arizona's freight transportation system include:

- **Uneven population growth, concentrated in the Phoenix and to a lesser extent Tucson metro areas,** will have the dual impact of generating more truck trips to serve local demand while also increasing pressure from passenger vehicles on area roads. Road capacity needs and issues will be most acute in and around Phoenix. For example, from the 2000 and 2013, the size of urban areas in the state has increased by 514 square miles, from 1,686 to 2,200 square miles. Figure 7-1 maps out this increase, with red areas representing the increase in urban land use between 2000 and 2013.

Figure 7-1: Growth in Size of Urban Areas in Arizona

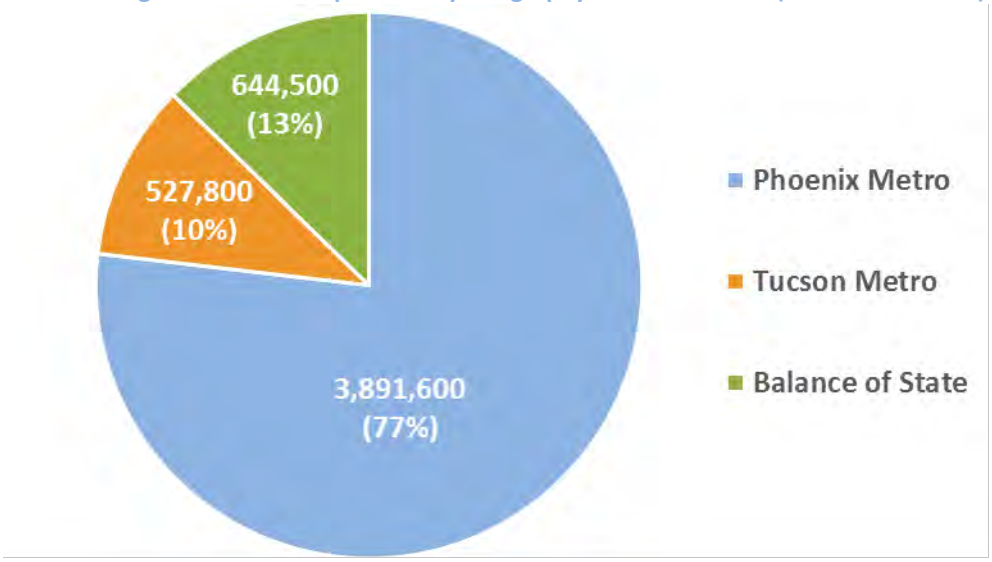


Source: BTW TIGER Database

This uneven growth pattern is expected to continue. Figure 7-2 breaks down the projected increase in population by location within the state. The Phoenix Metro Area is expected to lead this growth. Of the 5.1 million additional inhabitants expected to be living in Arizona between 2012 and 2050, it is forecast that 77 percent of those will be located in the Phoenix Metro Area, 10 percent will be located in the Tucson Metro area, and the remaining 13 percent will be located in other areas of the state (Figure 7-2). In relative terms, Metro Phoenix in 2050 will be 1.9 times its population in 2012, with Tucson Metro and the balance of the state both expected in 2050 to have 1.5 times their respective 2012 populations.[10]

[10]Arizona Department of Administration, Office of Employment and Population Statistics, op. cit.

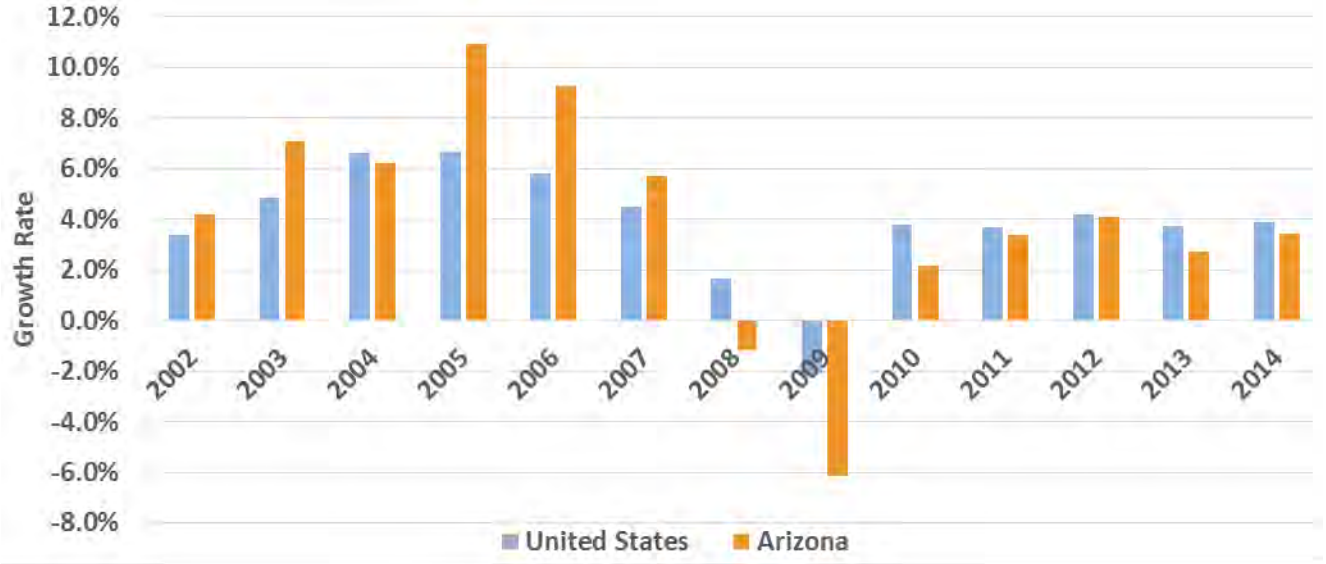
Figure 7-2: Change in Arizona's Population by Geography from 2012-2050 (Medium Forecast)



Source: Arizona Department of Administration, Office of Employment and Population Statistics

- The **gradual and continuing economic recovery in Arizona** will also lead to more truck trips on roads in major urban centers. A rebound in trade will add pressure on some of Arizona's KCCs. This may be offset somewhat if regional water scarcity and regional manufacturing challenges erode some of Arizona's growth prospects. Figure 7-3 and Figure 7-4 illustrate trends in Arizona GDP and international export trade, respectively. It should be noted that while Arizona domestic export trade (Arizona produced goods shipped to other states) has been relatively stable, international exports – particularly to Mexico – have shown strong growth.

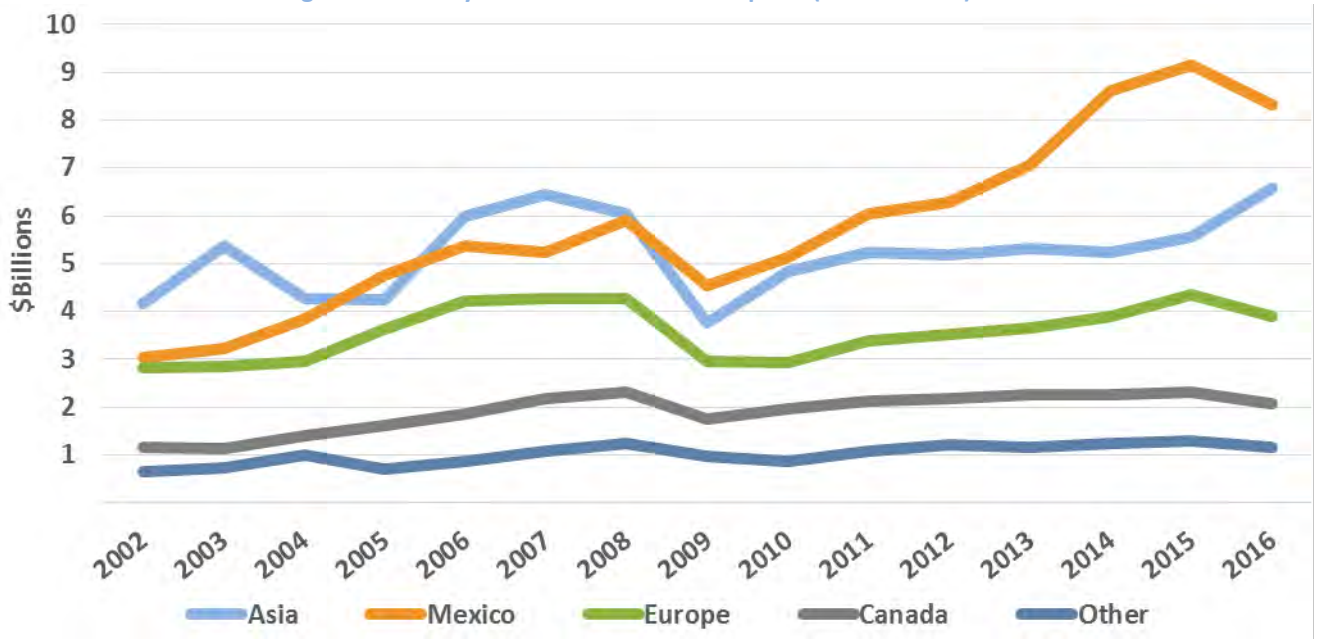
Figure 7-3: Year over Year Change in GDP for the United States and Arizona (1997 to 2014)



Source: CPCS Analysis of Bureau of Economic Analysis Regional Accounts: GDP by state (current dollars)

Arizona's economy has begun to recover to pre-recession levels based on trade with Mexico and employment levels.

Figure 7-4: Yearly Arizona International Exports (2002 to 2014)



Source: U.S. Census Bureau, Trade Data Online

- **Funding freight projects in Arizona will continue to be a challenge** given scarce resources and competing funding priorities, though the FAST Act creates one new means of helping pay for critical freight projects.
- Though more difficult to predict, climate change has been associated with a greater number of extreme weather events. An increase in the frequency of extreme weather events negatively impacts transportation infrastructure in Arizona and causes disruptions in the freight supply chains that rely on Arizona's freight transportation system. ADOT and other Arizona transportation agencies should continue to prepare contingencies and deploy operations strategies (like dust storm notification to trucks) to make the freight system more resilient to changing weather conditions.

In addition to the trends identified above, ADOT developed a Base Case and three alternative scenarios during a freight scenario planning workshop, held in Phoenix in November 2015. The scenario planning process intentionally produced very different and extreme alternative futures that cover a wide breadth of possible outcomes. ADOT considered social, technological, economic, environmental, and political ("STEEP") drivers affecting transportation to develop four alternative scenarios, as explained below.

7.1.1 STEEP Drivers

Informing the trends, ADOT considered **social, technological, economic, environmental, and political** drivers of change. The STEEP drivers formed the basis for developing potential future scenarios. Figure 7-5 summarizes the STEEP drivers which inform the trends analysis and the formation of scenarios.

Figure 7-5: STEEP Drivers Affecting Freight in Arizona (and Scenarios)

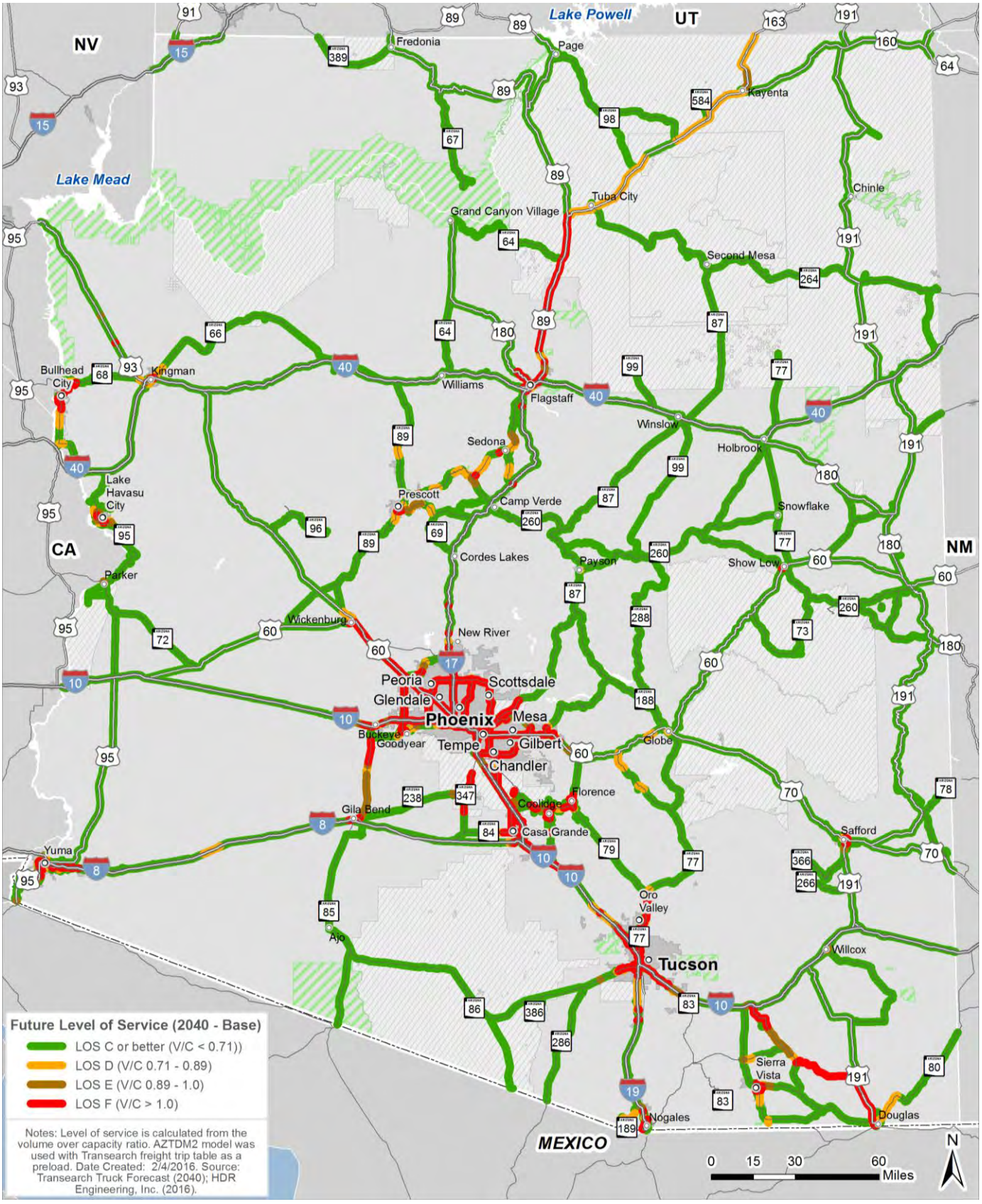
7.2 Potential Future Scenarios

Using the STEEP drivers, the scenario planning workshop developed four future scenarios. The impacts of the scenarios were modeled as changes to TRANSEARCH's base projection.

7.2.1 Base Case

The Base Case scenario has Arizona experiencing a significant growth in population and an increasing number of exports in high-tech industries. Arizona maintains its reliance on population growth to stimulate economic growth and its economic linkages with Mexico to continue as they are now, resulting in tonnage and value continuing to grow. Under the Base Case, the KCCs such as I-10, I-19, I-17, I-10, and proposed I-11 show significant truck growth. Trade between Arizona and Mexico will almost triple, requiring action to address port of entry capacity and congestion on primary corridors (i.e. SR 189, I-19, I-10). In terms of performance, one percent of rural and 13 percent of urban miles are at LOS F (Figure 7-6).

Figure 7-6: Base Case 2040 Congestion



7.2.2 Domestic Bliss

Domestic Bliss manifests itself in a dampening of international trade and a re-focusing on domestic markets. There are many smaller scale urban clusters all along the Sun Corridor from Phoenix to Tucson. The clusters have a high population density – but at a small scale.

Compared to the 2040 Base Case, Domestic Bliss is anticipated to have two percent overall truck growth. The increase in freight flows in Phoenix and Tucson reflect the boom in consumption, resulting in more trucks along I-10, US 60, US 70, US 93, and SR 87. Yuma and La Paz Counties experience an additional increase in freight flows due to Californian firms moving there, resulting in increased truck traffic along I-10, I-8, and US/SR 95.

There is a decrease in the number of trucks entering Arizona at the Nogales and Douglas LPOEs, compared to the Base Case. This reduces the number of trucks on I-19, SR 75, SR 78, SR 80, SR 82, and SR 90. Adjacent states and the Midwest have increased their exports to Arizona to offset the falling imports from Mexico.

There would be slightly less congestion than Base Case in metro areas as population is distributed more evenly (e.g. both rural and urban growth). Domestic Bliss exacerbates some of the issues freight flows already experience in rural areas of the state (e.g. lack of redundancy in the network, lack of climbing and passing lanes, and peak period congestion at rural junctions and population centers).

7.2.3 #Urbanizona

#Urbanizona manifests itself in tremendous growth in the populations of Phoenix and Tucson. The majority of the new population are younger, highly skilled professionals, choosing to live in urban condos. The shared economy has taken full root in Phoenix and Tucson and the number of vehicles owned per capita has been reduced. Arizona is still a major distribution hub for retailers bringing goods from the coasts to the interior.

Compared to the 2040 Base Case, #Urbanizona will experience six percent overall truck growth, increasing use of air cargo (for higher value goods), and last mile deliveries serving concentrated population in metro areas are plagued by urban congestion. I-8, I-10, I-17, I-19, US 60, US 70, US 160, US 191, and SR 89, are the main routes supporting Arizona's new consumption and production. Additionally, large percentage increases in trucks on I-19 are due to increases in exports. Approximately 16 percent of roadway miles operating at LOS F.

7.2.4 SOBO (South of the Border)

SOBO manifests itself in a re-focused economy looking south to Mexico and other Latin American countries for markets and products. Mexico has replaced China as the primary manufacturing hub for North America. There are more border communities serving this huge and still growing cross-border economic activity.

I-10 sees a strong increase in the number of trucks traveling along the east-west corridor. This freight flow serves the population increase, primarily in the southern half of Arizona. The integration of the economies in Arizona and Mexico allows Mexican imports to spread

throughout Arizona. I-10 and I-19 also facilitate Mexican imports meeting the growth in consumption in Phoenix. The decrease on I-40 reflects the overall decrease in east-west traffic.

