



Arizona State Rail Plan

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Foreword

The Arizona State Rail Plan is one piece of a larger multimodal planning framework for the State of Arizona. This document presents a series of issues and opportunities relative to the future of rail development in Arizona, including a series of implementation directions and a discussion on funding options. The technical work to support this document can be found in the Statewide Rail Framework Study, part of a broader 40-year multimodal transportation vision for Arizona. This planning process has spanned the last three years, included intense interagency and public involvement efforts, and was recently accepted by the State Transportation Board as part of the Statewide Transportation Planning Framework Program. Additional information and technical reports can be found at:

<http://www.bqaz.gov>

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Abbreviations

AA	Alternatives Analysis
AAR	Association of American Railroads
ACC	Arizona Corporation Commission
ADOT	Arizona Department of Transportation
APA	Apache Railway Company
APS	Arizona Public Service
APSX	APS Cholla Power Plant/Palo Verde Nuclear Generating Station Plant Railroad
AZCR	Arizona Central Railroad
ARRA	American Recovery and Reinvestment Act of 2009
ARZC	Arizona & California Railroad
ASARCO	American Smelting and Refining Company
ATSF	Atchison, Topeka, and Santa Fe Railway
AZCR	Arizona Central Railroad
AZER	Arizona Eastern Railway, Inc.
AGFD	Arizona Game and Fish Department
BIA	Bureau of Indian Affairs
BLKM	Black Mesa & Lake Powell Railroad
BNSF	BNSF Railway
BqAZ	Building a Quality Arizona
BRT	Bus Rapid Transit
CAAG	Central Arizona Association of Governments
CBRY	Copper Basin Railway
CMAQ	Congestion Mitigation and Air Quality Management
CTC	Centralized Traffic Control
CWR	Continuous Welded Rail
DOT	Department of Transportation
DSC	Drake Switching Company
DTC	direct traffic control
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FMPO	Flagstaff Metropolitan Planning Organization
FRA	Federal Railroad Administration
FRAC	Freight and Rail Advisory Council
FTA	Federal Transit Administration
FTZ	foreign trade zone
FXE	Ferromex

GCRX	Grand Canyon Railway
GVGN	Gila Valley Globe and Northern Railway
HSR	High-Speed Rail
HUD	Housing and Urban Development
HURF	Highway User Revenue Fund
ICR	intercity rail
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
KCSM	Kansas City Southern de Mexico
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRTP	State Long Range Transportation Plan
MAA	Magma Arizona Railroad
MAG	Maricopa Association of Governments
MP	Milepost
mph	Miles per hour
MPOs	metropolitan planning organizations
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act
PAG	Pima Associations of Governments
PDOX	Phelps Dodge Morenci Mine Industrial Railroad
PFE	Pacific Fruit Express
POLA/POLB	Ports of Los Angeles/Long Beach
PRIIA	Passenger Rail Investment and Improvement Act
PTC	Positive Train Control
RSIA	Rail Safety Improvement Act
RTA	Regional Transportation Authority
SAFETEA-LU	Safe Accountable, Flexible and Efficient Transportation Equity Act: a Legacy for Users
SMA	San Manuel Arizona Railroad
SP	Southern Pacific
SPSR	San Pedro and Southwestern Railroad
SR	State Route
SRFS	Statewide Rail Framework Study
SRP	Arizona State Rail Plan
STFS	Statewide Transportation Framework Study
TCG	Tucson, Cornelia and Gila Bend Railroad Company
TCIF	Trade Corridor Improvement Fund
TEA-21	Transportation Equity Act for the 21st Century

TEP	Transportation Enhancements Program
TEUs	Twenty Foot Equivalent Units
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIGER	Transportation Investment Generating Economic Recovery
TWC	Track Warrant Control
UPRR	Union Pacific Railroad
USDOT	United States Department of Transportation
USG/YVR	Yuma Valley Railway
VRE	Virginia Railway Express
WHSRA	Western High Speed Rail Alliance
YMPO	Yuma Metropolitan Planning Organization

Glossary of Terms

Alternatives Analysis: Alternatives Analysis focuses on a specific transportation need (or set of needs) in a corridor or subarea, identifies alternative actions to meet these needs, and generates the information necessary to select a preferred project for implementation. These activities are often collectively called “alternatives analysis” and address such issues as potential corridors, corridor characteristics, costs, benefits, environmental and community impacts, and financial feasibility.

Amtrak: Trade name of the National Railroad Passenger Corporation, established in 1971 to take over intercity rail passenger service from private railroads that no longer wished to provide such service.

Branch: A rail track which connects into a railroad trunk line. Rules and instructions pertaining to subdivisions apply on branches.

Class I railroad: As defined by the Association of American Railroads, a railroad with an operating revenue exceeding \$319.3 million per year. The U.S. has seven such railroads, including BNSF and Union Pacific.

CANAMEX: The CANAMEX Trade Corridor, as defined by Congress in the 1995 National Highway Systems Designation Act, is a High Priority Corridor connecting Nogales, Arizona, through Las Vegas, Nevada, to Salt Lake City, Utah, to Idaho Falls, Idaho, to Montana, to Canada.

Class II railroad: These railroads are considered by the Association of American Railroads as “Regional Railroads” and are typically at least 350 miles in length with more than \$40 million in annual operating revenues.

Class III railroad: These railroads are defined as having annual operating revenues of less than \$40 million or are switching/terminal railroads. Class III railroads are typically local short line railroads, serving a very small number of towns or industries. Many Class III railroads were once branch lines of larger railroads that were spun off, or portions of mainlines that had been abandoned.

Classification yard: A railroad yard used to separate railroad cars on to one of several tracks, building new trains in the process. Cars are first taken to a track, called a lead or a drill track, and then sent through a series of switches, called a ladder, to the classification tracks.

Larger yards tend to put the lead on an artificial hill, called a hump, so that gravity may propel the cars through the ladder. There are three types of classification yards: flat-shunted yards, hump yards, and gravity yards.

Commuter rail: Passenger rail service that operates within a metropolitan area—also called metropolitan rail, regional rail or suburban rail—or between two nearby metropolitan areas (e.g., San Francisco and San Jose). Commuter Rail most often connects a central city with its suburbs, and typically operates on track that is part of the general railroad system.

Deep-water port: Has more than one definition; perhaps the most pertinent is a port capable of accommodating the largest freight container ships that can pass through the Panama Canal.

Division: A geographical unit used by railroads to divide their operations for administrative purposes.

Environmental Impact Statement (EIS): As required by Section 102 of the National Environmental Policy Act; a detailed statements assessing the environmental impact of, and alternatives to, major federal actions significantly affecting the environment. Such a statement is called an EIS.

Flyover: A grade-separated crossing of two transportation facilities, where one line is physically elevated over the other. Also called an underpass or overpass.

Fracture zone: Areas of reduced permeability between habitat blocks.

Greenfield corridor: A corridor, to be used for development/transportation projects, whose previous use (if any) was vacant undeveloped land or agriculture.

Habitat block: An area of land that consists of important wildlife habitat and can reasonably be expected to remain wild for at least 50 years. Habitat blocks are primarily comprised of lands within National Forests, National Parks, National Wildlife Refuges, large military reservations, tribal lands, and lands managed by Bureau of Land Management (BLM) or Bureau of Land Reclamation (BLR).

High-speed rail: A mode that provides frequent passenger service between major population centers typically 100 to 600 miles apart, routinely achieves operating speeds of 110 mph or more, and may use shared tracks if equipped with positive train control (PTC) technology. According to the FRA, “service... is time-competitive with air and/or automobile travel in a given intercity corridor.” Top speeds of 125 mph or more generally require completely grade-separated tracks and dedicated right-of-way. The FRA defines three levels of high-speed rail: express (with top speeds of at least 150 mph), regional (with top speeds of 110 to 150), and emerging (with typical speeds of 90 to 110).

Industrial Lead: A relatively short length of privately operated and maintained rail track, originating from a rail line and serving industrial uses.

Inland port: An inland intermodal terminal directly connected by road or rail to a seaport, and operating as a center for the transshipment of sea cargo to inland destinations. In addition to its role in cargo transshipment, it may contain facilities for storage and consolidation of goods, maintenance for road or rail cargo carriers, customs clearance services. An inland port may also be located in a foreign trade zone (FTZ) that contains adjacent land beyond the inland port, often encompassing manufacturing facilities located in close proximity to the port to take advantage of its intermodal transportation benefits.

Intercity rail: Refers to rail passenger service connecting cities approximately 100 miles or more apart. In the U.S., top speeds may range from 79 mph to approximately 90 mph. It generally operates on track shared with freight trains, commuter rail or both.

Intermodal: Refers to the movement of freight by more than one mode of transportation. The railroad industry applies the term to container and trailer on flat car transportation only.

Linkage zone: A portion or subset of the fracture zone or habitat block identified as an area critical to wildlife movement.

Mainline: A railroad’s principal trunk route between two

points; it usually has sidings, spurs, and yards at a number of locations to serve customers, and to hold freight cars.

Metropolitan area (formally, Metropolitan Statistical Area or MSA): An area that contains at least one urbanized area of 50,000 or more inhabitants. An MSA “central county” has at least 50 percent of its population residing in urban areas of 10,000 or more population, or contains 5,000 or more people living in a single urban area of at least 10,000. An MSA “outlying county” has at least 25 percent of its employed residents working in the central county or counties of the MSA, or has at least 25 percent of its employment accounted for by workers who reside in the central county or counties.

Panamax: Refers to large ships that currently do not fit through the Panama Canal (carrying over 5,000 twenty thousand-foot equivalent units [TEUs]), until completion of the canal’s lock expansion project which will accommodate cargo capacity up to 13,000 TEUs.

Positive Train Control (PTC): Refers to technology that can prevent train-to-train collisions, overspeed derailments, and casualties or injuries to railway workers operating within their limits of authority as a result of unauthorized incursion by a train. PTC can also prevent train movements through a switch left in the wrong position. PTC systems vary widely in complexity and sophistication, based on their level of automation, the system architecture, the wayside system on which they are based (e.g., non-signaled, block signal, cab signal), and the degree of train control they can assume. The federal Rail Safety Improvement Act of 2008 mandates the widespread installation of PTC systems by December 2015.

Quiet zone: A segment of track, typically in an urbanized area, in which an agreement between local government and the railroad removes the requirement of sounding train whistles or horns, at least during specified hours. In return, the local jurisdiction may pay for and install additional safety measures, such as grade-separated road crossings or four-quadrant gates to enhance safety.

Section 130: An FHWA-administered program that provides funding to states for use in highway-rail grade crossing safety improvement projects.

Section 403(b): As part of the National Railroad Passenger Service Act of 1970, federal Amtrak legislation allows under Section 403(b) for a state or states to apply to Amtrak to establish rail service within their state(s) if they agree to pay at least 45 percent of the first year operating costs and 65 percent in the years thereafter.

Short line railroad: As defined by the Association of American Railroads (AAR), short lines consist of (1) line-haul railroads operating less than 350 miles of road and earning less than \$40 million of annual operating revenue, and (2) switching and terminal railroads, which are either jointly owned by two railroads for the purpose of transferring cars between railroads, or operate solely within a facility or group of facilities.

Subdivision: A railroad division may be divided into a number of subdivisions for ease of operations.

Switch: As a noun, refers to track equipment that allows cars to move, or cross over, from one track to another. The verb refers to shuffling or moving rail cars, usually within a yard (also called marshaling).

Team Track: A rail siding for general usage by freight shippers, named for the teams of horses that once pulled the wagons to fetch the freight.

Trackage rights: An agreement between two railroads whereby one buys the right to run its trains on the tracks of the other.

Train spot: To switch a freight car to a specific location, usually for loading or unloading.

Transit-oriented development (TOD): A specialized case of mixed-use, moderate-to-high-density development that is located within walking distance of a fixed guideway transit stop. The proximity to fixed guideway transit allows for reduced parking requirements; the mixed-use aspect encourages a reduced demand for trips by bringing housing, jobs, community facilities, and goods and services close together so that the need for travel beyond the immediate vicinity is less than in typical developments. TOD developments typically emphasize walkable streetscapes, moderate to high density housing, office, and supporting retail, focused public spaces, and integrated design that offer the ambience of traditional

neighborhoods.

Transloading: The transfer of a shipment from one mode of transportation to another.

Value-added: The enhancement added to a product or service by a company before the product is offered to customers.

Wye: A triangular shaped arrangement of railway tracks with a switch at each corner. In mainline railroads, this is used at a railway junction, where two railways join, or cross over. It can also be used as a stub for turning railway equipment. By performing the railway equivalent of a three-point turn, the direction of a locomotive or railway vehicle can be reversed.

Yard: A system of tracks, other than main tracks and sidings, used for making up trains, storing cars or other purposes.

Yard limits: A portion of main track designated by yard limit signs and by timetable, train order Form T or track bulletin, which trains and engines may use.

CHAPTER 1. INTRODUCTION AND OVERVIEW

Arizona has experienced several decades of extraordinary growth, and during that time has built modern, vibrant cities and towns. These cities are built on a foundation of well-planned freeway networks integrated into an extensive roadway system generally organized in a grid pattern that has supported a vehicle dominated transportation system throughout the State. The land use patterns which have developed from these decades of growth has tended to be characterized as suburban development with large, single family home subdivisions separated from commercial and employment centers.

The latest economic downturn has vividly demonstrated that unfocused growth is not the path to stable long-term prosperity. Like all Sunbelt states, Arizona is confronting a serious recession and is faced with limited funding for transportation infrastructure. Transportation investments over the next several decades must be strategically utilized to leverage the maximum economic benefits for the State of Arizona. Investment in rail infrastructure has been demonstrated to provide economic stimulation during the implementation phase, and maximizes benefits through direct linkages with private land development along rail corridors once constructed. This can foster urgent job growth needed for the state to navigate a successful recovery from the current economic conditions.

The highly connected grid of highways and local streets which currently exist in the state represent the first half of an efficient multi-modal transportation system which will support the emerging Sun Corridor Megapolitan, and expanding rural areas. The second half of the system is envisioned to be an integrated transit system designed in harmony with the roadway system, and will include intercity passenger rail, commuter rail, high capacity bus rapid transit, light rail, and street car systems. These multi-modal transportation components will expand the new development models emerging within the state. These new approaches integrate horizontal and vertical mixes of land uses with higher density residential sites, including a wide variety of multi-family building types.

In order to economically compete globally the State will need to provide educated workers, sufficient capital to fund research and entrepreneurs, while nurturing promising new homegrown companies. The recession has awakened a sense of urgency to restructure the economy of our State to attract a more sustainable mix of industries and the jobs they offer. A key cornerstone for creating a sustainable economy is an efficient multi-modal transportation system which can support an additional six million people in Arizona within the next 50 years. A multi-modal transportation system which includes a strong rail component can help to promote a compact land use development pattern in the State of Arizona that could have the following benefits;

1. Save over 800 square miles of open desert and agricultural lands from development
2. Eliminate the need for as many as 30 million miles of driving each day, reducing the amount of greenhouse gas emissions and our reliance on foreign energy sources
3. Provide an estimated savings of over \$10 B in transportation capital costs, as opposed to an auto-dominated transportation system.

Arizona's economy needs an efficient and competitive rail network. A healthy rail network must provide a reliable, accessible, and cost effective service to shippers and customers across the State. In addition, a fast, frequent and reliable passenger rail service between population centers and tourist destinations that is competitive with automobile and air travel times, is important to the State's economic and environmental well-being.

1.1 Purpose of the Arizona Rail Plan

In the next 20 years, the State of Arizona will face great challenges in managing and developing its transportation system. With a rapidly growing population and expanding business sector, the transportation network will have to accommodate significant increases in passenger and freight movements.

The reality is that much of this demand will stress an already overburdened highway system, and investment in Arizona's rail system may provide some relief to future highway congestion. There is an opportunity to divert passenger and freight demand from highway facilities to the rail network. Through collaborative planning, Arizona can build a rail system that will move people and goods in a safer, sustainable, and in a cost effective way.

The Arizona State Rail Plan (SRP) is the first comprehensive assessment of the State's rail needs and was initiated in response to the increasing involvement by the Arizona Department of Transportation (ADOT) in freight and passenger rail issues. The SRP serves to identify the current rail system, determine infrastructure needs, and to have rail projects included in the State's long-range planning processes to improve regional and statewide safety and mobility. The principle purpose is to convey the magnitude of rail needs in the State and set forth a policy framework through which strategic actions can be taken to realize the full potential of passenger and freight rail transportation.

1.2 History of Railroads in Arizona

Railroads came to Arizona in the late 1800s and had a profound influence on the development of the State. The cornerstones of early Arizona commerce (cattle, citrus, copper, climate and cotton) would not have been possible without the transportation provided by the railroad industry.

Before the railroad reached Yuma, practically all of the supplies for the State were shipped by steamer from San Francisco down the coast, around Lower California and up the Sea of Cortez to Port Isabel, where the cargoes were shifted to light draft stern-wheel boats, and the journey continued up the Colorado River to points in Arizona. Most of this river traffic was carried by the Colorado River Steamer Navigation Company, which was purchased by the Southern Pacific in 1877.

In July 1866, Congress passed a law incorporating the Atlantic and Pacific Railroad, the company was given the mission to build near the 35th parallel from Springfield, Missouri west to the Pacific. In exchange for its completion,

the railroad would receive land grants along its route. In 1880, the Atlantic and Pacific Railroad began laying track westward from Albuquerque on its way to California. On August 1, 1882 the railroad reached Flagstaff, and was completed across the State in August 1883. At the time of its completion the Atlantic and Pacific Railroad was a subsidiary of the Atchison, Topeka, and Santa Fe Railway (ATSF). The 209-mile 'Peavine', that connects Williams Junction to Phoenix through Wickenburg, was originally built in 1893-1895 by ATSF, and originally provided service to Prescott. The Peavine has had no passenger trains since 1969, and the Prescott Branch was abandoned in the 1980s. However, the current alignment through Skull Valley is a major freight rail connection between Phoenix and the Transcon Corridor.

The Territorial Act of 1877 called for another main line route to enter into southern Arizona at Yuma, and continue eastward across the southern part of the State into New Mexico at Lordsburg. Southern Pacific (SP) was given the charter for constructing the southern route. By 1879, SP's operations extended from Yuma to Maricopa Wells and later that same year to Tucson. It was another three years before service was opened to Lordsburg. In the early 1900s, the other segments of the historic Southern Pacific system (Phoenix Loop, Nogales, Douglas, Globe, Hayden and Clifton lines) were added. Most of the significant railroading activities occurred at the end of the 19th and the first half of the 20th Century. Few rail development activities occurred in the second half of the 20th Century. The construction of the interstate and defense highways and the increased regulation of railroads, made the automobile the preferred choice for personal mobility and increased the trucking industry's share of freight movements.

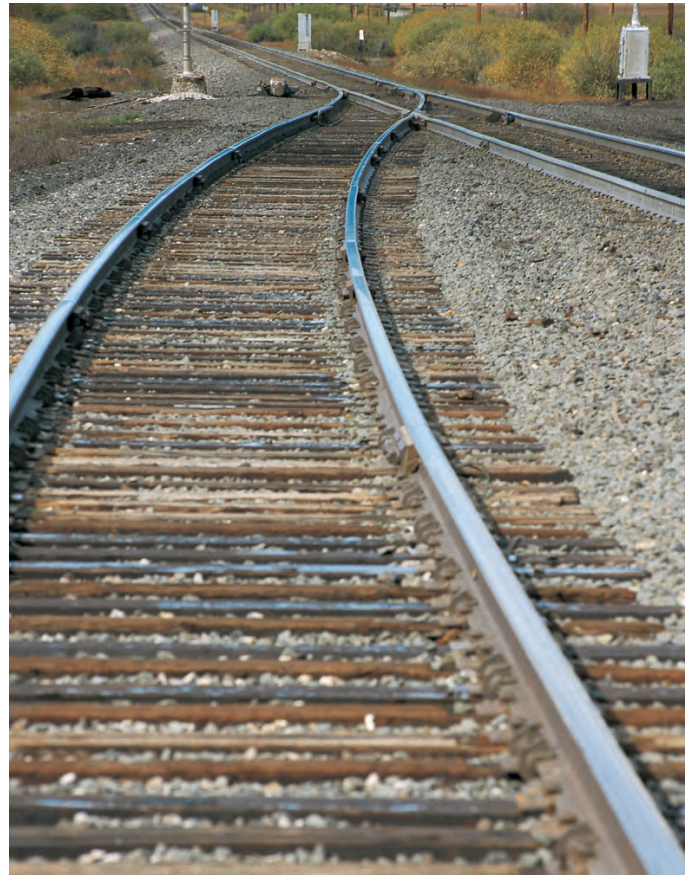
The Staggers Rail Act of 1980 is a federal law that deregulated the American railroad industry to a significant extent, and replaced the regulatory structure that existed since the 1887 Interstate Commerce Act. Deregulation provided for the rebirth of railroads by reversing the historic loss of traffic to the trucking industry, and increasing railroad industry profits.

Today, the Arizona rail network provides an important link to the national system. The two Class I railroads in

Arizona, BNSF Railway Company (BNSF) and Union Pacific Railroad (UPRR), facilitate the coast-to-coast movement of various commodities. The two Class I railroads are the result of mergers between the Burlington Northern Railroad and the ATSF, and another merger of SP and UPRR. BNSF, created in 1995, operates 33,500 route miles in 28 states and 2 Canadian provinces. The UP-SP merger occurred in 1996 and the railroad now operates 36,000 miles in 23 states. These railroads provide a “rail-bridge” between California and Midwestern industrial and distribution areas.

In addition, thirteen active regional and short line railroads are located in Arizona. Many serve the natural resource industries, such as mining for which they were originally constructed. These Arizona railroads are addressed more extensively in the following sections of this document.

Until the early 1970s, the two Class I carriers provided passenger as well as freight service in Arizona. Amtrak was created in 1970 via the federal act titled ‘Rail Passenger Service Act’, and began service on May 1, 1971. Currently, Amtrak operations through Arizona are part of a long-distance, coast-to-coast service which follows the two Class I carrier mainlines through northern and southern Arizona, and represent the existing intercity rail service for the State. In the late 1980s, the tourist railroad industry began operating in Arizona. Currently, Arizona has three tourist railroads.



“The time will come when people will travel in stages moved by steam engines from one city to another, almost as fast as birds can fly. A carriage will start from Washington in the morning, the passengers will breakfast at Baltimore, and supper in New York in the same day.” - Oliver Evans, 1800.

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CHAPTER 2. ARIZONA RAIL

VISION, GOALS AND OBJECTIVES

2.1 A Vision of Rail Transportation in 2030

A safe, secure, efficient and cost-effective passenger and freight rail network forms an integral part of Arizona's multimodal transportation system. Arizona railroads promote economic opportunities and environmental sustainability that reflect the high value Arizonans place on their unique southwestern lifestyle.

Intercity passenger rail, a new and reliable mode for Arizonans, is well connected to commuter rail and local transit systems. Through coordinated land use decisions and wise investments in multimodal facilities, the State is now a showpiece of compact sustainable growth patterns served by an efficient and seamless transit system. Passenger rail has competitive travel times and is the preferred option for many trips both locally and regionally.

The State has a freight rail system that carries long-distance cargo in an energy-efficient manner, with intermodal connections that permit seamless distribution of local deliveries. A robust economy including a greater proportion of manufacturing and entrepreneurship industries is served by a freight system comprised of both Class I railroads and short line operations.

The Sun Corridor has become a model megapolitan within the United States; the focused growth patterns have preserved much of the desert environment and promoted a lifestyle emulated by the rest of the country. The multi-modal transportation system supporting the state has proven to be a key cornerstone of achieving an economy which supports all walks of life and has attracted employers to the state in new and exciting industries.

2.2 Goals and Objectives

Goal I: Improve mobility and accessibility, create a multi-modal transportation system where the existing roadway network is complimented by efficient passenger and freight rail service.



Objectives:

- Develop safe, reliable and affordable transportation choices that strive to reduce highway congestion, and leverage additional capacity on the State's transportation system.
- Become a catalyst for smart growth community planning that includes multimodal connections and choices, transit oriented development, and economic growth opportunities.
- Improve the efficiency of passenger and freight movements within the State, in partnership with private carriers.

Goal II: Support economic growth, create a passenger rail network which fosters more livable communities that attract new employers to the State, and help enhance the State's global competitive position through strategic freight rail initiatives.



Objectives:

- Support regional, tribal and local economic development plans, priorities, goals, and objectives.
- Support growth of traditional and non-traditional rail-related and rail-supported industries to increase global competitiveness.
- Improve economic competitiveness through reliable and timely access to passenger rail connections between economic and employment centers.

Goal III: Promote sustainable transportation and land use coordination, develop a multi-modal transportation system that enables a compact mixed use development pattern which becomes a sustainable method for accommodating a growing population.



Objectives:

- Improve Arizona's sustainability through coordination of rail transportation, land use, and economic development planning activities.
- Encourage land use patterns connected by multiple modes of travel that support rail and transit access and encourage pedestrian mobility, reduce energy consumption and green house gas emissions, improve air quality and promote public health.
- Foster collaboration between federal, State, regional and local public agencies to plan a seamless multimodal transportation system.

- Planning efforts related to new rail corridors or improvements to existing corridors should be coordinated with local land use plans and the State Land Department conceptual plans to help promote rail as a community asset.

Goal IV: Preserve the environment, natural and cultural resources, move passengers and freight in a socially and environmentally responsible manner which will promote preservation of the State's natural environment.



Objectives:

- Provide seamless and energy-efficient intermodal rail connections from origin to destination.
- Avoid degradation of existing environmental resources, wildlife habitat blocks and movement corridors, and equitably mitigate impacts.
- Protect and maintain wildlife movement corridors.
- Promote rail as an environmentally friendly and sustainable alternative to other modes of travel.

Goal V: Provide safety and security; protect people, cargo, and infrastructure.



Objectives:

- Enhance the safety of passenger movements and connections between major activity hubs within the State and to the national passenger rail system.
- Strengthen the security of freight movements.
- Provide parallel or alternative transportation routes and services to facilitate emergency access, including evacuation.
- Promote energy security by reducing the state's reliance on petroleum products, particularly from foreign sources.

2.3 Benefits of Rail for Arizona

Arizona's railroads have historically played a crucial role in the State's transportation system, and continue to do so today. Passenger rail service, although mostly serving tourists today, could provide an alternative mode of travel for Arizonans in the future, and may help focus growth to achieve more sustainable development patterns enhancing the livability choices within Arizona communities. Commuter rail, conventional intercity rail, and ultimately high-speed rail will all have roles to play in Arizona's multimodal transportation system.

Strategic investments in railroad facilities, related industries and ancillary services can also open new opportunities for economic growth and development. Moving freight by rail is more energy efficient as compared to other modes of travel, and in most cases is at a reduced cost. Capturing a larger proportion of future freight movements on the rail system can help promote a more sustainable economy for Arizona.

Investment in passenger and freight rail infrastructure has been demonstrated to provide economic stimulation. The State will benefit from the engineering and construction activities required to implement improvements to the rail system, and

once implemented an efficient rail system will attract corporations and manufacturing industries needed to create a sustainable economy for the future.

2.3.1 Congestion Mitigation

During 2006, railroads carried freight equivalent to more than 12 million truckloads across the country. A typical 100-car containerized unit train is equivalent to approximately 385 freight trucks on the State's highways. Planning for greater freight movements on railroads along multimodal corridors can reduce the cost of maintaining existing roads and the pressure to build costly new ones. Freight rail avoids additional overcrowding on highways, making roads safer and promoting economic growth.

Class I railroad lines run parallel to most major Interstate highways in the State, such as I-8, I-10, I-19 and I-40. These corridors represent multi-modal thoroughfares providing freight movements by rail and truck, and passenger movements by intercity rail, bus and personal vehicles. In general, a class I mainline has an approximate capacity of 216 million annual tons. Assuming rail operations on each mainline at full capacity, the class I railroads in Arizona could move the equivalent of approximately 8.3 million truckloads annually or 23,000 daily. Table 1 compares the capacity of the three principal freight transportation modes in Arizona.

Table 1 - Capacity Comparison for Freight Transportation Modes

Vehicle	Truckloads	Boeing 747 Cargo Aircraft	100-Car Containerized Train
Average Capacity (Tons)	26	124	10,000
Equivalent Truck Units	1	5	385

Source: AECOM 2010

2.3.2 Economic Benefit

Passenger rail can work as a catalyst for more sustainable land use by focusing growth surrounding multimodal transportation nodes while providing cost savings and efficiency gains. Indirect benefits include congestion

reduction, infrastructure cost savings, consumer savings, reduced crash damage, improved air quality and public health. These economic savings and efficiency benefits filter through the economy as savings to consumers, businesses and governments, making a region more sustainable and competitive (Source: Victoria Transport Policy Institute. 2009. Rail Transit in America: A Comprehensive Evaluation of Benefits). Passenger rail can boost the economy by creating direct and indirect jobs, and spur economic growth by making travel between major cities easier.

The economic benefits of rail begin with direct job creation in construction of the rail facilities, while economic growth surrounding a freight distribution center or passenger station create indirect jobs, and finally there are benefits to the broader economy.

Rail facilities require vast amounts of labor to create, from professional services to pouring of concrete and laying of rails. The biggest source of job creation is in the actual construction of the rail system. At the peak of construction the Channel Tunnel, linking England and France together, employed over 10,000 workers just on the English side of the project. Hong Kong's high speed rail line is projected to create over 5000 jobs during construction and another 10,000 during the operation phase.

Passenger Rail station locations bring with them the potential for economic development serving as an attractive location for stores and offices. A passenger rail

station is envisioned to raise property values in the near vicinity, by creating a bustling and economically vibrant part of a community.

Freight distribution centers attract rail served companies which tend to employ large numbers of people in manufacturing and fabrication industries. Arizona's vision of a new economy including a vibrant renewable energy sector, aerospace and defense, and technology can provide numerous industrial opportunities which would be attracted to efficient rail service.

Recent research suggests that the non-transportation economic benefits of rail investments are as important as the transportation benefits received from construction of the system. Passenger rail and other rail investments put more people and businesses in closer connection to one another with potentially significant gains in productivity. Economists have long studied the gain in productivity that result from concentrations of industries or people, which shows that industries benefit in many ways from locating near other similar businesses, which is envisioned surrounding freight rail logistic centers or transit nodes.

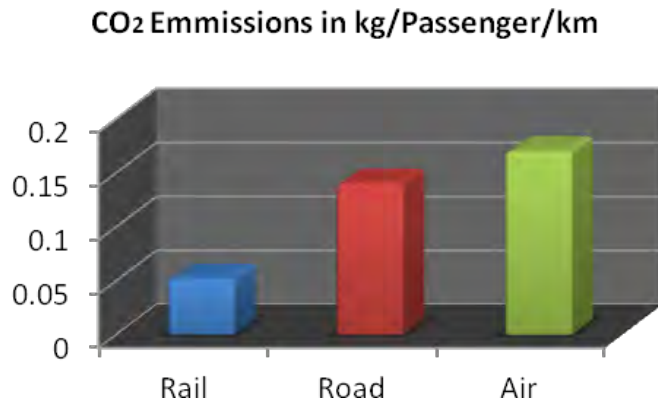
2.3.3 Air Quality

Of all modes of transportation, railroads cause the least air pollution per unit of freight carried which can reduce the amount of green house gas emissions within the state and improve public health. Aircraft take-offs and landings require a large amount of fuel, producing high emissions of CO₂ per passenger. A train uses up to 70 percent less energy and causes up to 85 percent less air pollution than a jet aircraft. Intercity trains provide similar benefits to the environment compared to the equivalent journey by automobile (Figure 1).

The U.S. Environmental Protection Agency (EPA) estimates that for every ton-mile carried, a typical truck emits roughly three times more nitrogen oxides and particulates than a locomotive. The emissions from a jet aircraft are even higher.

In 1812, Colonel John Stevens published a pamphlet about the superiority of railways and steam carriages over canal navigation and stated that he could "see nothing to hinder a steam carriage moving on its way with a velocity of 100 miles an hour."

Figure 1 - Carbon Dioxide Emissions by Transportation Mode



Source: Californians for High Speed Rail

The two major international airports in the State, Phoenix Sky Harbor International and Tucson International, face capacity expansion challenges as Arizona grows. The Phoenix-Mesa Gateway Airport is emerging as a regional airport that will ease the congestion at Phoenix Sky Harbor. New airports typically involve high capital costs, and complicated processes for clearances and approval. Rail can provide an environmentally cleaner option for movement of both freight and passenger traffic, while reducing the pressure on available aviation infrastructure.

2.3.4 Land Use

Passenger railroads tend to attract compact development near destinations that they serve. This can lead to a reduction in combined transportation and housing costs in urban and rural areas, which tend to provide location efficiency benefits, more efficient public infrastructure, and improved multimodal accessibility. Rail can act as a catalyst for redevelopment and infill that promotes pedestrian mobility and help reduce automobile traffic volumes in focused growth areas by limiting sprawl development patterns.

In communities across the State, scattered development is resulting in increased traffic and increased transportation needs, diminished local resources and reduction in the amount of open spaces. Development of rail can support communities that wish to offer diverse transportation and mobility options, supporting livable choices and

a better quality of life. Transit oriented development patterns include pedestrian activity as the highest priority with a train station as a prominent feature of the community center. This land use pattern would include high density development within a 10 minute walk circle around a multimodal node including a mixture of office, residential, retail, and civic opportunities to provide a healthy and sustainable transportation system.

2.3.5 Sustainability

As the State of Arizona continues to grow in population there will be a need for urban and rural communities to expand their existing transportation systems to support the expanded population. There is a desire to use transportation infrastructure as a tool to focus growth and plan for more sustainable built communities that incorporate all transportation modes. The rail system within Arizona can contribute to a multimodal transportation system that connects population and employment centers and more efficiently distributes freight within the state and beyond.

Nationally, the HUD, DOT, and EPA Interagency Partnership for Sustainable Communities have been formed to coordinate federal housing, transportation, and other infrastructure investments to protect the environment, promote equitable affordable development, and increase transportation choices. This newfound partnership will help guide the distribution of federal grants sponsored by HUD, DOT, and EPA in the near future. Planning for a sustainable transportation and land use choices will enhance Arizona's competitive position for a share of this federal funding.

An efficient passenger and freight rail system will encourage infill development and revitalization of existing communities which promotes focused growth patterns surrounding multimodal transportation nodes. This change in development patterns can create location efficiencies within Arizona communities by providing a higher concentration of mixed use development which allow people to work and play within the same neighborhoods which they reside.

The overall benefit of using transportation as a tool to focus growth is a reduction in the number of trips and improved location efficiency. This will alleviate traffic congestion on the state's highway system, and contribute to more livable communities which promote context sensitive solutions that help to preserve the natural environment.

Compact neighborhoods with walkable streets, access to rail transit, a wide variety of commercial development and employment have high location efficiency. They require less time, money, and green house gas emissions to meet everyday travel requirements. Transportation costs can consume over 30% of total household income for inefficient locations, compared to about 15% of household income in location efficient communities. By reducing the transportation costs, citizens can save a larger portion of their income which can be used to enjoy the benefits of living in the State of Arizona, while reducing the amount of greenhouse gas emissions, and lowering overall costs of construction and maintaining transportation infrastructure.

2.3.6 Energy Consumption

Trains are three times more fuel-efficient than trucks, and in the past 25 years freight trains have increased their fuel efficiency by 80 percent. Because of a train's greater fuel efficiency, shifting just 10 percent of long-haul freight from trucks to rail would reduce fuel consumption in the U.S. by more than one billion gallons a year reducing reliance on petroleum products and enhancing national security.

Rail provides a cost-effective and efficient mode of transportation (Table 2) for moving large quantities of

freight over long distances. Freight rail is convenient for many industries, especially where it provides point-to-point delivery of cargo, often for half the cost of shipping by truck.

Table 2 - Comparison of the Relative Efficiencies

Mode	Fuel Consumption	Infrastructure Capacity	Cost (to users)	Crash History
Railroad	455 ton-miles per gallon	216 million annual tons per mainline track	2.7 cents per ton-mile	0.61 fatalities per billion ton-miles; 12.4 incidents* per billion ton-miles
Truck	105 ton-miles per gallon	37.8 million annual tons per lane	5.0 cents per ton-mile	1.45 fatalities per billion ton-miles; 36.4 incidents per billion ton-miles

* Incidents include all non-fatal injuries and property damage accidents.

Source: Brown, T.A. and A.B. Hatch (2002), "The Value of Rail Intermodal to the U.S. Economy," 29H28H28Hhttp://www.aar.org/pubcommon/documents/govt/brown.pdf

2.4 Existing and Potential Rail Traffic

2.4.1 Commodity Flows

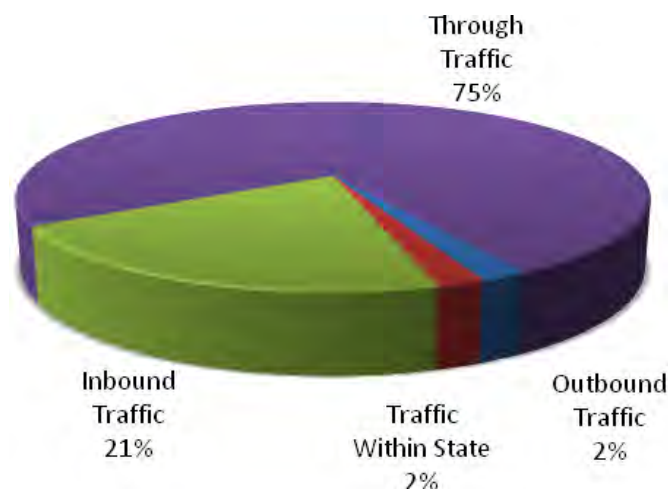
A review of 2005 and forecasted 2050 rail traffic forecasts clearly shows that most of the rail traffic passes through the State with only about one-fifth of the total traffic destined for Arizona (Figures 2 to 4). Outbound rail traffic accounts for only two percent indicating the gross mismatch between inbound and outbound freight on rail. The State lacks a strong manufacturing industry base, resulting in lost opportunity for balanced freight exports and a diverse economy. Currently most freight trains going out of the Phoenix metropolitan area carry only waste and scrap metal.

The State can take the opportunity to develop a mix of industries to strengthen the State economy, generate employment opportunities, and increase outbound commodity flows in order to make the most efficient use of existing freight rail infrastructure.

The highest percentage of inbound rail traffic originates in New Mexico. In addition to New Mexico; Texas, California, Wyoming, and Iowa are the other top origin states for rail traffic to Arizona, with coal and building materials representing the highest percentage of inbound product.

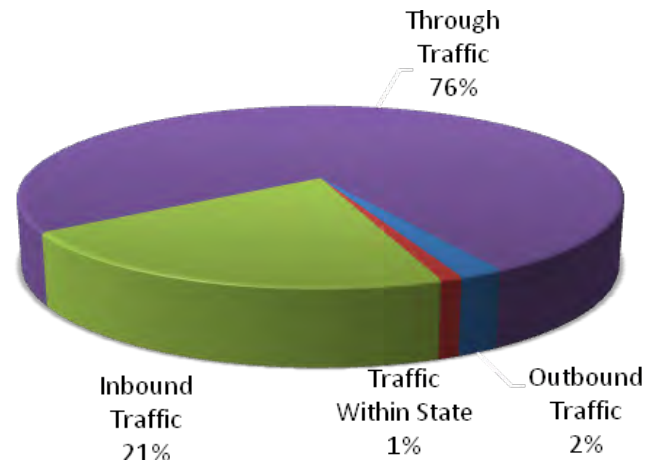
Waste or Scrap Metals represented 26 percent of commodities flowing out of Arizona in 2005. Primary metal products; or stone products; farm products; and chemicals were the other top commodities flowing via rail out of Arizona.

Figure 2 - 2005 Distribution of Rail Traffic in Arizona (by weight)



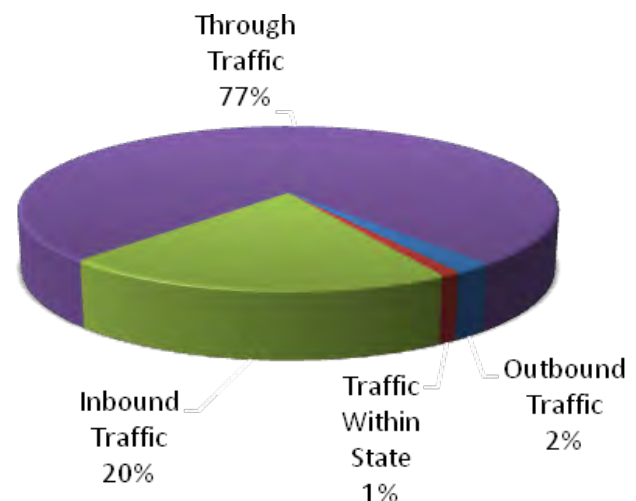
Source: ADOT. 2007. Arizona Multimodal Freight Analysis Study, Technical Memorandum #1: Analysis of Freight Dependent Industries.

Figure 3 - 2030 Distribution of Rail Traffic in Arizona (by weight)



Source: ADOT. 2007. Arizona Multimodal Freight Analysis Study, Technical Memorandum #1: Analysis of Freight Dependent Industries.

Figure 4 - 2050 Distribution of Rail Traffic in Arizona (by weight)



Source: ADOT. 2007. Arizona Multimodal Freight Analysis Study, Technical Memorandum #1: Analysis of Freight Dependent Industries.

2.4.2 Freight Demand (2030 & 2050)

The rail forecasts have been developed based on data for years 2005, 2010, 2020, and 2030 provided by TRANSEARCH. Values for all years are in 2005 constant dollars. Freight demand forecasts are based on a similar industrial composition in the future.

Distribution of Rail Traffic

Freight traffic is expected to grow significantly by 2030 and 2050. However, the percentage share of inbound, outbound, and through traffic is not expected to change. Figures 3 and Figure 4 illustrate the projected directional distribution of rail freight for the years 2030 and 2050. The data show that directional distribution of rail freight will generally be the same as in 2005, unless capacity expansions are completed that allow for a redistribution of freight flows. In 2030, 76 percent of rail traffic will travel through Arizona, rising slightly to 77 percent in 2050. Inbound traffic will decrease from 21 percent in 2005 and 2030 to 20 percent in 2050. Intrastate and outbound percentages will also change only slightly.

Regular upgrades will have to be made to the State's rail infrastructure to keep up with the growing demand for freight rail. Freight rail will also continue to function inefficiently with inbound freight far exceeding the outbound freight volumes.

Inbound Rail Freight

Inbound rail freight is projected to double by 2030 and triple by 2050. Coal and petroleum will make up more than half of the inbound shipments, with coal primarily coming from New Mexico and Wyoming in carload unit trains.

Figure 5 illustrates the expected growth in inbound intermodal rail traffic (Intermodal freight uses different modes of conveyance in conjunction, such as ships, aircraft, trucks, etc).

Figure 5 - Inbound Rail Traffic – Intermodal



Source: ADOT. 2008. Statewide Rail Framework Study, Technical Report #2: Economic Analysis of Rail Freight and Passenger Rail Demand Forecasts.

Outbound Rail Freight

Outbound traffic is a minor portion of rail freight, with less than three million tons in the base year (2005). Primary metal products (copper) and freight of all kinds/mixed shipments account for half of the commodity value. Most of this rail traffic is low value and is shipped in carload units. The rail shipments of empty containers occur due to the imbalance of inbound rail freight over outbound. Figure 6 illustrates the expected growth in outbound intermodal rail traffic.

Figure 6 - Outbound Rail Traffic – Intermodal



Source: ADOT. 2008. Statewide Rail Framework Study, Technical Report #2: Economic Analysis of Rail Freight and Passenger Rail Demand Forecasts.

Through Rail Freight

Through traffic will remain the dominant rail freight flow, representing over 75 percent of rail movements in Arizona. Most of the through traffic includes either a California origin or destination, indicating the dominance of the ports of Los Angeles/Long Beach (POLA/POLB) with regard to containerized freight between the U.S. and Asia.

Intermodal freight currently makes up approximately 70 percent of through rail tonnage, and is projected to grow to about 80 percent by 2050. Figure 7 illustrates the expected growth in intermodal through rail traffic.

Figure 7 - Through Rail Traffic – Intermodal



Source: ADOT. 2008. Statewide Rail Framework Study, Technical Report #2: Economic Analysis of Rail Freight and Passenger Rail Demand Forecasts.

Long-Range Economic Vision of Arizona and Impact on Freight Movement

If Arizona achieves the growth expected to occur in the core Sun Corridor Megapolitan region, the State's economy will undergo massive expansion. Although forecasts are not available for individual sectors where employment growth will occur, on a preliminary basis the six major sectors which are being targeted for growth in the State are:

- Microelectronics industry
- Medical/biotechnology industry

- Aerospace and military support industries
- Renewable energy industry
- Global transportation logistics industry
- Niche agricultural industry

Almost 75 percent of employment growth will occur in the Sun Corridor Megapolitan. Some of the industrial sectors highlighted above, such as the aerospace/military support and renewable energy industries, can take advantage of available freight rail infrastructure. Attracting these industries to the State will provide an additional market for freight rail. Industrial growth will result in new demand for office and residential building space and lead to more substantial urban development surrounding these industrial areas.

Passenger Demand

Passenger rail service in Arizona is currently limited to Amtrak's Southwest Chief and Sunset Limited/Texas Eagle trains, which connect Chicago and New Orleans to Los Angeles, and three tourist trains – Grand Canyon, Verde Canyon and Copper Spike.

This section describes the existing passenger rail services in Arizona, and 2050 passenger demand estimates for potential Arizona passenger rail corridors. Other rail systems such as the Phoenix Metro Light Rail and Tucson Streetcar are not itemized in this report and are part of local transit programs.

Existing Passenger Rail in Arizona

Two Amtrak long-distance trains currently serve Arizona: the Southwest Chief and Sunset Limited/Texas Eagle. Both trains are designed to serve long distance, overnight markets and do not serve Arizona during optimal times of day. While the Sunset Limited/Texas Eagle is described to provide service between the Phoenix and Tucson metropolitan areas, it operates during late night hours, and the "Phoenix" station is located in Maricopa, about 35 miles south of downtown Phoenix limiting the attractiveness of intercity travel.

2050 Passenger Demand Forecasts

Passenger rail forecasts were developed for both intercity rail service and commuter rail service on the following segments:

- Intercity rail
 - Phoenix–Tucson
 - Phoenix–Yuma
 - Tucson–Nogales
 - Phoenix–Flagstaff–Winslow
 - Phoenix–Los Angeles
 - Phoenix–San Diego
 - Phoenix–Las Vegas
- Commuter rail
 - Metropolitan Phoenix (Maricopa Association of Governments [MAG] region, with possible Pinal County extension)
 - Metropolitan Tucson (Pima Association of Governments [PAG] region)
 - Metropolitan Flagstaff

Intercity Passenger Rail

2050 Intercity Rail Passenger Estimates

One of the key determinants of ridership is the population served by a rail corridor. For this study, the potential market was defined by population within 25 miles of potential rail stations along a corridor. Past experience in providing ridership and revenue support to Amtrak and in completing other intercity rail studies has shown this to be a good measure of market size, and thus a predictor of rail ridership potential.

Table 3 - Summary of Population Served by Potential Rail Passenger Corridors in 2050

Route	2008 Population (in thousands)	2050 Population (in thousands)		
		Low	Baseline	High
Phoenix-Tucson	4,661	9,010	10,087	11,186
Phoenix-Yuma	3,658	6,341	7,102	7,879
Tucson-Nogales	874	1,585	1,775	1,969
Phoenix-Flagstaff-Winslow	3,950	7,160	8,018	8,893
Phoenix-Los Angeles	16,374	22,775	27,621	32,582
Phoenix-San Diego	6,152	9,835	11,407	13,014
Phoenix-Las Vegas	5,598	10,758	12,503	14,299

Source: ADOT Statewide Rail Framework Study, 2010

Comparable Intercity Rail Passenger Corridors

In order to confirm ridership estimates for corridors without existing forecasts, it is helpful to compare similar corridors and consider ridership, corridor population, corridor length, and service frequency associated with existing rail passenger corridors.

Table 4 provides a summary of the comparable corridors. The corridors represent a wide range of length, service frequency, population served, and regions of the country.

Based on demand forecasts, the Phoenix-Los Angeles and Phoenix-Tucson corridors offer the highest ridership potential

Table 4 - Summary of Comparable Amtrak Service

Amtrak Service	Endpoint Markets	2008 Annual Ridership (in thousands)	Length (miles)	Weekday Round Trips	2008 Population (in thousands)
Downeaster	Boston-Portland	474	116	5	5,472
Lincoln Service	Chicago-St. Louis	544	284	5	5,957
Hiawatha	Chicago-Milwaukee	750	86	7	2,642
Wolverine	Chicago-Detroit-Pontiac	472	304	3	8,049
Pacific Surfliner	Los Angeles-San Diego	2,085	129	11	16,852
Cascades	Seattle-Portland	500	186	5	5,887
Capitols	Oakland-Sacramento	1,163	90	16	6,426
Missouri River Runner	Kansas City-St. Louis	152	283	2	4,748
Piedmont	Raleigh-Charlotte	132	173	2	4,632
Keystone	Philadelphia-Harrisburg	849	104	13	7,155

Source: ADOT Statewide Rail Framework Study, 2010

2050 Intercity Rail Passenger Estimates

Table 5 summarizes Arizona corridors, the service assumptions, the 2050 ridership, and the source of the estimate.

Table 5 - Summary 2050 Intercity Rail Annual Passenger Estimates

Corridor	Length (mi)	Assumed Service	2050 Annual Ridership (in thousands)	Source of Original Estimate
Phoenix-Tucson	121	5-7 daily round trips	1,600 to 1,900	1998/2007 High Speed Rail Study - Sketch model
Phoenix-Yuma	175	7 daily round trips	450 to 800	2007 Response to Executive Order - \$2007-2 *(2008-2)
Tucson - Nogales	65	7 daily round trips	500 to 800	2007 Response to Executive Order - \$2007-2 *(2008-2)
Phoenix-Flagstaff-Winslow	294	3-5 daily round trips	150 to 300	2007 Response to Executive Order - \$2007-2 *(2008-2)
Phoenix-Los Angeles	426	6-12 daily round trips	1,800 to 4,400	ADOT Statewide Rail Framework Study, 2010
Phoenix-San Diego*	332	6-12 daily round trips	300 to 600	ADOT Statewide Rail Framework Study, 2010
Phoenix-Las Vegas	335	6-12 daily round trips	950 to 1,900	ADOT Statewide Rail Framework Study, 2010

*Note: Phoenix-San Diego estimates represent the increment above Phoenix-Yuma ridership

Sources noted in table.

Based on the analysis, the Phoenix–Los Angeles corridor offers the highest potential ridership, as it serves the largest population of all the corridors. While the Phoenix–San Diego estimates may appear low, they represent the additional incremental ridership over the Phoenix–Yuma corridor, which is part of the Phoenix–San Diego route. Taking both estimates into account brings the Phoenix–Yuma–San Diego potential annual ridership to between 750,000 and 1.4 million.

The ridership estimates in Table 5 represent the impact of the corridors individually. If service were implemented in more than one of these corridors, with connections between them, there would be potential for higher system-wide ridership.

Commuter Rail

Three potential commuter rail corridors were identified: Metro Phoenix, Metro Tucson, and Metro Flagstaff. Ridership forecasts are available for all these services except Flagstaff. This section provides a high-level overview of the service characteristics assumed, where available, for each system. Outside Phoenix few detailed studies have been conducted.

- Metropolitan Phoenix Commuter Rail
 - Source: 2010 MAG Commuter Rail System Study
 - Corridors: Four potential corridors: BNSF Grand Avenue Line, UPRR Tempe/West Chandler Branch, UPRR Southeast Mainline and UPRR Yuma West Line
 - 2030 Service Assumptions: 30-minute peak headway, 60-minute off-peak headway
- Metropolitan Tucson Commuter Rail
 - Source: 2007 Arizona Public Transportation Program Response to Executive Order #2007-02 (#2008-02)
 - Corridors: None specified
 - 2030 Service Assumptions: 15+ one-way trips per day

- Metropolitan Flagstaff Commuter Rail
 - Source: ADOT Statewide Rail Framework Study, 2010
 - Corridors: Williams–Flagstaff–Winslow
 - 2030 Service Assumptions: 10-15 one-way trips per day

Comparable Commuter Rail Corridors

As in the intercity corridor analysis described above, a high-level analysis approach was developed to provide order-of-magnitude estimate of commuter rail ridership in the three corridors. The approach provides estimates for Flagstaff and Tucson. The method considers the relationship between daily ridership and central business district employment. Since the analysis was applied to cities with relatively low employment compared to other cities with commuter rail service, only cities with a central business district employment of less than 100,000 were initially considered, as Table 6 shows.

Table 6 - Summary Selected Commuter Rail Corridors

City	Daily Ridership	Central Business District Employment
Flagstaff	N/A	6,300
Tucson	N/A	9,700
Phoenix	N/A	26,800
Albuquerque	2,500	40,000
Salt Lake City	5,800	42,900
San Diego	27,604	61,800
Dallas/Fort Worth	10,500	79,900
Miami/Fort Lauderdale	14,800	98,000

Sources: APTA Commuter Rail Public Transportation Ridership Report (March 2009), Demographia U.S. Central Business Districts, 2000 Data on Employment and Transit Work Trips (June 2006), Flagstaff central business district employment estimated from 2000 Census Transportation Planning Package.

Phoenix, Tucson, and Flagstaff's central business district employment are lower than in any of the comparison cities, so the two smallest cities, Albuquerque and Salt

Lake City (also the cities with the most recent commuter rail opening dates), were given primary consideration.

2050 Commuter Rail Estimates

Table 7 provides commuter rail daily ridership forecasts. Since commuter rail is oriented to serving workers, the 2050 original estimates are based on employment growth rates between the original forecast year and 2050. Estimates in the Phoenix metropolitan area were developed by MAG. In metropolitan Tucson, the estimates were produced using a high-level market assessment.

Table 7 - Summary Commuter Rail Passenger Estimates

Location	2050 Daily Ridership	Original Analysis Method
West Valley - Phoenix - East Valley	17,980 (2030 estimates)	2010 MAG Commuter Rail System Study
Tucson	3,500	2007 Response to Executive Order #2007-02 (#2008-02)
Flagstaff	1,000	ADOT Statewide Rail Framework Study, 2010

Source: ADOT Statewide Rail Framework Study, 2010; 2010 MAG Commuter Rail System Study; 2007 Response to Executive Order #2007-02 (#2008-02)

2.5 Positive Train Control

Positive Train Control (PTC) is a developing technology which is capable of preventing train-to-train collisions, derailments due to over-speeding, and casualties or injuries to roadway workers (e.g., maintenance-of-way workers, bridge workers, signal maintainers) operating within their limits of authority as a result of unauthorized incursion by a train. PTC is also capable of preventing train movements through a switch left in the wrong position. PTC systems vary widely in complexity and sophistication based on the level of automation and functionality they implement, the system architecture utilized, the wayside system upon which they are based (i.e., non-signalized, block signal, cab signal, etc.), and the degree of train control they are capable of assuming.

