I-11 NORTHERN NEVADA
ALTERNATIVES ANALYSIS

Draft:

Alternatives Analysis Methodology Report

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Prepared for

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Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
ADOT	Arizona Department of Transportation
AV/CV	automated and connected vehicles
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CNG	compressed natural gas
COG	council of government
EPA	Environmental Protection Agency
EV	electric vehicle
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
GIS	Geographic Information Systems
GOED	Governor's Office on Economic Development
I	Interstate
IWCS	I-11 & Intermountain West Corridor Study
ITS	intelligent transportation systems
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPO	metropolitan planning organization
NDER	Nevada Department of Environmental Resources
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Department of Water Resources
NEPA	National Environmental Policy Act
NVTDM	Nevada Statewide Travel Demand Model
OBU	on-board unit
PEL	Planning and Environmental Linkages
PRPA	Paleontological Resources Preservation Act
SHPO	State Historic Preservation Office
SR	State Route
STIP	Statewide Transportation Improvement Program
US	United States
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geologic Survey
VMT	vehicle miles traveled

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1. Introduction

The Nevada Department of Transportation (NDOT) is developing the *One Nevada Transportation Plan*, an update to the State's federally required Long Range Transportation Plan (LRTP). The LRTP will be a performance-based transportation plan that identifies needs and strategically supports decision-making for future investments that will improve Nevada's multimodal transportation system. A key project to be advanced within the 20-year *One Nevada Transportation Plan* horizon is Interstate 11 (I-11), a proposed high-capacity north-south transportation corridor envisioned to link Mexico and Canada through Arizona and Nevada.

The I-11 Northern Nevada Alternatives Analysis effort will evaluate specific corridor alternatives linking Las Vegas and I-80, and document issues, opportunities, and constraints in a Planning and Environmental Linkages (PEL) document to lay the groundwork for future National Environmental Policy Act (NEPA) studies.

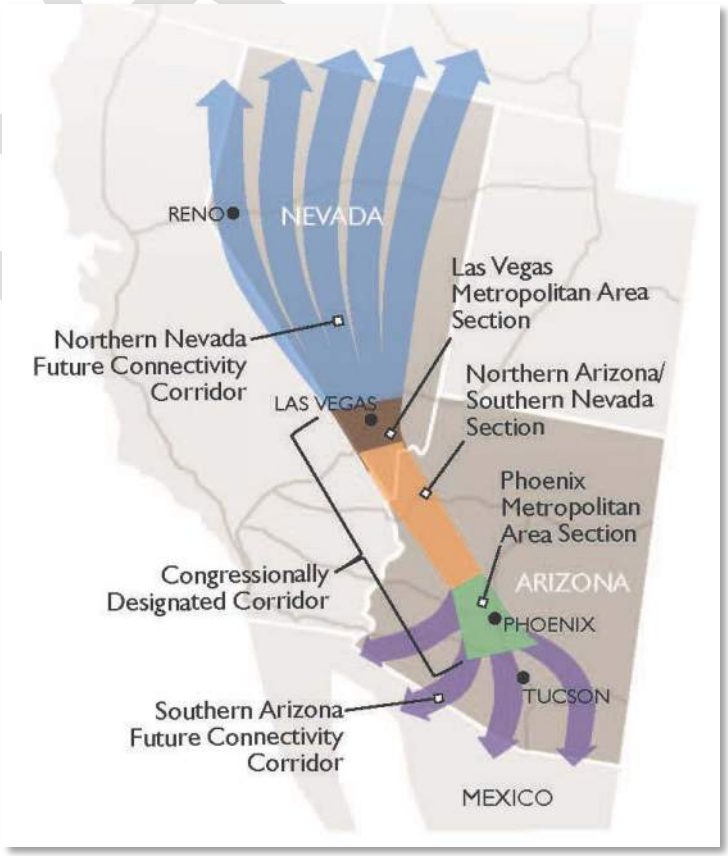
1.1 Background

In 2014, a joint study by NDOT and the Arizona Department of Transportation (ADOT) was conducted (*I-11 and Intermountain West Corridor Study* [IWCS]) that identified the I-11 Corridor as a critical piece of multimodal infrastructure that would diversify, support, and connect the economies of Arizona and Nevada. Because of its length and varying characteristics, the IWCS study area was divided into five segments (Figure 1). The area between Phoenix and Las Vegas was formally designated as I-11 in the Moving Ahead for Progress in the 21st Century Act (MAP-21).

The IWCS identified two sets of recommendations:

1. Narrowed range of feasible corridor alternatives in the Congressionally designated corridor, between Phoenix and Las Vegas that can be advanced in future environmental reviews, as required by NEPA.
2. Higher level review of connectivity options in Southern Arizona and Northern Nevada. Instead of focusing on specific corridor alternatives, this assessment identified the logical locations for I-11 to connect to the Arizona-Sonora border, as well as from Las Vegas to the northern Nevada border. Future studies were anticipated to follow a more detailed alternatives analysis process, similar as deployed between Phoenix and Las Vegas, within the selected connection route in Southern Arizona and Northern Nevada.

Figure 1: I-11 & IWCS Study Area Segments



At the conclusion of the *IWCS*, the analysis for the Northern Nevada Future Connectivity Corridor (Las Vegas to northern Nevada state border) recommended pursuing a western alignment, connecting to I-80, as opposed to more central or eastern options. The analysis and rationale is documented in a technical report: *Northern Nevada Feasibility Assessment Report.* Summary level findings that support a western connection as the most favorable option for meeting the overall I-11 Corridor Purpose and Need include:

- Connects major freight and economic activity centers within Nevada; improves connectivity and creates more efficient and higher capacity transportation connection between the two largest economic centers in Nevada.
- Potential to accommodate multiple modes in a shared corridor
- Generally follows Congressional high priority corridor
- Supports many industry cluster targets (defense, mining, gaming, transportation logistics, renewable energy, agriculture, etc.).

Since the *IWCS* was completed, there has been no major effort to further refine the alignment for I-11 in northern Nevada***. In 2015, the US Congress passed Fixing America's Surface Transportation Act (FAST Act), which officially extended the designation of I-11 north of Las Vegas to I-80, naming the US 95 corridor as the general routing.*** This Congressional designation validated a western connection within the state, and reinforced the concept of the I-11 Corridor that emerged in the *IWCS*.

In addition, the need for such a corridor was further corroborated in the *Nevada State Freight Plan*. Given the project's magnitude, importance to the state, and impact it will have on Nevada's transportation program in the future, additional detail is needed to make reasonable assumptions of future planning and construction phases for the northern Nevada portion of I-11.

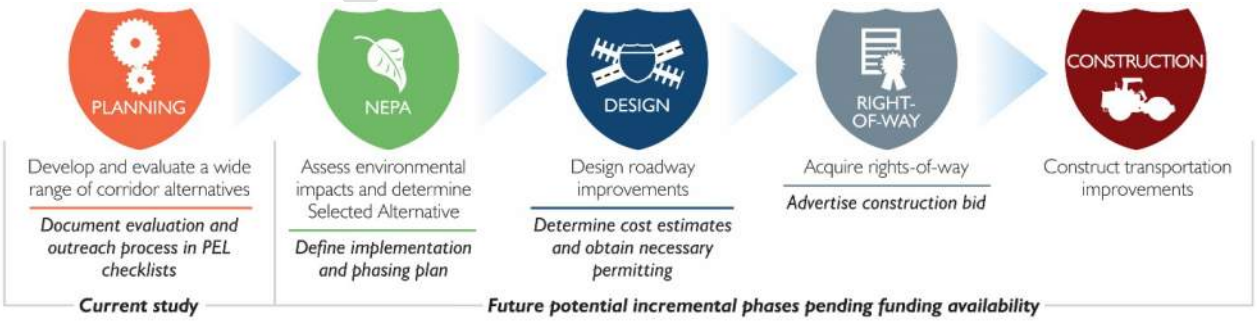
Thus, this Alternatives Analysis/PEL effort relies upon the Congressionally-designated corridor to define a starting point for alternatives definition.

1.2 PEL Process

The alternatives evaluation method that will be deployed in this effort follows the overarching PEL process, which is an integrated approach to transportation decision-making that considers environmental, community, and economic goals (Chapter 2 includes more detail on the evaluation methodology).

Figure 2 illustrates a typical project development process, from planning through construction. This alternatives analysis effort and PEL documentation are at the beginning of a project's lifecycle – setting the foundation for future evaluation, design, and implementation.

Figure 2: Project Development Process



PEL promotes greater communication within and among transportation and resource agencies, leading to improved decision-making and project development. The PEL process helps streamline the environmental review process, allowing this analysis to provide the foundation for future NEPA studies. For example, this Northern Nevada PEL builds upon the recommendations and analysis documented in the *IWCS*. Instead of developing and reviewing alternatives across the entire state of Nevada (which has already been done), this study effort can focus on the recommended connection between Las Vegas and I-80 in western Nevada, identifying more detailed corridor alternatives between the two termini. While final alignments, connections, and modes will be determined in NEPA, having a basis for reasonable assumptions will ensure a more focused and defensible project moving forward.

Outcome: To document this study process, an Alternatives Analysis Report will be prepared in addition to a public friendly handout. The required PEL checklists (Parts 1,2, and 3) will be prepared.

1.3 Report Purpose

This *Alternatives Analysis Methodology Report* outlines the overall approach and methods for developing and screening corridor alternatives for the segment of I-11 between Las Vegas and I-80, building upon the broad recommended connection route identified in the *IWCS*, as well as the formal congressional designation in the FAST Act.

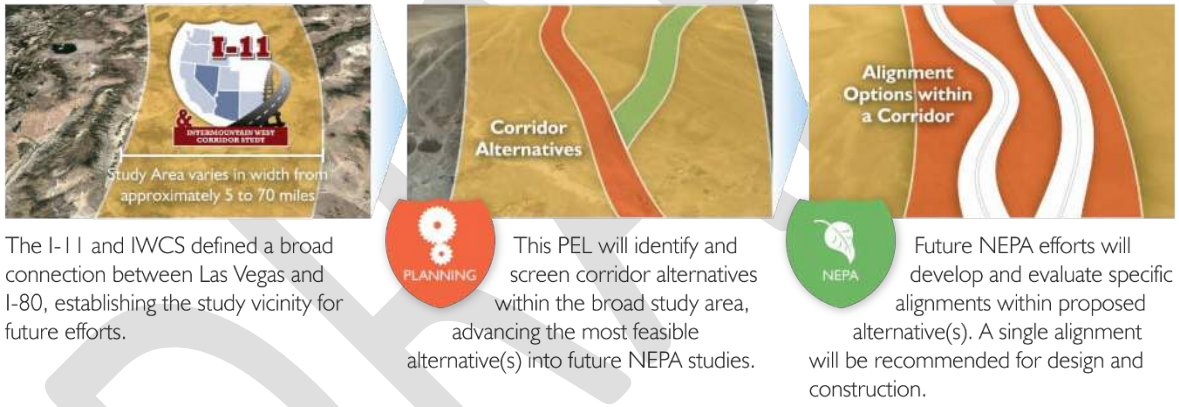
2. Evaluation Process

The purpose of this *Alternatives Analysis Methodology Report* is to establish a clear process and framework to define and screen potential corridor alternatives between Las Vegas and I-80. A range of specific corridor alternatives will be developed based on previous studies, stakeholder input, technical data, screening criteria, and rating and scoring processes. Each of these elements are described in further detail in the following sub-sections.

2.1 Baseline Assumptions

For purposes of this study, an alternative is defined as a planning-level corridor between Las Vegas and I-80. A corridor represents wide swaths, not specific alignments. Part or all of a corridor may contain an existing transportation facility, as well as other infrastructure, such as utilities. A reference to a "corridor alternative" corresponds to the various broad transportation routes under consideration. Within each corridor alternative, future NEPA studies will examine the specific location (or alignment) of the transportation footprint (Figure 3).

Figure 3: PEL Corridor Alternatives Level of Detail



The I-11 Corridor is assumed to include two access-controlled travel lanes in each direction, with a wide open median. The actual footprint and/or configuration may be individualized for portions of the Study Area to respond to the reuse of existing highways, narrow right-of-way availability, or other factors. Those design elements will be considered further in future studies. The limited access nature of the corridor is critical to maintaining a higher-speed route that serves long distance trips. Local access will still be provided through traffic interchanges. Locations of such interchanges will be determined in future studies once a specific alignment is selected and approved.

For comparison against a No Build – or do nothing assumption (primarily to compare transportation performance and capacity measures), potential impacts will be assessed or compared to the existing US 95 corridor, which varies from a two-lane highway with no passing lanes to a four-lane divided highway.

2.2 Previous Studies

Numerous technical documents were produced throughout the *IWCS*—establishing the corridor vision, developing justification, and defining an implementation program to move the project forward. This PEL effort will advance the methodology and findings of the prior *IWCS* effort, drawing from the significant

work that has already been completed to date. This includes building upon the high-level analysis conducted as part of the *Northern Nevada Future Connectivity Corridor Feasibility Report* (included as Appendix A) and include a more detailed analysis that uses the same approach completed for the MAP-21 Congressionally Designated segment (between Phoenix and Las Vegas), setting a consistent foundation for I-11 corridor planning in the Intermountain West that utilizes screening criteria that support the overall Corridor's Purpose and Need. Proposed detailed screening criteria are discussed in further detail in Section 2.4.

In addition, other statewide, regional, and corridor studies conducted within the Study Area will be referenced for findings, recommendations, and community support. Such resources include, but are not limited to: *Nevada State Freight Plan*, regional/county transportation and comprehensive plans, *I-80 Corridor Study*, *US 395 Washoe County Study*, and others. The *Southern Nevada Traffic Study* is currently reviewing the sensitivity of routing I-11 through or around the Las Vegas metropolitan area, considering co-location with existing freeway facilities, developing a new corridor, or a combination of both. The northern terminus of the *Southern Nevada Traffic Study* (US 95/CC-215) will connect to and match the southern terminus of this current I-11 Northern Nevada Alternatives Analysis study effort.

2.2.1 I-11 Corridor Purpose and Need

As identified in the *IWCS*, the goal of I-11 is to establish a high-capacity, limited-access, transportation corridor connecting Mexican ports and manufacturing areas with Canada, traversing Arizona's and Nevada's largest regional, national and international manufacturing and economic activity centers, in support of regional, national, and international trade. Western states compete individually and collectively in national and global markets with Canada, Mexico, the I-5 Corridor, and the Gulf of Mexico states. For Arizona and Nevada, the purpose of I-11 is to assist in diversifying the states' economies to target industry clusters that rely heavily on interconnected and efficient transportation systems to transport goods and facilitate business attraction/retention. This was reinforced in the 2015 FAST Act.

The I-11 Corridor has the potential to become one of the first north-south, high-capacity routes through the Intermountain West that could greatly improve commerce, tourism, and international trade opportunities across the West. This Northern Nevada segment of I-11 would connect Las Vegas and I-80 on the western side of the state, providing an efficient north-south interstate connection in the vicinity of Nevada's two largest economic centers.

The need for I-11 is based on a combination of factors that include legislation, system linkage, domestic and international trade, modal interrelationships, capacity, economics, and public policy. The transportation network in the Intermountain West was developed decades ago to serve the economic, population, and mobility needs at that time—east-west movement of people and goods between Southern California and the rest of the country. As manufacturing and other value-added services shifts back to North America from East Asia, the need is now shifting to north-south demand, and the only existing north-south interstates in this region are I-5 and I-15. Both corridors, especially in California, are heavily congested today. Investment in regional transportation infrastructure has not kept pace with population growth and changing economic trends.

Future projections indicate that the proposed I-11 Corridor will continue to see significant growth, prompting the need for better surface transportation connections to accommodate not only the travel demand between metropolitan areas, but also improved mobility for freight shipments throughout the Intermountain West. This Corridor could provide needed connectivity, offer alternative routes for freight and passenger traffic, and improve reliability for better trade and commerce opportunities. The Corridor would allow the U.S. West to realize economic benefits from more efficient freight movements, redundancy in north-south movements, and less congestion overall. Developing a north-south

multimodal corridor through Nevada provides the foundation for a renewed, stronger, diversified economy in the Intermountain West.

2.3 Stakeholder Input

A key element of the PEL process is active consultation and collaboration with stakeholders. Continuing the framework of the *IWCS*, a Stakeholder Partners Group will be convened as a venue to provide data, discuss issues, and share input. The following stakeholders have been identified for participation in the Stakeholder Partners Group:

- Bureau of Indian Affairs (BIA)
- Bureau of Land Management (BLM)
- MPOs
- County staff and/or rural planning commissions (as applicable)
- Department of Defense
- FHWA
- Governor's Office on Economic Development (GOED)
- Inter-Tribal Council
- Nevada Department of Environmental Protection (NDEP)
- Nevada Department of Wildlife (NDOW)
- Nevada State Office of Energy
- U.S. Department of Energy, Western Area Power Administration
- U.S. Environmental Protection Agency, Region 9 (EPA)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Forest Service (USFS)

This list represents an initial account of participants for the Stakeholder Partners Group. Other members may be added as the project progresses.

2.4 Screening Criteria and Data Sources

Table 1 lists the evaluation categories and screening criteria that will be used to compare the corridor alternatives. These categories support the overall I-11 Corridor's purpose and need and are consistent with I-11 Corridor planning throughout Arizona and Nevada. The purpose of the evaluation is to narrow down the reasonable and feasible range of corridor alternatives for further planning and environmental review (to be completed in future work efforts) as part of the continued I-11 project development process.

The following sub-sections describe the screening process and explain how each criterion will be applied to each corridor alternative. Potential data sources and types are listed for each criterion as well.

Table 1: Screening Criteria

Evaluation Category	Criteria		Approach	Data Source
Modal Interrelationships	1A	How well does this corridor provide sufficient opportunity for a multi-use corridor?	1. Identify if multiple modes/uses can be accommodated within the current corridor 2. Identify implications of each multimodal corridor option	GIS mapping/ Google Earth based on general design guidelines and right-of-way
Capacity/Travel Times and Speeds	2A	What are the estimated travel time savings over No-Build (2040)?	Quantitative analysis: based on travel times for each corridor using statewide model compared to No-Build	Nevada Statewide Travel Demand Model (2040)
	2B	What are the total long-distance vehicles miles traveled (VMT)?	Quantitative analysis: based on corridor VMT using statewide model for long distance trips (>50 miles)	
	2C	What is the average travel speed on the corridor?	Quantitative analysis: based on estimated 2040 corridor average PM peak period peak direction travel speeds	
	2D	How well does this corridor provide for a safe trip for travelers and meet motorists expectations?	Identify sections of the corridor that require speed reductions due to substandard horizontal and/or vertical curvature.	GIS mapping/ Google Earth based on general design guidelines
			Identify sections of the corridor that do not meet motorist's expectation due to unusual highway features or hazards.	GIS mapping/ Google Earth; crash data
Economic Vitality	3A	How well does this corridor improve access and connectivity to major economic activity centers in the Study Area?	Qualitative analysis of regional/local economic development plans	Regional/local plans (internet research, stakeholder coordination)
Transportation Plans and Policies	4A	How well is this corridor consistent with funded transportation projects?	Qualitative analysis: based on how much of the corridor is documented in transportation plans	NDOT Draft 2018 Statewide Transportation Improvement Program (STIP)
	4B	How well is this corridor consistent or compatible with long-term transportation visions and plans?	Qualitative analysis: based on how much of the corridor is documented in transportation plans	Statewide/regional planning documents (internet research, stakeholder coordination)
Environmental Sustainability	5A	What is the impact to wildlife corridors and/or habitat blocks?	Quantitative analysis: based on GIS data layers and environmental data availability	GIS mapping
	5B	What is the impact to land managed for conservation or wildlife purposes?		
	5C	How many linear miles of undisturbed waterways/ floodplains are impacted?		
	5D	What is the impact on cultural and paleontological resources?		

Table 1: Screening Criteria

Evaluation Category	Criteria		Approach	Data Source
	5E	What additional environmental concerns were identified by stakeholders?	Qualitative analysis: based on data or input received from resource agencies.	GIS mapping; stakeholder coordination
Land Use and Management	6A	How consistent is this corridor with regional and local land use plans (including tribal plans, if available)?	Qualitative analysis: based on consistency with land use and resource plans	GIS mapping; stakeholder coordination
	6B	How compatible is this corridor with major land management patterns?	Qualitative analysis: based on compatibility with land ownership patterns using GIS data layers	GIS mapping
Cost	7A	What is the order of magnitude cost for this corridor, including construction, maintenance/ operations, and right-of-way?	Quantitative analysis: based on NDOT cost estimating tools plus an order of magnitude cost for right-of-way and a factor for operations and maintenance	NDOT Project Estimation Wizard
Technology	8A	How well does the corridor accommodate alternative fuel vehicles?	Qualitative analysis	Nevada Electric Highway System Plan
	8B	What is the level of power and wireless communication availability/accessibility?	Qualitative analysis	TBD
Community Acceptance	9A	How well is this corridor accepted by the Stakeholder Partners Group?	Qualitative analysis: based on review of comments received on the alternative corridors.	Stakeholder outreach
	9B	How well is this corridor accepted by the public?		Public outreach

2.4.1 Modal Interrelationships

The goals and objectives for the I-11 Corridor recognize the importance and need for accommodating multiple modes and multiple uses (highway, rail, and utilities), as needed and applicable. Therefore, the proposed Modal Interrelationships evaluation criterion will analyze the opportunities for shared use or future accommodation of other transportation modes with the intended highway facility, such as rail or utilities. A discussion of consideration of other modes is presented in Section 3.2.

2.4.2 Capacity/Travel Times and Speeds

All alternatives will be modeled with the latest version of the Nevada Statewide Travel Demand Model (NVTDM). Future year (2040) scenarios will be run and outputs will be extracted. Outputs from the NVTDM will include corridor speeds based on congested volume to capacity ratios, and long-distance vehicle miles traveled on each corridor obtained by extracting total trips greater than 50 miles over the study facilities. Travel times will be calculated using the NVTDM based corridor speeds and corridor lengths. Total vehicle hours of delay will be calculated for each alternative by comparing travel times predicted by the NVTDM to theoretical free-flow travel times based on design speeds of all corridors.

Criteria described above will be obtained from the NVTDM for all alternatives to be analyzed. Criteria for each alternative or corridor will be evaluated against the rating scale shown in Table 2. All alternatives will be ranked from most favorable to least favorable.