Compared to the 2040 Base Case, SOBO will experience 11 percent overall truck growth. SOBO has the highest overall freight growth of any scenario, resulting in 16 percent of roadway miles operating at LOS F.

7.2.5 Outcome of Scenario Planning

Future scenarios and forecasts are intended to position the Arizona State Freight Plan to effectively *prepare* for an unknown future. Each scenario reveals a different set of potential economic outcomes and different transportation system impacts. Taken as a whole, the scenarios reveal the following:

- **All scenarios increase congestion and delay** on the roadway network, resulting in additional travel time. Congestion and delay directly affect the timeliness and reliability of freight transportation, increasing cost and decreasing economic productivity.
- Though the actual change in congested miles within rural areas does not vary substantially for the various scenarios, **congestion and delay in urban areas is exacerbated by all scenarios**.
- Overall, **truck vehicle miles of travel increase in all scenarios,** as trucks will likely travel longer distance using alternative routes.
- The sketch-level modeling exercise reveals that **congestion is primarily driven by the growth of population and employment**. Trucks are a component of this congestion, and therefore, affected by this congestion (both local and through). Because the origins and destinations of the truck components of congestion are largely in urban areas, truck traffic is inexorably linked to them.

The freight trends and scenarios inform the identification of strengths, weaknesses, needs, projects, and the development of a prioritization approach to focus future planning and implementation efforts.

7.3 Implication of Trends on Needs and Improvement Priorities

The prioritization of ADOT actions and identification of specific projects and improvement options are presented in the following chapters. Nevertheless, a number of key considerations inform policy responses and the identification of freight system needs.

- **Looking beyond freight**. The evaluation of project priorities and improvement options should recognize both freight and passenger benefits. The development of the Arizona State Freight Plan therefore, has been closely coordinated with the update of Arizona's LRTP.

- **Focusing on needs and issues in urban centers**. Related policy responses and investments should be closely coordinated with the MPOs in the Phoenix and Tucson metro areas, while continuing to respect the fundamental needs in greater Arizona.
- Maintaining a focus on **improving the performance of Arizona's KCCs**, including some of the specific needs identified herein, and enabling improved performance of road connectivity to Mexico LPOEs.
- Aligning with FAST Act requirements for freight investments.

8 Strengths, Weaknesses, Needs, and Issues

Key Messages

For the most part, the freight transportation system in Arizona has ample capacity and performs well. Arizona's network of freight transportation facilities is extensive, robust, and reliable—traits that are essential to maintaining Arizona's economic competitiveness. Yet, the system has a number of needs and issues for consideration in the Freight Plan, including those related to the condition, performance and capacity of the system and those related to policy:

System condition, performance, and capacity

- Recurring and non-recurring congestion and bottlenecks in and around urban centers
- Border-related delays
- Shortage of safe truck parking across Arizona
- Shortage of passing and climbing lanes on KCCs
- Winter weather-related disruptions and dust storms along the I-40 and I-10, respectively
- Road geometrics affects maneuvering large trucks
- Non-highway weaknesses include rail, pipeline, and airport capacity constraints and service levels

Transportation policy

- The P2P process uses simple freight flow evaluation criteria that needs to be strengthened
- The shortage of truck drivers is a national phenomenon and is pronounced in Arizona
- City ordinances related to noise have been cited by retail sector companies
- Low axle weights are often cited as a top issue, particularly for natural resources sector

8.1 Strengths of the Arizona Freight Transportation System

Based on the assessment of the performance of the freight system, Arizona's freight transportation system generally has ample capacity and performs well. Arizona's network of freight transportation facilities is extensive, robust, and reliable—traits that are essential to maintaining Arizona's economic competitiveness. Specifically, regarding the freight transportation system:

- Arizona has **ample capacity and performs well**, generally. Stakeholders interviewed in the development of the Arizona State Freight Plan have confirmed that they are generally pleased with the way the freight system works and how it supports their own business goals. Quantitative performance measures found 86 percent and 85 percent of KCCs are rated good when measured by TTTI and TPTI respectively. That is not to say there are no problems or deficiencies; these are identified by the Freight Plan's

performance measures and are identified as issues in the project identification and prioritization process.

- Arizona's network of **freight transportation facilities is extensive, robust, and reliable**. There are over 66,000 highway miles in Arizona. With exceptions in urban areas, the level of service of Arizona's highways can generally be described as high (LOS C or better). ADOT can capitalize on this strength by ensuring that state highways continue to function well through ongoing maintenance and repair, and by implementing key capacity enhancements and operational improvements, where warranted.
- Although ADOT has no responsibility for the rail network, **Arizona's freight rail system is also quite extensive**, covering nearly 2,000 route miles. Class I carriers BNSF and UPRR operate 1,465 miles, or 73 percent of Arizona's rail network, with intermodal transfer facilities in Phoenix and Tucson. Short line carriers provide reliable local service to rail-dependent industries like mining and provide connections to the Class I network.
- Arizona's two largest air cargo facilities are managed by municipal—rather than state—entities. These airports are nevertheless an important component of Arizona's multimodal freight transportation system. **Phoenix Sky Harbor International Airport has sufficient capacity and moves nearly 90 percent of all air cargo originating or terminating in Arizona**, and Tucson International Airport handles nearly 10 percent of the state's air cargo.
- Arizona's freight clusters, concentrations of freight distribution facilities, provide vital job opportunities for Arizona residents. **Arizona's freight clusters are generally well connected to the multimodal transportation system**.
- The freight transportation system provides **vital links with Arizona's principal trading partners: Mexico, California, and Texas**. I-10, I-19 and I-40 corridors and major border crossings are key components of Arizona's freight transportation system. They support inbound consumer goods and transportation and logistics sector flows from California, bi-directional manufacturing flows to and from Mexico and California, and bi-directional natural resources flows to and from Mexico.

8.2 Weaknesses of the Arizona Freight Transportation System

The analysis of condition, performance, trends, and scenario has identified several highway-specific needs and issues. Unless addressed, these needs and issues are likely to become more pronounced with increased passenger and freight-related traffic, economic growth, and increased trade with Mexico, as well as increased frequency of weather events such as dust storms. The extent to which ADOT can address these weaknesses depends largely on questions of jurisdiction and ownership – material considerations in defining ADOT policy responses.

Weaknesses ADOT can address directly:

- **Road:** Shortage of passing and climbing lanes on KCCs (e.g. along I-17, I-10, I-40, proposed I-11, US 93).
- **Road:** Shortage of safe truck parking across Arizona, especially on the I-17 corridor between Phoenix and Flagstaff and on I-10 between Tucson and Blythe, California.
- **Policy:** Current project prioritization process (P2P Link) uses simple freight flow evaluation criteria that needs to be strengthened through the application of criteria developed through this Freight Plan.

Weaknesses ADOT can address through collaboration and partnerships with others:

- **Road:** Congestion in and around urban centers, for example along the I-10 in Greater Phoenix and Tucson and at key junctions (US 60, SR 95, SR 85, on urban portions of the I-17).
- **Border:** Limited LPOE highway and rail capacity and limited roadway connections result in poor reliability at the Mexican border (unpredictability of crossing times). For example, all traffic is stopped at milepost 25 of I-19 due to border inspection activity, contributing to delay and reduced corridor reliability.

Weaknesses over which ADOT has little or no control:

- **Policy:** Retail sector companies have cited city ordinances related to noise as issues in certain areas of Tucson and Phoenix, which limits the ability of certain stores to be replenished outside of congested hours.
- **Policy:** Shortage of funding for transportation needs, including freight needs.
- **Rail:** Additional road/rail grade separation, where traffic justifies. Some have called for greater north-south rail infrastructure and access to industrial sites, though these are purely commercial considerations of freight railroads.
- **Air:** Inadequate international air connections at Sky Harbor International Airport, limited weekend and off-hour customs services, localized truck issues around Sky Harbor International Airport ("first and last" mile).
- **Pipeline:** A Shortage of fuel storage capacity in Arizona provides little inventory and/or options (e.g. redundancy) to redistribute product in the event of system disruptions. As with new rail infrastructure, these are strictly commercial considerations.
- **Road:** Low axle-load restrictions are often cited as a top issue, particularly for natural resources sector stakeholders.
- **Road:** A shortage of truck drivers is a national phenomenon and is pronounced in Arizona.
- **Winter weather-related disruptions** in the northern part of the state (e.g. snow-related closures along the I-40) and **dust storms** along the I-10 between Tucson and Phoenix.
- Volume of freight that is **pass through traffic** Arizona.

Many of the strengths and weaknesses of Arizona's freight transportation system – notably relating to the performance of the state's roadways and airports – are equally important for the mobility of people. Though not strictly within the scope of the Freight Plan, efficient people movement is also critical to Arizona's economic competitiveness and growth. Freight Plan considerations should not lose sight of this reality, particularly given the fact that highways and airports are used by both freight and passengers.

Sector-Specific Issues

Travel time, reliability and service levels are particularly important to freight sectors moving high value and time-sensitive goods, such as high-tech manufacturing sector outputs, or perishable goods such as produce. Logistics costs are also important, but tend to be the primary focus of sectors moving low value, high volume goods, such as construction aggregate, forestry products or other non-perishable natural resources. Other issues noted in consultations, specific to freight sector groups, include:

Consumer Goods Sectors

- Municipal noise ordinances as a barrier to off-peak deliveries
- Location-specific truck maneuverability issues, particularly relating to delivery docks at shipping centers

Manufacturing Sectors

- Dissatisfaction with limited international air connections and service at Phoenix Sky Harbor International Airport
- Unpredictability of crossing times at the Mexican border at Nogales

Natural Resources Sectors

- Truck reliability and availability during peak periods

Transportation and Logistics Sector

- Inadequate truck parking facilities

8.3 Policy Responses

ADOT policies can be implemented through planning, investments, operations, and regulations. Policy responses and priorities for addressing Arizona's freight transportation system weaknesses should be guided by the goals, objectives, and strategies of the Freight Plan.

Accordingly, Figure 8-1 provides a summary of project types in line with the key weaknesses identified in the Freight Plan's development. Importantly, ADOT should focus its policy responses on weaknesses falling within its mandate. Where it shares responsibility with other agencies or levels of government —in one way or another—policy responses should be closely coordinated and undertaken on a collaborative basis, as appropriate. Lastly, where ADOT has no direct mandate or jurisdiction – over rail infrastructure and service for example – it can most meaningfully respond by engaging regularly with the relevant stakeholders.

Figure 8-1: Types of Freight Projects by Mandate/Jurisdiction and ADOT Policy Response Levers

	Who's Mandate/Jurisdiction?				
Issue Types	**ADOT**	**Federal**	**MPO/ Local**	**Private**	**ADOT Response Lever**
Re-occurring urban congestion	✓		✓		Planning, Operations, Investment
Improvements to maintenance and operations	✓		✓		Operations
Modernization of infrastructure, systems, operations (e.g. ITS)	✓		✓		Operations, Investment
Expansion of physical capacity (e.g. additional lanes)	✓		✓		Planning, Investment
Re-occurring rural bottlenecks	✓		✓		Planning, Investment
Inadequate passing/climbing lanes on the highway system	✓		✓		Planning, Investment
Inadequate highway on/exit ramps for truck access	✓				Planning, Investment
Border access	✓	✓	✓		Planning, Investment
Impediments to freight system resilience	✓	✓	✓	✓	Planning
Inadequate truck parking facilities	✓		✓	✓	Planning, Investment
Restrictive axle loads on certain corridors	✓	✓	✓		Regulations, Engagement
Problematic at-grade rail crossings	✓		✓	✓	Engagement, Planning, Investment
Rail infrastructure/services				✓	Engagement
Inadequate pipeline system storage capacity				✓	Engagement
Inadequate international air service				✓	Engagement
Municipal by-laws that impede truck movements (off-peak noise, road geometry, etc.)			✓		Engagement
Inadequate supply of truck drivers				✓	Engagement

9 Prioritization of Needs and Project Identification

Key Messages

Over 100 freight transportation issues were identified through the development of the Freight Plan ranging from recurring urban congestion, to inadequate passing/climbing lanes, to inadequate truck parking facilities. The "Long List" of 100 issues was screened to 30 strategic issues using criteria based on the Freight Plan goals and objectives. The strategic issues were subsequently ranked using a weighted prioritization approach. Strategic issues were then used to identify and prioritize projects. The FAC reviewed the prioritization approach and helped establish weights.

The strategic projects are located throughout the state and reflect a wide range of freight challenges—from urban congestion to corridor bottlenecks and truck climbing lanes. The top-ranked overall freight projects are concentrated in the state's major urban areas and on I-10.

9.1 Prioritization Approach

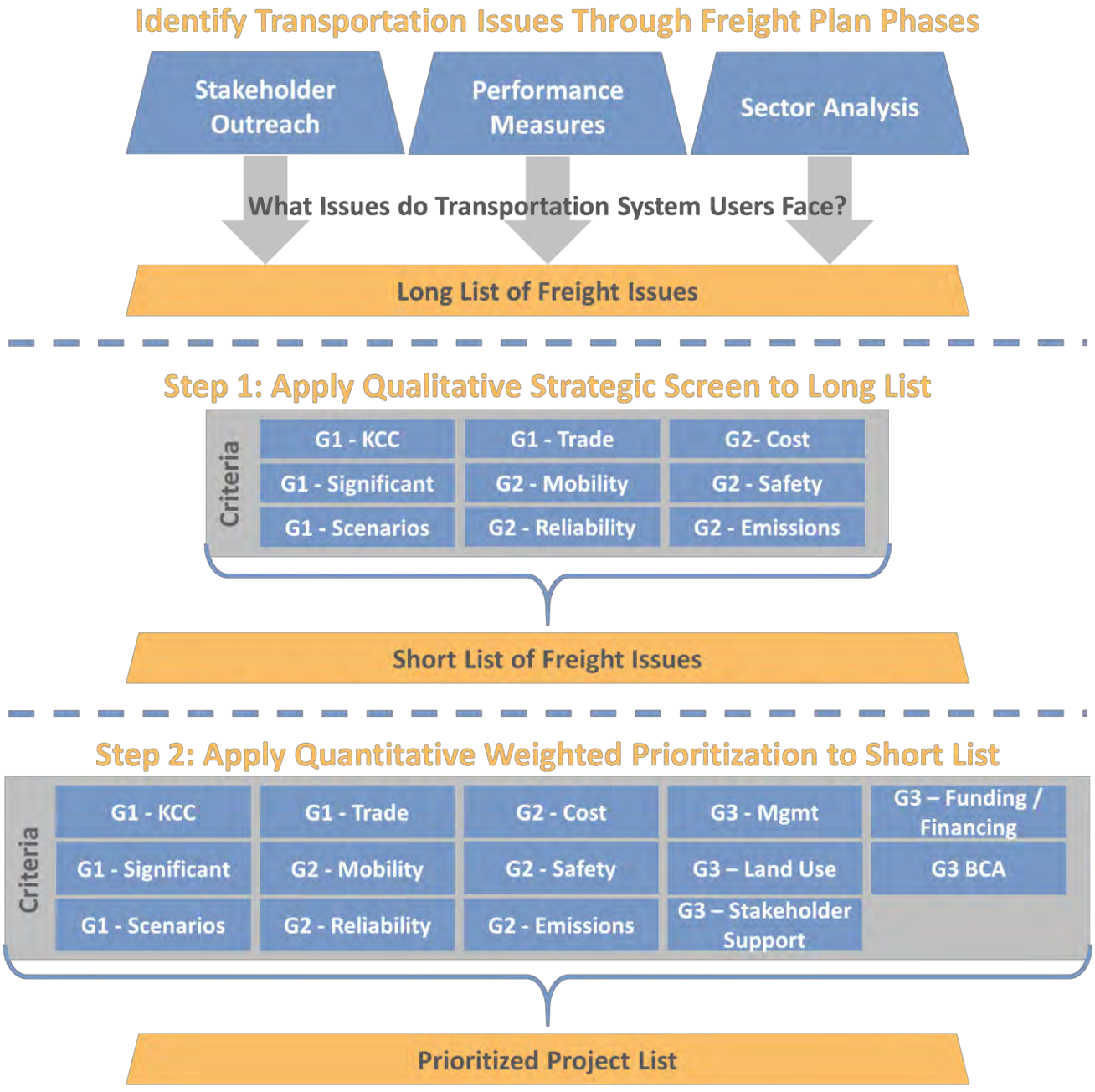
A long list of over 100 freight transportation system issues was identified (the "Long List") in the development of the Freight Plan, ranging from recurring urban congestion, to inadequate passing/climbing lanes, to inadequate truck parking facilities. The prioritization process distilled and prioritized the Long List of issues to identify a strategic set of priority projects that can best advance the goals and objectives of the Freight Plan. To accomplish this, ADOT established a two-step prioritization framework and an associated decision-making process as summarized in Figure 9-1 below.

Step 1 identified the freight transportation *issues* of most strategic importance with respect to Goal 1 (Increase Economic Competitive) and Goal 2 (Increase System Performance) of the Freight Plan, along with their related objectives. Identified issues were assessed qualitatively with a "yes/no" answer against a set of merit-based considerations to develop a Short List of the 30 most strategic freight issues.

Step 2 translated the Short List of most strategic issues identified in Step 1 into a ranked list of priority projects. Specifically, Step 2 quantitatively scored the Short List of freight *issues* based on weighted criteria relating to Goal 1 and Goal 2. Once freight issues were scored on Goal 1 and Goal 2 criteria, *potential projects* were put forward to address each of the strategic freight issues. These potential projects were assessed against Goal 3 (Improve System Management)

criteria. The combination of scoring against Goal 1, Goal 2, and Goal 3 criteria comprise the overall project score and define priority projects.