The Rail Safety Improvement Act (RSIA) of 2008 mandates that interoperable PTC systems be installed on most passenger-rail routes and lines used to move certain hazardous materials by December 2015. Closed passenger-rail systems, such as light-rail, rapid transit and subway systems, will not be required to adopt PTC. Freight railroads which meet certain criteria must install the system even if no passenger trains share their tracks.

The Federal Railroad Administration (FRA) issued the final PTC implementation rule in January 2010 which require all passenger rail lines, freight rail lines which share tracks with passenger service and Class I railroads (for routes carrying more than 5 million gross tons of freight and presence of Hazardous materials traffic during 2008) to submit PTC Implementation Plans, accompanied or preceded by PTC Development Plans.

An early version PTC system has been in operation on Amtrak's Northeast Corridor between Washington and Boston, however this system would not meet the current federal requirements. BNSF and UPRR have PTC installed on short segments of their track for testing purposes. New Jersey Transit is installing a Speed Enforcement System on its commuter lines. However, no true PTC systems as envisioned in the FRA implantation plan are active at the time of this report publication.



2.6 Purpose and Background of the State Rail Plan

The purpose of the Arizona State Rail Plan is:

- To inform Arizonans on the benefits of rail transportation and its importance to a sustainable state economy.
- To ensure the State's eligibility for federal rail funding programs, most notably those authorized by the Passenger Rail Investment and Improvement Act of 2008.
- To establish a long-range vision for the State's passenger and freight rail systems, along with goals and objectives for the year 2030.
- To serve as a reference document on railroad facilities, services and conditions.
- To recommend a prioritized long-range program of investment projects.
- To provide the rail element of the State's Long Range Transportation Plan creating a comprehensive and multimodal plan.

The Arizona State Rail Plan is an integral part of a multimodal long-range planning process. In 2007, at the direction of the Governor's Office and the State Transportation Board (STB), ADOT began work on a long-range (year 2050) transportation planning vision for Arizona known as the Building a Quality Arizona - Statewide Transportation Framework Study (STFS). After considering three alternative scenarios for the future of the statewide multimodal transportation system, ADOT and its local partners assembled the best elements into a single recommended scenario. The recommended scenario includes an intercity passenger rail network, as well as a comprehensive program of roadway and bus transit improvements. It also identifies very broad corridors for the study of future high-speed rail connections. The STB accepted the study in January 2010 as a basis for further planning, especially the State Long Range Transportation Plan.

The 2009 Statewide Rail Framework Study (SRFS) began

as an outgrowth of the STFS. The SRFS, which covers both freight and passenger rail, built a foundation for the State Rail Plan by identifying benefits and needs, developing strategic rail investment opportunities, and recommending implementation pursuits for the State of Arizona. A concluding matrix divided proposed rail improvement actions into immediate (2010), near-term (2010 to 2015) and long-term (beyond 2050) timeframes.

As elements of a comprehensive planning process known as "Building a Quality Arizona" (BQAZ), both the STFS and the SRFS embody the BQAZ guiding principles for transportation investment:

- Improve mobility and accessibility.
- Support economic growth.
- Promote sustainable development.
- Protect natural resources.
- Ensure safety and security.

The State Long Range Transportation Plan (LRTP) is a twenty five-year, fiscally constrained plan to guide State transportation investments in all modes, and is intended to establish the future allocation of ADOT resources. Arizona statutes require ADOT to update the plan every five years, with the next LRTP due in 2011. The Arizona State Rail Plan will provide input on rail priorities for the LRTP, and will be updated based on FRA requirements.

The State Rail Plan completes the work program initiated in the SRFS, relying on the stakeholder input described in Appendix A. The appendix also lists related Arizona rail studies and plans.

2.7 Compliance with United States Code, Section 22102

This SRP puts Arizona in compliance with the requirements of the United States Code, Section 22102.



2.8 Updates to this Rail Plan

This rail plan should be updated on a regular schedule as required by FRA, which is coordinated with the State's long range planning activities. The plan should be amended to reflect any changing conditions related to rail operations within the State.

The contents of this rail plan represent the vision for the state at the time of its completion, however this document should be thought of as a living document which should be updated or modified as implementation of various rail strategies are completed or revised.

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CHAPTER 3. ISSUES AND OPPORTUNITIES

Arizona's freight and passenger rail system faces a variety of issues and challenges. Arizona's government can play a role in helping to resolve some of these issues, in cooperation with the railroads and other stakeholders. This chapter focuses on the major issues and accompanying opportunities to enhance the role of railroads in the multimodal State transportation system. The description of each issue is followed by one or more related opportunities.

Chapter 3 is divided into three sections. The first discusses Arizona's future passenger rail network, including opportunities ranging from high-speed and intercity rail to regional commuter rail and the enhancement of tourist railroad corridors. The second and longest section is devoted to issues of the State's freight railroad network, including the two Class I railroads as well as short lines. The last section presents issues and opportunities regarding rail safety. Subsequent chapters bring together these elements to form a long-range statewide rail transportation plan for several corridors opportunities, with projects that address many aspects of rail freight service, passenger rail opportunities, and safety for each.

3.1 Passenger Rail System Issues and Opportunities

Arizona could benefit from developing a comprehensive passenger rail system that would include coordinated systems of interstate, intercity (including High Speed), and regional commuter rail service. Passenger rail is a transportation alternative that can help travelers avoid congestion on highways and air travel. Intercity passenger rail provides mobility options for tourists and residents. Passenger Rail can provide a convenient, efficient mode of travel, where riders can work, relax, and travel between employment cores, avoiding the need to drive to outlying airports or wait in long security lines or the need for travel by car. In addition, increased transit options can save money by reducing the amount of money spent on gas, vehicular maintenance, parking, and contributing to more location efficient housing choices. Opportunities

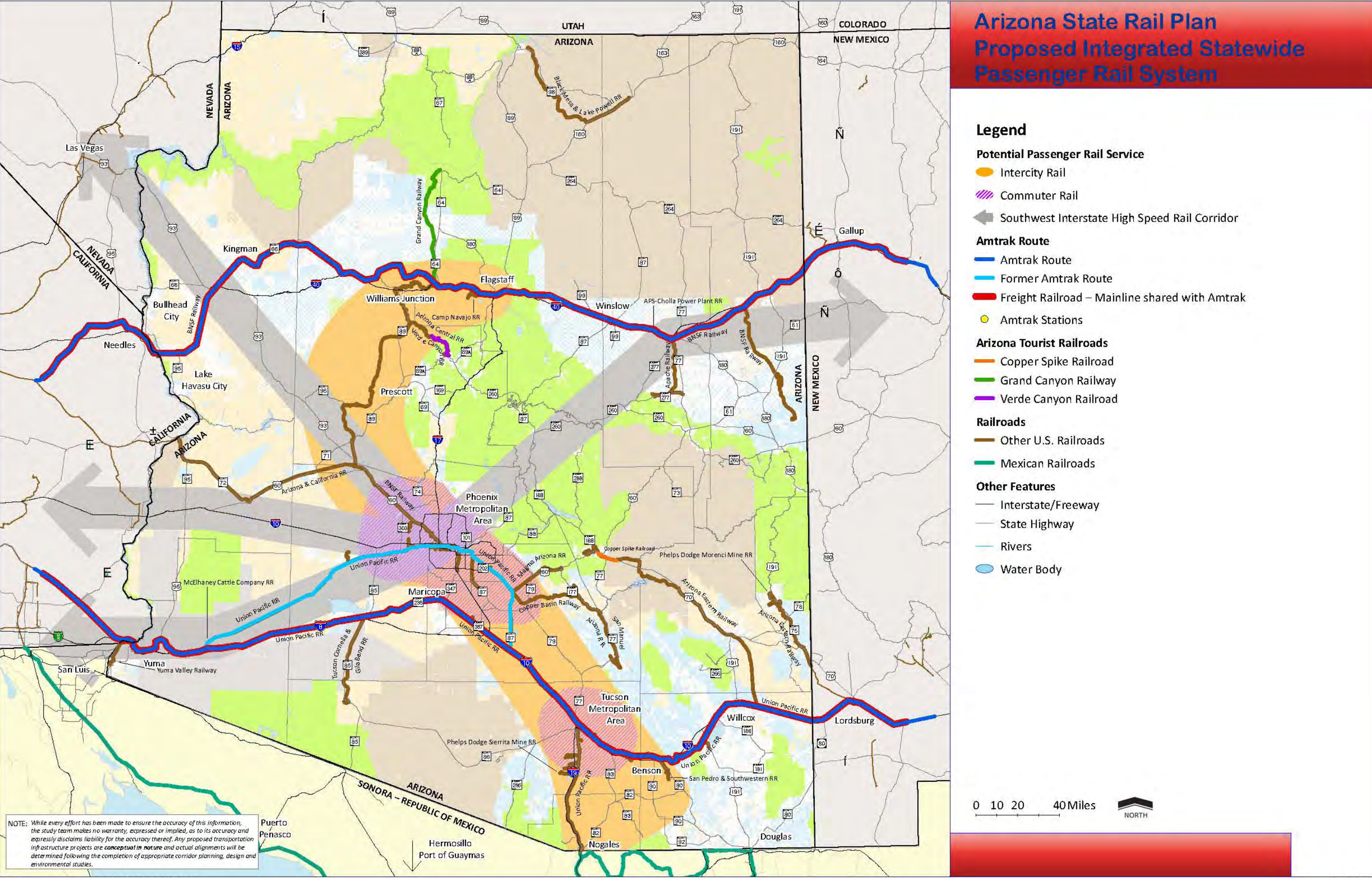
for an integrated statewide passenger rail system are illustrated in Figure 8.



In 1827, the Baltimore and Ohio Railroad was chartered to run from Baltimore to the Ohio River in Virginia. It was the first westward bound railroad in America. Today, Arizona is served by two Class I railroads; BNSF Railway and Union Pacific Railroad.

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Figure 8 - Integrated Statewide Passenger Rail System



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3.1.1 Intercity Passenger Rail System

Opportunity Statement

An intercity passenger rail (ICR) system that connects many of Arizona's population and job centers would create and support focused growth patterns and sustainable development within the Sun Corridor, enhancing mobility choices. Improvement to Amtrak services in Arizona will provide another element of a statewide passenger rail system, providing improved interstate passenger service to the largest cities in Arizona.



Potential Actions:

- ✓ Implement an ICR system for the Sun Corridor, starting with the Phoenix to Tucson section. Plan future extensions to Northern Arizona and Nogales.
- ✓ Partner with Amtrak to provide service to the Phoenix metropolitan area, potentially reopening and rehabilitation of the UPRR Wellton Branch, or using a route along the Arizona and California Railroad.
- ✓ Partner with Amtrak to improve existing service for the Sunset Limited/Texas Eagle route (UPRR), and consider expanded service between Arizona and the Los Angeles Basin.
- ✓ Partner with Amtrak to improve existing service for the Southwest Chief route (BNSF), including consideration of separate trains connecting Los Angeles with the Grand Canyon Railway.

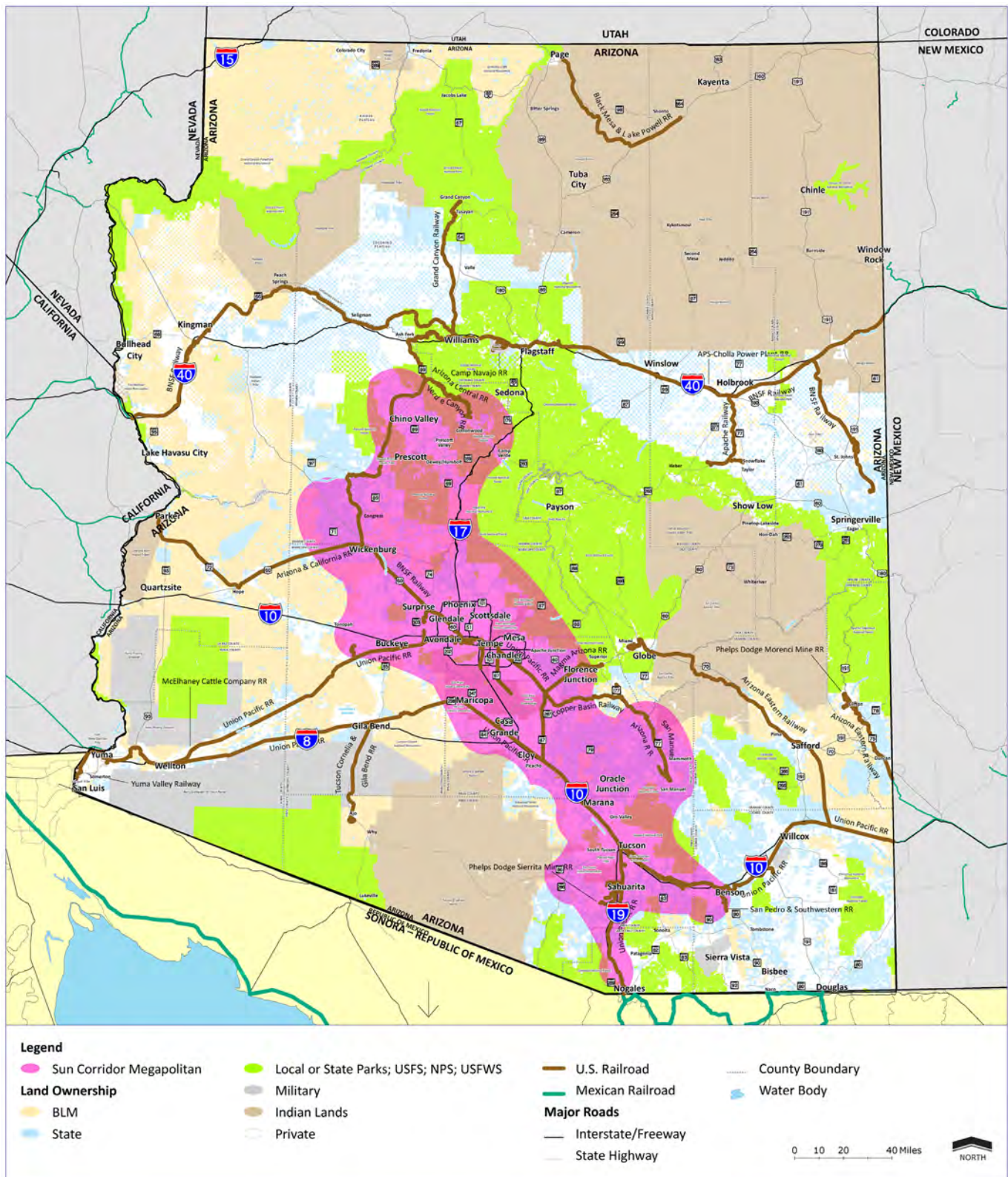
Background

By 2050, both population and employment in Arizona are projected to more than double from their 2005 levels. Growth of the Sun Corridor (Figure 9) will lead to increased transportation demand for both passengers and goods. It will not be possible to accommodate growth and avoid traffic congestion by improving roadways alone, so passenger rail should become a key component of the Sun Corridor transportation system.

Currently, I-10 is the only high-capacity connection between the Phoenix and Tucson metropolitan areas, limiting modal choices and incapacitating traffic in the event of an incident on the highway. Similarly, I-17 from Phoenix and I-19 from Tucson provide key connections with other growing communities in the Sun Corridor. The intent of a multimodal spine is to create a corridor of parallel transportation modes that pass through the center of the Sun Corridor, consisting of ICR, freeways with express buses, and possibly High Speed Rail (HSR). Such a system would provide travelers a range of transportation choices. From this multimodal spine, ancillary multimodal transportation systems could branch off and serve local communities.

The intent of a multimodal spine is to create a corridor of parallel transportation modes that pass through the center of the Sun Corridor. From this multimodal spine, ancillary multimodal transportation systems could branch off and serve local communities.

Figure 9 - Sun Corridor Megapolitan Region



The two Amtrak lines serving Arizona are the Southwest Chief and combined Sunset Limited/Texas Eagle. Both of these routes primarily serve long-distance tourist travel, with service frequency ranging from daily (Southwest Chief) to three times a week (Sunset Limited/Texas Eagle).

The Arizona Amtrak routes use track owned and operated by freight railroads. They share track with freight operations and are subject to delays caused by other rail traffic. The Southwest Chief traverses the northern portion of the State on the BNSF Transcon Corridor, which is double-tracked across Arizona. The Sunset Limited/Texas Eagle traverses the southern portion of the State on the UPRR Sunset Route, which is approximately 43% double tracked, and UPRR is planning to double-track the remaining corridor throughout Arizona.

In 2008, about 88,000 passengers boarded Amtrak trains in Arizona. Flagstaff had by far the most boardings (40,000), followed by Tucson (15,000), Kingman (10,000), and Williams Junction (8,000). Maricopa, the closest station to the Phoenix metropolitan area, had 6,400 boardings.

Amtrak provides direct service to Tucson but not the Phoenix metropolitan area. In 1996, UPRR suspended service on the Wellton Branch between Roll and Palo Verde, which ended Amtrak service to Phoenix and Tempe. The 81-mile segment required significant maintenance and upgrades, for which Amtrak was not prepared to finance. Since 1996, Amtrak has used the Sunset Route through Maricopa, approximately 30 miles south of Phoenix, where it established a new station. In 1995, the Phoenix and Tempe stations had approximately 35,000 combined passenger boardings on the Sunset Limited, in contrast to the 6,400 boardings at Maricopa in 2008. There is currently no connecting bus service from the Maricopa station to the Phoenix area.

Table 8 compares existing Amtrak passenger rail service in Arizona with service in five neighboring states. California accounts for the overwhelming majority of trains and riders in these states. Most California intercity riders use the state's three corridor services (Capitol, Pacific Surfliner and San Joaquin) rather than its four long-distance trains (including the Southwest Chief and Sunset

Limited). Among states with a similar level of intercity service, Arizona has more boardings than Nevada and Utah, but fewer than New Mexico and Colorado.

Table 8 - Existing Intercity and Commuter Rail Service in Arizona and Neighboring States

State	Intercity Rail (Amtrak)		
	Routes	Daily Trains	Annual Boardings (thousands)
Arizona	2	2-4*	88
California	7	72-74*	11,071
Colorado	2	4	200
Nevada	1	2	77
New Mexico	2	2-4*	114
Utah	1	2	38

Source: Amtrak State Fact Sheets for FY 2009

*Sunset Limited operates 3 times per week

The Sunset Limited has the lowest total ridership of any long-distance train in Amtrak's national system. The daily Southwest Chief, on the other hand, carries more riders than several long-haul routes in the Amtrak system. In fiscal year 2009, Amtrak reported 58,000 Arizona boardings of the Southwest Chief versus 30,000 of the Sunset Limited.

The Sunset Limited also suffers from its relatively low scheduled travel speed of 44 to 55 mph through Arizona, based on the direction of travel as listed in the Amtrak Sunset Limited schedule. The Southwest Chief timetable shows a higher speed, averaging 63 mph between Needles, California and Gallup, New Mexico. During the year ending in January 2010, the Sunset Limited had one of the best on-time records of Amtrak long-haul trains, at 92.6 percent. The Chief's record lagged behind at 75.8 percent—still substantially better than the California Zephyr (serving Nevada, Utah and Colorado), which met Amtrak's on-time definition only 53 percent of the time. The Southwest Chief did about as well as the average of 76.5 percent for fourteen long-distance services in the U.S.

Opportunities

In 2008, the Federal Railroad Administration (FRA) announced grant programs to plan and improve rail infrastructure, focusing on partnerships with state DOTs. ADOT applied for and received a \$1 million grant as part of this program to initiate planning for a passenger rail connection between Phoenix and Tucson. The State Transportation Board authorized a \$1 million match of the federal grant. These funds will be used to continue to build upon previous studies regarding ICR development between Phoenix and Tucson through a National Environmental Policy Act (NEPA) Alternatives Analysis (AA) and Environmental Impact Statement (EIS) in support of new passenger rail service. Additionally, the Federal Transit Administration (FTA) has earmarked funding to fund the second phase of the AA/EIS study.

With funding for the initiation of planning ICR between Phoenix and Tucson, the State has the opportunity to begin implementing the passenger rail element envisioned for the Sun Corridor, where more than 85 percent of the population of Arizona will reside in 2050. Roadways alone will not accommodate the projected travel demand in this concentrated corridor. Rail and other transportation alternatives will be a necessary component to reduce congestion and offer travelers multiple options for intercity travel.



New Mexico's Rail Runner Express train serves the metropolitan areas of Albuquerque and Santa Fe. Ridership averages about 4,500 passengers per day, helping to relieve congestion along I-25.

Phasing

The opportunity exists for the corridor to be constructed in segments, with extensions constructed as ridership warrants and funding becomes available. ICR could begin with a starter connection between Phoenix and Tucson, connecting the two largest metropolitan areas. Future segments could include extension from Phoenix to Prescott and/or Flagstaff, as well as from Tucson to Nogales.

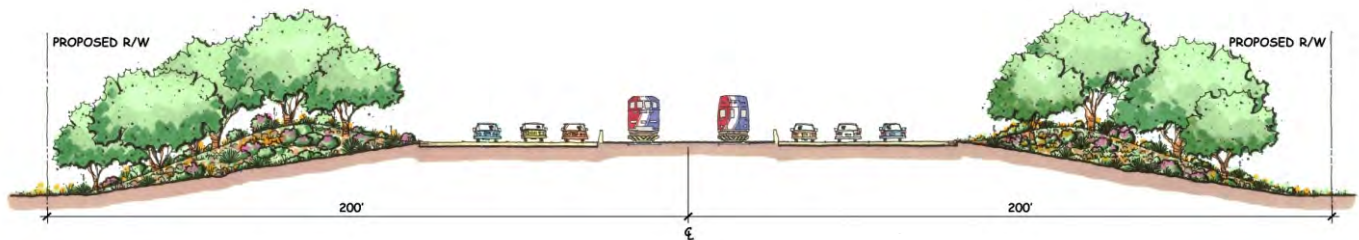
Planning for Sustainable Growth

Detached, single-family homes and master planned housing communities have been the predominant development type in the Sun Corridor, contributing to the expanse of the metropolitan areas and making transit less viable. This development pattern has reduced the availability of affordable housing near employment centers, impacted the natural environment, and created a "drive until you qualify" phenomenon contributing to a recent Arizona foreclosure crisis. Creating a future development pattern that better integrates land use, transportation, economic development, and the natural environment is critical to sustainable and livable communities.

Intercity Rail presents the opportunity for local communities to plan future growth around a multimodal transportation vision, maximizing employment uses and more compact and affordable development near station locations. Pinal County recently updated its Comprehensive Plan, which orients development into higher-density activity centers while maintaining open space in environmentally sensitive areas. This plan identified several high capacity transportation corridors to connect these activity centers, which could include intercity passenger rail service. The Pinal County Comprehensive Plan has been nationally recognized as an example of a local agency coordinating land use planning with a multimodal vision for the Sun Corridor.

The Statewide Transportation Planning Framework Program identified new greenfield roadways. This provides the opportunity to think more holistically about the future transportation system, incorporating Intercity Rail as future possibilities in shared rights-of-way (Figure 10).

Figure 10 - Freeway with Flexibility for Potential Intercity Rail (Typical Section)



Livable Communities

Passenger rail meets several of the livability principles defined by the HUD, DOT, and EPA Partnership for Sustainable Communities, offering an alternative transportation option, as well as helping to focus growth by encouraging infill and focused new development around station locations, thereby increasing mobility and lowering the combined cost of housing and transportation for residents. It also enhances the economic competitiveness of the region through reliable and timely access to such locations as employment centers and educational campuses. Planning for ICR, in concert with planning for sustainable land use, presents the opportunity to secure additional funding through federal programs which will have an emphasis on supporting livable communities.

Each Intercity rail station can be an important node on a statewide system, which if properly designed will add to Arizona's already rich and diverse spectrum of cities. Examples from other cities throughout Europe and Japan have demonstrated how intercity rail stations can be a catalyst for improved communities, both in the form of great architecture for the stations and through well designed new development in the surrounding area.

Reestablish Amtrak Service to Phoenix

Since the suspension of Amtrak service to Phoenix in 1996, the transportation industry has faced changes, including environmental concerns of constructing new corridors in greenfield lands, a more congested aviation system, roadway congestion, increased fuel prices, and the need for transportation alternatives. Re-establishing Amtrak service to Phoenix would increase long-distance

travel options and support the environment by using the existing, but inactive, Wellton Branch or a route along the Arizona and California Railroad. Passenger rail service along the Arizona and California Railroad would require coordination with multiple railroad companies. Additionally, renewed Amtrak service to Phoenix can build ridership throughout Arizona and attract out-of-state passenger travel. Opening these rail lines to passenger service would require installation of Positive Train Control (PTC) measures where passenger rail is reinstated such as the Wellton branch and other sections of the UPRR Phoenix subdivision.

Increase Ridership on the Sunset Limited/ Texas Eagle

Improving schedules, service frequency, and on-time performance of the Sunset Limited/Texas Eagle Amtrak service through southern Arizona may support successful development of an intercity passenger rail system throughout the Southwest. The Sunset Limited/Texas Eagle Amtrak corridor terminates in Los Angeles, where it connects to a broader rail network system, including local transit connections, Amtrak California routes, and future HSR.

Opportunities to increase ridership on the Sunset Limited/Texas Eagle through Arizona include:

- Upgrade the Sunset Limited from tri-weekly to daily service along the Sunset Route through Arizona. Work to attain ridership comparable to that of the Southwest Chief and other daily trains.
- In conjunction with Sunset Limited daily service, implement a new Amtrak Thruway bus service connecting Maricopa with Phoenix and

coordinated with the train's schedule.

- Work with UPRR and Amtrak to raise the scheduled travel speed on the Sunset Limited across Arizona from 49 mph to approximate the current 64 mph of the Southwest Chief. At the same time, maintain the current on-time performance (reliability) of this train. It will benefit from double-tracking of the Sunset Route.
- Operate a second daily train along the Sunset Limited route which could serve Phoenix directly, using the UPRR Phoenix Subdivision.
- Improve passenger facilities at stations where existing conditions may discourage ridership, such as Benson, Maricopa and Yuma. Investigate the feasibility of offering checked baggage service at these stations.
- Install self-serve Amtrak ticket machines at stations, especially Maricopa and Tucson.

New Amtrak Service

A new Amtrak California route is proposed between Los Angeles and Palm Springs, California, which provides the opportunity for Amtrak to expand service east to Yuma and Phoenix. This service would supplement the Sunset Limited/Texas Eagle route, and could provide multiple trains between Phoenix and Los Angeles each day.

Increase Ridership on the Southwest Chief

Improving schedules and on-time performance of the Southwest Chief would support development of an intercity passenger rail system throughout the Southwest. The Chief connects Chicago and Los Angeles, both of which provide connections to regional rail networks and future HSR networks. Within Arizona, this link to Los Angeles allows the opportunity to boost tourism by using Amtrak to connect the Los Angeles Basin with northern Arizona, specifically Grand Canyon National Park via the Grand Canyon Railway.

Opportunities to increase ridership on the Southwest Chief through Arizona, as well as achieve a desirable level of intercity passenger rail service include:

- Raise the on-time performance of the Southwest Chief across northern Arizona to at least 90 percent, making it one of the most reliable long-haul Amtrak services in the country. This route is a high priority for Amtrak, as it offers the most direct connection between the second and third largest metropolitan areas in the U.S., and serves major tourist attractions such as the Grand Canyon and Santa Fe.
- Improve passenger facilities at stations where limited amenities may discourage ridership, such as Winslow, Williams Junction, and Kingman. Investigate the feasibility of offering checked baggage service at these stations.
- Install self-serve Amtrak ticket machines at stations, especially Winslow and Kingman. (Flagstaff already offers this service.)
- Work with the Grand Canyon Railway to add a ticket machine, or at least direct Amtrak ticket sales, at its Williams depot.

Expand Tourism

An intercity rail system has the potential to support one of the largest economic engines in the State: tourism. Based on annual averages, Arizona attracts roughly 102,000 visitors a day. Travel-related spending in 2008 was \$19 billion, with more than half for leisure and hospitality services. Rail can be a tourist destination or activity, as seen from the successful Grand Canyon Railway and Verde Canyon Railroad tourist routes. ICR between the Phoenix metropolitan area and tourist destinations in northern Arizona would enhance recreational traffic to the Grand Canyon, Verde Valley, and other such locations. Any plans for ICR services along existing freight rail routes will require PTC measures as required by the FRA guidelines.



The Verde Canyon Tourist Railroad boosts Arizona tourism which brings visitors and revenue.

Estimated Costs

Upgrading Existing Intercity Railways

Some examples of the cost of upgrading existing passenger rail corridors include the following:

- The Illinois Department of Transportation submitted an application for American Recovery and Reinvestment Act ("ARRA") High Speed Intercity Passenger Rail funds in 2009 for \$4.4 billion, including stations and equipment. The application included rehabilitating 359 miles of existing mainline and sidings and constructing 238 miles of second mainline and sidings.
- The Pacific Northwest has an existing 466-mile ICR corridor between Eugene, Oregon and Vancouver, British Columbia. Between 1994 and 2007, Washington and Oregon invested \$700 million (or approximately \$1.5 million per mile) in the corridor to improve speeds and add capacity for commuter service and intercity Amtrak service.

- Upgrading the existing Charlotte to Richmond passenger line to achieve speeds of 95-100 mph and cut travel time by 50 percent is estimated to cost \$2.5 million per mile.
- Upgrading the Chicago to Minneapolis/St. Paul corridor, an existing 417-mile passenger rail corridor and currently an eight-hour Amtrak journey, to provide HSR service is estimated to cost \$1.5 billion (or approximately \$3.5 million per mile). This cost estimate will bring the line to operating speeds up to 110 mph, with the eventual plan to upgrade the line to top speeds of 150-220 mph.

Infrastructure for a new double-tracked intercity passenger line in the Sun Corridor is estimated at roughly \$15 million per mile, including right-of-way. Train sets and coach cars would add additional capital expenditures. Using the Phoenix-Tucson segment as an example, infrastructure and right-of-way costs are estimated at roughly \$2.0 billion, including train sets of locomotives and bi-level coach cars. Operating costs would vary depending on the system and equipment chosen, service levels, and other factors. Therefore, operating and maintenance costs have not been estimated.

These costs do not include potential implementation of positive train control which will be required on any existing freight tracks which do not have current passenger service.

Increase ridership on existing Amtrak Routes

Amtrak is currently focusing on opportunities to increase ridership along the Sunset Limited route; this may include new daily service and shuttle bus service to the Phoenix Metro area. Costs for these improvements are expected to be incurred by Amtrak.

Re-establishing Amtrak Service to Phoenix would include upgrades to the UPRR Phoenix Subdivision and rehabilitation of the Wellton Branch. Costs to complete a scoping document on the requirements for rehabilitation of the Wellton Branch are estimated at \$500,000. Initial estimates to rehabilitate the Wellton Branch and upgrade the Phoenix Subdivision to return passenger service to

return to Phoenix have ranged from \$150 million to \$300 million, depending on the travel speed desired.

3.1.2 Southwest U.S. High-Speed Rail Network (HSR)

Opportunity Statement

An HSR network in the southwestern U.S. will improve regional connectivity and provide modal choices to travelers. An HSR system in the Southwest can help individuals and business travelers avoid congestion on the roadways and delays in air travel.

Potential Actions:

- ✓ Receive federal HSR designation of corridors in Arizona.
- ✓ Complete feasibility and route studies to establish a Southwestern HSR network.
- ✓ Work with local and regional entities to update long-range plans that coordinate local and regional rail and transit planning, and land use and transit oriented development (TOD) with existing and proposed passenger rail networks to create more livable and sustainable communities.

Background

Four potential HSR corridors between Arizona and bordering states have been identified. These corridors are envisioned to link Phoenix-Tucson with Los Angeles, Las Vegas, San Diego, and Albuquerque, or the Front Range Megapolitan. These cities are within the 300- to 600-mile range in which HSR is competitive with other transportation modes such as highway and air travel. Such a network would provide significant public benefits, especially increased mobility via a more sustainable transportation mode.

As a travel mode, HSR can be competitive with short-haul flights in time, cost, and on-time performance. Weather delays are not as significant for rail and can provide direct access to central business districts and other economic

activity centers. Daily travel between airports in the Los Angeles Basin and Phoenix Sky Harbor International Airport currently exceeds 110 weekday departures. Interstate highway travel between the two metropolitan areas is also significant. Therefore, rationale exists for an HSR connection between Los Angeles and Phoenix, two of the largest metropolitan areas in the Southwest.

Congress has designated a series of HSR corridors across the U.S. that will serve as the foundation for a nationwide HSR system, as illustrated in Figure 11. Several southwest U.S. corridors are illustrated, mostly in California, however, FRA has designated additional corridors over what is shown on this map.

The American Recovery and Reinvestment Act of 2009 (ARRA) made an \$8 billion initial investment in HSR, helping jump-start activities in the federally-designated corridors. However, a portion of ARRA funds were also available for planning of non-federally-designated intercity rail (ICR) corridors. This State Rail Plan sets a precedent for rail planning in Arizona and will better position Arizona Department of Transportation (ADOT) to acquire future federal funding tied to HSR/ICR planning.



California High-Speed Rail opportunities translate to Arizona. (Photo courtesy of CHSRA)

Figure 11 - Congressionally Designated High Speed Rail Corridors



Opportunities

HSR Federal-Designation

Congressional establishment of an HSR corridor opens the opportunity of applying for federal ARRA funds, for such efforts as increasing capacity on freight rail lines and planning or constructing ICR – all in support of developing a comprehensive and cohesive passenger rail network.

The Western High Speed Rail Alliance (WHSRA), the regional advocacy group for a Southwestern high-speed rail network, has begun preliminary planning efforts on developing a cohesive network in the Intermountain West and the Southwest. The group, composed of metropolitan planning organizations (MPOs) in the Southwestern states, will expand to include state departments of transportation as well. Planning efforts conducted through the WHSRA is just one opportunity that exists to advocate federal designation of HSR in Arizona.

Figure 12 displays a map of planned and proposed high-speed rail corridors, including those proposed in Arizona.

Planning for Future Growth

HSR provides an opportunity to create a metropolitan station that can shape surrounding economic growth, presenting the opportunity to coordinate local transportation planning and transit-oriented land use development at a major transit hub.

HSR, in offering an alternative modal option for travelers and using alternative technologies, also allows the State the opportunity to apply for federal U.S. Department of Housing and Urban Development (HUD), Department of Transportation (DOT), and Environmental Protection Agency (EPA) Partnership for Livable Communities grant programs. These programs support multi-jurisdictional regional planning efforts that integrate affordable housing, economic development, and transportation decision-making.

Figure 12 - Designated and Planned High-Speed Intercity Passenger Rail Corridors



Alternative Mode of Longer Distance Travel

Because of its speed, HSR has the opportunity to become competitive with short-haul flights. Five regional airports exist in the Los Angeles Basin. As the Sun Corridor megapolitan region grows, Phoenix Sky Harbor and Tucson International Airports will serve larger population bases, and a mid Pinal County Regional Airport is likely to develop, as indicated in the recently adopted Pinal County Comprehensive Plan. HSR can alleviate the congestion caused by growing intercity travel demand.

Estimated Costs

Feasibility and Route Studies

Feasibility studies that focus on connecting Phoenix/Tucson with Los Angeles and Las Vegas, both endpoint locations on federally-recognized HSR corridors, are recommended. These studies would include corridor evaluations, ridership forecasts, coordination with adjacent states, and recommendations for implementation. Costs of these feasibility studies are

estimated to range from \$10 million to \$15 million, depending on the evaluation detail scoped. The studies would give the United States DOT sufficient information to have these corridors added to the “Congressionally Designated High-Speed Rail Network”. Recently, FRA has awarded a grant of \$500,000 to begin these feasibility studies of HSR corridors linking Phoenix-Las Vegas and Los Angeles.

Future Costs to implement an HSR Network

Some examples of estimated construction costs for proposed HSR corridors include the following:

- **Completed European Corridors:** Construction costs (2008 dollars) for recently constructed European corridors range from \$37 million to \$53 million per mile. Total project construction costs range from several billion to over twenty billion dollars depending on the length of the project. The recently constructed corridor between Madrid and Figueres, Spain, a 468-mile corridor comparable to the distance between

Phoenix and Albuquerque, cost \$18.2 billion, or \$39 million per mile.

- Planned U.S. Corridors: Estimated construction costs for proposed HSR corridors range from \$22 million per mile (Victorville, CA to Las Vegas) to \$63-65 million per mile (California Phase 1 HSR network).

3.1.3 Commuter Rail

Opportunity Statement

According to studies recently completed by MAG, implementing commuter rail in Arizona's urban centers will alleviate traffic congestion and improve travel times. Additionally, a commuter rail system can be coordinated with High-Speed and Intercity Rail to complete a comprehensive passenger rail system in the Sun Corridor. The Maricopa Association of Governments Commuter Rail studies website is available for review at www.azmag.gov.

Potential Actions:

- ✓ Create a partnership between ADOT, Maricopa Association of Governments (MAG) and Pima Association of Governments (PAG) to jointly plan and implement commuter rail systems in key urban areas, such as Phoenix and Tucson, as part of a coordinated passenger rail system for the Sun Corridor.

Background

Demands on Arizona's urban roadway system have resulted in increased travel time for commuters, as well as less predictable travel times that vary with congestion levels. These problems will only worsen in the future as the Sun Corridor continues to grow. Recent and planned public transportation investments in line haul bus, Bus Rapid Transit (BRT) and Light Rail Transit (LRT) will help mitigate the problem. Commuter rail service in the Phoenix and Tucson metro areas would complement and build on the existing transportation network and offer an alternative mode for commuters.

Commuter rail systems have been recently implemented in several western cities, including Albuquerque, Salt Lake City, San Diego, Los Angeles and Seattle. These commuter rail systems in similar states have shown high ridership and have become a successful part of their transportation systems.

Commuter rail trains typically provide service between suburban developments and urban centers for the purpose of reaching activity centers, such as employment, special events, and intermodal connections. Designed primarily to meet the needs of regional commuters in the AM and PM peak travel periods, commuter rail service typically operates at greater frequencies during the weekday peak travel times. The length of a typical commuter rail corridor ranges from 30 to 50 miles, with passenger stations generally spaced 3 to 10 miles apart. This type of system has been recommended for both the Phoenix and Tucson metro areas, as approved by both the MAG and PAG regional councils.



Opportunities

Coordinated Sun Corridor Passenger Rail Service

ADOT has begun planning for the ICR between Phoenix and Tucson, and both the MAG and the PAG have begun planning activities for commuter rail in their urban areas. The State has the opportunity to begin planning a coordinated passenger rail element envisioned for the Sun Corridor. Rail and other transportation alternatives will be a necessary component to reduce congestion and

offer travelers in Arizona multiple options for regional travel. ADOT's plans for ICR will need to consider PTC implementation in the alternatives analysis/NEPA process as it is a federal requirement for passenger rail services sharing existing freight rail tracks. ADOT will need to coordinate with various agencies including MAG, PAG, CAAG, Maricopa County, Pinal County and Pima County during the planning process.

Joint Transportation System Planning

Travelers need the ability to make a connection to their intended destination, requiring local transit systems and integrated land use patterns. To make the connection from ICR, local transit connections must be in place for travelers to reach their destinations. Locating a city's transit terminals for various systems within walking distance can improve ridership for all of the services. The City of Tucson has recently constructed a transit center across from the Amtrak Passenger Station, and is planning a modern streetcar system to operate generally between downtown and the University of Arizona campus that will interface with both terminals. Phoenix has recently opened a 20-mile light rail transit starter line with stations at several transit centers along the route. Both metropolitan areas are served by local and express bus service on a regional scale. Both are planning for future commuter rail systems in their metropolitan areas, with possible extensions to Pinal County.

Intercity Rail and express bus systems can boost development of the Tucson Modern Street Car and METRO LRT by providing connections between these modes. Commuter Rail Systems have the opportunity to connect to intracity light rail/ Modern Streetcar systems which in turn connect with the local bus network. The Sky Train currently being built by the City of Phoenix will provide transfer opportunities between the Sky Harbor International Airport, the METRO LRT station on Washington Street, and potentially Intercity and commuter rail service.

Together, these actions provide the foundation for an emerging transit system in the Sun Corridor. As commuter rail is still in the early planning stages in both metropolitan areas, this presents the opportunity to coordinate local system planning with ICR traversing the Sun Corridor, allowing shared rights-of-way, compatible infrastructures and shared station locations.

Estimated Costs

MAG estimates start-up costs for commuter rail at \$10-20 million per mile. This cost covers the acquisition of vehicles, infrastructure investments for stations, trackage and bridges, railroad signaling, and expenditures required to separate commuter rail from existing freight operations. Operating and maintenance costs will increase this capital estimate in varying amounts, depending on the level of service provided.



Connectivity between Intercity Rail, Light Rail, and local bus routes

The Joint Planning Advisory Committee (JPAC), comprised of MAG, PAG and CAAG, has been formed to work together to foster a successful and economically viable Sun Corridor.

3.1.4 Tourist Railroads

Opportunity Statement

Tourist railroads provide an alternative form of transportation to major destinations, as well as supporting one of the largest economic sectors in Arizona. Tourist Railroads have the potential to connect with the proposed intercity passenger rail system, by sharing depot locations and coordinating schedules.

Potential Actions:

- ✓ Partner with railroad operators to initiate and maintain tourist railroad service.
- ✓ Partner with local communities to create economic development opportunities surrounding tourist destinations.
- ✓ Partner with local communities and railroads to connect to a larger passenger rail network.

Background

Three tourist railroads exist in Arizona: the Grand Canyon Railway (GCRX), the Verde Canyon Railroad, and the seasonal Copper Spike service of the Arizona Eastern Railway (AZER). These railroads provide excursions or service to and from one destination.

The 64-mile GCRX connects the National Park Service hotels on the South Rim to the railroad's Williams depot. With a ridership of 240,000 in 2006, it is among the most popular tourist railroads in the United States. Between Memorial Day and Labor Day there are two round trips daily. A third train can be added during this peak season whenever demand calls for it. The rest of the year sees one daily round trip. The Grand Canyon National Park receives an average of 5 million visitors every year which translates into heavy traffic congestion and parking shortages, particularly in summer. The GCRX helps alleviate some of the traffic issues at the park by eliminating a portion of the vehicular traffic entering the park. Promoting additional ridership on the GCRX will offset some of the future traffic congestion experienced within the national park.

The Verde Canyon Railroad offers tourists round-trip excursions between the depot at Clarkdale and MP 18.3, the Perkinsville siding, providing several round trips daily. The trip provides a scenic tour of the Verde River Canyon, passing ancient Indian ruins and structures from the region's historic mining industry.

A seasonal passenger rail service, the Copper Spike, provides excursions Thursday through Sunday, two times a day. The Copper Spike departs from the original two-story Globe depot built in 1916 and travels to the Apache Gold Casino Resort on the San Carlos Apache Reservation. Arizona Eastern Railway is exploring additional opportunities for freight service and is looking at operating passenger rail between Globe and Safford which would include service throughout the San Carlos Apache Reservation.



The Grand Canyon Railway excursion train between Williams and Grand Canyon Village

Opportunities

Expand Tourism

Implementation of tourist railroads provide the opportunity to boost tourism in Arizona – with the railroad itself as a tourist attraction, as well as bringing in visitors and revenue to the town(s) anchoring the tourist train. Financial assistance programs could help initiate new tourist railroad corridors, such as an extension of the Copper Spike Railroad on the Arizona Eastern Railway to Safford, and the White Mountain Apache Scenic Railroad,

which is proposed to extend from McNary (HonDah Casino) to the Sunrise Ski Resort.

Right-of-Way Preservation

Railroads will become even more vital to Arizona as its population grows, so the rail network should be preserved. One opportunity for preserving rail corridors could be to lease or sell abandoned or out-of-service rail corridors to a short line operator that could run tourist railroads, which typically run at slower speeds and are lower in weight, therefore not requiring the level of improvements that would be needed to establish commuter passenger or heavy freight service.



3.2 Rail System Network Issues and Opportunities

Arizona could benefit from developing a balanced freight and passenger system that can respond to increased regional and international economic competition, constrained highway corridors, environmental challenges, and rising energy costs. Connectivity of the State's rail system allows more flexible and timely movements and greater access to customers.

3.2.1 Transcontinental Rail Congestion

Opportunity statement

Increasing the capacity of the transcontinental rail corridors across Arizona will enhance the State's ability to import and export freight by rail, and expedite the movement of freight nationwide.



A BNSF Freight Train passes through Flagstaff

Potential Actions:

- ✓ Partner with Class I railroads to implement operational improvements along transcontinental corridors, expanding the capacity for freight movements and providing additional opportunities for Intercity passenger rail.
- ✓ Partner to streamline the permitting process associated with major infrastructure improvements, such as adding new mainline tracks or constructing new classification yards.

The Sun Corridor market (Phoenix to Tucson) is projected to be almost as large as the current Los Angeles Basin market today, implying that substantially more freight moving east will be destined for Arizona.

Background

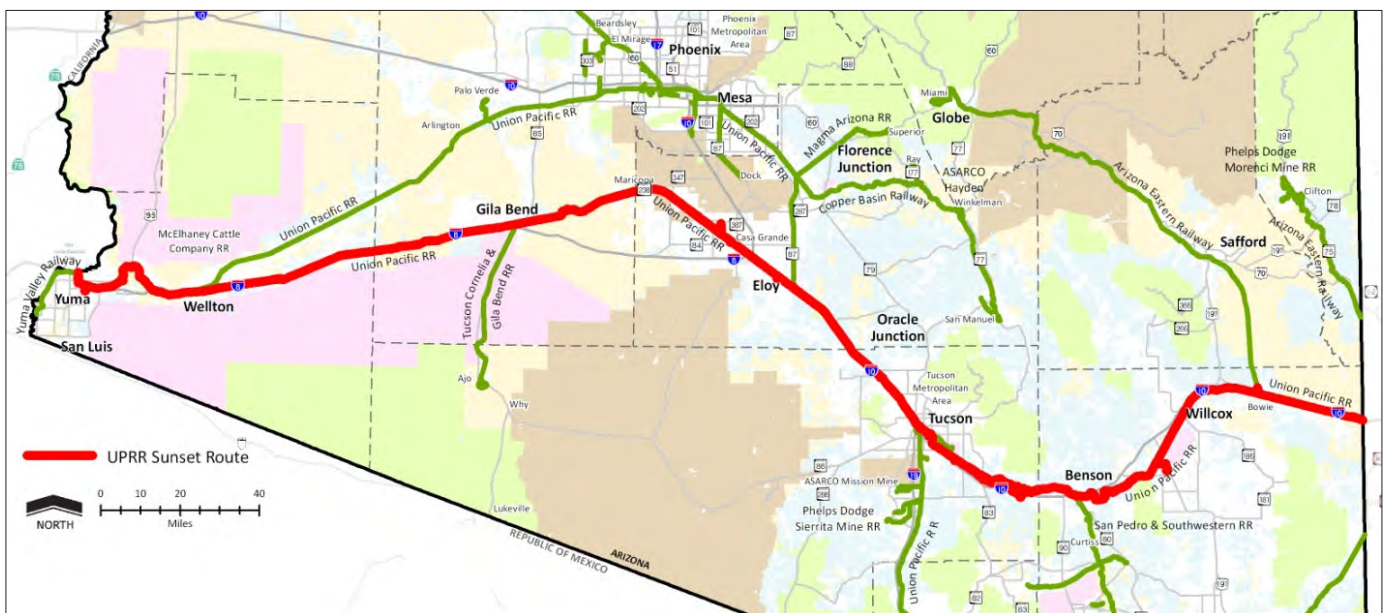
Approximately 130 million tons of commodities are currently transported via rail in Arizona, with over 75 percent of this traffic passing through the State. Inbound, outbound, and through rail freight tonnage is projected to triple in volume by 2050. While most of this traffic is expected to continue to pass through the State, the Sun Corridor market (Phoenix to Tucson) is projected to be almost as large as the current Los Angeles Basin market today, implying that substantially more freight moving east will be destined for Arizona. However, most of this freight is moved from the Los Angeles Basin to Arizona by truck. More efficiency in moving freight to Arizona and distributing it within the State will be required for rail to compete with the convenience of moving freight by truck.

Both the UPRR and BNSF have plans to expand their transcontinental routes to achieve greater freight capacity. Expanding these corridors will increase freight volumes and provide capacity for improved efficiency. Additional improvements are needed to classification and intermodal distribution systems for rail to be more competitive with moving freight by truck from Los Angeles.

Freight railroads are categorized as Class I, Class II (regional), and Class III (short lines). A railroad is classified as Class I if it has annual revenues exceeding \$378.8 million. Class II regional railroads have annual revenues between approximately \$40 million and \$378.8 million in 2009. Class III railroads have annual revenues less than \$20 million (1991 dollars). Two Class I transcontinental railroad corridors exist in Arizona: the UPRR Sunset Route mainline (425 miles) and the BNSF Transcon Corridor (390 miles).

The UPRR's mainline Sunset Route traverses the southern portion of the State in an east-west direction (Figure 13). This line carries large amounts of freight between cities on the Pacific Coast and major rail hubs in the Midwest and Texas. The average number of trains per day over this line has grown from 37 in 2001 to between 50 and 60 in 2007, with a slightly lower average today, due to the current economic downturn and decreased demand. The current corridor through Arizona is approximately 43% double-tracked, causing bottlenecks along the Sunset Route. Additionally, bottlenecks are caused by limited capacity of existing classification yards, including Phoenix and Tucson. UPRR also operates two branch routes that run north to Phoenix from Picacho, and south from Tucson to Nogales.

Figure 13 - UPRR Sunset Route



Traffic levels along the BNSF mainline peaked in 2008 at 120 trains per day, before the current economic downturn. The double-tracked Transcon Corridor (Figure 14) was nearing capacity in Arizona. Because it links the Port of Los Angeles (POLA)/Port of Long Beach (POLB) with Chicago, the Transcon Corridor handles two-thirds of BNSF's intermodal container or trailer on flat car traffic.

Opportunities

Removing bottlenecks and increasing capacity along the transcontinental routes will improve the efficiency of rail traffic, allowing greater volumes of traffic to travel to, from, and through Arizona; and permitting the State to take advantage of value-added, or enhanced, economic opportunities at existing and potential intermodal classification and logistics centers. Increasing the proportion of freight moving by rail can reduce the need for widening Interstate highways in Arizona.

Expansion of the Transcontinental Routes

UPRR is planning to improve the Sunset Route into a high-capacity route (double-tracked throughout Arizona), which will increase its use in the future. Half of this route from Los Angeles to El Paso was double-tracked by the end of 2006, with the remainder to follow once economic conditions improve. BNSF has begun triple-tracking through New Mexico and will pursue triple-tracking through Arizona when the economy recovers.

Adding capacity to the transcontinental routes would improve the movement of freight across the State, and can also provide an opportunity to increase the frequency of intercity passenger rail if the railroads will support it. Amtrak routes through Arizona (Sunset Limited and Southwest Chief) could more easily add train frequency and improve on-time performance. Additional intercity passenger routes between Arizona and other states could be more easily implemented along the transcontinental corridors once additional capacity is completed.

The opportunity exists to advance these plans by helping to secure federal or state funding to accelerate potential public-private partnerships. Through a public-private partnership with the railroad, where railroad and community needs intersect, public funding sources could be applied to help improve rail capacity at constrained locations throughout the State, which could improve freight movements and also increase opportunities for implementing intercity passenger service. Additionally, the State could assist in streamlining permitting processes between the railroads and the multiple government entities involved in granting the necessary approvals, reducing turnaround times to complete improvements.

Through public-private partnerships with railroads, public funding sources could be applied to help improve rail capacity at similar locations throughout the State, which could improve freight movements and

Figure 14 - BNSF Transcon Corridor



also increase opportunities for implementing intercity passenger service. Additionally, the State could assist in streamlining permitting processes between the railroads and the multiple government entities involved in granting the necessary approvals, reducing turnaround times to complete improvements.

3.2.2 Freight Rail Distribution Systems

Opportunity statement

The ability to distribute a larger proportion of the freight moving within Arizona by rail can help to create a more sustainable transportation system for the State. Several new rail support facilities would be needed to efficiently distribute freight in the Sun Corridor.

Potential Actions:

- ✓ Support construction of classification yards to provide additional capacity to serve Arizona industries by rail, and to consolidate some freight rail operations out of core urban areas.

Background

Due to the proximity of adjacent developments, the Phoenix and Tucson metropolitan area rail yards typically do not have the ability to expand to handle increased freight volumes. Both BNSF and UPRR have proposed projects that would enhance the capacity of existing rail yards in Phoenix and Tucson, providing an opportunity for more industries in the Sun Corridor to be served by rail.

BNSF currently has several facilities along the Phoenix Subdivision (Peavine) in the Phoenix metro area. There is limited opportunity to expand the Mobest Yard in Phoenix because of Interstate 10, which passes over the yard on elevated structures, and urbanized development surrounding the yard. The capacity of the Desert Lift facility in Glendale is limited to approximately 250,000 lifts per year, and expansion is not planned due to constraints from surrounding development.

UPRR's classification yards in Phoenix and Tucson support freight deliveries in Arizona. The largest yard is the Pacific Fruit Express (PFE) Yard in Tucson. Rail cars arriving from the west coast and Texas are shunted into trains based on destinations, including those destined for Phoenix. The PFE yard has reached its capacity, and as demand for deliveries in Phoenix and Tucson increase, additional yard capacity is needed for these freight movements to be completed by rail.

Opportunities

Developing a series of support facilities with greater capacity to serve the Sun Corridor may lead to an increase in the proportion of freight moved by rail (Figure 15).