2.4.3 Economic Vitality

The *Northern Nevada Future Connectivity Corridor Feasibility Report* recommended further studying a corridor that improves connectivity and creates more efficient and higher capacity transportation connections between the greater Las Vegas and Reno regions (the two largest economic centers in Nevada). As part of this, the recommended corridor should seek to connect major freight and economic activity centers and support statewide and regional industry cluster targets. To this end, the economic vitality criterion will evaluate how well an alternative is able to improve access and connectivity to major economic activity centers in the Study Area. When a transportation system is efficient, it provides economic and social opportunities and benefits that result in positive quality of life factors such as better access to jobs and economic markets, improved ability to provide goods and services, reduced transportation costs, higher grade employment opportunities, and value-added investments in local communities.

2.4.4 Transportation Plans and Policies

The alternatives analysis will include a comprehensive review of long-range state and regional plans to assess whether the alternatives are consistent and/or compatible with long-term transportation visions and plans. The alternatives will also be assessed for consistency with funded transportation projects. The state and regional plans will include, but not be limited to:

- US 395 Washoe County Study
- US 395 Southern Sierra Corridor Study
- Statewide Transportation Plan – Moving Nevada Through 2028
- I-80 Corridor Study
- Statewide Integrated Transportation Reliability Program
- Nevada State Freight Plan
- Connecting Nevada: Planning Our Transportation Future
- Southern Nevada Regional Transportation Plan
- Southern Nevada Traffic Study
- Washoe County Regional Transportation Plan
- Nye County Comprehensive Master Plan
- Douglas County 2030 Transportation Plan
- Carson Area Metropolitan Plan Organization 2040 Regional Transportation Plan
- Linking Tahoe: Regional Transportation Plan

2.4.5 Environmental Sustainability

The evaluation of potential impacts of the corridor alternatives to environmental sustainability would address five general areas of concern. The general approach to each of these areas would entail obtaining readily-available digital data on the location and/or extent of resources, contacting agencies to request updates or to fill data gaps, evaluating the sensitivities of, and constraints on, those resources, mapping available information, and comparing the degree to which each corridor may affect the resources. The status of the data acquisition is shown in Appendix B.

Wildlife and Habitat (5A)

Known populations of wildlife and habitat considered important to support the sustainability of those populations would be identified and evaluated. The evaluation would include parameters such as the amount of habitat within each proposed corridor alternative, the percent of overall available habitat

impacted by the corridor, status of the wildlife population, connectivity of habitat, etc. Resource management agencies (NDOW, USFWS) as well as land owners and land management agencies (BLM, USFS, USFWS, and tribes) collect and maintain data on Critical Habitat (legally mandated for species listed as threatened or endangered under Endangered Species Act), Seasonally Important Habitat (protected and game species), and known wildlife corridors for migration and general movements. Each agency will be contacted to obtain digital versions of mapped information or other data able to be evaluated in a spatial manner. Where necessary, sensitive data on wildlife locations would be protected and not released.

Each corridor alternative would be comparatively evaluated based on available information to assess the degree of impacts due to the potential loss or degradation of habitat and creation of connectivity barriers.

Special Designated Areas for Conservation (5B)

Agencies designate lands as special or protected to support the conservation of important resources or values such as presence of endangered species (plant and animal), historic and current cultural uses, and unique visual resources. Among others, the BLM designates such areas as Areas of Critical Environmental Concern and Wilderness Study Areas, the USFWS designates these areas as refuges, and the State designates these as parks. Additionally, all federal land management agencies manage Wilderness Preservation Areas designated by Congress. Readily available maps of such designations would be obtained, and available documents reviewed to identify sensitivities and restrictions on proposed corridor alternative lands as well as corridor buffer zones. Each land management agency would be contacted to confirm readily available information is current, and to confirm restrictions placed on those lands. If an agency determines information being used in corridor alternatives impact evaluations is not current, updated information would be requested from the appropriate agency.

Each corridor alternative would be comparatively evaluated based on available information to assess the degree of impacts due to the potential for degradation of the values of these areas.

Waterways and Floodplains (5C)

Rivers, streams and associated wetlands and floodplains are unique resources in the desert environment, and these resources have enhanced protections and regulations over other desert environments. Digital information on known perennial waterways, wetlands, and floodplains will be collected from the US Geologic Survey (USGS), USFWS, Federal Emergency Management Agency (FEMA), NDEP, Nevada Department of Water Resources (NDWR), BLM, USFS, and NDOW. The USGS topographic maps, FEMA floodplain maps and USFWS National Wetlands Inventory mapper would be relied on for initial identification and mapping of water resources and mapped floodplains. Additional information on known waterways and unique resources, values, or concerns for each water resource would be gathered from these agencies.

Each corridor alternative would be assessed by documenting the length and width of the water resource encountered along each route alternative. The evaluation would address the status of the waterway (i.e. impaired versus wild and/or scenic) and the potential cumulative impacts on the resource.

The number of linear miles of water resources potentially impacted along each alternative would be determined using georeferenced data points, and the criteria rankings for each corridor alternative would be based on the number of linear miles potentially impacted. The least favorable alternative in this category would impact the greatest linear distance of water resources and the most favorable alternative in this category would impact the smallest linear distance of water resources. Impacts to impaired waters would be evaluated separate from unimpaired waters.

Cultural and Paleontological Resources (5D)

Prehistoric and historic resources are prevalent in many areas of western Nevada and both are protected under state and federal laws and regulations. As described below, each of these resources will be identified to the extent available with existing information, then considered in the evaluation of the corridor alternatives.

- Cultural Resources – Native Americans have extensive histories in the use of this region, and the entire state has a history of habitation and use by many other peoples, therefore the cultural value of the region may be of concern to stakeholders. The Nevada State Historic Preservation Office (SHPO) would be consulted by a Secretary of the Interior licensed archaeologist to identify areas of known cultural or historic resources and values. When data sensitivities allow, areas of concern would be mapped and each corridor alternative would be assessed based on the potential to impact the identified resources.
- Paleontological Resources – Western Nevada has a well-documented history of vertebrate fossils and Southern Nevada has become increasingly known for its robust fossil record. These prehistoric materials are protected under the Paleontological Resources Preservation Act (PRPA). Paleontologically sensitive areas would be identified using geologic maps and consulting scientific literature. The maps identify the ages of stratigraphic units and provide the investigating scientists with information regarding the depositional environment. Based on this information, the presence or absence of fossil resources can be predicted and mapped. Where available, university and museum repositories where fossils are catalogued and stored, and the local institution nearest to the affected corridor alternative would be consulted. Each alternative would be assessed based on the potential to impact paleontological resources.

Other Concerns (5E)

Meetings would be held with stakeholders and resource and land management agency representatives to identify issues and concerns regarding potential impacts to lands, resources, and approved land or resource management plans. In addition, while gathering information on the resources described above, many of these stakeholders and agencies may identify other concerns or items to be addressed.

2.4.6 Land Use and Management

Evaluation of impacts from the potential corridor alternatives on land use and land management would focus on two approaches: compatibility with regional and local land use plans, and compatibility with State and Federal land management patterns.

Land Use Plans

Federal, state and local agencies develop short-term and long-term plans to guide land use and development. Such plans exist throughout many portions of the project area, and include BLM and USFS Resource Management Plans, comprehensive regional plans, or transportation/land use elements of master plans. Resource and land use plans developed by local, state, tribal, and federal agencies may be available in digital format with digitized maps, available only in hard-copy format, or some combination of both. Approved plans would be obtained from these agencies for evaluation.

Each approved plan would be reviewed to identify constraints or restrictions on development and to assess the potential compatibility of the construction and operation of a major highway. Corridor alternatives would be ranked based on their compliance with these existing plans.

Land Management

Current land management patterns in an area would be a key constraint on development of a major infrastructure project. Public lands managed by federal and state agencies are more conducive to such projects given these lands are managed for the interests and benefits of the public, whereas privately-held lands would require acquisition or leasing/rental. Multiple information sources on land management exist and would be compiled to identify the ownership patterns within each corridor alternative.

Each corridor alternative would be evaluated to assess the disposition of the land within the corridor, and ranked based on compatibility with land managers.

2.4.7 Cost

Cost estimates will be prepared for each corridor alternative. Since construction timing is highly uncertain, cost estimates will be in current dollars. The NDOT Project Estimation Wizard will be used to develop broad capital costs and factors used to capture soft costs such as engineering and construction management. Right-of-way costs will be estimated based on a "per acre" cost for major land uses (e.g. commercial, residential, etc.). Maintenance costs will be estimated based on a cost per linear mile with higher values used for mountainous terrain. Cost comparisons are relative with alternatives being considered against the range of estimates and not compared against static thresholds. Those alternatives with the least cost will be considered more acceptable.

2.4.8 Technology

Technology has been rapidly changed due to society, the economy, and the way people live, work, and interact with each other. Within the transportation sector, the implications of new technologies and models of transportation service delivery are broad and are likely to transform the way people and goods move over the coming decades. A few such technologies that will have consequential changes to how transportation infrastructure is planned and delivered include automated and connected vehicle (AV/CV) technology and continued emergence of alternative fuel vehicles.

The expansion of the state's electric vehicle charging infrastructure has been a major collaborative focus of the state in recent years. The Nevada Electric Highway started as a partnership between the Nevada Governor's Office of Energy, NV Energy, and Valley Electric Association to expand the state's electric vehicle charging infrastructure by placing charging stations at cost-effective and strategic locations between Reno and Las Vegas. I-11 has a unique opportunity to be a part of both the state and the national network of alternative fuel corridors (US 95 is one of FHWA's designated alternative fuel corridors). Alternative fuel vehicles include EV (electric, battery) powered vehicles and CNG (compressed natural gas) powered vehicles. Convenient recharging and refueling stations are necessary along the routes for the successful use of these types of vehicles. Alternatives will be evaluated based on their ability to accommodate alternative fuel vehicles.

Autonomous or Automated Vehicles would operate independently from other vehicles and utilize internal sensors to survey and respond to one's surroundings. Connected Vehicles, or vehicles that wirelessly communicate with other connected vehicles and the roadway, could operate cooperatively to reduce congestion, decrease fuel consumption, and promote increased safety. Ultimately, it has been reported by several large auto manufacturers that fully autonomous vehicles (driverless cars) could begin to replace conventional cars with autonomous cars by as soon as five years from now. Also, it is projected that autonomous vehicles would reach 50 percent market penetration in the next 15-20 years, based on current vehicle lifecycle trends. This AV/CV technology would necessitate the need for an

expanded connectivity network environment, since information would be disseminated directly to the vehicles using vehicle-to-infrastructure or vehicle-to-external device technologies and on-board units (OBUs). Information provided through traditional ITS message signs could become readily available inside vehicles through original equipment manufacturers and OBUs. In an environment using either cellular or dedicated short range communications technology, intelligent transportation system (ITS) message signs and radio advisories might be obsolete; the information transferred through the signs could be transmitted directly from a traffic management center to a cell tower or cloud, then to the vehicle itself.

Thus, alternatives will be evaluated on the level of power and communication availability and accessibility. Electricity availability is necessary along the routes to supply power for recharging and refueling vehicles, communications sites, rest stops, ITS devices such as traffic sensors/monitoring devices and dynamic message signs, highway lighting, and electrification of rest areas and truck stops. Real time data and communications is a necessary component of modern highways on parking availability, congestion, incidents and weather conditions can be transmitted between vehicles, roadside units and traffic management centers.

2.4.9 Community Acceptance

Public and stakeholder involvement is a critical element of the PEL process and will be important in informing the screening process. The community acceptance criteria is qualitative and based on the review of comments, both supportive and in opposition, received during community and stakeholder engagement. Comment review will focus on trends among responses to indicate the level of community acceptance or opposition, and may raise specific concerns or issues not yet raised by stakeholders or agencies. Numerous comments supporting or opposing particular corridor alternatives will help to determine the level of community concern or interest in the project, however this will not be a quantitative judgement, as input received will not be a statistically-valid sample. Corridor alternatives that do not receive comments will generally be considered acceptable, however, perhaps not preferred by the community.

2.5 Rating and Scoring

Each alternative will be rated and scored based on the evaluation criteria presented in Table 1. The rating system consists of a qualitative five-tiered rating (from least to most favorable), with “most favorable” relative rating representing the best performance, and “least favorable” relative rating representing the worst performance, for each evaluation category. The evaluation rating scale is strictly relative – alternatives will be considered in relation to each other, and not evaluated in comparison to a no build alternative unless specifically identified in the evaluation. An alternative receiving a “least favorable” rating does not inherently mean that the alternative is flawed, but rather it least meets the established criteria as compared to the other alternatives. Likewise, if an alternative receives the highest rating, it may still face issues or obstacles with respect to that criterion. The rating system is summarized in Table 2. Public-facing results will not convey actual measurements, but just represent the rating on the “least favorable” to “most favorable” range.

Table 2: Screening Criteria, Rating, and Scoring Scale

Evaluation Category		Scoring and Rating Scale				
		Least Favorable	Less Favorable	Moderately Favorable	Somewhat Favorable	Most Favorable
Modal Interrelationships						
1A	How well does this corridor provide sufficient opportunity for a multi-use corridor?	Cannot accommodate multiple modes/uses due to constraints along the corridor, and alternate corridors cannot be developed to accommodate other modes	Cannot accommodate multiple modes/uses due to constraints along the corridor, and less reasonable alternate corridors can be developed to accommodate other modes	Cannot accommodate multiple modes/uses due to significant constraints along the corridor, however reasonable alternate corridors can be developed to accommodate other modes/uses. Such alternate corridors would be relatively direct, with reasonable implementation	Can accommodate multiple modes/uses through most of the corridor, with minor exceptions and where a reasonable deviation could be found	Can fully accommodate multiple modes/uses throughout the entire length and within the same footprint. Rated most favorable for the following reasons: it is likely to be the most direct route, right-of-way could be preserved over the long-term, implementation would be maximized and flexibility preserved for future uses or technologies
Capacity/Travel Times and Speeds						
2A	What are the estimated travel time savings over No-Build (2040)?	XXX minutes savings over No Build	XXX minutes savings over No Build	XXX minutes savings over No Build	XXX minutes savings over No Build	XXX minutes savings over No Build
2B	What are the total long-distance vehicles miles traveled (VMT)?	Lowest long distance VMT alternative	XX% greater VMT than the lowest long distance VMT alternative	XX% greater VMT than the lowest long distance VMT alternative	XX% greater VMT than the lowest long distance VMT alternative	Over XX% greater VMT than the lowest long distance VMT alternative
2C	What is the average travel speed on the corridor?	Less than XX mph	XX – XX mph	XX – XX mph	XX – XX mph	Greater than XX mph
2D	How well does this corridor provide for a safe trip for travelers and meet motorists expectations?	Does not provide safe trip and/or large segments that do not meet traveler expectations	Some safety and/or expectation issues, with limited options for mitigation.	Some safety and/or expectation issues, with reasonable options for mitigation.	Limited safety and/or expectation issues, with reasonable options for mitigation.	No safety and/or expectation issues
Economic Vitality						
3A	How well does this corridor improve access and connectivity to major economic activity centers in the Study Area?	No economic activity centers within 5 miles either side of the corridor	Low number of economic activity centers within 5 miles either side of the corridor	Moderate number of economic activity centers within 5 miles either side of the corridor	Moderately high number of economic activity centers within 5 miles either side of the corridor	High number of economic activity centers within 5 miles either side of the corridor

Evaluation Category		Scoring and Rating Scale				
		Least Favorable	Less Favorable	Moderately Favorable	Somewhat Favorable	Most Favorable
Transportation Plans and Policies						
4A	How well is this corridor consistent with funded transportation projects?	No part of the alternative is consistent with funded transportation projects	Approximately 25% of the corridor is consistent with funded transportation projects	Approximately 50% of the corridor is consistent with funded transportation projects	Approximately 75% of the corridor is consistent with funded transportation projects	All of the corridor is consistent with funded transportation projects
4B	How well is this corridor consistent or compatible with long-term transportation visions and plans?	No part of the corridor is consistent or compatible with long-term transportation visions and plans	Approximately 25% of the corridor is consistent or compatible with long-term transportation visions and plans	Approximately 50% of the corridor is consistent or compatible with long-term transportation visions and plans	Approximately 75% of the corridor is consistent or compatible with long-term transportation visions and plans	All of the corridor is consistent or compatible with long-term transportation visions and plans
Environmental Sustainability						
5A	What is the impact to wildlife corridors and/or habitat blocks?	A high degree of impacts to the majority of the corridor or habitat blocks	A high degree of impacts to small portions of the corridor or habitat blocks	Moderate degree of impacts to the entire corridor or habitat blocks	Moderate degree of impacts to small portions of the corridor or habitat blocks	Limited impacts to the entire corridor or habitat blocks
5B	What is the impact to land managed for conservation or wildlife purposes?	A high degree of impacts along the majority of the corridor	A high degree of impacts along small portions of the corridor	Moderate degree of impacts along the entire corridor	Moderate degree of impacts along small portions of the corridor	Limited impacts along the entire corridor
5C	How many linear miles of undisturbed waterways/ floodplains are impacted?	More than XX miles of the corridor impacts currently undisturbed waterways/ floodplains	Between XX and XX miles of the corridor impacts currently undisturbed waterways/ floodplains	Between XX and XX miles of the corridor impacts currently undisturbed waterways/ floodplains	Between XX and XX miles of the corridor impacts currently undisturbed waterways/ floodplains	The corridor impacts less than XX miles of currently undisturbed waterways/ floodplains
5D	What is the impact to important paleontological and cultural resources?	A high degree of impact to significant resources throughout the majority of the corridor.	A high degree of impact to significant resources along a small portion of the corridor.	A moderate degree of impact to significant resources throughout the majority of the corridor.	A moderate degree of impact to significant resources a small portion of the corridor.	A minimal degree of impact to significant resources throughout the corridor.
5E	What additional environmental concerns were identified by stakeholders?	A high degree of impacts along the majority of the corridor	A high degree of impacts along small portions of the corridor	Moderate degree of impacts along the entire corridor	Moderate degree of impacts along small portions of the corridor	Limited impacts along the entire corridor
Land Use and Ownership/Management						
6A	How consistent is this corridor with regional and local land use plans?	No part of the corridor is consistent with land use plans	Approximately 25% of the corridor is consistent with land use plans	Approximately 50% of the corridor is consistent with land use plans	Approximately 75% of the corridor is consistent with land use plans	All of the corridor is consistent with land use plans

Evaluation Category		Scoring and Rating Scale				
		Least Favorable	Less Favorable	Moderately Favorable	Somewhat Favorable	Most Favorable
6B	How compatible is this corridor with major land management patterns?	No part of the corridor is compatible with land ownership/ management patterns	Approximately 25% of the corridor is compatible with land ownership/ management patterns	Approximately 50% of the corridor is compatible with land ownership/ management patterns	Approximately 75% of the corridor is compatible with land ownership/ management patterns	All of the corridor is compatible with land ownership/ management patterns
Cost						
7A	What is the order of magnitude cost for this corridor, including construction and right-of-way?	Those corridors with the lowest cost will be considered the most favorable and those with the highest cost considered least favorable. Corridors that fall in between the highest and lowest costs will be rated based on a proration of cost compared to the rating scale.				
Technology						
8A	How well does the corridor accommodate corridor fuel vehicles?	Corridor is not part of Nevada's Electric Highway system	25% of corridor is part of Nevada's Electric Highway system	50% of corridor is part of Nevada's Electric Highway system	75% of corridor is part of Nevada's Electric Highway system	100% of corridor is part of Nevada's Electric Highway system, and already has existing or planned charging stations
8B	What is the level of power and wireless communication availability/accessibility?	Corridor does not have any power accessibility and/or wireless communication coverage	25% of corridor has power accessibility and/or wireless communication coverage	50% of corridor has power accessibility and/or wireless communication coverage	75% of corridor has power accessibility and/or wireless communication coverage	100% of corridor has power accessibility and/or wireless communication coverage
Community Acceptance						
9A	How well is this corridor accepted by the Stakeholder Partners Group?	Most Stakeholder Partners are opposed to corridor	N/A	Split opposition/support of corridor	N/A	Most Stakeholder Partners support corridor
9B	How well is this corridor accepted by the public?	Most public feedback is opposed to corridor	N/A	Split opposition/support of corridor	N/A	Most public feedback supports corridor

Note: Rating system is not yet finalized. Some quantitative measures remain undefined (e.g., XX) until a comparative scale can be developed pending the analysis.

3. Study Area and Corridor Alternatives

The Study Area extends from Las Vegas north approximately 450 miles to I-80 in western Nevada. The southern terminus is defined as US 95 at CC-215. Three northern termini are all located at I-80, but at different locations along the corridor, spanning approximately 70 miles between Reno and Fernley/Fallon. A map of the study vicinity is presented in Figure 4.

The Study Area is bounded by Las Vegas to the south, and I-80/the greater Reno-Sparks region to the north, which represent the two largest metropolitan areas of the state with significant freight, distribution, manufacturing and tourism sectors. To the east, the Study Area generally does not extend past major military lands, including Nellis Air Force Range and Fallon Naval Target Range. To the west, the study area extends to the Nevada/California border.

The area between Las Vegas and I-80 is sparsely populated, consisting of small towns that support mining, solar, recreation, and military operations. The approximate 20,000 square mile Study Area contains several mountain ranges running mostly north/south. These mountains form topographic barriers where tunneling can be cost prohibitive, limiting the area within the Study Area feasible to construct such a high capacity transportation corridor. The only major body of water within the Study Area is Walker Lake near Hawthorne.

3.1 Range of Corridor Alternatives

The *Northern Nevada Future Connectivity Corridor Feasibility Report* concluded that the proposed I-11 Corridor would connect Las Vegas to I-80 in western Nevada. This was confirmed and approved by the State Transportation Board and reflected in the 2015 FAST Act, designating this western connection officially as the I-11 Corridor.

Several other routes were evaluated in the prior study and not recommended for further analysis due to fatal flaws or inability to meet project goals and objectives, including following US 395 into California, US 93 through eastern Nevada, and a new corridor through central Nevada. These routes are still important to statewide and regional travel, but do not meet the broader goals of the I-11 Corridor.

Based on the tenants of the Purpose and Need, a series of corridor alternatives were developed connecting Las Vegas with I-80. These corridor alternatives are open to refinement based on the planning-level analysis to be conducted. They were developed using engineering design parameters (e.g., topography), major known environmental constraints, as well as suggestions from stakeholders (e.g., Mineral County, Town of Hawthorne). They are split into two segments (Segment A and Segment B). Segment A spans from Las Vegas to Tonopah, in which only one corridor is under consideration (US 95 corridor with various improvements). Four corridor alternatives within Segment B deviate from Tonopah to make connections with I-80 at three locations (Reno, Fernley [via two possible routes], and a new location north of Fallon).