Figure 9-1: Two-Step Prioritization Process



9.1.1 Step 1 Strategic Screen: Process and Results

The Long List of freight issues are assessed qualitatively with a "yes/no" answer against the merit-based criteria. This qualitative assessment is based on value judgments and informed by a quantitative data and supporting maps. As shown in Figure 9-2, Step 1 screen yields a Short List of the 30 most strategic freight transportation issues in Arizona.

Figure 9-2: Prioritization Step 1

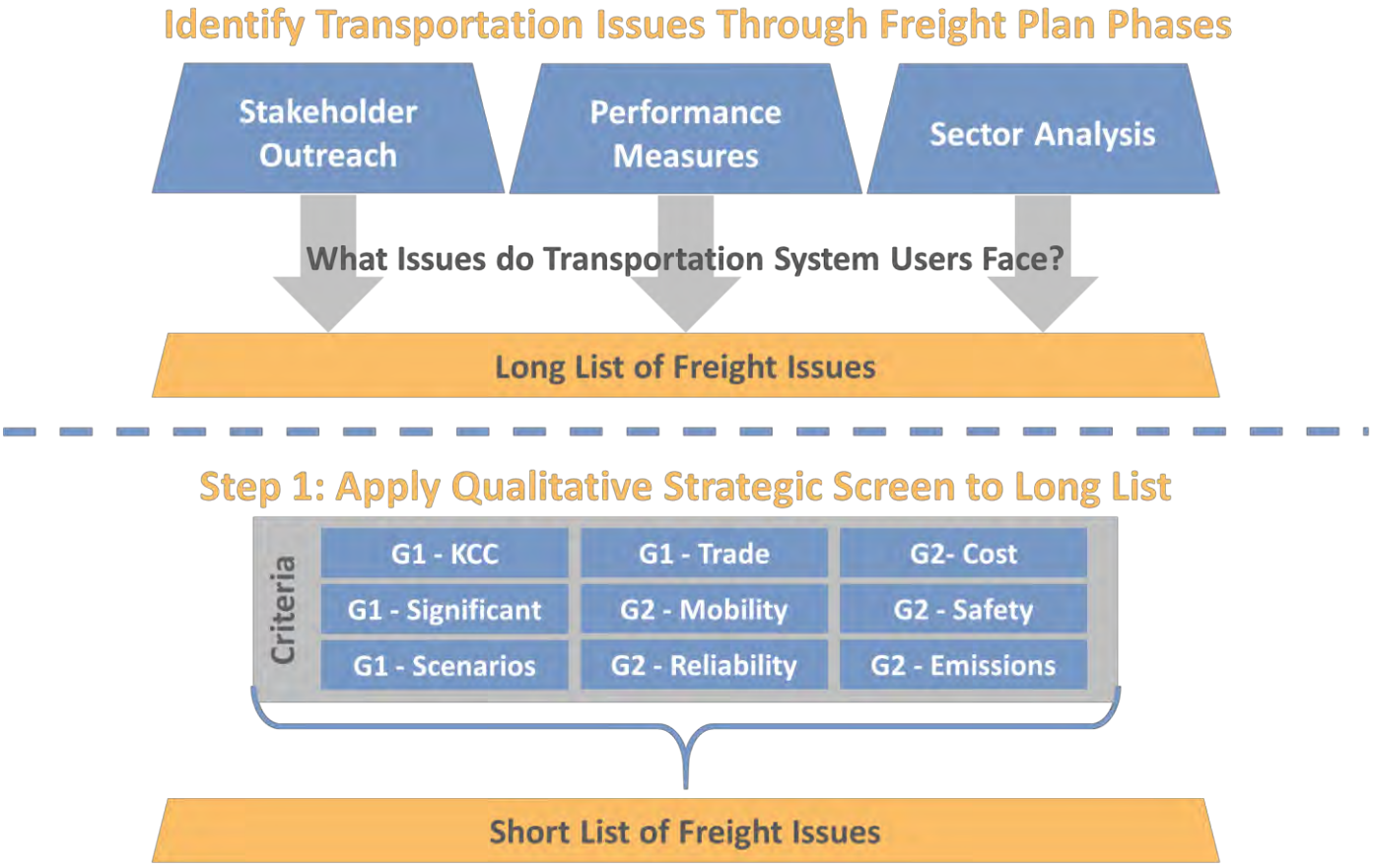


Figure 9-3 displays the specific question used to assess each project. Figure 9-4 presents the output of Step 1, with green representing "yes" and red representing "no" answers in the Step 1 screen. Figure 9-5 maps the 30 most strategic freight transportation issues.

Figure 9-3: Goal 1 and Goal 2 Merit-Based Considerations to Identify Most Strategic Issues

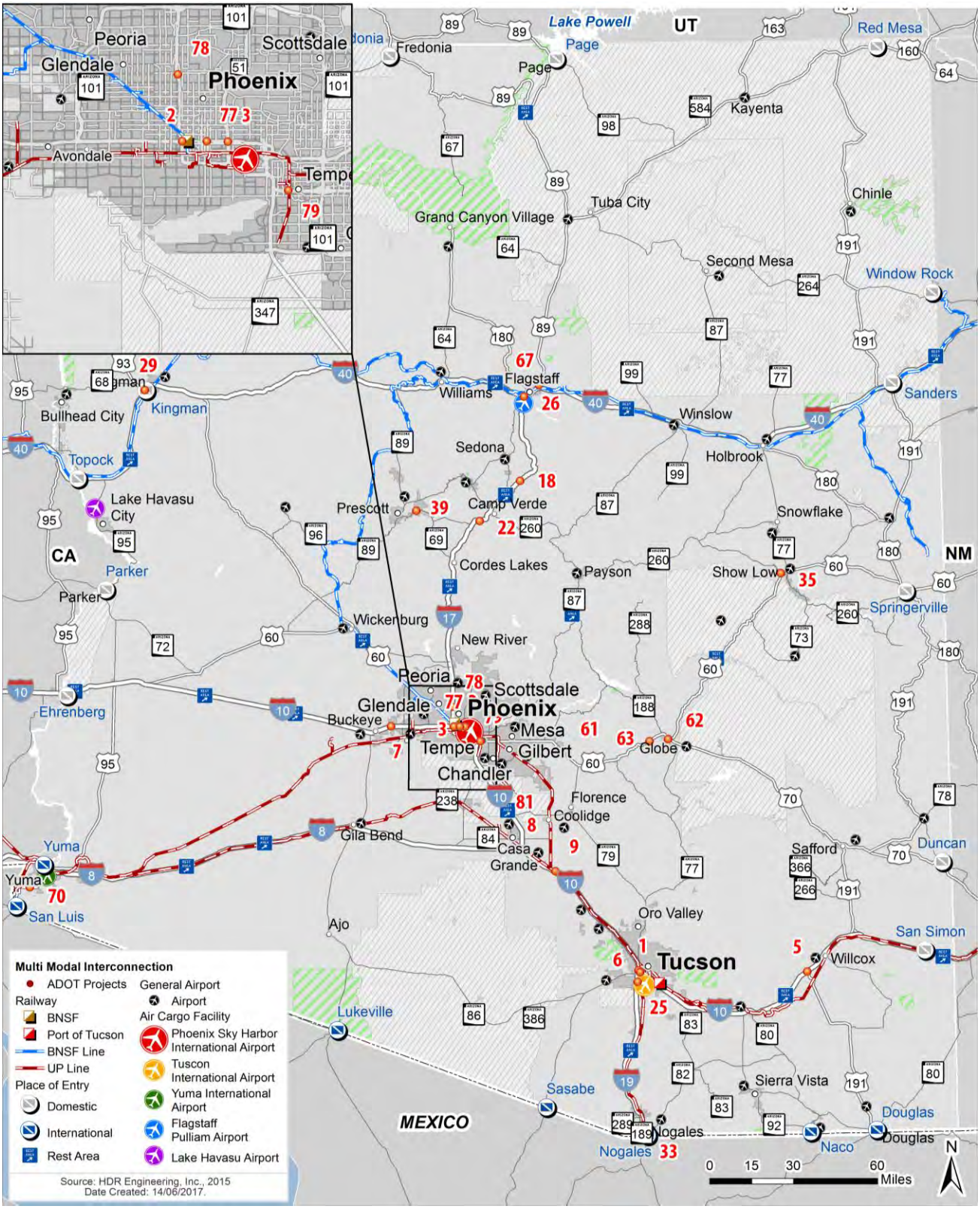
Goal 1 - Enhance Economic Competitiveness
Is the Issue on a Key Commerce Corridor? (G1-KCC)
Are the Flows Impacted by the Issue Significant? (G1-Significant)
Do Future Scenarios Aggravate this Significance? (G1-Significant/Scenarios)
Is the Issue an Impediment to Trade? (G1-Trade)
Goal 2 - Increase System Performance
Does the Issue Hinder Mobility? (G2-Mobility)
Does the Issue Hinder Freight Transportation System Reliability? (G2-Reliability)
Does the Issue Increase Transportation Costs of Freight Transportation? (G2-Cost)
Does the Issue Affect Transportation System Safety? (G2-Safety)
Does the Issue Result in Negative Social/Environmental Impacts? (G2-Emissions)

Figure 9-4: Short List of Strategic Issues Resulting from Step 1 Screen

Ref	Route (Area)	Issue Segment	Issues "Type"	G1-KCC	G1-Significant	G1-Scenario	G1-Trade	G2-Mobility	G2-Reliability	G2-Safety	G2-Cost	G2-Emissions
1	I-10	I-10 at I-19 Traffic System Interchange	Recurring urban congestion					■		■	■	
2	I-10	I-10 at I-17 Traffic System Interchange (The Stack)	Recurring urban congestion									
3	I-10	I-10 at SR 202L and SR 51 Traffic System Interchange (The Mini-Stack)	Recurring urban congestion									
5	I-10	I-10 at US 191 Cochise Traffic Interchange (TI)	Recurring rural bottlenecks							■	■	■
6	I-10	I-10 east of I-19	Recurring urban congestion							■	■	■
7	I-10	I-10 between SR 85 and L303	Recurring urban congestion					■		■		
8	I-10	I-10 Mainline and Traffic Interchange at I-8	Recurring rural bottlenecks					■	■		■	■
9	I-10	I-10 east of Phoenix	Recurring rural bottlenecks								■	
14	Buckeye Road	I-10 Freight Route Alternative along Buckeye Road	Recurring urban congestion	■								
15	I-10	Sonoran Corridor	Recurring urban congestion							■	■	
16	I-11	I-11: Intermountain West Corridor	Recurring urban congestion									
18	I-17	I-17 between SR 179 to Stoneman Lake Road	Recurring rural bottlenecks						■	■		■
22*	I-17	I-17 Climbing Lane: Southbound	Inadequate passing/climbing lanes							■		■
25	I-19	I-19 between I-10 and Valencia Road (south of Tucson)	Recurring urban congestion				■			■	■	
26	I-40	I-40 (West Bound) to NB (North Bound) system ramp at I-40/I-17/SR 89 interchange)	Recurring urban congestion				■		■		■	■
29	I-40	I-40 at US 93 Junction within Kingman area	Recurring rural bottlenecks				■			■		■
32	NSCS	New freeway connection between I-10 and US 60	Recurring rural bottlenecks	■	■	■						
33	SR 189	SR 189 between Mariposa LPOE and I-19	Border access	■			■					
35	SR 260	SR 260, West of Show Low to East of SR 73	Recurring rural bottlenecks	■			■				■	■
37	SR 30	Parallel to I-10 from SR 202L to SR 85	Recurring urban congestion	■	■	■						
39	SR 69	SR 69, East of Prescott area	Recurring urban congestion	■			■				■	■
61	US 60	US 60 between SR 88 and SR 79	Recurring rural bottlenecks	■			■			■	■	
62	US 60	US 60 within Globe area	Recurring rural bottlenecks	■			■					■
63	US 60	US 60 Passing Lane: Westbound	Inadequate passing/climbing lanes	■			■				■	■
67	US 89	US 89 Within Flagstaff, north of I-40	Recurring urban congestion	■					■		■	■
70*	US 95	US 95, San Luis LPOE to Yuma	Recurring urban congestion	■			■				■	■
77	I-10	From L101 to L202 (Santan Freeway) within Phoenix Metro area	Recurring urban congestion									
78	I-17	From I-10 to L101 within Phoenix Metro area	Recurring urban congestion									■
79	US 60	Loop 303 to L202 within Phoenix Metro area	Recurring urban congestion				■				■	
81	I-10	From SR 202L to East of SR 387	Recurring urban congestion					■	■	■	■	

*Reference Project #22, I-17 Climbing Lane: Southbound at milepost 281-285 has been completed since the performance evaluation identified this as an issue. Reference Project #70, US 95, San Luis LPOE to Yuma (milepost 0-33) is not necessary since SR 195 addresses freight issues in the area. References to these projects have been removed going forward.

Figure 9-5: Location of Strategic Issues Resulting from Step 1 Screen



9.1.2 Step 2 Weighted Prioritization: Quantitative Assessment

Figure 9-6 overviews the process of translating the Short List of strategic issues identified in Step 1 to a prioritized list of freight projects in Step 2. Specifically, Step 2 quantitatively scores issues based on weighted criteria relating to Goal 1 (Enhance Economic Competitiveness) and Goal 2 (Increase System Performance). Once freight issues have been scored on Goal 1 and Goal 2 criteria, *potential projects* are put forward to address each of the priority strategic freight issues. These potential projects are then assessed using the Goal 3 (Improve System Management) criteria presented in Figure 9-7. The combination of scoring against Goal 1, Goal 2, and Goal 3 criteria comprise the overall project score and define priority projects.

Figure 9-6: From Short List of Issues to Priority Projects: Conceptual Overview of Step 2 Process

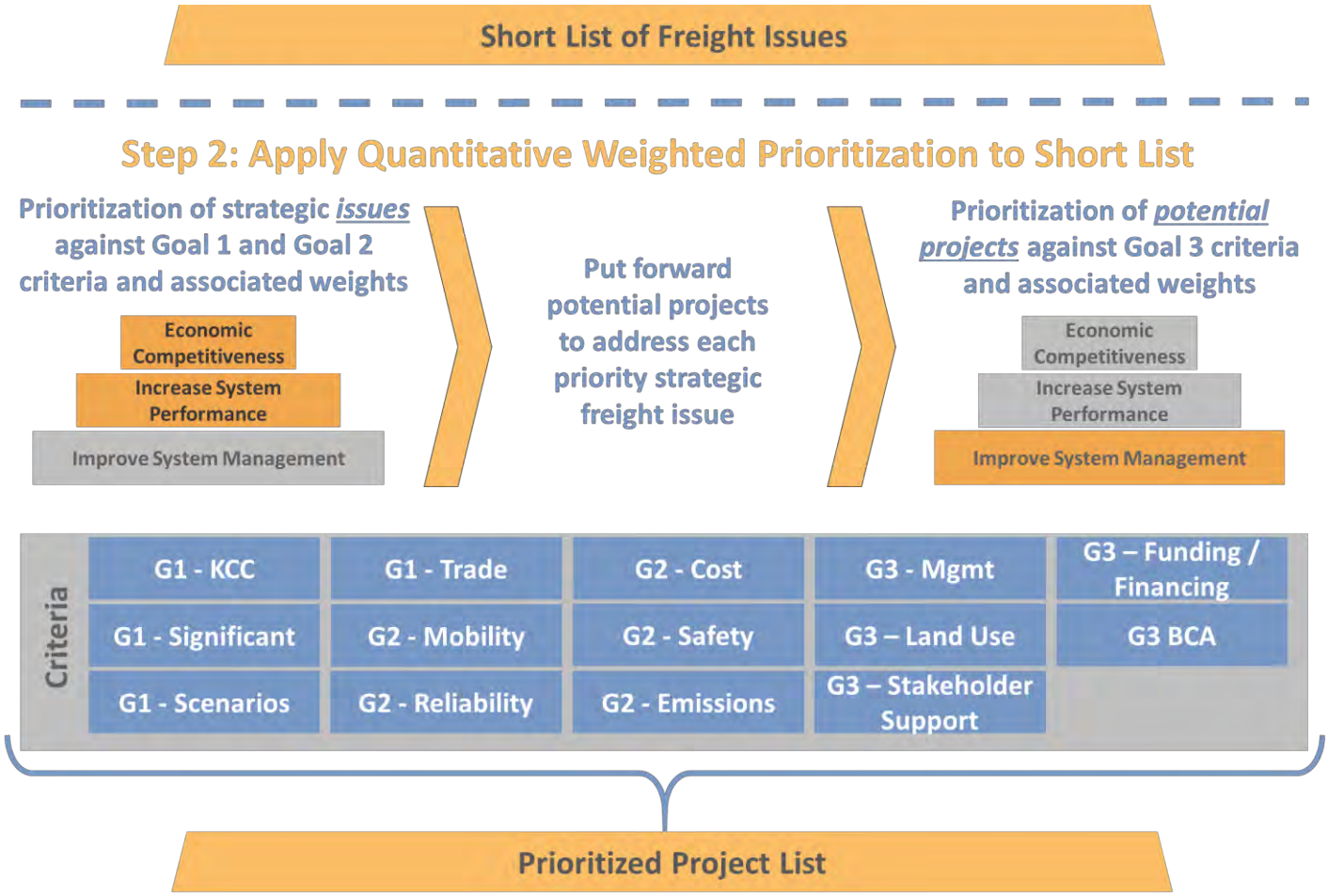


Figure 9-7: Goal 3 Criteria to Prioritize Potential Projects

Goal 3 - Improve System Management
Does the Project Prioritize Good Management of Assets? (G3–Mgmt)
Is the Project Appropriately Linked to Local Land Use/Regional Plans? (G3–Land Use)
Would the Project be Expected to Receive Freight Stakeholder Support (G3–Stakeholder Support)
Would the Project be Likely to Attract Funding/Financing Partners? (G3–Funding/Financing)
Does the Project Have a Positive Benefit-Cost Analysis? (G3–BCA)

The Step 2 quantitative assessment is based on two factors:

1) **A multi-criteria analysis based on quantitative measures**: All issues/projects are assigned a value for each criterion, based on specific measures relevant to each criterion (e.g. average annualized daily truck traffic (AADTT) to measure the significance of truck flows), to be combined into a cumulative score.
2) **The application of weights to each criterion**: Weights are applied to each criterion to emphasize or de-emphasize the importance of each criterion in prioritizing issues and projects. The initial weights for each criterion, developed by the consultant team and validated through the TAC and FAC, are primarily based on the importance of each criterion with respect to achieving the goals and objectives of the Freight Plan.