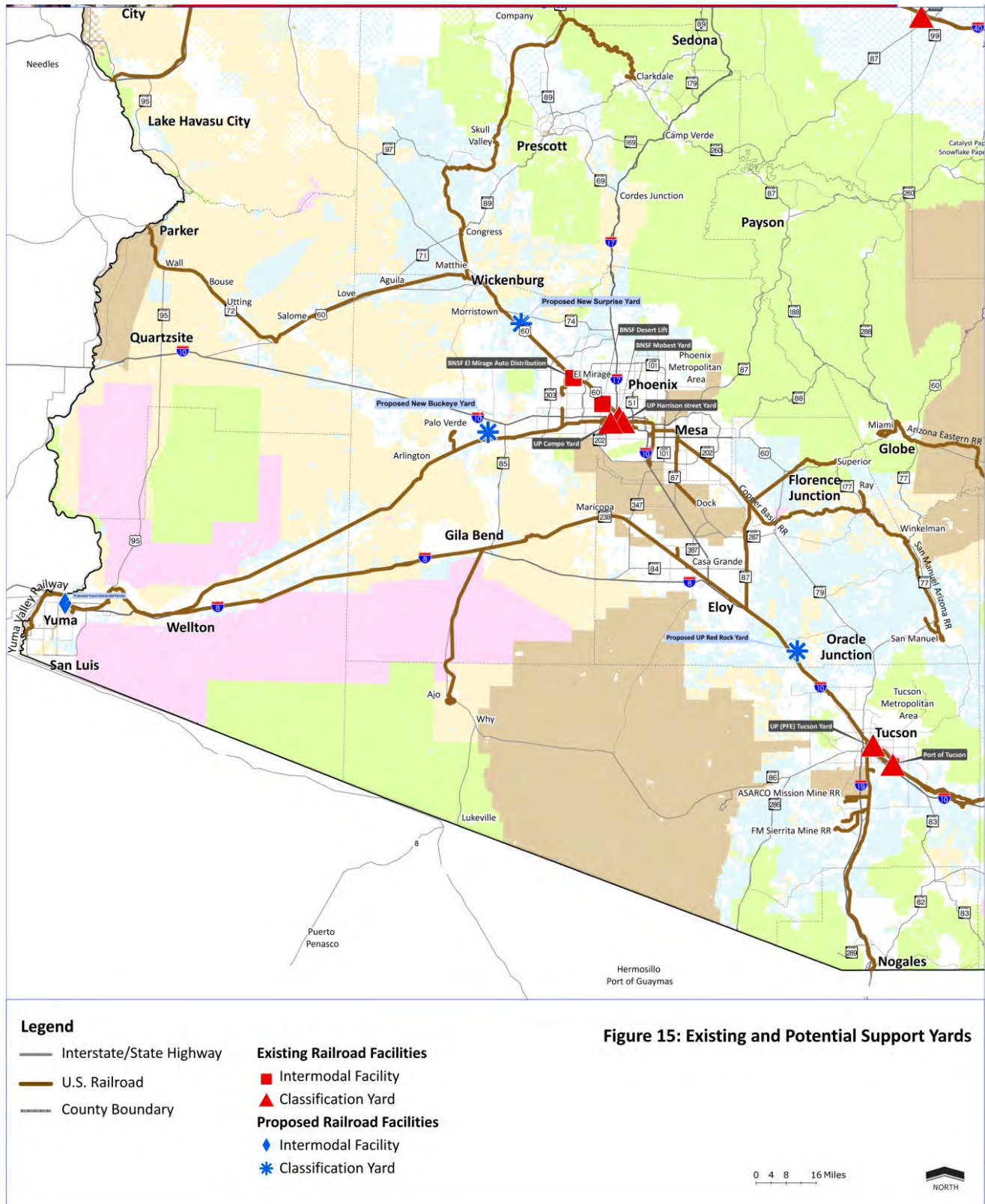
Red Rock Classification Yard

A proposed new UPRR classification yard near Red Rock presents an opportunity to supplement classification activities occurring at the Tucson Yard, increasing switching volumes and thereby enhancing the overall efficiency of the Sunset Route. The proposed yard at Red Rock will serve to break down and reclassify trains carrying goods destined for the Phoenix metropolitan area.



Union Pacific's Pacific Fruit Express (PFE) Yard located in Tucson is the largest classification yard in Arizona

Figure 15 - Existing and Potential Support Yards



By moving switching activities for Phoenix-bound trains from the Tucson Yard to Red Rock, train congestion in Tucson will be reduced. The Nogales Subdivision currently links with the Sunset Route through a direct connection into the Tucson Yard. If a classification yard at Red Rock is built, constructing a wye connection between the Nogales Subdivision and UPRR Sunset Route would permit direct traffic flow between Nogales and Red Rock, avoiding the Tucson Yard and therefore opening up capacity at the yard for other functions.

An additional benefit of the proposed Red Rock classification yard is that it is being planned to accommodate a logistics and freight distribution park, which would further promote job creation. Without additional infrastructure improvements such as the proposed classification yard at Red Rock or similar facilities, UPRR may not have the capacity to serve additional customers and future growth.

Development of such a logistics facility could evolve into an inland port and foreign trade zone (FTZ), to attract adjacent manufacturing that desires excellent intermodal transportation options. A recent study prepared for the Joint Planning Advisory Council (of MAG, CAAG YMPO and PAG) identified transportation logistics and associated manufacturing, as one of the key economic engines that could drive growth and development of the Sun Corridor over the next 40 years.

Buckeye Support Facility

UPRR currently conducts switching activities at its Harrison and Campo yards in central Phoenix and, to a lesser extent, at a small yard in Buckeye. UPRR has purchased significant additional property in Buckeye to create a rail/truck logistics center if economic activity levels warrant. As growth in the western portion of the Phoenix metropolitan area continues, the Buckeye Support Facility will allow rail deliveries to become more competitive with trucks within the region.

BNSF Support Facility

BNSF has also purchased significant additional property along the railroad in Surprise, which could be used to support future growth in the northwestern portion of the

Phoenix metropolitan area. Additionally, the yard could serve to consolidate some of BNSF's existing operations at this Surprise location, or at another location further northwest. Consolidating the operations from Mobest, the BNSF Desert Lift intermodal, and the El Mirage Auto Distribution yard at Surprise could reduce the number of trains traveling the Peavine route along Grand Avenue each day. Fewer trains traveling the Grand Avenue corridor would reduce the number of trains crossing each at-grade crossing along Grand Avenue, improving roadway safety and reducing delays.

Yuma Area Freight Opportunities

The Yuma area has been studying the opportunities to capitalize on the current freight movements through their community, and future freight movements from Mexico. Opportunities which are under consideration include an inland port, intermodal logistic center, and a new rail connection with Mexico.

Funding Railroad Facilities

Improvements to private railroad facilities are typically borne by the railroad companies, but there are many opportunities for the State of Arizona to enter into public/private partnerships with BNSF and UPRR. Increased capacity along the transcontinental railroad corridors can improve not only freight shipments throughout the country, but also economic activity in the State, on-time performance of intercity passenger rail, and opportunities to expand passenger service.

Estimating a cost for participation in a public/private partnership is project specific. The public contribution should depend on the expected benefit to the State of Arizona through improved transportation or economic growth realized.

Public investment for implementation of classification yards could be justified if the costs offset expenditures for other projects, such as eliminating the need for grade separations, or reducing the cost to implement passenger rail service.

3.2.3 Intermodal and Freight Logistic Centers

Opportunity Statement

Improvements to railroad infrastructure can spur economic development by better serving businesses that locate near railroads. Ancillary railroad facilities such as inland ports, intermodal yards, and freight logistics centers can provide opportunities to serve railroad customers while increasing local job growth and clustering auxiliary industries. Attracting adjacent economic development brings jobs to the State and helps to attract additional business for the railroad.

Potential Actions:

- ✓ Partner with railroads to locate and develop inland port and logistics centers along railroad corridors.
- ✓ Partner with short line railroads to improve operations and facilitate connections to intermodal and logistics centers, as well as mainline railroads.

Background

Arizona currently lacks a manufacturing industry base sufficient to balance state exports with current import levels. Currently, most freight trains leaving the major metropolitan areas carry waste or scrap metals, and a minimal number of export goods.

Although freight traffic is expected to grow in the future, the distribution of inbound, outbound and through traffic is not expected to change without restructuring of the Arizona economy. Currently, the major employment sectors in Arizona include aerospace, microelectronics, tourism, business services, and back-office operations. The construction sector is also unusually large because of the State's rapid growth. Arizona's original export activities - agriculture and mining - remain significant in many rural parts of the State, but do not contribute enough productivity to balance commodity imports.

Inland ports/logistic facilities are intermodal facilities that allow containerized freight to be shipped directly



Union Pacific trains haul freight along the Sunset Route

from the port terminal to an inland facility for trade processing, sorting, and other value-added services. The ability to develop inland port and logistic facilities in Arizona to spur economic development depends on meeting warehousing/distribution location requirements, particularly in relation to "just-in-time" product delivery needs. One logistic facility currently exists at the Port of Tucson, along the UPRR Sunset Route. Studies have been conducted for sites near Flagstaff and Yuma for future inland ports/logistic facilities, with discussion of an additional site near Kingman. From an economic perspective, inland ports/logistics facilities provide locations for value-added activities that create investment opportunities for Arizona, including freight manipulation, warehousing/distribution, and manufacturing – all of which bring jobs and improve the business climate for economic development.

Almost 75 percent of predicted Arizona employment growth will occur in the Sun Corridor. If Arizona achieves the growth expected, the State's economy will undergo massive expansion. Although forecasts are not available for individual sectors of employment, several sectors are targeted as emerging economic engines for the State. Emerging industries that include a manufacturing component and can expand the amount of goods exported from Arizona include:

- **Microelectronics:** While Arizona already has a niche in microelectronics design and



The State's biggest opportunity is to develop a mix of industries to strengthen the economy and generate employment opportunities

development, the opportunity exists for dramatically expanded manufacturing of such microelectronic technologies.

- **Medical/biotechnology:** This industry has recently been oriented toward research, but it will increasingly turn toward manufacturing medicines and other materials.
- **Renewable energy:** Renewable energy systems are gaining in popularity as the world's supply of fossil fuels declines. The opportunity exists to manufacture the equipment necessary to capture solar and wind energy (e.g., photovoltaic panels, wind turbines).

Opportunities

The State's biggest opportunity is to develop a mix of industries to strengthen the economy, generate employment opportunities, and increase exports in order to make the most efficient use of existing and improved freight rail infrastructure. These emerging economic drivers for Arizona may necessitate large industrial centers with access to long-haul freight movement. Such industries can take advantage of available freight infrastructure, increasing the amount of outbound goods from Arizona and balancing freight movement. Additionally, while promoting economic development and increasing commodities for export, industrial growth

will result in new demand for office, residential and retail space surrounding these industrial areas.

The following points summarize the attractiveness of locating inland port and warehouse/distribution facilities in Arizona:

- Arizona has several locations capable of serving the Class I railroads operating out of the POLA/POLB.
- Inland ports located in Arizona can accommodate northbound and southbound traffic generated by the North American Free Trade Agreement (NAFTA).
- Sites in Arizona provide direct access to I-8, I-10, I-17, I-19 and I-40 for intermodal truck movements.
- Arizona has no State inventory tax for distribution facilities.
- FTZ created as part of the inland port facility could receive property tax relief through existing Arizona State legislation allowing eligibility for an 80 percent reduction in State real and personal property taxes, and exempting inbound foreign goods from federal import taxation until distributed within the United States.
- Costs of doing business in Arizona are below the national average and about one-third lower than in California.

Development of Inland Ports/Logistic Facilities

Arizona has the opportunity to develop inland ports and associated warehouse/distribution facilities to help address some of the capacity constraints at the west coast deepwater ports and to serve the growing Sun Corridor.



Majority of import commodities arrive from foreign trade through POLA/POLB

The majority of import commodities arrive from foreign trade through POLA/POLB. The current annual capacity of these ports is approximately 28.5 million twenty foot equivalent units (TEUs). With substantial capital investment (about \$3 billion), capacity could nearly double. Forecasts of POLA/POLB container traffic demand range from 36.2 million to 56.4 million TEUs by 2020 – potentially exceeding their capacity. In the long run, trade with Asia will continue to grow. After the POLA/POLB reach capacity, there may be opportunities for the development of inland ports in Arizona, off-loading containers from ships and directly transferring them to trains headed for inland ports, with customs facilities and FTZs provided at the inland locations.

Prime sites for inland ports are the junctions of transportation corridors, including railroads, freeways, and airports. Several such junctions already exist in Arizona. Smaller infrastructure investments, such as railroad sidings or access roads, may be required, but much of the public investment has already been made.

Job Creation

The main benefit of inland port/logistic facility economic development to the Arizona public is the creation of jobs. Typically, one million square feet of logistics center employs approximately 500 people, depending on the level of automation. Developable acres of inland port facilities typically range from 300 to 700 acres for a moderate-sized facility, and up to 5,000 acres for a large facility.

Spinoff Economic Development

If an inland port is paired with a FTZ, the related tax advantages will attract certain industries – creating an industrial agglomeration. For example, transshipment companies often prefer facilities with FTZs to defer import taxes until the products are “shelf-ready” and prepared for transport, reducing holding costs. Implementing inland port/logistics facilities with FTZ designations provides the opportunity for spinoff economic development.

3.2.4 Class I Branch Lines and Short Line Railroads

Opportunity Statement

Improvements to key branch lines of BNSF and UPRR will promote more freight movements in Arizona by rail, and can provide opportunities for additional passenger rail service. Upgrades to Arizona’s short line system may provide additional opportunities for expanding the State’s manufacturing sector.

Potential Actions:

- ✓ Partner with UPRR to rehabilitate and reactivate the Wellton Branch.
- ✓ Partner with BNSF to improve operations along the Peavine line.
- ✓ Develop a short line assistance program for strategic rail investments.

Background

Creating a comprehensive and well connected railroad system in Arizona can help with commodity distribution

throughout the State. Secondary Class I corridors can provide an opportunity to locate industrial centers, while also connecting metropolitan areas to Class I transcontinental facilities. Two major facilities that make such connections are the BNSF Peavine line connecting the BNSF Transcon Corridor to Phoenix, and the UPRR Wellton Branch connecting the UPRR Sunset Route to Phoenix from the west.

Wellton Branch

The Wellton Branch is a segment of the UPRR Phoenix Subdivision through west central Arizona. Thirty miles of the Wellton Branch between Phoenix and Buckeye has significant industrial development along its right-of-way and is currently in service. The McElhaney Cattle Company has trackage rights on six miles of the branch east of Wellton and handles about 11,000 carloads of grain annually. In between, however, the track is out of service and would require rehabilitation in order to be reactivated (Figure 16).

Rail Network Enhancements

Several key rail network improvements have been identified that can reduce the impacts that existing at-

grade crossings have on the surrounding communities. A highway-rail crossing safety account could be structured to contribute to rail network enhancements that can alleviate delays at existing at-grade crossings. Examples of some rail network improvements that have been suggested include:

- **Rio Rico Siding:** Construction of a new set out track north of the community of Rio Rico may reduce train delays in Nogales. The new set-out track in combination with a passing siding would become a waiting location for trains destined to cross the international boundary. This would reduce the number of long train delays in downtown Nogales and may reduce the need for grade separation structures.
- **Amtrak Sidings:** At several Amtrak stations in Arizona, the addition of a new siding for Amtrak trains could reduce impacts to the surrounding communities. For instance, an Amtrak station is located in Maricopa. When the Sunset Limited train stops there it blocks the SR 347 grade crossing, and potentially delays freight trains passing through the community. A siding for

Figure 16 - Wellton Branch Rehabilitation Area



Amtrak trains could be designed so that they would not block freight trains or auto traffic on SR 347. Similar situations occur at other Amtrak stations where the addition of a siding track might improve operations. However, since Amtrak trains stop no more than twice a day, usually during off-peak hours, the cost of constructing a siding may exceed the benefit.

Peavine Line

The BNSF provides rail freight service to metropolitan Phoenix using its Phoenix Subdivision (Peavine line), connecting the Transcon Corridor just east of Williams with Phoenix (Figure 17).

Figure 17 - BNSF Peavine Line



Short Line Railroads

The ability to maintain the existing infrastructure in a state of good repair is a challenge for the short lines, which lack the resources of larger railroads. Many of these lines suffered from years of deferred maintenance before being spun off by the Class I carriers. Many short lines find it difficult to catch up, as their limited resources are expended in making emergency repairs.

Short line railroads are required to maintain infrastructure and pay taxes on active and dormant rail corridors. This expenditure on inactive corridors can burden a short line railroad company to the point of abandonment.



Short line railroads could struggle to maintain the existing infrastructure in a state of good repair without financial assistance

Opportunities

The opportunity exists to partner with UPRR to reopen the Wellton Branch for rail service. The route allows ample opportunity for economic growth due to the amount of private and State Trust land along the line. Inland ports/logistic facilities or manufacturing industries could use this line for transfer of goods to the UPRR Sunset Route. Improving this corridor may also allow opportunities for shared freight and passenger service. This could result in the restoration of Amtrak service to Phoenix for the first time since 1996. Additionally, MAG studied the possibility of commuter rail along this line – the Yuma west commuter rail study – from Phoenix to Buckeye.

BNSF runs only about ten trains a day on the Peavine line. With improvements to the route, the Peavine line could provide a crucial link in a future statewide freight and passenger rail system. From a freight perspective, the corridor connects to the Arizona & California Railroad—the most direct rail route between Phoenix and Los Angeles. A significant amount of private land also exists along the corridor, allowing the opportunity for added economic development. While the line could handle increased freight traffic in its current condition, improvements such as track signaling would be required to run passenger service on the line.

From a passenger perspective, the segment of the corridor between Wickenburg and Phoenix could provide a leg of the proposed MAG commuter rail system, and could also be used to develop a northward extension of intercity rail outside the central Sun Corridor. To make such a passenger rail system successful, operational improvement to the Peavine line is critical.

Short line railroads can be major assets for industrial manufacturing and agricultural sites (e.g., mines, fertilizer and fuel terminals) located away from Class I freight railroads, connecting with inland ports or logistics centers for transshipment. These industries may provide spinoff or ancillary economic development, having the added opportunity of offering employment options to residents. Many short lines, however, require operational improvements to handle container traffic or heavy freight loads (such as loaded hopper or tank cars) compatible with Class I shipments.

A rail assistance program for short line railroads could provide them with investment capital and help them comply with FRA regulations. Arizona would require new legislation to form and fund a rail assistance program, and to take full advantage of potential federal funding opportunities.

However, as required by the FRA, planning for passenger rail service along the Wellton Branch would require consideration of installation of PTC measures, as required by the FRA, and potential allocation of additional funds.

Estimated Costs

The immediate cost to ADOT of fostering inland port/intermodal opportunities is minimal. Longer-term costs could include feasibility and planning studies, but are not expected to include construction costs – unless the State enters into an agreement to assist with access roads or other infrastructure needs. Other state agencies such as the Arizona State Land Department or Arizona Commerce Authority could also incent development of such facilities through land provision at reduced costs. Providing land at reduced costs will require changes to the constitution of the State. However, infrastructure development at these sites will lead to enhanced land values and will eventually benefit the State.

Estimates have predicted the cost of renovating the Wellton Branch at \$40 to \$60 million if rehabilitated to basic freight standards, and if passenger rail is implemented along this corridor, estimates indicate the cost could increase to \$150 to \$300 million. A feasibility study must be completed to determine the extent of renovations required and then a more accurate cost estimate can be determined. This cost would include not only the 130-mile Wellton Branch, but the full 210 miles of the UPRR Phoenix Subdivision, allowing Amtrak service access to Phoenix. Added passenger rail improvements would bring the track in compliance with Amtrak passenger rail standards.

If intercity rail, in addition to commuter rail, is pursued on the BNSF Peavine line, double-tracking from Phoenix

Wisconsin Department of Transportation purchased an abandoned 31-mile shortline in west central Wisconsin because an economic impact analysis showed that enhanced market access benefits industries and the region could produce an annual average increase in employment of 2,200 jobs which equated to a 91 million dollar economic benefit.

to Wickenburg may be necessary at an estimated cost of \$125 million. Additional track upgrades beyond Wickenburg, passenger rail stations, and rolling stock would also be required.

3.2.5 Rail Corridor Preservation

Opportunity Statement

Railroads are important assets to the State and will become even more vital to Arizona as its population and employment increases with growth in the Sun Corridor. The existing rail network should be preserved, not only for freight traffic, but also for passenger service. Abandoned rail corridors may provide valuable recreational opportunities. The objective of rail preservation is to prevent the loss of any additional rail corridors.

Potential Actions:

- ✓ Regularly update the statewide rail inventory.
- ✓ Create a rail corridor preservation program to preserve abandoned rail lines for future uses (e.g., rail bank).

Background

Arizona State Transportation Board Policy 9 states that “it is the policy of the Board to advocate preserving rail corridor property as an important resource for future transportation policies.” ADOT completed an Arizona Railroad Inventory and Assessment in 2007 that catalogued all existing railroad facilities in the State, as well as investments underway or under discussion. However, not all the necessary data has been available to clearly prioritize preservation needs.

Opportunities

Railroad Asset Inventory

As a baseline for future investment, an inventory of railroad assets (Class I railroads and short lines) can serve as a helpful tool. With a current railroad inventory, the State can determine which corridors to prioritize for preservation. Consistent data for each railroad has not



An inventory of railroad assets can serve as a tool for future investments

always been available, but should be obtained to create a comprehensive inventory.

Rail Banking

The opportunity also exists for the State to directly purchase railroad rights-of-way to prevent branch line abandonments. In this situation, rail lines can be leased out to and operated by short lines, used as trails, or held for future use. The objective of rail preservation is to prevent the loss of any additional rail corridors. The Rails to Trails Program involves a trail being constructed with the understanding that the corridor can revert back to a railroad line if necessary (and politically feasible).

A rail bank provides a mechanism to manage inactive railroad corridors for possible future transportation uses. Once abandoned, railroad right-of-way can be difficult or impossible to recover for future transportation use. Some railroad rights-of-way were acquired through government land grants that may be conditional on continuous operation of the line, while others are an easement that reverts to the property owner if the line is not used for transportation purposes. If the State anticipates any future transportation use for the rail lines within its borders, it should, at a minimum, rail bank the lines in order to preserve them for that potential use. Rail banking preserves the rail line, generates minimal costs to the State, and relieves the railroad from maintaining

the line. Generally speaking, rail banking leaves the tracks, bridges, and other infrastructure intact, relieving the railroad operating company from responsibility of maintenance and taxation. Often the tracks are put in custody of a State transportation agency, who then seeks a new operator for possible rehabilitation or reactivation. This helps ensure the possibility of future restored rail service when new economic conditions may warrant resuming operation.



Abandoned railway corridors can be difficult to recover for future transportation use

Federal Funding

Several opportunities exist for both the State and railroads to apply for federal grants. If acquired through the State, the opportunity exists to pass this money to short line railroads. Several grants are available through the FRA, including the Railroad Rehabilitation and Improvement Financing Program. Railroad Rehabilitation and Improvement Financing Program was established by the Transportation Equity Act for the 21st Century (TEA-21), amended by the Safe Accountable, Flexible and Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU), and may be reauthorized under

the next transportation bill. Under this program, the FRA is authorized to provide direct loans and loan guarantees of up to \$35 billion. One-fifth of this amount (\$7 billion) is reserved for projects benefiting freight railroads other than Class I carriers.

Funds provided under the Railroad Rehabilitation and Improvement Financing Program can be used to: (1) acquire, improve, or rehabilitate intermodal or rail freight or passenger equipment or facilities, including track, components of track, bridges, yards, buildings and shops; (2) refinance outstanding debt; and (3) develop or establish new intermodal or railroad facilities. The maximum loan amount is based on the remaining available funds under the program's authorization. Direct loans can fund up to 100 percent of a railroad project, with repayment periods of up to 35 years and interest rates equal to the government's cost of borrowing. Eligible borrowers include railroads, State and local governments, government-sponsored authorities and corporations, and joint ventures that include at least one railroad.

Estimated Costs

The cost of purchasing or assisting short lines can vary greatly. To have a strong short line rail system in the State, four types of capital investment are needed:

- **Track improvements:** Upgrades of existing track so that all short line railroads can handle larger and heavier railroad cars, and possibly construction of new tracks to access new markets.
- **Bridge improvements:** Repairing, reconstructing and constructing bridges to improve their safety and load-bearing capacity.
- **Traffic and train control:** Installing PTC as required by the FRA.
- **Right-of-way preservation:** Preserving short line right-of-way for future transportation corridors statewide.

Funding is also needed for short line operations and maintenance, and administrative costs of the short line assistance program.

3.2.6 New Railroad System Development

Opportunity Statement

To facilitate mobility in a statewide rail system, new corridors may need to be constructed to accommodate changes in travel patterns, take advantage of new economic development opportunities, and improve safety systemwide.

Potential Actions:

- ✓ Establish several new rail corridors which are determined to be feasible
- ✓ Future High Capacity Facilities will be planned as Multi Modal Corridors
- ✓ Reserve space for utilities along future multimodal corridors

Background

New railroad corridors have been proposed in Arizona to facilitate future freight and passenger rail transportation, including a north-south rail corridor in the Hassayampa Valley (Figure 12) and the South Mesa Rail Spur.

The first transcontinental railroad line, known as the “Overland Route” was built between 1863 and 1869 by the Central Pacific Railroad of California and the Union Pacific Railroad. Opened for through traffic on May 10, 1869 with the driving of the “Last Spike” at Promontory Summit Utah, a mechanized transcontinental transportation network that revolutionized travel and the economy of the American west was born.

Potential Phoenix-Las Vegas Multimodal Corridor

A new interstate route is the proposed route connecting Phoenix to Las Vegas in Nevada and eventually to Seattle in Washington. Phoenix and Las Vegas metropolitan areas are the two largest urban regions in adjacent states not featuring a direct interstate connection. The corridor would be approximately 285 miles in length between Phoenix and Las Vegas and most likely follow the existing U.S. Highway 93 via the proposed ‘Hassayampa’ corridor. The proposed Interstate route may be developed as a multimodal corridor, including freight rail, and is part of the Canamex high priority corridor, which is envisioned to include intercity or high-speed passenger rail service.

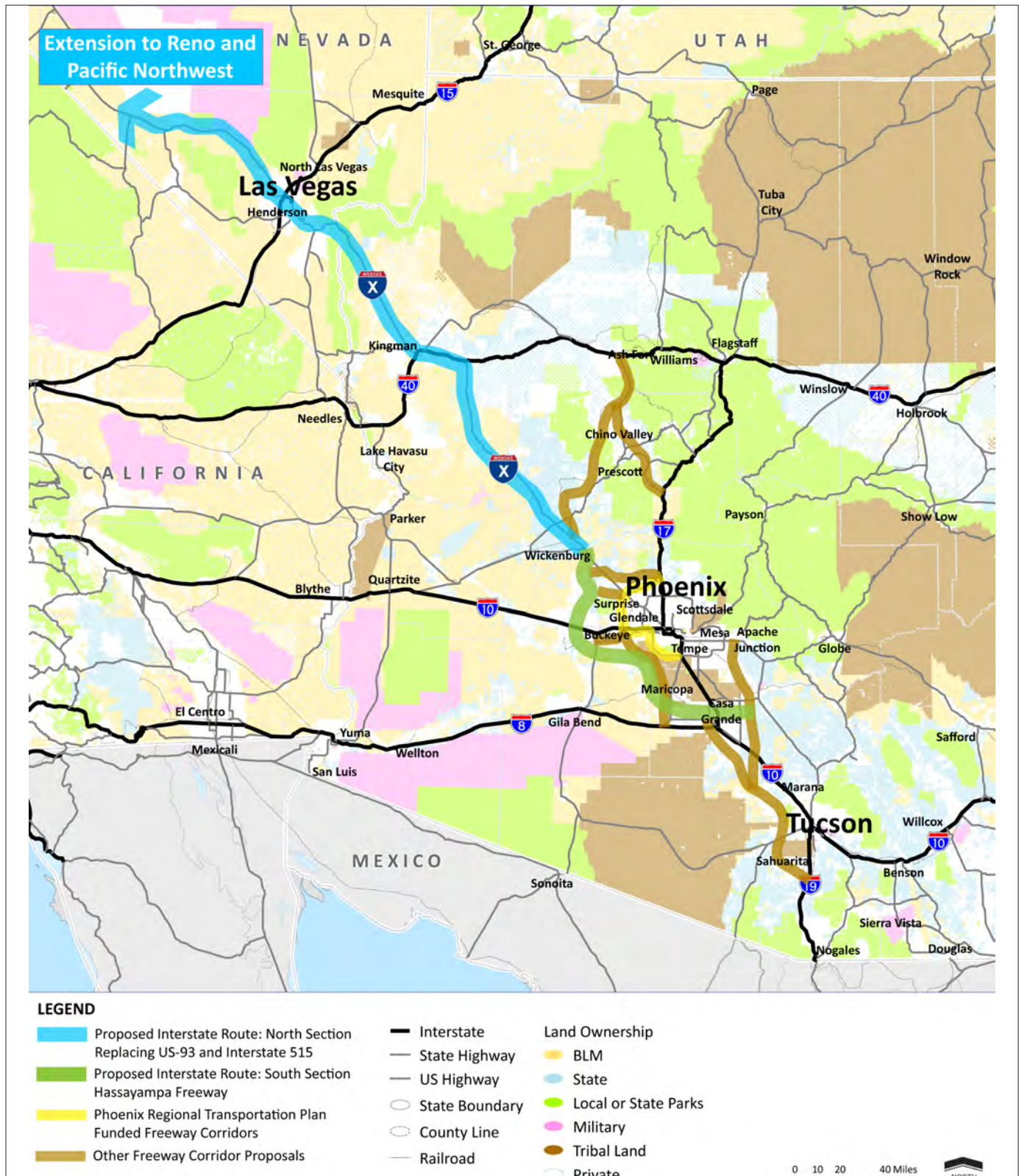
The CANAMEX Corridor Project is a joint project of Arizona, Nevada, Idaho, Utah and Montana, with the primary objective of developing and implementing the CANAMEX Corridor Plan. The Plan provides areas of collaboration by the states with the goals of stimulating investment and economic growth in the region and enhancing safety and efficiency within the corridor. CANAMEX includes transportation, commerce and communications components. The transportation component calls for the development of a continuous four-lane roadway from Mexico through the US CANAMEX states, into Canada.

Hassayampa Valley

MAG completed the I-10/Hassayampa Valley Transportation Framework Study in 2007. The study proposes a year 2050 transportation framework for the 1,400 square miles bounded by SR 303L on the east, 459th Avenue on the west, the alignment of SR 74 on the north, and the Gila River on the south.

MAG and its partners in the study recognized the importance of transit and rail in meeting the future travel and freight transportation needs of the Hassayampa Valley. The study recommends a new north-south railroad line connecting the UPRR and BNSF and provide opportunities for commuter and intercity rail.

Figure 18 - Potential Phoenix-Las Vegas Multimodal Corridor



South Mesa

The Black Mesa and Kayenta Mines located in northern Arizona are the largest concentration of coal deposits in the State. Coal mined at these locations is moved through a 26-mile network of conveyor belts to the railhead of the Black Mesa and Lake Powell Railroad. This 78-mile short line moves coal from the railhead to the Navajo Power Generating Station near Page. Currently the Navajo Power Generating Station is the only Arizona customer for this coal.

Three other coal-fired power generating stations are located in northeast Arizona: the APS Cholla Power Plant, the Salt River Project Coronado Power Plant, and the Tucson Electric Power Springerville Power Plant. Each of these plants is located along the existing BNSF rail network, and each receives daily coal shipments from New Mexico and Wyoming. A new rail connection between the mines and the BNSF Transcon Corridor near Flagstaff would allow coal mined at Black Mesa and Kayenta to be delivered to all of the power plants in Northern Arizona located along the BNSF rail system and beyond to international markets, potentially reducing the cost of coal used at these power plants and reducing the carbon footprint of its delivery.

Opportunities

Hassayampa Rail Corridor (Potential Interstate 11 Corridor, Figure 19)

This corridor could start at the BNSF Peavine line near Morristown, running south along the proposed Hassayampa Freeway to the UPRR Wellton Branch, and continuing south parallel to SR 85 and the proposed Hidden Waters Parkway to Gila Bend, where it would connect to the UPRR Sunset Route. This corridor is very conceptual and requires additional study to determine an alignment. North of the Gila River, this corridor is planned in conjunction with a new freeway corridor, running through or near several proposed master planned communities. The land south of the Gila River is environmentally sensitive, and positioning a new rail line along an existing roadway (e.g., SR 85) might be the least intrusive alternative.

Figure 19 - Proposed Hassayampa Rail Corridor



As much of this corridor traverses greenfield private and State Trust land, opportunities for new industrial development or logistic facilities exist. Current master planned communities such as Douglas Ranch and Belmont in the Hassayampa Valley are already designating land adjacent to this multimodal transportation corridor (rail and highway) for industrial and major employment uses.

The new rail corridor could provide a transit spine through the Hassayampa Valley, linking future economic activity centers and supporting future population and employment growth. A north-south connection would link the proposed MAG commuter rail routes on the BNSF/Grand Avenue and UPRR/Yuma West corridors, allowing commuters in the Hassayampa Valley to gain access to central Phoenix. Additionally, the new rail corridor would connect the many future major classification yards of

the BNSF (near Surprise) and UPRR (near Buckeye) thus allowing interchange traffic to occur outside the Phoenix metropolitan area, as well as providing access to both Class I railroads in Arizona with any potential future new railroad links to Mexico.

South Mesa Rail Corridor

The Hopi Tribe and Navajo Nation have proposed implementing a 115-mile freight rail line from the Black Mesa and Kayenta Mines, connecting to the BNSF Transcon Corridor east of Flagstaff (Figure 20). This rail connection would allow the delivery of coal from the mines to several coal-fired power plants in Arizona and international markets.

Figure 20 - Proposed South Mesa Rail Line



Currently Arizona imports 16 million tons of coal at a cost of \$0.6 billion per year, shipped from the Powder River Basin in Wyoming, traveling over 1,200 miles daily to

meet the demands of Arizona power plants. Constructing a new rail line from the Black Mesa and Kayenta mines provides the opportunity to supply coal from a location within 300 miles of most of the large coal-fired power plants in Arizona bringing jobs, royalties, tax revenue, and more to Arizona while also lowering the delivered costs of coal paid by the State's regulated electric utilities, and hence, lowering electricity rates in the State.

Estimated Costs

The initial cost associated with developing new rail corridors would be that of setting aside right-of-way for future development. Right-of-way preservation can begin with completion of approved environmental documentation. This will require one or more AA/EIS for the corridor as a whole, or for individual segments.

Additional AA/EIS work will be required for planning and designing the rest of the proposed rail line. Discussions will be necessary to determine ownership and operation of the new line, which would include shared-use agreements for freight and passenger rail.

The Hassayampa corridor and South Mesa rail line may provide opportunities to create public/private partnerships for implementation of new corridors.

The Hopi Tribe and Navajo Nation have proposed implementing a 115-mile freight rail line from the Black Mesa and Kayenta Mines, connecting to the BNSF Transcon Corridor east of Flagstaff, which provides the opportunity to supply coal from a location within 300 miles of most of the large coal-fired power plants in Arizona. This will bring jobs, royalties, tax revenue, and new opportunities to Arizona while also lowering the delivered costs of coal paid by the State's regulated electric utilities, and hence, lowering electricity rates in the State.

3.3 Safety and Congestion Mitigation Issues and Opportunities

Arizona would benefit from providing a safe rail system by providing alternatives for emergency access routes, grade separations at rail/highway crossings, network enhancements to mitigate congestion, and improvements to wildlife connectivity.

3.3.1 Public Rail Grade Crossing Improvements

Opportunity Statement

Reducing the number of conflict points between vehicles and trains will improve the safety for the traveling public, while reducing the risk for highway agencies and railroad companies. Converting existing at-grade railroad crossings to grade separations can improve traffic operations in Arizona communities, and reduce rail delays due to incidents.

Potential Actions:

- ✓ Develop a comprehensive data collection system for at-grade crossings, which can include traffic and incident information to help prioritize grade separation or at-grade crossing elimination/consolidation projects.
- ✓ Implement a Grade Separation Program that could provide a dedicated funding source to construct improvements at the state's highest-priority crossings, and provide operational improvements by allowing for increased speed.
- ✓ Implement key rail network improvements that can help reduce traffic delays in the surrounding communities.

Background

Arizona Public Rail Grade Crossings

Rail is one of the safest transportation modes and great improvements have been made in reducing accidents in recent decades. However, there are concerns about

the safety and security of railroad infrastructure. Grade crossings, trespassing, and rail speed limits are key safety and mobility issues.

Public and private rail grade crossings are of critical importance to all levels of government because of the crashes that occur at these locations. Arizona has 805 public at-grade railroad crossings. Many crossings around the State are not signalized and lack automatic crossing gates. Reducing the number of at-grade rail crossings by eliminating at-grade crossings and constructing grade separations eliminates the frequent interaction between trains, vehicular, and pedestrian traffic, facilitating the possibility for trains to operate at higher speeds and increasing the capacity along existing rail corridors.

The Federal Highway Administration (FHWA) administers federal grade crossing safety funding to the states, including Arizona. The FHWA Section 148 Highway Safety Improvement Program, FHWA Section 130, and SAFETEA-LU Section 1103(f) provide funding to states for use in public highway-rail grade crossing safety projects.



Reducing the number of conflict points between vehicles and trains will improve the safety for the traveling public, while reducing the risk for highway agencies and railroad companies

FRA is responsible for safety inspection of grade crossings at non-highway intersections. The ACC assists FRA in carrying out certain rail safety functions. Both the ACC and FRA inspect portions of Arizona's railroads annually. The extent of ACC's regulation of safety at public railroad crossings extends beyond inspections and has the



At-grade rail crossings through downtown Flagstaff lead to vehicular traffic congestion

responsibility and authority for evaluating all requested modifications to public railroad grade crossings and approving appropriate modifications. ADOT's Utility and Railroad Engineering Section administers the federal railroad/highway crossing improvement program and compiles data related to at-grade crossings in the State.

One of the major findings of the ADOT Draft Multimodal Freight Analysis Study is the need to improve crossing safety. It recommends replacing at-grade crossings with grade-separated crossings to the extent feasible. Public railroad crossing closure is coordinated by the local agency that is responsible for the road and the affected railroad. An Opinion and order is required from the Arizona Corporation Commission for all public crossing removals. The railroad and road agency will then remove their respective facilities from the crossing. Either party can start the process to close a crossing, but both must agree to it, and the ACC must issue an order allowing it. Removal of private railroad crossings is between the private owner and the affected railroad only and is governed by the agreement between the 2 parties. However, it notes that freight rail operations often do not significantly benefit from investments in crossing improvements and that local communities may lack the resources to fund crossing improvements on their own.

The railroads provide support for Operation Lifesaver, a non-profit public education organization whose goal is

to reduce collisions, deaths, and injuries at rail crossings and railroad rights-of-way nationwide. Public education, through organizations such as this, may help reduce the number of injuries sustained by Arizonans every year.

Community Recommendations (Examples)

Several communities within Arizona have studied and made recommendations related to public grade crossings, as follows:

- The city of Flagstaff completed a feasibility study in 1999 that evaluated alternative routes for a railroad bypass around the community. Relocation of the railroad around the city would remove several at-grade crossings located in downtown Flagstaff that delay traffic and raise safety concerns. The feasibility study recommended not a rail bypass, but construction of three grade separated crossings. The city recently completed a grade separation between the BNSF Transcon Corridor and 4th Street, and is currently in the planning phase of another grade separation at Lone Tree Road.
- SR 347 is a north-south highway through the city of Maricopa which has an at-grade crossing of the UPRR Sunset Route. Traffic delays due to trains blocking the highway have led the city to complete several studies to improve access

across the rail line. Recommendations include new grade separations at SR 347 and White and Parker Road, plus a potential bypass roadway located west of the SR 347 corridor.

- The city of Nogales has completed a Nogales Railroad Small Area Transportation Study that recommended locations for pedestrian and vehicular grade separations over the UPRR Nogales Subdivision. The grade separations are recommended to enhance vehicular and pedestrian mobility in the downtown area of Nogales, and also to improve emergency response. Several freight trains cross the international border at Nogales every day, and on many occasions experience long waits for permission to proceed across the border. The waiting trains block most roadway crossings in the downtown area of Nogales, which can cause emergency responders to travel out of direction.
- The Regional Transportation Authority (RTA) of Pima County has developed a regional transportation plan for the Tucson metropolitan area, which includes several grade separation projects in Tucson and Marana.

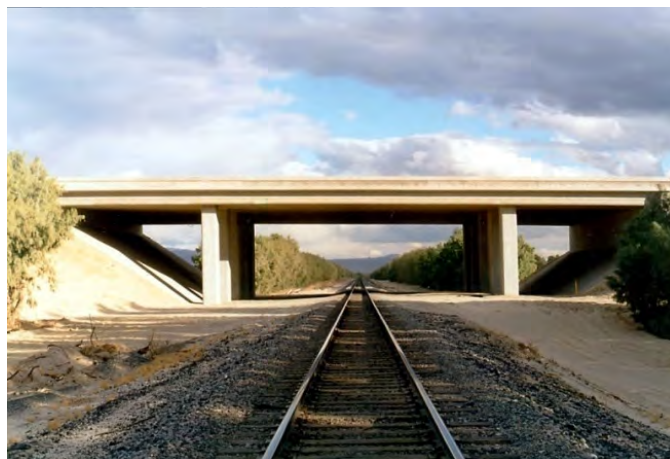


The Nogales Railroad Small Area Transportation Study has identified locations for potential grade-separations within the City of Nogales

grade crossings. Removing the delay at blocked public crossings improves rail and highway operations and can provide air quality benefits through fewer vehicles idling at crossing gates.

To expedite the completion of high-priority grade separation improvements, a comprehensive data collection system on existing grade crossings should be implemented to document the highest-priority crossings in the State. This could also prioritize the locations where FHWA Section 130 Highway-Rail Grade Crossing Program funds are distributed throughout the State.

A dedicated funding source could be established to implement grade separations that are considered high priority. The State of California has established a Highway-Rail Crossing Safety Account, with \$250 million available



A Dedicated funding source is required to implement grade separations

Opportunities

Grade Separation Program

At-grade vehicle conflicts increase liability exposure for railroads and the public, and these conflicts interrupt vehicle, pedestrian and bicycle traffic and can increase emergency response times. The optimal safety improvements for crossings are to build structures that completely separate a roadway from the railroad. This eliminates the risk of collisions, reduces noise levels from train horns, and relieves congestion. Elimination of these traffic stoppages also improves emergency incident response since first responders are not forced to take detour routes to emergency calls due to blocked at-

for completion of high-priority grade separation and crossing safety improvements. The program requires a one-to-one match from the local communities benefiting from the grade separation. If an at-grade crossing is eliminated, the affected railroad company is required to contribute funding to the project.

3.3.2 Wildlife Corridors

Opportunity Statement

Enhancing habitat connectivity will avoid, minimize, and/or mitigate the detrimental effects caused by the built environment to ensure Arizona's wildlife continues to flourish.

Potential Actions:

- ✓ Work with the Arizona Game and Fish Department (AGFD) to implement wildlife movement corridors along existing rail corridors
- ✓ Plan appropriate wildlife crossings for any new or expanded rail lines proposed in Arizona

Background

The varied landscapes and climates that draw people from all over the world to Arizona are also responsible for the tremendous plant and animal diversity. Ranking third in the nation for overall biodiversity, Arizona has nearly 900 vertebrate wildlife species in habitats ranging from low deserts to alpine biotic communities.

The Arizona Wildlife Linkages Workgroup, a partnership of public and non-governmental agencies, completed a study known as Arizona's Wildlife Linkages Assessment in 2006, which documented and mapped initial efforts to identify habitat blocks, fracture zones, and potential linkage zones. The purpose of the assessment was to promote habitat connectivity for Arizona's wildlife. The assessment was intended to provide a framework for land managers and planners to assess opportunities for mitigation, such as wildlife crossings, land protection measures, and community planning. Through this planning process, a map was created that illustrates major habitat blocks and linkage zones in Arizona (Figure

21). Many of these linkage zones span Class I railroad corridors.

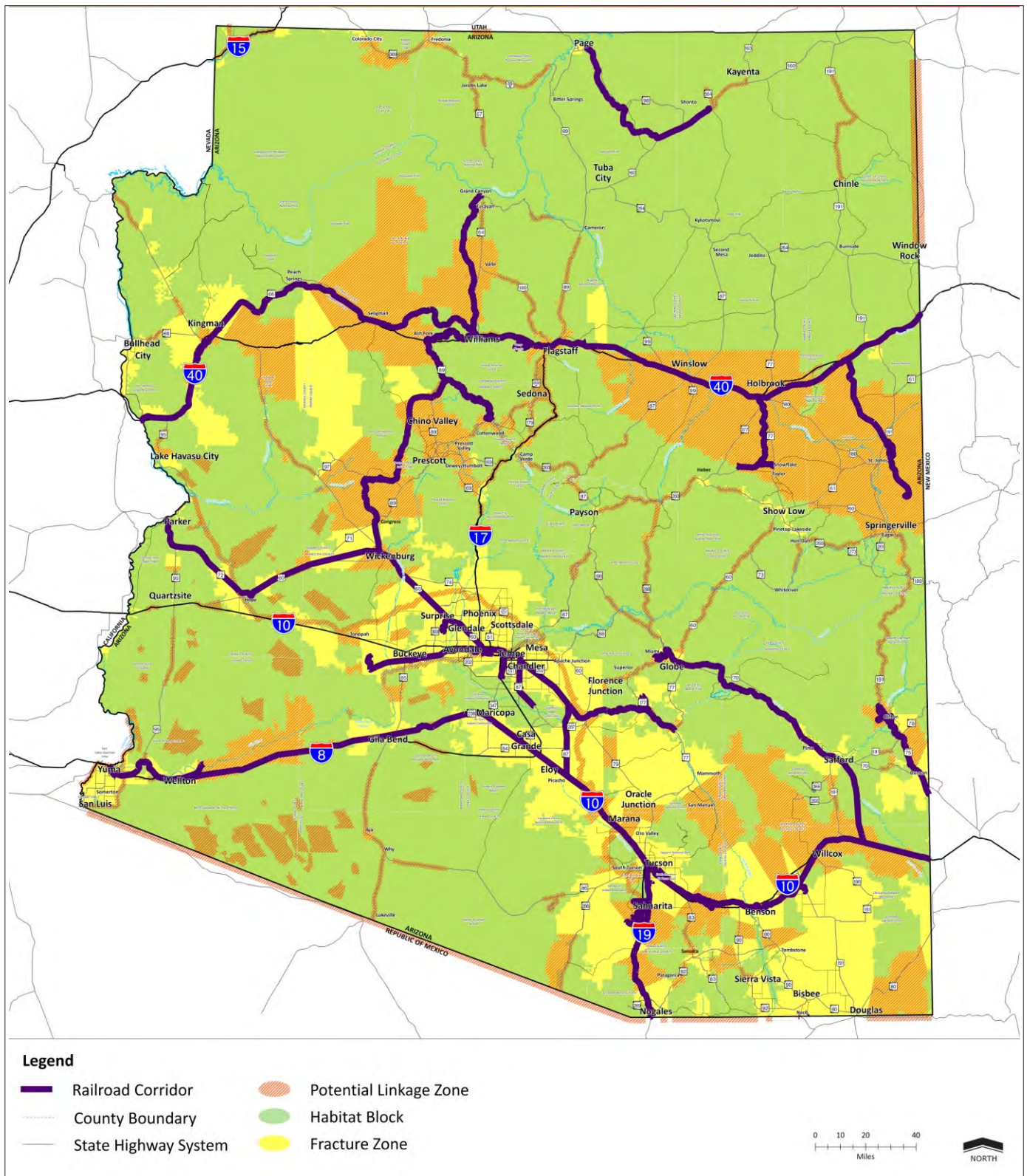
The AGFD is carrying this effort forward to monitor wildlife interaction with railroad and roadway corridors. Preliminary efforts show that railroad corridors serve as barriers to wildlife movement, especially across both Class I transcontinental corridors where the large number of trains make the railroads a "moving wall."

While mitigation techniques have not yet been implemented on railroad routes, they have been along roadways, which serve as similar barriers. On a 17-mile section of State Route (SR) 260 between Payson and Show Low, over 100 wildlife/vehicle collisions were documented in 2001. Eleven underpasses were constructed to permit elk to cross the highway corridor. The system includes thermal imaging to detect elk, real-time warning signs for motorists, directional fencing to funnel wildlife to crossing structures, and photovoltaic panels to power the monitoring system. Within two years, vehicle collisions with elk were reduced by 80 percent and elk movement from one side of the road to the other increased by 80 percent.

To accommodate desert bighorn sheep on US 93, three wildlife bridges will be constructed over the highway. Near Superior along the Gonzales Pass segment of US 60, concrete ramps have been constructed at the entrance of each culvert to help tortoises avoid slipping between the riprap entrances to culverts. The ramp guarantees the animals a pathway up to and into the culvert, so that they can safely cross under the highway.

The AGFD is monitoring wildlife interaction with railroad and roadway corridors. Preliminary efforts show that railroad corridors serve as barriers to wildlife movement, especially across both Class I transcontinental corridors where the large number of trains make the railroads a "moving wall."

Figure 21 - Arizona Wildlife Linkages Workgroup Assessment Map



Opportunities

Investing in wildlife connectivity not only helps wild populations, but also provides direct benefits to the people of Arizona. Integrating wildlife crossing structures with fencing along transportation facilities has been found to minimize the ability of large animals, such as elk, to gain access to the right-of-way (Figure 22). Wildlife crossings can improve safety and aesthetics, while helping to educate Arizonans about wildlife.

As rail projects are planned and designed, collaboration with AGFD should occur throughout the process to identify opportunities to avoid or minimize impacts to wildlife, and identify needed wildlife mitigation features. New rail lines should plan for wildlife crossings, especially in areas where critical wildlife linkages have been identified in the assessment document. Enhancing wildlife connectivity should be considered in any project that will expand the capacity of rail corridors or increase the number of trains.

Role of the Federal Railroad Administration

The FRA is envisioned to have an oversight role in most of the opportunities described in this State Rail Plan. The Office of Railroad Policy and Development will be responsible for administration of the development

and implementation of intercity rail passenger service and high speed rail. The Office of Railroad Safety is responsible of regulating safety throughout the nations rail system, and would be involved with issues related to PTC and highway-rail grade crossings.

Rail on Native American Lands in Arizona

In addition to the Federal Railroad Administration, the Bureau of Indian Affairs (BIA) will be an interested agency where rail runs through many of the tribal lands (Table 9).

Plans for improvements or new service that have been identified during the outreach process for the plan and may impact tribal communities include (Table 10).

For some tribal lands, the rail line passively runs through, for others, the rail provides an economic driver such as the Navajo and Hopi joint concern with the Black Mesa and Lake Powell Railroad and also the Gila River Indian Community with their industrial yards served by rail. For all traffic movement and safety, wildlife migration, natural and cultural preservation and community concerns should be considered as well as the inclusion of the BIA.

Figure 22 - Conceptual Integration of Wildlife Crossing Structure into a Rail Corridor



Table 9 - Tribes having existing rail infrastructure on Native American lands

Tribe	Railroad
Ak-Chin Indian Community	UPRR Sunset Line
Colorado River Indian Tribes	Arizona & California Railroad enters near Parker
Fort Yuma Quechan Tribe	UPRR Sunset Line
Gila River Indian Community	UPRR Branch lines and Phoenix Sub
Hualapai Tribe	BNSF Transcon Corridor
Navajo Nation	BNSF Transcon Corridor & Black Mesa Lake Powell Railroad
San Carlos Apache Tribe	The Arizona Eastern Railway
Tohono O'odham Nation	UPRR Branch to Nogales

Table 10 - Improvements identified near tribal lands

Tribe	New service or line improvements identified adjacent or on tribal lands
Ak-Chin Indian Community	Double track of UPRR Sunset line
Fort Yuma Quechan Tribe	Double track of UPRR Sunset line
Gila River Indian Community	Intercity Passenger service between Phoenix to Tucson (may be included in the alternatives analysis)
Hopi Tribe	South Mesa Coal line extension to BNSF
Navajo Nation	South Mesa Coal line extension to BNSF
San Carlos Apache Tribe	Arizona Eastern Railroad is exploring passenger service and line upgrades which may include stops in San Carlos
White Mountain Apache Tribe	A proposed passenger service connection between the Hon Dah casino and Sunrise ski resort

CHAPTER 4. PROPOSED RAIL PROJECTS

Arizona's rail system provides a network over which freight and passengers are transported. As the population of the State grows, rail will become an even more important mode.

Chapter 3 detailed issues and opportunities for Arizona to further develop and improve both freight and passenger service. Several of the opportunities would increase the involvement of the public sector in the rail industry to ensure that Arizonans have a viable alternative for shipping freight and transporting people. Increasing the safety of Arizona's citizens is a guiding principle, along with preserving the State's environment and quality of life.



4.1 Recommended Actions

This section of the rail plan recommends a rail strategy for the State of Arizona, and a set of priorities that the State should pursue for implementation. A separate rail strategy has been structured for several Corridors of Opportunities within the State. These Corridors of Opportunities were created to segregate the State into 4 corridors each having a unique strategy, however many of the recommendations in this plan apply to multiple corridors. Following the discussion of the each Corridor of Opportunity are some recommendations which apply statewide.

The four Corridors of Opportunities are as follows (Figure 23);

Arizona Spine – this is a north to south corridor through the central part of the State which focuses on Passenger Rail opportunities to support the emerging Sun Corridor and the tourism industry.