There are also options which provide various connectivity within and between each of the four corridor alternatives. These will not undergo detailed evaluation at this point, but can be studied further if major flaws preclude the viability of a given alternative or segment. Segment B alternatives include a combination of upgraded existing facilities and new corridor development. A map of the corridor alternatives is presented in Figure 5, and described further as follows.

Figure 4: Study Area

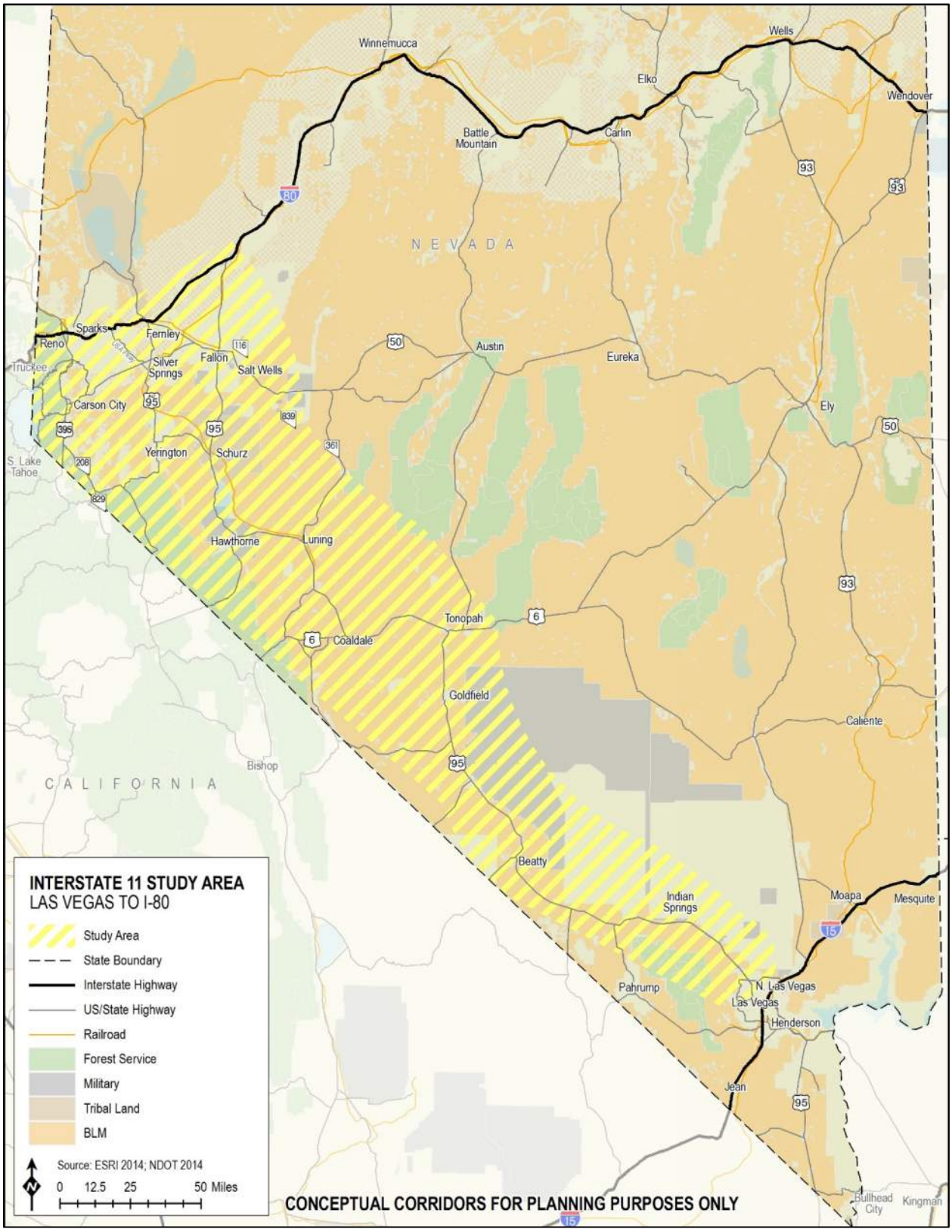
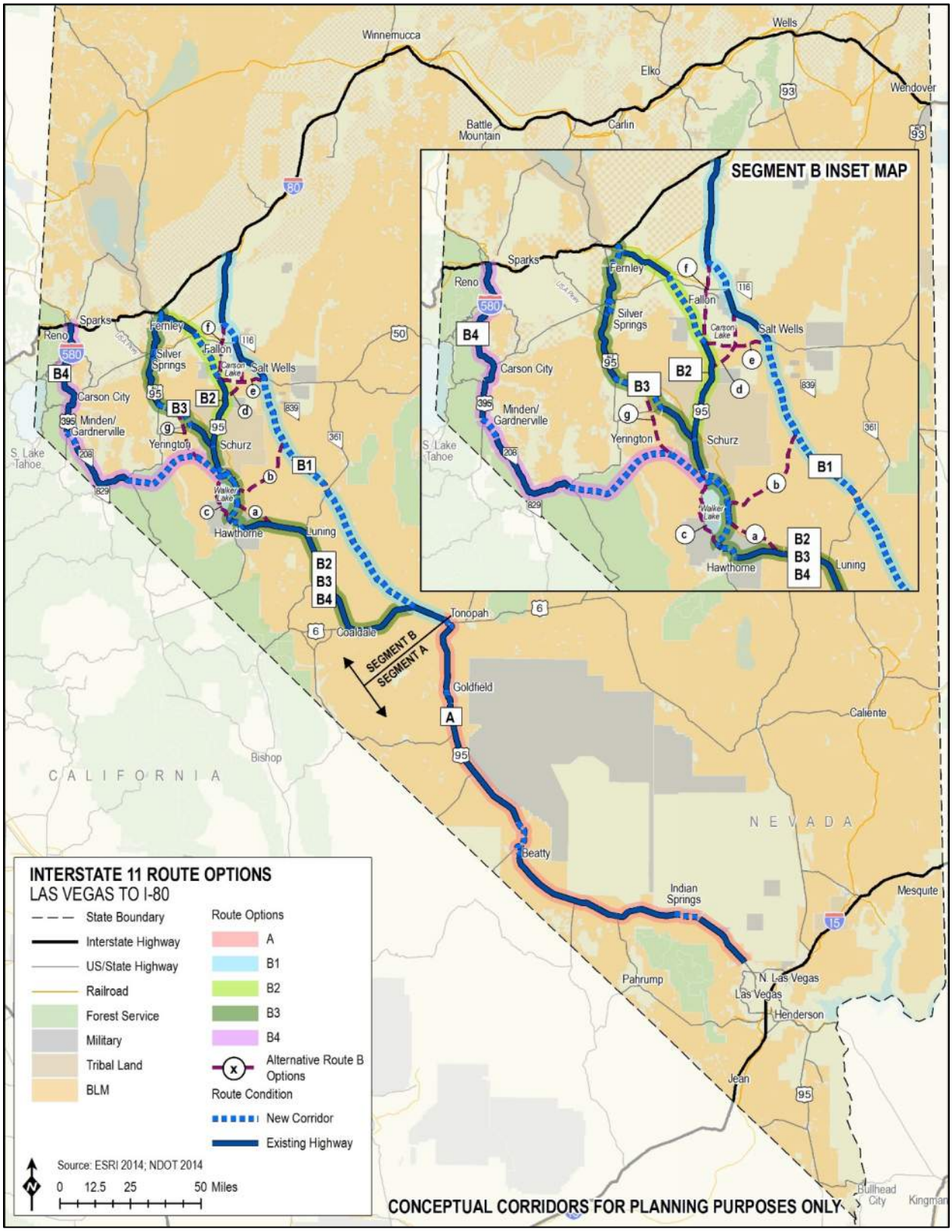


Figure 5: I-11 Corridor Alternatives



3.1.1 Las Vegas to Tonopah (Segment A)

Segment A includes the following corridor alternative. Only one corridor is under review, as land management patterns and topographical challenges do not allow any viable alternatives to US 95 in this vicinity. The US 95 corridor has been designated by the US Congress in the FAST Act as the I-11 Corridor in Nevada, and numerous improvements have been made along the corridor to bring it closer to interstate standards, as well as support the US 95 Electric Highway corridor designation (e.g., electric vehicle charging stations).

Route A1- Las Vegas to Tonopah

- The corridor alternative would follow existing US 95 between Las Vegas and Tonopah. New corridors are proposed for review at the towns along the alternative (Indian Springs, Beatty, Goldfield, and Tonopah) as options for providing a limited-access transportation facility that directly serves, but does not displace, local communities.

3.1.2 Tonopah to I-80 (Segment B)

Segment B includes four potential corridor alternatives, with some varying options.

Route B1 – Tonopah to I-80 Fallon Interchange

- This is a new corridor from US 95 west of Tonopah to US 50 east of Salt Wells. From Salt Wells, the alternative follows the existing US 50 to the intersection with SR 116. A new corridor connects US 50 to US 95 northeast of Fallon, following US 95 at the most northern end, connecting to an existing interchange at I-80.

Route B2 – Tonopah to I-80 Fernley Interchange

- This alternative follows US 95 through Coaldale north past Luning. A new corridor bypasses the town of Hawthorne and runs along the east side of Walker Lake. The corridor connects with US 95 north of Walker Lake to Fallon. A new corridor bypasses Fallon to connect with US 50 ALT north to I-80 and Fernley.

Route B3 – Tonopah to I-80 Fernley Interchange

- This alternative follows US 95 through Coaldale north past Luning. A new corridor bypasses the town of Hawthorne and runs along the east side of Walker Lake (same as Route B2). The corridor connects with US 95 north of Walker Lake to Schurz where the corridor deviates from B2 to follow US 95 ALT to I-80 and Fernley. New corridor segments will bypass Yerington, Sliver Springs, and Fernley.

Route B4 – Tonopah to I-80 Reno Interchange

- This alternative follows Routes B2 and B3 along US 95 past Walker Lake/Hawthorne. Route B4 deviates north of Walker Lake to a new corridor that travels west and connects to SR 829 and follows SR 208 west to US 395, continuing along US 395 north to Carson City with a bypass around Minden/Gardnerville. At Carson City, the corridor follows I-580 north to its interchange with I-80.

The primary corridor alternatives for Segment B (Routes B1 through B4) will be analyzed based on the evaluation criteria in Table 1. The route options listed below are shorter segments that provide connections between and within the main corridor alternatives. Including these options in the overall analysis would generate a large range of alternatives that are difficult to compare; thus, these segments are separated out and will not be analyzed using the evaluation criteria. Rather a qualitative analysis will be summarized for each option to identify the opportunities and challenges and how they impact

the primary corridor alternatives. If a major flaw is detected in one of the primary corridor alternatives, one of these options could be substituted in for the flawed segment.

Route B Options

a. New corridor providing a more direct bypass of Hawthorne to the east side of Walker Lake.
b. New corridor connecting B2/B3/B4 to B1 on the east side of Walker Lake.
c. New corridor connecting existing US 95 along the west side of Walker Lake to existing US 95 north of Walker Lake.
d. New corridor from US 50 at Salt Wells west to US 95.
e. New corridor connecting existing US 95 south of Carson Lake to US 50 at Salt Wells.
f. New corridor connecting existing US 95 south of Carson Lake north to US 95 north of Fallon and SR 116.
g. New corridor from north of Walker Lake to US 95 ALT north of Yerington.

3.2 Other Modal Considerations

The I-11 Corridor is primarily proposed as a new highway facility, but this infrastructure provides an opportunity to review the broader transportation connectivity between southern and northern Nevada (CC-215 to I-80), including passenger and freight rail, and major utility transmission. There is currently no continuous rail service between Las Vegas and northern Nevada.

As part of the previous high-level, multi-use evaluation in the *IWCS*, it was determined that many corridors are not able to accommodate multiple modes, specifically rail, throughout the entire length of the corridor due to right-of-way or terrain constraints. Interstates usually have a maximum grade rate of 6 percent, while rail typically has 1.5 percent maximum grades (2 percent for short distances). While the analysis found that an entire corridor could not accommodate multiple modes, portions of the recommended corridors were found suitable for multiple uses and modes and new rail corridors were identified that could close north-south gaps in the existing rail network. Closing these gaps can provide an alternate modal system to the proposed highway corridors through northern Nevada. Subsequent studies have identified other high capacity transportation options as well, including Hyperloop.

This study will summarize the results of previous study recommendations as they relate to passenger and freight rail/transportation improvements between southern and northern Nevada, as well as provide recommendations for opportunities of co-located transportation facilities. It is important to note that while NDOT is directly responsible for the state's highway network, the implementation of freight rail is dependent on private sector rail companies to determine market feasibility. Connections will likely only be constructed if demand warrants, rather than from convenience to build out an interconnected statewide system.

4. Stakeholder and Public Outreach

Meaningful involvement from stakeholders and the public is critical to a successful PEL process. The study team will conduct stakeholder meetings with federal, state, and regional resource agencies to receive data inputs and keep agencies appraised of this study's progress. The stakeholders identified in Section 2.2 will be assembled into the Stakeholder Partners Group. The Stakeholder Partners Group will be convened for approximately three meeting opportunities, to be conducted in person at NDOT Headquarters in Carson City, and teleconferenced or videoconferenced from other locations. The general meeting plan is shown in Table 3.

Table 3: Stakeholder Partners Group Meeting Plan

Meeting	Purpose	Timeframe*
1	• Study purpose, introduction and participation • Methodology overview • Data collection • Public outreach plan	March 2018
2	• Public outreach summary • Screening process inputs and results • Alternatives Analysis Study Report	April 2018
3	• Draft PEL • Public outreach plan	May 2018

* Subject to change

Given the Study Area's rural setting, public outreach will be primarily conducted through in-person meetings. Two series of public meetings will be held in multiple locations (Las Vegas, Tonopah, Hawthorne, Fallon, and Reno) to provide opportunities for the general public to learn about the process and findings, and provide direct input. Public meetings will follow traditional NDOT format with prior noticing to communities through newspaper, internet, and email advertisements two weeks prior, day prior and day of, and a formal presentation followed by a question and answer period. Direct notices to parcel owners along the corridor alternatives is not included. The study team will contact staff from relevant counties to distribute meeting information through established local venues. These meetings will be streamed via Facebook Live from NDOT's Facebook account. A virtual public meeting will also be developed and posted online at the project website for those unable to attend in person. Social media posts will be through NDOT's existing accounts. The general public meeting plan is shown in Table 4.

Table 4: Public Meeting Plan

Meeting	Purpose	Timeframe*
1	• Study purpose, introduction and participation • Methodology overview • Data collection • Initial range of corridor alternatives	March 2018
2	• Screening process inputs and results • Alternatives Analysis Study Report • Draft PEL	May 2018

* Subject to change

Appendix A: Northern Nevada Future Connectivity Corridor Feasibility Report

I-11 and Intermountain West Corridor Study

Northern Nevada Future Connectivity Corridor Feasibility Assessment Report







Prepared for

NEVADA DOT and ADOT

July 2014

I-11 AND INTERMOUNTAIN WEST CORRIDOR STUDY

Northern Nevada Future Connectivity Corridor Feasibility Assessment Report

Prepared for

Nevada Department of Transportation

and

Arizona Department of Transportation

July 2014

Prepared by

CH2MHILL® and AECOM

DISCLAIMER

The contents of this planning document are based on information available to the Arizona Department of Transportation and the Nevada Department of Transportation (herein referred to as the Sponsoring Agencies) as of the date of this report. Accordingly, this report may be subject to change.

The Sponsoring Agencies' acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project-level environmental impact assessments and/or studies of alternatives will be necessary.

The Sponsoring Agencies do not warrant the use of this report, or any information contained in this report, for use or consideration by any third party. Nor do the Sponsoring Agencies accept any liability arising out of reliance by a third party on this report, or any information contained in this report. Any use or reliance by third parties is at their own risk.

Contents

Appendices

1. Introduction and Overview

The I-11 and Intermountain West Corridor

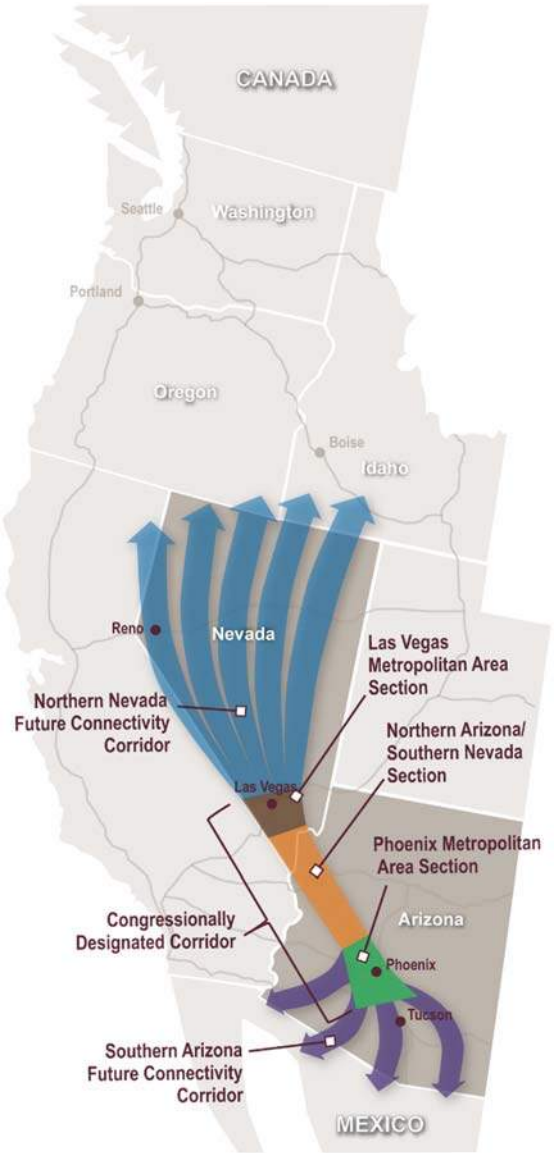
The Arizona Department of Transportation (ADOT) and Nevada Department of Transportation (NDOT), in consultation with the Federal Highway Administration (FHWA) and the Federal Railroad Administration (FRA), and in partnership with the Maricopa Association of Governments (MAG) and the Regional Transportation Commission of Southern Nevada (RTC), referred to as Core Agency Partners, are conducting the Interstate 11 (I-11) and Intermountain West Corridor Study.

The study is the latest action in a decades-long effort by Arizona, Nevada, and other Intermountain West states and the federal government to develop a transportation corridor between the Rocky Mountains and the Cascade Range/Sierra Nevada Mountains linking Mexico and Canada. The two-year study includes detailed corridor planning of a possible high-capacity transportation link connecting Phoenix and Las Vegas, and high-level visioning for extending the corridor north of Las Vegas to Canada and south of Phoenix to Mexico. The Corridor is proposed to include an upgraded highway facility, but it could be paired with rail and other major infrastructure components—such as energy and telecommunications—to serve the nation's needs from Mexico to Canada.

For the purposes of this study, the Intermountain West is the geographic region of the western United States (U.S.) located between the Rocky Mountains on the east and the Cascade Range and Sierra Nevada on the west (**Figure 1-1**). This region is facing a rapidly growing population, expanding global trade, and an aging transportation infrastructure that is reaching capacity.

In addition to the designation of the CANAMEX High Priority Corridor in 1995, recently enacted federal transportation legislation called Moving Ahead for Progress in the 21st Century (MAP-21) designates I-11 as a future Interstate between Phoenix and Las Vegas. In approving the I-11 designation, Congress recognized the need for, and importance of, an Interstate link between these two metropolitan areas.

Figure 1-1. Study Area Segments



The Study Area

The study area includes the entire states of Arizona and Nevada, although more detailed planning will occur in concentrated study segments. The principal project goal is to identify and establish feasible corridor(s) and transportation connections for the portion of the study corridor between Phoenix and Las Vegas, with options for extensions to the north and south. The central segment, extending between the greater Phoenix and Las Vegas Metropolitan Areas, is known as the Congressionally Designated Corridor because of Congress' designation of this segment as future I-11. Because of its length and varying characteristics, this Corridor segment is divided into three sections. Two additional segments beyond the Phoenix and Las Vegas Metropolitan Areas allow higher-level visioning for potential extensions (Figure 1-1).

The I-11 and Intermountain West Corridor divisions are as follows:

- Southern Arizona Future Connectivity Corridor: Mexico to Casa Grande
- Congressionally Designated Corridor: Phoenix Metropolitan Area Section (Casa Grande to Wickenburg)
- Congressionally Designated Corridor: Northern Arizona/Southern Nevada Section (Wickenburg to the Las Vegas Metropolitan Area)
- Congressionally Designated Corridor: Las Vegas Metropolitan Area Section
- Northern Nevada Future Connectivity Corridor: Beyond the Las Vegas Metropolitan Area

The study includes two levels of analysis over a 24-month schedule:

- Detailed planning for the Congressionally Designated Corridor segment between (and including) Phoenix and Las Vegas
- A high-level visioning approach to possible future connectivity corridors from Las Vegas to Canada and from Phoenix to Mexico

This document describes the Northern Nevada Future Connectivity Corridor analysis and findings.

Northern Nevada Future Connectivity Corridor

The Northern Nevada Future Connectivity Corridor stretches from the northern edge of the Las Vegas Metropolitan Area, potentially all the way to the U.S./Canadian border (**Figure 1-2**). However, for this study, the segment is considered to terminate at the northern Nevada and California borders with Oregon and Idaho. Although the maps include the Las Vegas Metropolitan Area, the focus of this study portion spans from beyond the metropolitan area north to the northern edge of the state.

The breadth of the future connectivity study segment allows higher-level visioning for this potential extension beyond the Las Vegas Metropolitan Area.