The process assumes similar weights correspond to each of the three overarching goals of the Freight Plan, though the weighting differs by criteria relating to each goal (Figure 9-8).

Figure 9-8: Equal Weighting to Each Overarching Goal

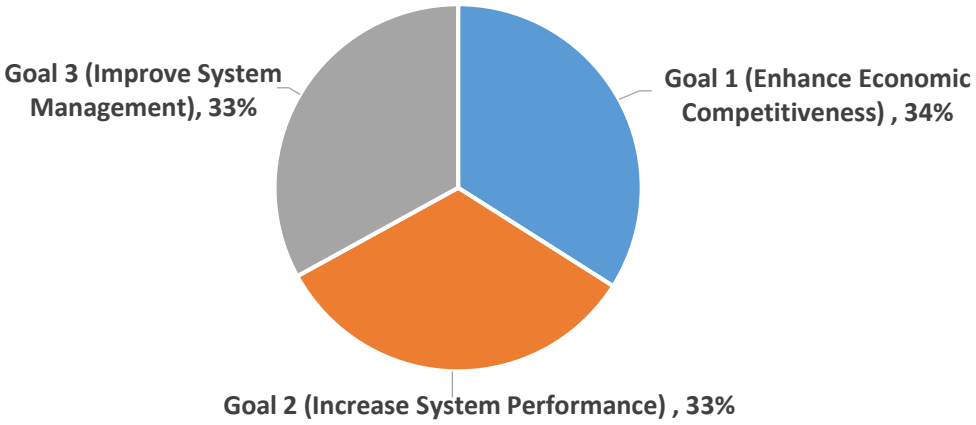


Figure 9-9 displays all criteria used in Step 2, how those criteria are measured, the range of values for Freight Plan project segments, and the overall weight given to each criterion. The project team applied the measure for each criterion to each issue (Goal 1 and Goal 2) or project (Goal 3). The range of values depends on the measure. For example, G1-KCC gave an issue a score of three (highest possible) if the issue was on a KCC while issues that connected to a KCC were given a score of one, and issues that were not related to a KCC received a zero. The maximum value in the prioritization framework for the G1-KCC criterion was ten. The full ten percentage points were given to issues with a KCC value was three, 3.333 percentage points for a KCC value of one, and zero percentage points for a KC value of zero. Adding the percentage points for G1-KCCs and other criteria together provides a final score and ranking.

Criterion with ranges of values that were continuous, such as G1-Significant, G2-Reliability, or G3-BCA, were normalized with the highest score receiving the maximum number of percentage points and the lowest score receiving zero percentage points.

The prioritization approach allows for different types of projects with different impacts to be compared.

Figure 9-9: Step 2 Prioritization Criteria, Range of Values and Weights

Goal 1 – Enhance Economic Competitiveness			
Criterion	**Measure**	**Range Values**	**Weight (34%)**
Is the Issue on a Key Commerce Corridor? (G1-KCC)	Issue is either 'on'; 'directly connected to', or 'unrelated' to KCC	0-3	**10%** (29% of Goal 1 weight)
Are the Flows Impacted by the Issue Significant? (G1-Significant)	Truck volume (AADTT) through the issue segment	1,200 – 19,100	**8%** (24% of Goal 1 weight)
Do Future Scenarios Aggravate this Significance? (G1-Significant/Scenarios)	AADTT significance (over 1000) on each issue segment that is common in all future scenarios ('#urbanizona'; 'Domestic Bliss'; 'SoBo')	0 – 3	**8%** (24% of Goal 1 weight)
Is the Issue an Impediment to Trade? (G1-Trade)	Volumes of Arizona's commodity flows relating to manufacturing and natural resources (excluding aggregate intra Arizona flows).	0 – 20,000,000	**8%** (24% of Goal 1 weight)
Goal 2 – Increase System Performance			
Criterion	**Measure**	**Range Values**	**Weight (33%)**
Would Addressing the Issue Improve Multimodal Access? (G2-Modal Access)	Is issue a barrier to modal connectivity (e.g. access to airport or rail intermodal terminal)?	0 – 1	**2%** (6% of Goal 1 weight)
Does the Issue Hinder Mobility? (G2-Mobility)	Truck Travel Time Index (TTTI)	1.2 – 9.0	**7%** (21% of Goal 1 weight)
Does the Issue Hinder Freight Transportation System Reliability? (G2-Reliability)	Issue segment's Truck Planning Time Index (TPTI)	1.2 – 15.7	**7%** (21% of Goal 1 weight)
Does the Issue Increase Transportation Costs of Freight Transportation? (G2-Cost)	Total truck delay per day (hours)	0 – 1250	**7%** (21% of Goal 1 weight)
Does the Issue Affect Transportation System Safety? (G2-Safety)	Truck-related crashes per 100 MVMT	0.1 – 9.1	**9%** (27% of Goal 1 weight)
Does the Issue Result in Negative Social/Environmental Impacts? (G2-Emissions)	CO2 emissions for a peak-hour volume of traffic	0.029 – 1.00	**1%** (3% of Goal 1 weight)
Goal 3 – Improve System Management			
Criterion	**Measure**	**Range Values**	**Weight (33%)**
Does the Project Prioritize Good Management of Assets? (G3- Mgmt)	*Project* is characterized as preservation vs. modernization vs. expansion	0 – 2	**3%** (10% of Goal 1 weight)
Is the Project Appropriately Linked to Local Land Use/Regional Plans? (G3-Land Use)	*Project* is identified in BQAZ Statewide Transportation Framework Studies and or regional transportation plans	0 – 1	**5%** (15% of Goal 1 weight)
Would the Project be Expected to Receive Freight Stakeholder Support? (G3-Stakeholder Support)	Evaluate *project* with input from the Freight Advisory Committee	0 – 1	**5%** (15% of Goal 1 weight)
Would the Project be Likely to Attract Funding/Financing Partners? (G3-Funding/Financing)	*Project's* Potential to attract project funding	0 – 1	**5%** (15% of Goal 1 weight)
Does the Project Have a Positive Benefit-Cost Analysis? (G3-BCA)	Actual *project* benefit cost analysis (lite)	0 – 1	**15%** (45% of Goal 1 weight)

Note: percentages reported may not equal 100% due to rounding

9.1.3 Resulting Project Priorities and Supporting Discussion

Ultimately, 25 projects were assessed quantitatively in Step 2 from the 30 issues advanced through Step 1. Two projects were dropped from the list: 1.) Project Reference #22, I-17 Climbing Lane: Southbound at milepost 281-285, was completed since the performance evaluation identified this as an issue and 2.) Project Reference #70, US 95, San Luis LPOE to Yuma (milepost 0-33), is not necessary since SR 195 was developed to address freight issues in the area. Additionally, five of the issues identified in the Short List represent illustrative projects, all of which are the subject of ongoing studies by ADOT or others. These issues were not evaluated in Step 2, as their respective studies are developing the purpose and need for each, and through that evaluation may make recommendations to carry forward. For the purposes of the Plan, these issues were carried forward and documented as "Illustrative Projects" included at the bottom of Figure 9-10.

Additionally, after consultation with MPOs, issues number 5 and 33 were assigned two potential projects denoted with an "a" and "b" following their reference number. Figure 9-10 below lists the projects in priority order. Note that two projects on the top 25 priority projects have since received funding through a 2016 FASTLANE grant: 1.) Project Reference #9, I-10, Picacho Area Roadway Widening and 2.) Project reference #8, I-10, Earley Road to I-8 Widening and Traffic Interchange Improvements. The Freight Plan assumes these projects are now fully funded using FASTLANE and ADOT funding.

Figure 9-10: Summary Prioritization Framework Results

Ref	Route (Area)	Issue Segment	Project Option(s)	Planning Level Project Cost $ million*	Goal 1 Criteria Score (/34)	Goal 2 Criteria Score (/33)	Goal 3 Criteria Score (/33)	Total Score (/100)	Rank
77	I-10	From L101 to L202 (Santan Freeway) within Phoenix Metro	I-10 Phoenix Urban Area Improvements	$775	31.0	30.7	11.55	73.2	1
3	I-10	I-10 at SR 202L & SR 51 Traffic System Interchange (Mini-Stack)	I-10 Phoenix Urban Area Improvements	$300	30.6	26.7	10.52	67.9	2
2	I-10	I-10 at I-17 Traffic System Interchange (The Stack)	I-10 Phoenix Urban Area Improvements	$200	29.6	19.9	10.64	60.1	3
79	US 60	Loop 303 to L202 within Phoenix Metro area	US 60 Phoenix Urban Area Improvements	$425	14.6	25.5	13.51	53.6	4
7	I-10	I-10 between SR 85 & L303	I-10 West of Phoenix General Purpose Lane	$61.3	28.0	8.4	16.88	53.3	5
78	I-17	From I-10 to L101 within Phoenix Metro area	I-17 Phoenix Urban Area Improvements	$600	24.5	16.0	11.87	52.3	6
81	I-10	From SR 202L to East of SR 387	I-10 Gila River Indian Community Area Widening	$189	26.7	6.5	17.97	51.1	7
6	I-10	I-10 east of I-19	Tucson Area I-10 Widening Project	$1,860	26.4	9.5	9.68	45.6	8
5a	I-10	I-10 at US 191 (Cochise TI)	I-10/US 191 System Interchange Improvements (interim)	$1.5	15.8	5.6	23.00	44.4	9
9**	I-10	I-10 east of Phoenix	I-10 Picacho Area Roadway Widening	$85	26.5	5.4	12.05	44.0	10
1	I-10	I-10 at I-19 Traffic System Interchange	I-10/I-19 System Interchange Improvements	$83	29.4	4.3	9.12	42.8	11
8**	I-10	I-10 Mainline & Traffic Interchange at I-8	Earley Road to I-8 Widening & TI Improvements on I-10	$40	24.9	2.4	13.81	41.2	12
25	I-19	I-19 between I-10 & Valencia Road (south of Tucson)	I-19 Tucson Area Widening & TI Improvements	$625	20.5	6.9	9.87	37.3	13
67	US 89	US 89 Within Flagstaff, north of I-40	SR 89/I-40 System Interchange Improvements	$29	12.9	9.3	13.70	35.9	14
39	SR 69	SR 69, East of Prescott area	SR 69 East of Prescott ITS Improvements	$3.3	3.8	6.3	24.17	34.3	15
29	I-40	I-40 at US 93 Junction within Kingman area	I-40/US 93 System Interchange Improvements	$86.5	15.1	9.1	9.67	33.9	16
5b	US 191	US 191/Cochise RR Overpass	US 191/Cochise RR Overpass to allow oversize freight	$16.5	15.8	5.6	10.08	31.5	17
26	I-40	I-40 (WB to NB system ramp at I-40/I-17/SR 89 interchange)	I-40/I-17 System Interchange Improvements	$82	20.1	2.6	8.50	31.1	18
62	US 60	US 60 within Globe area	Globe Area Freight Improvements	$6.8	0.4	9.5	18.09	28.0	19
33a	SR 189	SR 189 between Mariposa LPOE & I-19	SR 189 Traffic Flow Improvements (interim)	$70	4.5	8.2	12.93	25.7	20
33b	SR 189	SR 189 between Mariposa LPOE & I-19	SR 189 Traffic Flow Improvements (ultimate)	$161	4.5	8.2	12.17	24.9	21
18	I-17	I-17 between SR 179 to Stoneman Lake Road	I-17 Stoneman Lake Area Climbing Lane & ITS	$23.1	13.5	6.3	3.67	23.4	22
35	SR 260	SR 260, West of Show Low to East of SR 73	SR 260 Show Low Area Intersection Improvements	$8	0.0	11.4	10.32	21.7	23
61	US 60	US 60 between SR 88 & SR 79	US 60 Access Controlled Freeway Extension	$245	9.0	6.1	2.43	17.5	24
63	US 60	US 60 Passing Lane: Westbound	US 60 Passing Lane	$5.1	0.0	3.8	3.26	7.1	25
Illustrative Projects									
14	Buckeye Rd.	I-10 Freight Route Alternative along Buckeye Road		-	-	-	-	-	-
15	I-10	Sonoran Corridor		-	-	-	-	-	-
16	I-11	I-11: Intermountain West Corridor		-	-	-	-	-	-
32	NSCS	New freeway connecting between I-10 and US 60		-	-	-	-	-	-
37	SR 30	Parallel to I-10 from SR 202L to SR 85		-	-	-	-	-	-

Source: HDR. *Planning level project cost is estimated by reviewing concurrent studies and/or from similar regional projects. Where concurrent studies were not available, unit costs were used to represent a value range, with the low, average, and high costs defined by the complexity of the project and project type. Project costs may change during project development. **Funded by 2016 FASTLANE Grant and ADOT funds.

10 Arizona Freight System Improvement Strategy

Key Messages

This chapter defines a FAST Act compliant strategy for improving Arizona's freight transportation system. The improvement strategy forms the foundation of the Implementation Plan by identifying the key considerations faced by ADOT when implementing the Freight Plan. The strategy identifies funding availability versus needs, Arizona and national freight goals and objectives, the benefits of freight projects to freight users relative to the benefits to all users, and the location of major projects within MPO boundaries as key considerations.

The strategy identifies the strengthening of the freight criteria to be used in the existing P2P Link prioritization process as a key output of the Freight Plan. Data developed in the Freight Plan can be used in the P2P Link process, allowing improved consideration of freight in the prioritization process. Finally, this chapter identifies Arizona's CRFCs and CUFCs designated to date.

10.1 Strategic Considerations

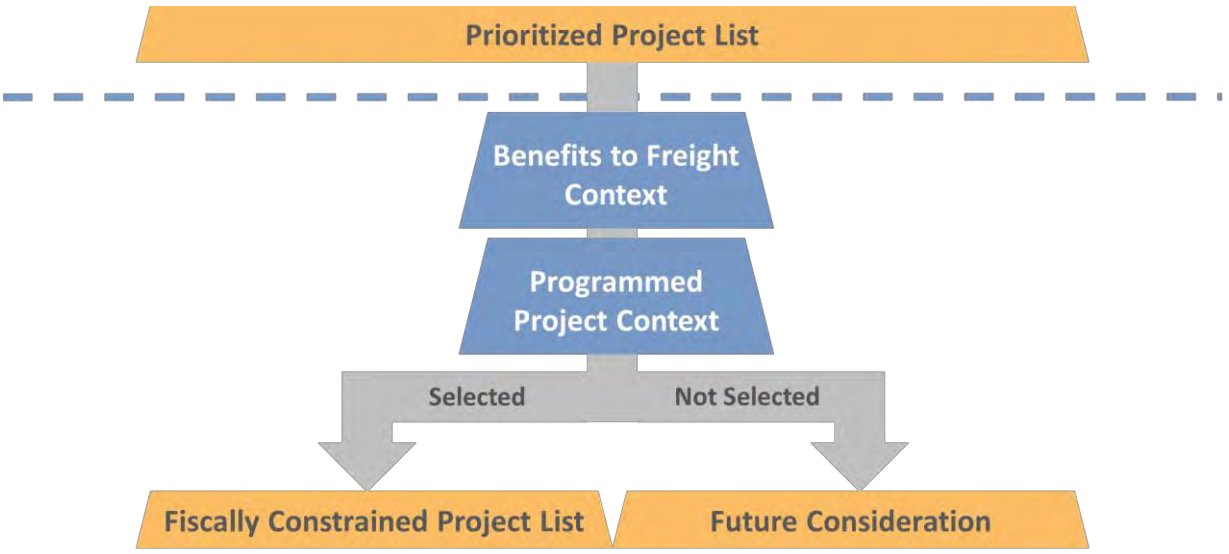
Key considerations in defining Arizona's freight improvement strategy include:

- The estimated cost of identified freight improvement projects (almost $6 billion, excluding the illustrative projects) is far greater than dedicated freight funds expected to be apportioned to Arizona under the FAST Act ($95.7 million from 2016 – 2020).
- The FAST Act freight funds must be spent within four years of their apportionment, which places a focus on projects that can be funded in the short-term.
- The goals and objectives of the Freight Plan, which are aligned with national goals, were used as the basis for prioritizing freight improvements and are implicit in the identified priority improvement projects.
- The reality is that most freight improvement projects would benefit passenger transportation disproportionately relative to freight, particularly on key commuter corridors, such as the I-10.

- Priority projects in metropolitan regions, and in particular in Maricopa County, are currently being studied and should be collaboratively advanced with the respective MPOs.

The strategy outlined in the Freight Plan takes the information developed in the prioritization process and places it within the overall planning context in Arizona. The realities of funding cycles and the readiness of projects to begin are variable, requiring an additional step to develop the fiscally constrained project list. The final step "Programmed Project Context," as shown in Figure 10-1, accounts for strategic considerations to develop recommendations that are implementable.