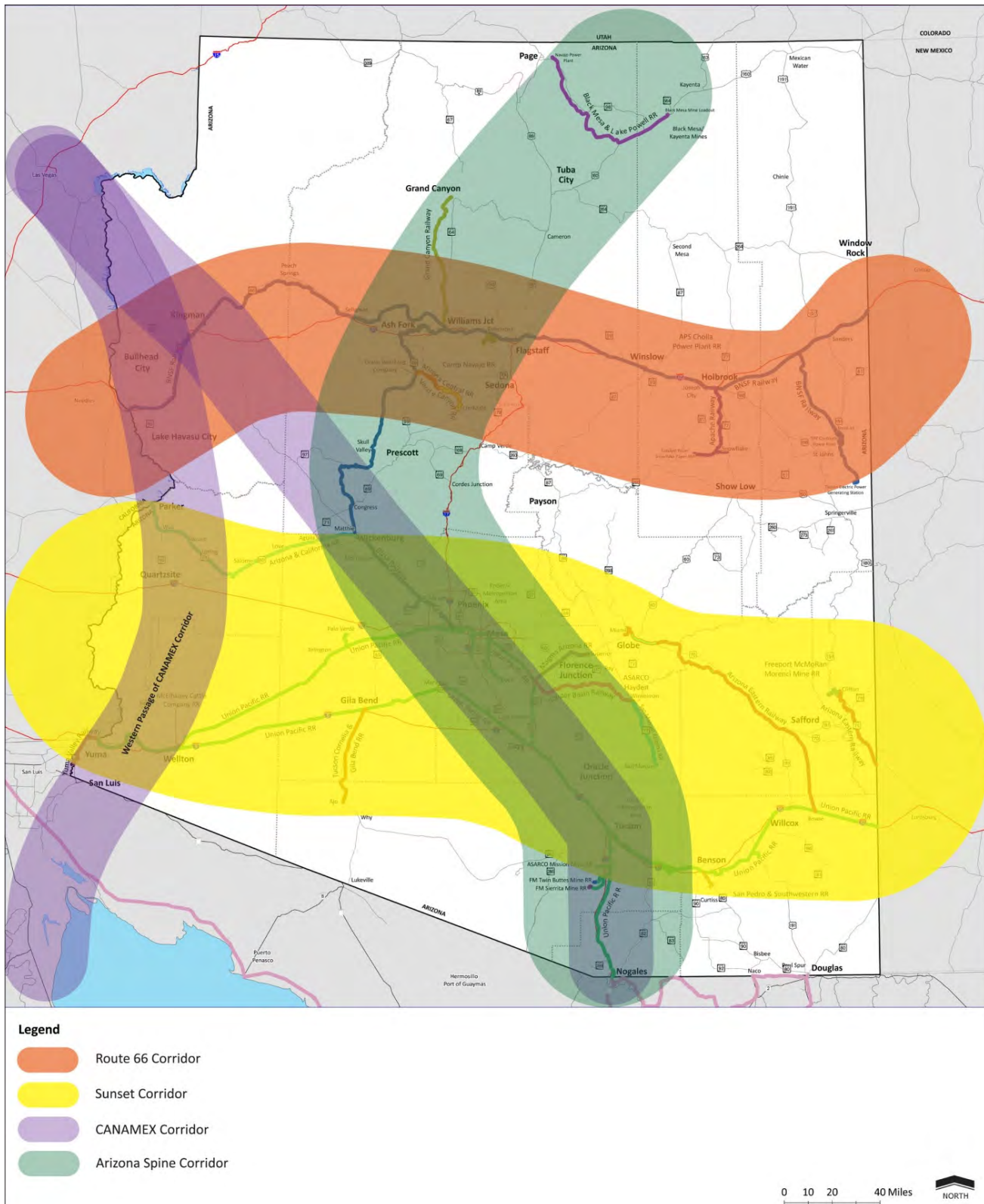
CANAMEX Corridor – this is a corridor which spans from Las Vegas to the international border with Mexico. This corridor focuses on supporting the priorities of the CANAMEX Coalition, and establishing a Southwestern High Speed Rail Network.

Route 66 Corridor – this is an east to west corridor generally following the cross country transportation corridor consisting of the BNSF Transcon Corridor and Interstate 40. This corridor focuses on network enhancements to move people and goods within Northern Arizona and across the country.

Sunset Corridor – this is an east to west corridor generally following the cross country transportation corridor consisting of the UPRR Sunset Corridor and Interstates 8 and 10. This corridor focuses on network enhancements to move people and goods within Southern Arizona and across the country.

A separate rail strategy has been structured for several Corridors of Opportunities within the State. These Corridors of Opportunities were created to focus the State into 4 corridors each having a unique strategy.

Figure 23 - Arizona's Corridors of Opportunity

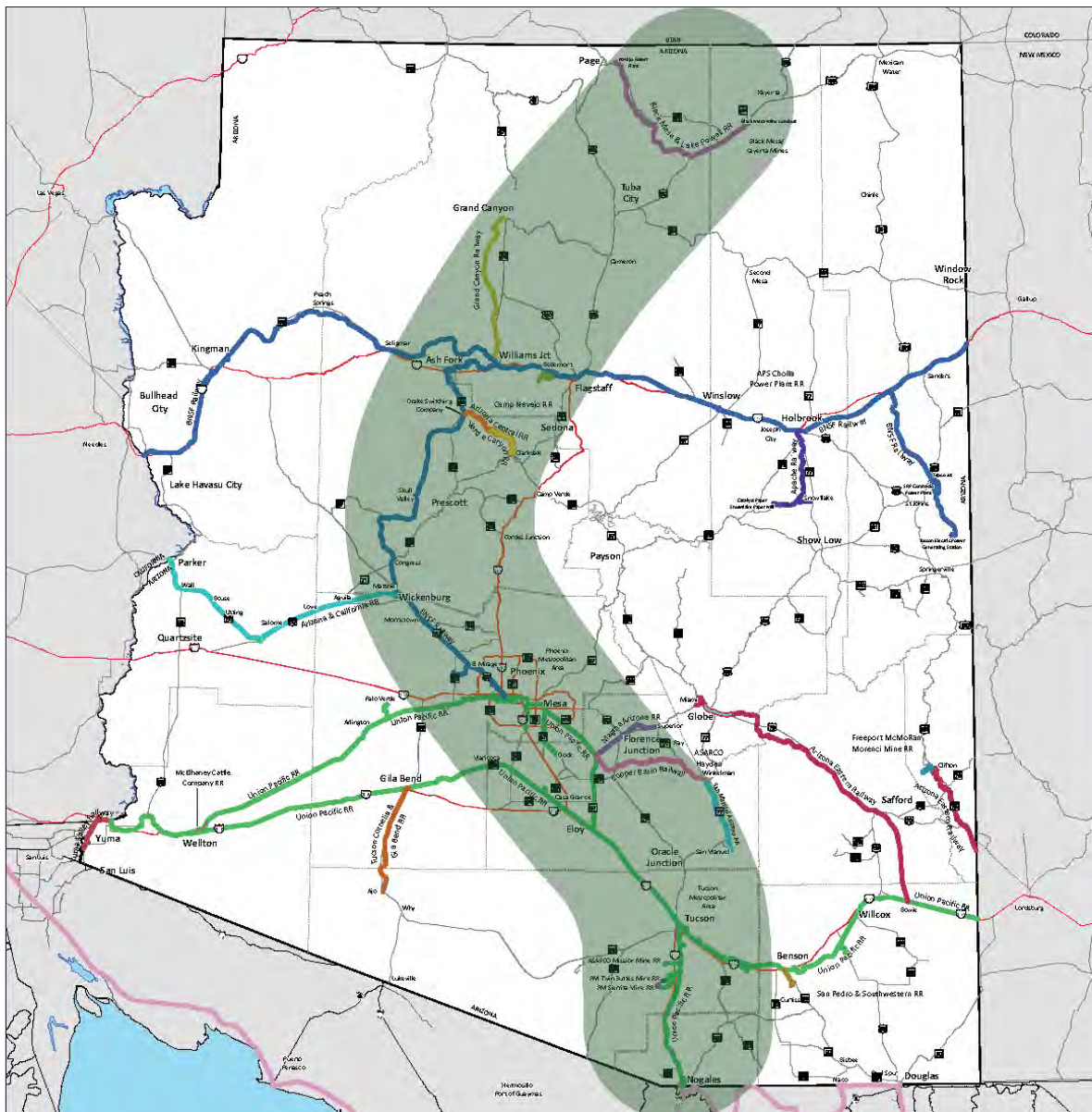


4.2 Arizona Spine Corridor

The Arizona Spine is a north-south corridor through the center of the state which links the northern gateway into Arizona at Page with the southern gateway at Nogales (Figure 24). This corridor is currently served by a series of major highways linked together to create the primary north-south movement of people and goods across the state. These highways include US89; Interstate 17, Interstate 10, and Interstate 19, together these highways

create a continuous primary route that serves major tourist destinations and links several of the state's largest communities. This corridor includes the passenger rail service accommodating the highest number of boardings in the state, the Grand Canyon Railway which has become a major tourist attraction connecting the Grand Canyon National Park with Williams Arizona. Rail connections along the Arizona Spine have the potential to link the Grand Canyon to Nogales, which includes branches of the UPRR, BNSF and the Grand Canyon Railway.

Figure 24 - Arizona Spine Corridor



This corridor focuses on several passenger rail opportunities to support the growth of the Sun Corridor Megaregion, expand rail tourism throughout the state, and enhance Intercity rail connections. This corridor of opportunity includes strategies for Commuter Rail operations within the urban cores of Phoenix and Tucson, and enhancing Amtrak Services to connect seamlessly with these urban centers. An Intercity Passenger rail service is envisioned to interconnect Nogales, Tucson and Phoenix with Northern Arizona that will provide an alternative mode of travel for not only Arizona citizens by tourists who wish to visit our largest attractions, such as the Grand Canyon.

Freight rail opportunities in this corridor focus on improved freight service to the Phoenix metropolitan area, and improved north-south freight movements within the State. Historically, rail connections have focused on moving large amounts of freight in an east-west direction, this corridor of opportunity focuses on serving a larger portion of freight moving along the Arizona Spine.

4.2.1 Inventory of Existing Conditions

The State of Arizona does not include any continuous north-south rail corridors which traverse the state from Utah to Mexico. However freight rail corridors do exist which connect Williams in Northern Arizona to Nogales located on the US-Mexico border. These rail lines are primarily single track branch lines of both the BNSF and UPRR, and current speed limits along these rail lines are low in comparison to the major east-west transcontinental corridors which cross the State. In addition to the existing freight corridors, the Grand Canyon Railway provides passenger service between Williams and the Grand Canyon National Park, this railway represents the highest number of boardings for passenger rail service in the State (excluding METRO light rail service in Maricopa County).

BNSF Railway

BNSF was formed in 1995 with the merger of the Burlington Northern and the Atchison, Topeka and Santa Fe (ATSF) railroads. The BNSF "Transcon Corridor"

connects Los Angeles with Chicago and passes through northern Arizona, including Holbrook, Winslow, Flagstaff, Williams, Seligman, and Kingman (Figure 25).



Figure 25 - BNSF Phoenix Subdivision



The 209-mile BNSF Phoenix Subdivision connects the Transcon Corridor (at Williams Junction) with Phoenix. Previously this subdivision provided passenger service

from Williams to Phoenix, but service was terminated in 1969. The Phoenix Subdivision, which is nicknamed the Peavine, currently provides a freight bridge between the Mobest classification yard in downtown Phoenix and the BNSF Transcon Corridor at Williams Junction. It interchanges with UPRR at its downtown Phoenix terminus east of the Arizona State Capitol. The Peavine is single-track throughout its length, and there are up to 10 trains per day operating along the subdivision, however most of the train activity is along the Grand Ave section from Surprise to downtown Phoenix.

Arizona Central Railroad

The Arizona Central Railroad (AZCR) carries freight between Drake, its connection with the BNSF Phoenix Subdivision and Clarkdale, a distance of 38.7 miles (Figure 26) and provides the only rail service to the Verde Valley portion of Yavapai County. This shortline provides a tourist based passenger service, operating as the Verde Canyon Railroad; it offers tourists round-trip excursions between the depot at Clarkdale and MP 18.3, the Perkinsville siding, during the spring and summer the Verde Canyon operates up to 5 trains per week. The AZCR operates up to 4 freight trains per day and interchanges with the Drake Switching Company railroad at Drake.

Figure 26 - Arizona Central Railroad



The Town of Clarkdale considers the availability of rail in this industrial area as an advantage to businesses

interested in locating in this rural region, and as a key component of the Town's long term sustainable economic development strategy

Grand Canyon Railway



The 64-mile Grand Canyon Railway (GCRX), a passenger railroad, connects the National Park Service hotel facilities on the South Rim of the Grand Canyon to the railroad's Williams depot (Figure 27). With a ridership of 240,000 in 2006, it is among the most popular tourist railroads in the United States. Between Memorial Day and Labor Day there are two round trips daily. A third train can be added during this peak season whenever demand calls for it. The rest of the year sees one daily round trip. With demand growing, along with pressure to reduce auto-generated congestion and pollution at the park, additional trips are planned. The Polar Express service carries passengers 17 miles during the winter season and is a growing segment of the business.

Figure 27 - Grand Canyon Railway



UPRR

The UPRR system has significant amounts of traffic between Southern California and El Paso, and between Texas and Chicago. According to a railroad news release, Union Pacific's 760-mile corridor between Los Angeles and El Paso carries 20 percent of the railroad's traffic.

Figure 28 - UPRR Phoenix Subdivision



The Phoenix Subdivision connects the Sunset Route with Phoenix and points west of Phoenix, to a point a few miles west of Arlington. It consists of approximately 125 miles of single track. Traffic on the Phoenix Subdivision, which serves 147 customers, averages about six trains per day (Figure 28).

The 65.7-mile, single-tracked Nogales Subdivision connects Tucson with Nogales and provides UPRR an entry into Mexico and an interchange with Ferromex. Traffic on the Nogales Subdivision averages four round trip trains per day, plus two locals (Figure 29).

Figure 29 - UPRR Nogales Subdivision



Copper Basin Railway

The Copper Basin Railway (CBRY) extends 54.6 miles from its interchange point with the UPRR and Magma Arizona Railroad at Magma to Winkelman (Figure 30). The railroad is owned by ASARCO LLC, a Tucson-based integrated copper mining, smelting and refining company, and operates as many as 5 trains per day.

CBRY's principal customers are ASARCO, a lumber dealer and a plastics manufacturer. The railroad transports ore from the mine to the Hayden concentrator, concentrate from the Ray concentrator to the smelter, and sulfuric acid from the smelter to the leaching facilities.

Figure 30 - Copper Basin Railway



Table 11 - Summary of Existing Rail within the Arizona Spine Corridor

Railroad	Route Miles	Annual Carloads	Approximate No. of Trains	Maximum Track Speed
BNSF Phoenix Subdivision	209	293,400 (Total BNSF)	10 / day	49 mph
UPRR Phoenix Subdivision	125	6,000,000 Tons	6 / day	60 mph
UPRR Nogales Subdivision	65.7	7,000,000 Tons	6 / day	40 mph
Arizona Central Railroad	38.7	900-1200	4 / day	10 mph
Grand Canyon Railway	64	240,000 Passengers	2 / day (Summer)	40 mph
Verde Canyon Railroad	20.4	90,000 Passengers	5 / week (Summer)	15 mph
Copper Basin Railway	55	13,000	5 / day	40 mph

4.2.2 Corridor Strategy

Arizona's existing rail network primarily moves freight east and west across the state using the BNSF Transcon Corridor or the UPRR Sunset Corridor. As the Sun Corridor continues to grow, Arizona needs to create better rail connections from north to south.

The passenger rail vision for the State would include a north-south spine of intercity rail serving the emerging Sun Corridor megaregion, coupled with a regional high speed rail network. The strategy for the Arizona Spine would be to begin planning for an efficient passenger rail connection between Northern Arizona, the Sun Corridor, and Mexico while supporting commuter rail within the urban cores of Phoenix and Tucson.

Currently freight movements by rail to the Phoenix Metro Area are served by two subdivisions of BNSF and UPRR. This metropolitan area with a population of nearly 4 million is essentially located on a cul-de-sac along both Class I rail systems. The strategy for this corridor is to expand the capabilities for the freight railroads, Class I and Short lines, to expand the proportion of future freight which can be moved by rail within the emerging Sun Corridor. This can be accomplished not only by expanding capacity of rail corridors, but also expanding classification yards, intermodal facilities, and other freight logistic centers.

An objective of the strategy for the Arizona Spine corridor is to improve the coordination between land use and multi-modal transportation planning. The intent is to use transportation planning as a tool to help create

more focused growth along rail corridors that provide passenger service. This approach would encourage infill development and revitalization of communities that would increase density within areas of existing development and reduce the demand for developing our open spaces. Transit orientated development around new rail station locations will support mixed-use development which has been demonstrated to reduce the number of overall trips. Therefore this strategy will create more livable communities within the Sun Corridor, while reducing the overall demand on the existing highway system and helping to preserve some of Arizona's environmental resources.

4.2.3 Passenger Rail Opportunities for the Arizona Spine

By 2050, both population and employment in Arizona are projected to more than double from their 2005 levels. Growth of the Sun Corridor (Figure 31) will lead to increased transportation demand for both passengers and goods. It will not be possible to accommodate growth and avoid traffic congestion by improving roadways alone, so passenger rail should become a key component of the Sun Corridor transportation system.

Currently, I-10 is the only high-capacity connection between the Phoenix and Tucson metropolitan areas, limiting modal choices and incapacitating traffic in the event of an incident on the highway. Similarly, I-17 and I-19 provide key connections from Phoenix and Tucson with other growing communities in the Sun Corridor

and throughout the state. The intent of a multimodal spine is to create a corridor of parallel transportation modes that pass through the center of the Sun Corridor, consisting of ICR, freeways with express buses, and possibly HSR. Such a system would provide travelers a range of transportation choices. From this multimodal spine, ancillary multimodal transportation systems could branch off and serve local communities.

Arizona could benefit from developing a comprehensive passenger rail system that would include coordinated systems of interstate high-speed, intercity, and regional commuter rail service. Passenger rail is a transportation alternative that can help travelers avoid congestion on highways and air travel. Intercity passenger rail provides mobility options for tourists and residents. Passenger Rail can provide a convenient, efficient mode of travel, where riders can work, relax, and travel between employment cores, avoiding the need to drive to outlying airports or wait in long security lines or the need for travel by car. In addition, increased transit options can save money by reducing the amount of money spent on gas, vehicular maintenance, parking and contributing to more location efficient housing choices. Opportunities for an integrated statewide passenger rail system are illustrated in Figure 31, with the legend corresponding to each issue presented below.

Intercity Passenger Rail System

The creation of an ICR system that would traverse the spine of the Sun Corridor, eventually stretching from northern Arizona to the Mexican border, includes a series of projects that have a strong correlation with the goals and objectives of this rail plan. An ICR system is anticipated to operate on existing tracks where feasible, but much of the system may be located in new rail corridors. Establishing new rail corridors in areas of the State expected to grow in population provides an opportunity to promote the principles of Smart Growth. Intercity passenger service will provide a new mode of transportation for some communities in the Sun Corridor, which will establish new station locations. New intercity passenger rail stations create an opportunity for communities to promote nearby land use activities that create a more sustainable community.

Transit orientated development would be encouraged around the new station locations along the ICR system which will create areas of compact growth which support the ideas of Livability. Compact growth is expected to create a mixture of housing, commercial, and employment activities closely located to the ICR system which will provide locations for new employment centers located within higher density housing areas that provide affordable and desirable places for our next generation of entrepreneurs.

The highest priority section of the ICR system is the Phoenix to Tucson corridor which is a key component of the Arizona Spine. Several studies completed over the past decade have predicted strong ridership for this segment, and strong public support has been demonstrated during the SFPS. ADOT has begun the process of evaluating feasible corridors for an ICR connection between Phoenix and Tucson, and future phases of this process including environmental clearance, preliminary design, and right-of-way acquisition should be programmed.

The Phoenix to Tucson section of an emerging ICR system should be planned to accommodate commuter and potentially high speed rail within the same corridor, therefore the state would have the flexibility to use this segment as a portion of local and national passenger rail systems.

Phoenix had an electric street car system that began operating in 1893 and was decommissioned in 1948. Tucson's electric street car began operating in 1906. The Old Pueblo Trolley in Tucson is a heritage street car system that began operating in 1993.

Figure 31 - Sun Corridor Megapolitan Region

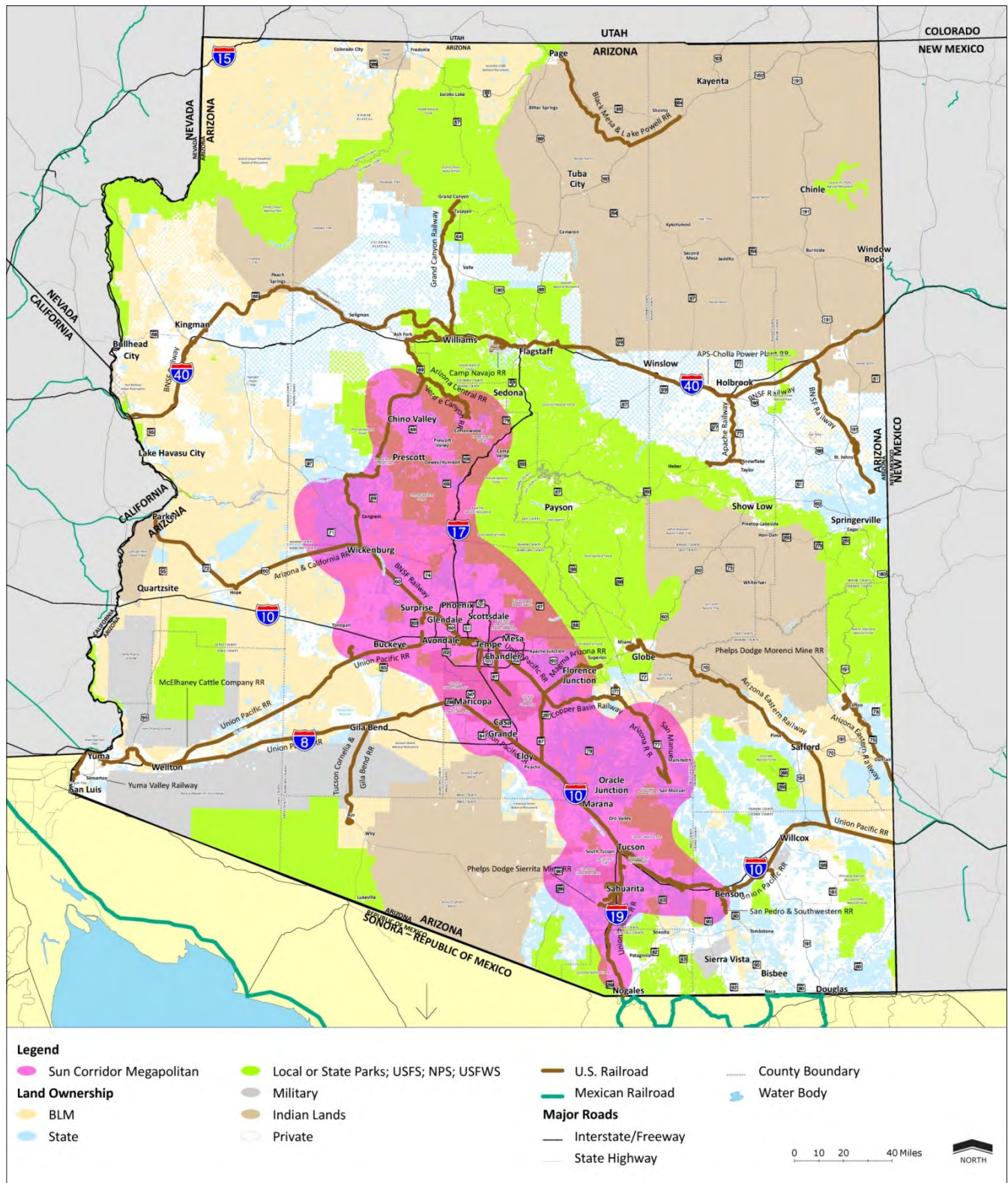
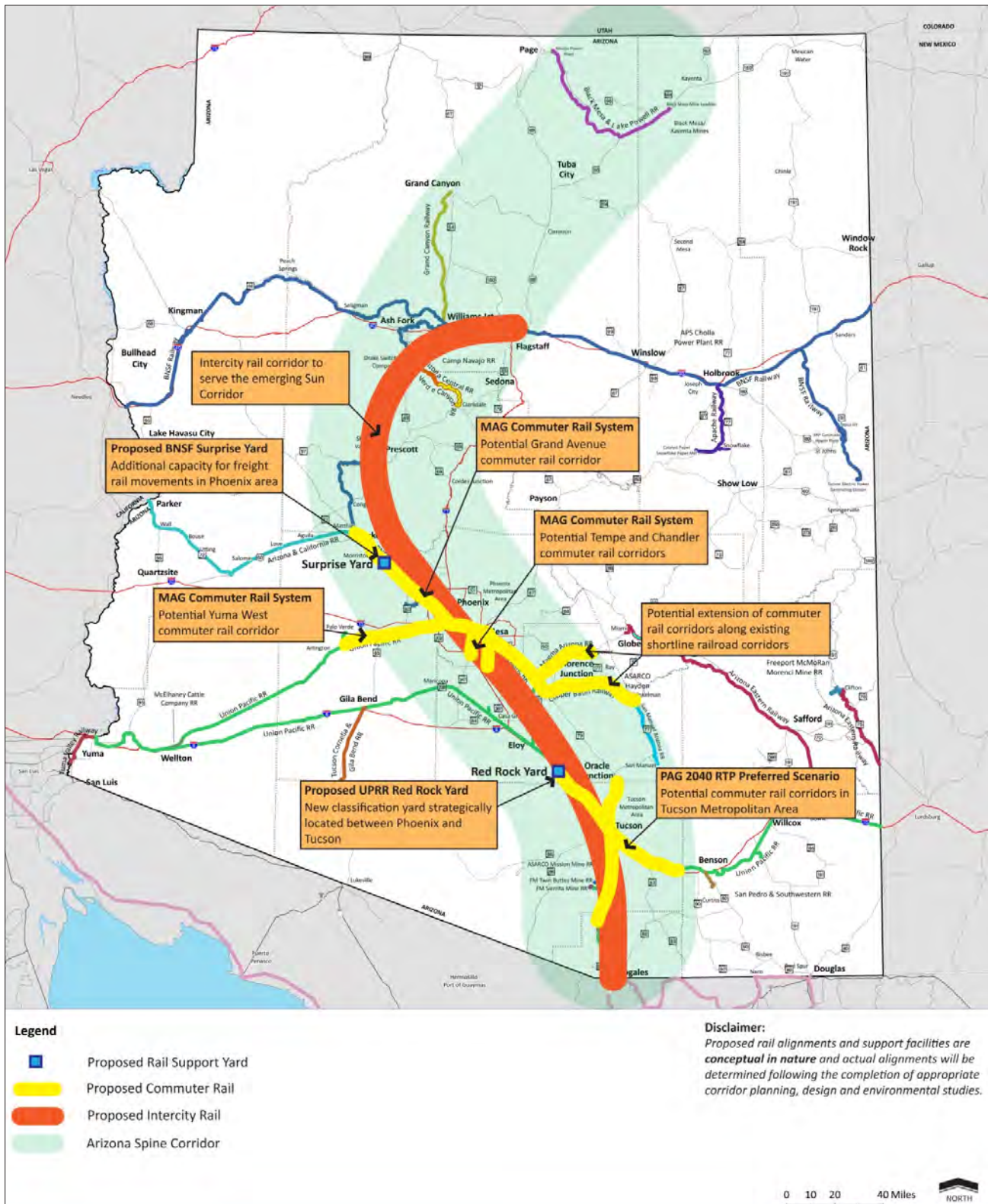


Figure 32 - Arizona Spine Corridor of Opportunity



Commuter Rail Service within the Phoenix and Tucson urban areas

Both the Phoenix and Tucson areas are wrestling with traffic congestion issues, and the long-range plan for each area envisions the implementation of commuter rail. A partnership between the Maricopa Association of Governments (MAG), the Pima Association of Governments (PAG), the Central Arizona Association of Governments (CAAG), and ADOT is recommended to plan the commuter rail systems in concert with an ICR connection between Phoenix and Tucson. Components of each commuter rail system would overlap with the ICR system. The coordinated planning of all systems could accelerate the implementation of each.

The implementation of commuter rail systems in Phoenix and Tucson may help to alleviate traffic congestion in each community, and can provide a seamless connection with an ICR system. The highest priorities within the Arizona Spine are the Grand Ave section of the BNSF Peavine Corridor, and the Southeast Corridor traversing Tempe, Mesa and Queen Creek.

Implementing commuter rail between Phoenix and Wickenburg can not only alleviate traffic congestion within several communities along Grand Ave, but would also be an initial step to a larger Intercity Rail system connecting Phoenix with Northern Arizona and potentially connections to Southern California.

The Southeast commuter rail corridor could represent a stepping stone to frequent Intercity service between Phoenix and Tucson, coordinating commuter rail and intercity service in this corridor could relieve traffic congestion within the East Valley, but also provide benefits to the I-10 corridor between Phoenix and Tucson.

Currently there are large sections of land being planned as multi-use master planned communities, one example is Superstition Vistas located in Pinal County between Apache Junction and Florence. This community has considered planning a rail corridor through the development which could promote passenger and freight rail service in the area. Two short line railroads (Magma Arizona Railroad, and Copper Basin Railway)

are associated with the Superstition Vistas development and have the potential and capacity for commuter rail service.

4.2.4 Freight Network Opportunities for the Arizona Spine

Arizona could benefit from developing a balanced freight and passenger system that can respond to increased regional and international economic competition, constrained highway corridors, environmental challenges, and rising energy costs. Connectivity of the State's rail system allows more flexible and timely movements and greater access to customers. The strategy for the Arizona Spine is to expand the intermodal and logistics centers that serve the Sun Corridor, allowing both Class I and Short line railroads to serve a greater proportion of the freight movements within the megaregion.

Develop Intermodal and Freight Logistic Centers

As the economy of Arizona continues to grow, the need for a more robust system to move freight in and through the State will increase. Development of intermodal facilities that can efficiently transfer cargo between rail and trucks will be needed as the Sun Corridor continues to expand. Freight logistic centers, such as inland ports, warehouse distribution centers and supporting rail infrastructure, will be needed to continue to expand the number of jobs located in Arizona, and to import and export the products required for a balanced economy.

The UPRR Harrison Street Classification yard located in downtown Phoenix has limited capacity to support this growing metropolitan area. Currently many transcontinental trains are classified in Tucson and then dispatched to the Phoenix area for delivery, utilizing critical capacity within the Tucson PFR yard. The UPRR has proposed construction of a new classification yard near Red Rock in Pinal County. This classification yard would alleviate the demands on the Tucson yard, and provide a modern classification yard strategically located near Phoenix and Tucson to serve the growing freight demands of the area. Currently private lands near the potential Red Rock yard are considering industrial developments that would enhance employment opportunities in Pinal County that can be served by rail.

The BNSF Mobest Yard located near the state capitol in Phoenix has capacity constraints and limited potential for expansion. BNSF has proposed a new facility in Surprise which can provide additional capacity for freight rail movements into the Phoenix area. There is potential for this new facility to alleviate the Mobest Yard, but also replace the Auto facility in El Mirage and the Desert Lift facility in Glendale. By concentrating the operations of several facilities in one location, the number of trains required to traverse the Grand Ave corridor could be reduced. This could improve traffic operations at at-grade crossings and reduce the potential for conflicts between trains and vehicles.

The Magma Arizona Railroad is strategically located east of the Phoenix Metro area in Pinal County. The railroad has expressed interest in discussions of a freight logistic center located within the proposed Superstition Vistas master planned community. This logistic center would be surrounded by industrial land uses creating an employment center for the far east valley. In combination with potential commuter rail operating along this corridor, this short line railroad could contribute to the goal of providing more mixed use development surrounding a multi modal transportation system.

Program for Implementing High-Priority Grade Separations

Reducing the number of potential conflicts between vehicles and trains will improve the level of safety and efficiency of freight rail movements, and reduce risk for all parties. Converting existing at-grade crossings to grade separations can improve traffic operations and reduce delays in Arizona communities throughout the Arizona Spine corridor. Upgrades to freight rail infrastructure will benefit future passenger rail services along these routes.

Numerous at grade crossings exist along the Grand Ave section of the BNSF Phoenix Subdivision. Concentrating on efforts to grade separate crossings along this corridor can not only benefit the freight movements, but enhance the ability for Commuter and Intercity Rail along this corridor, while reducing the potential for conflicts.

The combination of a comprehensive data collection system for at-grade crossings that can help prioritize grade separation projects, eliminate redundant grade crossings, and initiating a potential funding source to expedite their implementation, will help meet several goals of this plan, including increasing mobility and improving the safety and security of the transportation system.

4.2.5 Recommended Actions for the Arizona Spine Corridor

Several rail actions are recommended for the Arizona Spine Corridor of Opportunity to achieve the goals and objectives of this rail plan.

Partner with Amtrak to provide service to the Phoenix metropolitan area. Amtrak service to Phoenix ceased in 1996 when the Wellton Branch of the Southern Pacific Railroad (now UPRR) was taken out of service. This action would include partnering with Amtrak to return service to the Phoenix metropolitan area. This action may involve rehabilitation of the UPRR Wellton Branch or use of a route along the Arizona and California Railroad.

Re-established Amtrak service to Phoenix will provide improved connectivity between Los Angeles, Phoenix and points east, and provide economic development opportunities for the Sun Corridor.

Construct and operate a Phoenix to Tucson ICR system. This Intercity Rail system (ICR) would provide frequent train service for passengers between Phoenix and Tucson. ADOT has begun the process to study potential corridors for this service. This action would build on initial studies to implement passenger rail service. In 2010, many local, regional and state agencies, as well as transit advocacy groups have initiated resolutions and letters of support to the Federal Government for the return of intercity passenger rail to the Metropolitan Phoenix Area.

An ICR connection between Phoenix and Tucson would help reduce vehicular traffic on I-10 by providing an alternative mode of travel. It could reduce the potential impacts on the environment caused by widening the I-10 corridor. Increased connectivity between Phoenix and Tucson will also result in improved economic

opportunities in the southern part of Sun Corridor, and encourage smart growth between the two Metropolitan areas.

Construct and operate a Phoenix to Northern Arizona intercity passenger rail system. During the SRFS, several requests were made to evaluate an alternative mode for accessing northern Arizona from the Phoenix metropolitan area. This action would include the studies required to evaluate the feasibility of intercity passenger service and, if feasible, implementation of the service. Suggested routes include the existing BNSF Peavine line and new corridors that could parallel I-17.

An ICR connection between Phoenix and Flagstaff could help reduce vehicular traffic on I-17 by providing an alternative mode of travel. It will provide improved connectivity between Phoenix and northern Arizona and boost tourism activities in and around Flagstaff and Grand Canyon. Tourists who presently arrive at the Phoenix Sky Harbor International Airport may be able to take a train to Williams/Flagstaff and connect to the Grand Canyon Railway which accesses the Grand Canyon National Park. Increased connectivity between Phoenix and Flagstaff will also result in improved economic opportunities in the northern part of the State.

Construct and operate a Tucson to Mexico intercity passenger rail system. Substantial intercity service is currently provided in this corridor by buses and vans. This action would include the studies required to evaluate the feasibility of intercity passenger service and, if feasible, implementation of the service. The amount of right-of-way available limits implementing this service along the existing UPRR Nogales Subdivision, so new corridors would also need to be considered.

An ICR connection between Tucson and Nogales could significantly boost tourist traffic between Arizona and Mexico by providing a convenient passenger rail option connecting with the passenger rail system envisioned for the State.

Construct commuter rail systems within Phoenix and Tucson urban areas. Initial planning of commuter rail systems is underway by both MAG and PAG. ADOT or

another appropriate State agency could partner with MAG and PAG to coordinate planning and implementation of commuter rail systems with HSR and ICR. The objective of this action is to ensure a coordinated passenger rail system throughout the State that can provide seamless transfer between the different services.

Commuter rail systems in Phoenix and Tucson could greatly enhance passenger mobility within the metropolitan areas and provide seamless connections to future intercity and HSR systems. It will also support economic growth in the Sun Corridor and provide a faster, reliable and safe travel option to commuters and tourists.

The interconnectivity between Intercity Rail and Commuter Rail systems is critical. Stations could be located at places where passengers have access to a variety of transportation options to connect from one mode to the other. A well-connected passenger rail network could also work as a catalyst for transit-oriented development.

Partner with BNSF to implement operational improvements along the Phoenix Subdivision. The Phoenix Subdivision, known as the Peavine, is one of two access points for freight rail into the greater Phoenix area. It includes the Grand Ave corridor within the Phoenix metro area, and the rural rail connection between the Phoenix area and Williams Junction in northern Arizona. This action includes partnering with BNSF to implement improvements such as new classification yards and geometric improvements to improve travel time between Phoenix and Williams Junction. These improvements would enhance freight movements and might also provide opportunities for commuter and intercity passenger rail service.

Operational improvements along the BNSF Phoenix subdivision (Peavine) will enhance capacity for freight transportation on rail, and reduce freight traffic on Arizona highways. Potential passenger rail services will benefit from any improvements made along this line, if existing tracks are shared between freight and passenger trains.

Partner with UPRR to implement operational improvements that would support the emerging Sun Corridor. A proposed new UPRR classification yard near Red Rock presents an opportunity to supplement classification activities occurring at the Tucson Yard, increasing switching volumes and thereby enhancing the overall efficiency of the Sunset Route. The proposed yard at Red Rock will serve to break down and reclassify trains carrying goods destined for the Phoenix metropolitan area.

Partner with Copper Basin Railway and Magma Arizona Railway to expand freight and consider passenger services that would support the emerging Sun Corridor. Both of these short line railroads are located within the southeast valley of the Phoenix Metro area and can support the objective of supporting compact land uses along a multi-modal transportation system.

Summary of Rail Implementation for the Arizona Spine Corridor

Based on the prioritization of potential actions, and the recommended projects for implementation, Tables 7-9 provide a summary of the proposed implementation plan.

4.2.6 Implementation

Several implementation steps are recommended with fit within the time frame of this rail plan that can contribute to the long range rail vision for the State of Arizona.

Table 12 - Arizona Spine Corridor Short-Term Implementation Actions (within 5 years)

Implementation Action	Description	Comments
Phoenix to Tucson ICR Study	Establish a Locally Preferred Alternative (LPA) and Environmental Clearance for the Phoenix to Tucson ICR corridor.	Parts of this corridor would be used to implement commuter rail in the Phoenix and Tucson metropolitan areas.
Amtrak Service to Phoenix	Routing the Sunset Limited service to Phoenix would be an initial step to more frequent passenger service between Phoenix and Tucson.	Service can be provided to Phoenix by rehabilitating the Wellton Branch, a Phoenix turnaround, or along the Arizona and California Railroad.

Based on responses from project stakeholders, completing the Phoenix to Tucson Intercity Rail Study is the highest priority implementation action of this rail plan.

Table 13 - Arizona Spine Intermediate Implementation Actions (within 10 years)

Implementation Action	Description	Comments
Commuter Rail	Partner with MAG and PAG to plan commuter rail systems within the Phoenix and Tucson metropolitan areas.	Within the Arizona Spine Corridor the key corridors are Grand Ave and the Southeast Valley.
Additional Amtrak Intercity Service	Establish more frequent Amtrak Service between Phoenix and Tucson, and if feasible between Phoenix and Los Angeles.	
Short Line Assistance Program	Implement a program which can provide financial assistance for improvements to short line railroads.	This program could include loan and grant programs, financed through individual legislative initiatives or a dedicated funding source. The program should be made available to Short Line and Tourist railroads.
Intermodal and Freight Logistics Centers	Based on recommendations provided by the FRAC, work with private sponsors to plan and implement new facilities at key locations. Public incentives could be established to promote facility development.	Intermodal and logistics centers may be funded by public-private partnerships.

Table 14 - Long-Term Implementation Actions (within 20 years)

Implementation Action	Description	Comments
ICR service between Phoenix and Tucson	Design and construct an intercity rail system connecting Phoenix and Tucson.	Commuter rail operations along Grand Ave and the Southeast Valley may begin before or after this service, but should operate in a common corridor.
Extensions of ICR throughout the Sun Corridor	Complete corridor studies and obtain environmental clearance for extensions of the intercity rail system north of Phoenix, and south of Tucson.	Freight rail improvements accomplished earlier might facilitate such ICR extensions.
Freight Rail improvements to benefit Arizona communities	Implement feasible improvements within communities such as; Quiet Zones, rail realignments, or other improvements	Based on recommendations provided by feasibility studies, partner with railroads and communities to implement improvements. Classification yard projects have been proposed within Surprise and at Red Rock.

4.3 CANAMEX Corridor

The CANAMEX Corridor is a nationally designated high priority route traversing the states of Arizona, Nevada, Utah, Idaho and Montana, linking to the Canadian Province of Alberta and the Mexican States of Sonora, Sinaloa, Nayarit and Jalisco. In the State of Arizona, the **CANAMEX** Corridor (Figure 33) generally follows I-19 from Nogales to Tucson; I-10 from Tucson to Phoenix; and US Route 93 in the vicinity of Phoenix to the Nevada Border.



Organizationally the development of the Corridor is advanced through a multi-state coalition including public and private sector representatives selected by the Governors of the five states. The Governor of Arizona designates a Taskforce representing state directors, and community and business leaders to help advance the goals of the coalition.

The intention is to strategically invest in infrastructure and technology to advance a focused agenda to increase competitiveness in global trade, create jobs and maximize economic potential within the five-state region.

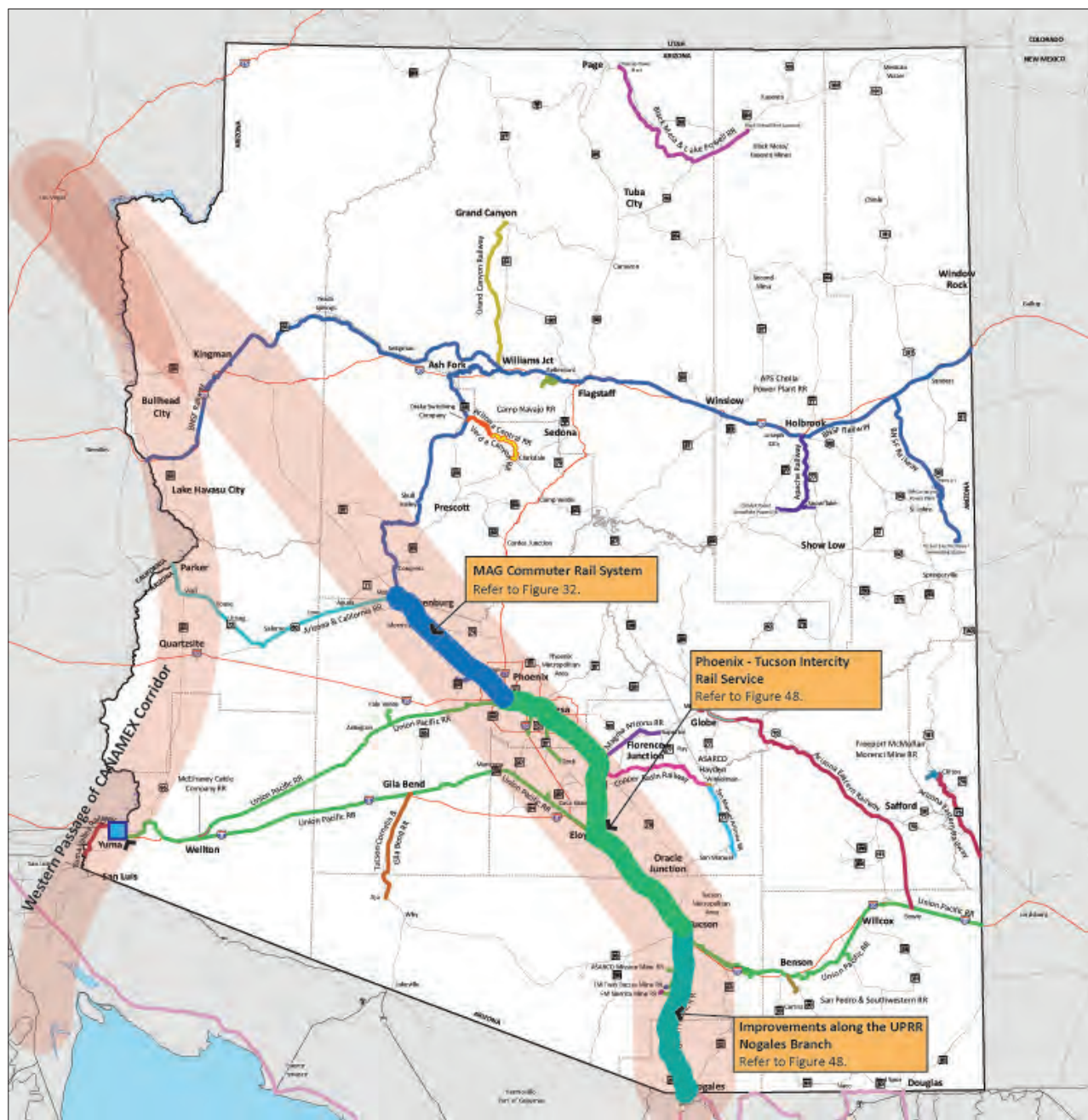
The priorities for the CANAMEX corridor within the state of Arizona that relate to rail infrastructure include:

- Develop in conjunction with identified stakeholders a strategy to position Arizona to capitalize on new marine port development plans at Punta Colonet Mexico and existing trade from LA/Long Beach.
- Cooperate with border communities to secure federal resources and high prioritization for infrastructure enhancements at Arizona border ports of entry to further the objectives of repairing the nations crumbling infrastructure and create jobs, and border port improvements that significantly enhance safety and security while facilitating international trade flows.
- Develop a statewide freight and logistics strategy.

This state rail plan proposes a rail strategy for this corridor of opportunity which can help to achieve these priorities, while also meeting the goals of the rail plan, including improving mobility, promoting sustainability, and preserving environmental resources.

Metro Light Rail serves the cities of Phoenix, Tempe and Mesa and began operating in 2008. The City of Tucson is currently completing design of its Modern Streetcar that will begin operating in 2014.

Figure 33 - CANAMEX Corridor



4.3.1 Inventory of Existing Conditions

The existing rail system connecting Nogales Arizona to Las Vegas Nevada does not include a direct rail line and includes subdivisions of both BNSF and UPRR. Rail freight moving between Mexico and Canada along the

CANAMEX corridor is currently diverted to Southern California before moving northward.

The 65.7-mile, single-tracked Nogales Subdivision connects Tucson with Nogales and provides UPRR an entry into Mexico and an interchange with Ferromex.

Traffic on the Nogales Subdivision averages four round trip trains per day, plus two locals. UPRR has suggested improvements along this subdivision which can improve train movements across the border, including a new rail spur in the area of Rio Rico where trains can be inspected before border crossings.

Trains moving from Tucson to Phoenix would traverse a portion of the UPRR Sunset Corridor and the Phoenix Subdivision from Picacho to Phoenix. The Phoenix Subdivision connects the Sunset Route with the Phoenix area, to a point a few miles west of Arlington. It consists of approximately 125 miles active of single track. Traffic on the Phoenix Subdivision, which serves 147 customers, averages about six trains per day. Local UPRR yards were operating near capacity in 2007, and are expected to return to capacity once the economy recovers from the current recession. UPRR has proposed a new classification yard at Red Rock to enhance their ability to serve new customers, and to continue to serve the growing freight market of the Phoenix area. A proposed classification yard at Buckeye is also located on the Phoenix subdivision which would provide building materials to the growing communities within the west valley portion of the Phoenix Metro area.

Freight moving beyond Phoenix along the CANAMEX corridor would use one of two routes, either the BNSF Phoenix subdivision to Williams Junction, or the Arizona & California Railroad to Parker Arizona.

The 209-mile BNSF Phoenix Subdivision, known as the Peavine, connects the BNSF Transcon Corridor (at Williams Junction) with Phoenix. Previously this was a key passenger rail corridor between Phoenix and point east, however it has had no passenger trains since 1969. It interchanges with UPRR at its downtown Phoenix terminus east of the Arizona State Capitol. The Peavine is single-track throughout its length, and serves 10 trains per day.



The Arizona & California Railroad (ARZC) is owned by Rail America. Is a short line railroad which connects Matthie, Arizona (five miles northwest of Wickenburg on the BNSF Phoenix Subdivision) with Cadiz, California. This 190-mile short line, formerly a branch of the ATSF, is part of the most direct active rail route between Phoenix and the Los Angeles Basin. Operating up to three trains per day, ARZC is primarily a carrier of BNSF bridge traffic between Matthie and Cadiz.

Table 15 - Key Characteristics of Arizona Railroads along CANAMEX Corridor

Railroad	Route Miles	Annual Payload	Approximate No. of Trains	Maximum Track Speed
BNSF Phoenix Subdivision	209	293,400 Carload (Total BNSF)	10 / day	49 mph
UPRR Phoenix Subdivision	125	6,000,000 Tons	6 / day	60 mph
UPRR Nogales Subdivision	65.7	7,000,000 Tons	6 / day	40 mph
Arizona & California Railroad	106	18,900 Carload	3 / day	49 mph

4.3.2 Corridor Strategy

Arizona's existing rail network primarily moves freight east and west across the state using the BNSF Transcon Corridor or the UPRR Sunset Corridor. As the Sun Corridor continues to grow and trade along the CANAMEX Corridor increases, Arizona needs to create better rail connections from north to south.

The passenger rail vision for the State would include a north-south spine of intercity rail serving the emerging Sun Corridor megaregion, coupled with a regional high speed rail network. The strategy for the CANAMEX corridor would be to begin planning for an efficient passenger rail connection between central Arizona and Las Vegas while supporting implementation of intercity and commuter rail within the Sun Corridor.

Movement of freight along the congressionally designated CANAMEX Corridor is envisioned to enhance international trade and enhance the state's economy. It is

important to improve freight rail connections in a north-south direction within the state to serve this emerging freight pattern, and meet the objectives of the CANAMEX coalition.

Western High Speed Rail

The establishment of a Western high-speed rail (HSR) network meets several goals of this rail plan. Once implemented, it would help to improve mobility within Arizona and surrounding states. This recommended action includes completing feasibility studies for HSR corridors connecting Phoenix with Tucson, Las Vegas and Southern California (Figure 34).

The long-range vision is to establish a system of HSR corridors with trains operating faster than 125 miles per hour (mph) to compete with air travel. The implementation of an HSR network connecting Arizona with destinations in California and Nevada would be accomplished over several decades. Required studies

Figure 34 - FRA HSR Map



and environmental clearances can take a decade or longer, and should be a priority for the near future.

The highest demand is expected to be between Phoenix and Tucson, and between Phoenix and Los Angeles. There has also been recent interest to study a connection between Phoenix and Las Vegas, potentially as part of development of a multimodal corridor, converting US 93 to an Interstate route.

Based on the analysis, the Phoenix–Los Angeles corridor offers the highest potential ridership, with the highest potential market size, compared to other corridors such as Phoenix–Las Vegas and Tucson–Phoenix–Flagstaff. The 2050 annual ridership along the Phoenix–Los Angeles ICR route is estimated at 1.8 to 4.4 million passengers.

Phoenix to Las Vegas Multi Modal Corridor (Potential Interstate Route)

This is the proposed interstate route connecting Phoenix to Las Vegas in Nevada and eventually to Seattle in Washington. Phoenix and Las Vegas metropolitan areas are the two largest urban regions in adjacent states not featuring a direct interstate connection. The corridor would be approximately 285 miles in length between Phoenix and Las Vegas and most likely follow the existing U.S. Highway 93 via the proposed ‘Hassayampa’ corridor (Figure 35). The proposed Interstate route may be developed as a multimodal corridor, including freight rail, and is part of the CANAMEX high priority corridor, which is envisioned to include intercity or high-speed passenger rail service.

Western Passage of CANAMEX

Several communities along the Colorado River in Western Arizona have initiated the concept of a western passage of CANAMEX. The western passage would focus on improving connections between western Arizona and Mexico. Improved connections with Mexico could include a new rail corridor linking Yuma Arizona with a proposed Mega port at Punta Colonet. The western passage of CANAMEX will focus on improved freight movements along the Colorado River, from Yuma to Las Vegas Nevada, complementing similar efforts underway

between Nogales and Las Vegas. Currently a resolution has been prepared in support of establishing the western passage, and recognition from congress has been requested.

Grand Ave Corridor

Initial phases of providing HSR service between Arizona and the surrounding states may include establishing intercity passenger service along new or existing corridors. These intercity rail (ICR) corridors might be

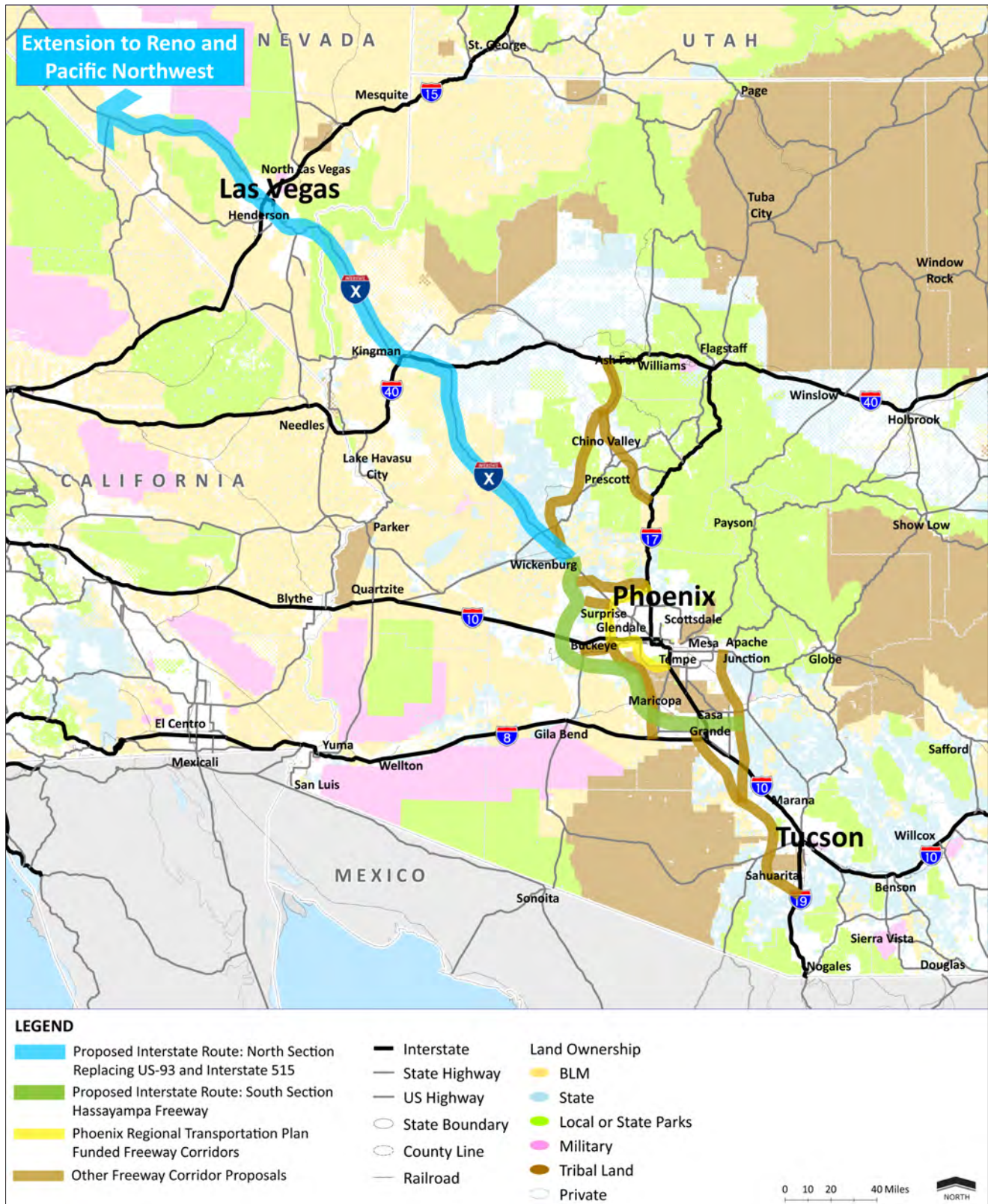


upgraded over time to become HSR corridors.