Figure 1-2. Study Area for the Northern Nevada Future Connectivity Corridor

Report Purpose

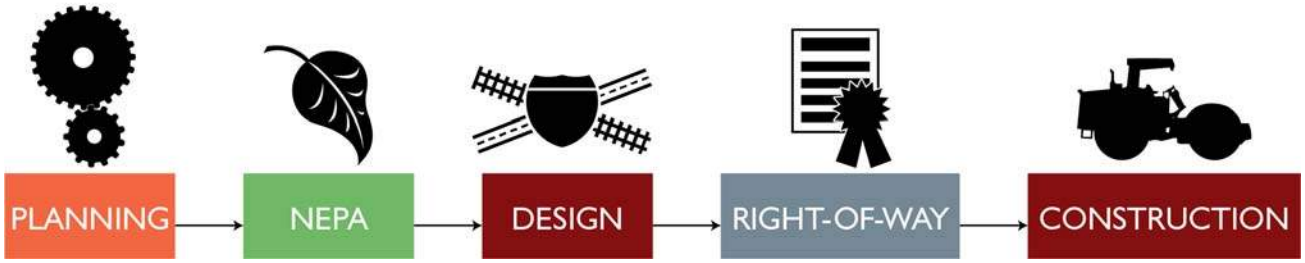
This report is a summary culmination of the entire study process and findings relative to the Northern Nevada Future Connectivity Corridor. While intended as independent documentation of the corridor planning process, this report is supported by various other reports and technical memorandums including:

- Existing Natural and Built Environment Technical Memorandum
- Corridor Justification Report
- Level 1 Evaluation Results Summary Technical Memorandum

All reports are available on the project website, at: http://i11study.com

This information serves as the foundation for the first step in the project development process (**Figure 1-3**), which will be followed by initiation of the National Environmental Policy Act (NEPA) process, eventually leading to design, right-of-way acquisition, and construction.

Figure 1-3. Project Development Process



Report Organization

The following sections of the Northern Nevada Future Connectivity Corridor Feasibility Assessment include:

- Chapter 2: Corridor Context
- Chapter 3: Existing and Future Conditions Overview
- Chapter 4: Evaluation Framework and Alternatives Development
- Chapter 5: Alternatives Evaluation Summary and Results
- Chapter 6: Findings and Recommendations
- Chapter 7: Stakeholder Involvement Summary

2. Corridor Context

Corridor-Wide Goals and Objectives

The Goals and Objectives Statement (full documentation found in Appendix A) provides a big-picture explanation of the potential benefits of the I-11 and Intermountain West Corridor, particularly the segments in Arizona and Nevada. As each segment of the I-11 and Intermountain West Corridor moves from the planning stage to the NEPA phase, individual Purpose and Need Statements will be developed that focus on the unique transportation deficiencies in that segment that must be addressed.

Defining the Goals and Objectives is a first step in the development of this project's Purpose and Need Statement. It begins the process of gathering information to evaluate the need for the I-11 and Intermountain West Corridor that will be shared with agencies and other stakeholders participating in the study.

This chapter provides a summary of the Corridor's Goals and Objectives, as well as other contextual factors that speak to the need for the I-11 and Intermountain West Corridor, as well as transportation problems the corridor has the potential to address.

Key factors that support the I-11 and Intermountain West Corridor's Goals and Objectives include the following:

- **Legislation** – Is there a federal, state, or local governmental mandate for the action?
- **System Linkage** – Is the proposed project a "connecting link?" How does it fit in the transportation system?
- **Trade Corridor** – Will the proposed facility enhance the efficient movement of freight in the study corridor?
- **Modal Interrelationships** – Will the proposed facility interface with and serve to complement airports, rail and port facilities, mass transit services, etc.?
- **Capacity** – Is the capacity of the present facility inadequate for the present traffic? Projected traffic? What capacity is needed? What is the level(s) of service for existing and proposed facilities?
- **Economics** – Projected economic development/land use changes indicating the need to improve or add to the highway capacity
- **Project Status**—Project history, including actions taken to date, other agencies and governmental units involved, action spending, schedules, etc.

The goal of the proposed action is to establish a high-capacity, limited-access, transportation corridor connecting Mexican ports and manufacturing areas with Arizona's and Nevada's largest regional, national and international manufacturing and economic activity centers to support regional, national and international trade. For Arizona and Nevada, the objective of the proposed action is to assist in diversifying the states' economies to target industry clusters that rely heavily on interconnected and efficient transportation systems to transport goods and facilitate business attraction/retention. The need for the proposed action is based on a combination of factors that include legislation, system linkage, domestic and international trade, modal interrelationships, capacity/congestion, economics, and project status/public policy. Together, the goals

and objectives shape the range of corridor alternatives developed and evaluated for the project.

Regional Opportunities

Current global and regional trends are creating demands for new transportation links. It is now often more cost-effective to manufacture and import goods from Mexico than it is from Asia Pacific, increasing the need for high-capacity, north-south transportation infrastructure. The transportation network in the Intermountain West was developed decades ago to serve the economic, population, and mobility needs at that time—east-west movement of people and goods between Southern California and the rest of the country. The need is now shifting to north-south demand.

Investment in regional transportation infrastructure has not kept pace with population growth and changing economic trends. The population of the Intermountain West states (Arizona, Idaho, Montana, Nevada, Oregon, Utah, and Washington) is currently 25 million. Between 2000 and 2010, the rate of growth for the Intermountain West states was 19.6 percent—double that of the U.S. as a whole, which grew at a rate of 9.8 percent. Population and economic growth in Arizona and Nevada are expected to continue to outpace the U.S. average.

Without strategic improvements in transportation infrastructure, the region will lose the opportunity to capitalize on enhanced economic growth related to important trends in regional and national trade. For instance, manufacturing growth in Arizona and Nevada exceeded the U.S. average, indicating a strengthening economic sector that is strongly linked with transportation demand. State economic development departments are focused on diversifying the Arizona and Nevada economies to target industry clusters that rely heavily on interconnected and efficient transportation systems to both transport goods and facilitate business attraction/retention.

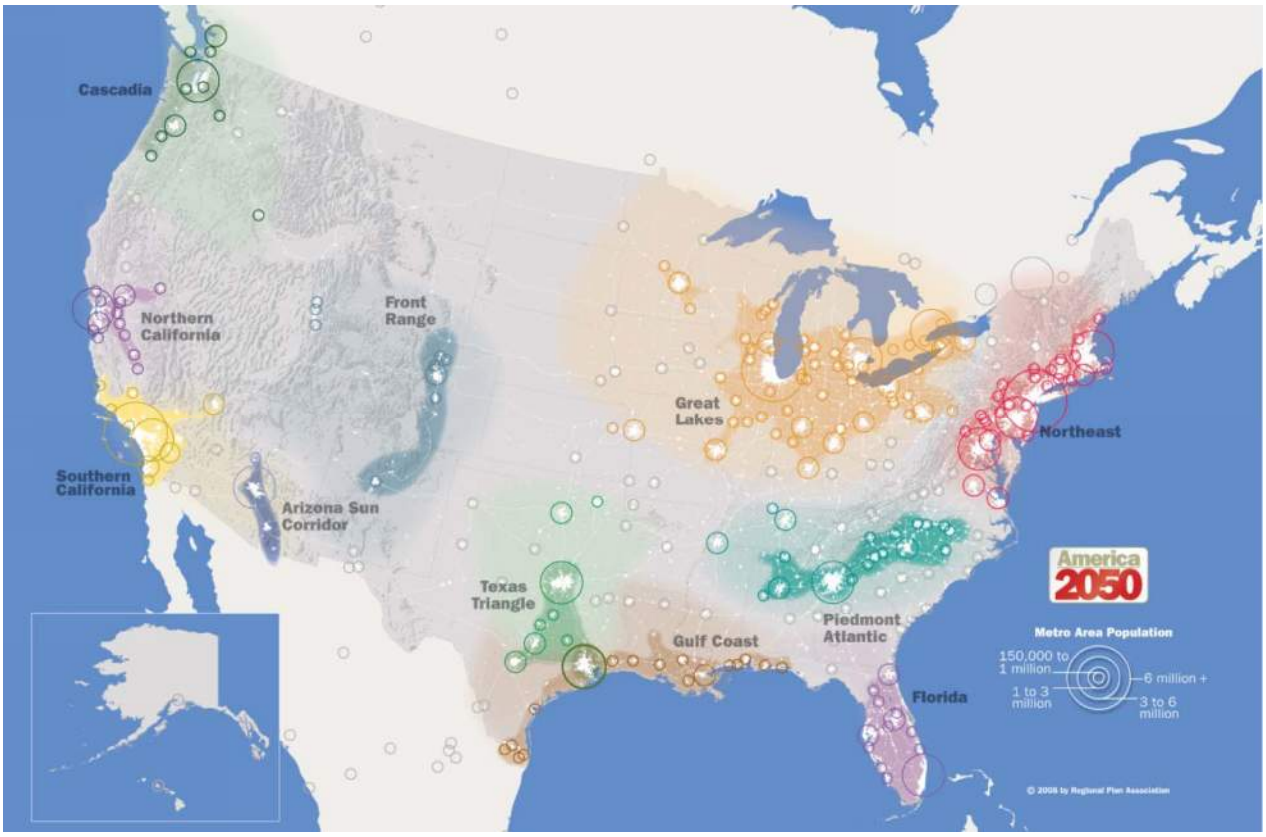
Economic Opportunities Created by Connected Megaregions

The Brookings Institution, Regional Plan Association, and others have developed and furthered the concept of “megapolitans” as the key U.S. areas of integration with world trade (Regional Plan Association 2005) (**Figure 2-1**).

A megapolitan, of which 11 have been designated in the U.S., can be defined as a conglomeration of two or more intertwined metropolitan areas with a combined population of 5 million or more. A megapolitan is characterized by interlocking economic systems, shared natural resources and ecosystems, and common transportation systems. The U.S. megapolitan areas contain most of the nation’s major ports and international airports, and their assets give them a large presence in world trade (Nelson and Lang 2011).

Efficient mobility is a major competitive advantage in the global playing field, where time savings create value. Our competitors in Asia and Europe are creating Global Integration Zones by linking specialized economic functions across vast geographic areas and national boundaries with high-speed rail and dedicated goods movement systems. The increased mobility of workers, business travelers, and goods between the cities of these megapolitans enables greater collaboration, flexibility, and innovation.

Figure 2-1. Megapolitan Areas in the Continental United States and Southern Canada



Source: Regional Plan Association 2005

Improving and maintaining megapolitan infrastructure is an important national priority, especially for the Southwest, which seeks more trade and exports as a way to diversify its economy from consumption and real estate toward technology, innovation, and high-value manufacturing. The megapolitan capacity for trade is a key element in this economic transition. Failure to establish adequate infrastructure to move people and goods around the country and the region would significantly constrain future economic growth.

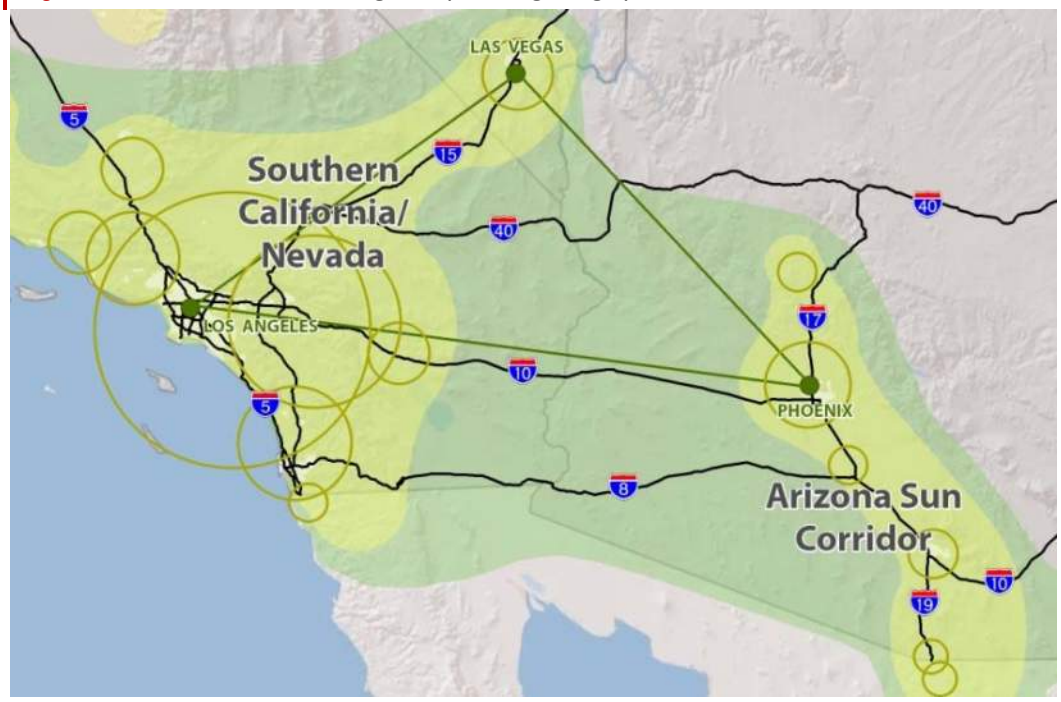
Southwest Triangle Megaregion

The emerging Southwest Triangle, with a population approaching 30 million (**Figure 2-2**), consists of three main centers of growth, however its influence area can be much greater, encompassing travel throughout Arizona and Nevada:

- Southern California, with more than 20 million residents from San Diego to Santa Barbara
- Arizona's Sun Corridor, which is comprised of the metropolitan areas of Phoenix, Tucson, Prescott, and Nogales, with nearly 6 million people
- The Greater Mojave Region centered on Las Vegas with about 2.2 million people (part of Southern California megapolitan)

The Southwest Triangle is on a trajectory to be one of the most economically strong American regions that maintains linkages to the world's fastest emerging economies in both Asia and Latin America. For the last half century, Southern California has built America's most significant connections to Asia, displacing San Francisco as the nation's leading region for this trade. Southern California is now hyperlinked to Asia, and Las Vegas and the Sun Corridor are actively engaged in establishing new trade with Latin America.

Figure 2-2. The Southwest Triangle: Expanding Megapolitans



The key issue now is to determine what infrastructure improvements would facilitate greater economic integration of this megaregion. This area already has one of the most densely linked air systems of any region in the country, with 2 of the 10 ten busiest air corridors: Los Angeles-Las Vegas and Los Angeles-Phoenix (Brookings Institution 2009a).

This region also has the weakest ground-based transportation connectivity of any U.S. megaregion. The Southwest Triangle, especially Phoenix and Las Vegas, has an underdeveloped Interstate network that does not meet current demand; which is expected to double between these cities by 2040.

This is the only megaregion where there is a gap in the Interstate system between megapolitan anchors (Phoenix and Las Vegas). In addition, the lane miles between the key megapolitans is also limited compared to peer megaregions. Consider that the Piedmont region in the East extends from Raleigh, North Carolina, to Atlanta, Georgia, with large stretches of I-85 that exceed four lanes lining these metropolitan areas. By contrast, most of I-10 linking the Sun Corridor to Southern California and I-15 linking Las Vegas to Southern California are mostly standard four-lane Interstate roadways. With no direct rail service between the two metropolitan areas, and only minimal intercity bus service, the region has not kept pace with evolving needs.

Despite this, the Southwest Triangle has significant international connections. The international trade through Los Angeles and Long Beach is the largest in the country, and the majority of goods are handled on the congested California freeways, including I-5 for goods traveling north-south. Most of these goods are moving north or east for distribution throughout the U.S.—traveling throughout the Southwest Triangle and on to other points. Shifting trade trends from Asia to Latin America increase the demand for north-south travel corridors.

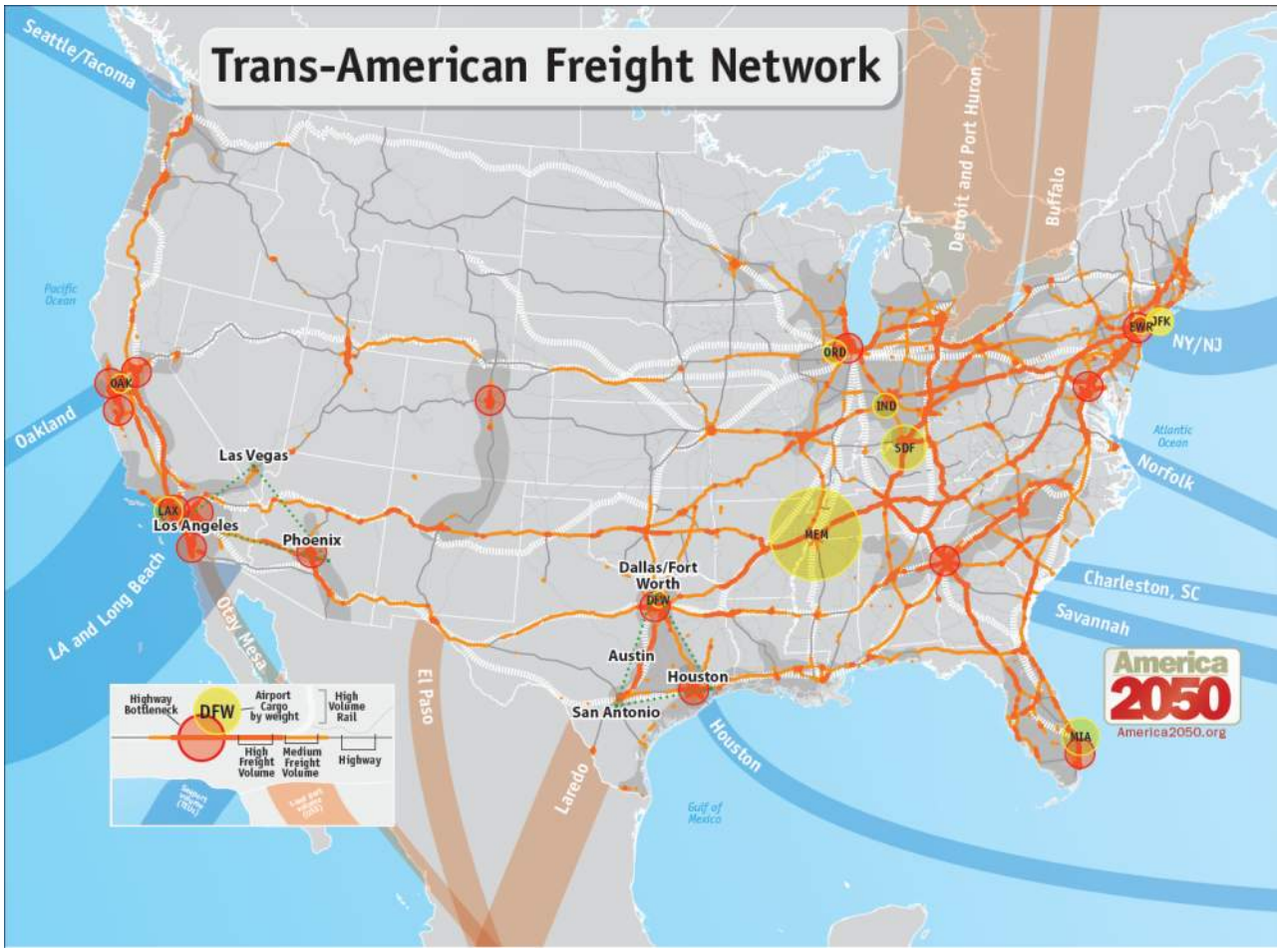
The I-11 and Intermountain West Corridor and Arizona and Nevada

The states of Arizona and Nevada, with the addition of the I-11 and Intermountain West Corridor, are well positioned to take advantage of megaregion economic activity, specifically to fill the gap of the north-south trade demand. The Corridor has the ability to connect the megaregions in the western U.S. (Sun

Corridor/evolving Southwest Triangle and Casacadia) – both of whose economic influence area transcend national boundaries (Mexico and Canada) – forming a corridor to take advantage of the shifting trade trends.

The lack of connections and transportation infrastructure in this study area however, makes freight flows from and to Mexico more attractive through Texas or California border crossings than Arizona. **Figure 2-3** highlights the lack of both rail and Interstate highway connections between the major cities within Arizona and Nevada.

Figure 2-3. North American Freight Network



Source: America2050.org

Providing an alternate north-south connection in the western U.S. is crucial to ensure timely, efficient, and competitive trade. The I-11 and Intermountain West Corridor provides an opportunity to fill this transportation gap in terms of efficient high-speed, domestic north-south travel. It also provides potential expeditious linkages between existing and future foreign ports and critical east-west, high-speed transportation corridors in the U.S., the junctions of which can provide significant regional economic development opportunities. The I-11 and Intermountain West Corridor has the potential to become one of the first north-south, high-capacity routes through the Intermountain West that could greatly improve commerce, tourism, and international trade opportunities across the West.

3. Existing and Future Conditions Overview

Planning and Environmental Linkages Approach

FHWA has recently issued new guidance to assist transportation planners and environmental practitioners in the use of corridor and subarea planning to inform the NEPA process. While this study phase will not include detailed environmental documentation such as an environmental impact statement, the results of this "pre-NEPA" effort will follow the Planning and Environmental Linkages (PEL) process, which is an integrated approach to transportation decision-making that takes into account environmental, community, and economic goals throughout the project life cycle, from the planning stage (current study) through environmental (NEPA), design, and construction/maintenance. PEL promotes greater communication within and among transportation and resource agencies, leading to improved decision-making and project development.

ADOT and NDOT have both worked with the FHWA to adapt the federal guidance into state-led processes, which include checklists to be completed throughout a study's process. The PEL processes of the two states are similar and will be carried forth throughout this study to identify important issues early so that agencies, stakeholders, and the public can make informed and timely decisions.

The PEL documentation includes a description of the environmental setting and an understanding of the existing infrastructure to make corridor use as efficient as possible through innovative solutions. The use of the PEL process will help streamline the entire environmental review process, allowing this study to provide the foundation and minimize the need for re-evaluation as the project progresses into the environmental phase.

This review of the existing environment is intended to be preliminary. Its intent is to identify fatal flaws and issues that will need to be considered as the project moves into the alternatives analysis phase. While this review supports both the ADOT and NDOT PEL processes, the full analysis of environmental impacts of project implementation, pursuant to NEPA, has yet to begin. The intent of this PEL-supported work will assist in the scoping of that NEPA analysis.

Opportunities and Constraints Analysis

Using the data and information acquired to conduct an analysis of the natural and built environment, maps were developed to illustrate constraint and opportunity areas for Corridor development. **Figure 3-1** shows these areas for the Northern Nevada Future Connectivity Corridor. The blue areas on this map show constraint areas, or portions of the environment that are generally not conducive to placement of or implementation of a high capacity transportation corridor. While this analysis presents these constraints on a macro scale, all areas shaded in blue on the map do not necessarily reflect fatal flaws. Some contributing factors may be accommodated or mitigated as Corridor refinement evolves. Maps of contributing opportunities and constraints data are available in the *Existing Natural and Built Environment Technical Memorandum*.