Figure 10-1: Final Project Selection and Considerations for Implementation



10.2 Improvement Strategies

The improvement strategy takes into account the considerations introduced in 10.1 and advances two major strategies for implementation:

1. Use analysis of disproportionate freight benefits to inform project selection
2. Improve consideration of freight benefits in P2P Link prioritization process

10.2.1 Analysis of Disproportionate Freight Benefits to Inform Project Selection

The Arizona State Freight Plan identifies 25 priority freight improvement projects. The total cost of these projects is expected to be almost $6 billion, far exceeding the roughly $95.7 million in expected Arizona apportioned federal funds dedicated for freight under the FAST Act between 2016 and 2020. Figure 10-2 displays the estimated apportionments under the FAST.[11]

[11] Estimated apportionments are subject to future federal funding levels, federal obligation limits, sequestration, penalties, and post-apportionment set asides

Figure 10-2: Arizona's Estimated FAST Act Freight Apportionments (Including Rescission)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Total
National Highway Freight Program	$14.9	$18.0	$19.7	$22.5	$20.6	$95.7

Source: Arizona Department of Transportation

Because there are no other freight dedicated funds outside NHFP funds, freight investment priorities not funded with FAST Act freight dedicated funds must compete for general transportation funds. Given this situation, one strategy of the Freight Plan is to direct NHFP (i.e. FAST Act) freight funds apportioned to Arizona to projects that disproportionately benefit freight, relative to passenger benefits. To that end, Figure 10-4 takes the same identified freight investment priorities as presented in Chapter 9 and ranks the projects in order of greatest relative benefit for truck traffic. The methodology for the ranking is explained below and in Figure 10-3.

Approach to Estimating Disproportionate Freight Benefits

Projects with disproportionate freight benefits are identified by estimating improvements in truck travel time and safety. Travel time savings are estimated by defining annual vehicle hours traveled (VHT) if the project is built (Build) compared to no project being built (No Build). The difference in the Build vs No Build VHT is the travel time benefit. The proportion of traffic that are trucks defines the travel time savings benefiting freight. Similarly, in order to estimate safety, crash rates for the Build and No Build scenarios are estimated based on 5-year crash numbers categorized by severity and translated into a rate using VMT. Safety benefits are allocated to vehicle types based on the proportion of overall traffic that are trucks. In order to translate travel time and safety benefits into dollars, the monetization factors shown in Figure 10-3 are used. After annual benefits are generated for the entire period of analysis, these benefits are discounted according to the year in which they occur and added resulting in the total benefits of a project. The total share of travel time savings and crash cost savings accruing to trucks relative to total truck and passenger benefits defines the proportion of benefits going to trucks, as shown in Figure 10-3.

Figure 10-3: Benefit-Cost Analysis Inputs and Assumptions

Description	Unit	Value[12]	Source
Value of Time (Cars)	$ per hour	$13.60	TIGER Benefit-Cost Analysis Guidance
Value of Time (Trucks)	$ per hour	$26.98	TIGER Benefit-Cost Analysis Guidance
Cost of Fatality Crash	$ per fatality	$9,600,000	TIGER Benefit-Cost Analysis Guidance
Cost of Injury Crash	$ per injury	$110,081	TIGER Benefit-Cost Analysis Guidance
Cost of Property Damage Only Crash	$ per vehicle	$4,198	TIGER Benefit-Cost Analysis Guidance

[12] Dollar values are in 2016 dollars.

Figure 10-4: Identified Freight Improvement Priority Projects with a Disproportionate Benefit to Freight

Rank by Freight Benefits	Ref	Route (Area)	Issue Segment	Project Option(s)	Planning Level Project Cost (millions)	Share of Freight Benefits
1	29	I-40	I-40 at US 93 Junction within Kingman area	I-40/US 93 System Interchange Improvements	$86.50	55.0%
2	5a	I-10	I-10 at US 191 (Cochise TI)	I-10/US 191 System Interchange Improvements (interim)	$1.50	54.0%
3	5b	I-10	US 191/Cochise RR Overpass	Reconstruct the US 191/Cochise RR Overpass to accommodate oversize freight	$16.50	52.2%
4	26	I-40	I-40 (WB to NB system ramp at I-40/I-17/SR 89 interchange)	I-40/I-17 System Interchange Improvements	$82	34.9%
5	9**	I-10	I-10 east of Phoenix	I-10 Picacho Area Roadway Widening	$85	29.5%
6	7	I-10	I-10 between SR 85 and L303	I-10 West of Phoenix General Purpose Lane	$61.30	28.2%
7	6	I-10	I-10 east of I-19	Tucson Area I-10 Widening Project	$1,860	22.4%
8	81	I-10	From SR 202L to East of SR 387	I-10 Gila River Indian Community Area Widening	$189	21.6%
9	8**	I-10	I-10 Mainline and Traffic Interchange at I-8	Earley Road to I-8 Widening and TI Improvements on I-10	$40	21.3%
10	1	I-10	I-10 at I-19 Traffic System Interchange	I-10/I-19 System Interchange Improvements	$83	20.4%
11	63	US 60	US 60 Passing Lane: Westbound	US 60 Passing Lane	$5.10	19.9%
12	61	US 60	US 60 between SR 88 and SR 79	US 60 Access Controlled Freeway Extension	$245	18.0%
13	35	SR 260	SR 260, West of Show Low to East of SR 73	SR 260 Show Low Area Intersection Improvements	$8	17.2%
14	18	I-17	I-17 between AZ 179 to Stoneman Lake Road	I-17 Stoneman Lake Area Climbing Lane and ITS	$23.10	17.1%
15	62	US 60	US 60 within Globe area	Globe Area Freight Improvements	$6.80	16.0%
16	67	US 89	US 89 Within Flagstaff, north of I-40	SR 89/I-40 System Interchange Improvements	$29	15.6%
17	33a	SR 189	SR 189 between Mariposa LPOE and I-19	SR 189 Traffic Flow Improvements (interim)	$70	14.9%
18	77	I-10	From L101 to L202 (Santan Freeway) within Phoenix Metro area	I-10 Phoenix Urban Area Improvements	$775	14.8%
19	33b	SR 189	SR 189 between Mariposa LPOE and I-19	SR 189 Traffic Flow Improvements (ultimate)	$161	14.7%
20	79	US 60	Loop 303 to L202 within Phoenix Metro area	US 60 Phoenix Urban Area Improvements	$425	13.2%
21	39	SR 69	SR 69, East of Prescott area	SR 69 East of Prescott ITS Improvements	$3.30	13.1%
22	78	I-17	From I-10 to L101 within Phoenix Metro area	I-17 Phoenix Urban Area Improvements	$600	11.4%
23	3	I-10	I-10 at SR 202L and SR 51 Traffic System Interchange (The Mini-Stack)	I-10 Phoenix Urban Area Improvements	$300	10.2%
24	2	I-10	I-10 at I-17 Traffic System Interchange (The Stack)	I-10 Phoenix Urban Area Improvements	$200	10.1%
25	25	I-19	I-19 between I-10 and Valencia Road (south of Tucson)	I-19 Tucson Area Widening and TI Improvements	$625	8.8%

Source: HDR, analysis of prioritization. *Planning level project cost is estimated by reviewing concurrent studies and/or from similar regional projects. Where concurrent studies were not available, unit costs were used to represent a value range, with the low, average, and high costs defined by the complexity of the project and project type. Project costs may change during project development **Project Funded by 2016 FASTLANE Grant.

10.2.2 Improve Consideration of Freight Benefits in P2P Link Prioritization Process

The development of the Freight Plan and freight improvement strategy provides a valuable opportunity to increase the prominence of freight in ADOT planning and programming.

A stronger set of freight criteria could be used within the policy evaluation criteria of the P2P Link evaluation process. Specifically, the development of the Freight Plan has produced performance measures and variables used to prioritize projects. The data from the Freight Plan could be used in P2P Link to increase the prominence of freight.

The 2017 update to the Arizona LRTP, to which the P2P Link process is aligned, provides an opportunity to better recognize the importance of freight for Arizona's transportation system and to better reflect the prominence on freight in the P2P Link process.

Increasing Prominence of Freight in LRTP Update

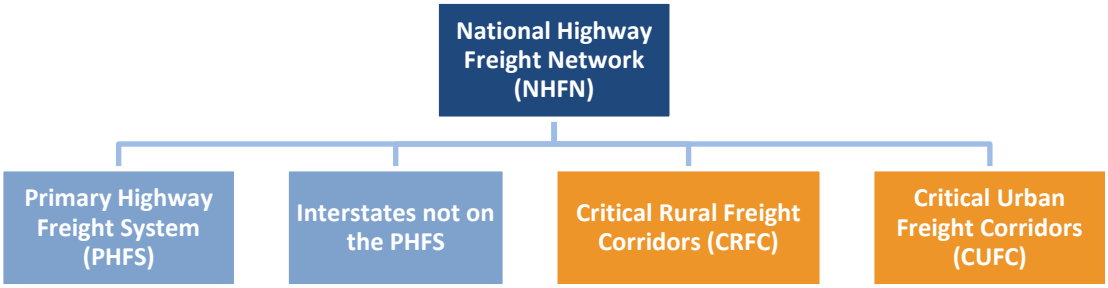
The ongoing update of the Arizona LRTP provides a practical opportunity to increase the prominence of freight in planning and programming. The rationale to do this is twofold:

- Efficient freight transportation is critical to the competitiveness and growth of Arizona's economy
- Freight moves on the same roads that are used by passenger vehicles and vice versa.

10.3 Critical Freight Networks

While NHFP funds can be used for a variety of projects, there are limits on the types of roadways eligible for NHFP funded projects. The FAST Act requires the Federal Highway Administration (FHWA) to establish the NHFN to strategically direct federal resources and policies toward improved performance of the NHFN. The NHFN is the focus of funding under the NHFP and a significant funding target under the Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) Grants. The NHFN consists of the following four subsystems shown in Figure 10-5.

Figure 10-5: Components of the National Highway Freight Network



The PHFS and Interstates not on the PHFS, represented in blue in Figure 10-5, are components that are designated by USDOT/FHWA. The PHFS consists of 37,436 centerline miles of Interstate highways and 4,082 centerline miles of non-Interstate roads. Interstate portions not on the PHFS total approximately 9,511 centerline miles. The CRFCs and CUFCs shown in orange are

designated by states and MPOs. CRFC and CUFC eligibility and the designating organization are based on population:

- **Roadways outside of urbanized areas (defined by the U.S. Census as having a population of less than 50,000)** – Eligible for CRFC designation. CRFCs are designated by the state.
- **Roadways within an urbanized area with a population of at least 50,000 but less than 500,000** - Eligible for CUFC status and designated by the state DOT in consultation with the MPO.
- **Roadways within an urbanized area with a population of 500,000 and above** - Eligible for CUFC status and designated by the MPO in consultation with the state DOT.

10.3.1 Arizona Corridor Designations

State limits on the designation of CRFCs and CUFCs are as follows:

- For CUFCs, a maximum of 75 miles of highway or 10 percent of PHFS mileage in the state, whichever is greater.
- For CRFCs, a maximum of 150 miles of highway or 20 percent of the PHFS mileage in the state, whichever is greater.

The State of Arizona has 1,025.62 miles of PHFS. Thus the CUFCs maximum limit is 102.56 miles and the CRFCs maximum limit is 205.12 miles.[13] Figure 10-6 shows the components of the NHFN in Arizona.

[13] FHWA Freight Management and Operations, Office of Operations, "Table of National Highway Freight Network Mileages by State."

Figure 10-6: National Highway Freight Network Mileage in Arizona

Component of the NHFN	Roadways	Distance
PHFS - Interstates	Interstate 10	392.50
	Interstate 15	29.48
	Interstate 17 (I-10 to I-40)	144.02
	Interstate 19	63.36
	Interstate 40	359.11
PHFS - Non-Interstates	US 60 from I-10 to Gilbert Rd	10.41
	SR 202 (Red Mountain Fwy) from I-10 to Gilbert Rd.	9.56
	SR 101 from SR 202 (Red Mountain Fwy) to Warner Rd.	6.87
	Thomas Rd from I-17 to US 60	0.24
	51st Ave from I-10 to Grand Ave* (connector to Glendale Intermodal Yard)	4.25
	7th St from I-10 to I-17* (connector to Phoenix Intermodal Yard)	2.29
	Sky Harbor Blvd from I-10 to SR 153* (Connector to Phoenix Sky Harbor Airport)	3.53
	Total PHFS Mileage	**1025.62**
Interstates not on the PHFS	Interstate 8	178.66
	Interstate 17 (SR 69 to 0.43 mi N of SR 69)	0.43
	Total Interstates not on the PHFS Mileage	**179.09**
CRFCs and CUFCs	CUFC Miles in MAG Region	60.00
	CUFC Miles in PAG Region	30.00
	CUFC Miles in the rest of Arizona (urbanized areas with population <500,000)	12.56
	CRFC	205.12
	Total CUFCs/CRFCs	**307.68**
Total NHFN Mileage		**1512.37**

Source: FHWA
*designated PHFS Intermodal Connectors

Because Arizona is one of 18 states whose proportion of the national NHFN mileage exceeds two percent of the national total, it may only obligate NHFP funds for projects on the PHFS, CRFCs or CUFCs (but not non-PHFS Interstates, in this case essentially I-8).[14] States that do not meet the two percent threshold may obligate funds for projects anywhere on the NHFN, including other portions of the Interstate network within the state.[15]

Arizona is in the final steps of designating these CRFCs and CUFCs. These designations, once approved by FHWA, make roadways designated as a CRFC or CUFC eligible for NHFP funds for improvements listed in the Freight Plan. The following sections outline the process and roadways designated as CRFCs and CUFCs in Arizona.

[14] 23 U.S.C.167(i)(3)
[15] FHWA Freight Management and Operations, Office of Operations, "Table of National Highway Freight Network Mileages by State."

10.3.2 Critical Rural Freight Corridors

The FAST Act enumerates several criteria for designating a roadway as a CUFC or CRFC but empowers State DOTs and MPOs to define which criteria are most important. Additionally, the FAST Act allows a roadway to be designated as a CUFC or CRFC if it is vital to improving the movement of freight, regardless of how the roadway performs on other criteria.

ADOT leveraged input from the FAC and data developed in the Freight Plan to designate CRFCs. CRFCs were developed using a data-driven process which considered performance, current volumes of trucks, freight tonnage, and freight value. In addition to the criteria established in the FAST Act, the network designation took into account three objectives, developed in collaboration with the FAC:

- Connected and Contiguous Network – CRFCs and CUFCs should be connected to the other portions of the NHFN and form a linked network of roadways rather than being composed of disparate segments.
- Data Driven – utilize multiple data sets to triangulate data. Seek input from FAC, MPOs and ADOT staff on the variables and not the outcome of the analysis.
- Focus on Freight Demand – variables used to designate CRFC/CUFC will be focused on the quantity of freight using the roadway currently, as opposed to future flows. While performance has a role in designation, the primary focus is freight demand.
- Collaborative – Engage FAC and MPOs throughout the designation process to select variables and validate results. Partner with MPOs to assign CUFC mileage.

FAST Act CRFC Criteria (23 U.S.C. 167 (e))

Principal arterials with trucks comprising at least 25% of AADT

Provides access to energy exploration, development, installation, or production areas

Connects the PHFS or Interstate System, or a road qualifying under (a) or (b), to a facility handling more than 50,000 twenty-foot equivalent units per/year or 500,000 tons per year of bulk commodities

Provides access to a grain elevator, agricultural facility, mining facility, forestry facility, or intermodal facility

Connects to an international port of entry

Provides access to significant air, rail, water, or other freight facilities in the State

Is vital to improving the efficient movement of economically important freight

Using these criteria, the designation includes:

- **US 93 from the Nevada state line to near Wickenburg.** This corridor is the key freight route between Phoenix and Las Vegas and is under consideration as part of the proposed I-11 corridor.
- **SR 189 from Mariposa LPOE to I-19.** This is the primary truck route for fresh produce, manufacturing, and other top trade commodities moving between Mexico and Arizona.

- **SR 85 from I-8 to 1-10.** The "Phoenix Truck Bypass" is a critical north-south link between major Interstate corridors and a conduit for trade moving between Yuma, San Diego, and Phoenix.
- **SR 69 from I-17 to the Prescott MPO boundary.** SR 69 connects the City of Prescott to the PHFS via I-17.
- **US 191 railroad overpass.** A segment of US 191 was included in the CRFCs to facilitate the movement of freight between US 191 and I-10 (Inclusion US 191 as a CRFC enabled the funding of the US 191/Cochise Railroad Overpass project).

10.3.3 Critical Urban Freight Corridors

CUFCs were developed using variables similar to those used to designate CRFCs. The CUFC designation process considered performance, current volumes of trucks, freight tonnage (both with and without consumer goods included), and freight value.

In line with the FAST Act, the Maricopa Association of Governments (MAG) and the Pima Association of Government (PAG) are responsible for CUFC designation within their urbanized areas and ADOT is responsible for designating CUFCs for the rest of the state. ADOT coordinated CUFC designations with MAG, PAG, and affected MPOs with populations less than 500,000.