A key corridor which will support rail movements within the CANAMEX corridor is the Grand Ave section of the BNSF Phoenix Subdivision. This rail line begins in downtown Phoenix and passes through the communities of Glendale, Peoria, Surprise, and Wickenburg.

Current train operations include numerous conflicts with at-grade crossings on heavily travelled roadways. The BNSF rail line along Grand Ave, known as the Peavine, handled about 41,000 carloads in 2007, with the vast majority terminating in the Phoenix metropolitan area rather than interchanging with the UP at the junction of the two railroads in central Phoenix. Mobest Yard, the major switching yard located at the south end of the Peavine, handles many cars more than once. Loaded cars on the Peavine travel about 52 miles south of Wickenburg to be switched at Mobest, then are taken back by a local train to be spotted at various industries located on sidings connected to the Peavine corridor. Empties are picked

Figure 35 - Potential Phoenix-Las Vegas Multimodal Corridor



up by the local, taken back to Mobest for switching, and then travel north to Wickenburg and beyond.

BNSF has already acquired land in the planning area of Surprise for a potential new classification yard. Current forecasts indicate that Arizona's population and employment centers will continue to grow northwest of Phoenix. Accordingly, it is reasonable to assume that more rail-served industries will be located along this line in the future. If railcars can be switched in the vicinity of the Arizona and California Railroad interchange, then out-of-route miles can be avoided for cars destined north of the interchange. Furthermore, relocation of the yard further out of the metropolitan area helps to minimize the transport of hazardous materials into populous areas. For BNSF, relocation of the yard would increase the efficiency of freight traffic and free up rail capacity. Such efficiencies could promote growth with current industries and may attract new industries along the Peavine line. The increased capacity could also allow passenger rail service (commuter, intercity and, potentially, future high-speed) along the line into central Phoenix.

Relocating BNSF's switching activities, discussed above, would also allow for the reuse of Mobest Yard. Mobest Yard could be an ideal site for development of a multimodal transportation hub, with potential connections between the other passenger rail modes (e.g., light rail, commuter rail, ICR), as well as redevelopment opportunities for transit-oriented development.

The Peavine track along Grand Ave is ideal for commuter rail service between several municipalities into central Phoenix and MAG is currently undertaking detailed planning to examine the feasibility of developing a commuter rail system. The current and forecasted population shows a larger commuter base than that of either the FrontRunner (in Utah) or Rail Runner Express (in New Mexico), suggesting potentially higher ridership than either of these existing systems. Pursuit of commuter rail on the Peavine could provide a foundation for a future intercity rail extension to the north of Phoenix.

Intercity Rail

The Phoenix to Los Angeles Corridor has demonstrated

high ridership potential, and should be a strong candidate for federal designation as a High Speed Rail (HSR) corridor. Initial steps for establishing a HSR connection between these cities would be to establish ICR, and incrementally move towards a true HSR system. Re-establishment of Amtrak to Phoenix by rehabilitation of the UPRR Wellton branch would be a first step to providing ICR service. Amtrak California is currently considering starting service between Los Angeles and Palm Springs, consideration could be given to extend this service east to Yuma and Phoenix, assuming the Wellton branch is re-established.

The ICR connection between Phoenix and Los Angeles will strengthen the need for a Southwestern HSR network. As popularity of using a rail connection to Los Angeles increases, and Air Traffic becomes congested, the opportunity to implement true High Speed Rail between several southwestern cities will become more feasible.

Hassayampa Multi Modal Corridor

The potential multimodal interstate route connecting Phoenix to Las Vegas in Nevada and eventually to Seattle in Washington will most likely follow the existing U.S. Highway 93 via the proposed 'Hassayampa' corridor. The 'Hassayampa' corridor has been identified by MAG in its I-10/Hassayampa Valley Transportation Framework Study as a new multimodal corridor that will act as a faster, convenient route for freight rail traffic that will bypass downtown Phoenix, connecting Northern and Southern Arizona.

Inland Port to support International Trade

Inland ports/logistic facilities are intermodal facilities that allow containerized freight to be shipped directly from the port terminal to an inland facility for trade processing, sorting, and other value-added services. The ability to develop inland port and logistic facilities in Arizona to spur economic development depends on meeting warehousing/distribution location requirements, particularly in relation to "just-in-time" product delivery needs. One logistic facility currently exists at the Port of Tucson, along the UPRR Sunset Route. Studies have been conducted for sites near Flagstaff and Yuma for future inland ports/logistic facilities, with discussion

of an additional site near Kingman. From an economic perspective, inland ports/logistics facilities provide locations for value-added activities that create investment opportunities for Arizona, including freight manipulation, warehousing/distribution, and manufacturing – all of which bring jobs and improve the business climate for economic development.

Arizona has the opportunity to develop inland ports and associated warehouse/distribution facilities to help address some of the capacity constraints at the west coast deepwater ports and to serve the growing Sun Corridor.

The majority of import commodities arrive from foreign trade through POLA/POLB. The current annual capacity of these ports is approximately 28.5 million twenty foot equivalent units (TEUs). With substantial capital investment (about \$3 billion), capacity could nearly double. Forecasts of POLA/POLB container traffic demand range from 36.2 million to 56.4 million TEUs by 2020 – potentially exceeding their capacity. In the long run, trade with Asia will continue to grow. After the POLA/POLB reach capacity, there may be opportunities for the development of inland ports in Arizona, offloading containers from ships and directly transferring them to trains headed for inland ports, with customs facilities and FTZs provided at the inland locations. Prime sites for inland ports are the junctions of transportation corridors, including railroads, freeways, and airports. Several such junctions already exist in Arizona. Smaller infrastructure investments, such as railroad sidings or access roads, may be required, but much of the public investment has already been made.

A proposed new UPRR classification yard near Red Rock presents an opportunity to supplement classification activities occurring at the Tucson Yard, increasing switching volumes and thereby enhancing the overall efficiency of the Sunset Route. The proposed yard at Red Rock will serve to break down and reclassify trains carrying goods destined for the Phoenix metropolitan area.

Development of such a logistics facility could evolve into an inland port and foreign trade zone (FTZ), to attract

adjacent manufacturing that desires excellent intermodal transportation options. A recent study prepared for the Joint Planning Advisory Council (of MAG, CAAG YMPO and PAG) identified transportation logistics and associated manufacturing, as one of the key economic engines that could drive growth and development of the Sun Corridor over the next 40 years.

4.3.3 Recommended Rail Actions for the Canamex Corridor

Several rail actions are recommended for the Canamex Corridor of Opportunity to achieve the goals and objectives of this rail plan.

Complete feasibility and route studies to establish a western HSR network. This action would require coordination with adjacent states or HSR alliances, to complete studies that would explore potential ridership, environmental considerations, and potential high-speed routes linking metropolitan areas in adjacent states with Arizona. Corridors have been identified linking the Phoenix metropolitan area with Tucson, Las Vegas, Southern California, and the Front Range (Albuquerque and Denver). The objective is to receive federal designation for these corridors, which will provide the opportunity for future federal HSR funding for passenger rail projects in these corridors. This action would also include working with local agencies to update long range plans that coordinate local transit planning with potential HSR service.

Once implemented, the HSR network will help to improve mobility within Arizona and surrounding states, provide a faster and more reliable travel choice to users, and support the State's commitment to a sustainable and environmentally friendly transportation system. The HSR network will also enhance connectivity and increase the economic competitiveness of the State.

Establish a Hassayampa multimodal corridor. The potential Interstate 11 multimodal corridor connecting Phoenix to Las Vegas in Nevada and eventually to Seattle in Washington will most likely follow the existing U.S. Highway 93 via the proposed 'Hassayampa' corridor (Figure 36). The 'Hassayampa' corridor has been identified

by MAG in its I-10/Hassayampa Valley Transportation Framework Study as a new multimodal corridor that will act as a faster, convenient route for freight rail traffic that will bypass downtown Phoenix, connecting Northern and Southern Arizona.

Figure 36 - Proposed Hassayampa Rail Corridor



This action would include the studies, design, and implementation of a multimodal corridor, which could include a freeway and rail facilities for both freight and passenger service, including potential HSR.

Construct and operate a Phoenix to Tucson ICR system.

This Intercity Rail system (ICR) would provide frequent train service for passengers between Phoenix and Tucson. ADOT has begun the process to study potential corridors for this service. This action would build on initial studies to implement passenger rail service. In 2010, many local, regional and state agencies, as well as transit advocacy

groups have initiated resolutions and letters of support to the Federal Government for the return of intercity passenger rail to the Metropolitan Phoenix Area.

An ICR connection between Phoenix and Tucson would help reduce vehicular traffic on I-10 by providing an alternative mode of travel. It could reduce the potential impacts on the environment caused by widening the I-10 corridor. Increased connectivity between Phoenix and Tucson will also result in improved economic opportunities in the southern part of Sun Corridor, and encourage smart growth between the two Metropolitan areas.

Construct commuter rail systems in Phoenix and Tucson.

Initial planning of commuter rail systems is underway by both MAG and PAG. ADOT or another appropriate State agency could partner with MAG and PAG to coordinate planning and implementation of commuter rail systems with HSR and ICR. The objective of this action is to ensure a coordinated passenger rail system throughout the State that can provide seamless transfer between the different services.

Commuter rail systems in Phoenix and Tucson could greatly enhance passenger mobility within the metropolitan areas and provide seamless connections to future intercity and HSR systems. It will also support economic growth in the Sun Corridor and provide a faster, reliable and safe travel option to commuters and tourists.

The interconnectivity between Intercity Rail and Commuter Rail systems is critical. Stations could be located at places where passengers have access to a variety of transportation options to connect from one mode to the other. A well-connected passenger rail network could also work as a catalyst for transit-oriented development.

Partner with BNSF to implement operational improvements along the Phoenix Subdivision.

The Phoenix Subdivision, known as the Peavine, is one of two access points for freight rail into the greater Phoenix area. It includes the Grand Ave corridor within the Phoenix metro area, and the rural rail connection between the Phoenix area and Williams Junction in northern

Arizona. This action includes partnering with BNSF to implement improvements such as new classification yards and geometric improvements to improve travel time between Phoenix and Williams Junction. These improvements would enhance freight movements and might also provide opportunities for commuter and intercity passenger rail service.

Operational improvements along the BNSF Phoenix subdivision (Peavine) will enhance capacity for freight transportation on rail, and reduce freight traffic on Arizona highways. Potential passenger rail services,

especially along Grand Ave, will benefit from any improvements made along this line, if existing tracks are shared between freight and passenger trains.

4.3.4 Implementation

Several implementation steps are recommended with fit within the time frame of this rail plan that can contribute to the long range rail vision for the State of Arizona (Tables 16-18).

Table 16 - Canamex Corridor Short-Term Implementation Actions (within 5 years)

Implementation Action	Description	Comments
Phoenix to Tucson ICR Study	Establish a Locally Preferred Alternative (LPA) and Environmental Clearance for the Phoenix to Tucson ICR corridor.	Parts of this corridor would be used to implement commuter rail in the Phoenix and Tucson metropolitan areas.
High Speed Rail Corridors	Complete feasibility and route studies required for the recommended HSR Corridors	Feasibility studies pertaining to HSR corridors from Phoenix to Los Angeles and Las Vegas can help to promote more Intercity Rail service.
Grade Separation Program	Establish a program that prioritizes and implements key grade separations throughout the state.	Several at grade crossings of the BNSF Peavine along Grand Ave could be high priority candidates.

Table 17 - Canamex Corridor Intermediate Implementation Actions (within 10 years)

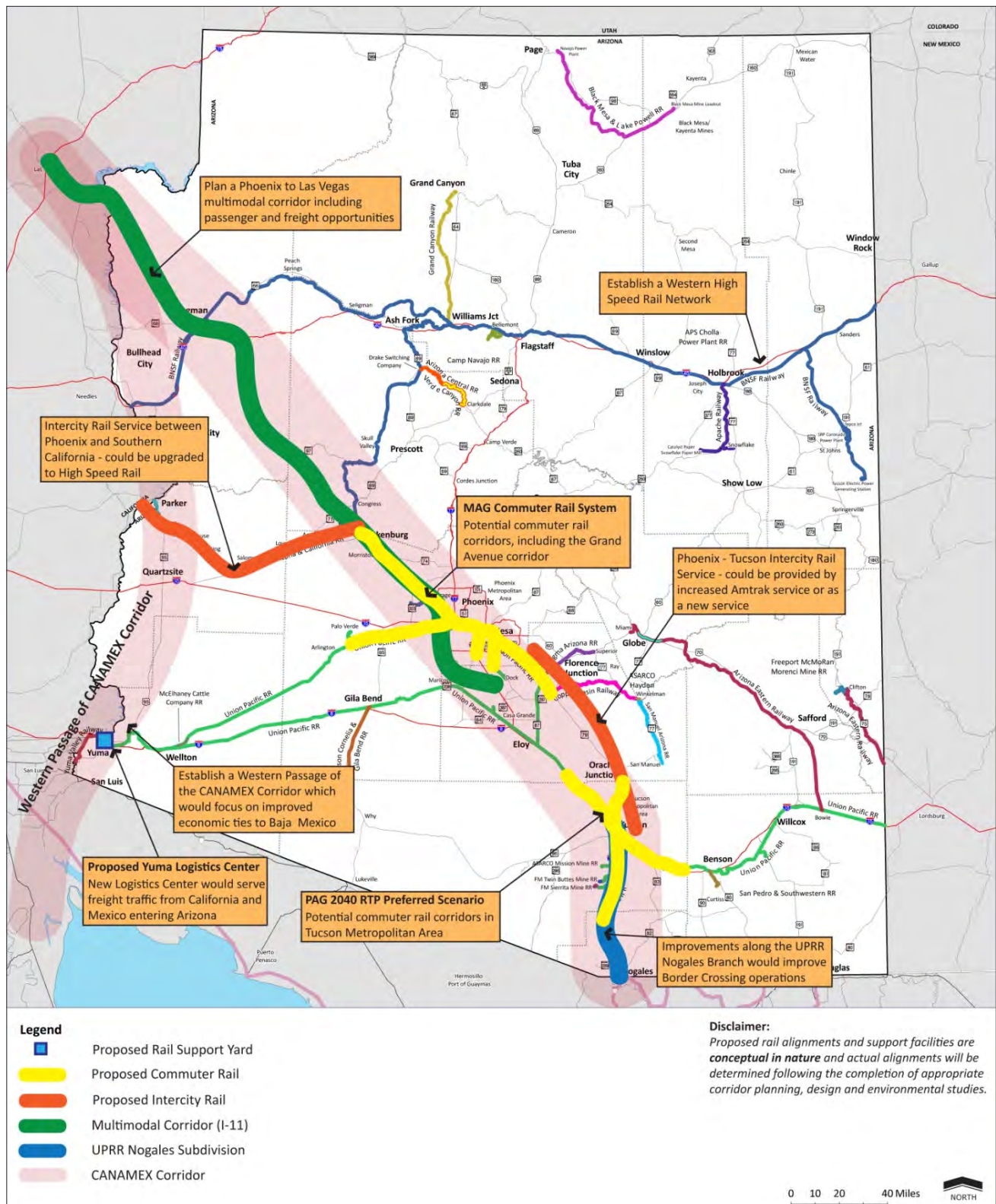
Implementation Action	Description	Comments
Commuter Rail	Partner with MAG and PAG to plan commuter rail systems within the Phoenix and Tucson metropolitan areas.	Within the Canamex Corridor the key corridor is Grand Ave.
Additional Amtrak Intercity Service	Establish more frequent Amtrak Service between Phoenix and Los Angeles.	Intercity service to Los Angeles could be routed along Grand Ave and the Arizona and California Railroad, serving several west valley communities.
Intermodal and Freight Logistics Centers	Based on recommendations provided by the FRAC, work with private sponsors to plan and implement new facilities at key locations. Public incentives could be established to promote facility development.	The Surprise support facility, proposed by BNSF, could consolidate operations currently located in El Mirage, Glendale, and downtown Phoenix.

Table 18 - Canamex Corridor Long-Term Implementation Actions (within 20 years)

Implementation Action	Description	Comments
ICR service between Phoenix and Tucson	Design and construct an intercity rail system connecting Phoenix and Tucson.	Commuter rail operations along Grand Ave and the Southeast Valley may begin before or after this service, but should operate in a common corridor.
Extensions of ICR throughout the Sun Corridor	Complete corridor studies and obtain environmental clearance for extensions of the intercity rail system north of Phoenix, and south of Tucson.	Freight rail improvements accomplished earlier might facilitate such ICR extensions.
Freight Rail improvements to benefit Arizona communities	Implement feasible improvements within communities such as; Quiet Zones, rail realignments, or other improvements	Based on recommendations provided by feasibility studies, partner with railroads and communities to implement improvements.



Figure 37 - CANAMEX Corridor of Opportunity



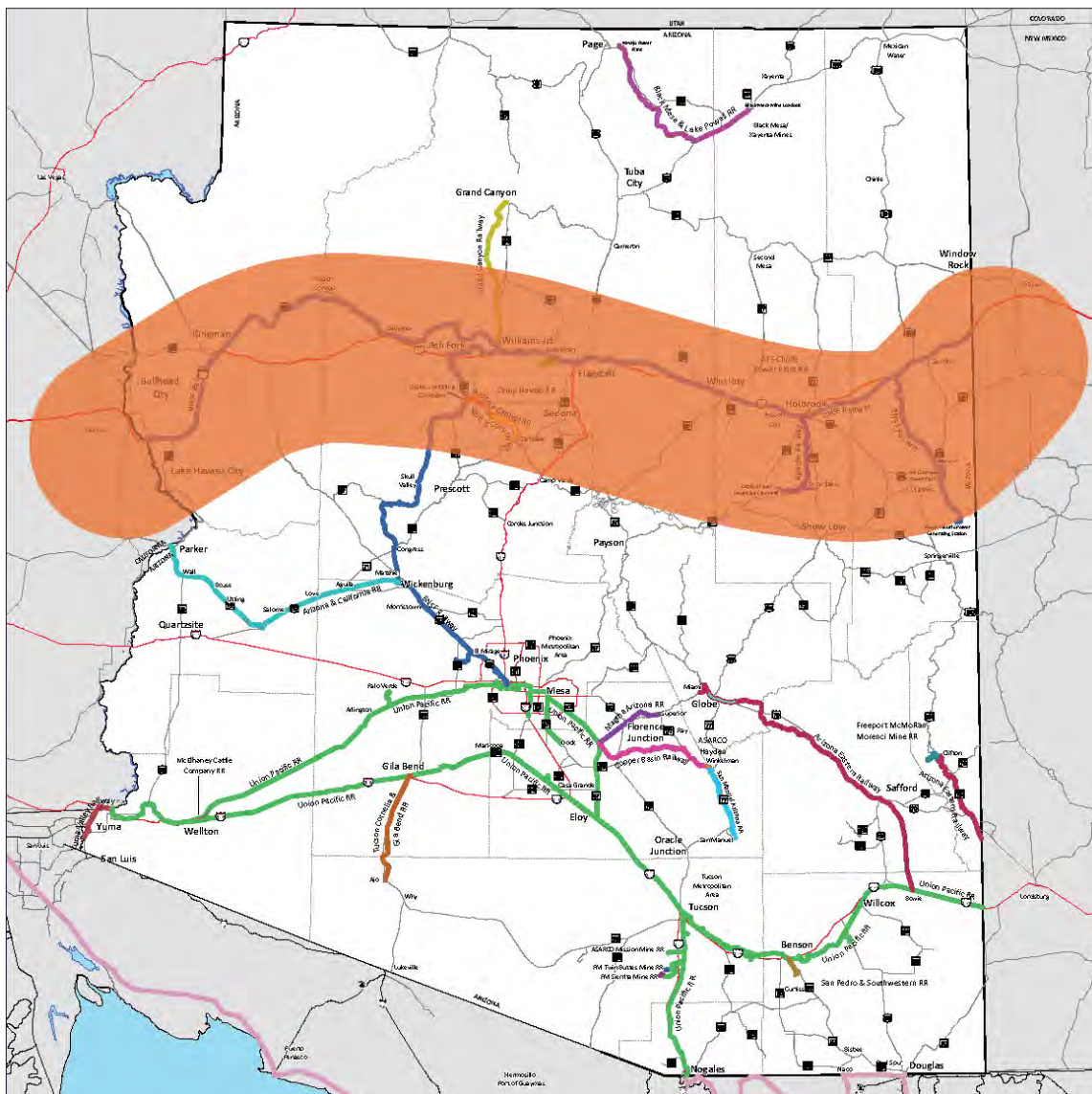
4.4 Route 66 Corridor

Route 66 corridor follows an east-west alignment across the northern part of the state. This corridor has been a key transportation route across Arizona since Edward Beale surveyed a wagon road from Fort Defiance to the Colorado River in 1857. Since the establishment of the Beale Wagon Road, this route has been followed by the Santa Fe Railroad, Route 66 and Interstate 40. Today the BNSF Transcon Corridor traverses this corridor, which is a mostly double tracked intermodal route connecting southern California to Chicago.

The Southwest Chief, operated by Amtrak, uses this route to provide intercity passenger service between Chicago and Los Angeles. This corridor of opportunity focuses on enhancing this intercity passenger service to support our tourist industry, and plan for seamless connections to future intercity service that would serve the emerging Sun Corridor.

Freight opportunities in this corridor focus on providing the required capacity to serve this key transcontinental corridor, and expanding the intermodal resources that serve northern Arizona.

Figure 38 - Route 66 Corridor



There are several Short Line railroads located in Northern Arizona which compliment the operations of the BNSF, and the opportunity to create new rail links which can move coal from the Black Mesa Coal Mines near Kayenta Arizona to the rest of country and abroad.

4.4.1 Inventory of Existing Conditions

Route 66 Corridor is a major freight corridor connecting the ports of Los Angeles and Long Beach with the eastern part of the country. In addition to freight traffic, this corridor is also served by the Amtrak's Southwest Chief service which connects Los Angeles to Chicago.

BNSF Railway



Route 66 Corridor is constituted mainly of the BNSF 'Transcon' Corridor which connects Los Angeles with Chicago and passes through northern Arizona, including Holbrook, Winslow, Flagstaff, Williams, Seligman, and Kingman. Traffic across Arizona on the Transcon corridor averages over 100 trains per day, an average of one train

every 15 minutes. The BNSF Transcon Corridor currently interchanges with three short line railroads in Arizona: the Apache Railway at Holbrook, the APS Cholla Power Plant Industrial lead track at Joseph City, and the Camp Navajo Railroad at Bellemont. The Transcon also connects with the BNSF Phoenix Subdivision at Williams Junction and provides transfer opportunities to the tourist rail service of the Grand Canyon Railway. The Transcon Corridor is 390 route miles of double-track in Arizona.

The BNSF Coronado Subdivision, 45.4 route miles, links the Salt River Project Coronado Power Plant with the BNSF Transcon Corridor at East and West Coronado Junctions, about 36 miles from the New Mexico border (Figure 39). The Springerville Subdivision, extending an additional 29.7 route miles, connects the Tucson Electric Power Company's Springerville Generating Station with the Coronado Subdivision at Tepco Junction. These subdivisions were built between 1979 and 1980 and are co-owned by BNSF, Salt River Project and Tucson Electric Power (Figure 40).

Figure 39 - BNSF Transcon Corridor

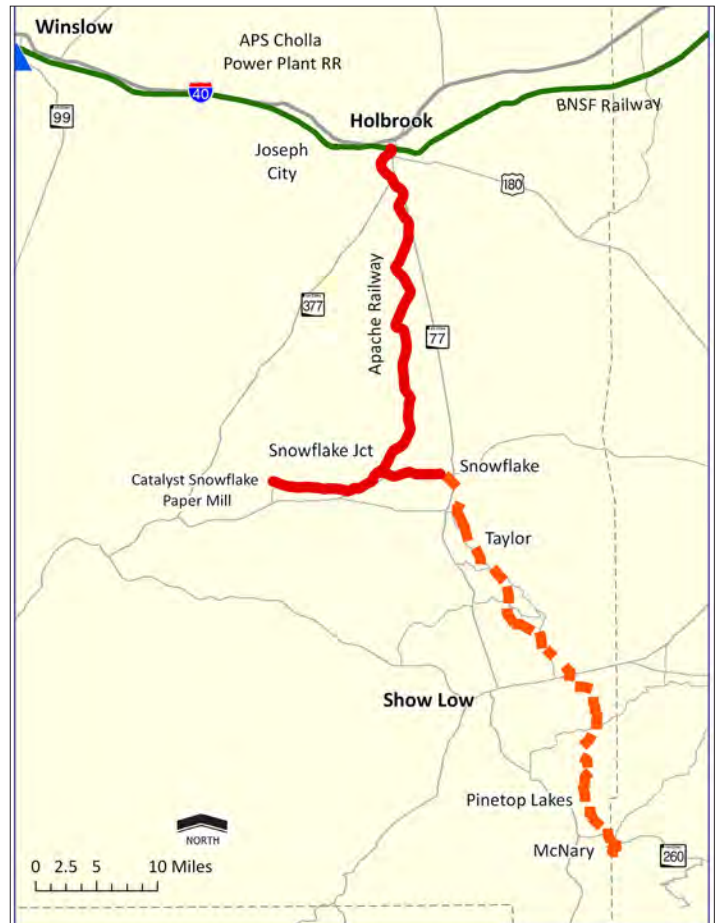


Figure 40 - BNSF Coronado & Springerville Subdivision



The 38-mile mainline of the Apache Railway (APA) connects a newsprint plant near Snowflake with the BNSF Transcon Corridor at Holbrook (Figure 41). A seven-mile branch line links Snowflake with APA's mainline, with service as needed.

Figure 41 - Apache Railway



The Camp Navajo Railroad (DODX/USAX/USNX) is a 38-mile network, located entirely within the 28,000-acre State of Arizona military reservation at Bellemont and owned by the Arizona National Guard. Train movements are on an "as required" basis. The Camp Navajo Railroad connects with the BNSF Transcon Corridor and moves about 40 carloads per year to and from storage igloos.



From 1870's until the 1930's, most intercity travel and movement of goods was on the country's railway system. At the present time, intercity passenger rail plays only a small part in the nation's overall transportation system and the majority of goods are shipped on trucks.

Black Mesa & Lake Powell Railroad

The 78-mile Black Mesa & Lake Powell Railroad (BLKM/ BMLP), jointly owned by the Navajo Nation and the Hopi Tribe, hauls coal from a strip mine at Black Mesa, near Kayenta, to the Salt River Project Navajo Generating Station near Page (Figure 42). It was constructed in 1972 as the world’s first 50,000-volt electric railroad. This single-purpose line is not connected with any other railroad. The entire right-of-way is fenced.

Figure 42 - Black Mesa & Lake Powell Railroad



Grand Canyon Railway

The 64-mile Grand Canyon Railway (GCRX), a tourist passenger railroad, connects the National Park Service hotel facilities on the South Rim of the Grand Canyon to the railroad’s Williams depot. With a ridership of 240,000 in 2006, it is among the most popular tourist railroads in the United States.

4.4.2 Corridor Strategy

The route 66 corridor has been a key transportation corridor for the state for over 150 years, and currently the BNSF Transcon is a key transcontinental freight corridor and provides intercity passenger service.

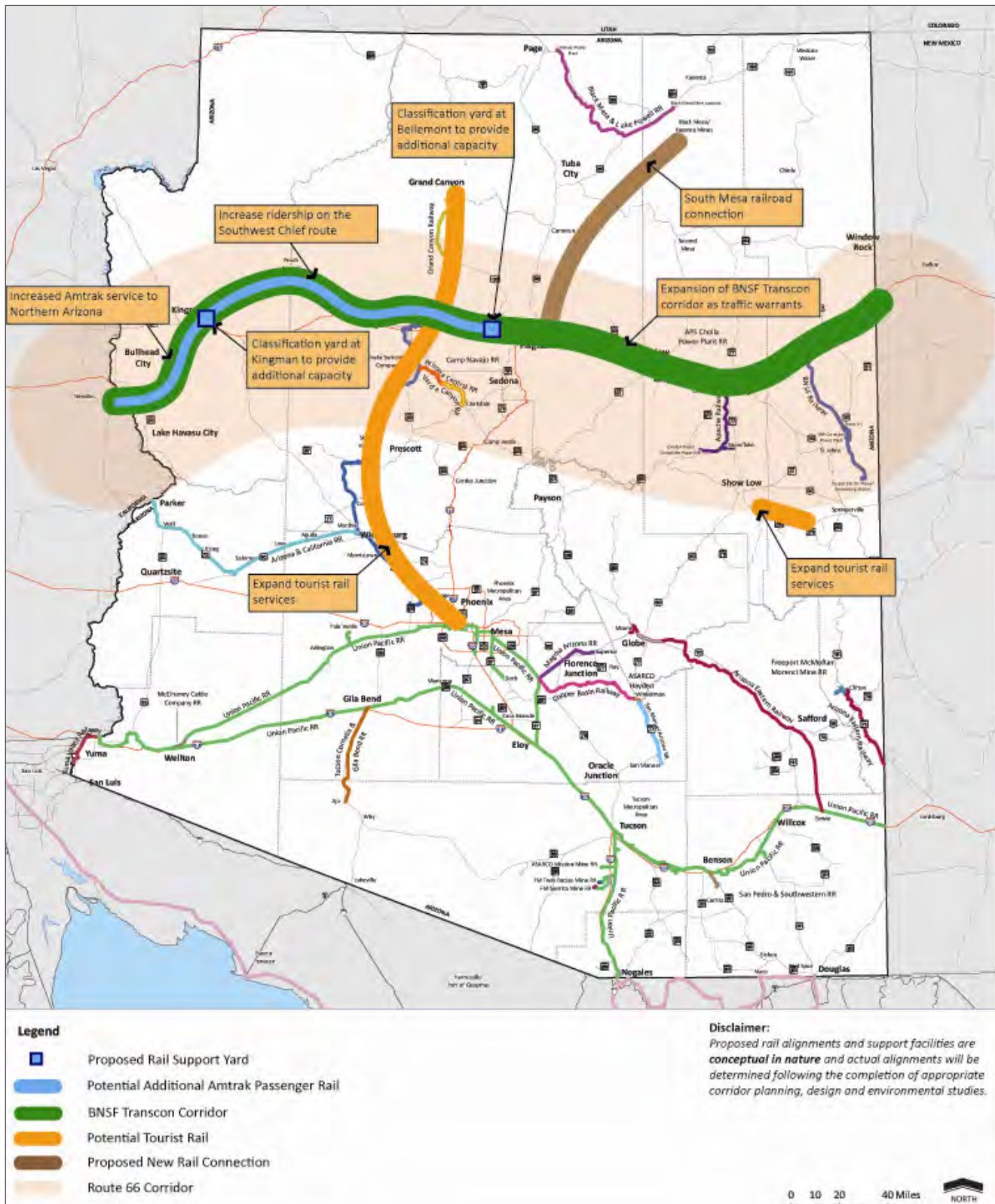
The passenger rail strategy of this corridor is to enhance intercity passenger service which supports our tourist industry, and plan for seamless connections to future intercity service that would serve the emerging Sun Corridor. Improved connections between the Amtrak service, including the Southwest Chief, and the Grand Canyon Railway would enhance the ability for tourists worldwide to use passenger rail to access Grand Canyon National Park. Passenger service within this corridor should be coordinated with the planning of ICR service within the Sun Corridor, seamless connections should be planned between these systems.

Freight opportunities in this corridor focus on providing the required capacity to serve this key transcontinental corridor, and expanding the intermodal resources that serve northern Arizona. BNSF has indicated the need to triple track the Transcon Corridor once traffic warrants, and the state should partner with BNSF to ensure the capacity needed to move intermodal freight is provided without unacceptable impacts to the adjacent communities. The proposed grade separation program could allow for additional transcontinental traffic while enhancing traffic movements within the communities located along the BNSF Transcon Corridor. New intermodal and freight logistic centers have been proposed near Flagstaff and Kingman which could expand the local economies of these communities by supporting additional rail supported industries.

Table 19 - Key Characteristics of Arizona Railroads along Route 66 Corridor

Railroad	Route Miles	Annual Carloads	Approximate No. of Trains	Maximum Track Speed
BNSF Transcon	390	293,400	< 100 / day	70 mph (90 mph- Amtrak)
Apache Railway	38	11,400	1 / day	35 mph
Grand Canyon Railway	64	240,000 Passengers	2 / day (Summer)	40 mph
Black Mesa & Lake Powell Railroad	78	84,000	3 / day	40 mph

Figure 43 - Route 66 Corridor of Opportunity



4.4.3 Passenger Rail Opportunities for the Route 66 Corridor

The Southwest Chief provides daily intercity passenger service to the communities of Winslow, Flagstaff, Williams (Williams Jct.), and Kingman. Improving schedules of the Southwest Chief would support development of an intercity passenger rail system throughout the Southwest. The Chief connects Chicago and Los Angeles, both of which provide connections to regional rail networks and future HSR networks. Within Arizona, this link to Los Angeles allows the opportunity to boost tourism by using Amtrak from the Los Angeles Basin to northern Arizona, specifically Grand Canyon National Park via the Grand Canyon Railway.

Increase Ridership on the Southwest Chief

One location identified for station enhancement is at the community of Williams, which could increase overall ridership on the Chief. The Grand Canyon Railway provides daily passenger service (seasonal) from downtown Williams to the Grand Canyon National Park; however the Southwest Chief stops at Williams Junction which is located several miles from downtown Williams. Currently the Grand Canyon Railway provides a free van service between the two locations if visitors have reservations on the Grand Canyon Railway. There is an opportunity to provide improved services at Williams Junction, which currently is only a platform, and provide a dedicated shuttle service for all patrons of the Southwest Chief to transfer to downtown Williams. Currently the schedules of the Chief and Grand Canyon Railway are not well coordinated, with the Southwest Chief arriving during the night and Grand Canyon providing service during the daylight hours. An adjustment in the Amtrak schedule to better coordinate with departures to the Grand Canyon could increase on both services.

Other improvements along this route include improving passenger services at Winslow, Flagstaff, and Kingman such as self-serve ticket machines and baggage checking services.

Increased Amtrak Service to Northern Arizona

Additional Amtrak trains running between the Los Angeles Basin and Northern Arizona could increase tourism to the State. A proposal has been discussed to provide an additional intercity train which leaves Los Angeles in the evening and arrives at Williams Junction and Flagstaff the next morning on a schedule which allows visitors convenient transfers to the Grand Canyon National Park. This would also provide a more convenient schedule for Northern Arizona residents to travel by train to southern California.

Expand Tourist Rail Services

The Grand Canyon Railway has expressed interest in extending their service south along the BNSF Peavine route to the Phoenix Metro Area, if ridership numbers and revenue forecasts show the service is feasible. This could allow tourists to fly into Sky Harbor Airport and transfer to a direct train bound for Grand Canyon National Park. Enhancing rail service to Grand Canyon is an objective of the National Park Service to help alleviate traffic congestion and parking limitations currently experienced in the park.

The White Mountain Apache Indian Community has expressed interest in establishing tourist rail service between McNary and the Sunrise Ski Resort. This service would follow an abandoned alignment previously used by the Apache Railway Company. This rail passenger service, known as the White Mountain Apache Scenic Railroad, would provide access for employees and visitors to a major casino (HonDah) within the White Mountain community and the ski resort, alleviating parking limitations at both locations.

4.4.4 Freight Rail Opportunities for the Route 66 Corridor

Approximately 130 million tons of commodities are currently transported via rail in Arizona, with over 75 percent of this traffic passing through the State. Inbound, outbound, and through rail freight tonnage is projected to triple in volume by 2050.

Traffic levels along the BNSF mainline peaked in 2008 at 120 trains per day, before the current economic downturn. The double tracked Transcon Corridor was nearing capacity in Arizona. Because it links the Port of Los Angeles (POLA)/Port of Long Beach (POLB) with Chicago, the Transcon Corridor handles two-thirds of BNSF's intermodal container or trailer on flat car traffic.

BNSF have plans to expand their transcontinental route to achieve greater freight capacity. Expanding the Transcon Corridor will increase freight volumes and provide capacity for improved efficiency. Additional improvements are needed to classification and intermodal distribution systems for rail to be more competitive with moving freight by truck from Los Angeles.

The State of Arizona has established a Freight and Rail Advisory Council (FRAC) that represents BNSF, UPRR, the trucking industry, major airports and other key economic stakeholders around the State. This council's mission is to identify how the freight can work more efficiently in the State, promote economic vitality and development and enhance quality of life while preserving our natural environment and minimizing carbon footprint resulting from freight movements. This includes working with the freight industry, including the Class I railroads, to help set priorities for improvements to the freight transportation network, including roadway, rail and air components, as well as intermodal connections.

Expansion of the Transcontinental Routes

Adding capacity to the transcontinental routes would improve the movement of freight across the State, and can also provide an opportunity to increase the frequency of intercity passenger rail if the railroads will support it. The Amtrak Southwest Chief route through Arizona could more easily add train frequency and improve on-time performance. Additional intercity passenger routes between Arizona and other states, such as southern California, could be more easily implemented along the transcontinental corridors once additional capacity is completed.

The opportunity exists to advance these plans by helping to secure federal or state funding to accelerate

potential public-private partnerships. Through a public-private partnership with the railroad, where railroad and community needs intersect, public funding sources could be applied to help improve rail capacity at constrained locations throughout the State, which could improve freight movements and also increase opportunities for implementing intercity passenger service. Additionally, the State could assist in streamlining permitting processes between the railroads and the multiple government entities involved in granting the necessary approvals, reducing turnaround times to complete improvements.

South Mesa Railroad Connection

The Black Mesa and Kayenta Mines located in northern Arizona are the largest concentration of coal deposits in the State. Coal mined at these locations is moved through a 26-mile network of conveyor belts to the railhead of the Black Mesa and Lake Powell Railroad. This 78-mile short line moves coal from the railhead to the Navajo Power Generating Station near Page. Currently the Navajo Power Generating Station is the only Arizona customer for this coal.

Three other coal-fired power generating stations are located in northeast Arizona: the APS Cholla Power Plant, the Salt River Project Coronado Power Plant, and the Tucson Electric Power Springerville Power Plant. Each of these plants is located along the existing BNSF rail network, and each receives daily coal shipments from New Mexico and Wyoming. A new rail connection between the mines and the BNSF Transcon Corridor near Flagstaff would allow coal mined at Black Mesa and Kayenta to be delivered to all of the power plants in Northern Arizona located along the BNSF rail system and beyond to international markets, potentially reducing the cost of coal used at these power plants and reducing the carbon footprint of its delivery.

Develop Intermodal and Freight Logistic Centers

As the economy of Arizona continues to grow, the need for a more robust system to move freight in and through the State will increase. Development of intermodal facilities that can efficiently transfer cargo between rail and trucks will be needed as the Sun Corridor continues to expand.

Freight logistic centers, such as inland ports, warehouse distribution centers and supporting rail infrastructure, will be needed to continue to expand the number of jobs located in Arizona, and to import and export the products required for a balanced economy.

Funding Railroad Facilities

Improvements to private railroad facilities are typically borne by the railroad companies, but there are many opportunities for the State of Arizona to enter into public/private partnerships with BNSF. Increased capacity along the transcontinental railroad corridors can improve not only freight shipments throughout the country, but also economic activity in the State, on-time performance of intercity passenger rail, and opportunities to expand passenger service.

Intermodal facilities proposed at Bellemont and near Kingman could become candidates for these types of partnerships. Public investment for implementation of classification yards could be justified if the costs offset expenditures for other projects, such as eliminating the need for grade separations, or reducing the cost to implement passenger rail service.

4.4.5 Recommended Actions for the Route 66 Corridor

Several rail actions are recommended for the Route 66 Corridor of Opportunity to achieve the goals and objectives of this rail plan.

Partner with Amtrak to improve existing service for the Southwest Chief route. The Southwest Chief is an intercity passenger rail service provided by Amtrak connecting Chicago and Los Angeles. Station locations in Arizona include Winslow, Flagstaff, Williams Junction and Kingman. This action would include partnering with Amtrak to improve station amenities along the route, and to consider more efficient connections via shuttle buses.

Improved Amtrak service along the Southwest Chief route will provide improved connectivity between Arizona and the other states, enhance passenger mobility, and help in alleviating congestion on major highways. It will also

provide an affordable transportation option that helps with the reduction of greenhouse gas emissions.

Support existing tourist railroads and their expansion.

Three tourist railroads currently operate in the State and several new opportunities have been identified. This action would enable tourist railroads to access any available funding and include them in any assistance programs that the State may implement.

This action would enhance the attraction that brings millions of tourists to the State annually. Expanded tourist rail connections will provide more frequent service and potential connections to a statewide passenger rail system which will help in the growth of tourism in the State.

Partner with BNSF to implement operational improvements along the Transcon Corridor.

BNSF has identified numerous improvements along their transcontinental routes that would expand capacity and improve operations. Typically these improvements are implemented by the freight rail companies, but this action includes any partnerships that could be formed between the public and private sectors to streamline the implementation of improvements. Partnerships could include completion of studies, expediting the permit process, providing a combination of public and private funding for the improvements, and coordinating improvements with adjacent projects. The recently enacted State of Arizona legislation that authorizes public-private partnerships for transportation projects provides flexibility in procurement, favorable tax, financing, and performance bonding provisions.

Summary of Rail Implementation for the Arizona Spine Corridor

Based on the prioritization of potential actions, and the recommended projects for implementation, Tables 20 -22 provide a summary of the proposed implementation plan.

4.4.6 Implementation

Several implementation steps are recommended with fit within the time frame of this rail plan that can contribute to the long range rail vision for the State of Arizona.

Table 20 - Route 66 Corridor Short-Term Implementation Actions (within 5 years)

Implementation Action	Description	Comments
Partner with Amtrak to improve service along the Southwest Chief Route	Recommend enhancements to station locations along the Southwest Chief route, and improved connections.	Improving connections between the Southwest Chief and Grand Canyon National Park would increase tourism in Northern Arizona.
Additional Amtrak service between southern California and Flagstaff	Partner with Amtrak and Grand Canyon Railway to explore the feasibility of additional Amtrak service.	Improving connections between the southern California and Grand Canyon Railway would increase tourism in Northern Arizona.

Table 21 - Route 66 Corridor Intermediate Implementation Actions (within 10 years)

Implementation Action	Description	Comments
Expansion of Tourism Rail service	Partner with Grand Canyon Railway and White Mountain Apache community to explore the feasibility of expanding tourist railroad services	Potential expansions could include tourist service between Phoenix and Grand Canyon NP, and between McNary and Sunrise Ski Resort
Intermodal and Freight Logistics Centers	Based on recommendations provided by the FRAC, work with private sponsors to plan and implement new facilities at key locations. Public incentives could be established to promote facility development.	Intermodal and logistics centers may be funded by public-private partnerships.

Table 22 - Long-Term Implementation Actions (within 20 years)

Implementation Action	Description	Comments
Extensions of ICR to Northern Arizona	Complete corridor studies and obtain environmental clearance for extensions of the intercity rail system north of Phoenix.	Freight rail improvements accomplished earlier might facilitate such ICR extensions.
Freight Rail improvements to benefit Arizona communities	Implement feasible improvements within communities such as; Quiet Zones, rail realignments, or other improvements	Based on recommendations provided by feasibility studies, partner with railroads and communities to implement improvements. Classification yard projects have been proposed within Surprise and at Red Rock.

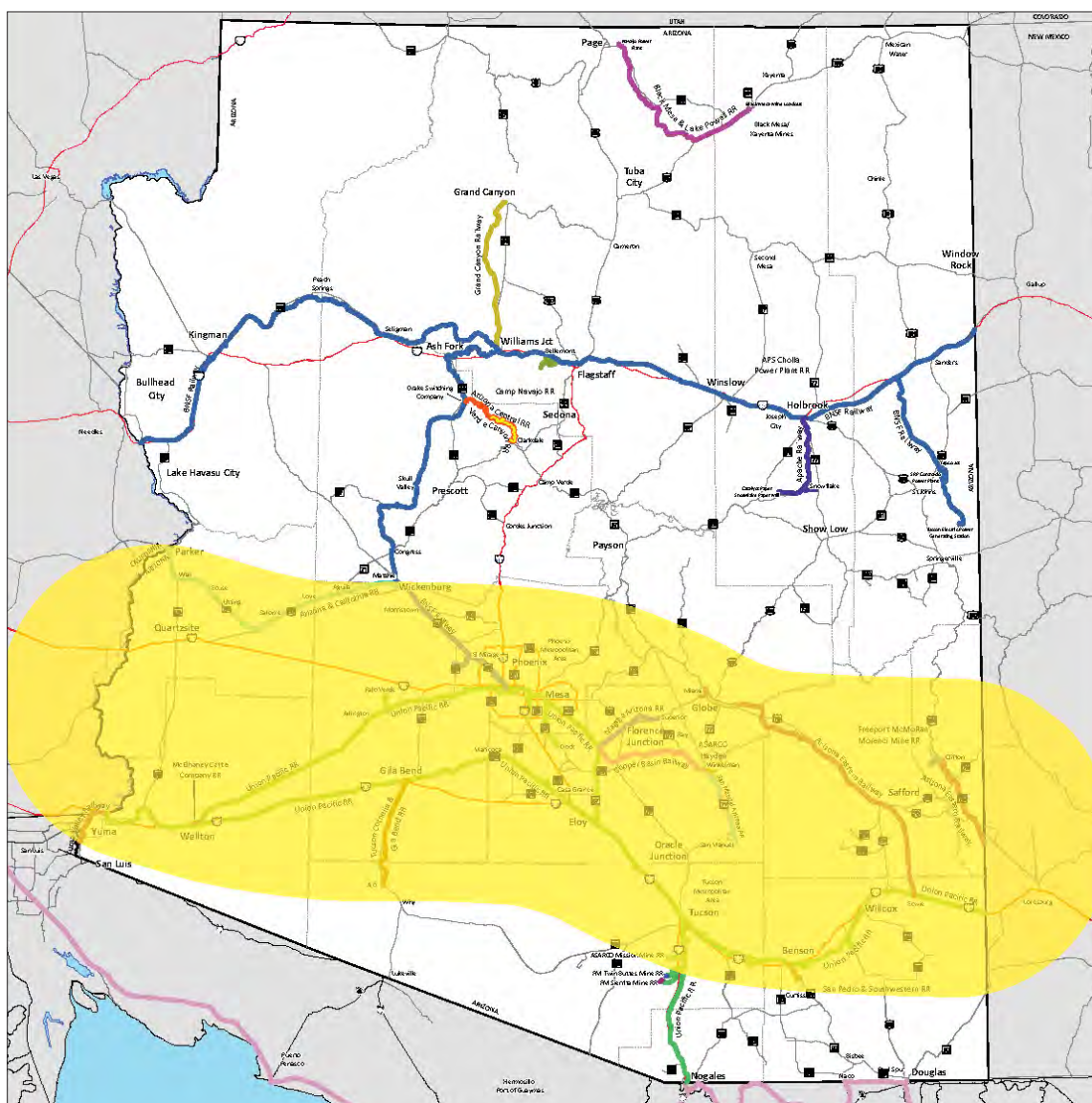
4.5 Sunset Route Corridor

The Sunset Route corridor follows an east-west alignment across the southern part of the state. This corridor has been a key transportation route across Arizona since the Butterfield Overland stage route was established in 1858. Since the establishment of the Butterfield Stage Route, this route has been followed by the Southern Pacific Railroad, the Spanish Trail (US 80), Interstates 8 and 10. Today the UPRR Sunset Corridor traverses this corridor, which is a mostly single tracked intermodal route connecting southern California to Texas and Chicago.

The Sunset Limited, operated by Amtrak, uses this route to provide intercity passenger service between New Orleans and Los Angeles. This corridor of opportunity focuses on enhancing this intercity passenger service to support Intercity Rail between southern California and the emerging Sun Corridor.

Freight opportunities in this corridor focus on providing the required capacity to serve this key transcontinental corridor, and expanding the intermodal resources that serve southern Arizona and the Sun Corridor megaregion.

Figure 44 - Sunset Route Corridor



There are several Short Line railroads located in southern Arizona which compliment the operations of the UPRR, including the Arizona Eastern Railroad, San Pedro and Southwestern Railroad, and several mining operations owned by Freeport McMoRan.

4.5.1 Inventory of Existing Conditions

Union Pacific Railroad

The UPRR (formerly Southern Pacific) Sunset Route crosses southern Arizona through Yuma, Gila Bend, Casa Grande, Tucson, Benson, and Willcox. The UPRR system has significant amounts of traffic between Southern California and El Paso, and continuing east to Chicago. According to a railroad news release, Union Pacific's 760-mile corridor between Los Angeles and El Paso carries nearly 20 percent of the railroad's traffic (Figure 45).

The Phoenix Subdivision connects the Sunset Route with Phoenix and points west of Phoenix, to a point a few miles west of Arlington, and consists of approximately 125 miles of single track. Traffic on the Phoenix Subdivision, which serves approximately 150 customers, averages about six trains per day. Local UPRR yards along this



Subdivision were operating near capacity in 2006-2007. UPRR has proposed new classification yard locations to enhance their ability to serve new customers within the Phoenix Metro area.

The 65.7-mile, single-tracked Nogales Subdivision connects Tucson with Nogales and provides UPRR an entry into Mexico and an interchange with Ferromex. Traffic on the Nogales Subdivision averages four round trip trains per day, plus two locals.

Figure 45 - Union Pacific Sunset Route Mainline



Arizona Eastern Railway, Inc.

The Arizona Eastern Railway (AZER) operates 135 miles of railroad between Bowie and Miami and 70 miles from Lordsburg, New Mexico to Clifton (Figure 46). UPRR has granted AZER trackage rights on the Sunset Route between Bowie and Lordsburg, thus allowing a seamless connection between the two AZER properties.



The railroad serves the copper mining region of southeastern Arizona and the agricultural Gila River Valley. Its primary commodities are copper concentrate, copper anode and cathode, and copper rod and other copper processing materials. The railroad carried 7,310 carloads and 950,300 gross tons in 2005. Its principal customer is the Freeport McMoRan (formerly Phelps Dodge/Cyprus) copper production facility at Miami, which is served by extensive industrial trackage within the plant. The service level is one round trip per day, six or seven days a week.

Figure 46 - Arizona Eastern Railroad



San Pedro and Southwestern Railroad

San Pedro and Southwestern runs from a connection with UPRR at Benson to Curtiss, 7.5 miles (Figure 47). A team track is available for transloading at Benson. The SPSR organization performs a satellite switching operation at Willcox.

The SPSR, part of the SP system until 1992, once had daily operations over 65 miles of mainline track between Benson and Bisbee Junction. Ten more miles of track between Paul Spur (east of Naco) and Douglas had been abandoned and removed by the late 1990s.

The fortunes of the SPSR began to decline when the copper smelter at Douglas closed in 1987. Negotiations to establish a railroad border crossing at Naco were unsuccessful. The Federal Railroad Administration (FRA) determined in 2005 that the railroad must be embargoed between Curtiss (SPSR MP 7.5) and the end of track at Paul Spur (near Douglas) unless certain bridges between Curtiss Siding and Naco were repaired.

By the fall of 2006, the SPSR had sold the track between Curtiss and Paul Spur, and the rail was removed in 2007. The sale of track assets will allow a \$0.5 million upgrade (3,000 new ties and 3,000 tons of new ballast and other improvements) on the remaining Benson-Curtiss line, permitting speeds up to 20 mph and cars up to 286,000 pounds gross weight.

SPSR track is jointed rail ranging from 110 to 132 pounds per yard. SPSR owns the right-of-way between Benson and Douglas, except for a 20-mile UPRR-owned segment in the San Pedro River Riparian Area. The right-of-way width is generally 200 feet. The maximum gross weight of car and locomotive is 263,000 pounds.

SPSR's sole customer, at Curtiss, produces ammonium nitrate and generates approximately 1,350 annual carloads (inbound anhydrous ammonia, outbound fertilizer). SPSR serves this customer three days a week.

Figure 47 - San Pedro & Southwestern Railroad



4.5.2 Corridor Strategy

The Sunset Corridor has been a key transportation corridor for the state for over 150 years, and currently the UPRR Sunset Corridor is a key transcontinental freight corridor and provides intercity Amtrak passenger service.

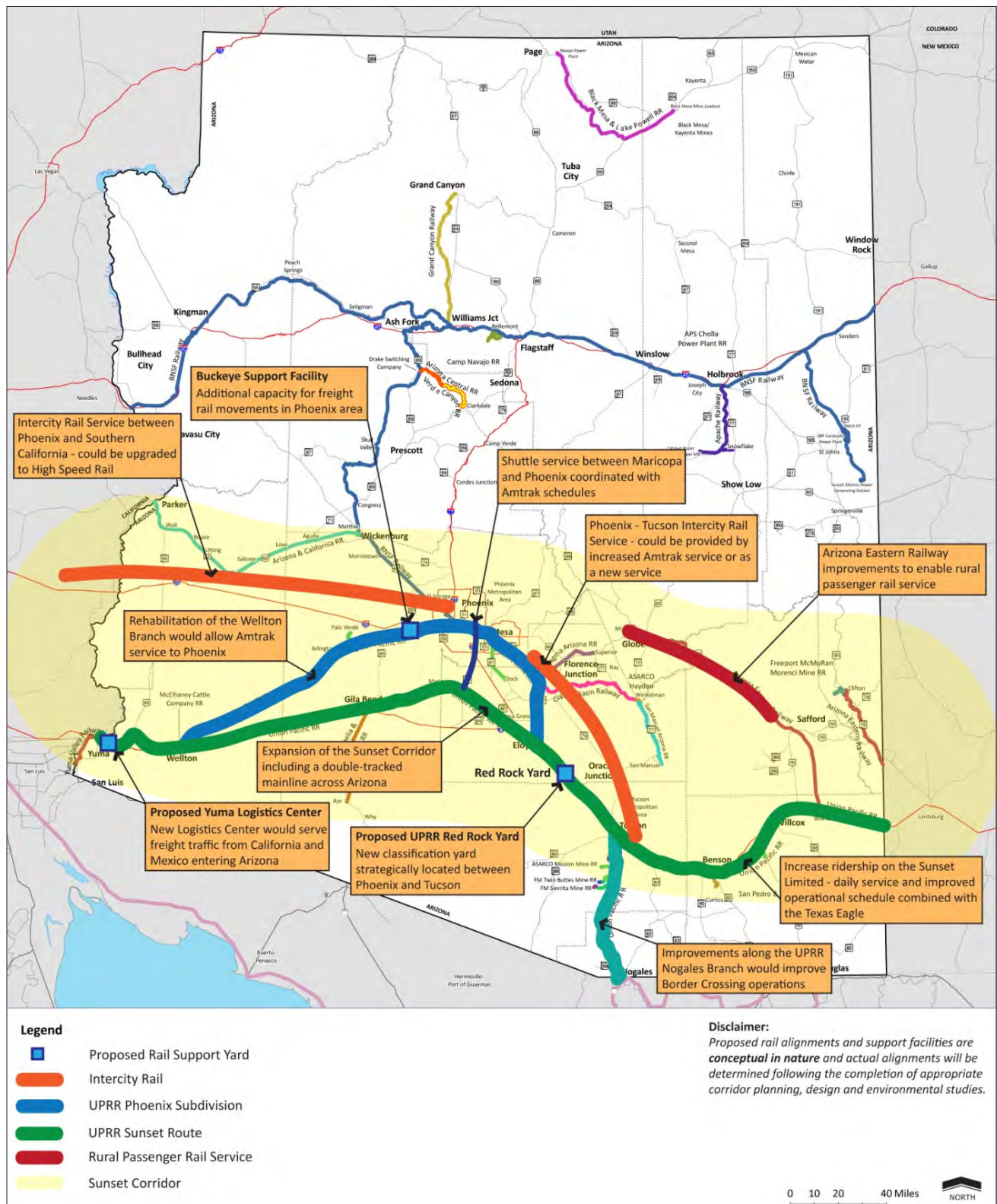
The passenger rail strategy of this corridor is to enhance intercity passenger service which can be an incremental step to intercity service that would serve the emerging Sun Corridor, and a southwestern High Speed Rail network. Improved Amtrak service, including the Sunset Limited, would provide a more desirable alternative mode for trips from Arizona to southern California. Passenger service within this corridor should be coordinated with the planning of ICR service within the Sun Corridor, seamless connections should be planned between these systems.