Figure 3-1. Opportunity and Constraint Areas: Northern Nevada Future Connectivity Corridor

At a high level, the blue constraint areas reflect the following features:

- Areas of Critical Environmental Concern (ACECs)
- Wilderness areas
- National monuments
- National Conservation Areas (NCAs)
- Critical habitats
- Slopes in excess of 12 percent
- Rivers/scenic rivers
- Federal Emergency Management Agency 100-year flood zone
- Surface water
- Riparian areas
- Wetlands
- Tribal lands
- Military installations
- Local/state parks, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service/national wildlife refuges

The white areas on the map reflect opportunity areas for corridor development. Ranges of population densities are also shown. These areas represent developed communities with a population density threshold of more than 100 persons per square mile and all fall within the white opportunity areas. These areas are shown for reference purposes to understand where population clusters reside and, therefore, to understand the nodes or activity centers that people may be traveling between.

Additional opportunities exist to consider in corridor planning; however, these are not necessarily geographic in nature and are therefore translational to the above mentioned maps. These considerations include:

- Potential shared corridors for broadband infrastructure deployment
- Coordination with the Bureau of Land Management (BLM) and other federal land management agencies' planning processes to better serve recreational areas and/or align with their travel and/or resource management plans
- High potential for commercial-scale renewable energy generation throughout the study area (especially solar), which requires transport options for energy transmission, as well as facilitates industrial growth
- Potential for shared or adjacent rights-of-way for other utility transmission

Leading Opportunities and Constraints

Topography and land ownership patterns will form the major corridor consideration constraints in the Northern Nevada Future Connectivity Corridor, which comprises the majority of the state (Figure 3-1). Nevada contains many isolated mountain ranges separated by flatter basins. These ranges generally trend north-south and most are short and narrow with steep slopes (greater than 12 percent). The western side of the state includes portions of the Sierra Nevada Mountains, as well as many lakes and reservoirs. From a land management standpoint, the overwhelming majority of the state is comprised of BLM land, U.S. Forest Service lands, and military land holdings. The Humboldt-Toiyabe National Forest comprises 6.3 million acres in Nevada (the largest national forest in the lower 48 states), split into more than 10 clusters of forest lands throughout the state. Military land holdings are large, specifically Nellis Air Force Base, the Nevada National

Security Site (Nevada Test Site), Creech Air Force Base, Fallon Naval Air Station, and Hawthorn Army Ammunition Plant. The area also has several state wildlife areas, wilderness areas, and tribal communities. Most ACECs and critical habitat areas are located in the southeastern and northwestern parts of Nevada. Population clusters are dispersed, with Reno-Sparks/Carson City being the primary population/employment center in northern Nevada.

From an opportunity standpoint, the majority of the Northern Nevada Future Connectivity Corridor area is primarily managed by government entities with minimal development. The area falls within a medium to very high solar potential range and has potential for other renewable energy resources, including wind and geothermal energy production.

Existing and Future Transport Characteristics

Nevada is served by two Interstate highways with primary travel being east-west movements, including I-80 which traverses the northern portion of the state, and I-15, which although serving north-south travel, crosses southern Nevada in an east-west direction. Two Union Pacific Railroad (UPRR) mainlines traverse Nevada – one linking central California with Salt Lake City via Reno, and the other connecting Los Angeles with Salt Lake City via Las Vegas. No north-south rail service exists connecting the Las Vegas metropolitan areas to Northern Nevada.

New passenger rail routes are currently under study to improve passenger rail connectivity in the Southwestern U.S. Similar to highways, interstate passenger rail (Amtrak) is limited to east-west travel. Intercity and Interstate public transportation is currently served exclusively by buses.

Congestion

Congestion has impacts on both people and goods, affecting businesses, suppliers, manufacturers, and the overall economy. If congestion affects truck productivity and delivery times, costs are passed on to consumers in the form of higher prices, affecting areas far from the region where the congestion occurs. Congestion can result in unreliable trip times and missed deliveries, which have major business implications. Severe congestion also has the potential to impact shipping patterns whereby freight flows are diverted to less congested routes.

Two locations in Nevada appear in FHWA's annual report on congestion at freight-significant highway locations. The majority of locations currently monitored are urban Interstate interchanges, and they are ranked according to the impact of congestion on freight (American Transportation Research Institute 2011):

- I-15 at I-515 in Las Vegas
- I-80 at US-395 in Reno

Figure 3-2 shows the existing congestion on the major highways in Northern Nevada. As illustrated, very little congestion exists today, with the exception of some congested segments of US-395 through Reno.

Future year 2040 forecasts (**Figure 3-3**) show that in the Northern Nevada Future Connectivity Corridor, new capacity may be needed to accommodate growth along I-580/US-395 through Reno. Additionally, some moderate congestion is expected along I-580 through Carson City and south of Reno. All other major highway corridors are expected to experience little to no congestion in 2040 based on current travel demand models. As traffic congestion continues to increase on California highways, long-distance passenger vehicle and commercial truck trips greater than 50 miles may shift to parallel routes east of the Sierra Nevada such as US-395, US 95, I-15, or an I-11 and Intermountain West Corridor. Nearly all of the major freeways in Southern California are projected to be congested in 2040.

Ports

The U.S. is the top importer of containerized cargo in the world, much of which enters the country on the West Coast and is shipped to destinations across the country. Because the Port of Los Angeles/Port of Long Beach (POLA/POLB) in Southern California are the number one and two gateways of manufactured goods from the Asian markets, and are typically the most cost-effective way to deliver goods to North American markets, their function and capacity have a significant impact on the direction and volume of freight flows in the study area. Increasing congestion on California's road and rail systems could have the effect of shifting greater amounts of trade.

The ports of Seattle, Tacoma, and Oakland could potentially use an I-11 and Intermountain West Corridor. These ports handled only 61 percent of their total capacity in 2010. The Canadian ports of Vancouver and Prince Rupert are also viable alternatives to the congested POLA/POLB complex. They are the 5th and 26th largest ports in North America, for containerized cargo. The port of Vancouver is essentially located at the north end of the I-5 Corridor and has committed to improvements to meet the growing demand for capacity expected over the next 25 years. Prince Rupert has a geographically advantageous location; due to its high latitude, it is three days closer to China than POLA/POLB. It is located in an area with little congestion, and goods that land in Prince Rupert can be transported to Chicago via road or rail within four days.

The I-11 and Intermountain West Corridor has the opportunity to facilitate goods movement across the country by providing efficient north-south connections between major east-west highway and rail corridors.

Figure 3-2. Existing Congestion on Major Highways in Northern Nevada Future Connectivity Area

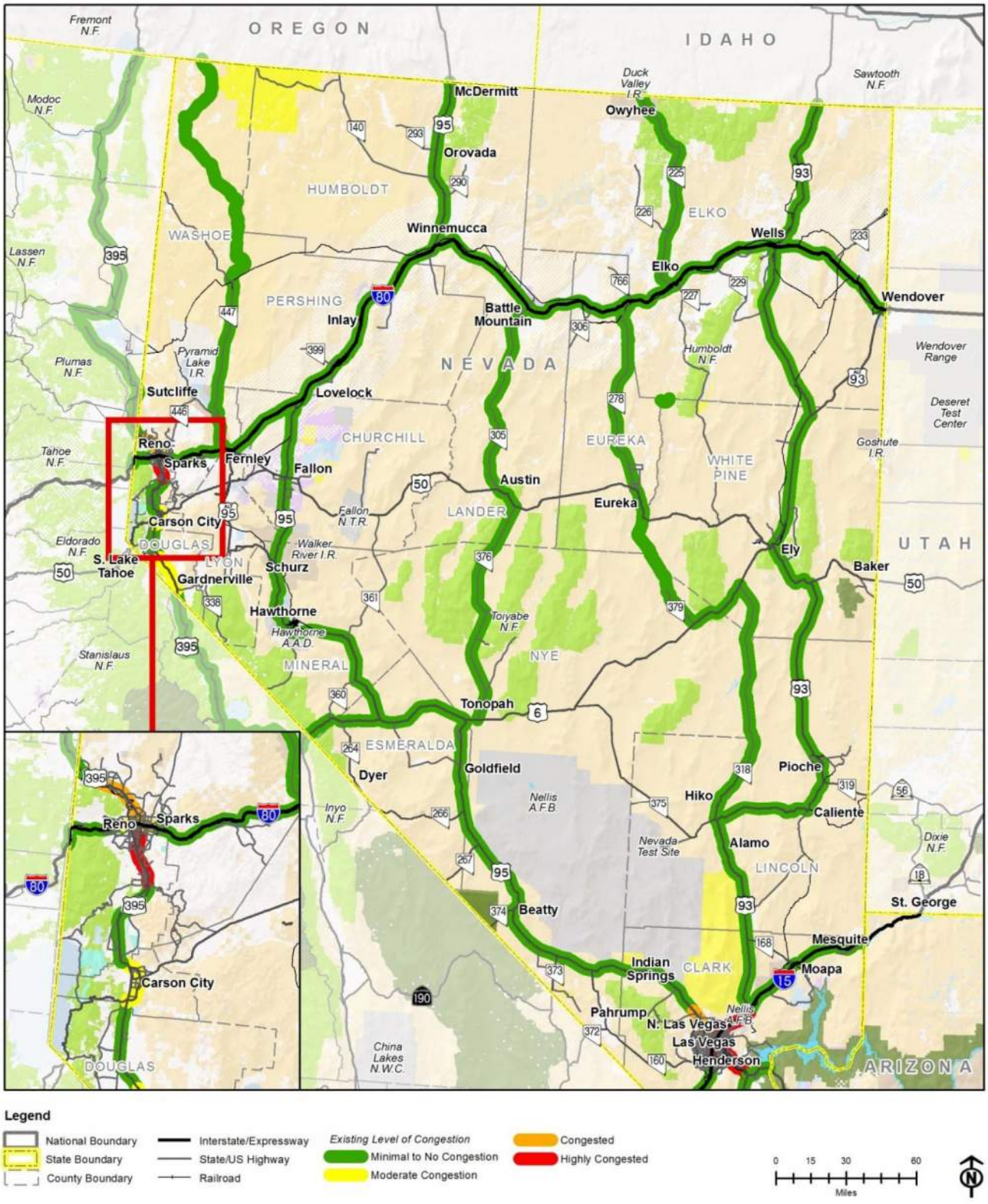
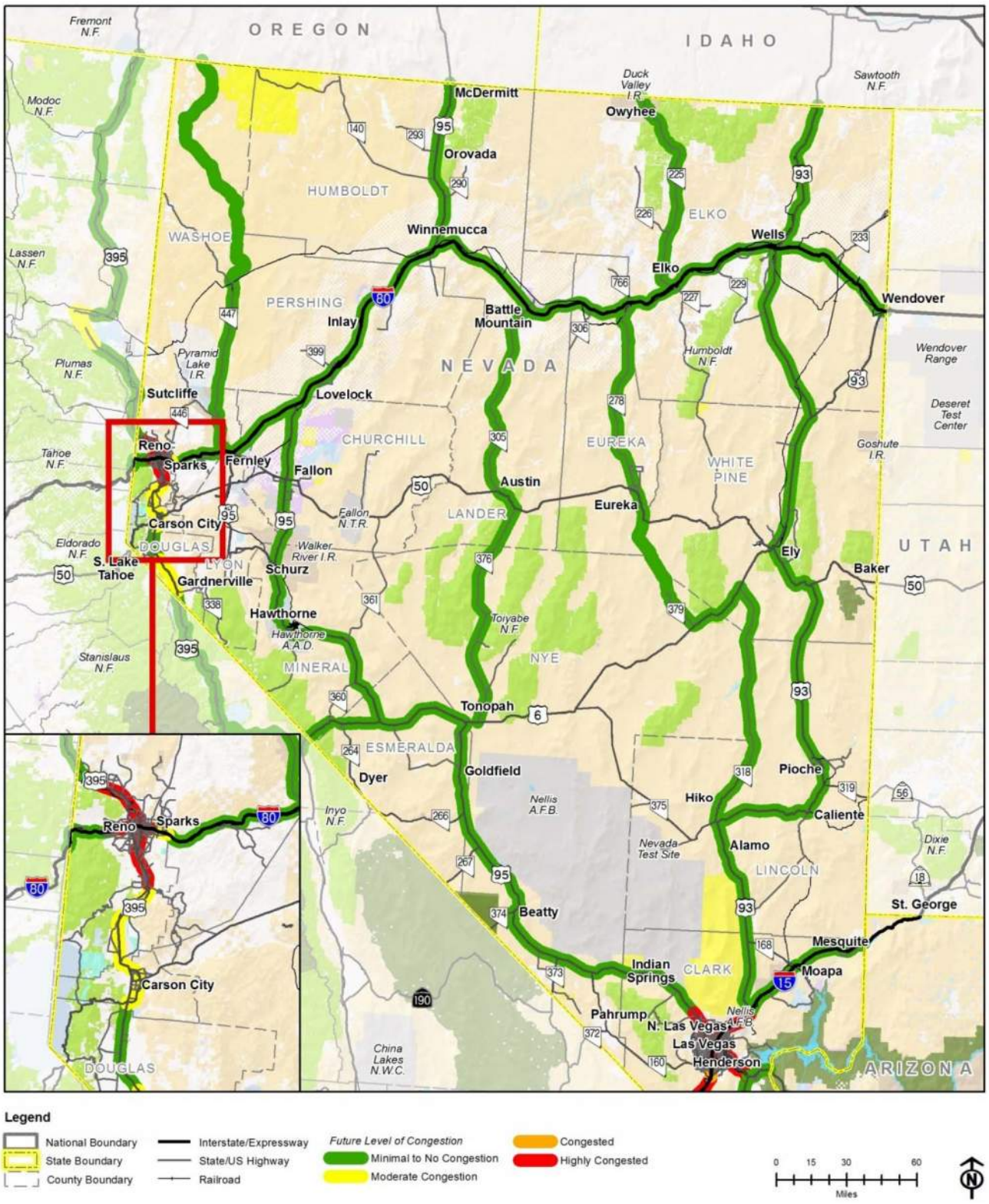


Figure 3-3. Future Congestion on Major Highways in Northern Nevada Future Connectivity Area

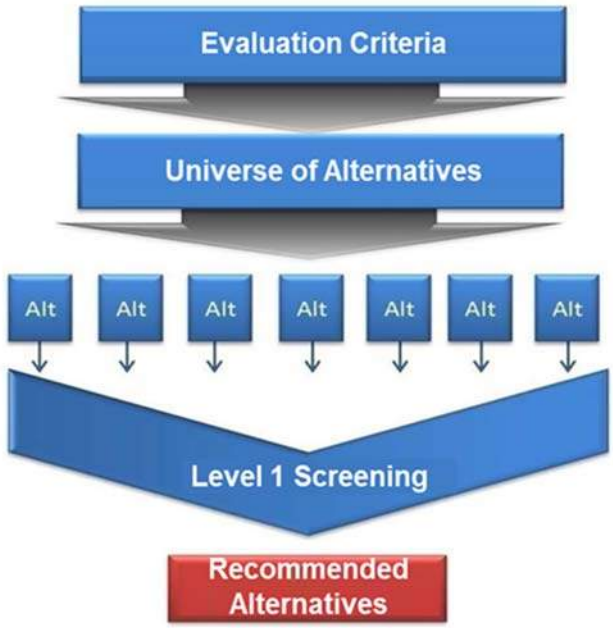


4. Evaluation Framework and Alternatives Development

Evaluation Framework

For purposes of this study, an alternative is defined as a corridor containing one or more modes (e.g., highway or rail) within one or more of the corridor segments. Part or all of a corridor may consist of, or contain, an existing transportation facility as well as other infrastructure, such as utilities. The evaluation process for the future connectivity corridors consisted of one level of qualitative screening (see **Figure 4-1**). Recommended alternatives suggest preferred corridor connections only, with specific alignment planning to be pursued in future planning efforts.

Figure 4-1. Evaluation Process for Future Connectivity Corridors



Process

The Level 1 screening applied a small number of qualitative criteria to a comprehensive universe of alternatives. The purpose of this evaluation was to assess whether an alternative met the Goals and Objectives of the project to help identify which corridor options (routes and modes) could be the most promising candidates for long-term connections to the Congressionally Designated Corridor.

Evaluation Criteria

The first step of this process was to develop the evaluation criteria. Eleven evaluation categories were formulated in consultation with stakeholders and consisting of one or more evaluation criteria, as shown in **Table 4-1**.

Table 4-1. Evaluation Criteria

Evaluation Category		Criteria
Legislation	1	How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?
System Linkage	2	How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?
	3	How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?
	4	How well does this alternative connect with adjacent segments/sections?
Trade Corridor	5	How well does this alternative connect major freight hubs and high-capacity transportation corridors?
Modal Interrelationships	6	How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?
	7	How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?
Capacity/Congestion	8	How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?
	9	How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?
Economic Vitality	10	How well does this alternative support regional, state and national economic development goals?
Project Status/ Transportation Policy	11	How well does this alternative comply with corridor-related actions taken to date?
	12	How well does this alternative conform to locally adopted transportation plans?
Environmental Sustainability	13	How compatible is this alternative with regional open space, conservation, and land management agency planning?
	14	How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?
Land Use and Ownership	15	How consistent is this alternative with regional land use and growth strategies?
	16	How compatible is this alternative with major land ownership patterns?
Community Acceptance	17	How well is this alternative accepted by the local communities?
Cost	18	What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?

Note: Each criteria was rated on a five-level qualitative scale of “least favorable” to “most favorable.”

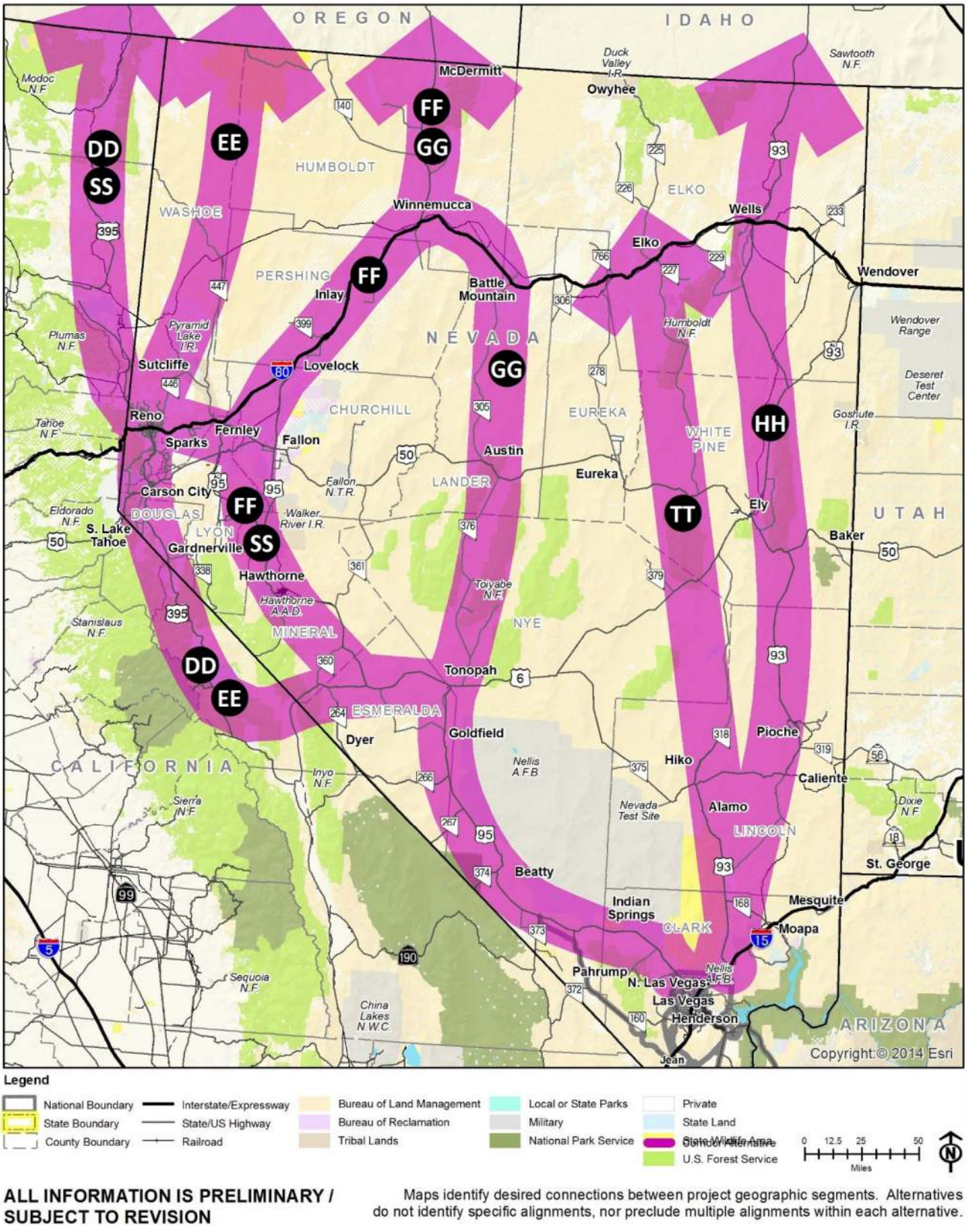
Universe of Alternatives

Seven alternative corridor connections were developed for the Northern Nevada Future Connectivity Corridor. **Table 4-2** describes the alternative corridor connections developed, as illustrated together in **Figure 4-2**. Alternative corridors are shown as wide swaths to represent broad corridor connections. These broad swaths do not necessarily represent one corridor, but rather might encompass a range of alternative alignments that can be explored in future phases of more detailed study. The ultimate goal of selecting a preferred alternative(s) is to choose a connection(s) between the Congressionally Designated Corridor and Canada that best meets the Goals and Objectives of implementing a major trade corridor in the Intermountain West.

Table 4-2. Alternative Corridor Connections for the Northern Nevada Future Connectivity Corridor

Alternative	Description
DD	This alternative travels through western Nevada to make a northerly connection into California and Oregon, diverting west near Reno.
EE	This alternative travels through western Nevada to make a northerly connection into Oregon through Washoe County.
FF	This alternative travels through western Nevada to make a northerly connection into Oregon through Winnemucca, and traversing the Fernley/Fallon area.
GG	This alternative travels through central Nevada to make a northerly connection into Oregon through Winnemucca.
HH	This alternative travels through eastern Nevada to make a northerly connection into Idaho (centered on the existing US-93 corridor).
SS	This alternative travels through western Nevada to make a northerly connection into California and Oregon, diverting west near Fernley toward Reno.
TT	This alternative travels through eastern Nevada to make a connection at Elko with the ability to travel east, west, or north.

Figure 4-2. Alternative Corridor Connections for the Northern Nevada Future Connectivity Corridor



ALL INFORMATION IS PRELIMINARY / SUBJECT TO REVISION

Maps identify desired connections between project geographic segments. Alternatives do not identify specific alignments, nor preclude multiple alignments within each alternative.