FAST Act CUFC Criteria (23 U.S.C. 167 (f))

Located in an urbanized area (population greater than 50,000)

Connects an intermodal facility to the PHFS, the Interstate System, or an intermodal freight facility

Is located within a corridor of a route on the PHFS and provides an alternative highway option important to goods movement

Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land

Is important to the movement of freight within the region

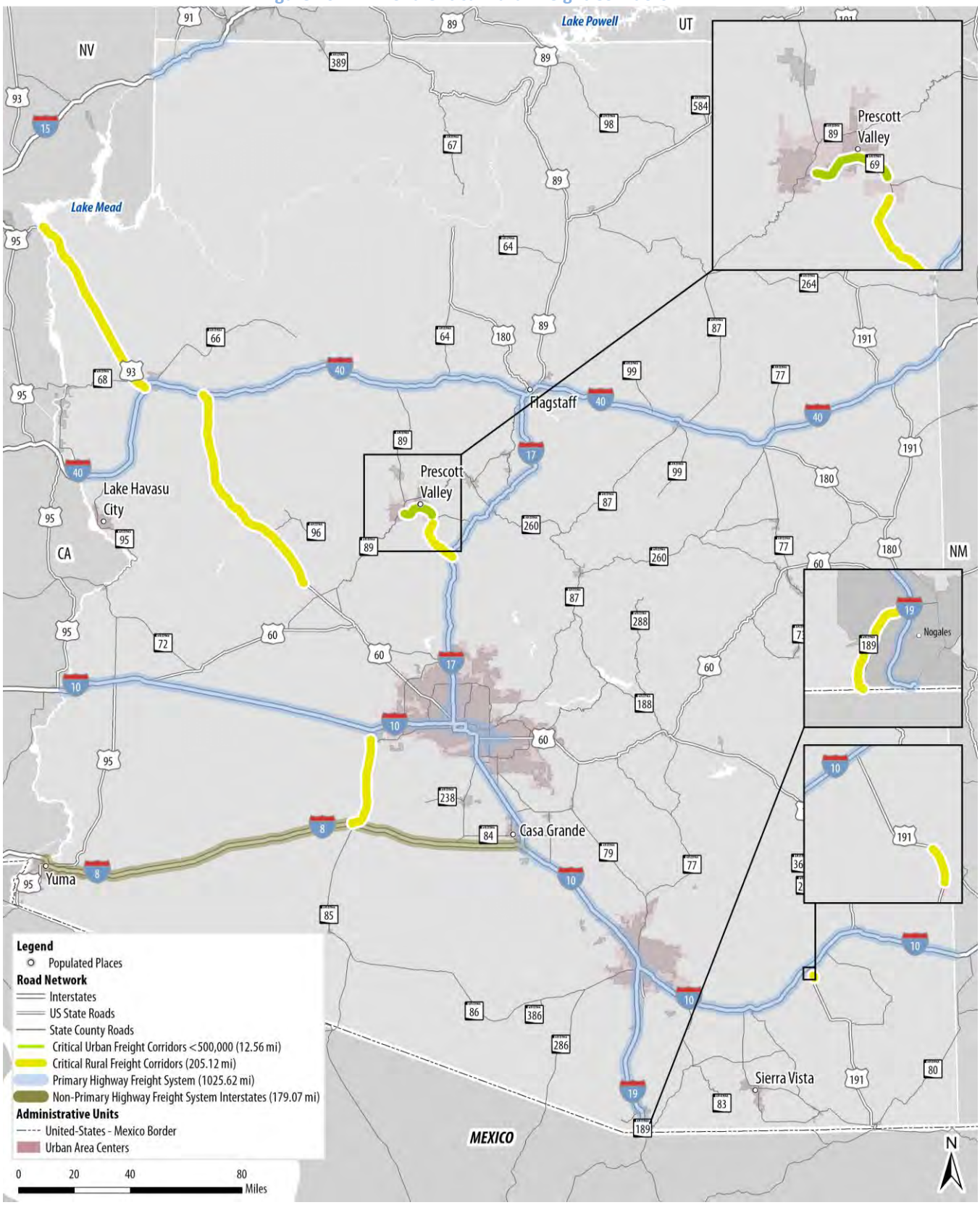
In coordination with ADOT, MAG designated 60 miles and PAG designated 30 miles of Arizona's 102.56 miles of CUFCs, leaving ADOT responsible (in coordination with the MPOs) to designate 12.56 miles. ADOT, MAG, and PAG have all completed the designation process to define Arizona's CUFCs. MAG received approval for their CUFCs from their Regional Council in September 2017, PAG submitted its CUFC designations to FHWA in April 2017, and ADOT received concurrence from Central Yavapai Metropolitan Planning Organization for the 12.56 miles of CUFCs in their MPO jurisdiction in June 2017.

The SR 69 in the Prescott Valley ultimately received all 12.56 miles because it consistently was among the top roadways for each variable.

10.3.4 Critical Rural and Critical Urban Freight Corridors in Arizona

Figure 10-7 displays the CRFCs in yellow, CUFCs designated by ADOT in green, PHFS in blue, and Interstates not on the PHFS in brown. Appendix 2 displays the CUFCs designated by MAG and PAG.

Figure 10-7: Arizona Critical Rural Freight Corridors



11 Implementation Plan

Key Messages

The Implementation Plan includes the fiscally constrained project list, which was informed by the project prioritization, identification of projects with disproportionate benefits to freight, ADOT planning/funding cycles, and the readiness of projects to be advanced. The following projects form the fiscally constrained project list and use Arizona's NHFP funds ($95.7 million over five years):

- I-40/US 93 System Interchange Improvements – $15 million
- I-10/US 191 System Interchange Improvements (interim)– $6.2 million
- US 191/Cochise Railroad Overpass – $16.5 million
- I-10 West of Phoenix General Purpose Lane – $33 million
- SR 189 Traffic Flow Improvements (interim) Mariposa LPOE to I-19 – $15 million
- Statewide Truck Parking and Freight Operations – $10 million

The Implementation Plan identifies approaches to incorporate findings from the Freight Plan into ADOT planning and programming by increasing the prominence of freight, coordinating with MPOs, and continuing the involvement of the FAC. The Freight Plan identifies projects and policies to benefit the state's freight transportation system in the short and long-term.

11.1 Approach to Implementation

Implementing the Freight Plan means that, at a minimum, Arizona is in compliance with FAST Act requirements. Surpassing minimum compliance and positioning ADOT to achieve the Freight Plan's Vision, will require a combination of funding and strategic actions that:

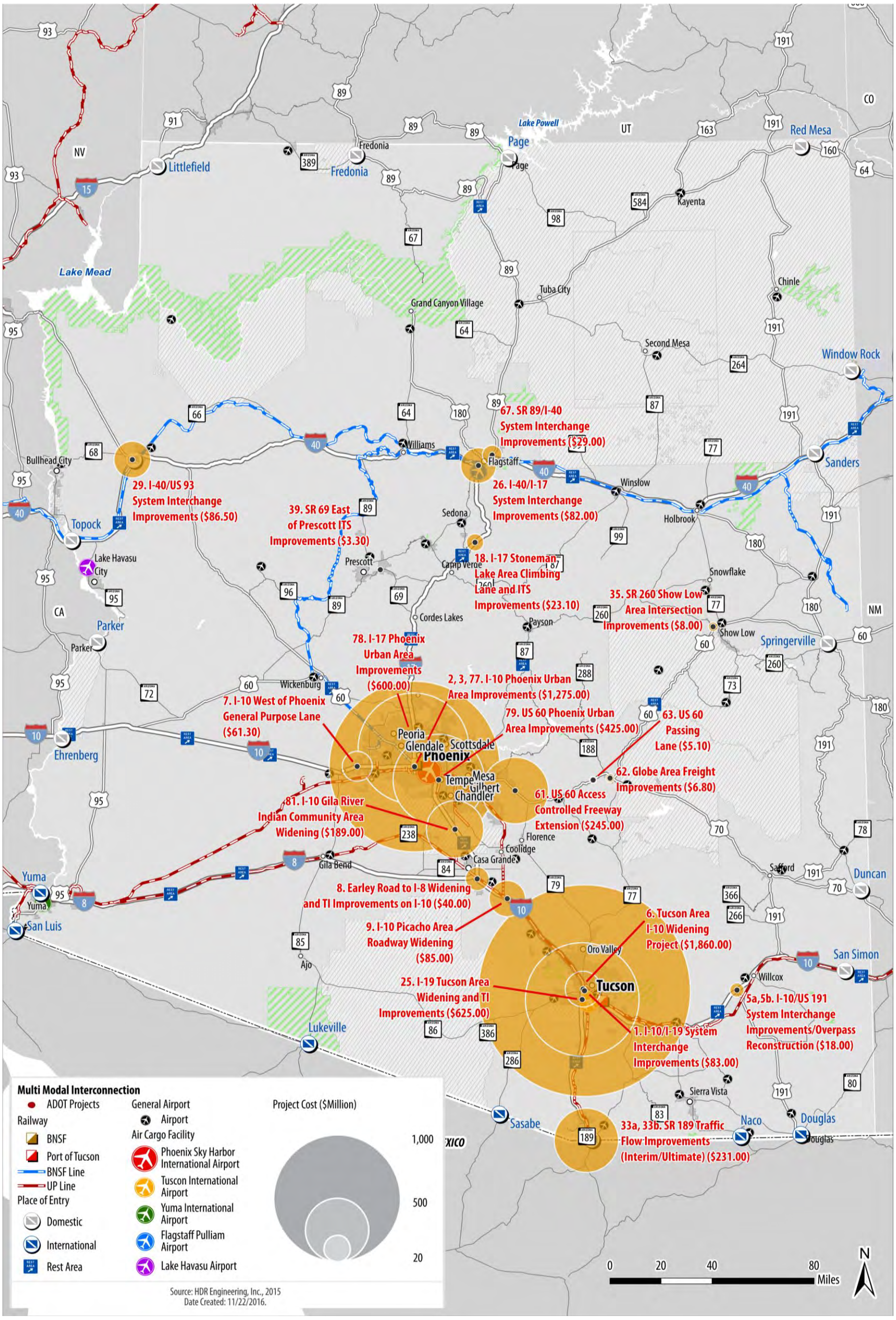
- Advance top priority freight improvements to development and completion
- Fully integrate the policies and strategies recommended in the Freight Plan, including its chief policy – increase the prominence of freight in ADOT planning and programming

This chapter summarizes the available funding and actions to implement the Freight Plan.

11.2 Priority Projects and Implementation

The estimated capital cost of the top 25 identified priority freight improvement projects is nearly $6 billion. This excludes illustrative projects such as the Sonoran Corridor and the Interstate 11 Intermountain West Corridor, which together would cost billions more. Figure 11-1 shows project reference number, description, and the estimated planning-level costs in millions for the top 25 identified projects.

Figure 11-1: Locations of Top 25 Identified Freight Improvement Projects



11.2.1 Balance of Funding Needs

Assuming that the two noted FASTLANE grant awarded projects are fully funded, the balance of funding needs for the remaining freight improvement projects is approximately $5.9 billion. Two projects account for roughly 45 percent of the estimated total planning-level costs:

- Tucson Area I-10 Widening Project – Project reference: 6, ranked 8, estimated cost of $1.86 billion
- I-10 Phoenix Urban Area Improvements – Project reference: 77, ranked 1, estimated cost of $775 million

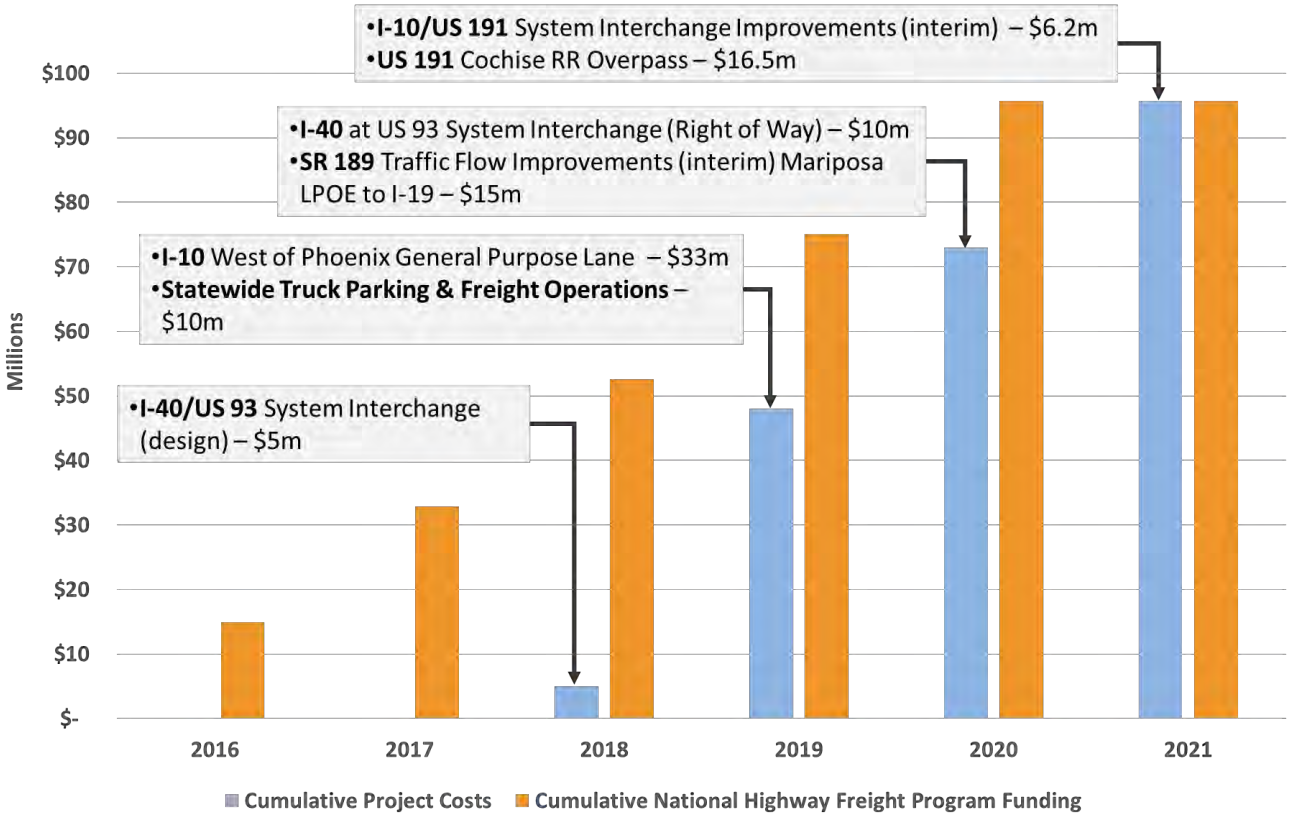
The larger capital cost of these projects may make them better candidates for using P3 approaches. When effectively executed as a P3, the potential cost savings on large projects can be significant. Also, large projects have the ability to absorb the expense of P3 procurements and take advantage of more P3 tools than some smaller projects.

11.3 Funding Sources

Arizona's apportionment of dedicated FAST Act freight funds under the NHFP ($95.7 million over five years) can best be used to advance six freight improvement projects. The selection of these projects is informed by their benefits to freight relative to passenger vehicles, ADOT planning/funding cycles, emerging issues, and the readiness of the project to be advanced. For example, as the Freight Plan neared completion, freight stakeholders highlighted the upcoming Electronic Logging Device mandate and concerns that this mandate would further exacerbate the shortages in truck parking identified in the Freight Plan. In response, ADOT is undertaking a study of truck parking and is holding $10 million in NHFP funding to implement the conclusions of the study.

In anticipation of the Freight Plan's fiscally constrained project list, ADOT has not spent its NHFP funds, so the Freight Plan accounts for all $95.7 million in NHFP funding. Figure 11-2 displays cumulative NHFP funds from 2016 to 2020 and cumulative spending of NHFP funds in bar graph format. Figure 11-2 also includes a table displaying how the projects and associated funding are being programmed by fiscal year (FY), as well as the anticipated year of federal authorization. Figure 11-2 includes only the NHFP funds being spent on these projects and does not include state, local, or other federal funds used to pay for projects. The Freight Plan covers NHFP funding from 2016-2020 because it is not clear whether the NHFP or another freight specific funding source will continue beyond 2020.

Figure 11-2: Arizona's Planned NHFP Expenditures Displayed by Programmed and Authorized Years (Expected 2016 – 2020 Funding)



Ref	Route (Area)	Project	Funding Amount ($ million)	Fiscal Year Programmed / Authorized
29	I-40	I-40/US 93 System Interchange - Design	$ 5.0	2018
7	I-10	I-10 West of Phoenix General Purpose Lane	$ 33.0	2019
N/A	N/A	Statewide Truck Parking and Freight Operations	$ 10.0	2019
29	I-40	I-40/US 93 System Interchange – Right-of-way	$ 10.0	2020
33a	SR 189	Traffic Flow Improvements (Interim) Mariposa LPOE to I-19	$ 15.0	2020
5a	I-10	I-10/US 191 System Interchange Improvements (interim)	$ 6.2	2021
5b	US 191	US 191 Cochise RR Overpass	$ 16.5	2021
Total National Highway Freight Program Expenditures			**$ 95.7**	

Source: CPCS analysis of FAST Act summary of estimated apportionments

Arizona leverages other funding sources (Figure 11-3) in addition to NHFP funds to create a fiscally constrained project list. ADOT will match federal NHFP funding with state funding from the State Highway Fund. The project costs in Figure 11-3 have been updated to reflect current total project cost estimates. Note that projects identified in the Freight Plan's fiscally constrained project list will be added to Arizona's Five-Year Transportation Facilities Construction Program. Future additions to the Five-Year Transportation Facilities Construction Program are subject to recommendation and approval by the State Transportation Board, as all projects must be approved by the Board before inclusion in the ADOT Program. Figure 11-3 also displays the projects identified in the Freight Plan receiving funding through a 2016 FASTLANE grant.

Figure 11-3: Funding Freight with NHFP Funds, FASTLANE Grants, and Other Federal Funds ($millions)

Ref	Route (Area)	Project (Fiscal Year of Authorization)	NHFP Funds	Other Federal **	Fastlane Grant	Other State	State Match 5.7%***	Total Cost
Projects Spending National Highway Freight Program Funds								
29	I-40	I-40/US 93 System Interchange Improvements (FY 2018 – Design and FY 2020 – Right of Way)	$15	$66.5	-	-	$5	$86.5
7	I-10	I-10 West of Phoenix General Purpose Lane (FY 2019)	$33	-	-	$24.8	$3.5	$61.3
N/A	N/A	Statewide Truck Parking and Freight Operations (FY 2019)	$10				0.6	$10.6
33a*	SR 189	SR 189 Traffic Flow Improvements (interim) Mariposa LPOE to I-19 (FY 2020)	$15	$25	-	$25	$4	$69
5a*	I-10	I-10/US 191 System Interchange Improvements (interim) (FY 2021)	$6.2				$0.4	$6.6
5b*	US 191	US 191/Cochise Railroad Overpass (FY 2021)	$16.5				$0.9	$17.4
FASTLANE Grant Recipients								
9	I-10	FASTLANE: I-10 Picacho Area Roadway Widening	-	-	$34	$46	$4.8	$85
8	I-10	FASTLANE: I-10, Earley Road to I-8 Widening and Traffic Interchange Improvements	-	-	$20	$58.3	$4.7	$83

* In consultation with ADOT, the total cost for 5a, 5b, and 33a has been updated based on the current total project cost estimates
**The source of other federal funding is the National Highway Performance Program
***State match is provided by the State Highway Fund

Beyond Freight funding, other potential sources of funding for freight improvements include: the Arizona Highway User Revenue Fund, the Regional Area Road Fund, and the Federal-Aid Highway Program. Freight improvements would be considered together with non-freight priorities in the context of Arizona's Five-Year Transportation Facilities Construction Program.