Freight opportunities in this corridor focus on providing the required capacity to serve this key transcontinental corridor, and expanding the intermodal resources that serve the emerging Sun Corridor and southern Arizona. UPRR is in the process of double tracking the Sunset Corridor through Arizona, and the state should partner with UPRR to ensure the capacity needed to move intermodal freight is provided without unacceptable impacts to the adjacent communities. The proposed grade separation

program could allow for additional transcontinental traffic while enhancing traffic movements within the communities located along the UPRR Sunset Corridor. New intermodal and freight logistic centers have been proposed near Red Rock, and Yuma which could expand the local economies of these communities by supporting additional rail supported industries.

In the past 20 years there has been a resurgence of interest in intercity rail. In 2000 two new high speed corridors were designated bringing the designated high speed corridors to seven. The Passenger Rail Investment and Improvement Act (PRIIA) of 2008 authorized \$14.3 billion for development of new and improved intercity passenger rail service.

Figure 48 - Sunset Route Corridor of Opportunity



4.5.3 Passenger Rail Opportunities for the Sunset Corridor

The Sunset Limited provides intercity passenger service 3 times a week to the communities of Benson, Tucson, Maricopa and Yuma. Improving schedules of the Southwest Limited would support development of an intercity passenger rail system throughout the Southwest. The Limited connects New Orleans and Los Angeles, both of which provide connections to regional rail networks and future HSR networks.

Increase Ridership on the Southwest Limited

The highest potential for increasing ridership on the Sunset Limited is to provide daily service; Amtrak has already proposed this change. The Sunset Limited is envisioned to provide combined daily service with the Amtrak Texas Eagle service, providing an alternative daily intercity route from Chicago to Los Angeles.

The operating schedule of the combined route is proposed to be revised also, which will provide daylight service to Arizona stations in both directions. This change in schedule is encouraged since the current service travels through Arizona during the late evening and early morning hours which is not convenient for Arizona citizens. Improving schedules, service frequency, and on-time performance of the Sunset Limited/Texas Eagle Amtrak service through southern Arizona may support successful development of an intercity passenger rail system throughout the Southwest. The Sunset Limited/Texas Eagle Amtrak corridor terminates in Los Angeles, where it connects to a broader rail network system, including local transit connections, Amtrak California routes, and future HSR.

Currently the Sunset Limited does not provide direct service to the Phoenix Metro Area, but stops in the city of Maricopa about 35 miles from downtown Phoenix. Currently there is no shuttle service from the Amtrak Station in Maricopa to Phoenix that is scheduled to meet the trains when they arrive. Providing a coordinated shuttle service from Maricopa to Phoenix will provide a more efficient intercity rail connection to the country's fifth largest city.

Other improvements along this route include improving passenger services at Benson, Tucson, and Yuma such as self-serve ticket machines and baggage checking services.

Amtrak Service to the Phoenix Metro Area

Amtrak provides direct service to Tucson but not the Phoenix metropolitan area. In 1996, UPRR suspended service on the Wellton Branch between Wellton and Palo Verde, which ended Amtrak service to Phoenix and Tempe. The 81-mile segment required significant maintenance and upgrades, for which Amtrak was not prepared to finance. Since 1996, Amtrak has used the Sunset Route through Maricopa, approximately 30 miles south of Phoenix, where it established a new station. In 1995, the Phoenix and Tempe stations had approximately 35,000 combined passenger boardings on the Sunset Limited, in contrast to the 6,400 boardings at Maricopa in 2008. There is currently no connecting bus service from the Maricopa station to the Phoenix area.

Since the suspension of Amtrak service to Phoenix in 1996, many factors concerning the transportation industry have changed, including environmental concerns of constructing new corridors in greenfield lands, a more congested aviation system, roadway congestion, increased fuel prices, and the need for transportation alternatives. Re-establishing Amtrak service to Phoenix would increase long-distance travel options and support the environment by using the existing, but inactive, Wellton Branch or a route along the Arizona and California Railroad.

Passenger rail service along the Arizona and California Railroad would require coordination with multiple railroad companies. Additionally, renewed Amtrak service to Phoenix might build ridership throughout Arizona and attract out-of-state passenger travel. This will also require installation of Positive Train Control (PTC) measures along the Wellton branch and other sections of the UPRR Phoenix subdivision where it is not currently required for freight movements.

Additional Amtrak Service

A new Amtrak California route is proposed between Los Angeles and Palm Springs, California, which provides the opportunity for Amtrak to expand service east to Yuma and Phoenix. This service would supplement the Sunset Limited/Texas Eagle route, and could provide multiple trains between Phoenix and Los Angeles each day.

If Amtrak service were returned to Phoenix, consideration should be given to more frequent service between Phoenix and Tucson. Revising the operating schedule of the Sunset Limited, and returning service to Phoenix could provide a more convenient intercity rail connections between these two cities, however ridership demand for additional daily trains has been demonstrated in several studies.

Phoenix to Tucson Intercity Passenger Rail System

The creation of an ICR system that would traverse the spine of the Sun Corridor, eventually stretching from northern Arizona to the Mexican border, includes a series of projects that have a strong correlation with the goals and objectives of this rail plan. An ICR system is anticipated to operate on existing tracks where feasible, but much of the system may be located in new rail corridors.

The highest priority section of the ICR system is the Phoenix to Tucson corridor and several studies completed over the past decade have predicted strong ridership for this segment, and strong public support has been demonstrated during the SFPS. ADOT has begun the process of evaluating feasible corridors for an ICR connection between Phoenix and Tucson, and future phases of this process including environmental clearance, preliminary design, and right-of-way acquisition should be programmed.

Transit orientated development would be encouraged around the new station locations along the ICR system which will create areas of compact growth which support the ideas of Livability. Compact growth is expected to create a mixture of housing, commercial, and employment activities closely located to the ICR system which will provide locations for new employment centers

located within higher density housing areas that provide affordable and desirable places for our next generation of entrepreneurs.

Arizona Eastern Railway

Short line rail freight carriers may, in some circumstances, be positioned to partner with local and regional governments to provide rural mobility passenger transportation to local residents. The success of such schemes relies heavily on the viability of the underlying freight rail franchise and the value of public investment to support passenger operations. A local passenger rail operation may simultaneously enhance tourism and leisure economic development goals while providing an essential service for local residents.

In 2009 the state in partnership with AZER and the San Carlos Apache Tribe sponsored a Federal TIGER grant application to upgrade the railway to a standard that would permit regularly-scheduled, twelve-month passenger services. Such trains would serve local residents as well as the existing tourism and visitor markets. A unique feature of this proposal was a twenty-year commitment by the railway to provide such service without operating subsidy; sourcing such subsidies is an ongoing challenge with most rural mobility schemes. ADOT supports innovative rail solutions to rural mobility challenges and will encourage further consideration of such proposals by short line and regional carriers.

4.5.4 Freight Rail Opportunities for the Sunset Corridor

Approximately 130 million tons of commodities are currently transported via rail in Arizona, with over 75 percent of this traffic passing through the State. Inbound, outbound, and through rail freight tonnage is projected to triple in volume by 2050.

Traffic levels along the single track UPRR Sunset Corridor was at capacity during the previous economic expansion period. UPRR is currently expanding their transcontinental route to a double tracked mainline that will provide greater freight capacity. Expanding the Sunset Corridor will increase freight volumes and provide capacity for

improved efficiency. Additional improvements are needed to classification and intermodal distribution systems for rail to be more competitive with moving freight by truck from Los Angeles.

The State of Arizona has established a Freight and Rail Advisory Council (FRAC) that represents BNSF, UPRR, the trucking industry, major airports and other key economic stakeholders around the State. This council's mission is to identify how the freight can work more efficiently in the State, promote economic vitality and development and enhance quality of life while preserving our natural environment and minimizing carbon footprint resulting from freight movements. This includes working with the freight industry, including the Class I railroads, to help set priorities for improvements to the freight transportation network, including roadway, rail and air components, as well as intermodal connections.

Expansion of the Transcontinental Routes

Adding capacity to the transcontinental routes would improve the movement of freight across the State, and can also provide an opportunity to increase the frequency of intercity passenger rail if the railroads will support it. The Amtrak Sunset Limited route through Arizona could more easily add train frequency and improve on-time performance. Additional intercity passenger routes between Arizona and other states, such as southern California, could be more easily implemented along the transcontinental corridors once additional capacity is completed.

Improved Connection with Mexico

The UPRR Nogales Branch connects Tucson to the International Border at Nogales Mexico. This single track branch line provides an efficient connection between the Tucson PFE classification yard and Nogales Arizona; however UPRR has proposed an additional siding near Rio Rico to allow for more efficient inspections before trains proceed to the border. This could reduce the amount of wait time trains are experiencing at the international border crossing. Each train that is delayed at the international border creates traffic delays within Nogales Arizona because the trains block several at grade

roadway crossings near the border. The addition of a new siding near Rio Rico would reduce some of the delays the community is experiencing by avoiding the prolonged blockage of at grade crossings.

Develop Intermodal and Freight Logistic Centers

As the economy of Arizona continues to grow, the need for a more robust system to move freight in and through the State will increase. Development of freight facilities that can efficiently transfer cargo between rail and trucks will be needed as the Sun Corridor continues to expand. Freight logistic centers, such as inland ports, warehouse distribution centers and supporting rail infrastructure, will be needed to continue to expand the number of jobs located in Arizona, and to import and export the products required for a balanced economy.

Red Rock Classification Yard

A proposed new UPRR classification yard near Red Rock presents an opportunity to supplement classification activities occurring at the Tucson Yard, increasing switching volumes and thereby enhancing the overall efficiency of the Sunset Route. The proposed yard at Red Rock will serve to break down and reclassify trains carrying goods destined for the Phoenix metropolitan area.

By moving switching activities for Phoenix-bound trains from the Tucson Yard to Red Rock, train congestion in Tucson will be reduced. The Nogales Subdivision currently links with the Sunset Route through a direct connection into the Tucson Yard. If a classification yard at Red Rock is built, constructing a wye connection between the Nogales Subdivision and UPRR Sunset Route would permit direct traffic flow between Nogales and Red Rock, avoiding the Tucson Yard and therefore opening up capacity at the yard for other functions.

An additional benefit of the proposed Red Rock classification yard is that it is being planned to accommodate a logistics and freight distribution park, which would further promote job creation. Without additional infrastructure improvements such as the proposed classification yard at Red Rock or similar facilities, UPRR may not have the capacity to serve additional customers and future growth.

Development of such a logistics facility could evolve into an inland port and foreign trade zone (FTZ), to attract adjacent manufacturing that desires excellent intermodal transportation options. A recent study prepared for the Joint Planning Advisory Council (of MAG, CAAG YMPO and PAG) identified transportation logistics and associated manufacturing, as one of the key economic engines that could drive growth and development of the Sun Corridor over the next 40 years.

Buckeye Support Facility

UPRR currently conducts switching activities at its Harrison and Campo yards in central Phoenix and, to a lesser extent, at a small yard in Buckeye. UPRR has purchased significant additional property in Buckeye to create a rail/truck logistics center if economic activity levels warrant. As growth in the western portion of the Phoenix metropolitan area continues, the Buckeye Support Facility will allow rail deliveries to become more competitive with trucks within the region.

Yuma Logistic Center

A proposed freight logistic center is currently under study, and if determined feasible could capitalize on expanded freight movements from Mexico. This facility is envisioned to be planned as an inland port that could allow container shipments to bypass inspections at the ports of Long Beach and Los Angeles and having customs procedures completed in Yuma. This could more efficiently move containers from the southern California ports which are destined to Arizona and further points east.

Funding Railroad Facilities

Improvements to private railroad facilities are typically borne by the railroad companies, but there are many opportunities for the State of Arizona to enter into public/private partnerships with UPRR. Increased capacity along the transcontinental railroad corridors can improve not only freight shipments throughout the country, but also economic activity in the State, on-time performance of intercity passenger rail, and opportunities to expand passenger service.

Intermodal facilities proposed at Red Rock and Yuma could become candidates for these types of partnerships.

Public investment for implementation of classification yards could be justified if the costs offset expenditures for other projects, such as eliminating the need for grade separations, or reducing the cost to implement passenger rail service.

4.5.5 Recommended Actions for the Sunset Corridor

Several rail actions are recommended for the Sunset Corridor of Opportunity to achieve the goals and objectives of this rail plan.

Partner with Amtrak to improve existing service for the Sunset Limited route. The Sunset Limited is an intercity passenger rail service provided by Amtrak three times a week, which connects New Orleans and Los Angeles. Station locations in Arizona include Benson, Tucson, Maricopa, and Yuma. This action would include partnering with Amtrak to increase service to daily trains, and improve station amenities. This action would also include consideration of implementing bus service between Maricopa and Phoenix, which would enable passengers to connect with the Phoenix metropolitan area.

Improved Amtrak service along the Sunset Limited route will provide improved connectivity between Arizona and the other states, enhance passenger mobility, and help in alleviating congestion on major highways. It will also provide an affordable transportation option that helps with the reduction of greenhouse gas emissions.

Partner with Amtrak to provide service to the Phoenix metropolitan area. Amtrak service to Phoenix ceased in 1996 when the Wellton Branch of the Southern Pacific Railroad (now UPRR) was taken out of service. This action would include partnering with Amtrak to return service to the Phoenix metropolitan area. This action may involve rehabilitation of the UPRR Wellton Branch or use of a route along the Arizona and California Railroad.

Re-established Amtrak service to Phoenix will provide improved connectivity between Los Angeles, Phoenix and points east, and provide economic development opportunities for the Sun Corridor.

Construct and operate a Phoenix to Tucson ICR system.

This Intercity Rail system (ICR) would provide frequent train service for passengers between Phoenix and Tucson. ADOT has begun the process to study potential corridors for this service. This action would build on initial studies to implement passenger rail service. In 2010, many local, regional and state agencies, as well as transit advocacy groups have initiated resolutions and letters of support to the Federal Government for the return of intercity passenger rail to the Metropolitan Phoenix Area.

Partner with Arizona Eastern Railway to explore providing rural passenger rail service.

The traditional role for short line and regional rail carriers is to simply act as freight gathering agents of the large Class I roads. In some circumstances it is possible for local communities to lever the railway's presence by establishing partnerships that re-create or refurbish historic structures and to share in the investment required for operation of tourism-oriented passenger services. An even broader partnership role has been considered by Arizona DOT in sponsorship of grant applications for the Arizona Eastern Railway.

Partner with Class I railroads to implement operational improvements along the transcontinental mainline.

UPRR has identified numerous improvements along their transcontinental routes that would expand capacity and improve operations. Typically these improvements are implemented by the freight rail companies, but this action includes any partnerships that could be formed between the public and private sectors to streamline the implementation of improvements. Partnerships could include completion of studies, expediting the permit process, providing a combination of public and private funding for the improvements, and coordinating improvements with adjacent projects. The recently enacted State of Arizona legislation that authorizes public-private partnerships for transportation projects provides flexibility in procurement, favorable tax, financing, and performance bonding provisions.

Operational improvements along the Class I continental mainlines will enhance capacity and movement of freight. Increased capacity along railroad routes could also alleviate pressure on the main interstate highways (I-



8, I-10 and I-19), and provide more capacity for passenger rail service.

Partner with the railroads to locate and develop intermodal and logistics centers along key railroad corridors.

Additional capacity in an expanded distribution system could enhance the movement of freight in Arizona. The expected growth within the State, and a means of balancing the freight movements within the State among various modes, require the expansion of the freight rail distribution system. This action includes any partnerships that could be formed between the public and private sectors to streamline the implementation of improvements. Partnerships could involve completion of studies, expediting the permit process, and providing a combination of public and private funding for the improvements.

Development of intermodal and logistics centers and supporting rail infrastructure can act as a catalyst for economic development in the Sun Corridor, and establish Arizona as a major distribution center for goods. Distribution and warehousing activities are expected to grow in the region as a result of this and lead to creation of jobs and a diverse economic base. These types of developments can provide distribution capacity which may enable the State to capitalize on the potential implementation of the Port of Punta Colonet in Mexico. New rail connections between Mexico and the U.S. to move this trade may be attracted to an inland port location within Arizona.

Partner with UPRR to rehabilitate and reactivate the Wellton Branch. This rail line was removed from service in 1996 and since then all UP freight trains have entered and left the Phoenix area to and from the east. This action would include partnering with UPRR to implement improvements needed to reactivate this line. The Wellton Branch could also be used to restore Amtrak trains to the Phoenix metropolitan area. Improvements should be considered to upgrade the rail line for passenger rail service (Figure 49).

Operational improvements along the UPRR Phoenix subdivision will provide freight trains from California direct access to Phoenix area from the west, which could facilitate development of a new classification yard or inland port west of the Phoenix metropolitan area. Rehabilitation of the Wellton Branch will benefit plans for a potential passenger rail service to Phoenix. This line could be included in emergency response planning for the metro area, thereby enhancing the safety and security in the region.

Complete a Freight Opportunity Study near the City of Yuma. One of the locations where UPRR has identified

a need for capacity improvements along the Sunset Route is the Colorado River crossing at Yuma. A freight rail study which would consider alternatives for adding capacity to the UPRR Sunset Route near Yuma and the community needs could benefit both the railroad and the community. Currently the UPRR Sunset Route crosses the Colorado River on a single-track bridge crossing, and expanding it with a double-track bridge may be difficult due to surrounding constraints, such as park lands, a historic prison, and a tribal community.

The freight opportunity study would consider alternatives to address adding capacity at this location, including possible rail relocation around the City of Yuma. Rail relocation could provide benefits to the local community; however the study must evaluate potential impacts to Union Pacific's operations such as adding route miles to the transcontinental corridor, and access to existing rail customers. Union Pacific's preferred alignment is to double track the existing bridge crossing of the Colorado River, and will continue to move forward with this alternative in parallel to the evaluation of other alternatives.

Figure 49 - Wellton Branch



Completing a planning process which considers all potential solutions for an expanded river crossing provides the flexibility to define an implementation plan which can provide near term capacity enhancements, while understanding the long term vision for the area. This action includes the studies to determine whether a Yuma relocation of the UPRR Sunset Route is feasible, followed by a partnership with UPRR for implementation of near term capacity enhancements. Partnerships could include completion of studies, expediting the permit process, and providing a combination of public and private funding.

Summary of Rail Implementation for the Arizona Spine Corridor

Based on the prioritization of potential actions, and the recommended projects for implementation, Tables 23 – 25 provide a summary of the proposed implementation plan.

4.5.6 Implementation

Several implementation steps are recommended with fit within the time frame of this rail plan that can contribute to the long range rail vision for the State of Arizona.

Table 23 - Sunset Corridor Short-Term Implementation Actions (within 5 years)

Implementation Action	Description	Comments
Partner with Amtrak to improve service along the Sunset Limited Route	Increase frequency of service and modifications to the operation schedule.	Daily service and bus connections to Phoenix could dramatically increase ridership on this route
Phoenix to Tucson Intercity Rail Study	Establish a Locally Preferred Alternative (LPA) and Environmental Clearance for the Phoenix to Tucson ICR Corridor	Portions of this corridor would be used to implement commuter rail in the Phoenix and Tucson metropolitan areas
Amtrak service to Phoenix	Routing the Sunset Limited service to Phoenix would be an initial step to more frequent passenger service between Phoenix and Tucson	Service could be provided to Phoenix by rehabilitating the Wellton Branch, a Phoenix turnaround, or rerouting along the Arizona and California Railroad to Los Angeles.
Rehabilitation of the Wellton Branch	Reinstating rail service along the UPRR Wellton Branch will provide an opportunity to return intercity service to Phoenix	Initial activities would include a feasibility study to identify the scope of improvements needed.

New Mexico's Rail Runner officially went into service in 2006 and by 2009 was providing service between Albuquerque and Santa Fe.

Table 24 - Sunset Corridor Intermediate Implementation Actions (within 10 years)

Implementation Action	Description	Comments
Arizona Eastern Rural Passenger Rail Service	Partner with Arizona Eastern Railway to help acquire funding for improvements which would allow for rural passenger service	Passenger rail service between Globe and Safford would provide an alternative mode of travel for the San Carlos Indian Community and several rural communities in Gila and Graham Counties.
Sunset Corridor Transcontinental Mainline	Implement improvements to the transcontinental rail corridors.	Based on recommendations provided by the FRAC, partner with UPRR to implement improvements.
Intermodal and Freight Logistics Centers	Based on recommendations provided by the FRAC, work with private sponsors to plan and implement new facilities at key locations. Public incentives could be established to promote facility development.	Intermodal and logistics centers have been proposed in Pinal and Yuma Counties and may be funded by public-private partnerships.

Table 25 - Sunset Corridor Long-Term Implementation Actions (within 20 years)

Implementation Action	Description	Comments
ICR service between Phoenix and Tucson	Design and construct an intercity rail system connecting Phoenix and Tucson	Commuter rail operation may begin before or after this service, but should operate in a common corridor.
Extensions of ICR to Nogales	Complete corridor studies and obtain environmental clearance for extensions of the intercity rail system south of Tucson.	Freight rail improvements accomplished earlier might facilitate such ICR extensions.
Freight Rail improvements to benefit Arizona communities	Implement feasible improvements within communities such as; Quiet Zones, rail realignments, or other improvements	Based on recommendations provided by feasibility studies, partner with railroads and communities to implement improvements. Classification yard projects have been proposed within Surprise and at Red Rock.

4.6 Recommended Statewide Opportunities

Several opportunities identified in the Issues and Opportunities section of this report do not apply to a specific Corridor of Opportunity, but apply statewide.

Create a program to replace or remove existing at-grade rail crossings with grade-separated crossings. This program would fund and implement high-priority grade separations or other projects which could consolidate or remove at grade crossings. The program would include regular updates to the statewide rail inventory and a comprehensive data collection system for at-grade crossings that can help prioritize grade separation and other safety projects. At-grade crossings have been successfully converted to grade-separated crossings along the Phoenix Grand Avenue corridor.



Explore freight rail improvements to benefit communities. Freight rail improvements include infrastructure improvements to existing tracks, double tracking along freight corridors, and elimination of at-grade rail crossings to enhance safety. Identification and elimination of critical at-grade rail crossings is a priority for the State.

- The Pima County Regional Transportation Authority has recommended a series of grade separations in the Tucson metropolitan area, which will alleviate the traffic blockages created by frequent freight trains going through downtown Tucson. The Flagstaff Burlington Northern/Santa Fe Corridor Alignment Feasibility Study completed by the City of Flagstaff in 1999 recommended

implementing three grade separations instead of relocating the BNSF around Flagstaff.

- The city of Nogales completed the Nogales Railroad Small Area Transportation Study which recommended locations for pedestrian and vehicular grade separations.
- The Yuma Metropolitan Planning Organization (YMPO) has identified the need to study freight opportunities within the Yuma area to identify economic development opportunities and rail safety enhancements.
- The City of Phoenix is actively managing their existing at-grade rail crossings including strategic closings tied to land use and redevelopment plans.

Create a rail corridor preservation program to preserve abandoned rail lines for future uses. This action includes establishing a funding program that can preserve any future rail corridors whose owner's petition for abandonment. The program could include provisions to convert rails to trails and purchase of abandoned rights-of-way.



Collaborate with the Arizona Game and Fish Department to implement wildlife mitigation measures along existing rail corridors. Roads and railroads across Arizona have affected the movements of wildlife between key habitat blocks. Additionally, there is a safety concern for the wildlife at locations where wildlife corridors cross existing rail facilities. These actions would include partnering with AGFD during the development of improvement projects

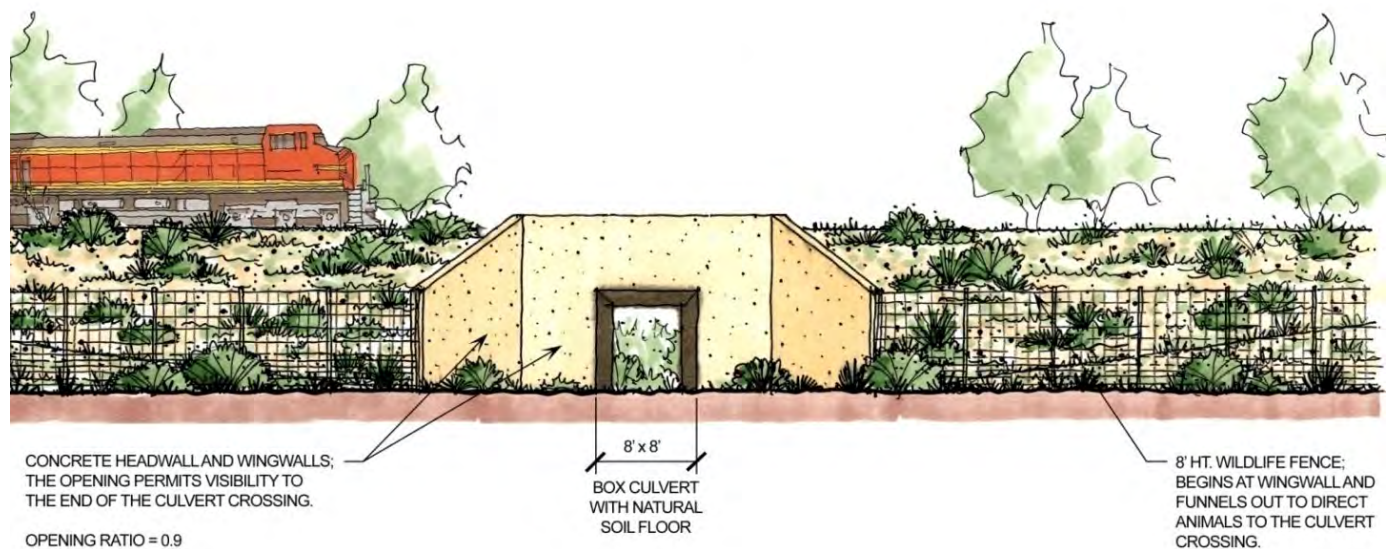
along existing and future rail corridors throughout the process to identify opportunities to avoid or minimize impacts to wildlife, and identify needed wildlife mitigation features.

This action will protect wildlife habitats and improve connectivity between habitat blocks. Wildlife mitigation measures like wildlife crossings will prevent environmentally critical habitat blocks from deterioration, and minimize the impact of rail corridors on wildlife.

Investing in wildlife connectivity not only helps wild populations, but also provides direct benefits to the people of Arizona. Integrating wildlife crossing structures with fencing along transportation facilities has been found to minimize the ability of large animals, such as elk, to gain access to the right-of-way (Figure 50). Wildlife crossings can improve safety and aesthetics, while helping to educate Arizonans about wildlife.

As rail projects are planned and designed, collaboration with AGFD should occur throughout the process to identify opportunities to avoid or minimize impacts to wildlife, and identify needed wildlife mitigation features.

Figure 50 - Conceptual Integration of Wildlife Crossing Structure into a Rail Corridor



CHAPTER 5. FUNDING OF PROPOSED RAIL PROJECTS

Investment on rail yields significant economic, transportation and environmental benefits. According to the U.S. Department of Commerce data, every dollar spent on investments in freight railroads — tracks, equipment, locomotives, bridges — yields three dollars in economic output. According to a U.S. Department of Commerce model of the U.S. economy, the nation's freight railroads generate nearly \$265 billion in total economic activity each year, including direct, indirect, and induced effects. In addition, each \$1 billion of rail investment creates 20,000 jobs. Investments in railroads also alleviate congestion on highways, resulting in reduction of greenhouse gas and air pollutant emissions.

Arizona's rail infrastructure is dependent on limited support from federal funding sources, most of which are directed toward highway improvements. Federal rail funding is becoming increasingly competitive among similar projects across the country and typically requires matching funds from the State. The State of Arizona is in the process of identifying potential funding sources and mechanisms that can support rail development, both freight and passenger, and provide matching funds required by certain federal programs, with a view to a more efficient State rail system. Funding for rail could also act as a catalyst for generating economic activity and employment in the State. Investments in rail will be crucial in the diversification of the State's economy by attracting more industrial development to the State.

This chapter identifies federal rail funding programs, which provide support to states for a variety of rail improvements. Examples of funding mechanisms used by other states have been identified based on the possible role of these states as examples for Arizona to follow. Sample rail projects in Arizona, supported by public funding, are included to highlight projects that have provided benefits to the State's taxpayers.

5.1 Federal Funding Programs for Rail

5.1.1 American Recovery and Reinvestment Act, 2009

The objectives of the American Recovery and Reinvestment Act (ARRA) of 2009 include preserving and creating jobs and promoting economic recovery, investing in transportation infrastructure that will provide long-term economic benefits, and assisting those most affected by the current economic downturn. Title XII of the Recovery Act appropriates \$1.5 billion, available through September 30, 2011, for Supplementary Discretionary Grants for a National Surface Transportation System, the "TIGER Discretionary Grants" (Transportation Investment Generating Economic Recovery).

Under the TIGER grants program, State and local governments, including U.S. territories, tribal governments, transit agencies, port authorities, metropolitan planning organizations (MPOs), other political subdivisions of State or local governments, and multi-State or multi-jurisdictional applicants can receive funding for surface transportation projects that have a significant impact on desirable long-term outcomes for the Nation, a metropolitan area, or a region.

5.1.2 Passenger Rail Investment and Improvement Act, 2008

The federal Passenger Rail Investment and Improvement Act (PRIIA) of 2008 authorized \$14.3 billion during FY 2009–2013 for the development of new and improved intercity passenger rail services. As part of the act, an innovative intercity passenger rail capital grant program was established, to help the states fund intercity passenger rail projects. States must identify intercity passenger rail corridor improvement projects in their State Rail Plan (SRP) in order to be eligible for the grants.

The act authorized \$1.9 billion over a period of five years, beginning in 2009, for capital grants to states for facilities

and equipment required for new and improved passenger rail, \$2 million annually for small capital projects. The act authorized \$325 million in ‘congestion grants’ for high priority rail corridors, to be made available to Amtrak and states during FY 2009 – 2013, which will help in increasing capacity along certain lines to reduce congestion and facilitate ridership.

Amtrak and the states can also apply for capital project grants out of the \$1.5 billion authorized for the high-speed rail (HSR) corridor development program.

5.1.3 SAFETEA-LU Funding Programs

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) originally came into effect in 2005 and originally expired in September 2009. In December 2009 the law was extended through September 2010. SAFETEA-LU continues many of the policies and programs established by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21).

SAFETEA-LU allows states and MPOs to tap various federal funding sources for rail projects. These sources include Congestion Mitigation and Air Quality Management (CMAQ), Transportation Enhancements Program, Rail-Highway Crossing Safety Program (Section 130 Program), HSR Development, and other programs.

5.1.4 Surface Transportation Program

The Surface Transportation Program provides flexible funding that may be used by states and localities for projects on any federal-aid highway, including the National Highway System, bridge projects such as grade separations with rail facilities on any public road, transit capital projects, and intercity bus terminals.

5.1.5 Congestion Mitigation and Air Quality Management

The CMAQ program was created in 1991 as part of ISTEA in order to provide innovative funding for transportation projects that improve air quality and help achieve

compliance with national air quality standards set forth by the Clean Air Act. SAFETEA-LU authorized funding through CMAQ for projects in areas not meeting national air quality standards. The CMAQ program pays for transportation projects or programs that will contribute to attainment of national ambient air quality standards.

CMAQ funding is directed toward transportation projects or services having air quality benefits. The program encompasses projects and programs that reduce traffic congestion and help meet federal Clean Air Act requirements. CMAQ funding may be used for freight and passenger rail projects that accomplish the program’s air quality goals.

5.1.6 Transportation Enhancements Program

SAFETEA-LU set aside 10 percent of funds from the Surface Transportation Program for the Transportation Enhancement Program. The purpose of this program is to fund projects that allow communities to strengthen the local economy, improve the quality of life, enhance the travel experience, and protect the environment. Transportation Enhancement Program funds can be used for rehabilitation and operation of historic transportation buildings, structures or facilities and preservation of abandoned railway corridors (e.g. conversion of abandoned rail corridors to trails).

5.1.7 Section 130 Highway-Rail Grade Crossing Program

The Federal Highway Administration (FHWA) Section 130 Highway Railroad Grade Safety Crossing program provides grants for the improvement of highway-railroad grade crossings that enhance safety, including: separation or protection of grades at crossings; the reconstruction of existing railroad grade crossing structures; and the relocation of highways or rail lines to eliminate grade crossings.

Funds from the FHWA Section 130 Program can be used for freight rail projects, provided that the projects improve safety at grade crossings. This may include a variety of methods, such as installation of warning devices,

elimination of at-grade crossings by grade separation or consolidation, and closing of crossings. Work may also include replacement of crossing surfaces, improvement of road approaches, installation of new gates/flashers, and installation of other safety signal equipment.

Funding may also be used for elimination of crossing hazards should a state choose to use the funds for this purpose. For example, any repair, construction or reconstruction of roads and bridges affected by a project would be eligible.

In general, federal funding is available for up to 94.3 percent of project costs, with a 5.7 percent minimum local match. For certain projects, such as active warning devices and crossing closures, the federal share may amount to 100 percent.

5.1.8 HSR Corridor Development Program

PRIIA ended the HSR Corridor Development Program under SAFETEA-LU and recreated it in a new section as state grant program with \$1.5 billion over five years. The states are required to match 20 percent of the federal funding.

5.1.9 Railroad Rehabilitation and Improvement Financing

The Railroad Rehabilitation and Improvement Financing Program provides direct federal loans and loan guarantees to finance development of railroad infrastructure. The program was established by TEA-21 and amended by SAFETEA-LU. Under this program the FRA Administrator is authorized to provide direct loans and loan guarantees up to \$35.0 billion. Up to \$7.0 billion is reserved for projects benefiting freight railroads other than Class I carriers.

The funding may be used to:

- Acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings and shops;

- Refinance outstanding debt incurred for the purposes listed above; and
- Develop or establish new intermodal or railroad facilities

Direct loans can fund up to 100 percent of a railroad project, with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the government.

Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad, and limited option freight shippers that intend to construct a new rail connection.

5.1.10 Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. TIFIA credit assistance provides improved access to capital markets, flexible repayment terms, and potentially more favorable interest rates than can be found in private capital markets for similar instruments. TIFIA can help advance qualified, large-scale projects that otherwise might be delayed or deferred because of size, complexity, or uncertainty over the timing of revenues. Each dollar of federal funds can provide up to \$10 in TIFIA credit assistance and leverage \$30 in transportation infrastructure investment. TIFIA is not a funding source, but a method of financing projects through assisted borrowing.

5.1.11 Tax Credits

The American Jobs Creation Act of 2004 provides for a tax credit to help regional and short line railroads fund their infrastructure projects. The tax credit provides small railroads 50 cents for every dollar of qualifying track maintenance expenditures, such as the cost to improve track, bridges and signals.

5.2 Rail Funding Programs in Other States

Several funding programs from other states are presented below as illustrations of the creativity utilized to support freight and passenger rail improvements elsewhere. These programs have funded rail improvement projects that are similar to those recommended for Arizona in this SRP.

5.2.1 California

Proposition 1A, approved in November 2008, approved the issuance of \$9.95 billion of general obligation bonds. This will partially fund a \$40 billion, 800-mile high speed train under the supervision of the California High-Speed Rail Authority. The train will run between San Francisco and Los Angeles, with Anaheim, California, designated as the southern terminus of the initial segment of the high-speed train system. \$950 million of the bond proceeds will be available for capital projects on other passenger rail lines to provide connectivity to the high-speed train system and for capacity enhancements and safety improvements to those lines.

Proposition 1B, approved in November 2006, authorized approximately \$20 billion of State general obligation bonds for sixteen transportation programs. Under the Trade Corridor Improvement Fund (TCIF), \$2 billion is provided for infrastructure improvements along federally designated "Trade Corridors of National Significance" and other corridors with a high volume of freight movement.

The TCIF program adopted in April 2008 provides \$3.088 billion for 79 projects, including \$643 million for rail projects. The TCIF funds will leverage an additional \$925 million in non-state funds, resulting in total rail-related investment of \$1.6 billion. Projects funded by the TCIF include mainline track improvements, rail port and yard improvements, and a rail over rail flyover.

The California DOT supports three intercity Amtrak rail corridors: the Pacific Surfliner between San Diego, Los Angeles and San Luis Obispo; the San Joaquin between Oakland, Sacramento, and Bakersfield; and the Capitol Corridor between San Jose, Oakland, Sacramento and

Auburn. The State also supports buses that connect trains with areas not directly served by the Amtrak corridors. During FY 2007, ridership along the three corridors was 4,962,000, with State support totaling \$86.14 million. The ICR Improvement program (under Proposition 1 B) provides \$400 million for intercity passenger rail improvement projects, with \$125 million reserved for acquisition of new rail cars.

5.2.2 North Carolina

North Carolina DOT began the rail industrial access program to encourage railroads to locate or expand their facilities in North Carolina. The funding helps ensure that companies have access to the tracks needed to transport freight and materials. The program uses State funds to assist in constructing or refurbishing tracks required by a new or expanding industry. Funding for the projects is contingent upon prior approval of an application and on the commitment of matching funds.

Local governments, community development agencies, railroad companies and industries are eligible for funds to improve rail access. Approval of requests is based on the economic benefit of the project, including the number of expected new jobs, the amount of capital investment, rail use and the area's economic conditions.

5.2.3 Oregon

The Oregon legislature designated \$2 million in 2001 to create a short line infrastructure program offering loans and grants. In 2003, the legislature approved an additional \$2 million for the original program and began an \$8 million rail spur program for all types of railroads. The Oregon legislature authorized \$100 million in 2005, 2007 and 2009 for a Multimodal Transportation program known as Connect Oregon.

5.2.4 Pennsylvania

The Rail Freight Assistance Program of the Pennsylvania DOT provides financial assistance for rail freight infrastructure projects that preserve essential rail freight service where economically feasible, and preserve or stimulate economic development through improved or

new rail services. In March 2008, Pennsylvania allocated \$10.2 million for investment in freight infrastructure.

The Pennsylvania DOT offers Transit Assistance Programs under which it supports capital improvements and operating costs of passenger rail service between Philadelphia and Harrisburg (the Keystone Corridor).

5.2.5 Tennessee

The Short Line Railroad Rehabilitation Program in Tennessee is funded by a tax on diesel fuel used by aeronautics, railroads, and towboats. From this tax, the fund receives some money towards the short line program. The program is split into two parts: track rehabilitation and bridge rehabilitation, with both requiring a 10 percent match. Over the past ten years, the program has awarded \$66.87 million to short lines in Tennessee.

5.2.6 Texas

The Texas Rail Relocation and Improvement Fund, created in 2005, helps share the cost of relocating and improving rail facilities, both public and private. The fund could be used throughout the State to improve freight mobility and relieve traffic congestion. The cost of relocation is shared by the State and the railroads in proportion to the benefit each entity receives for improvements. In 2009, the Texas legislature appropriated \$182 million for the Rail Relocation Fund for the current two-year budget period.

5.2.7 Virginia

Virginia offers financial support to freight railroads through three programs:

1. Rail Enhancement Fund
2. The Rail Preservation and Development Program
3. Rail Industrial Access Program

The State's assistance to freight railroads is based primarily on the potential for job creation, economic development, and the continuation of rail service. Funding from these

programs can help construct rail spurs into industrial sites to attract new tenants, or it can help upgrade and preserve a rail line that might otherwise be abandoned.

Created in 2005, the Rail Enhancement Fund is the first dedicated revenue stream for investment in rail infrastructure in Virginia's history. The fund supports improvements for passenger and freight rail transportation throughout Virginia.

The Rail Preservation and Development Program has grown from \$500,000 in 1991 to nearly \$3.0 million per year between 1999 and 2004. This fund administers grants to the railroads for qualifying projects, with recipients providing a 30 percent match.

The Rail Industrial Access Program is part of a pool of \$5.5 million annually, but it is not dedicated to rail and must compete with road and airport projects. More than \$20 million has been distributed through this program since 1986. The Virginia Department of Rail and Public Transportation estimates that this program has assisted in generating nearly 20,000 new jobs, more than 140,000 annual carloads of rail traffic, and more than \$4.0 billion in planned capital improvements.

Virginia's passenger rail system is largely publicly funded. Virginia Railway Express's (VRE) operating revenues come from fare revenue and equipment rental, and VRE receives subsidies and grants from the State of Virginia, federal sources, and local jurisdictions. Operating revenues pay for majority of VRE's operating expenses, with the rest of the funding supplied by grants and interest income.

5.2.8 Wisconsin

The Wisconsin DOT currently has two freight rail assistance programs:

- The Freight Rail Infrastructure Improvement Program: The Freight Rail Infrastructure Improvement Program provides loans for rail projects that connect industries to the national rail system, enhance safety and intermodal freight movements, and provides opportunities for economic development. The program supports up to 100 percent of the project costs.

- **Freight Rail Preservation Program:** The Freight Rail Preservation Program supports purchase of abandoned rail right-of-way for future use and rehabilitation of rail infrastructure. The program supports up to 80 percent of project costs.

The Wisconsin DOT provides up to \$8.5 million annually to Amtrak's Hiawatha service, which operates seven round trips daily between Chicago and Milwaukee. The Wisconsin DOT is currently studying the feasibility of increasing the service to ten round trips per day. Commuter rail and the restoration of service to Madison are also under study.

5.3 Existing Funding Sources

Funding is available to railroads in Arizona in several forms: the FHWA Section 130 Highway-Rail Grade Crossing Program, projects funded by local governments (including regional transportation plans), and general construction projects on the state highway system funded by ADOT. Rail-highway crossing improvements can be funded by federal, state or local governments. Proposition 400 funds have been used to fund the study of potential commuter rail corridors in the Maricopa County, in accordance with the Regional Transportation Plan (RTP).

5.3.1 Proposition 400

Proposition 400 was passed by Maricopa County voters on November 2, 2004 and authorizes a 20-year continuation of the half-cent sales tax for transportation projects in Maricopa County initially approved in 1985. The estimated revenues from the tax will total approximately \$14.3 billion (year of expenditure dollars) for the 20-year period covering calendar year 2006 through 2025, and represent the major funding source for implementation of the MAG RTP.

Out of the \$14.3 billion, 33.3 percent will be allocated to the public transportation fund for capital construction, maintenance and operation of public transportation classifications, and capital costs and utility relocation costs associated with a light rail public transit system; and 66.7 percent of the total revenue collected through the sales

tax will be allocated to the regional area road fund for freeways and other routes in the state Highway System, major arterial street and intersection improvements, including capital expense and implementation studies. The MAG has recently completed four commuter rail studies in the Phoenix metropolitan area, funded using proposition 400 funds, including:

- Regional Commuter Rail Strategic Plan
- Regional Commuter Rail System Plan
- Grand Avenue Commuter Rail Corridor Development Plan
- Yuma West Commuter Rail Corridor Development Plan

5.3.2 Arizona Section 130 Highway-Rail Grade Crossing Program

Section 130 as funded by SAFETEA-LU allocates funds to the states specifically for eliminating hazards at public highway-railroad grade crossings (federal highway funds cannot be spent on safety improvements at private crossings). The FHWA administers the distribution of SAFETEA-LU funds.

SAFETEA-LU provided \$220 million nationwide per year FY 2005-2009 for Section 130 from the Highway Trust Fund (Table 26). Arizona's apportionment for FY 2008 was \$ 2.67 million.

Table 26 - Section 130 Projects Fund Allocation Summary

Year	Allocation
FY 2001	\$ 2.1 million
FY 2002	\$ 2.1 million
FY 2003	\$ 2.1 million
FY 2004	\$ 2.1 million
FY 2005	\$ 2.1 million
FY 2006	\$ 2.6 million
FY 2007	\$ 2.6 million
FY 2008	\$ 2.6 million

5.3.3 Sample Arizona Projects Using Public Funds

General Highway Improvement Projects Funded by FHWA and ADOT

General highway system improvement projects funded by the FHWA, ADOT, or the RTP of an MPO may include provisions for removal of at-grade crossings and replacing them with grade-separated crossings, installation of new grade-separated crossings, and widening of existing at-grade or grade-separated crossings. These projects are primarily designed to increase highway traffic mobility and not rail mobility, although they benefit railroads indirectly.

Examples of highway improvement projects that have resulted in improvements to the railroad grade crossings include:

1. Marsh Station Project (ADOT): The Marsh Station project will include a realignment of the UPRR Sunset Route, which traverses an I-10 overpass, and the realignment of Marsh Station Road. The existing railroad overpass on I-10 does not have adequate clearance, resulting in frequent truck accidents that can shut down train traffic during an incident. The realignment of the UPRR line would allow removal of the overpass and increase speed along the rail line. The realigned Marsh Station Road will need to cross over the railroad line in order to interchange with I-10 east of the existing location. A grade-separated railroad crossing will be constructed on the new Marsh Station Road.
2. Twin Peaks Traffic Interchange Project (ADOT and Town of Marana): This project includes extension of the existing Twin Peaks Road east to connect with I-10 and construction of a new traffic interchange on I-10 in Marana. The project also includes construction of a grade-separated crossing of Twin Peaks Road with the UPRR, and removal of an existing at-grade crossing. Construction of the Twin Peaks Road extension will require a grade-separated railroad crossing to ensure public safety and smooth movement of traffic.
3. I-10, Val Vista Road to Junction I-8 (ADOT): This is a project along I-10 from the Val Vista Road overpass to I-8 in Pinal County. The overpass structures over Jimmie Kerr Boulevard and the UPRR do not include adequate shoulder width on I-10; this limits the ability of UPRR to expand the Sunset Route. This project includes a new I-10 overpass which provides additional highway capacity and a longer span over the railroad providing space for additional track installation in the future.
4. SR 85 at Gila Bend (ADOT): This project includes improvements to SR 85, Business Route 8 (B-8), and the existing grade-separated railroad crossing over B-8. Improvements include construction of SR 85 as a four-lane divided highway with frontage roads that would ultimately become a grade-separated, fully access-controlled facility between I-10 and B-8; improvements to B-8, incorporating both four-lane divided and five-lane roadway sections and the reconstruction of the existing traffic interchange with SR 85; and widening of the existing grade-separated railroad crossing.
5. I-10 Ruthrauff Road to Prince Road (ADOT): This project includes converting an existing at-grade crossing of Prince Road with the UPRR into a grade separated crossing. This project involves reconstruction of several miles of Interstate 10 (which is aligned parallel to the UPRR) and the Prince Road interchange, in order to revise the profile of Prince Road to pass above the UPRR mainline and over I-10.

General Highway Improvement Projects Funded by Local Governments

Local governments also fund highway improvement projects either through the Highway User Revenue Fund (HURF) or funds received from the FHWA. Some of the funds for these projects may be used for Quiet Zone improvements, widening at-grade crossings, installation

of new crossing surfaces and signal equipment and removal of at-grade crossings.

Examples of highway improvement projects funded by local governments that have resulted in improvements to the railroad grade crossings include:

1. Fourth Street Railroad Overpass, Flagstaff: The goal of the Fourth Street Railroad Overpass was to provide a grade-separated overpass connecting the north and south portions of Fourth Street across the BNSF railroad and Route 66. The overpass was dedicated on August 28, 2006.
2. Quiet Zones: A Quiet Zone means that railroad engineers are not required to sound their horn or whistle when approaching the intersection. The FRA may approve the creation of a Quiet Zone when it is satisfied the crossing is safe enough for engineers to opt not to sound their whistle.

To date, five quiet zones have been created in Flagstaff, Sun City West, Wellton, Surprise and Phoenix. Creation of a new Quiet Zone at the 163rd Avenue/Grand Ave BSNF railroad crossing in Surprise included installation of safety measures at the crossing: flashing lights, electric bells, traffic signs, and a pedestrian sidewalk with warning signs. The Town of Wellton has also established a Quiet Zone after enhancing safety measures at the existing UPRR at-grade

railroad crossing at Williams Street.

Additionally, creation of quiet zones in four locations is under consideration. These include Tempe, Chandler, Tucson and Clifton.

3. Marana Road/I-10 Interchange Project: The Marana Road Interchange project included extension of Marana Road east of the interchange and creation of an at-grade railroad crossing of the UPRR Sunset Route. The railroad previously had two at-grade railroad crossings at McKenzie Ranch Road and Adonis Road. Extension of Marana Road allowed the closure and removal of the two old crossings, along with installation of flashing lights, traffic signs, warning signs and gates.

5.4 Conclusion

The State Rail Plan addresses current and future needs for passenger and/or freight rail investment at a statewide level. With the recent enactment of the PRIIA in October 2008, the nation is experiencing a surge in statewide rail planning as DOTs mobilize to become eligible for federal funding. To obtain funding for such projects as intercity and high-speed rail planning and design, states are required to have a FRA-approved state rail plan. With the Statewide Rail Framework Study providing the foundation, this document represents Arizona's first State Rail Plan.

This rail plan should be updated on a regular schedule as required by FRA, which is coordinated with the State's long range planning activities. The plan should be amended to reflect any changing conditions related to rail operations within the State.

The findings of this State Rail Plan will be incorporated into the State's Long Range Transportation Plan which will guide the development of the transportation Network for the following 20 years.

Expanded passenger and freight rail will be an important part of Arizona's multimodal future.

APPENDIX A. INVENTORY OF EXISTING CONDITIONS

Railroad Network

Arizona's railroad network is composed of two Class I railroads, BNSF Railway (BNSF) and Union Pacific Railroad (UPRR), and a number of short line railroads.



Arizona's railroads generate five million tons of freight traffic annually from locations in Arizona, including glass and stone products, waste and scrap, primary metal products, chemicals, and metallic ores. The railroads bring to Arizona nearly 28 million tons of freight traffic annually that terminates in the State, including coal, lumber and wood products, glass and stone products, farm products, and food. Figure A.1 presents the existing railroads in the State of Arizona.

Class I Railroads

Both Class I railroads have Trans Arizona connections and also service into Phoenix on branch lines. Additional branch lines serve industrial and mining operations, while the Nogales subdivision of the UPRR connects to the Mexican border and interchanges with Ferromex.

BNSF operates freight trains along its Transcon Corridor between Los Angeles and Chicago, passing through Kingman, Williams, Flagstaff, Winslow, Holbrook and other communities in northern Arizona. The BNSF Transcon Corridor through Arizona carries the Amtrak Southwest Chief intercity service.

UPRR's mainline, the Sunset Route, runs south of Phoenix and connects Los Angeles to Yuma, Wellton, Gila Bend, Maricopa, Casa Grande, Eloy, Marana, Tucson, Benson and Willcox in southern Arizona. Amtrak's combined Sunset Limited/Texas Eagle passenger service traverses the UPRR Sunset Route three times per week.

Table A.1 presents the key characteristics of Arizona's active Class I operations.