5. Alternatives Evaluation Summary and Results

Criteria Applicability

The study team conducted the evaluation of the seven alternatives shown in Figure 4-2, with each alternative rated with respect to the evaluation criteria presented in Table 4-1. General guidance on how the criteria were evaluated for the Northern Nevada Future Connectivity Corridor in relationship to the project's Goals and Objectives follows.

Criterion 1: How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?

- Alternatives were evaluated based on their compliance with Congressionally-designated high priority corridors, including:
  - CANAMEX: I-19 from Nogales to Tucson, I-10 from Tucson to Phoenix, US-93 in the vicinity of Phoenix to the Nevada border, US-93 from the Arizona border to Las Vegas, and I-15 from Las Vegas to the Canadian border.
  - The Washoe County corridor, along Interstate Route 580/United States Route 95/United States Route 95A, from Reno, Nevada, to Las Vegas, Nevada.
  - United States Route 395 Corridor from the United States-Canadian border to Reno, Nevada.
  - United States Route 95 Corridor from the Canadian border at Eastport, Idaho, to the Oregon state border.

Criterion 2: How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?

- Alternatives were evaluated based on their connectivity to primary centers of population and commerce at segment termini and along the corridor. This analysis was conducted at a macro scale using the megapolitan areas identified by America 2050 and the Regional Plan Association, shown previously in Figure 2-1 and introduced in the "Corridor Justification Report", as major economic activity centers. In this segment, primary consideration was given to alternatives that connected to both the Southern California (includes Las Vegas) megapolitan and the Northern California (includes Reno/Fernley) megapolitan.

Criterion 3: How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?

- This criterion was applied to all segments to understand gaps or links in the regional transportation network that can be filled (or a route made more efficient) with the construction of this corridor. In this segment, there are gaps in the Congressionally-designated Washoe County Corridor, specifically in that I-580 does not connect to US 95 or US 95A; therefore, alternatives that closed these gaps and important gaps in the overall transportation network rated higher than those that did not.

Criterion 4: How well does this alternative connect with adjacent segments/sections?

- Alternatives were evaluated based on the ability to make a connection with an alternative in the adjacent segment/section. Alternatives that connected with two adjacent segments rated "most

favorable"; alternatives that connected with one adjacent segment rated "moderately favorable"; and alternatives that did not connect with any adjacent segments rated "least favorable." A maximum of only one connection is possible in this segment, and therefore the maximum rating is "moderately favorable." All alternatives in this segment connect to the Congressionally Designated Corridor.

Criterion 5: How well does this alternative connect major freight hubs and high capacity transportation corridors?

- Alternatives were evaluated based on how many freight hubs (Reno/Sparks Metropolitan Area, Fernley Industrial Park, Elko Regional Railport, and Tahoe-Reno Industrial Center) and/or high capacity transportation corridors (I-80, UPRR) they traversed.

Criterion 6: How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?

- Alternatives were evaluated based on the number of east-west, high-capacity roadway and railroad corridors traversed, and proximate airports and intermodal yard facilities. Intermodal connections include the UPRR Sparks Intermodal Facility, Elko Rail Yard, Elko Regional Railport, Fernley Industrial Park, Tahoe-Reno Industrial Center, Carlin Rail Yard, Reno-Tahoe International Airport, Amtrak (operating in UPRR corridor parallel to I-80), and I-80.

Criterion 7: How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?

- Alternatives were evaluated qualitatively, based on the percent of the corridor that could accommodate multiple modes and uses (highway, rail, utilities, etc.) in one corridor footprint. Those alternatives along existing rail lines (e.g., Nevada Northern Railway, South Central Route, and Thorne Branch Line) rated higher. Other alternatives with topographic constraints rated lower.

Criterion 8: How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?

- Alternatives were evaluated using existing and projected future level of service conditions identified in the "Corridor Justification Report". Where an alternative has the opportunity to relieve congestion between major activity centers, it was rated "most favorable".

Criterion 9: How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?

- Since this criterion was not related to this segment, all of the alternatives were rated equally with a "moderately favorable" rating.

Criterion 10: How well does this alternative support regional, state and national economic development goals?

- Alternative corridors were rated "somewhat favorable", "moderately favorable", or "less favorable" based on their ability to take advantage of industry targets identified in **Table 5-1**. Generally speaking, the larger urbanized areas (e.g., Reno-Sparks, Carson City) are better situated to take advantage of the industry clusters requiring a larger and/or higher-skilled workforce.

Table 5-1. Arizona and Nevada Industry Targets and Clusters

Industry Targets	Arizona	Nevada	Requires Regional Transportation Network
Advanced Manufacturing	•	•	•
Aerospace, Aviation, Defense	•	•	•
Agriculture	•	•	•
Biotechnology	•		•
Healthcare	•	•	
Information and Computer Technology	•	•	
Life Sciences	•		•
Mining and Materials	•	•	•
Optics	•		•
Renewable Energy	•	•	•
Science and Technology	•		•
Tourism, Gaming, and Entertainment	•	•	•
Transportation and Logistics	•	•	•

Sources: Arizona Commerce Authority 2013, Greater Phoenix Economic Council 2013, Tucson Regional Economic Opportunities 2006, Nevada Governor's Office of Economic Development 2013

Criterion 11: How well does this alternative comply with corridor-related actions taken to date?

- Alternatives were evaluated based on the percent of the corridor recognized by a state or regional corridor-related action. Alternatives utilizing USA Parkway, improved US 95 northwest of Las Vegas, and/or the new I-580 were rated higher.

Criterion 12: How well does this alternative conform to locally adopted transportation plans?

- Alternatives were evaluated based on the percent of the corridor recognized by a plan adopted by a local community, such as a General/Comprehensive Plan or Transportation Master Plan.

Criterion 13: How compatible is this alternative with regional open space, conservation, and land management agency planning?

- Alternatives were evaluated based on the amount of the alternative that traverses a protected open space, identified from various sources which include, but are not limited to: national conservation areas, existing parks, wilderness areas, wildlife refuges, and local/regional open space management plans.

Criterion 14: How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?

- Alternatives were evaluated based on the amount of the corridor traversing various environmental features (as presented in the "Existing Natural and Built Environment" technical memorandum).

Criterion 15: How consistent is this alternative with regional land use and growth strategies?

- Alternatives were evaluated based on the consistency of the corridor with land use or growth strategies identified as part of regional planning efforts (e.g., Regional Transportation Plan [RTP], socioeconomic projections, county comprehensive plans, federal land management plans).

Criterion 16: How compatible is this alternative with major land ownership patterns?

- Alternatives were evaluated based on the compatibility of a major transportation infrastructure facility to traverse land under state or federal ownership, including such land owners as BLM, Bureau of Reclamation, U.S. military, National Park Service, state land departments, state parks, tribal communities, U.S. Fish and Wildlife, and U.S. Forest Service.

Criterion 17: How well is this alternative accepted by the local communities?

- Input received from Stakeholder Partners and their constituents at the October 2013 stakeholder partner/public meetings, as well as input received via the online comment form or other written communication, were considered in determining the degree of acceptance of an alternative. Alternatives that received no comments or conflicting comments (supportive and non-supportive) received a "moderately favorable" rating. Alternatives that received mostly supportive comments received the "most favorable" rating and alternatives that received mostly non-supportive comments received the "least favorable" rating.

Criterion 18: What is the overall relative cost of this alternative, where "least favorable" is the highest relative cost and "most favorable" the lowest?

- Generalized, comparative planning-level costs were estimated based primarily on length of the alternative, with capital construction cost factors given to (a) existing corridors, (b) existing corridors requiring additional right-of-way or significant upgrades/improvements, and (c) new/green corridor development. Compared to the cost per mile of improving an existing highway, it was assumed that a new highway would cost twice as much, and that an existing highway with estimated significant right-of-way acquisitions or improvements needed would cost 1.5 times as much.

Stakeholder Input

Stakeholder input was received at each stage of the evaluation process, as further discussed in Chapter 7. The evaluation was conducted by a multidisciplinary consultant team, with input from the Project Sponsors (NDOT and ADOT), Core Agency Partners, Stakeholder Partners, and the general public.

Northern Nevada Evaluation Results

The study team conducted the evaluation of all alternatives (please refer to the *Technical Memorandum: Level 1 Evaluation Results Summary*, June 2014).

Each alternative was rated with respect to each of the evaluation criteria. The rating system consisted of a qualitative scale from least to most favorable, with "most favorable" relative rating representing the best performance and "least favorable" relative rating representing the worst performance.

Most Favorable	Somewhat Favorable	Moderately Favorable	Less Favorable	Least Favorable

The evaluation rating scale is strictly relative – alternatives were considered in relation to each other in the same project segment. If an alternative receives the highest rating, it may still face issues or obstacles with respect to that criterion.

A summary rating was applied to all of the alternatives to note their overall ability to meet the goals and objectives as a measure of reasonableness and feasibility. Alternatives ranking "moderately favorable," "less favorable", or "least favorable" typically include a fatal flaw or do not support the project's goals and objectives.

A summary of the evaluation results are presented in **Table 5-2**, listing each member of the universe of alternatives for the Northern Nevada Future Connectivity Corridor, its summary rating, and its recommendation. For this segment, those corridors "recommended for further analysis" will undergo more detailed analysis in future studies.

Table 5-2. Evaluation Results for Northern Nevada

Alternative	Rating Scale	Recommendation
DD		Not Recommended for Further Analysis
EE		Not Recommended for Further Analysis
FF		***Recommended for Further Analysis***
GG		Not Recommended for Further Analysis
HH		Not Recommended for Further Analysis
SS		***Recommended for Further Analysis***
TT		Not Recommended for Further Analysis

The following summary sheets provide an overview of the evaluation results for each alternative in the Northern Nevada Future Connectivity Corridor, including a map of the alternative, alternative description, summary rating scale, and opportunities/constraints of the alternative, followed by the detailed evaluation rating scales and notes.

Alternative DD

Description

This alternative travels through western Nevada to make a northerly connection into California and Oregon, diverting west near Reno.

Recommendation

- **Not Recommended for Further Analysis**

Opportunities

- Connects major freight and economic activity centers within Nevada, with opportunities for intermodal connectivity (with UPRR Sparks rail yard, Reno-Tahoe International Airport, Amtrak and I-80)

Constraints

- Environmental constraints along existing US 395 requiring significant upgrades/improvements
- Steep grades in portions are not suitable for rail and difficult for trucks
- Not compatible with major land ownership; traverses U.S. Forest Service land

Alternative DD			
Category	**Criteria**	**Rating**	**Notes**
Legislation	1 How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		Two corridor components use federal high priority corridor elements (Washoe County Corridor and US 395).
System Linkage	2 How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Directly connects the Southern California megapolitan (includes Las Vegas) to the Northern California megapolitan (includes Reno).
	3 How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Closes gaps between I-580 and US 95.
	4 How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5 How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between Las Vegas and Reno metropolitan areas and between I-15 and I-80, however, steep grades in portions are difficult for rail and truck transport.
Modal Interrelationships	6 How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Opportunities for intermodal connectivity with UPRR Sparks rail yard, Reno-Tahoe International Airport, Amtrak and I-80.
	7 How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Accommodation of multiple modes might be difficult due to steep grades on the portion of US 395 south of Reno, and no existence of parallel rail lines.
Capacity/Congestion	8 How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9 How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10 How well does this alternative support regional, state and national economic development goals?		Supports many industry cluster targets (mining, gaming, transportation logistics, renewable energy, agriculture).
Project Status/ Transportation Policy	11 How well does this alternative comply with corridor-related actions taken to date?		Uses improved US 95 northwest of Las Vegas, and new I-580.
	12 How well does this alternative conform to locally adopted transportation plans?		Consistent with Connecting Nevada, improves connectivity between Las Vegas and Reno metropolitan areas.
Environmental Sustainability	13 How compatible is this alternative with regional open space, conservation, and land management agency planning?		No known open space constraints.
	14 How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Potential environmental constraints along existing highways, requiring upgrades/improvements. Passes through aboriginal roaming areas.
Land Use and Ownership	15 How consistent is this alternative with regional land use and growth strategies?		Traverses Reno; most consistent with statewide growth strategies.
	16 How compatible is this alternative with major land ownership patterns?		Not compatible with major land ownership; alternative traverses U.S. Forest Service land.
Community Acceptance	17 How well is this alternative accepted by the local communities?		Mostly non-supportive comments.
Cost	18 What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

Alternative EE

Description

This alternative travels through western Nevada to make a northerly connection into Oregon through Washoe County.

Recommendation

- **Not Recommended for Further Analysis**

Opportunities

- Connects major freight and economic activity centers within Nevada (including Las Vegas and Reno metropolitan areas)
- Closes existing gaps between I-580 and US 95

Constraints

- Traverses National Conservation Area
- Significant environmental constraints (traverses Wilderness Area and does not utilize existing major highways)
- Not consistent with major land ownership patterns (traverses forest service land and Pyramid Lake Paiute tribal lands)

Alternative EE			
Category	**Criteria**	**Rating**	**Notes**
Legislation	1 How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		One component uses a federal high priority corridor element (Washoe County Corridor).
System Linkage	2 How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Directly connects the Southern California megapolitan (includes Las Vegas) to the Northern California megapolitan (includes Reno).
	3 How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Closes gaps between I-580 and US 95.
	4 How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5 How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between Las Vegas and Reno metropolitan areas and between I-15 and I-80, however, steep grades in portions are difficult for rail and truck transport.
Modal Interrelationships	6 How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Opportunities for intermodal connectivity with UPRR Sparks rail yard, Reno-Tahoe International Airport, Amtrak and I-80.
	7 How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Accommodation of multiple modes might be difficult due to steep grades on the portion of US 395 south of Reno, and no existence of parallel rail lines.
Capacity/Congestion	8 How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9 How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10 How well does this alternative support regional, state and national economic development goals?		Supports many industry cluster targets (mining, gaming, transportation logistics, renewable energy, agriculture).
Project Status/ Transportation Policy	11 How well does this alternative comply with corridor-related actions taken to date?		Uses improved US 95 northwest of Las Vegas, and new I-580.
	12 How well does this alternative conform to locally adopted transportation plans?		Consistent with Connecting Nevada, improves connectivity between Las Vegas and Reno metropolitan areas.
Environmental Sustainability	13 How compatible is this alternative with regional open space, conservation, and land management agency planning?		Traverses through National Conservation Area.
	14 How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Goes through wilderness area in northeastern Nevada and does not follow existing major highways. Passes through aboriginal roaming areas.
Land Use and Ownership	15 How consistent is this alternative with regional land use and growth strategies?		Traverses Reno; most consistent with statewide growth strategies.
	16 How compatible is this alternative with major land ownership patterns?		Not compatible with major land ownership; alternative traverses U.S. Forest Service and tribal land.
Community Acceptance	17 How well is this alternative accepted by the local communities?		Mostly non-supportive comments.
Cost	18 What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

Alternative FF

Description

This alternative loosely follows the US 95 Corridor north from Las Vegas through the Fernley/Fallon area, then on to Oregon and Idaho through Winnemucca.

Recommendation

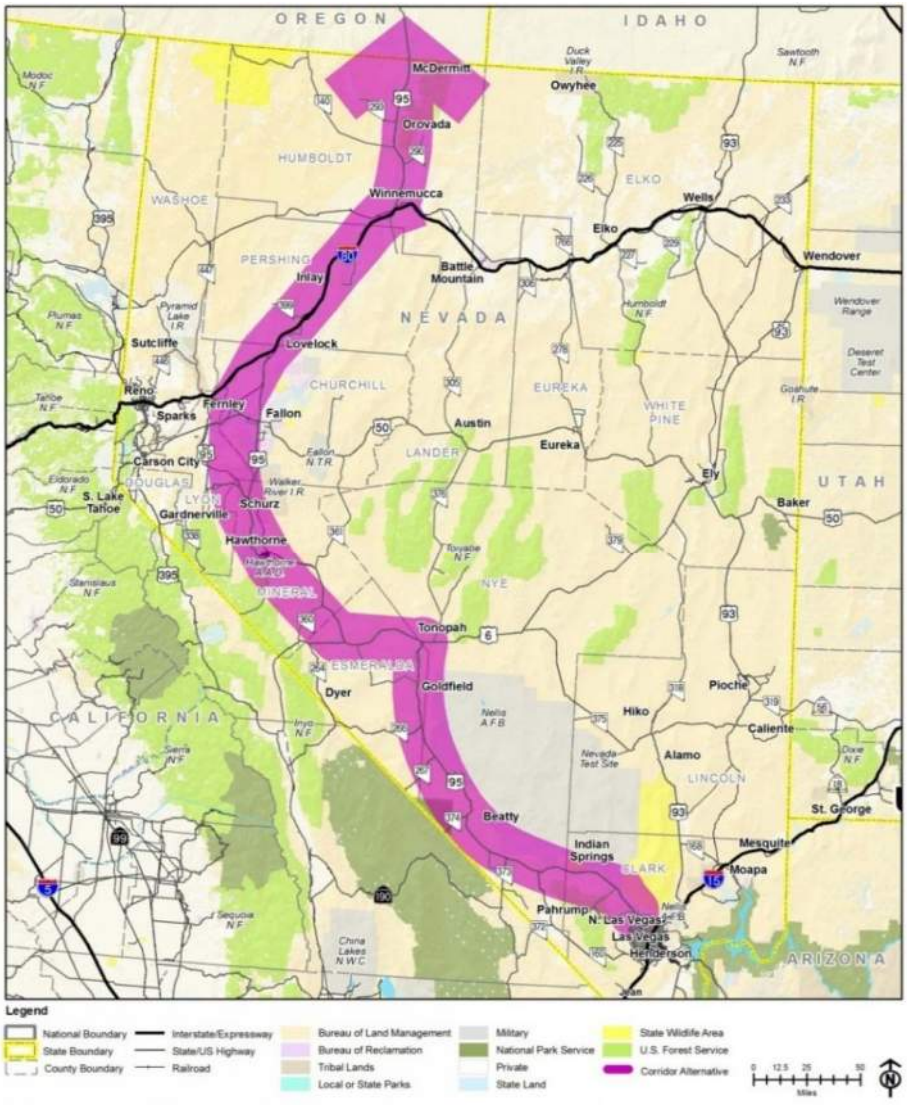
- **Recommended for Further Analysis**

Opportunities

- Connects major freight and economic activity centers within Nevada (including Las Vegas Metropolitan Area, Reno Metropolitan Area through Fernley, and Fernley Industrial Park)
- Potential to accommodate multiple modes in a share corridor with existing rail along the Thorne Branch Line
- Much of corridor follows Congressional high priority corridor (Washoe County Corridor), aligns with US 95 completed improvements northwest of Las Vegas, and provides opportunity to also connect to high priority corridor US 95 from the Oregon state border to the Canadian border

Constraints

- Potential environmental constraints



Alternative FF			
Category	**Criteria**	**Rating**	**Notes**
Legislation	1 How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		Portions of corridor use a federal high priority corridor element (Washoe County Corridor) and provides opportunity to also connect to high priority corridor (US 95 from the Oregon state border to the Canadian border).
System Linkage	2 How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Directly connects the Southern California megapolitan (includes Las Vegas) to the Northern California megapolitan (includes Reno/Fernley).
	3 How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Develops higher capacity linkage.
	4 How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5 How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between Las Vegas and Fernley (including Fernley Industrial Park) and between I-15 and I-80.
Modal Interrelationships	6 How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Opportunities for intermodal connectivity with Fernley Industrial Park, Amtrak and I-80.
	7 How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Connection between Tonopah and Fernley is along existing rail line (Thorne Branch Line).
Capacity/Congestion	8 How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9 How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10 How well does this alternative support regional, state and national economic development goals?		Supports many industry cluster targets (defense, mining, gaming, transportation logistics, renewable energy, agriculture).
Project Status/ Transportation Policy	11 How well does this alternative comply with corridor-related actions taken to date?		Uses improved US 95 northwest of Las Vegas.
	12 How well does this alternative conform to locally adopted transportation plans?		Consistent with Nevada State Rail Plan and Connecting Nevada, improves connectivity between Las Vegas and Reno metropolitan areas.
Environmental Sustainability	13 How compatible is this alternative with regional open space, conservation, and land management agency planning?		No known open space constraints.
	14 How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Potential environmental constraints along existing highways, requiring fewer upgrades/improvements. Passes through aboriginal roaming areas.
Land Use and Ownership	15 How consistent is this alternative with regional land use and growth strategies?		Provides connection to Reno; most consistent with statewide growth strategies.
	16 How compatible is this alternative with major land ownership patterns?		Wide corridor swath; generally compatible with major land ownership.
Community Acceptance	17 How well is this alternative accepted by the local communities?		Mostly supportive comments.
Cost	18 What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

Alternative GG

Description

This alternative travels through central Nevada to make a northerly connection into Oregon through Winnemucca.

Recommendation

- **Not Recommended for Further Analysis**

Opportunities

- Provides opportunity to connect to a high priority corridor (US 95 from the Oregon state border to the Canadian border)

Constraints

- Connects limited number of major freight and economic activity centers and has limited opportunities for intermodal connectivity
- Because of limited connectivity, does not fully support economic development goals
- Not consistent with transportation plans, such as Connecting Nevada (does not improve connections between Las Vegas and Reno metropolitan areas or between Las Vegas and eastern Nevada)

Alternative GG			
Category	**Criteria**	**Rating**	**Notes**
Legislation	1 How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		One corridor component uses a federal high priority corridor element (Washoe County Corridor) and provides opportunity to also connect to high priority corridor (US 95 from the Oregon state border to the Canadian border).
System Linkage	2 How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Connects to the Southern California megapolitan (includes Las Vegas).
	3 How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Develops higher capacity linkage.
	4 How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5 How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between I-15 and I-80.
Modal Interrelationships	6 How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Limited opportunities for intermodal connectivity include Amtrak and I-80.
	7 How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Wide corridor swath; might accommodate highway and rail.
Capacity/Congestion	8 How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9 How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10 How well does this alternative support regional, state and national economic development goals?		Supports some industry cluster targets (mining, renewable energy, agriculture).
Project Status/ Transportation Policy	11 How well does this alternative comply with corridor-related actions taken to date?		Uses improved US 95 northwest of Las Vegas.
	12 How well does this alternative conform to locally adopted transportation plans?		Not consistent with Connecting Nevada.
Environmental Sustainability	13 How compatible is this alternative with regional open space, conservation, and land management agency planning?		No known open space constraints.
	14 How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Potential traversal of steep slopes, areas of critical environmental concern, wilderness areas, and drainage corridors. Passes through aboriginal roaming areas.
Land Use and Ownership	15 How consistent is this alternative with regional land use and growth strategies?		Supports community development; although major trade corridor not in regional land use plans.
	16 How compatible is this alternative with major land ownership patterns?		Wide corridor swath; generally compatible with major land ownership.
Community Acceptance	17 How well is this alternative accepted by the local communities?		No comments.
Cost	18 What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

Alternative HH

Description

This alternative travels through eastern Nevada to make a northerly connection into Idaho (centered on the existing US-93 corridor).