Discretionary funding programs, such as the FASTLANE and TIGER Grant Programs, may help raise funding for freight priorities, although these programs are very competitive.

The FAST Act funds address only about two percent of the funding needs associated with the identified top priority freight improvements.

Alternative funding mechanisms—including heavy goods vehicle charges, transportation-dedicated sales taxes on motor vehicles and tires, tolls, and vehicle miles traveled fees—have been used in other jurisdictions to help fund transportation projects and may warrant consideration. The magnitude of potential funding from these approaches can be significant.

11.3.1 Financing Sources

Traditional sources of financing for ADOT transportation projects include bonds (Highway Revenue Bonds and Transportation Excise Tax Revenue Bonds), and Grant Anticipation Notes. ADOT also has access to loans and credit instruments under federal programs, such as the Transportation Infrastructure Finance and Innovation Act (TIFIA) program and Private Activity

Bonds through the Build America Bureau of the USDOT. Nevertheless, it is critical to note that financing cannot address a funding gap. Financing merely helps raise money to pay for projects, and money raised through financing must be repaid, with interest.

P3s are project delivery mechanisms that often include a financing component. Arizona has effective P3-enabling legislation, and P3 project delivery is available to ADOT as a tool in its toolbox. The Loop 202 South Mountain Freeway, for example, is currently under construction and is being undertaken as a P3. It is, however, the only true P3 project in the transportation realm that is under construction, besides the State Safety Rest Areas maintenance, which is in operation (all others are at various stages of consideration/procurement).

The Freight Plan proposes a P3 Screen for identifying the potential applicability of P3s for delivering freight improvement priorities in Arizona. In some cases, it would not be prudent to recommend using P3s. Nevertheless, of the top identified freight improvement projects, the US 60 Access Controlled Freeway Extension project (Project reference: 61) may be the best short-term candidate project for further P3 consideration. It is not currently on ADOT's list of planned P3 projects.

11.4 Implementation Strategies

The Arizona freight improvement strategy defines four specific and actionable strategies. The Freight Plan puts forward an implementation plan and associated considerations and actions specific to each of these strategies.

11.4.1 Implement Priority Freight Projects with Dedicated FAST Act Freight Funds

Informed by data developed in the project prioritization and from the analysis of projects that disproportionately benefit freight, ADOT identified the six freight improvement projects shown in Figure 11-4 (total estimated cost of $95.7 million).

Figure 11-4: Identified Freight Improvement Priority Projects

Rank by Freight Benefit	Ref.	Route	Issue Segment	Project Option(s)	NHFP Funds ($ million)	Freight Benefits Share
1	29	I-40	I-40 at US 93 Junction within Kingman area	I-40/US 93 System Interchange Improvements	$15	55%
2	5a	I-10	I-10 at US 191 (Cochise TI)	I-10/US 191 System Interchange Improvements (interim)	$6.2	54.0%
3	5b	US 191	US 191/Cochise RR Overpass	US 191/Cochise Railroad Overpass	$16.5	52.2%
6	7	I-10	I-10 between SR 85 and L303	I-10 West of Phoenix General Purpose Lane	$33	28.2%
17	33a	SR 189	SR 189 between Mariposa LPOE and I-19	SR 189 between Mariposa LPOE and I-19	$15	15.9%
N/A	N/A	N/A	N/A	Statewide Truck Parking & Freight Ops	$10	N/A

Source: HDR, analysis of prioritization ranking analysis

11.4.2 Implement Processes to Increase Prominence of Freight in ADOT Planning and Programming

Beyond leveraging Arizona's apportionment of FAST Act dedicated freight funds, ADOT should leverage the research, analysis, working papers and reports of the Arizona State Freight Plan with the aim of disseminating and promoting the findings to others within the MPD and ADOT more broadly.

The 2017 update of the Arizona LRTP provides a practical opportunity to increase the prominence of freight in planning and programming as this guiding document will inform Arizona's planning and programming for the next five years.

Since the LRTP also guides project prioritization (i.e. merit-based prioritization criteria), ADOT should strengthen the freight criteria within the policy evaluation criteria of ADOT's P2P prioritization process. ADOT should also ensure the addition of freight projects for statewide consideration in the P2P process. This will help ensure ADOT is well positioned to use future freight funds as they are made available.

11.4.3 Coordinate Freight Improvement Issues and Projects Falling within MPO Jurisdiction

ADOT will continue to coordinate with the State's regional transportation planning agencies (MPOs and COGs) to advance projects for programming into the STIP.

Coordination between ADOT and the MPOs and COGs on freight planning initiatives, such as the State Freight Plan, MPO freight plans, and regional efforts, such as the 'SPINE' study addressing freight in the Phoenix metropolitan area, can help define freight priorities and implement freight improvement projects.

11.4.4 Continue Involvement of a Freight Advisory Committee

Throughout the development of the Arizona State Freight Plan, ADOT has benefitted from advice offered by the Freight Advisory Committee. The FAC has been comprised of representation from the following groups, among others:

- AP Logistics
- Arizona Commerce Authority
- Arizona Department of Transportation
- Arizona Rock Products Association
- Arizona State University
- Arizona Trucking Association
- BNSF Railway Company
- Brackers Department Store, Nogales AZ
- Central Arizona Governments

- Central Yavapai Metropolitan Planning Organization
- City of Kingman
- City of Mesa
- City of Phoenix
- Cocopah Indian Tribe
- CPCS Transcom Inc.
- Eastern Arizona Counties
- Eastern International Airport
- Federal Highway Administration
- FedEx
- Flagstaff Metropolitan Planning Organization
- Freeport McMoRan
- Fresh Produce Association of the Americas
- Genesee & Wyoming Railroad
- Granite Mountain Asset Management
- Greater Yuma Economic Development Corporation
- HDR Engineering Inc.
- Help Inc.
- Kingman Airport and Industrial Park
- Knight Transportation
- Lake Havasu Metropolitan Planning Organization
- Laron industries
- Maricopa Association of Governments
- Mohave County
- Molera Alvarez Public Relations
- Nestle Purina Petcare, Flagstaff Factory
- Northern Arizona Council of Governments
- Pacific Brokerage Co. Inc
- Pima Association of Governments
- Plan *ET Communities PLLC

- Port of Tucson (Arizona's Active Inland Port)
- Prologis Real Estate
- Rural Transportation Alliance
- Sierra Vista MPO
- South Eastern Arizona Governments Organization
- Sun Corridor Metropolitan Planning Organization
- Swift Transportation
- TTX Company
- Tucson International Airport
- United Parcel Service
- Western Arizona Council of Governments
- Yuma MPO

There is no federal mandate for a state to create a FAC; however, 49 U.S.C. 70201 and Section 8001 of the FAST Act requires USDOT to encourage each state to establish a FAC. In the spirit of this federal encouragement, the State of Arizona has established a FAC. Specifically, Arizona Revised Statutes Section 28-9402 provides that the ADOT Director "shall establish a freight advisory council to advise the director regarding freight systems issues, infrastructure, and planning in this state." The ADOT FAC fulfills the state's statutory "freight advisory council" purpose, including a strong role in advising the development of the Arizona State Freight Plan. Regardless of any mandate, ADOT would choose to seek advice from the freight community in transportation planning endeavors because it is needed.

There is no requirement that the Arizona FAC adhere to a certain organizational structure or adopt bylaws or a charter. To date, the FAC has operated informally without any structure or bylaws. It has been the FAC members' consensus preference to be informal, to have a free exchange of information during their meetings, and full input and stakeholder involvement have been achieved and appreciated. However, FHWA and ADOT believe there would be benefits from ADOT adopting a more formalized FAC structure after approval of the Freight Plan. Creating a FAC charter and drafting more formal meeting minutes would help to increase the transparency under which the State Freight Plan is implemented once the plan is finalized and released. A formal record of the FAC's membership, structure, meetings, and advice could address potential comments received during future public review periods. As with any planning activity potentially involving Federal-Aid Highway funding, it will be important to follow federal planning requirements. A more formal FAC structure and bylaws will be considered for its possible future benefits.

ADOT is grateful to all FAC participants for their hard work and helpful advice.

Appendix 1 Arizona Freight Facts

Volumes and Value of Freight by Mode

A commodity flow analysis used TRANSEARCH data from IHS Global Insight to identify the relative value and tonnage of freight moving to, from, within and across Arizona by mode (road, rail, air and other). This analysis covers the base year (2013) flows.

Appendix 1-1: Distribution of Flow Type by Tonnage

Flow Type	Tonnage	Proportion of Total
To Arizona	56,724,072	15%
From Arizona	29,206,357	8%
Within Arizona	91,075,243	25%
Through Arizona	191,752,874	52%
Total	**368,758,545**	**100%**

Appendix 1-2: Modal Distribution by Tonnage

Mode	To Arizona	From Arizona	Within Arizona	Through Arizona
Air	131,549	142,746	2,625	-
Truck	32,045,325	25,819,258	89,862,198	93,707,920
Rail	24,546,464	3,243,380	1,210,420	98,044,577
Other	734	973	-	378
Total	**56,724,072**	**29,206,357**	**91,075,243**	**191,752,874**

Note: Through flows are not included in the TRANSEARCH database for freight moving via air cargo and TRANSEARCH classifies other or unknown mode when the mode is not specified on customs documents for imported or exported freight, therefore there are zero within flows classified as other.

Appendix 1-3: Distribution of Flow Type by Value

Flow Type	Value (billions)	Proportion of Total
To Arizona	$98.4	11%
From Arizona	$66.7	7%
Within Arizona	$72.3	8%
Through Arizona	$676.8	74%
Total	**$914.1**	**100%**

Appendix 1-4: Modal Distribution by Value

Mode	To Arizona	From Arizona	Within Arizona	Through Arizona
Air	$12.03	$14.51	$0.27	$-
Truck	$69.68	$41.77	$68.50	$307.98
Rail	$16.70	$10.36	$3.53	$368.77
Other	$0.00	$0.01	$-	$0.00
Total	**$98.41**	**$66.65**	**$72.30**	**$676.75**

Note: Through flows are not included in the TRANSEARCH database for freight moving via air cargo and TRANSEARCH classifies other or unknown mode when the mode is not specified on customs documents for imported or exported freight, therefore there are zero within flows classified as other.

Top Trading Partners

The top Arizona trading partners by state or province are shown below. The flows are organized by inbound and outbound. They include both foreign and domestic origins and destinations, with specific Mexican states and Canadian provinces identified. Other foreign origins and destinations are coded coming from the state where the goods enter or exit the U.S.

Appendix 1-5: Top 15 Trading Partners of Outbound (from Arizona) Freight Flows by Tonnage

Rank	State/Province	Tonnage	Proportion of Total
1	**California**	12,065,847	41%
2	**Texas**	3,119,261	11%
3	**New Mexico**	2,380,440	8%
4	**Nevada**	1,978,008	7%
5	**Colorado**	944,118	3%
6	**Utah**	875,752	3%
7	**Sonora**	670,429	2%
8	**Illinois**	647,403	2%
9	**Michigan**	550,528	2%
10	**Washington**	543,933	2%
11	**Oregon**	349,229	1%
12	**Missouri**	346,742	1%
13	**Louisiana**	343,003	1%
14	**Florida**	319,811	1%
15	**Kansas**	239,972	1%
Total for Top 15 Trading Partners		**25,374,476**	**87%**

Appendix 1-6: Top 15 Trading Partners of Outbound (from Arizona) Freight Flows by Value

Rank	State/Province	Value (billions)	Proportion of Total
1	California	$17.58	26%
2	Texas	$8.03	12%
3	Illinois	$3.89	6%
4	Sonora	$3.36	5%
5	Washington	$3.35	5%
6	Nevada	$2.54	4%
7	New Mexico	$2.24	3%
8	Missouri	$2.13	3%
9	Florida	$1.76	3%
10	Colorado	$1.65	2%
11	Utah	$1.55	2%
12	Tennessee	$0.99	1%
13	Louisiana	$0.96	1%
14	Kansas	$0.93	1%
15	Oregon	$0.90	1%
Total for Top 15 Trading Partners		**$51.9**	**78%**

Appendix 1-7: Top 15 Trading Partners of Inbound (to Arizona) Freight Flows by Tonnage

Rank	State/Province	Tonnage	Proportion of Total
1	California	15,604,218	28%
2	New Mexico	10,399,446	18%
3	Wyoming	6,382,357	11%
4	Texas	4,328,253	8%
5	Mexico Unknown State	2,428,507	4%
6	Iowa	1,486,232	3%
7	Utah	1,159,122	2%
8	Illinois	1,048,375	2%
9	Louisiana	997,728	2%
10	Montana	901,424	2%
11	Washington	900,401	2%
12	Oregon	896,547	2%
13	Nevada	867,625	2%
14	Nebraska	850,893	2%
15	Colorado	781,537	1%
Total for Top 15 Trading Partners		**49,032,666**	**86%**

Appendix 1-8: Top 15 Trading Partners of Inbound (to Arizona) Freight Flows by Value

Rank	State/Province	Value (billions)	Proportion of Total
1	California	$38.2	39%
2	Texas	$8.9	9%
3	Illinois	$5.4	5%
4	New Mexico	$3.6	4%
5	Louisiana	$2.7	3%
6	Mexico Unknown State	$2.6	3%
7	Washington	$2.6	3%
8	Missouri	$2.0	2%
9	Sonora	$1.8	2%
10	Utah	$1.8	2%
11	Tennessee	$1.7	2%
12	Alabama	$1.6	2%
13	Iowa	$1.5	2%
14	Colorado	$1.5	1%
15	Georgia	$1.3	1%
Total for Top 15 Trading Partners		**$77.1**	**78%**

Top Commodities

The top Arizona commodities by flow type are shown below. The flows are organized by type and include foreign and domestic origins and destinations, as well as all modes. Commodities are classified by Standard Transportation Commodity Code.

Appendix 1-9: Top 15 Commodities Traveling to Arizona by Tonnage

Rank	Commodity	Tonnage	Proportion of Total
1	Bituminous Coal	14,314,893	25%
2	Warehouse & Distribution Center	6,120,553	11%
3	Petroleum Refining Products	1,963,331	3%
4	Misc. Fresh Vegetables	1,722,598	3%
5	Grain	1,170,423	2%
6	Asphalt Paving Blocks or Mix	993,717	2%
7	Misc. Industrial Organic Chemicals	864,520	2%
8	Portland Cement	790,247	1%
9	Misc. Field Crops	674,341	1%
10	Chemical or Fertilizer Mineral Crude	625,404	1%
11	Freight of All Kinds Shipments	614,960	1%
12	Lumber or Dimension Stock	565,480	1%
13	Primary Iron or Steel Products	558,824	1%
14	Primary Forest Materials	517,863	1%
15	Broken Stone or Riprap	514,824	1%
Total for Top 15 Commodities		**32,011,978**	**56%**

Appendix 1-10: Top 15 Commodities Traveling to Arizona by Value

Rank	Commodity	Value (billions)	Proportion of Total
1	Warehouse & Distribution Center	$7.55	8%
2	Motor Vehicles	$4.54	5%
3	Misc. Manufacturing Products	$3.46	4%
4	Freight of All Kinds Shipments	$3.17	3%
5	Electrical Equipment	$2.64	3%
6	Misc. Primary Nonferrous Smelter Products	$2.46	2%
7	Drugs	$2.34	2%
8	Petroleum Refining Products	$2.15	2%
9	Misc. Fresh Vegetables	$1.67	2%
10	Electronic Data Processing Equipment	$1.65	2%
11	Instruments, Photo Equipment, Optical Equipment	$1.62	2%
12	Misc. Plastic Products	$1.61	2%
13	Transportation Equipment	$1.55	2%
14	Construction Machinery or Equipment	$1.30	1%
15	Women's or Children's Clothing	$1.20	1%
Total for Top 15 Commodities		**$38.91**	**40%**

Appendix 1-11: Top 15 Commodities Traveling from Arizona by Tonnage

Rank	Commodity	Tonnage	Proportion of Total
1	Product of Petroleum Refining	3,345,772	11%
2	Waste or Scrap	3,220,710	11%
3	Beverages or Flavor Extracts	2,115,028	7%
4	Concrete, Gypsum, or Plaster	1,660,572	6%
5	Gravel or Sand	1,538,470	5%
6	Grain	1,070,466	4%
7	Dairy Farm Products	955,482	3%
8	Warehouse & Distribution Center	900,262	3%
9	Misc. Field Crops	865,238	3%
10	Leafy Fresh Vegetables	859,168	3%
11	Misc. Food Preparations	603,739	2%
12	Paving or Roofing Materials	472,735	2%
13	Fabricated Structural Metal Products	414,494	1%
14	Misc. Fresh Vegetables	371,053	1%
15	Agricultural Chemicals	350,357	1%
Total for Top 15 Commodities		**18,743,545**	**64%**

Appendix 1-12: Top 15 Commodities Traveling from Arizona by Value

Rank	Commodity	Value (billions)	Proportion of Total
1	Electrical Equipment	$4.90	7%
2	Electronic Components	$4.56	7%
3	Products of Petroleum Refining	$3.61	5%
4	Misc. Manufacturing Products	$2.71	4%
5	Industrial Electrical Equipment	$2.23	3%
6	Aircraft or Parts	$2.01	3%
7	Drugs	$1.89	3%
8	Medical or Dental Instruments	$1.58	2%
9	Transportation Equipment	$1.54	2%
10	Beverages or Flavor Extracts	$1.51	2%
11	Misc. Plastic Products	$1.17	2%
12	Waste or Scrap	$1.17	2%
13	Motor Vehicle or Equipment	$1.12	2%
14	Fabricated Structural Metal Products	$1.12	2%
15	Warehouse & Distribution Center	$1.11	2%
Total for Top 15 Commodities		**$32.25**	**48%**