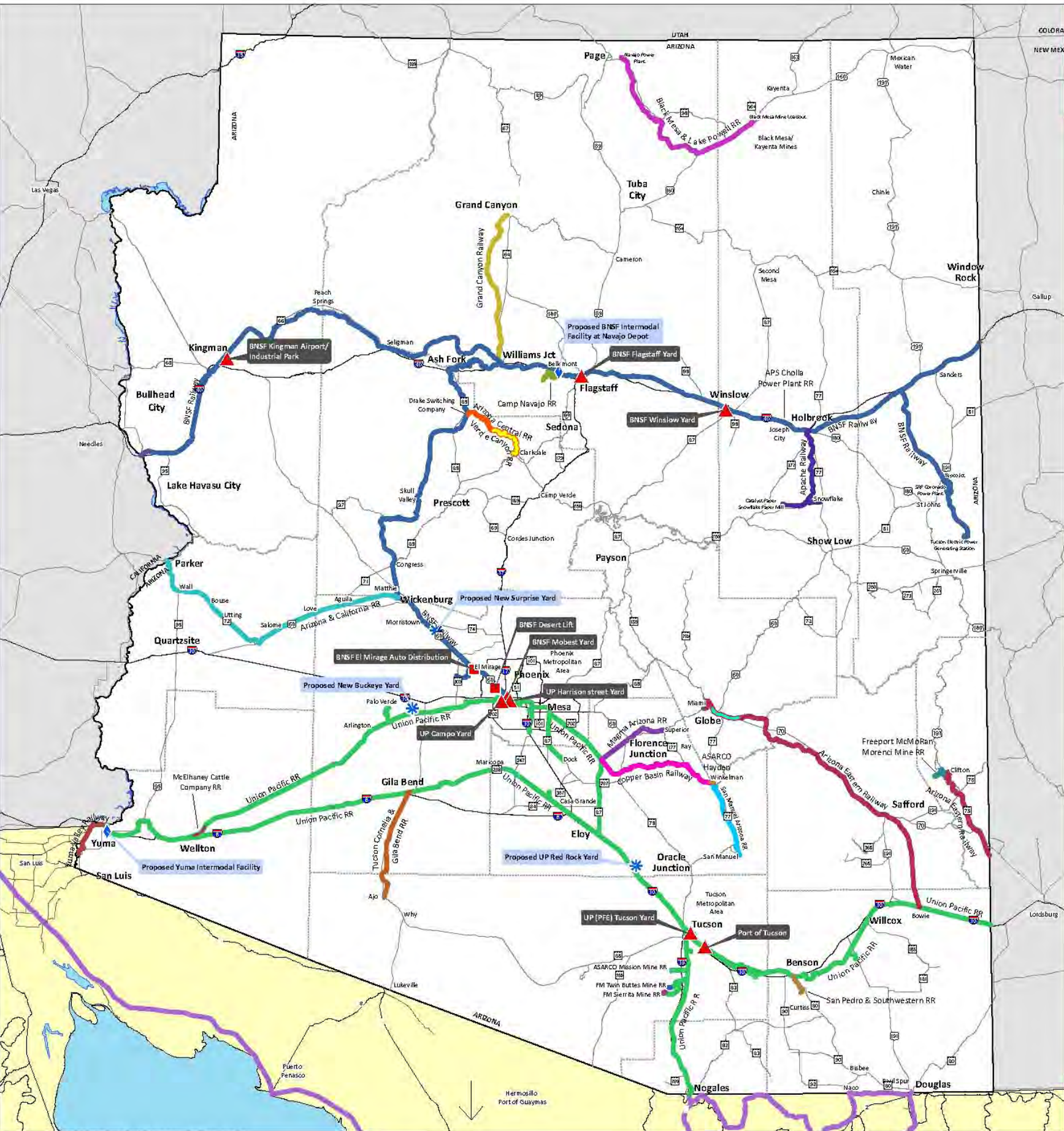
Table A.1 - Key Characteristics of Class I Railroads in Arizona

Railroad	Route Miles	Annual Carloads	Commodities	Maximum Track Speed
BNSF Railway	690	293,400	intermodal, automobiles, cement, coal, chemicals, lumber products, general merchandise	70 mph (90 mph-Amtrak)
UPRR	775	168,000	intermodal, automobiles, cement, coal, chemicals, lumber products, copper products, general merchandise	70 mph (79 mph-Amtrak)

Source: Arizona Railroad Inventory and Assessment, 2007

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Figure A.1 - Existing Arizona Railroads



Arizona State Rail Plan Existing Arizona Railroads

Legend

Arizona Railroads

- ASARCO Hayden Smelter Railroad
- Apache Railway (owned by and serves Catalyst Paper Mill)
- Arizona & California Railroad (owned by RailAmerica and carries miscellaneous building materials)
- Arizona Central Railroad (owned by The Western Group and serves the cement industry)
- Arizona Eastern Railway (owned by Permian Basin Railways and carries minerals, fuel and fertilizers)
- BNSF Railway
- Black Mesa & Lake Powell Railroad (owned by Salt River Project, Navajo Nation/Hopi Tribe and serves Navajo Generating Station Power Plant)
- Camp Navajo Railroad (serves the Arizona National Guard)
- Copper Basin Railway (owned by ASARCO and serves copper mining operations)
- Copper Spike Railroad (tourist railroad operated by Rio Grand Scenic RR)
- Freeport McMoRan Morenci Mine Railroad
- Freeport McMoRan Sierrita Mine Railroad
- Freeport McMoRan Twin Buttes Mine Railroad (inactive)
- Grand Canyon Railway (tourist railroad owned by Xanterra Parks & Resorts)
- Magma Arizona Railroad (inactive - owned by BHP Billiton mining operations)
- McElhaney Cattle Company Railroad
- San Manuel Arizona Railroad (inactive - owned by BHP Billiton mining operations)
- San Pedro & Southwestern Railroad (owned by Arizona Rail Group and serves agriculture)
- Tucson-Cornelia & Gila Bend Railroad (inactive - owned by Freeport McMoran)
- Union Pacific Railroad
- Verde Canyon Railroad (tourist railroad operated by The Western Group)
- Yuma Valley Railway (inactive tourist rail operated by Yuma Valley Live Steamers Association)

Mexican Railroad

- Ferromex

Existing Railroad Facilities

- Intermodal Facility
- Classification Yard

Proposed Railroad Facilities

- Intermodal Facility
- Classification Yard

Sources: ASLD 2008, ADOT 2008, INEGI 2008

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Passenger Rail

The Amtrak Southwest Chief and Sunset Limited are long-distance trains that serve interstate passenger rail demand. Other passenger rail services consist of three tourist railroads: the Grand Canyon Railway, Verde Canyon Railroad (operated by Arizona Central Railroad), and seasonal Copper Spike Railroad (operated by Arizona Eastern Railway).

Short Line Railroads

Most of Arizona's short lines are former segments of one of the two Class I systems. All of the short lines are connected to the national system except the Black Mesa

& Lake Powell, a single-purpose electrified coal hauling operation located on the Navajo Nation in northern Arizona that carries coal from the Black Mesa mine to the Navajo power plant.

Table A.2 presents the key characteristics of Arizona's active short line operations. Of the carriers listed, the Apache Railway, Black Mesa & Lake Powell, Camp Navajo, and Freeport-McMoRan (formerly Phelps Dodge) Morenci Mine routes were originally constructed as independent entities. The Arizona & California and Arizona Central were once part of the Santa Fe Railway (now BNSF), and the Arizona Eastern, Copper Basin, and San Pedro & Southwestern were once part of the Southern Pacific Railroad (now UPRR).

Table A.2 - Key Characteristics of Active Arizona Short Line Railroads

Railroad	Route Miles	Annual Carloads	Commodities	Maximum Track Speed
Apache Railway	38	11,400	waste paper, coal, newsprint, animal feed	35 mph
Arizona & California Railroad	106	18,900	cement, lumber, liquefied petroleum gas, steel	49 mph
Arizona Central Railroad	38.7	900-1200	coal, coke, mill scale, bauxite	10 mph
Arizona Eastern Railway	135	7,300	copper ore, perlite, diesel fuel, kerosene, fertilizer	20 mph
Black Mesa & Lake Powell Railroad	78	84,000	coal	40 mph
Camp Navajo Railroad	38	40	military loads	10 mph
Copper Basin Railway	55	13,000	sulfuric acid, copper concentrate, copper, copper-scandium oxide	40 mph
Freeport-McMoRan Morenci Mine	15	N/A	copper concentrate, copper	yard limits
Freeport-McMoRan Sierrita Mine	2	N/A	copper concentrate, copper	yard limits
San Pedro & Southwestern	7	1,400	anhydrous ammonia, fertilizer	20 mph
APS Cholla Power Plant	7	33,000	coal, ash	yard limits
Port of Tucson	5	10,000	Container freight, intermodal-transload, frozen storage, beer, utility pipe.	yard limits
Drake Switching Company	4.12	N/A	cement, raw materials	yard limits

Source: Arizona Railroad Inventory and Assessment, 2007

Tourist Railroads

Three tourist railroads operate within the State of Arizona. The Grand Canyon Railway owns its own dedicated rail corridor and operates daily between Williams Junction and Grand Canyon. The Verde Canyon Railroad and Copper Spike Railroad operate on trackage owned by the Arizona Central Railroad and the Arizona Eastern Railroad, respectively.

Table A.3 presents the key characteristics of Arizona’s active tourist railroad operations.



Table A.3 - Key Characteristics of Active Arizona Tourist Railroads

Railroad	Route Miles	Annual Ridership	Commodities	Maximum Track Speed
Grand Canyon Railway	64	240,000 Passengers	passengers only	40 mph
Verde Canyon Railroad	20.4	90,000 Passengers	passengers only	15 mph
Copper Spike Railroad	8	11,000 Passengers	passengers only	20 mph

Source: Arizona Railroad Inventory and Assessment, 2007

Railroad Profiles

The Association of American Railroads (AAR) assigns a two-to-four-letter alphabetic code called a reporting mark to all owners or lessees of rolling stock and other equipment used on the North American railroad network. Under current practice, the first letter must match the initial letter of the railroad name, however the other two to three letters may not match exactly, which is why the acronym in parenthesis for each railroad will not always be an exact abbreviation of the railroad name. Because this code gets assigned by owner or lessee, short line railroads under the same ownership will have the same code. For example, the Freeport McMoran Morenci Mine Industrial Railroad and the Freeport McMoran Sierrita Mine Industrial Railroad both have “PDOX” as the reporting mark.

Class I Railroads

BNSF Railway and UPRR are the predominant Class I railroads in the western United States. Both railroads serve Arizona; BNSF in the central and northern parts of the State, and UPRR to the south. The mainlines of both railroads cross Arizona and pass through to California on the west and to New Mexico on the east.

BNSF Railway

BNSF was formed in 1995 with the merger of the Burlington Northern and the Atchison, Topeka and Santa Fe (ATSF) railroads. The BNSF “Transcon Corridor” connects Los Angeles with Chicago and passes through northern Arizona, including Holbrook, Winslow, Flagstaff, Williams, Seligman, and Kingman.



Transcon Corridor

The BNSF Transcon Corridor (Figure A.2) was originally built by the ATSF in 1880 through 1883 and was double-tracked in 1913. Transcon traffic through Arizona recently reached volumes of about 120 trains per day, an average of one train every 12 minutes. The BNSF Transcon Corridor currently interchanges with three short line railroads in Arizona: the Apache Railway at Holbrook, the APS Cholla Power Plant Industrial lead track at Joseph City, and the Camp Navajo Railroad at Bellemont. More

Figure A.2 - BNSF “Transcon Corridor”



than 90 percent of traffic on the Transcon Corridor is intermodal freight. The Transcon Corridor is 390 route miles of double-track in Arizona.

The Transcon Corridor has two short spurs serving aggregate industries, at Darling (Winona), milepost (MP) 328 and at Shipley, MP 461.4. Additionally, Railhead (located in east Flagstaff, MP 338.8) was a major bulk transload and wood products facility from the late 1950s to the late 1990s. Much of the material used to build Glen Canyon Dam at Page was offloaded here in the early 1960s. The railhead facility and track were removed in the last decade.

Transported commodities include intermodal containers (also called freight containers or shipping containers), automobiles, cement, coal, chemicals, lumber products, and general merchandise.

Phoenix Subdivision

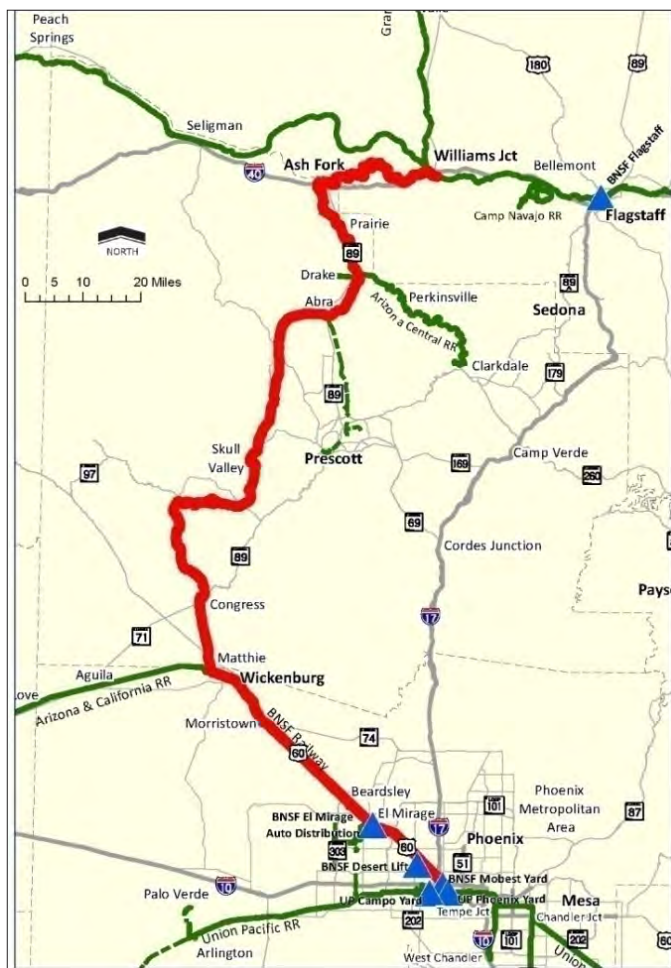
The 209-mile Phoenix Subdivision connects the Transcon Corridor (at Williams Junction) with Phoenix and was originally built in 1893 through 1895 (Figure A.3). It has had no passenger trains since 1969. It interchanges with UPRR at its downtown Phoenix terminus east of the Arizona State Capitol. The Peavine is single-track with almost all 131- and 136-pound continuous welded rail (CWR), but with short stretches of jointed rail and sections of rail that have other weights. BNSF currently interchanges with five railroads on its Phoenix Subdivision: the Grand Canyon Railway at Williams, the Arizona Central Railroad and Drake Switching Company at Drake, the Arizona & California Railroad at Matthie, and UPRR in Phoenix. Three of the short lines are former branches of the ATSF.

The line is unsignaled (often called “dark territory”) and the train control protocol is track warrant control (TWC), whereby all train movements are governed by oral or written instructions issued by a BNSF dispatcher, often by radio. The maximum freight speed is 49 mph. The width of right-of-way varies but is predominantly 200 feet. The maximum gross weight of railcars is 143 tons.

Since 1994, both Beardsley Siding (MP 169.2) and a siding in Skull Valley (MP 66.2/80.6) have been double-tracked with signaled switches.



Figure A.3 - Phoenix Subdivision



BNSF operates an intermodal facility in Glendale, with a capacity between 100,000 and 250,000 lifts per year. In addition to intermodal freight traffic, BNSF brings automobiles to a transload facility in El Mirage. The primary switching facility is Mobest Yard (MP 191.6, between 19th Avenue and 21st Avenue, McDowell Road and Fillmore Street), less than two miles west of downtown Phoenix. The BNSF Phoenix Yard (MP 193.7) lies between 17th Avenue and 9th Avenue, parallel to the UPRR line. It is used to stage trains for the lumber, chemical and cement industries in the area.



In 1992, the 28-mile Prescott Branch was removed and scrapped between Paulden and Prescott. The line was part of the original Peavine route to Phoenix, but a 1962 bypass, allowed ATSF to build a modern, welded rail, level route between Paulden and Skull Valley (north and west of Prescott, respectively). The resulting 28-mile branch segment of the line continued to serve the Prescott area for an additional two decades.

On September 28, 1983, Tropical Storm Octave washed out over one mile of track on the branch and the Arizona Corporation Commission (ACC) granted abandonment in May 1984. The track was scrapped and removed in May 1992. BNSF later built an additional mainline siding at Abra and retained one mile of the Prescott Branch at Abra-Paulden for storage. Portions of the roadbed have been preserved; since 1995 several miles of the old line now have served as the Peavine Trail north of Prescott.

Coronado and Springerville Subdivisions

The BNSF Coronado Subdivision, 45.4 route miles, links the Salt River Project Coronado Power Plant with the BNSF Transcon Corridor at East and West Coronado Junctions, about 36 miles from the New Mexico border. The Springerville Subdivision, extending an additional 29.7 route miles, connects the Tucson Electric Power Company's Springerville Generating Station with the Coronado Subdivision at Tepco Junction. These subdivisions were built between 1979 and 1980 and are co-owned by BNSF, Salt River Project and Tucson Electric Power (Figure A.4).

Salt River Project and Tucson Electric Power use a local private contractor for maintenance-of-way on the lines. Freight car service and repair for the fleets of Salt River Project and Tucson Electric Power coal hoppers is provided on-site by a contractor.

Both subdivisions are unsignalized, operate by TWC, employ 115- to 119-pound CWR, and have a maximum track speed of 49 mph. Both have bridge and equipment

Figure A.4 - Coronado & Springerville Subdivision



weight restrictions of 143 tons (the maximum gross weight of railcar). BNSF coal trains on these lines traditionally use distributed power units, with locomotives in the middle or rear of each train to assist with traction and braking.

The Salt River Project and Tucson Electric Power contract with BNSF to operate daily coal train service. On the Coronado Subdivision, coal from New Mexico and Wyoming is transported twice daily to the Salt River Project Coronado Power Plant near St. Johns. The average train length is 120 cars, delivering up to 12,000 tons per train. On the Springerville Subdivision, coal from New Mexico and Wyoming is delivered less frequently to the Tucson Electric Power generating station near Springerville. The average length is 110 to 130 cars, delivering up to 13,000 tons per train.

UPRR

The UPRR system has significant amounts of traffic between Southern California and El Paso, and between Texas and Chicago. According to a railroad news release, Union Pacific's 760-mile corridor between Los Angeles and El Paso carries 20 percent of the railroad's traffic.

Sunset Route Mainline

The UPRR (formerly Southern Pacific) Sunset Route crosses southern Arizona through Yuma, Wellton, Gila Bend, Maricopa, Casa Grande, Eloy, Marana, Tucson, Benson, and Willcox (Figure A.5), and was originally built from 1877 to 1881. In Arizona, the Sunset Route connects with five short line railroads: the Arizona Eastern Railway at Bowie and Lordsburg (New Mexico), the San Pedro & Southwestern Railroad at both Willcox (a switching operation) and Benson, the Port of Tucson at Tucson, the inactive Tucson, Cornelia & Gila Bend Railroad at Gila Bend, and the inactive Yuma Valley Railway at Yuma.

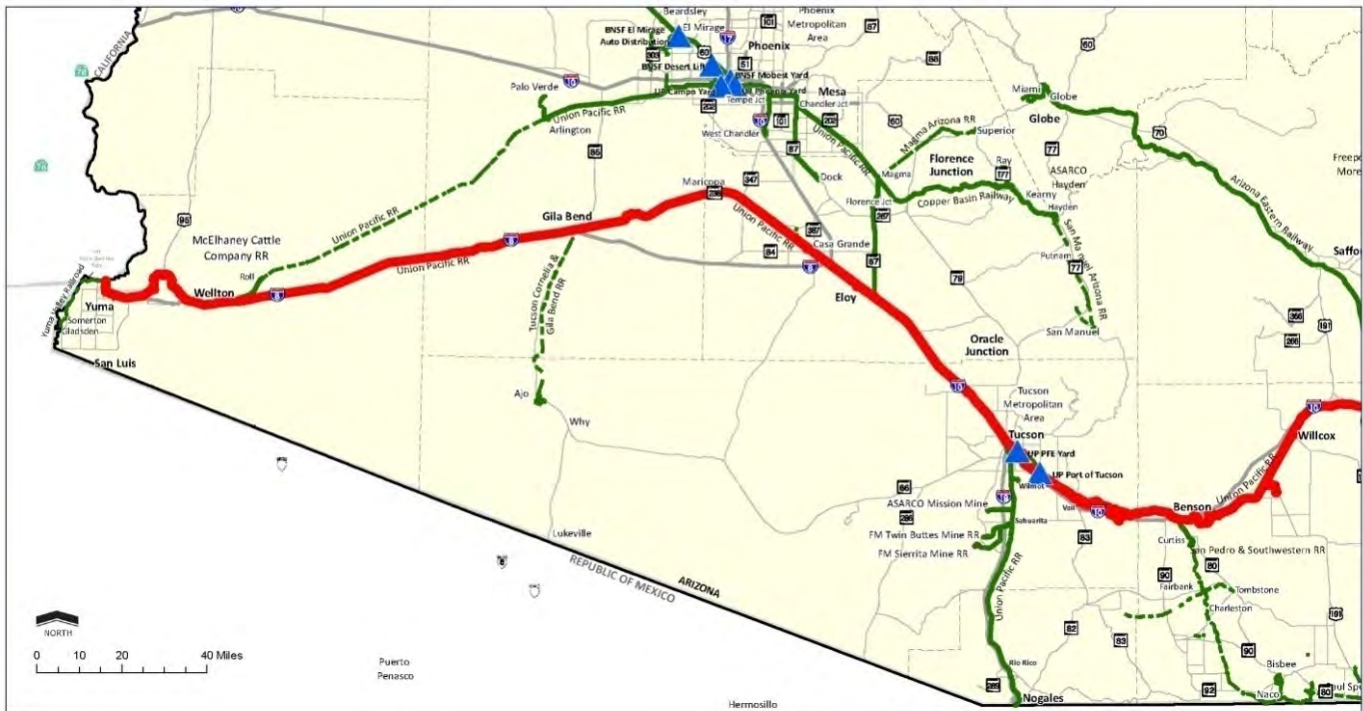
UPRR's Tucson Service Unit is responsible for UPRR operations in Arizona, and has as subordinate units the Lordsburg Subdivision (in Arizona, from the New Mexico border to Tucson), Gila Subdivision (Tucson-Yuma), Yuma Subdivision (in Arizona, only 0.37 miles in Yuma), Phoenix Subdivision (from Picacho through Phoenix to a point west of Arlington), and Nogales Subdivision (Tucson to Nogales).



The Sunset Route through Arizona includes the Gila Subdivision and parts of the Lordsburg and Yuma Subdivisions. Traffic on the Sunset Route recently reached volumes of 49 trains per day, on average. The maximum track speeds are 79 mph for passenger trains and 70 mph for freight. The rail is predominantly 136-pound CWR, with sections of 132-, 133- and 141-pound rail. 141-pound CWR is replacing the others. Train operations are governed by Centralized Traffic Control (CTC).

A national concrete-tie manufacturer has built a new facility in the former PFE yards to provide ties for the Sunset Route double-tracking project currently underway. Additionally, the Port of Tucson rail switching service / Puerto Nuevo warehouse developments in southeast Tucson (Wilmot Siding at Kolb Road) brings rail freight and intermodal traffic to the area. The five-mile long spur that served Davis-Monthan Air Force Base from Wilmot siding was removed in 2007 to make way for new development. Finally, UPRR has proposed building a major new hump-yard facility near Red Rock, east of Picacho on the Sunset Route that would provide much of the classification activities now conducted at Colton Yard east of Los Angeles.

Figure A.5 - Union Pacific Sunset Route Mainline



West of Willcox at Cochise (MP 1063.9), UPRR provides daily coal train service to the Arizona Electric Power Company Apache Station Generating Plant via a three-mile welded-rail spur owned by Arizona Electric Power Company. At Bon (west of Casa Grande at MP 907.7), an inactive two-mile rail spur served the American Smelting and Refining Company (ASARCO) Sacaton Unit copper mine. At Yuma, two spurs serve the Yuma Proving Grounds and Yuma International Airport, which includes the Yuma Marine Corps Air Station.

UPRR ships metallic ores (copper, silver, gold and zinc) from Arizona, and carries 10,000,000 tons of coal per year to power plants in the State. Allowable gross weights for rail cars are 315,000 pounds on the Sunset Route and the Phoenix Subdivision, 286,000 pound gross weight cars on the Tempe Industrial Lead, and 268,000 pounds on the Nogales and Chandler Branches.

The Sunset Route is connected to the UPRR Phoenix Subdivision, which makes a loop from Wellton to Picacho passing through downtown Phoenix. The Nogales Subdivision connects Nogales on the Mexican border

(where it intersects with Ferrocarril de Mexico Railroad [Ferromex]) to the Sunset Route at Tucson.

Certain portions of the Sunset Route have been double-tracked, while preparations for double-tracking of the remaining sections have been completed.

Phoenix Subdivision

The Phoenix Subdivision connects the Sunset Route with Phoenix and points west of Phoenix, to a point a few miles west of Arlington (Figure A.6). It consists of approximately 125 miles of single track.

The line was originally built in 1887 and later (1923-1926) expanded from the West Valley to Wellton. Passenger service on the Phoenix Subdivision ceased in June 1996, and Amtrak's Sunset Limited train was rerouted to the Gila Subdivision (Yuma to Tucson) on the Sunset Route.

Rail on the Phoenix Subdivision was predominantly bolted 113-pound and 115-pound CWR, until recently. In spring 2010, UPRR performed major upgrades to the Phoenix Subdivision. New ties were installed between



Phoenix and Picacho Junction, and new 136-pound CWR was installed between downtown's Phoenix Harrison Street Yard and Picacho Junction (the Sunset Route mainline). Train control is automatic block system (ABS). ABS is a signaling scheme used to increase the capacity of a given track by allowing movements (trains) to follow one another, reasonably closely, on the same track, while providing safety. The signals used in ABS to accomplish this goal operate automatically (i.e., automatic signals) and allow trains to pass at restricted speed (i.e., are permissive signals). The maximum track speed is 60 mph.

UPRR currently interchanges with three railroads on its Phoenix Subdivision: Copper Basin Railway at Magma Junction, the inactive Magma Arizona Railroad at Magma Junction, and BNSF Railway near downtown Phoenix.

The 19.6-mile Chandler Industrial Lead connects Dock, a railroad location seven miles into Pinal County, with the Phoenix Subdivision at McQueen. The 9.5-mile Tempe Industrial Lead (Kyrene) connects an industrial park in West Chandler with the Phoenix Subdivision. This line was originally built in 1886 as the Maricopa & Phoenix Railroad and was formerly a through route to Tucson via Maricopa, but was relegated to a branch line when 17 miles of track were removed in 1933. The UPRR Phoenix Yard (Harrison Street Yard) lies between the 7th Street and 16th Street viaducts just east of downtown Phoenix. South of the yard and next to it is the UPRR Phoenix Auto Facility. The three-mile Salt River (37th Avenue) spur serves lumber, scrap steel and chemical customers in south Phoenix, and the two-mile long Cotpro spur serves the warehouse, coil steel, lumber and general merchandise market near I-10. The 2.9-mile Litchfield Industrial Lead connecting Litchfield Park and Litchfield Junction, the latter a location near the intersection of Litchfield Road and Main Street, immediately east of the Phoenix Goodyear Airport, was recently abandoned and track removed. The 2-mile long Tempe River lead

Figure A.6 - Phoenix Subdivision





was also deactivated in 1997, and abandoned in 2008. A major portion of the lead alignment and right of way from Tempe's Macayo's Depot Cantina eastward to Rural Road has been utilized for the METRO light rail system.

A 4.5-mile industrial lead built in 1979 connects the Palo Verde Nuclear Generating Station with the Phoenix Subdivision near Arlington Siding. The section of this spur leading up to the generating plant is still under operation. However, the remaining portion which leads into the power plant is now out of service.

To the west, 63.5 miles of track roughly between Arlington and Roll have been out of service since 1996. This track, originally built from 1923 through 1926, was closed in 1996 because of low traffic volumes and high maintenance costs. UPRR has made no decision regarding reopening of this segment (known as the Wellton Branch), which would allow through trains to serve the Phoenix metropolitan area from the west.

Traffic on the Phoenix Subdivision, which serves 147 customers, averages about six trains per day. Local UPRR yards are operating near capacity. UPRR has proposed a new classification yard at Red Rock to enhance their ability to serve new customers, as discussed above. A proposed classification yard at Buckeye is also located on the Phoenix subdivision.

Nogales Subdivision

The 65.7-mile, single-tracked Nogales Subdivision connects Tucson with Nogales and provides UPRR an entry into Mexico and an interchange with Ferromex (Figure A.7).

The subdivision was originally built in 1910. The maximum speed is 40 mph. Rail is almost entirely continuous welded, including sections of 112-, 113-, 115-, 119-, 132- and 136-pound rail. This line has three mine spurs: ASARCO Mission Mine (MP 999.8) and Freeport McMoRan Sierrita Mine (MP 1002.7). The Freeport McMoRan Twin Buttes spur (inactive) also branches off the Sierrita Mine spur. A six-track UPRR yard facilitates operations in Nogales.

The 6.5-mile ASARCO Mission Mine spur connects the mine with the UPRR at Pima Junction. At Sahuarita

Figure A.7 - Nogales Subdivision



Junction (MP 1002.4) two mining operations are served by business tracks radiating west from the Nogales Subdivision. Freeport McMoRan Sahuarita facility is served by a 7.5-mile rail line. Traffic on the line has increased with salvage and maintenance operations as well as car storage. The former Cyprus Mine Spur serves the Freeport-McMoRan Sierrita Mine in Green Valley.

Traffic on the Nogales Subdivision averages four round trip trains per day, plus two locals.

UPRR - International Freight

UPRR is the leading provider of transportation services to and from the U.S./Mexico border, serving all six major U.S. gateways to Mexico and connecting directly to the two largest Mexican railroads. UPRR exchanges approximately 58 percent of shipments to and from Mexico with Kansas City Southern de Mexico (KCSM) and the remaining 42 percent with Ferromex (FXE). Union Pacific has a 26 percent ownership interest in Ferromex.

The Nogales Port-of-Entry (POE) is the only rail crossing of the Arizona-Sonora border. Nogales accounts for 12 percent of all freight shipments transported across the border by UPRR. Two to four trains operate on this route daily. In 2007, 588 trains entered the United States through the Nogales port.

Short Line Railroads - Common Carriers

Apache Railway Company

The 38-mile mainline of the Apache Railway (APA) connects a newsprint plant near Snowflake with the BNSF Transcon Corridor at Holbrook (Figure A.8). A seven-mile branch line links Snowflake with APA's mainline, with service as needed.

Initially constructed by the Apache Timber Company in 1917, when it served a much larger area, today's APA is owned by Catalyst Paper, a manufacturer of paper products.



Total carloads in 2005 stood at 11,422. APA operates five days a week, typically moving 55-car trains. The method of train control is TWC. According to ADOT's 2007 Railroad Inventory and Assessment Study, the track appears to be in excellent condition. The maximum train speed is 35 mph. Mainline rail is 131-pound, jointed. Unusual for a short line, APA can handle 286,000-pound and even 300,000-pound (gross weight) rail cars at 29-35 mph speeds. APA operates six Alco locomotives, with a seventh on loan to the Catalyst Paper plant. There are fifteen grade crossings on this railroad.

Inbound traffic to the newsprint plant consists primarily of baled waste paper and coal. Outbound shipments consist of newsprint and brown paper used in the manufacture of cardboard boxes. APA ships other materials to and from other customers.

Figure A.8 - Apache Railway



Arizona & California Railroad

The Arizona & California Railroad (ARZC) is owned by RailAmerica and connects Matthie, Arizona (five miles northwest of Wickenburg on the BNSF Phoenix Subdivision) with Cadiz, California (Figure A.9). This 190-mile short line, formerly a branch of the ATSF, is part of the most direct rail route between Phoenix and the Los Angeles Basin. Within Arizona, the railroad traverses 106 miles between Matthie and Parker.

ARZC has trackage rights on the BNSF from Matthie to the BNSF Mobest Yard in Phoenix. At Castle Hot Springs (near Morristown), ARZC exchanges eastbound and westbound trains with BNSF crews from Mobest. Operating up to three trains per day, ARZC is primarily (95 to 99 percent) a carrier of BNSF Bridge (through) traffic between Matthie and Cadiz.



The maximum speed is 49 mph. The rail is 112-pound CWR over approximately 80 percent of the Parker Subdivision; the remainder is 112-pound jointed (bolted) rail. Much of the line is tangent (straight) track, but there are a number of curves at MP 54-58, including some seven-degree curves. The maximum grade in Arizona is 1.6 percent. Right-of-way width is estimated at 100 feet. ARZC can handle 286,000-pound gross weight rail cars.

There are sidings at Aguila (MP 22.0), Love (MP 40.0), Salome (MP 50.0), Utting (MP 70.5), Bouse (MP 79.9) and Wall (MP 90.6). The Parker Subdivision is not signaled; train control is by TWC. Within Arizona there are a few customers, including petroleum, chemical and bulk shipment customers near Parker. ARZC carried 18,922 carloads in 2005. Principal commodities were cement, lumber, liquefied petroleum gas and steel.

Figure A.9 - Arizona & California Railroad



Arizona Central Railroad/Verde Canyon Railroad

The Arizona Central Railroad (AZCR) carries freight between Drake, its connection with the BNSF Phoenix Subdivision and the Drake Switching Company railroad, and Clarkdale, a distance of 38.7 miles (Figure 10) and provides the only rail service to the Verde Valley portion of Yavapai County.



Operating as the Verde Canyon Railroad, it also offers tourists round-trip excursions between the depot at Clarkdale and MP 18.3, the Perkinsville siding. The line was built in 1911-1912 and purchased from the ATSF in 1989. It is owned by The Western Group and the Clarkdale yard is surrounded by approximately 400 acres of the Town's industrially zoned property and bordered by additional lands that the Town has identified as a future annexation area. The Town of Clarkdale considers the availability of rail in this industrial area as an advantage to businesses interested in the area, and a key component of the Town's long term economic development strategy.

Yard limits apply to the entire railroad. The maximum track speed is 10 mph for freight and 15 mph for passenger trains. This line has 90-pound rail and is in excellent condition. The ruling grade is two percent. There are numerous curves, up to 16 degrees. The right-of-way width is 100 feet and the maximum gross weight of rail cars is 238,000 pounds.

Two freight customers currently generate between 900 and 1,200 annual carloads. The primary customer is

Figure A.10 - Arizona Central Railroad



Phoenix Cement, whose traffic base consists of outbound loads of cement and inbound loads of coal and coke (produced from coal). Train frequency goes as high as three or four 15-carload trains per week. Another freight customer, a lumber company, ships relatively few carloads.

The Town of Clarkdale's General Plan anticipates expansion of the freight transportation options, and envisions commercial, light industrial and residential enhancements centered around the railroad depot and its tourist excursions.

Arizona Eastern Railway, Inc.

The Arizona Eastern Railway (AZER) operates 135 miles of railroad between Bowie and Miami and 70 miles from Lordsburg, New Mexico to Clifton (Figure A.11). UPRR has granted AZER trackage rights on the Sunset Route between Bowie and Lordsburg, thus allowing a seamless connection between the two AZER properties.

What is now the AZER was chartered as the Gila Valley Globe and Northern Railway (GVGN) in 1885. The railroad was leased by the Southern Pacific in 1905 and merged into the SP system in 1924. SP sold the Bowie-Miami line to Kyle Railroad in 1988. Permian Basin Railways has owned the AZER since 2004.



Yard limits apply to the 135 miles of main track. Since the track improvements of 2008, six-axle power is now permitted on the Bowie-Miami mainline, however wide loads are not permitted. Six-axle power and high-wide loads are not permitted on the Clifton Branch due to curvature and tunnel clearances. The maximum car weight is 263,000 pounds. The rail weight varies from 75 to 136 pounds, and new upgraded sections of welded rail and 112-pound bolted rail have helped increase train length and weight since 2008. The maximum horizontal gradient is 2.3 percent, near Globe. The maximum horizontal curvature is 16 degrees, also near Globe. Right-of-way width ranges from 100 to 400 feet, with a predominant width of 200 feet. Permian Basin's systemwide Central Car Repair Shop is located in the AZER's Globe shops.

The railroad serves the copper mining region of southeastern Arizona and the agricultural Gila River Valley. Its primary commodities are copper concentrate, copper anode and cathode, and copper rod and other

Figure A.11 - Arizona Eastern Railroad



copper processing materials. AZER also handles minerals, chemicals, sulfuric acid, building supplies and lumber. It operates a transload center for lumber, building materials and other consumer goods at Globe. The railroad carried 7,310 carloads and 950,300 gross tons in 2005. Its principal customer is the Freeport McMoRan (formerly Phelps Dodge/Cyprus) copper production facility at Miami, which is served by extensive industrial trackage within the plant. Other customers, at Safford, accept inbound kerosene and fertilizer. The service level is one round trip per day, six or seven days a week, and the average train length is 23 cars.

There are plans to construct a new rail spur from Safford to the nearby Freeport McMoRan (formerly Phelps Dodge) copper mine. Iowa Pacific Holdings, parent company of the AZER, applied in September 2009 for a \$95-million Transportation Investment Generating Economic Recovery (TIGER) grant from the United States Department of Transportation (USDOT) to pay for upgrades to its rails in southeast Arizona and to add the rail spur to Freeport-McMoRan's mine near Safford. Construction of the rail spur has been delayed due to discussions about a grade separated crossing of US 70, as well as the fluctuations of the global copper market.

Clifton Subdivision

The 70.3-mile Clifton Subdivision connects Clifton with the UPRR Sunset Route at Lordsburg, New Mexico. It was one of Arizona's first rail lines, originally built in 1884. In 2008, the AZER purchased the Clifton branch from Union Pacific.

Just over 41 miles of this subdivision are in Arizona. The single-track line is composed of a variety of rail weights, ranging from 75 to 136 pounds. The maximum track speed is 40 mph, but much of the line is restricted to speeds as low as 10 mph. The maximum gradient is approximately two percent. There are many horizontal curves, with a maximum of approximately 15 degrees. Six tunnels are located near the Clifton end of the line.

The railroad provides weekly or twice-weekly service, hauling primarily copper cathodes and other copper products. An industrial lead owned by Freeport-McMoRan connects the Morenci Mine to this line.

Copper Basin Railway

The Copper Basin Railway (CBRY) extends 54.6 miles from its interchange point with the UPRR and Magma Arizona Railroad at Magma to Winkelman (Figure A.12). A four-mile branch line, the Ray Branch, connects the ASARCO-owned Ray Mine with the CBRY mainline at Ray Junction (MP 987). At Hayden Junction, a 1.8-mile smelter branch connects the mainline with the ASARCO concentrator and smelter railroad. The railroad is owned by ASARCO LLC, a Tucson-based integrated copper mining, smelting and refining company.



Figure A.12 - Figure 12 - Copper Basin Railway



Train control is by direct traffic control (DTC), with a maximum speed of 25 miles per hour (mph). DTC is a system for authorizing track occupancy used on some railroads instead of or in addition to signals. It is known as “direct” traffic control because the train dispatcher gives track authority directly to the train crew via radio, as opposed to through wayside personnel via telephone or telegraph, as in train orders. The rail is a combination of CWR and bolted, with weights ranging from 90 to 136 pounds. Nearly all the mainline track, however, consists of rail weighing at least 110 pounds. The mainline has three tunnels and a maximum gradient of 1.78 percent, but a 2.2 percent grade descends from Hayden smelter to Hayden on the smelter branch. The maximum horizontal curvature on the mainline is 12 degrees 5 minutes. The maximum track speed between MP 950.5 (Magma Junction Yard) and MP 971.6 is 25 mph, then 10 mph to MP 987 (Ray Junction), and then 25 mph to MP 999.3 (Hayden). The Ray Branch is 10-mph track. The maximum loaded rail car weight is 286,000 pounds (the interline standard) and right-of-way is 50 to 200 feet wide.

Major commodities carried include copper ore, concentrates, anodes, cathodes, coal, coke, Cso (smelting bi-product), lumber products, military vehicles, petroleum naphtha, plastic resins, and sulfuric acid. CBRY’s principal customers are ASARCO, a lumber dealer and a plastics manufacturer. The railroad transports ore from the mine to the Hayden concentrator, concentrate from the Ray concentrator to the smelter, and sulfuric acid from the smelter to the leaching facilities.

San Pedro and Southwestern Railroad

SPSR runs from a connection with UPRR at Benson to Curtiss, or 7.5 miles (Figure A.13). Traffic consists of chemicals (used in manufacturing fertilizer and other nitrogen products) and copper products. A team track is available for transloading at Benson. The SPSR organization performs a satellite switching operation at Willcox. Arizona Rail Group has owned the SPSR since 2003.

The SPSR, part of the SP system until 1992, once had daily operations over 65 miles of mainline track between Benson and Bisbee Junction. Ten more miles of track

between Paul Spur (east of Naco) and Douglas had been abandoned and removed by the late 1990s.

The fortunes of the SPSR began to decline when the copper smelter at Douglas closed in 1987. Negotiations to establish a railroad border crossing at Naco were unsuccessful. The Federal Railroad Administration (FRA) determined in 2005 that the railroad must be embargoed between Curtiss (SPSR MP 7.5) and the end of track at Paul Spur (near Douglas) unless certain bridges between Curtiss Siding and Naco were repaired.

By the fall of 2006, the SPSR had sold the track between Curtiss and Paul Spur, and the rail was removed in 2007. The sale of track assets will allow a \$0.5 million upgrade (3,000 new ties and 3,000 tons of new ballast and other improvements) on the remaining Benson-Curtiss line, permitting speeds up to 20 mph and cars up to 286,000 pounds gross weight.

SPSR track is jointed rail ranging from 110 to 132 pounds per yard. SPSR owns the right-of-way between Benson and Douglas, except for a 20-mile UPRR-owned segment in the San Pedro River Riparian Area. The right-of-way width is generally 200 feet. The maximum gross weight of car and locomotive is 263,000 pounds.

SPSR's sole customer, at Curtiss, produces ammonium

nitrate and generates approximately 1,350 annual carloads (inbound anhydrous ammonia, outbound fertilizer). SPSR serves this customer three days a week.

Other Short Line Railroads (Owned by Their Sole Customer)

Port of Tucson



The Port of Tucson is an inland port rail facility located in east Tucson near UPRR's Wilmot Siding (Figure A.14). The port provides a variety of rail-oriented transportation services in and around the southwest region, including intermodal freight container handling, boxcar access, and a team track facility. It is a

privately-funded, 600-acre freight transload facility and foreign trade zone (FTZ) bonded warehouse district, opened in 2001 to service the growing North American Free Trade Agreement (NAFTA) and CANAMEX corridor markets.

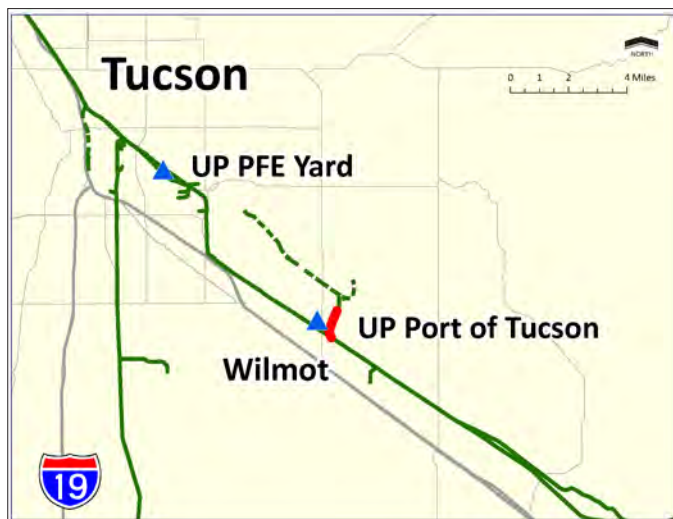
The port operates five miles of track (yard trackage), has six employees, and operates General Motors diesel locomotives. Rail is 90-, 110- and 119-pound bolted. The railroad has an annual carload volume of 9,000 to 10,000 cars per year, with a capacity of 150

Figure A.13 - San Pedro & Southwestern Railroad



to 300 cars at a time. Two container lift cranes operate on-site. The port's rail access to the UPRR consists of a two-mile siding and a 3,000-foot siding. The shorter siding branches to grade level access, dock level access, intermodal container access, and team track facilities.

Figure A.14 - Port of Tucson



The switching service and warehouse district specializes in intermodal transloading, frozen storage, beer and utility pipe unloading. The railroad currently serves four customers. In 2007, the port expanded east of Kolb Road and built a new one-mile long switching lead, parallel to and north of the UPRR mainline. Additional spur tracks were constructed to serve a new warehouse and intermodal ramp.

Camp Navajo Railroad

The Camp Navajo Railroad (DODX/USAX/USNX) is a 38-mile network, located entirely within the 28,000-acre State of Arizona military reservation at Belmont and owned by the Arizona National Guard (Figure A.15). It was built in 1942.

Train movements are on an "as required" basis. The Camp Navajo Railroad connects with the BNSF Transcon Corridor and moves about 40 carloads per year to and from storage igloos. Not all of the unsignaled track is currently in service. The maximum speed is ten mph. Most of the rail is 80-, 85- and 90-pound, with some 131-pound rail. Camp Navajo plans to lease the area

known as Volunteer Mountain Industrial Park, adjacent to the BNSF Transcon Corridor, for commercial rail yard use.

Figure A.15 - Camp Navajo Railroad



APS Cholla Power Plant

Arizona Public Service (APS) operates the Cholla Power Plant Railroad (APSX) at Joseph City. The industrial railroad's purpose is to cycle coal trains through the plant, which provides electricity to Arizona and customers in the Pacific Northwest. APS built the line in 1974 along with the power plant.

The railroad consists of nearly seven miles of loop, yard and spur track located north of the BNSF Transcon Corridor. It owns three remote-controlled locomotives for switching.



APS contracts with BNSF, which operates daily coal service of 80- to 97-car trains on the Transcon Corridor. The coal is brought from several mines in New Mexico and Wyoming. The power plant railroad usually shuttles 30-car cuts of coal to the plant, with empty cars returned to the BNSF yard. Fly ash (one of the residues generated in the combustion of coal) is routinely shipped out.

ASARCO Railroad

ASARCO operates the Hayden Smelter industrial railroad to serve its smelter in Hayden. The railroad consists of over two miles of yard, spur and loop track. It is connected to the national railroad network by its sister ASARCO-owned railroad, the CBRY, which provides on-call switching via its 1.8-mile lead from Hayden Junction.

The railroad owns and maintains five small locomotives for plant, mill and smelter switching. ASARCO employees provide railroad operations and maintenance. The railroad transports about 6,000 carloads of copper concentrate and products annually along its 2.5 miles. The rail weight ranges from 75 to 119 pounds.

Black Mesa & Lake Powell Railroad

The 78-mile Black Mesa & Lake Powell Railroad (BLKM/BMLP), jointly owned by the Navajo Nation and the Hopi Tribe, hauls coal from a strip mine at Black Mesa, near Kayenta, to the Salt River Project Navajo Generating Station near Page (Figure A.16). It was constructed in 1972 as the world's first 50,000-volt electric railroad. This single-purpose line is not connected with any other railroad. The entire right-of-way is fenced.

The rail is 115- to 119-pound CWR. A 6,000-foot siding midway permits passing of trains. The maximum speed is 40 mph. There are 32 public grade crossings and 6 private crossings. The maximum grade is 2.3 percent. The company maintains six electric locomotives manufactured by General Electric, one diesel, and 110-ton coal hoppers. Operating within the Navajo Nation, the railroad has three round trips daily carrying approximately 8,000 tons of coal per trip. The Navajo Generating Station supplies electricity power to the railroad.

Figure A.16 - Black Mesa & Lake Powell Railroad



McElhaney Cattle Company

The McElhaney Cattle Company operates one of the ten largest cattle-feed facilities in the U.S. The UPRR granted McElhaney trackage rights over six miles of the Roll Industrial Lead (Wellton Branch) from Wellton Junction (MP 771) to MP 777. McElhaney's cattle-feed facility is located in Wellton. Built in the 1950s, it has over 130,000 head of cattle, consuming over 11,000 carloads of grain per year.

The railroad operates its one locomotive for switching grain silo tracks. UPRR 100-car grain trains are delivered twice a week, with McElhaney crews taking over operation from UPRR crews at Wellton.



Freeport McMoRan Morenci Mine Industrial Railroad

The Freeport McMoRan Morenci Mine Industrial Railroad (PDOX), which has operated since 1937, is the largest producer of copper in North America. Two thousand employees work in three shifts, five days a week, producing 840 million pounds of copper each year. The railroad is used to ship copper concentrate to the smelter in Morenci.

The railroad can handle 263,000 pounds per car on Freeport McMoRan Morenci Mine track. The maximum gradient between Morenci and Clifton Yard is five percent and the maximum horizontal curve is twenty degrees. Rail is jointed 90-pound and 133-pound. There are nine operable locomotives. PDOX also owns two ballast cars and eight air-activated side dump cars.

The railroad connects at Clifton with the Arizona Eastern Railroad (formerly UPRR), where PDOX has trackage rights (Figure A.17). Arizona Eastern owns the yard at Clifton and provides service once or twice a week, depending on volume requirements.

Figure A.17 - Freeport McMoRan Morenci Mine Industrial Railroad



Freeport McMoRan Sierrita Mine Industrial Railroad

The Freeport McMoRan Sierrita Mine Industrial Railroad (PDOX) (Figure A.18) is a short line that interchanges with the UPRR Sierrita Mine Spur just east of the plant at the top of a 2.5 percent grade. The operation and railroad are located in Green Valley.

The railroad operates on a two-mile track. Rail weights include 90- and 110-pound sections. Commodities transported include copper, copper concentrate and sulfuric acid.

Figure A.18 - Freeport McMoRan Sierrita Mine Industrial Railroad



Drake Switching Company

The Drake Switching Company (DSC) has recently started operations along 4.12 miles of yard, wye and spur trackage located at Drake, Arizona. DSC provides switching services for the Drake Cement Company, LLC and permits trackage rights between BNSF Railway and Arizona Central Railroad. The Drake rail yard consists of six tracks and a wye totaling approximately 3.46 miles, with two leads extending 0.66 miles from the yard into the cement plant. The cement company is served by a newly resuscitated limestone mine on the south side of Hell Canyon near the remains of the 1800's town-site of Puntenney. The raw materials are transported from the mine to the cement plant via a new conveyor-belt system that stretches across the canyon.

The cement plant is expected to add additional freight traffic on the Peavine. The number of trains per day on the Peavine is approximately twenty (including locals)—ten in each direction. Within the confines of the Drake wye, the DSC interchanges freight with both BNSF Railway and AZCR.

Out of Service or Abandoned Short Line Railroads

Freeport McMoRan Twin Buttes Mine Industrial Railroad

The Freeport McMoRan Twin Buttes Mine Industrial Railroad (PDOX) (Figure 19) is a short line that interchanges with the UPRR Sierrita Mine Spur just east of the Twin Buttes Mine.

The mine was closed in 1997 and since that time the Twin Buttes Mine Industrial Railroad has not been in operation.

Magma Arizona Railroad

Magma Arizona Railroad (MAA), owned by BHP Billiton, operated freight service from a connection with the UPRR and the CBRY at Magma to Superior (28.1 miles) (Figure A.19). It is currently out of service.

The railroad was incorporated in 1914 as the Magma Arizona Railroad Company and was converted from

narrow to standard gauge in 1923. At its east end is the BHP Superior Mine, a copper mine closed in 1996. A local perlite company also shipped products via MAA before to the mine's closure. Inasmuch as the mine is currently the only potential customer, this line has been placed in a "care and maintenance" status, although not abandoned.

The maximum speed is 15 mph. The railroad may become active again if the Resolution Copper Company-Rio Tinto shaft mine east of Superior is re-opened. Initial planning to reopen the mine is underway, and service may resume on this line in 2020. Trains occasionally run along the line.

San Manuel Arizona Railroad

San Manuel Arizona Railroad (SMA) operated freight service from a connection with the Copper Basin Railroad (and by haulage agreement with UPRR) at Hayden to San Manuel, a distance of 29.4 miles (Figure A.20). The railroad began operations in 1955.

From 1988 to 1999, the San Manuel smelter was the largest and most technologically advanced in the world.

Figure A.20 - San Manuel Arizona Railroad

Figure A.19 - Magma Arizona Railroad



But because of a decline in copper prices and global demand, it was shut down between 1999 and 2002, and dismantled in 2004. Before the San Manuel mine was closed, rail service operated daily on the 7-mile line between mine and smelter. The rail was removed in 2005.

The 29-mile mainline railroad ceased operations on July 31, 2006, but there are no abandonment plans. The present owner, BHP-Billiton, has decided to leave the track in place, and is considering ways of resuming freight operations.

The maximum speed on the SMA is 20 mph. The rail is 90-pound jointed and the maximum grade is two percent.

Tucson, Cornelia and Gila Bend Railroad Company

The Tucson, Cornelia and Gila Bend Railroad Company (TCG) is a subsidiary of Freeport-McMoRan and extends from Gila Bend to the closed Phelps Dodge Ajo mine (Figure A.21).

The 43-mile rail line was built in 1916 to serve the mines, but has been out of service since 1984. TCG's accompanying Phelps Dodge New Cornelia Mine railroad trackage served the terraced New Cornelia pit before mining extraction operations were converted to a system of conveyor belts. This track was gradually removed between the mid-1970s and 1997.

Figure A.21 - Tucson, Cornelia and Gila Bend Railroad Company



The track, consisting mostly of 70- and 90-pound rail, remains in place. The line was temporarily reopened by Phelps Dodge in 1995 and 1996 to ship In early 2007, the former TCG Ajo locomotive and car shops were dismantled. While all remaining locomotives and cars were sold, donated or scrapped between 1984-2010, two locomotives remain within the plant-site on isolated sections of track. Resumption of service to the New Cornelia Mine would require the rebuilding of the entire line with new rail, ties and bridges to accommodate the new industry standard of 286,000lb (140 ton) hopper cars, as well as new locomotive and car servicing facilities at Gila Bend or Ajo.

Yuma Valley Railway

The Yuma Valley Railway (USG/YVR) was a tourist operation hosted and operated by the non-profit volunteer group, Yuma Valley Live Steamers Association/ Yuma Valley Chapter-NRHS.



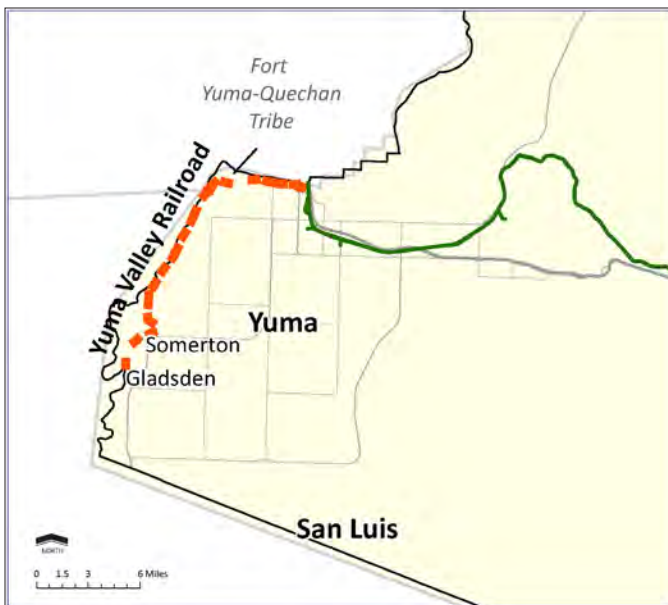
The YVR line was originally built in 1914 for the U.S. Bureau of Reclamation to create a new system of irrigation canals, levees and dikes along the Colorado River. It operated for nearly 20 years along the UPRR Yuma Industrial Lead before being shut down in 2005 by the Bureau of Reclamation (BOR), which declared the tracks inadequately maintained for passenger traffic. Further, the U.S. Department of Homeland Security and the Arizona National Guard had begun to utilize the YVR right-of-way for border patrol and military operations, blocking the tracks south of MP 6.1.

Prior to shut-down in 2005, the three-car tourist train pulled by a vintage diesel had operated over a 6.1-mile route between downtown Yuma and the Yuma Desalting

Plant (Figure A.22). In the recent past, the passenger train had also operated from a small depot built by the Yuma Valley Live Steamers Association at Steam as far south as Somerton and Waltz.

The Yuma Industrial Lead had 80-, 85- and 90-pound rail over a distance of six miles. In 2007, end of track was MP 5.5 (Yuma County Water Quality Improvement Center). Beyond that distance, between MP 6.09 and MP 18.1, the line was abandoned (approved by the Interstate Commerce Commission) in 1983. The track and rails remain in place as of 2010.