Recommendation

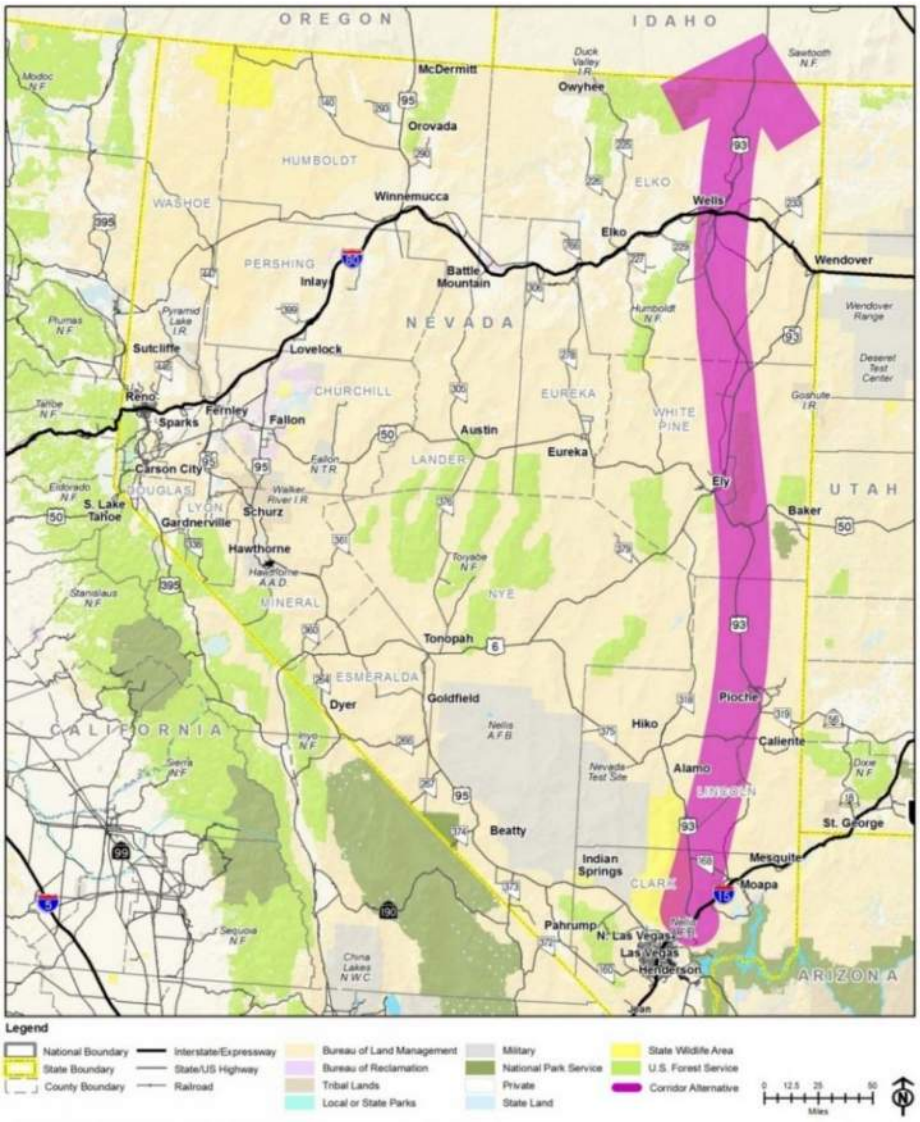
- **Not Recommended for Further Analysis**

Opportunities

- Can accommodate multiple modes; majority of corridor is along existing rail line (South Central Route and Nevada Northern Railway)
- Consistent with several statewide transportation and economic development goals

Constraints

- Does not efficiently connect the Southern California megapolitan (includes Las Vegas) to the Northern California megapolitan (includes Reno)
- Compared to other alternatives, connects a fewer number of major freight and economic activity centers
- Not as consistent with interstate transportation and economic development goals as other alternatives



Alternative HH				
Category		**Criteria**	**Rating**	**Notes**
Legislation	1	How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		Uses no federal high priority corridor components.
System Linkage	2	How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Connects to the Southern California megapolitan (includes Las Vegas), but does not efficiently connect to the Northern California megapolitan (includes Reno).
	3	How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Develops higher capacity linkage.
	4	How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5	How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between I-15 and I-80.
Modal Interrelationships	6	How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Opportunities for intermodal connectivity with Carlin rail yard, Amtrak and I-80.
	7	How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Majority of corridor is along existing rail line (South Central Route and Nevada Northern Railway).
Capacity/ Congestion	8	How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9	How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10	How well does this alternative support regional, state and national economic development goals?		Supports some industry cluster targets (mining, renewable energy, agriculture).
Project Status/ Transportation Policy	11	How well does this alternative comply with corridor-related actions taken to date?		No known recent corridor-related actions taken to date.
	12	How well does this alternative conform to locally adopted transportation plans?		Consistent with Nevada State Rail Plan and Connecting Nevada, improves connectivity between Las Vegas Metropolitan Area and eastern Nevada.
Environmental Sustainability	13	How compatible is this alternative with regional open space, conservation, and land management agency planning?		No known open space constraints.
	14	How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Potential environmental constraints along existing highways, requiring fewer upgrades/improvements. Passes through Confederated Tribes of the Goshute Reservation aboriginal roaming area.
Land Use and Ownership	15	How consistent is this alternative with regional land use and growth strategies?		Supports community development; consistent with Great Basin Regional Development Authority growth strategies.
	16	How compatible is this alternative with major land ownership patterns?		Wide corridor swath; generally compatible with major land ownership.
Community Acceptance	17	How well is this alternative accepted by the local communities?		Mixed comments.
Cost	18	What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

Alternative SS

Description

This alternative loosely follows the US 95 Corridor north from Las Vegas to Interstate 80, then west to US 395 in Reno, then makes a northerly connection into California and Oregon.

Recommendation

- **Recommended for Further Analysis**

Opportunities

- Connects major freight and economic activity centers within Nevada (including Las Vegas and Reno metropolitan areas, Tahoe-Reno Industrial Center, and Fernley Industrial Park)
- Closes gaps between two Congressionally designated corridors (Washoe County Corridor and US 395) and aligns with US 95 completed improvements northwest of Las Vegas and potential use of USA Parkway between US-50 and I-80
- Opportunities for intermodal connectivity with UPRR Sparks rail yard, Tahoe-Reno Industrial Center, Fernley Industrial Park, Reno-Tahoe International Airport, Amtrak and I-80

Constraints

- Potential environmental constraints

Alternative SS			
Category	**Criteria**	**Rating**	**Notes**
Legislation	1 How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		Majority of segments are components of federal high priority corridors (Washoe County Corridor and US 395).
System Linkage	2 How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Directly connects the Southern California megapolitan (includes Las Vegas) to the Northern California megapolitan (includes Reno/Fernley).
	3 How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Closes gaps between two Congressionally designated corridors (US 95 and US 395).
	4 How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5 How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between Las Vegas, Reno metropolitan areas (including the Tahoe-Reno Industrial Center), Fernley (including the Fernley Industrial Park) and between I-15 and I-80.
Modal Interrelationships	6 How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Opportunities for intermodal connectivity with UPRR Sparks rail yard, Tahoe-Reno Industrial Center, Reno-Tahoe International Airport, Fernley Industrial Park, Amtrak and I-80.
	7 How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Connection between Tonopah and Fernley is along existing rail line (Thorne Branch Line).
Capacity/Congestion	8 How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9 How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10 How well does this alternative support regional, state and national economic development goals?		Supports many industry cluster targets (defense, mining, gaming, transportation logistics, renewable energy, agriculture).
Project Status/ Transportation Policy	11 How well does this alternative comply with corridor-related actions taken to date?		Uses improved US 95 northwest of Las Vegas and potentially USA Parkway between US-50 and I-80.
	12 How well does this alternative conform to locally adopted transportation plans?		Consistent with Connecting Nevada, improves connectivity between Las Vegas and Reno metropolitan areas.
Environmental Sustainability	13 How compatible is this alternative with regional open space, conservation, and land management agency planning?		No known open space constraints
	14 How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Potential environmental constraints along existing highways, requiring fewer upgrades/improvements. Passes through aboriginal roaming areas.
Land Use and Ownership	15 How consistent is this alternative with regional land use and growth strategies?		Traverses Reno; most consistent with statewide growth strategies.
	16 How compatible is this alternative with major land ownership patterns?		Wide corridor swath; generally compatible with major land ownership.
Community Acceptance	17 How well is this alternative accepted by the local communities?		Mixed comments.
Cost	18 What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

Alternative TT

Description

This alternative travels through eastern Nevada to make a connection at Elko with the ability to travel east, west, or north.

Recommendation

- **Not Recommended for Further Analysis**

Opportunities

- Opportunities for intermodal connectivity with Elko Regional Airport, Elko rail yard, Elko Regional Railport, Amtrak and I-80

Constraints

- Does not efficiently connect the Southern California megapolitan (includes Las Vegas) to the Northern California megapolitan (includes Reno)
- Compared to other alternatives, connects a fewer number of major freight and economic activity centers
- Potential environmental constraints

Alternative TT			
Category	**Criteria**	**Rating**	**Notes**
Legislation	1 How well does the alternative meet the intent of legislative actions, including MAP-21 and the 1995 National Highway Systems Designation Act?		Uses no federal high priority corridor components.
System Linkage	2 How well does this alternative connect major national and international activity centers from Mexico to Canada through the Intermountain West?		Connects to the Southern California megapolitan (includes Las Vegas) but does not efficiently connect to the Northern California megapolitan (includes Reno).
	3 How well does this alternative most directly close gaps and/or develop missing linkages in the regional and national transportation network?		Develops higher capacity linkage.
	4 How well does this alternative connect with adjacent segments/sections?		Connects with adjacent segments to the south.
Trade Corridor	5 How well does this alternative connect major freight hubs and high-capacity transportation corridors?		Creates connections between Las Vegas and freight hubs in Elko (Elko Regional Railport) and between I-15 and I-80.
Modal Interrelationships	6 How well does this alternative maximize opportunities for intermodal connectivity (highway, rail/transit, aviation)?		Opportunities for intermodal connectivity with Elko Regional Airport, Elko rail yard, Elko Regional Railport, Amtrak and I-80.
	7 How well does this alternative accommodate multiple modes in a shared corridor footprint (highway and rail)?		Wide corridor swath; might accommodate highway and rail.
Capacity/Congestion	8 How well does this alternative relieve existing and projected congestion between and within the major activity centers in Nevada and Arizona?		N/A
	9 How well does this alternative align with existing conditions or proposed improvements at land ports of entry (as appropriate)?		N/A
Economic Vitality	10 How well does this alternative support regional, state and national economic development goals?		Supports some industry cluster targets (mining, renewable energy, agriculture).
Project Status/ Transportation Policy	11 How well does this alternative comply with corridor-related actions taken to date?		No known recent corridor-related actions taken to date.
	12 How well does this alternative conform to locally adopted transportation plans?		Consistent with Connecting Nevada, improves connectivity between Las Vegas Metropolitan Area and eastern Nevada.
Environmental Sustainability	13 How compatible is this alternative with regional open space, conservation, and land management agency planning?		No known open space constraints.
	14 How well does this alternative minimize environmental impacts (such as drainage, topography, species, and biological connectivity)?		Potential traversal of steep slopes, areas of critical environmental concern, wilderness areas, and drainage corridors. Passes through aboriginal roaming areas.
Land Use and Ownership	15 How consistent is this alternative with regional land use and growth strategies?		Supports community development; consistent with Great Basin Regional Development Authority growth strategies.
	16 How compatible is this alternative with major land ownership patterns?		Wide corridor swath; generally compatible with major land ownership
Community Acceptance	17 How well is this alternative accepted by the local communities?		No comments.
Cost	18 What is the overall relative cost of this alternative, where “least favorable” is the highest relative cost and “most favorable” the lowest?		

6. Findings and Recommendations

Recommendation for Further Analysis

For the Northern Nevada Future Connectivity Corridor, two alternative corridors are recommended as potential candidates for an I-11 and Intermountain West trade corridor, to undergo further analysis in future studies. These include Alternatives FF and SS, which both connect the Las Vegas Metropolitan Area to northwestern Nevada continuing north to the Oregon border for Alternative FF and the California border for SS (**Figure 6-1**). While not recommended as candidate I-11 and Intermountain West Corridors, Alternatives HH and TT (corridor options in eastern Nevada) are recommended for further consideration as key multimodal transportation links of statewide economic importance, to be elaborated further below.

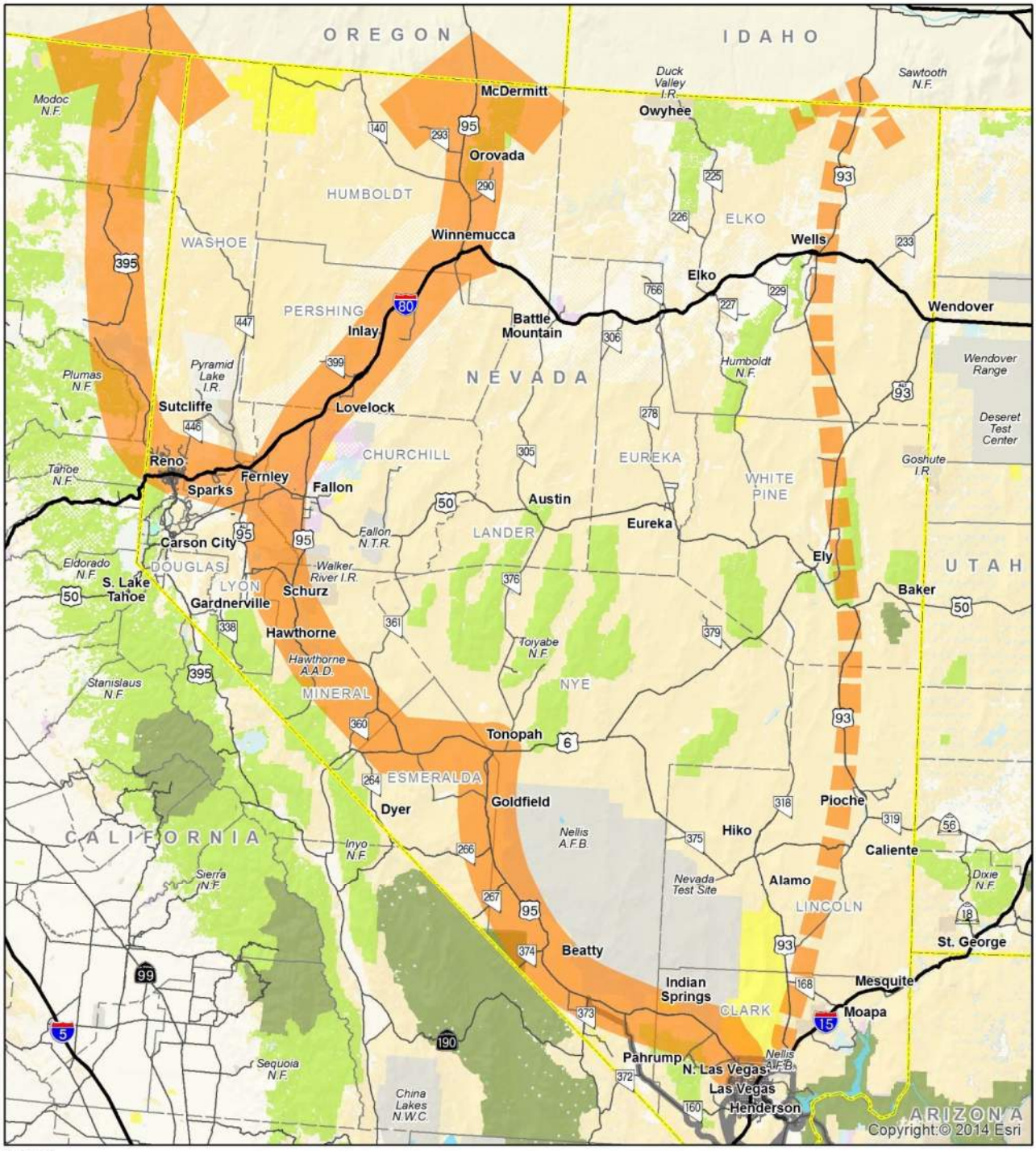
Alternatives FF and SS were found to be the most favorable corridor connections based on a number of factors, as discussed in the evaluation screening results in Chapter 5. As noted previously, this study adheres to the PEL process. While a review of known environmental factors was performed, more detailed analysis is required to select a specific alignment within these broad corridors. The full PEL documentation for the recommended corridor connections is available as its own technical report.

Corridor Opportunities

The summary of major opportunities that Alternative FF (US 95 corridor) provides include:

- Connects major freight and economic activity centers within Nevada (including Las Vegas Metropolitan Area, Reno Metropolitan Area through Fernley, and Fernley Industrial Park); improves connectivity and creates more efficient and higher capacity transportation connection between the two largest economic centers in Nevada.
- Potential to accommodate multiple modes in a shared corridor with existing rail along the Thorne Branch Line.
- Much of alternative follows Congressional high priority corridor (Washoe County Corridor) and provides opportunity to also connect to high priority corridor US 95 from the Oregon state border to the Canadian border.
- Supports many industry cluster targets (defense, mining, gaming, transportation logistics, renewable energy, agriculture, etc.).

Figure 6-1. Alternative Corridor Connections Recommended for Further Analysis



The summary of major opportunities that Alternative SS (US 95 and US 395 corridors) provides include:

- Connects major freight and economic activity centers within Nevada (including Las Vegas and Reno Metropolitan Areas, Tahoe-Reno Industrial Center, and Fernley Industrial Park); improves connectivity and creates more efficient and higher capacity transportation connection between the two largest economic centers in Nevada.
- Closes gaps between two Congressionally-designated high priority corridors (Washoe County Corridor and US 395) and aligns with US 95 completed improvements northwest of Las Vegas and potential use of USA Parkway between US-50 and I-80.
- Opportunities for intermodal connectivity with UPRR Sparks rail yard, Tahoe-Reno Industrial Center, Fernley Industrial Park, Reno-Tahoe International Airport, Amtrak and I-80.
- Potential to accommodate multiple modes in a shared corridor with existing rail along the Thorne Branch Line.
- Supports many industry cluster targets (including but not limited to defense, mining, gaming, transportation logistics, renewable energy, agriculture).

Challenges for Implementation

The following steps are recommended to fully address potential challenges through further evaluation in future studies:

- Close coordination with project stakeholders and public at-large. Underlying federal land ownership patterns could pose a challenge, with several large military installations, national parks, and national forests located in northwestern Nevada, proximate to corridor recommendations. An effort will need to be made to balance the provision of access to such destinations, while not traversing protected areas.
- Much more detailed environmental review will be required to determine the least impactful and most cost effective corridor solution. Topography will be a challenge for both corridors, due to the mountainous terrain. While potential environmental constraints may be lower along existing state highways, there is no direct connection between the Las Vegas and Reno area, likely requiring some corridor upgrades to create a more direct and consistent high-capacity route. Also, these corridors potentially pass through aboriginal roaming areas, which could impact wildlife movement and connectivity.
- Continued coordination with neighboring states will be necessary to understand the best corridor connection point to Canada, including the path of travel through states north of Nevada. To date, conversations have occurred with state DOT representatives from California, Idaho, and Oregon. Their commitments and challenges to implementing such a corridor will need to be understood to develop and define segments of independent utility and logical termini.

Corridors of Statewide Economic Importance

Alternatives HH and TT (corridor options in eastern Nevada) are recommended for further consideration as key multimodal transportation links of statewide economic importance. *Connecting Nevada* recommends improved connectivity between Las Vegas and Reno as well as Las Vegas and the eastern part of the state. Both Alternatives HH and TT are consistent with *Connecting Nevada* in that they improve connectivity between the Las Vegas Metropolitan Area and eastern Nevada. The *Nevada State Rail Plan* recommends improvements to existing rail lines in northern Nevada. Alternative HH may be able to accommodate multiple modes in a shared alignment as the majority of the corridor alternative is along existing South Central Route and Nevada Northern Railway. Alternative TT provides a connection to Elko with opportunities

for intermodal connectivity with Elko Regional Airport, Elko rail yard, Elko Regional Railport, Amtrak and I-80.

White Pine County submitted a letter regarding the advantages and opportunities with these eastern alignments (see Appendix B). Eastern Nevada is on the forefront of new energy development with the only major wind farm in Nevada, and potential to utilize biomass, hydro and solar for future energy projects. It will continue to provide a strong tax base for Nevada with its mining, oil and gas, and renewable energy industries, and a high-capacity transportation link would provide economic benefits to further improve the economy in eastern Nevada.

These eastern alternatives do not meet the goals and objectives of the I-11 and Intermountain West Corridor, however, these corridors support overall regional community development and are consistent with several statewide transportation and economic development goals. Therefore, this study recommends that NDOT and local governments proceed with further study of these corridors as key multimodal transportation links which will support not only regional but also and statewide mobility needs.

Multi-Use Considerations

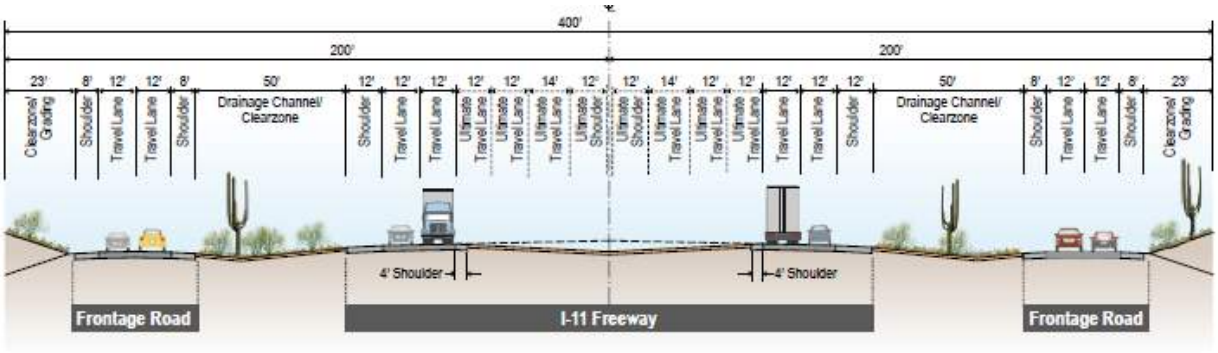
As the Goals and Objectives for the I-11 and Intermountain West Corridor recognize the importance and need for accommodating multiple modes and multiple uses within the corridor's footprint, each corridor alternative was rated based on its ability to accommodate multiple modes and multiple uses (highway, rail, and utilities) through the Modal Interrelationships evaluation category.