Appendix 1-13: Top 15 Commodities Traveling within Arizona by Tonnage

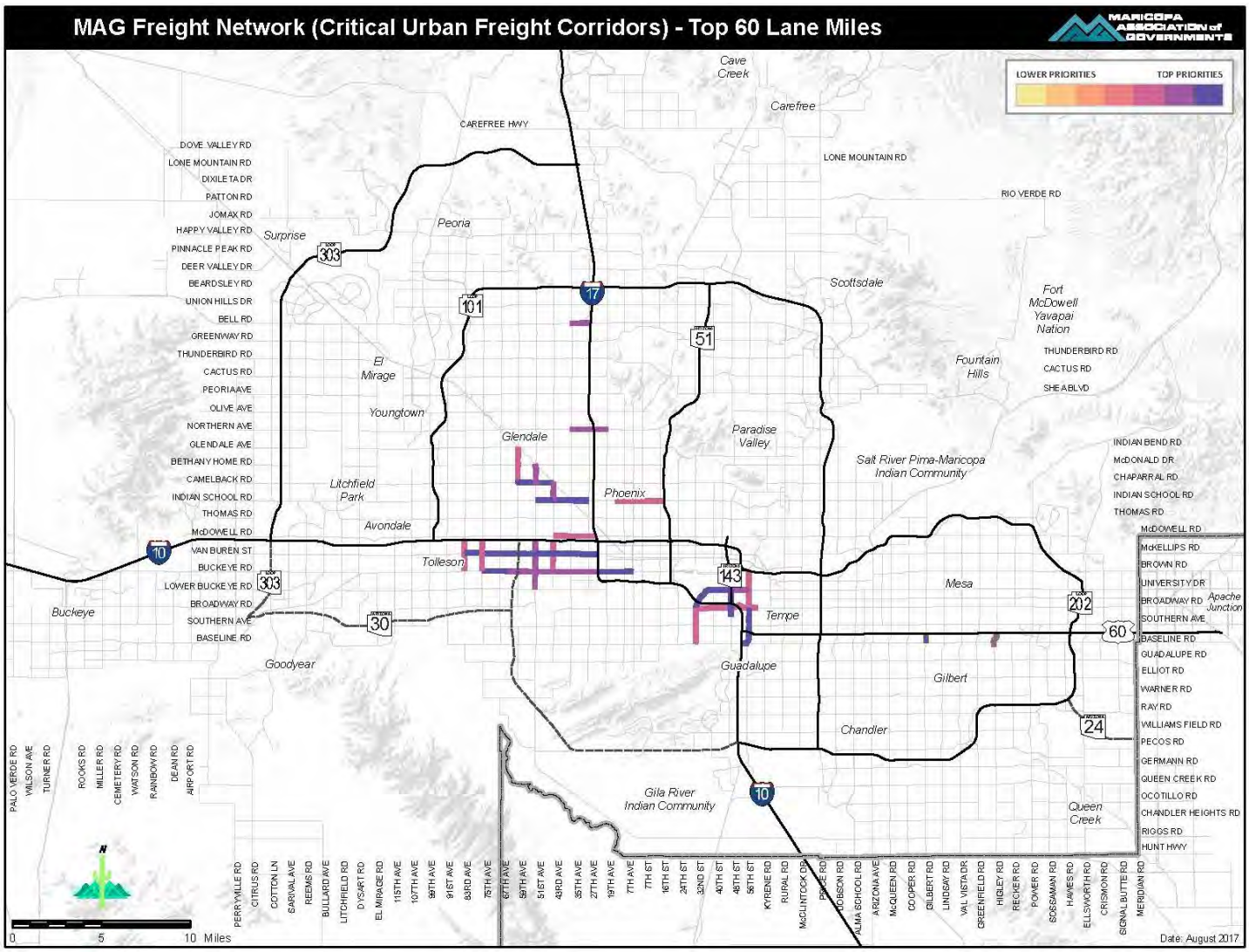
Rank	Commodity	Tonnage	Proportion of Total
1	Gravel or Sand	37,376,968	41%
2	Dairy Farm Products	10,770,141	12%
3	Concrete, Gypsum, or Plaster	7,894,522	9%
4	Products of Petroleum Refining	7,735,018	8%
5	Warehouse & Distribution Center	5,017,509	6%
6	Waste or Scrap	2,915,217	3%
7	Paving or Roofing Materials	2,520,912	3%
8	Beverages or Flavor Extracts	2,035,974	2%
9	Rail Intermodal Drayage	1,449,651	2%
10	Misc. Field Crops	1,291,308	1%
11	Cut Stone or Stone Products	836,496	1%
12	Misc. Food Preparations	692,990	1%
13	Portland Cement	564,461	1%
14	Fabricated Structural Metal Products	538,481	1%
15	Grain Mill Products	501,985	1%
Total for Top 15 Commodities		**82,141,634**	**90%**

Appendix 1-14: Top 15 Commodities Traveling within Arizona by Value

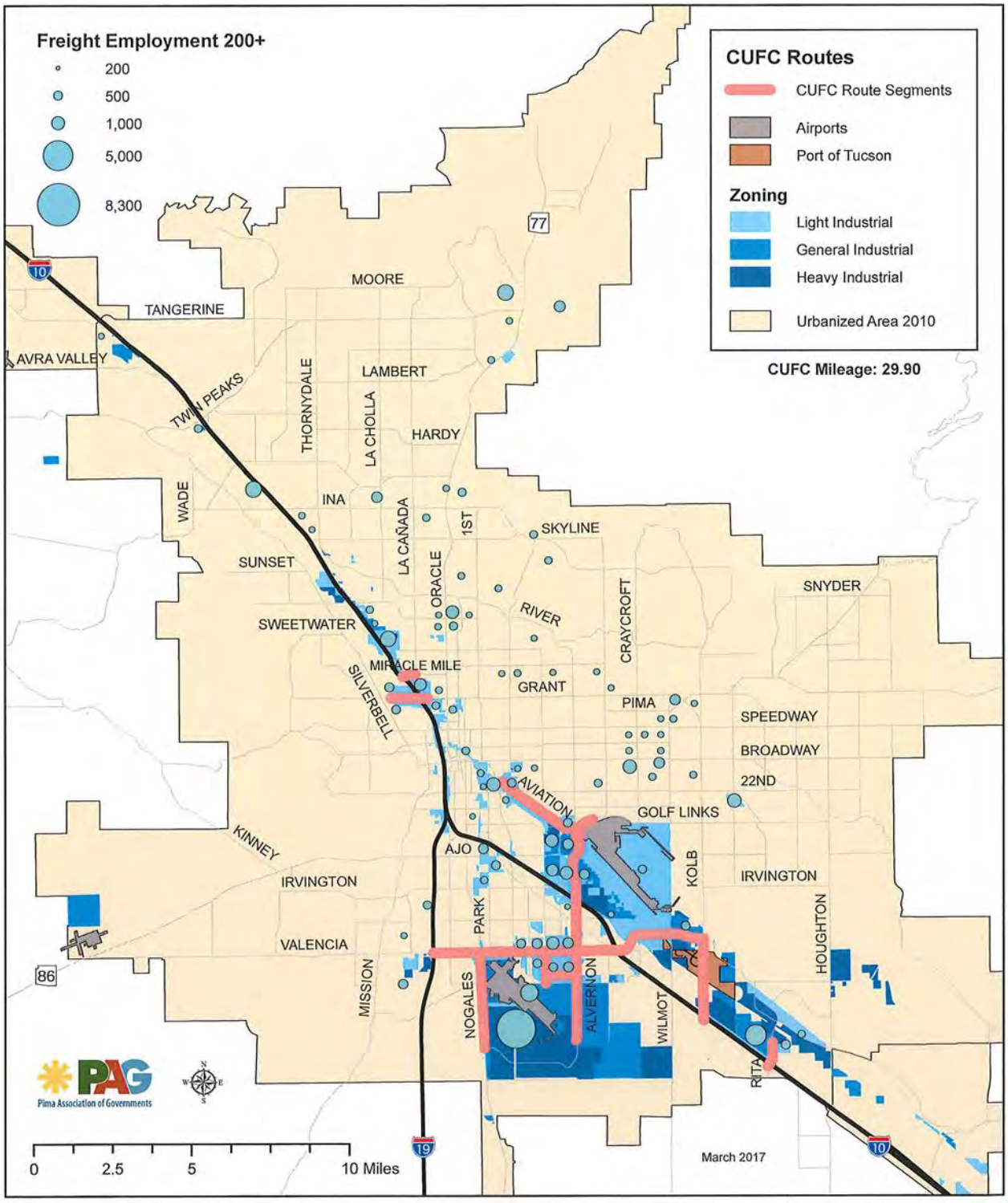
Rank	Commodity	Value (billions)	Proportion of Total
1	Products of Petroleum Refining	$8.50	12%
2	Missile or Space Vehicle Parts	$7.63	11%
3	Rail Intermodal Drayage	$6.75	9%
4	Warehouse & Distribution Center	$6.19	9%
5	Motor Vehicle or Equipment	$3.95	5%
6	Aircraft or Parts	$3.76	5%
7	Industrial Electrical Equipment	$3.19	4%
8	Air Freight Drayage	$3.10	4%
9	Electronic Components	$2.88	4%
10	Beverages or Flavor Extracts	$1.45	2%
11	Fabricated Structural Metal Products	$1.39	2%
12	Medical or Dental Instruments	$0.99	1%
13	Misc. Field Crops	$0.91	1%
14	Bakery Products	$0.85	1%
15	Drugs	$0.85	1%
Total for Top 15 Commodities		**$52.39**	**72%**

Appendix 2 MAG and PAG Critical Urban Freight Corridors

Appendix 2-1: MAG Critical Urban Freight Corridors



Appendix 2-2: PAG Critical Urban Freight Corridors



Source: Pima Association of Governments

Appendix 2-3: PAG Critical Urban Freight Corridors Submission Documentation

04/07/2017

Karla Petty, Division Administrator, Federal Highway Administration
FHWA Arizona Division Office
4000 N. Central Avenue, Suite 1500
Phoenix, Arizona 85012-3500
(602) 379-3646

RE: Pima Association of Governments (PAG) Region Critical Urban Freight Corridor Designation

Dear Ms. Petty:

As required by 23 U.S.C 167(g), and other pertinent Federal regulations, the table on the following page identifies critical urban freight corridors in accordance with the current FHWA guidance covering the designation and certification requirements. The designation was approved by PAG Regional Council on March 23, 2017.

CRITICAL URBAN FREIGHT CORRIDOR CERTIFICATE

I hereby certify that the public roads listed in the table below meet the requirements of 23 U.S.C. 167(f) as designated CUFC routes and connectors.

I further certify that the applicable consultation requirements under 23 U.S.C. 167(f)(1) or (2) have been satisfied.

I further certify that the length in centerline mileage is accurate and does not exceed the maximum mileage limit, that the designated freight corridors have been coordinated with the appropriate stakeholder groups, and that the freight corridors will be incorporated into the State Freight Plan prior to FHWA authorizing the use of Federal funds.

Dated at Pima Association of Governments, this 7th day of April, 2017

Sincerely,

Farhad Moghimi
Executive Director
Pima Association of Governments

Pima Association of Governments 1 E. Broadway Ave, Suite 401, Tucson, AZ 85701 (520) 792-1093 *[tel]* (520) 620-6981 *[fax]* www.pagnet.org *[web]*

Appendix 2-4: List of PAG Critical Urban Freight Corridors

CUFC ROUTES and CONNECTORS					
State	Route No	Start Point	End Point	Length	CUFC_ID
AZ	Alvernon Way	1.8 miles south of Los Reales Rd.	Aviation Pkwy	6.72	J
AZ	Aviation Pkwy	22nd St	Aviation Pkwy-Golf Links Rd	2.55	J
AZ	Aviation Pkwy-Golf Links Rd	Aviation Pkwy	Golf Links Rd	0.54	K
AZ	Corona Rd	Country Club Rd	Alvernon Way	0.98	J
AZ	Country Club Rd	Los Reales Rd	Valencia Rd	1.00	H
AZ	Golf Links Rd EB	Alvernon Way	Golf Links Rd	1.34	K
AZ	Grant Rd	Silverbell Rd	Flowing Wells Rd	1.16	K
AZ	Kolb Rd	I-10 EB on ramp (Exit 270 from south)	Benson Hwy	0.24	H
AZ	Miracle Mile	I-10	Flowing Wells Rd	0.41	K
AZ	Nogales Hwy	Hughes Access Rd	Valencia Rd	3.02	J
AZ	Rita Rd	I-10 EB on ramp (Exit 273 from south)	Rita Access Rd	0.79	J
AZ	Valencia Rd	I-19	I-10 EB on ramp (Exit 267 from west)	5.73	H
AZ	Valencia Rd-Kolb Rd	I-10 / Valencia ramp (west side of I-10)	I-10 / Kolb ramp (north side of I-10)	5.43	H
			Total	29.91	

Pima Association of Governments 1 E. Broadway Ave, Suite 401, Tucson, AZ 85701 (520) 792-1093 *[tel]* (520) 620-6981 *[fax]* www.pagnet.org *[web]*

Appendix 3 Acronyms and Abbreviations

AADTT	AVERAGE ANNUALIZED DAILY TRACK TRAFFIC
ADOT	ARIZONA DEPARTMENT OF TRANSPORTATION
AL	ALASKA
AR	ARIZONA
BCA	BENEFIT-COST ANALYSIS
bqAZ	BUILDING A QUALITY ARIZONA
CA	CALIFORNIA
CO	COLORADO
COG	COUNCIL OF GOVERNMENTS
COMPASS	US-60/GRAND AVENUE COMPASS STUDY
CPCS	CPCS TRANSCOM INC.
CRFC	CRITICAL RURAL FREIGHT CORRIDOR
CT	CONNECTICUT
CUFC	CRITICAL URBAN FREIGHT CORRIDOR
DE	DELAWARE
DOT	DEPARTMENT OF TRANSPORTATION
EB	EAST BOUND
FAC	FREIGHT ADVISORY COMMITTEE
FAST ACT	FIXING AMERICA'S SURFACE TRANSPORTATION ACT
FASTLANE	FOSTERING ADVANCEMENTS IN SHIPPING AND TRANSPORTATION FOR THE LONG-TERM ACHIEVEMENT OF NATIONAL EFFICIENCIES
FHWA	FEDERAL HIGHWAY ADMINISTRATION
FL	FLORIDA
FY	FISCAL YEAR
GA	GEORGIA
GDP	GROSS DOMESTIC PRODUCT
HDR	HDR ENGINEERING INC.
HI	HAWAII
IA	IOWA
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
ITS	INTELLIGENT TRANSPORTATION SYSTEM
KCC	KEY COMMERCE CORRIDORS
KS	KANSAS
KY	KENTUCKY

LA	LOUISIANA
LOS	LEVEL OF SERVICE
LPOE	LAND PORT OF ENTRY
LRTP	LONG RANGE TRANSPORTATION PLAN
MA	MASSACHUSETTS
MAG	MARICOPA ASSOCIATION OF GOVERNMENTS
MAP-21	MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY ACT
MD	MARYLAND
ME	MAINE
MI	MICHIGAN
MN	MINNESOTA
MO	MONTANA
MPD	MULTIMODAL PLANNING DIVISION
MPOS	METROPOLITAN PLANNING ORGANIZATION
MS	MISSIPPI
MT	MONTANA
NB	NORTHBOUND
NC	NORTH CAROLINA
ND	NORTH DAKOTA
NE	NEBRASKA
NH	NEW HAMPSHIRE
NHFN	NATIONAL HIGHWAY FREIGHT NETWORK
NHFP	NATIONAL HIGHWAY FREIGHT PROGRAM
NJ	NEW JERSEY
NM	NEW MEXICO
NMFN	NATIONAL MULTIMODAL FREIGHT NETWORK
NMFP	NATIONAL MULTIMODAL FREIGHT POLICY
NVPHX	NEVADA
NY	NEW YORK
OH	OHIO
OK	OKLAHOMA
OR	OREGON
P2P	PLANNING TO PROGRAMMING
P3	PUBLIC PRIVATE PARTNERSHIP
PA	PENNSYLVANIA
PAG	PIMA ASSOCIATION OF GOVERNMENT
PHFS	PRIMARY HIGHWAY FREIGHT SYSTEM
PHX	PHOENIX SKY HARBOR INTERNATIONAL AIRPORT
POE	PORT OF ENTRY
PLS	PLANNING LEVEL SCOPING
RI	RHODE ISLAND
RR	RAILROAD
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA

SOBO	SOUTH OF THE BORDER
SR	STATE ROUTE
STEEP	SOCIAL, TECHNOLOGICAL, ECONOMIC, ENVIRONMENTAL & POLITICAL
STIP	STATE TRANSPORTATION IMPROVEMENT PROGRAM
TAC	TECHNICAL ADVISORY COMMITTEE
TI	TRAFFIC INTERCHANGE
TIFIA	TRANSPORTATION INFRASTRUCTURE FINANCE AND INNOVATION ACT
TIGER	TRANSPORTATION INVESTMENT GENERATING ECONOMIC RECOVERY
TN	TENNESSEE
TPTI	TRUCK PLANNING TIME INDEX
TTTI	TRUCK TRAVEL TIME INDEX
TX	TEXAS
UPRR	UNION PACIFIC RAILROAD
US	UNITED STATES
USDOT	UNITED STATES DEPARTMENT OF TRANSPORTATION
UT	UTAH
VA	VIRGINIA
VHT	VEHICLE HOURS TRAVELED
VMT	VEHICLE MILES TRAVELED
VT	VERMONT
WA	WASHINGTON
WI	WISCONSIN
WV	WEST VIRGINIA
WY	WYOMING


ADOT