Figure A.22 - Yuma Valley Railway



Tourist Railroads

Grand Canyon Railway



The 64-mile Grand Canyon Railway (GCRX), a passenger railroad, connects the National Park Service hotel facilities on the South Rim of the Grand Canyon to the railroad's Williams depot (Figure A.23). With a ridership of 240,000 in 2006, it is among the most popular tourist railroads in the United States. Originally built in 1901, ATSF ended passenger service in 1968 and later sold the line to short line operators, who restored service in 1989. Xanterra Parks & Resorts have owned the railroad since 2007.

Between Memorial Day and Labor Day there are two round trips daily. A third train can be added during this peak season whenever demand calls for it. The rest of the year sees one daily round trip. With demand growing, along with pressure to reduce auto-generated congestion and pollution at the park, additional trips are planned. The Polar Express service carries passengers 17 miles during the winter season and is a growing segment of the business.



This railroad has two active steam locomotives and nine vintage diesel locomotives. The maximum train length is four locomotives and sixteen passenger cars. All equipment is serviced at the Williams shops, one of the few remaining steam locomotive maintenance facilities in the U.S.

Maximum speed is 40 mph. Rail is 90- and 115-pound, bolted. Train control is TWC and wyes at both ends of the line allow turning of trains. The GCRX is connected to the BNSF Phoenix Subdivision at Williams. Shuttle bus service is available to and from the Amtrak station at Williams Junction. In 2010 the National Park Service partnered with the GCRX to rebuild the last two additional tracks and passenger platforms in the Grand Canyon depot yard, while a new bus-only lane was constructed along the south side of the yard in order to provide for cross platform transfers between rail and bus within the park.

Figure A.23 - Grand Canyon Railway



Verde Canyon Railroad



The Verde Canyon Railroad operates passenger train round trips on the Arizona Central Railroad (AZCR) right-of-way, between the depot at Clarkdale and the Perkinsville siding. The tourist railroad's principal attraction is the scenic Verde River Canyon. The line was originally built in 1912. The railroad was purchased from ATSF by the Western Group, in the late 1980s. (ATSF discontinued daily mixed-rail passenger service on the line in the early 1950s.) Since 1990, passenger trains have become the focal point of operations, and the tourist operation attracts about 90,000 riders annually.

Two General Motors FP7 locomotives pull 16 passenger cars through the scenic Verde Canyon between Clarkdale and Perkinsville. There are six tourist trains per week, offering both first-class and coach service. The railroad has three types of passenger cars: Pullman Standard, Budd Stainless Steel and a refurbished American Car and Foundry caboose.

Copper Spike Railway



Copper Spike Railway began passenger service in December 2008 and operates between downtown Globe and the Apache Gold Casino about eight miles to the east. The rail line was originally completed in 1899, as the Gila Valley, Globe and Northern Railway. The SP Railroad took control of it in 1905. Globe was once an optional transcontinental stop between New Orleans and

Los Angeles. A rail-auto detour from the mainline ran from 1916 to 1932 to show California-bound passengers Globe, the Tonto National Monument's cliff dwellings, Roosevelt Dam and the Salt River Valley. Once called the Arizona National Reserve Route, it was renamed the "Apache Trail" and served as the name in heavy advertised campaigns during the 1920s in the golden age of rail travel.

A small passenger station has been constructed at the Apache Gold Casino Resort on SR 70. The railroad operates three 90-minute round trips daily, Thursday through Sunday. The railroad is part of the Arizona Eastern Railway, and runs on existing tracks from the mines west of Globe into the San Carlos Apache Reservation east of Globe. The passenger train runs about half of this route, from inside Globe to the Apache Gold Casino.

Passenger Services – Amtrak

Amtrak owns no track in Arizona, but operates passenger trains on the BNSF Transcon Corridor and the UPRR Sunset Route. Two Amtrak long-distance trains serve Arizona: the Southwest Chief and Sunset Limited/Texas Eagle (Figure A.24). Since 1996, the closest Sunset Limited/Texas Eagle stop to Phoenix is in Maricopa, about 35 miles to the south. Both trains offer sleeping accommodations as well as coach seats.

Figure A.24 - Amtrak Routes through Arizona



Amtrak operates the Southwest Chief daily along a 2,256-mile route from Chicago to Los Angeles which had an annual ridership of about 300,000 passengers in 2009. The Sunset Limited/Texas Eagle operates between Chicago, New Orleans and Los Angeles. Three trains operate weekly in each direction between New Orleans and Los Angeles with an annual ridership of about 80,000 passengers (2009). The Sunset Limited and Texas Eagle operate as a combined train between San Antonio and Los Angeles. Of the station locations in Arizona, Flagstaff reports the highest number of boardings and alightings with approximately 40,000 passengers per year accessing the Southwest Chief service.

Amtrak is considering an upgrade of the Sunset Limited/Texas Eagle to a daily train between Chicago, San Antonio and Los Angeles. A new connecting train would then serve the segment from New Orleans to San Antonio.

Intermodal Connections – Freight

BNSF Railway

BNSF operates a major intermodal facility in Glendale, with a capacity of 100,000 to 250,000 lifts per year. In addition, BNSF brings automobiles to a transload facility in El Mirage. BNSF's primary switching facility is Mobest Yard near downtown Phoenix. The Mobest Yard is a relatively short (3,000 feet) yard built in 1895 which has been refurbished in the past few years to handle heavier trains. Its newly resurfaced transload team tracks handle cuts of unit trains. The BNSF fueling facility, turntable, repair shop and crew terminal are located in the Mobest Yard. The BNSF Phoenix Yard lies between 17th Avenue and 9th Avenue in Phoenix, and is used to stage trains for the lumber, chemical and cement industries in the area. All of these facilities are located along the Phoenix Subdivision.

Union Pacific Railroad

A national concrete tie manufacturer has built a new facility in the former Pacific Fruit Express (PFE) yards to provide ties for the Sunset Route double-tracking project currently underway.

The UPRR Phoenix Yard (Harrison Street Yard), on the Phoenix Subdivision, lies between the 7th Street and 16th Street viaducts. South of the yard and next to it is the UPRR Phoenix Auto Facility. UPRR has another transload facility at Elliot Road near the Palo Verde Nuclear Generating Station.

Other Intermodal Facilities

The Port of Tucson, located in east Tucson near UPRR's Wilmot Siding, provides a variety of rail-oriented transportation services in and around the southwest region, including intermodal container handling, boxcar access and a team track facility.

The City of Flagstaff and the Flagstaff Metropolitan Planning Organization (FMPO) have identified Bellmont-Camp Navajo as a potential site for an inland port/intermodal facility in northern Arizona.

BNSF has plans to develop a new classification yard in Surprise which will have the potential to operate as an intermodal transloading facility and could relieve the pressure from BNSF's El Mirage auto distribution facility and Desert Lift facility. The City of Surprise has expressed interest in developing an inland port in the vicinity of the proposed yard.

UPRR is in the process of developing a classification yard at Red Rock which may be expanded to include intermodal facilities. The Red Rock yard will enable UPRR to assemble Phoenix bound trains at this location, alleviating the already busy Tucson yard.

Additionally, ADOT and the Arizona Department of Commerce are studying the feasibility of inland port development in Yuma which would function as an interface between the UPRR Sunset Route and the potential railroad connecting the proposed Port at Punta Colonet, Mexico.

Intermodal Connections – Passenger

Table A.4 summarizes intermodal connections currently available at passenger rail stations in Arizona. All stations offer parking except Williams Junction. Local public transit service is available at Flagstaff, Grand Canyon National Park, Tucson and Yuma, although service does not necessarily operate at scheduled train arrival times. Six stations are in cities with intercity bus service, but Greyhound does not serve these stations. In Flagstaff, however, Amtrak "Thruway" buses connect the Amtrak station with Camp Verde and Phoenix.

Table A.4 - Existing Intermodal Connections at Rail Passenger Stations

Station	Local Transit Connections	Intercity Transit Connections	Airport Connections	Notes
Benson	None	Greyhound 0.8 mi away	None	
Flagstaff	Mountain Line serves station	“Thruway” motor coach to Camp Verde and Phoenix five times daily. Greyhound 0.6 miles away.	“Thruway” buses to Phoenix Sky Harbor Airport	No local buses at westbound train time
Grand Canyon	National Park Service shuttles	None	None	
Kingman	None at scheduled train times	Daily “Thruway” motor coach to Laughlin and Las Vegas. Greyhound 3.3 miles away.	None	
Maricopa	None	None	None	
Tucson	Sun Tran serves station	Greyhound one mile away	Via Sun Tran	No local buses at eastbound train time
Williams	None	Free shuttle to Amtrak Williams Jct.	None	
Williams Junction	None	Free shuttle to Grand Canyon Railway in Williams	None	No automobile access
Winslow	None	Greyhound 1.4 miles away	None	
Yuma	Yuma County Area Transit (YCAT) serves station	Greyhound 2.5 miles away	Via YCAT; requires transfer	No local buses at westbound train time

Sources: Amtrak, Greyhound and transit agency websites, February 2010

Abandoned Routes and Segments

Table A.5 provides a list of railroad sections that are no longer in service or have been abandoned (and in some cases removed) since 1933. Abandonment does not imply surrender of right-of-way and trackage rights.

Some of the abandoned railroads have been preserved and may be used for freight or passenger rail service in the future, depending on demand and the cost of upgrading the track and signal infrastructure to current operating standards.

Table A.5 - List of Railroad Sections No-Longer in Service

Railroad Section Description		Miles	Status	Date Effective
CLASS I RAILROADS				
BNSF	Railhead Facility and track		Abandoned	Early 2000s
	Prescott Branch	28	Abandoned	1984
	Prescott-Entro-Chino Valley-Paulden-Abra		Removed	1992
	Entro-Prescott Valley-Dewey-Humboldt-Iron King		Abandoned	1974
	Prescott-Iron Springs-Skull Valley		Abandoned	1962
	Crookton-Pineveta-Ash Fork-Crookton Cutoff		Abandoned	1961
	Iron King-Blue Bell-Mayer		Abandoned	1958
UPRR	Chandler Lead section from Dock (Sacaton) to Poston through Gila River Indian Community (GRIC)	16	Abandoned	1964
	Portions of Tempe Industrial lead	17	Abandoned	1933
	Wellton Branch	63.5	Out of service	1996
	Davis-Monthan Air Force Base Spur	5	Abandoned	2004
	Lewis Springs-Sierra Vista/Ft. Huachuca		Abandoned	1979
	Waltz-Gadsden-San Luis		Abandoned	1974
	Santan-Olberg-Poston		Abandoned	1964
	Fairbank-Sonoita-Patagonia		Abandoned	1962
	Fenner-Sibyl Line Change			1962
	Douglas-Apache-New Mexico State Line		Abandoned	1964
	Mescal-Benson Junction		Abandoned	1962
	Mohawk Summit Line Change			1960
	Bosque Line Change			1959
	Webb Subdivision from Northern Avenue to Luke Air Force Base			2001
	Cotton Lane Lead from Fertizola to Goodyear			Early 1990s
	Litchfield Industrial Lead	2.9	Abandoned	2009-2010
	Phoenix I-10 – River Lead		Abandoned	2007
SHORT LINE RAILROADS				
San Pedro & Southwestern Railroad (SPSR)	Curtiss to Paul Spur near Douglas	57	Abandoned	2007
San Manuel Arizona Railroad (SMA)	Hayden to San Manuel	29	Out of service	2006

Table A.5 Continued.

Railroad Section Description		Miles	Status	Date Effective
San Pedro & Southwestern Railroad (SPSR)	Bisbee Junction to Douglas		Abandoned	1999
Magma Arizona Railroad (MAA)	Magma Junction to Superior	28	Out of service	1997
Tucson, Cornelia & Gila Bend Railroad Company (TCG)	Ajo to Gila Bend	43	Out of service	1984/1997
Yuma Valley Railway (USG/YVR)	Steam siding to Waltz	12	Abandoned	1983
Apache Railway	Snowflake-Taylor-Shumway-Pinetop Lakes-McNary		Abandoned	1982
Southwest Forest Industries/White Mountain Scenic Road	McNary-Apache Sunrise Ski Resort area-Big Lake		Abandoned	1976
Southern Forest Industries	Flagstaff-Mountaineer-Newman Park-Mormon Lake		Abandoned	1967
Southwest Forest Industries/White Mountain Scenic Road	Big Lake-Maverick, AZ		Abandoned	1967
San Pedro & Southwestern Railroad (SPSR)	Fairbank-Tombstone		Abandoned	1960

Source: Arizona Railroad Inventory and Assessment, 2007

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APPENDIX B. PUBLIC AND STAKEHOLDER INVOLVEMENT

An extensive public involvement effort was conducted as part of the BQAZ process which resulted in the Statewide Rail Framework Study and carried through to the State Rail Plan. The appendix includes documentation from the BQAZ process, focus groups held for the State Rail Plan and RTAT meetings. Additionally, related Rail Planning Studies in Arizona are included.

Introduction

This report is an addendum to Working Paper #2: Summary of Key Issues and Background Data. Working Paper #2 contained a discussion of five key issues which were defined based on a review of background information and stakeholder input: policy, systems planning, operations, project implementation, and sustainability. These issues will serve as the basis on which the future conditions or alternatives will be developed. To maintain a comprehensive study effort, this document outlines and summarizes the major community involvement activities completed to date. Significant issues that came out of these activities will be compared to the previously defined set of key issues. Recommendations on any other key issues will be presented for use during the next phase of the study.

Five major sets of community involvement events have occurred:

1. Rail Technical Advisory Team (RTAT) Meetings: An RTAT was convened at the inception of the study to provide input at key milestones throughout the project. Two RTAT meetings have occurred so far. The first introduced the group to the study; the second presented and discussed existing conditions and key issues.
2. Focus Group Meetings: Focus group meetings were convened in southern (Tucson) and northern (Flagstaff) Arizona to gain additional input into the key issues development. This presentation and discussion paralleled the second RTAT meeting, held in Phoenix – which doubled as the central Arizona focus group.
3. Stakeholder Meetings: A series of stakeholder meetings was conducted to gain more in-depth information from particular groups or agencies. Such stakeholders included: BNSF Railway, UP Railroad, short line railroads, trucking companies, City of Phoenix Economic Development Department, and MAG.
4. Online Survey: Because not every stakeholder in Arizona could be personally interviewed, an online survey was distributed via e-mail to gain additional public input. These surveys were distributed in four groups: private transportation-related companies, economic development agencies, local or regional governments, and state or federal agencies.
5. Border State Consultations: Meetings were conducted with each bordering state to coordinate rail planning efforts as a larger part of the Statewide Transportation Planning Framework program. The states are California, Nevada, New Mexico, Utah, and Sonora, Mexico.

The study team received similar input at many of these community involvement events. These important issues include:

The need for multimodal connectivity
Conflicting regulatory processes
The need to streamline the environmental review process
PPP/private sector investment
Freight efficiency on tracks shared with passenger service
The need for a statewide prioritized project plan
Right-of-way preservation
Financial sustainability
Air quality
Multi-use corridors (roadway, rail, utilities)
Public education on the benefits of rail

Definition of authority and responsibility for a passenger rail system

Better coordination between the ACC and the railroads

Opportunities for rail development in Arizona include:

- Economic development
- Increased safety
- Community relations
- Grade crossing improvements
- Passenger rail

The remainder of this document will further detail the elements of, and key issues raised at, the community involvement events described above.

1. Regional Technical Advisory Team Meetings

The RTAT is a multidisciplinary team, representing rail-related interests, that provides technical input and review as the long-term direction for rail is formulated for Arizona. The RTAT provides input for each major task and has an opportunity to review each work product. Additionally, RTAT members serve as primary communicators for the Statewide Rail Framework Study.

Members of the RTAT include representatives of statewide agencies, regional and local agencies, federal agencies, railroads, rail interest groups, trade and economic development organizations, and major freight users.

RTAT Meeting #1

The first RTAT meeting was held in January 2009. This was an introductory meeting to outline the purpose of the Statewide Rail Framework Study, the role of the RTAT, and the study scope and schedule. After the project's logistics were discussed, the remainder of the meeting was a roundtable discussion on issues and opportunities related to rail in Arizona. A series of questions was presented, including:

What are your interests in the Rail Framework Study?

How do state and federal regulations affect you?

How can coordination be improved among entities influencing rail issues?

How will changes in technology affect your decision-making?

How do rail interests in Arizona fit into the context of regional rail, including the Southwest and Mexico?

How can the state take advantage of pass-through rail traffic to create economic opportunity?

What is your expectation of the study outcome/recommendations?

The answers to these questions helped in defining the key issues for the study. A full summary of questions and answers can be found in Appendix C.

RTAT Meeting #2

The second RTAT meeting was held in March 2009. This meeting was primarily intended to review the key issues, conducting a working session to voice challenges and opportunities regarding these issues. A brief overview of all activities to date was presented, summarizing existing conditions, public outreach, and freight and passenger rail demand forecasts. Key discussion elements revolved around the five key issues – policy, systems planning, operations, project implementation, and sustainability.

RTAT Meeting #3

The third RTAT meeting was held in June 2009. This meeting provided an overview of several important stakeholder meetings that had been held to gain input on a series of strategic concepts for the project. These meetings included two focus groups – one in northern Arizona and one in southern Arizona; a visit to the team that implemented the New Mexico Rail Runner service; highlights from the Arizona-Mexico Border Commission proceedings; coordination with the short line railroads; coordination with the trucking industry; ongoing coordination with both MAG and PAG and their commuter rail planning; and future intercity rail planning that will be conducted through ADOT. The remainder of the meeting included a roundtable discussion of

issues and opportunities relative to a series of freight and passenger rail strategic opportunities, as well as organizational development and support activities.

RTAT Meeting #4

The last RTAT was held in August 2009. The intent of this meeting was gain further depth to the strategic opportunities presented at the third RTAT meeting. Between meetings, the Project Team further detailed out the strategic opportunities and the component elements of each concept. This meeting provided an opportunity for input to these elements and the overall vision of each opportunity. The strategic opportunities presented are listed below.

Freight Rail

- BNSF Phoenix Metropolitan Area Development and Operations
- BNSF Statewide Development and Operations
- UP Tucson Metropolitan Area Development and Operations
- UP Statewide Development and Operations
- Development/Expansion of Mexican Deep-water Ports
- Development/Expansion of Inland Ports
- New Freight/Passenger Rail Corridor in the Greater Hassayampa Valley
- Development/Expansion of Short Line Railroads

Passenger Rail

- High-Speed Interstate Passenger Rail
- Phoenix/Tucson Intercity Rail
- Megapolitan Extensions of the Phoenix/Tucson Intercity Rail Corridor
- Enhancement of Amtrak Passenger Rail Service
- Incorporation of MAG and PAG Commuter Rail Planning

Organizational Development and Support Systems

- State Agency Lead
- Statewide Rail Authority
- Alternative or Hybrid Models

2. Focus Group Meetings

Two focus groups were held in both southern and northern Arizona in April 2009 to gain additional input to the key issues development of the project. These meetings paralleled the second RTAT meeting and provided another method to garner public input from various stakeholders across the state. Groups that received invitations included environmental organizations, economic development organizations, cities, towns, counties, COGs/MPOs, Class I railroads, short line railroads, and railroad special interest groups.

The meetings began with a brief introduction of the project's purpose and activities to date. The rest of the meeting was conducted similarly to the second RTAT meeting, with a roundtable discussion of issues and opportunities relative to each key issue topic.

3. Stakeholder Meetings

A series of stakeholder meetings (and conference calls) were conducted with certain organizations to gain more in-depth information on rail issues and opportunities. Summaries of these meetings and the major rail issues presented are discussed below.

BNSF Railway

The project coordination meeting with the BNSF Railway occurred in February 2009. This was a combined meeting with members of the State Rail Framework Project Team and the MAG commuter rail team. BNSF representatives shared a summary of existing facilities and planning improvements in Arizona.

BNSF has 595 route miles of track in Arizona. There is an intermodal facility in Glendale and major yards in Kingman, Glendale, Flagstaff, and Phoenix. Rail service in the Phoenix metropolitan area is at capacity, and therefore has service issues: the Phoenix Subdivision

dead-ends in Phoenix and single-tracking is not very efficient, the Glendale yard is small and dysfunctional, and operations are slow, ranging from 10-20 mph.

Improvements planned or underway in Arizona include:

- Triple-tracking in some areas and quadruple-tracking in a small area along the transcontinental corridor roughly paralleling I-40.
- Development of a major classification yard in Surprise, relocating activities from downtown Phoenix.
- Redevelopment of the unit train facility in El Mirage.
- Improvements to the Ennis Spur with the construction of a new wye at Grand Avenue and a new rail-oriented business park adjacent to Luke Air Force Base.
- Improvements to the Grand Avenue corridor.
- Construction of a classification yard in Kingman.
- Potential development of an intermodal facility (and possibly an inland port) at Camp Navajo, west of Flagstaff.

The biggest challenge BNSF faces is coordination with the ACC.

Union Pacific Railroad

Consultation with the UP also occurred in February 2009 with the same team that attended the BNSF meeting. Likewise, UP shared summary of existing facilities and planning improvements in Arizona.

The UP main line in Arizona is part of the Sunset Corridor, the southern transcontinental corridor. The UP would like to be more involved in the freight movement planning process, and is already involved in several studies in Arizona.

Potential future projects that could affect Arizona include:

Development of the deepwater container port at Punta Colonet, in Mexico. UP has a vested

interest and has been a participant in this project. If development of this port moves forward, Arizona has the potential to capture freight movements (and related economic development opportunities) through Yuma or Nogales.

Interest of the City of Yuma in rerouting tracks through town.

Support for a classification yard in Buckeye to complement existing operations in downtown Phoenix.

Potential improvements to the Tucson classification yard to support New Mexico expansion.

Improvements in Arizona include the following:

Completion of double-tracking across Arizona.

Reconstruction of the Colorado River bridge to accommodate two tracks.

The UP has submitted a permit application for the development of the Red Rock Classification Yard east of Picacho, a major project to relieve congestion in the West Colton Yard in the Los Angeles metropolitan area.

The biggest challenge UP faces is coordination with the ACC.

Short Line Railroads and Port Entities

A request was distributed to all short line railroads and port entities in the state to converse upon issues relative to their operations. A series of three conference calls were conducted in May 2009 with the positive respondents. The first was with the Greater Yuma Port Authority (GYPA), the second with representatives of the Arizona Eastern Railway and the San Pedro and Southwestern Railroad, and the third with the Port of Tucson. Major issues and opportunities that came out of these calls are listed below.

Lack of funding opportunities to upgrade short line railroad infrastructure.

Class I railroad pricing is too high for short line customers to make shipments on the mainline.

Lack of funding for highway safety crossing improvements (i.e., grade crossings).

Concern with Arizona Senate Bill (SB) 1241 – Railroad Assessment, which will require railroads to help subsidize the cost of ACC inspections.

A more expedient approval process with state and federal agencies would help implementation of projects.

Trucking Companies

The trucking industry was contacted to educate the study on current shipping and freight trends across the nation and Arizona as a state. Some of the larger trucking companies also have a share of the rail business – owning and transporting containers. The shift of products to rail and the intermodal nature of product distribution were explored to gain a better understanding of future freight shipping trends. Two large trucking companies are present in Phoenix – Swift Transportation and Knight Transportation.

Swift Transportation

A coordination meeting was held with Swift Transportation in May 2009 to gather input on the current state of rail and truck transport and learn the trucking industry's needs for the future. While Swift provides shipping services using both trucks and containers on rail, the majority of its service is by truck. Arizona is a pass-through state for rail freight and this is not likely to change. Rail may become more attractive to shippers nationally if the shipping cost structure evolves to more of a carbon footprint-based system. The shipping industry would then be based more on reliability than on speed and efficiency, which could be a significant change from the current "just-in-time" shipping methods. In all probability, trucking will still play a large part in the freight industry, particularly focusing on the "just-in-time" deliveries.

Swift is skeptical of future development or expansion of Mexican deepwater ports such as Punta Colonet or Guaymas. It feels the ports of Los Angeles and Long Beach still have unused capacity. Additionally, it is difficult to see the added value from a U.S. intermodal facility (e.g., in Yuma). Building trains closer to a U.S. or Mexican port,

where containers are off-loaded from ships, will continue to be cheaper and more efficient. If a large intermodal facility is built on the U.S. side of the border, El Paso is the more practical connection, as two competing U.S. Class I railroads exist there (UP and BNSF), avoiding the monopoly that currently exists in southern Arizona today.

Knight Transportation

A coordination meeting with Knight Transportation was held in June 2009. Knight Transportation does not transport goods via rail containers. They recognized that rail is an important component of long-haul shipping, but that it will not replace trucking, as rail requires longer distances for similar efficiencies. According to Knight, 88 percent of all freight in Arizona is hauled by truck; 12 percent by rail. Arizona is a difficult market because it is very consumer-based with a small manufacturing economy, causing most trucks/containers to leave Arizona empty.

Knight acknowledged that the importance of Nogales as a major border crossing will increase with Mexican port improvements that may add a significant amount of both rail and truck freight to the Arizona transportation network.

Maricopa Association of Governments (MAG)

Passenger rail, and specifically commuter rail, is a key component of an integrated statewide multimodal transportation framework. The Maricopa Association of Governments (MAG) has been considering commuter rail strategies for the MAG region for several years. Studies include the MAG High Capacity Transit Study (2003), and the MAG Commuter Rail Strategic Plan (2008), as well as commuter rail studies for specific corridors that are underway concurrently with the rail framework study. The focus of commuter rail activities within the state will be within the MAG region, and the rail framework study will incorporate the findings of the ongoing MAG study as the commuter rail component of the overall framework.

In order to ensure that opportunities for an integrated system are realized, monthly coordination meetings have been conducted between ADOT together with its rail study consultants and MAG and its commuter rail consultants.

These coordination meetings have included sharing of goals, objectives, preliminary recommendations, and key information from each study, as well as schedule, scope, and progress reports, so that such information may provide a context for a cohesive approach to commuter rail as a component of the statewide rail strategy. It is expected that these coordination meetings will continue throughout the course of the rail study, and that the system recommendations from the MAG study will be incorporated into the Statewide Rail Framework Study as the commuter rail component in the MAG region.

City of Phoenix

A coordination meeting with the City of Phoenix Economic Development Department occurred in February 2009. The purpose of this meeting was to give the city an overview of the Statewide Rail Framework Study and to learn more about the city's involvement with the railroad companies, particularly related to the two major classification yards located in central Phoenix and the congestion this causes to local circulation.

From the freight side, the railroads do not have a good history of being good partners with the city of Phoenix. The railroads change staff often and re-education is often needed to understand the city's concerns and any planning efforts. Most interaction with the railroads has been regarding commercial or industrial real estate development.

From the passenger side, the city would like to see cooperation with the railroads to construct intercity rail services between Phoenix and Tucson. No leadership is seen at the state level to lead transit or passenger rail efforts. The City of Phoenix is actively involved in commuter rail planning through MAG, and recognizes its potential for extension into Pinal County.

4. ONLINE SURVEY

An online survey was distributed via e-mail to gain additional public input from other stakeholders. The survey achieved a response rate of approximately 30 percent response rate, (160 responses out of 560 questionnaires distributed). These surveys were distributed to the following groups:

Private transportation-related companies

- Railroad companies
- Other freight carriers
- Manufacturing, distribution, and retail companies
- Utility companies

Economic development agencies

Local and regional governments

- Cities, towns and counties
- MPOs and COGs

State and federal agencies

Each group was asked a series of similar questions to seek out key issues and opportunities concerning rail planning in Arizona. Similar issues were voiced by all the groups surveyed. The leading issues include economic development, grade crossings, safety, and community relations. The greatest opportunity for Arizona is viewed as development of passenger rail.

5. Border State Consultations

Meetings were held to consult with the departments of transportation (DOTs), or their equivalents, in the states adjacent to Arizona. These meetings took place from November 2008 through February 2009. Their purpose did not focus specifically on rail, but rather on introducing the BQAZ Framework Planning process, and on soliciting information on multimodal transportation issues of interest to Arizona.

Border state meetings involved state DOTs from California, Nevada, Utah, New Mexico, and Sonora, Mexico; the last included the federal Secretaria de Carreteras y Transporte (SCT) and Junta de Caminos of Mexico. A synopsis of key issues regarding rail is presented below. For a full summary of border state consultations, see Appendix B.

California

The most important rail planning issue in California is the

inception of implementation of the recently approved Statewide North-South High-Speed Rail Initiative (passed by voters as Proposition 1A in November 2008). The most important new passenger rail connections to the east would be in the I-15 corridor to Las Vegas. There is currently no discussion of rail connections to Phoenix, either from Los Angeles or San Diego. Freight rail corridors of both the UP and BNSF railroads are heavily overburdened from the ports of Los Angeles and Long Beach. Both railroads are investing in adding tracks, and in triple- and quadruple-tracking in key areas. Caltrans is providing some assistance.

Nevada

The principal focus in southern Nevada is on the connection between Las Vegas and Los Angeles, from both high-capacity roadway and high-speed rail perspectives. Improved connections between Las Vegas and Phoenix should center on upgrading US 93 to freeway or even Interstate highway standards. Nevada DOT staff also have a favorable view of studying a potential high-speed rail connection to Phoenix.

Utah

The main cross-border issue relative to rail is the vision of a high-speed rail connection between Salt Lake City and Phoenix via Las Vegas, as part of a Salt Lake City to Los Angeles high-speed rail corridor project.

New Mexico

No new rail connections are currently proposed across state lines, but the New Mexico Rail Runner may provide an example of intercity/commuter passenger rail system development for Arizona; specifically, the Sun Corridor Megapolitan area.

Sonora, Mexico

Within the next three to five years, several roadway improvements are expected to be completed along the Arizona-Mexico border. Railroad considerations include:

Accommodate the freight traffic expected to result from deepening the port at Guaymas to serve post-Panamax container ships.

The existing Ferrocarril Mexicano (Ferromex) north-south rail line extending from Guaymas to Nogales will not be adequate, and new facilities will be needed to make the port successful.

New rail connections may also be needed to service the proposed new 'mega' deepwater container port at Punta Colonet in Baja California, near the northwest corner of Sonora.

The city of Nogales, Sonora is concerned that the existing rail line bisects the center of town, causing congestion and an unsafe environment. It wants to see the line relocated away from the center. This poses problems related to terrain and coordination with investments on the Nogales, Arizona side of the border.

Additional transportation-related issues include the construction of improvements at the port of Guaymas and the associated Free Trade Zone. If Guaymas becomes a successful operating port, the need will exist for north-south railroad improvements through that city to Nogales, connecting with the UP spur along I-19 extending north to the Sunset Corridor in Tucson.

6. Rail Plan Focus Groups

The primary purpose of the Arizona State Rail Plan Focus Groups was to solicit dialogue regarding rail priorities and evaluation criteria from stakeholders across Arizona and rail interests or agencies. The focus group process was not meant to reach a consensus among participants, but rather to encourage an interactive discussion between the 15 to 30 people with various viewpoints. Each of the facilitated dialogues lasted approximately two hours and covered the following agenda:

- Arizona State Rail Plan Overview and Introductions
- Presentation of Commuter and Freight Rail Opportunities
- Rail Opportunities Prioritization
 - Prioritization Exercise
 - Facilitated Dialogue and Discussion

- Evaluation Criteria Discussion
- Dialogue Summary
- Arizona State Rail Plan Next Steps and Individual Prioritization Exercise



Following a brief overview and introduction to the Arizona State Rail Plan, participants were presented with 8 Commuter and 12 Freight Rail Opportunities. During the presentation participants were encouraged to comment or ask for clarification of the opportunities. With a clear understanding of each opportunity, attendees then took part in a group prioritization exercise. Each attendee was given a set of eight voting dots and asked to identify their highest priority Passenger and/or Freight Rail Opportunities. Participants placed their stickers on large sheets of paper representing the 20 opportunities around the room. Attendees had the freedom to use their eight dots however they saw fit. For example, they could identify a single Passenger or Freight Opportunity as their highest priority project or spread their priorities evenly across other projects.



The group exercise results were the basis for the facilitated dialogue and discussion amongst the group. To identify commonalities, participants were asked to state why they chose certain opportunities or projects as high, medium or low priorities. Participants were also encouraged to discuss which projects could provide the greatest opportunity to the entire state. As a last step, the evaluation criteria for project prioritization were presented to the group and participants were asked to respond to the following questions:

- How did you decide on your project priorities?
- What went into your decision-making?
- What other evaluation criteria should be considered with determining investment priorities?

To supplement the dialogue surrounding Passenger and Freight Rail priorities and evaluation criteria, attendees were asked to complete an individual prioritization exercise. The individual prioritization exercise instructed participants to rank Passenger and Freight Rail Opportunities separately from one another indicating an order of importance for each over the next 20 years. The purpose of the individual exercise was to see if there were commonalities between the group exercise and individual preferences. The results of the group and individual exercises are summarized in the Statewide Priorities section of this report.

Focus Group Results and Statewide Priorities

The focus group dialogue and totaled results from the group prioritization exercise highlighted a number of common themes and divergent priorities regarding Statewide Passenger and Freight Rail opportunities. The individual prioritization exercise closely mirrored the results from the group exercise indicating that as an aggregate, participants voted consistently in each exercise. This section summarizes the results from the group prioritization and individual exercises. Opportunities for passenger and freight rail are presented separately; the first section summarizes the top rail priorities, while the second section groups middle and bottom priority opportunities. Each description focuses attention on the

factors that stakeholders cited in their decision making process. Related projects or opportunities that were discussed simultaneously are grouped together. The common themes and divergent priorities which emerged from focus groups align closely with Arizona State Rail objectives.

The Sifted Focus Group Results for each exercise are included following the summary of Evaluation Criteria. Detailed results of the group and individual exercises are included in the Appendix.

Top Ranked Passenger Rail Opportunities

1) Construct and operate a Phoenix to Tucson Intercity Rail System

The construction and operation of a Phoenix to Tucson Intercity Rail System was seen as a very high priority. Stakeholders cited the importance of connecting the growing Sun Corridor and the state's two largest metropolitan areas. They perceived it as the most feasible project to pursue over the next 20 years because of its current and future demand. Common support also stemmed from the need to alleviate traffic on Interstate 10 and the existence of preliminary corridor studies. Based on the results of these studies, stakeholders believed that such a project would provide the best chance for passenger rail success statewide by building momentum for future connectivity across Arizona. Demonstrating support for increased connectivity at all levels, participants also encouraged the construction and expansion of commuter rail in Phoenix and Tucson.

2) Construct commuter rail systems in Phoenix and Tucson

The construction and expansion of commuter rail systems in Phoenix and Tucson were seen as one of the highest priorities based on the common belief that Arizona needs to promote responsible and sustainable use of land in its fastest growing areas. Commuter rail within each city would increase the availability of affordable housing by decreasing auto dependence. In addition, commuter rail would help support an intercity rail system between the two cities. Overall, stakeholders viewed the construction of commuter rail systems in Phoenix and Tucson as an

opportunity to benefit residents within each city and provide connectivity to visitors who arrive through any mode of transportation.

3) Complete feasibility and route studies to establish a Southwestern High Speed Rail Network

Support for the completion of feasibility and route studies to establish a Southwestern high speed rail network was also seen as a high priority by rail stakeholders. Support stemmed from the recognition of air and vehicle traffic between Phoenix, Los Angeles and Las Vegas. The development of high speed rail in Arizona was also seen as a possible opportunity to create a major transportation hub in the Intermountain West that could better facilitate the exchange of people and goods between megapolitan areas. Stakeholders acknowledged that the project would require a high level of coordination across the Southwestern U.S., but would give advantages and opportunities to the entire State of Arizona.

Other Passenger Rail Opportunities Presented and Discussed

4) Partner with Amtrak to improve existing service for the Sunset Limited route (UPRR) and Partner with Amtrak to provide service to the Phoenix metropolitan area

Support for a partnership with Amtrak to improve the service along the Sunset Limited route was seen as a possible way to build a ridership foundation to support high speed rail in the future. Improvement to the service was also seen as a means to supplement intercity rail in Arizona. Similarly, bringing Amtrak service to the Phoenix metropolitan area was seen as a benefit because the partnership would provide a service that the city currently does not have. It would also provide an opportunity to take advantage of an existing rail corridor and would reduce environmental impacts. While there was some support for Amtrak partnerships along existing routes, the exploration of other route corridors was strongly supported. Stakeholders pointed out that there is a large support for action and thus the construction and operation of a Phoenix to Tucson intercity rail system was prioritized higher than partnerships with Amtrak.

5) Partner with Amtrak to improve existing service for the Southwest Chief route (BNSF)

The improvement of the Southwest Chief line was not recognized as a 20 year priority because it was seen as a pass through route. Stakeholders saw some tourism value in the route, but there was an overall belief that improvements would bring very little economic value to Arizona.

6) Construct and Operate a Tucson to Nogales intercity rail system

A Tucson to Nogales intercity rail system was among the lowest priorities statewide over the next 20 years, but was seen positively by stakeholders in southeastern Arizona because of their close proximity and perceived benefit of the system. Stakeholders based their decision on the large amount visitors who travel from Sonora, Mexico to Arizona. Visitors from Mexico have a positive economic impact on the state. While stakeholders in southeastern Arizona did not advocate that such a project would be an immediate priority, it could be phased after a Tucson to Phoenix intercity connection.

7) Construct and operate a Phoenix to Flagstaff intercity rail system

Similar to the Phoenix to Nogales intercity rail system project, the construction and operation of a Phoenix to Flagstaff intercity rail system received little outside support. However, there were some divergent views as to why the project should or should not be pursued over the next 20 years. Stakeholders stated that the project can benefit Flagstaff by bringing more tourists to the area and it would become more feasible as traffic along Interstate 17 increases. Additionally, participants in Flagstaff saw a link between this project and the improvement of the Peavine route for freight movements. They stated that it could be an opportunity to improve on and achieve both projects. On the other hand, those who did not support intercity rail between Phoenix and Flagstaff brought attention to the long travel time and constraints of such a route. They were skeptical as to whether or not it would be feasible to pursue intercity rail and freight improvements along the Peavine route.

Top Ranked Freight Rail Opportunities

8) Partner with Class I railroads to implement operational improvements along transcontinental corridors

The partnership with Class I railroads to implement operational improvements along transcontinental corridors was a high priority for stakeholders due to a need to increase operational movements and the efficiency of freight movement. This partnership was seen as a method that would reinforce economic development, which was a common theme among each of the high priority freight rail projects.

9) Partner with railroads to locate and develop intermodal and logistic centers along key railroad corridors

This project was seen as a high priority in each focus group for its potential to increase jobs through economic development expansion. Stakeholders stated that the development of intermodal and logistic centers would better link Arizona to the Intermountain West and promote local and regional economic development. The opportunity could also create a strong international connection with Mexico. Additionally, the opportunity was recognized for its potential to remove trucks and freight from Arizona.

10) Create a program to replace existing at-grade rail crossings with grade-separated crossings

Public safety and efficiency were the main reasons stakeholders ranked the replacement of at-grade rail crossings as a high priority over the next 20 years. They also attributed this high ranking based on Arizona's growing population and the need to accommodate rail in the state. In order for any type of rail to succeed in the state, especially high speed rail, current rail crossings need to be safe.

11) Collaborate with Arizona Game and Fish to implement wildlife mitigation measures along existing rail corridors and create a rail corridor preservation program to preserve abandoned rail lines for future uses

The need to implement wildlife mitigation measures and utilize existing rail corridors was a high priority for environmental and economic reasons. Stakeholders acknowledged that many tourists and residents come to Arizona to enjoy the natural beauty and wildlife. The preservation of wildlife corridors and use of existing rail corridors for future rail uses could benefit wildlife and the Arizona economy. Stakeholders advocated that new environmental studies should be pursued to help build momentum and show dedication to rail in Arizona. The use of existing infrastructure was a common theme across other freight opportunities.

Other Freight Rail Opportunities Presented and Discussed

12) Develop a Short Line Assistance Program for strategic rail investments in the Class III railroads

The development of a short line assistance program for Class III railroads was ranked as a middle priority for its economic value to small communities. Such a program could improve operational proficiency, reuse existing rail lines, and create much needed jobs for rural communities. According to stakeholders, different financing mechanisms for this opportunity would need to be explored.

13) Partner with BNSF to implement operational improvements along the Phoenix Subdivision (Peavine)

Low support for improvements to the Peavine route coincided with stakeholder opinions regarding intercity rail between Phoenix and Flagstaff. Flagstaff supporters stated that if improvements were made to increase efficiency, the line would be much more competitive and could push forward the development of the Camp Navajo intermodal yard that is currently being discussed. However, similar to the discussion of intercity rail, stakeholders in other parts of the state questioned how much more efficient the Peavine could become and if significant investments should be made over the next 20 years. As a whole, stakeholders across the state recognized that the varying terrain on the Peavine route would be difficult to overcome.

14) Establish a Tucson freight bypass route and establish a Nogales freight bypass route

The establishment of bypass routes in Tucson and Nogales were low priorities from a state perspective, but were ranked high among southeastern Arizona stakeholders. A freight bypass in Tucson could reduce traffic congestion, but would be difficult to coordinate given the amount of corridor preservation required in Pima County. Stakeholders agreed that a Tucson bypass should be explored further. The establishment of a Nogales freight bypass route was also a high priority for stakeholders in the Tucson area. Public safety and economic benefit were the primary reasons stakeholders supported a Nogales bypass route. The current line that runs through Nogales was also seen as an impediment to downtown development. In addition, stakeholders believed that Arizona could benefit by increasing the speed at which freight travels north from the Port of Guaymas.

15) Establish a Yuma freight bypass route

During the southwestern Arizona focus group, participants added a Yuma freight bypass route for consideration. Based on current rail activity in southwestern Arizona, Yuma area stakeholders strongly supported the new bypass. According to the stakeholders, the region is currently pursuing a freight rail bypass and stakeholders see it as an opportunity to connect the Arizona and California economies. Overall, stakeholders felt that this project would have a positive impact on trade in Yuma.

Common Themes

In all, six common themes emerged from the Arizona State Rail Plan Focus Groups. The themes were common across both passenger and freight rail and align closely with ADOTs State Rail Plan objectives. Common themes included:

- Support economic development
- Improve connectivity
- Promote sustainability
- Maintain and improve public safety
- Minimize environmental concerns
- Ensure coordination and implementation/action

a. Economic Development

A successful economic development plan can enhance a growing economy and help reinvigorate a declining economy. The need for quality jobs and economic growth was one of the most frequently discussed themes across the five focus group meetings. During these discussions stakeholders strongly supported freight rail projects that would improve Class I railroads and develop intermodal and logistical centers. Economic development in small communities was also advocated through support for the development of a Class III railroad assistance program. Economic development was also witnessed through widespread stakeholder support for passenger rail projects that established connectivity between metropolitan and megapolitan areas.

b. Connectivity

Connectivity was a common theme in each focus group meeting. Passenger and freight rail activities depend on connectivity to achieve efficiency and economic success. The connection of the Phoenix and Tucson metropolitan areas through an intercity rail system was a top priority because of its potential to join two large populations in the growing Sun Corridor. Commuter rail connectivity was also an important factor within Phoenix and Tucson. Commuter rail can reduce daily vehicle traffic, encourage infill development, and make housing more affordable by reducing transportation costs. On a much larger scale, connectivity between the Sun Corridor and other megapolitans can link people and economies across long distances. Stakeholders strongly supported the pursuit of a high speed rail network in the Southwestern U.S.

c. Sustainability

Sustainability can be achieved through the utilization of many different planning methods. Passenger and freight rail projects offer opportunities to achieve sustainability by encouraging the use of existing infrastructure. The use of existing infrastructure and corridors for new rail projects can reduce costs, preserve wildlife habitat, and encourage more responsible uses of land. This theme was frequently cited during dialogue surrounding commuter rail development and expansion in Phoenix and Tucson.

d. Public Safety

Public safety must be addressed as rail activity increases across the state. With the safety of rail and vehicle passengers, pedestrians, and other susceptible groups, stakeholders across Arizona believed that a program should be implemented to replace at-grade rail crossings with grade-separated crossings. Grade-separated crossings are safer for all modes of transportation and increase efficiency for trains and cars by allowing them to maintain higher speeds. The need for increased rail efficiency was identified several times during discussions of evaluation criteria.

e. Environmental Concerns

Arizona Game and Fish Department had a strong presence at all stakeholder focus groups and encouraged collaboration between rail planning and wildlife mitigation efforts. Other stakeholders recognized the preservation of wildlife habitat from an economic perspective and stressed Arizona's natural beauty as a tourist attraction. In addition, the fragmentation of wildlife was seen as a threat by all stakeholders.

f. Coordination and Implementation/Action

If a rail project is not coordinated closely among all necessary stakeholders it stands little chance of successful implementation. While stakeholders gravitated toward passenger and freight rail priorities that call for implementation, they also acknowledged the need to identify alternative funding sources and partnerships. There was strong support from stakeholders to build upon the current corridor studies, especially with regard to a Phoenix to Tucson intercity rail system. With respect to top freight rail projects, the importance of partnerships for projects that involved economic development, public safety, environmental concerns, and sustainability efforts. These common themes were echoed in the discussion of evaluation criteria.

Divergent Priorities

Two divergent priorities were common across each of the Focus Group meetings. The discussions regarding bypass routes and operational improvements along the Phoenix

Subdivision (Peavine) received mixed support because of perceived impact or benefit and feasibility. These divergent priorities are summarized below:

a. Bypasses

Bypasses across the state were reported as a low priority for stakeholders when viewed from a macro level. Stakeholders stated that these projects were low priorities because they saw little impact on their area. In addition, stakeholders across the state were not aware of all issues facing other regions. Freight rail bypasses in Tucson, Nogales and Yuma were viewed as top priorities for reasons such as efficiency, public safety, economic development, and connectivity.

b. Operation Improvements along the Phoenix Subdivision (Peavine)

As a 20 year priority, operational improvements along the Peavine route from Phoenix to Flagstaff were subject to different opinions across the state. Flagstaff acknowledged that improvements could potentially compete with traffic along Interstate 17, but outside stakeholders questioned the level of efficiency that could be achieved.

Evaluation Criteria

The development of quality evaluation criteria is one of the most crucial aspects that must be addressed in any planning effort. Following each focus group exercise, stakeholders were asked to identify how they prioritized projects and what factors went into their decisions. During this dialogue, stakeholders were introduced to the following potential evaluation criteria and were asked to comment or add to the list:

- Improve mobility and accessibility
- Support economic growth
- Promote a development pattern that links land use and transportation
- Consider Arizona's environment and natural resources
- Ensure safety and security

Based on the list above, stakeholders repeatedly identified the following evaluation criteria as very important:

- Available Funding
- Feasibility and Perceived Timeframe
- Responsible Land Use
- Efficiency

A. Available Funding

Available funding and the need for sources such as public-private partnerships were a topic of discussion during each focus group meeting. There was a clear consensus that the level of investment for any rail project would be immense and therefore priorities should be placed based on the likelihood that such a project could be funded. Important aspects such as perceived ridership demand and private investment were frequently cited as justification for passenger and freight rail priorities.

B. Feasibility

Perceived feasibility was also essential in decision making. Perceptions of the feasibility of a rail project were based on the financial undertaking and anticipated project timeframe. These aspects were likely the key reasons why a majority of stakeholders across the state ranked improvements to the Peavine route as a low priority over the next 20 years.

C. Responsible Land Use

Advocacy for responsible land use was frequently discussed as part of the rail project evaluation criteria. Stakeholders commonly stated that opportunities or projects should be evaluated based on whether or not an attempt was made to utilize an existing corridor versus a new corridor. Additionally, the connection between transportation and housing through infill development and redevelopment was also seen as a good gauge for a quality project.

D. Efficiency

From a statewide view, the overall efficiency that would result from a project was also a common interest of

stakeholders. For example, stakeholders wanted to know how many freight trucks and passenger vehicles could be taken off the road with rail expansion across the state. With regard to potential freight bypasses, stakeholders felt it would be useful to know how much freight and vehicle travel time could be improved. Therefore, the level of improved efficiency across freight or passenger rail opportunities should be part of the evaluation criteria in the final determination to pursue or forgo a project.

Rail Technical Advisory Team (RTAT) Meeting

Meeting Summary Notes

May 5, 2010, 2:00 p.m.

Phoenix Construction District Office

Attendees:

Kevin Wallace, MAG
Jack Tomasik, CAAG
Gordon Taylor, ASLD
Jay Smyth, SW Rail Corridor Coalition
Robert Bohannon, R.H. Bohannon & Assoc.
Carol Ketcherside, Valley Metro RPTA

Reuben Teran, AZ Game & Fish Dept.

Robert Travis, ADOT

David Jacobs, AZ SHPO

Gabe Thum, PAG/RTA

Jermaine Hannon, FHWA

Marc Pearsall, MAG

Via Telephone:

Zoe Richmond, Union Pacific
Cathy Norris, BNSF
Jim Chessum, Greater Yuma Port Authority

Paul Johnson, YMPO

Chris Watson, AZ Corporation Commission

Angela Mogel, BLM

Nakai Katosha, Governor's Office Tribal Liaison

Staff/Consultants:

Shannon Scutari, ADOT
Kristen Keener Busby, ADOT
Sara Allred, ADOT

John McNamara, AECOM

Michael Kies, AECOM

Vijayant Rajvanshi, AECOM

Peggy Fiandaca, PSA, Inc.

The primary purpose of the meeting was to provide the participants with an update of the work completed to date, including the Statewide Rail Framework Study (40-year rail vision for the state) and the ongoing State Rail Plan. The presentation included a review of the draft State Rail Plan recommendations and was followed by questions and discussion of the draft recommendations.

Members of the RTAT questioned whether the recommended projects were listed in an order of priority and generally agreed with the recommendations but thought that some of the priorities/steps may need to occur simultaneously. It was suggested that the State Rail Plan should include a discussion on sustainability and livability. It is critical to document, how transportation projects enhance livability and sustainability, environmental and economic benefits. It may be important to calculate the benefit particularly if

Arizona is going to pursue federal funds for projects. It was suggested that outreach to freight shippers is very important when determining economic benefit of the rail plan.

Inter-agency coordination is important for the successful implementation of the State Rail Plan. It was suggested that the role of the partner agencies such as the ASLD, BLM, and the Arizona Game and Fish Department be recognized. The ASLD will be impacted by many of the recommendations as they traverse state land holdings. It was suggested that ADOT hold discussions with ASLD right-of-way group during the Phoenix-Tucson Intercity Rail Alternatives Analysis (AA Planning Study). The BLM is concerned by the potential impacts of increased rail service and new corridors on the environment. BLM has its own planning process with which rail development efforts should be coordinated during the planning

process.

The Arizona Game and Fish Department appreciated the emphasis on wildlife habitats and crossings in the State Rail Plan and suggested that the Statewide Habitat Assessment/Reference Guide should be used for finalizing the plan. It was suggested that the plan should focus on addressing rail safety issues since joint freight and passenger rail opportunities exist in the state.

The importance of restoring operations along the Wellton Branch in establishing a future Intercity rail connection with California was highlighted. The Wellton Branch would provide the passenger base and could allow container freight from Mexico to access the two Class I rail corridors in Arizona if a Hassayampa rail corridor were established.

It is also important to develop the state rail system as part of a multimodal system with interconnectivity between different transit modes. This could support a compact land development pattern which could enable future growth to become more sustainable.

A brief overview of the next steps was provided to the participants before the meeting was adjourned.

APPENDIX C. RELATED RAIL PLANNING STUDIES IN ARIZONA

Table C.1 - Related Rail Planning Studies in Arizona

Name	Date	Relation to State Rail Plan	Purpose or Scope	Findings or Recommendations
Arizona Railroad Inventory and Assessment (ADOT)	2007	Reference for Inventory of Existing Conditions	Detailed inventory of all Arizona railroads; description of planning and proposed projects	Not applicable
ADOT High Speed Rail Strategic Plan	2007	Source of information on potential intercity rail routes and service	Explore feasibility of Phoenix-Tucson passenger rail	Service is feasible; phased implementation recommended; portions of existing UP may be used
MAG Commuter Rail Strategic Plan	2008	Lays foundation for detailed MAG commuter rail planning studies	Assess regional support in Maricopa Co. and northern Pinal Co.; develop implementation scenarios	MAG should precede with more detailed work on existing freight corridors
MAG Commuter Rail System Study	2010	Plans for commuter rail that may share tracks with other passenger and freight rail	Explore and prioritize options in five corridors	To be released in spring 2010
MAG Commuter Rail Grand Avenue (BNSF)	2010		Determine feasibility of service from Wickenburg to Phoenix	
MAG Commuter Rail Yuma West (UP)	2010		Determine feasibility of service from Buckeye area to Phoenix	
PAG High Capacity Transit System Study	2009	Plans for commuter rail that may share tracks with other passenger and freight rail	Establish appropriate corridors, modes and timeframes for action	Commuter rail recommended for long- term implementation in existing UP corridors
Arizona Multimodal Freight Analysis Study (ADOT)	2009	Source of current data on rail flows and commodities shipped	Assess freight issues and emerging trends; identifies needs and deficiencies	“Strategic responses” to establish freight as an integral part of the long-range planning process

Source: ADOT Statewide Rail Framework Study, 2010

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APPENDIX D. SUMMARY OF OPERATING RAILROADS IN ARIZONA

Table D.1 - Summary of Operating Railroads in Arizona

Railroad	Ownership	Trackage Miles	Speed Limits
<i>Class I Railroads</i>			
BNSF	Berkshire Hathaway Inc.	690 (main line and branch lines)	70 mph (90 mph Amtrak)
Union Pacific Railroad	Union Pacific Corporation	775 (main line and branch lines)	70 mph (79 mph Amtrak)
<i>Short Line Railroads</i>			
Apache Railway	Abitibi Bowater	45 (main line and branch line)	35 mph
Arizona & California Railroad	RailAmerica	190 (106 miles in Arizona)	49 mph
Arizona Central Railroad	The Western Group	38.7 main line (+2 miles of yard track)	10 mph
Arizona Eastern Railway	Permian Basin Railways	135 main line (+5 miles of smelter trackage)	20 mph
Black Mesa & Lake Powell Railroad	Navajo Nation/Hopi Tribe	78	40 mph
Camp Navajo Railroad	Arizona National Guard	38	10 mph
Copper Basin Railway	ASARCO LLC		
(American Smelting And Refining Company)	54.6 main line (+6 miles branches)	25 mph	
Freeport McMoRan Morenci Mine	Freeport McMoRan	15	Yard Limits
San Pedro & Southwestern	Arizona Rail Group	7.5 (main line)	20 mph
APS Cholla Power Plant	Arizona Public Service	7 (loop, yard and spur trackage)	Yard Limits
Grand Canyon Railway	Xanterra Parks & Resorts	64 main line (+1 mile of yard trackage)	40 mph