Several possible typical sections (or footprints) for the various modal options within the I-11 and Intermountain West Corridor were developed to assist in estimation of multi-use feasibility. The possible footprints include (1) the accommodation of multiple uses and modes (highway, rail, and utilities) (800-foot width), (2) highway and utilities (700-foot width), or (3) highway only (400-foot width) (**Figure 6-2**).

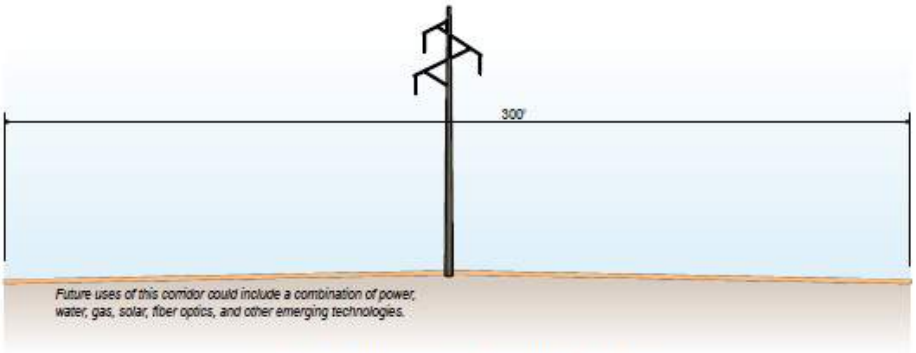
Through this analysis, it was discovered that the many alternative corridors are not able to accommodate multiple modes, specifically rail, throughout the entire length of the corridor due to right-of-way or terrain constraints. Interstates usually have a maximum grade rate of 6 percent, while rail typically has 1.5 percent maximum grades (2 percent for short distances). Therefore, alternate rail corridors were proposed for possible consideration in on-going and future planning studies conducted by public agencies and private sector stakeholders.

Figure 6-3 indicates those portions of the alternatives that are not suitable as multimodal corridors, and suggests possible new rail corridors for future consideration that could close north-south gaps in the existing rail network. These suggestions will require detailed analyses, and are illustrated here primarily to delineate the possibilities for rail enhancements in the region that are complimentary with an I-11 and Intermountain West Corridor. While private rail companies are responsible for decisions regarding their networks, it is hoped that the analyses and recommendations proposed in this study will offer insight and support for those decisions, as well as future partnering opportunities.

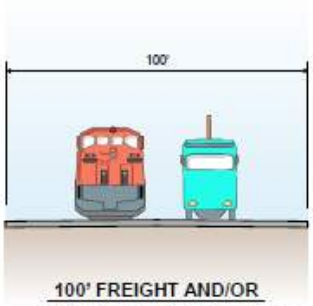
Figure 6-2. I-11 Potential Cross-sections Accommodating Multiple Uses and Modes



400' HIGHWAY SECTION: 4 LANE (10 LANE ULTIMATE)



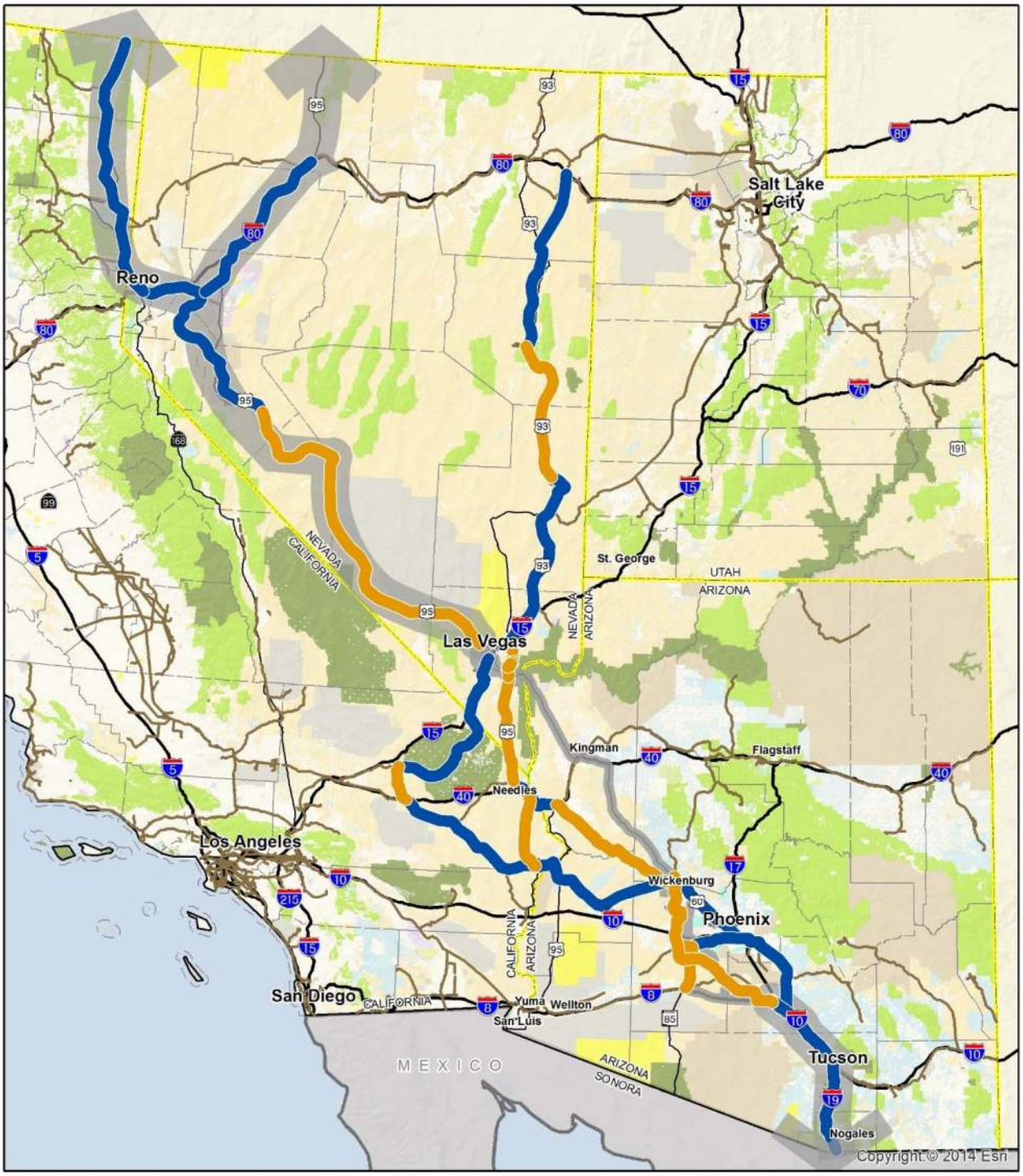
300' CORRIDOR FOR MULTIPLE UTILITIES



100' FREIGHT AND/OR PASSENGER RAIL CORRIDOR

Note:
400' Highway Section + 300' Utility Corridor + 100' Rail Corridor = 800' Right-of-Way
400' Highway Section + 300' Utility Corridor = 700' Right-of-Way

Figure 6-3. Multimodal Considerations



ALL INFORMATION IS PRELIMINARY / SUBJECT TO REVISION

Maps identify desired connections between metropolitan areas. Alternatives do not identify specific alignments, nor preclude multiple alignments within each alternative.

7. Stakeholder Involvement Summary

As noted previously, ADOT, NDOT, FHWA, FRA, MAG, and the RTC comprised a project oversight committee entitled the Core Agency Partners (CAP). In addition, interested public agencies, non-profit organizations and private interest groups were invited to participate in a Stakeholder Partners committee that was asked to provide data and other input, and to share their opinions and ideas at milestone decision points throughout the planning process. The public at large was also consulted to receive community input at key points of the process.

As part of this study effort, project constituents were specifically invited to participate in a series of meetings for Phase 3 of the project which was dedicated to identifying and evaluating alternatives, ultimately recommending a preferred corridor(s) for further consideration, and preparing the Corridor Concept Report.

To encourage participation, meetings were held in various locations and often offered the opportunity to participate via Webinar. **Table 7-1** lists the formal meetings held throughout the project, with specific dates noted for those regarding the future connectivity corridor.

In July 2013, the first of this meeting series occurred to review the results of the Corridor Justification Report, as well as to discuss and receive feedback on the Goals and Objectives, evaluation framework, and alternative modes to be considered for the Corridor. The purpose of this series of meetings was to receive feedback from Stakeholder Partners on the process and criteria that would be used to evaluate alternative corridors.

In August 2013, the second of this meeting series occurred to review the universe of possible alternatives for the Corridor, with the intent to receive feedback on the range of alternative corridor concepts to be evaluated.

In October 2013, the third meeting series occurred to review the results of the screening of alternatives and to receive feedback on the evaluation outcomes and recommendations.

In February 2014, a fourth round of engagement occurred to present and receive feedback on the draft recommendations for the Northern Nevada Future Connectivity Corridor. This round of engagement was facilitated “virtually” whereby interested individuals could view a narrated presentation about the current status of the study and then submit comments online via the project website. An invitation to participate was emailed to those in the project database, and stakeholders were encouraged to assist in soliciting feedback from their constituents. In partnership with ADOT and NDOT, a press release was distributed that resulted in significant media attention, in addition to three advertisements purchased by ADOT and published in the Arizona Republic. Feedback for this phase was solicited from February 10 through March 10, 2014.

The March, May, and June 2014 meetings consisted of discussions regarding the final recommended alternatives for all segments, the Corridor Implementation Program, Purpose and Need, Business Case, and finally the Corridor Concept Report. A concluding round of virtual public outreach will be held in June 2014.

Table 7-1. Public and Stakeholder Evaluation Process Meetings

Date	Meeting	Purpose
June 27, 2013	Core Agency Partners	Discuss the Goals and Objectives, and Evaluation process and criteria
July 22, 2013	Separate Stakeholder Partner meetings with all 5 geographic segments (175 participants)	Discuss the Goals and Objectives, and Evaluation process and criteria
July 30, 2013	Core Agency Partners	Discuss the Universe of Alternatives
August 12, 2013	Separate Stakeholder Partner meetings with all 5 geographic segments (193 participants)	Discuss the Universe of Alternatives
September 24, 2013	Core Agency Partners	Discuss Level 1 screening results and Level 2 screening criteria
October 16, 2013	Separate Stakeholder Partner meetings with all 5 geographic segments (166 participants)	Discuss Level 1 screening results and Level 2 screening criteria
October 16, 2013	Separate Public meetings in all 5 geographic segments (274 participants)	Discuss Level 1 screening results and Level 2 screening criteria
February 2014	Joint virtual public meeting in all 5 geographic segments	Discuss preliminary Recommended Alternatives
March 12, 2014	Core Agency Partners	Discuss Recommended Alternatives, and approach to Implementation Program, Purpose and Need, and Business Case
March 19, 2014	Joint Stakeholder Partner meeting with all 5 geographic segments	Discuss Recommended Alternatives, and approach to Implementation Program, Purpose and Need, and Business Case
May 14, 2014	Core Agency Partners	Present draft Implementation Program and Business Case
May 21, 2014	Joint Stakeholder Partner meeting with all 5 geographic segments	Present draft Implementation Program and Business Case
June 11, 2014	Core Agency Partners	Present draft Corridor Concept Report and public meeting materials
June 2014	Joint virtual public meeting in all 5 geographic segments	Present draft Corridor Concept Report and final study recommendations

8. Acronyms and Abbreviations

ACEC	area of critical environmental concern
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
BLM	Bureau of Land Management
bqAZ	Building a Quality Arizona
CANAMEX	Congressionally-designated high priority transportation corridor connecting Canada and Mexico through the United States
CAP	Core Agency Partners
Ferromex	Ferrocarril Mexicano
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
I	Interstate
LPOE	land port of entry
MAP-21	Moving Ahead for Progress in the 21st Century
NAFTA	North American Free Trade Agreement
NCA	National Conservation Area
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
PEL	Planning and Environmental Linkages
POLA/POLB	Port of Los Angeles/Port of Long Beach
RTC	Regional Transportation Commission of Southern Nevada
RTP	Regional Transportation Plan
SR	State Route
UPRR	Union Pacific Railroad
U.S.	United States

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Appendix A
Goals and Objectives

Interstate 11 and Intermountain West Corridor Study

Preliminary Goals and Objectives Statement

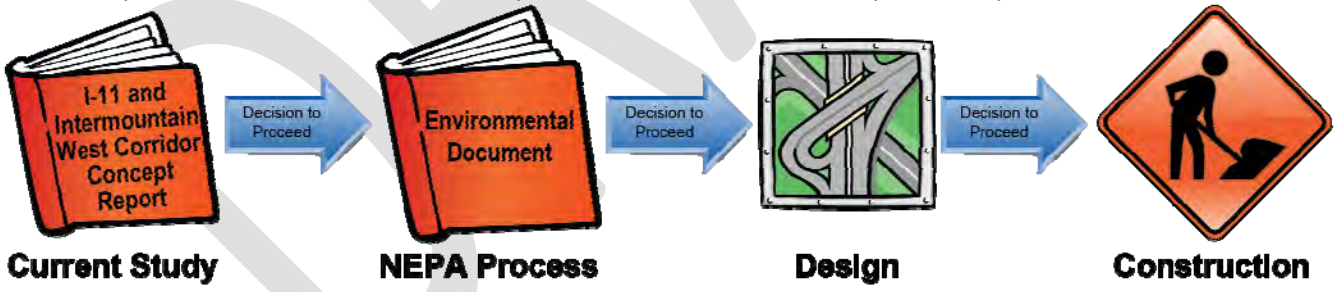
Background

Study Process

The Arizona Department of Transportation (ADOT) and Nevada DOT (NDOT), in consultation with the Federal Highway Administration (FHWA) and the Federal Railroad Administration (FRA), and in partnership with the Maricopa Association of Governments (MAG) and the Regional Transportation Commission of Southern Nevada (RTC) referred to as Core Agency Partners, are conducting the Interstate 11 (I-11) and Intermountain West Corridor Study. The study is the latest action in a decades-long effort by Arizona, Nevada, and other Intermountain West states and the federal government to develop a transportation corridor between the Rocky Mountains and the Cascade Range/Sierra Nevada Mountains linking Mexico and Canada. The 2-year study includes detailed corridor planning of a possible high-capacity transportation link connecting Phoenix and Las Vegas and high-level visioning for extending the corridor north of Las Vegas to Canada and south of Phoenix to Mexico.

This corridor study is a Planning and Environment Linkages (PEL) case study. The PEL process, which is supported by FHWA, is an integrated approach to transportation decision-making that takes into account environmental, community, and economic goals throughout the project life cycle, from the planning stage (current study) through development (National Environmental Policy Act [NEPA] phase), design, and construction/maintenance. PEL promotes greater communication within and among transportation and resource agencies, leading to improved decision-making and project development.[1] ADOT and NDOT have worked with FHWA to adapt the federal guidance into state-led processes, which include a series of checklists to be completed throughout a study's process.

For studies, analyses, or conclusions from the transportation planning process (such as the study at hand) to be used in a future NEPA phase, they must meet certain standards established by NEPA. This is because the information and products coming from the planning process must be sufficiently comprehensive that the federal government may reasonably rely upon them in its NEPA analysis and documentation. A sound planning process is a primary source of a future project purpose and need. It is through the planning process that state and local governments determine an area's transportation needs, which needs they wish to address, and in what period they wish to address them.



Indeed, that is what the law requires from the planning process and actually prevents projects that do not come from the planning process from going forward.[2]

This Goals and Objectives Statement is a first step in the development of this project's Purpose and Need Statement. It begins the process of gathering information to evaluate the need for the I-11 and Intermountain West Corridor that will be shared with agencies and other stakeholders participating in the study. The intent of the Goals and Objectives Statement for this study is to provide a big-picture explanation of the potential benefits of the I-11 and Intermountain West Corridor, particularly the segments in Arizona and Nevada. The input received from project stakeholders on the Goals and Objectives Statement will be used in the development of project's

[1] http://www.environment.fhwa.dot.gov/strmlng/newsletters/apr07nl.asp

[2] http://www.fhwa.dot.gov/hep/guidance/plannepalegal050222.cfm

Purpose and Need Statement as the study progresses. As each segment of the I-11 and Intermountain West Corridor moves from the planning stage to the NEPA phase, a separate Purpose and Need Statement will be developed that focuses on the unique transportation deficiencies in that segment that must be addressed.

The information in this Goals and Objectives Statement was obtained largely from the I-11 and Intermountain West Draft Corridor Study *Corridor Justification Report* (June 2013). The Draft *Corridor Justification Report* is available at http://i11study.com.

Study Area

Although the ultimate vision for the I-11 and Intermountain West Corridor is to link Mexico and Canada, ADOT and NDOT are evaluating and establishing feasible routes and transportation connections for the priority sections of the corridor from Phoenix and Las Vegas, with options for extensions to the north (to Canada) and south (to Mexico). Because of its length and varying characteristics, the study area is divided into the following five segments with three segments that will undergo detailed corridor planning, and two segments (north of the Las Vegas and south of Phoenix metropolitan areas) that will be evaluated using higher-level visioning for potential extensions (Figure 1):

- Southern Arizona Future Connectivity Segment: Mexico to Casa Grande
- Priority Corridor Section: Phoenix Metropolitan Area (Casa Grande to Wickenburg)
- Priority Corridor Section: Northern Arizona/Southern Nevada (Wickenburg to Las Vegas Metropolitan Area)
- Priority Corridor Section: Las Vegas Metropolitan Area
- Northern Nevada Future Connectivity Segment: Beyond Las Vegas Metropolitan Area

ADOT and NDOT will identify a single alignment between Phoenix and Las Vegas. The alignment will be a wide corridor that will be further refined in future phases. The study team will also conduct a higher-level corridor development process to identify potential corridor extension(s) north of Las Vegas and south of Phoenix metropolitan areas. At this planning phase, it is not a requirement to identify precise study termini or to prove that the termini are logical. That examination will take place segment by segment (or project by project), as parts of the I-11 and Intermountain West Corridor will be further examined during future NEPA phases.

Corridor-wide Goals and Objectives

This section discusses a range of factors relevant to the study area that describe state and federal actions that speak to the need for the I-11 and Intermountain West Corridor, as well as transportation problems the corridor has the potential to address. The factors, which are summarized in the bullet points below, are commonly used in FHWA environmental documents. More information can be found in FHWA's Technical Advisory T 6640.8A (*Guidance For Preparing and Processing Environmental and Section 4(f) Documents*). As the Purpose and Need Statement for this study is developed, the factors discussed below may be modified.

- **Legislation –** Is there a federal, state, or local governmental mandates for the action?
- **System Linkage –** Is the proposed project a "connecting link?" How does it fit in the transportation system?
- **Trade Corridor -** How will the proposed facility enhance the efficient movement of freight in the study corridor?
- **Modal Interrelationships –** How will the proposed facility interface with and serve to complement airports, rail and port facilities, mass transit services, etc.?
- **Capacity –** Is the capacity of the present facility inadequate for the present traffic? Projected traffic? What capacity is needed? What is the level(s) of service for existing and proposed facilities?
- **Economics –** Projected economic development/land use changes indicating the need to improve or add to the highway capacity

- **Project Status—**Project history, including actions taken to date, other agencies and governmental units involved, action spending, schedules, etc.

The goal of the proposed action is to establish a high-capacity, limited-access, transportation corridor connecting Mexican ports and manufacturing areas with Arizona's and Nevada's largest regional, national and international manufacturing and economic activity centers to support regional, national and international trade. For Arizona and Nevada, the goal of the proposed action is to assist in diversifying the states' economies to target industry clusters that rely heavily on interconnected and efficient transportation systems to transport goods and facilitate business attraction/retention. The need for the proposed action is based on a combination of factors that include legislation, system linkage, trade corridor, modal interrelationships, capacity/congestion, economics, and project status/public policy. The remainder of this document discusses those factors. Together, the goals and objectives shape the range of corridor alignments developed and evaluated for the project.

Legislation

As noted, various states in the Intermountain West and the federal government have a long history of activities working toward a Mexico-Canada transportation corridor. In the 1995 National Highway Systems Designation Act, Congress defined the CANAMEX Trade Corridor as High Priority Corridor 26 in the National Highway System (NHS) from Nogales, to Las Vegas, to Salt Lake City, to Idaho Falls, to Montana, to the Canadian border. High priority corridors are Congressionally-identified corridors of national significance that are eligible for special discretionary funding from the National Corridor Planning and Development program. The High Priority Corridor designation in the NHS recognizes the importance of the corridor to the nation's economy, defense, and mobility. The CANAMEX Corridor uses Interstate and state highway corridors and generally follows I-19 from Nogales to Tucson, I-10 from Tucson to Phoenix, US 93 from near Phoenix to Las Vegas, and I-15 from Las Vegas through Utah and Montana to the Canadian border. This is not a continuous route because of a gap in designation between I-10 and US 93 in the Phoenix area.

The CANAMEX Corridor Coalition is a group of public and private sector representatives selected by the five governors with the intention of strategically investing in infrastructure and technology to increase competitiveness in global trade, create jobs, and maximize economic potential in the five-state region. Subsequent to Congress' selection of the CANAMEX Trade Corridor as High Priority Corridor 26 in 1995, the current federal surface transportation law, Moving Ahead for Progress in the 21st Century (MAP-21), identified part of the CANAMEX Trade Corridor, the US 93 corridor between Wickenburg, Arizona, and Las Vegas, as an NHS High Priority Corridor designated as future Interstate Highway I-11 (Figure 2) (FHWA 2012). The I-11 designation not only recognizes the economic importance of a more efficient Las Vegas-Phoenix connection to the Southwest's economy, but also it reaffirms the importance to the national economy of the larger CANAMEX Trade Corridor, of which the US 93 corridor is a part. Although US 93 extends from just outside Phoenix to Montana, converting the Phoenix to Las Vegas segment to an Interstate would create a more regionally and nationally recognizable connection between those cities. The "Interstate brand" would enhance the ability of US 93 (the future I-11) to support and expand business and tourism in both states and increase its importance as a segment of the I-11 and Intermountain West Corridor route serving regional and national freight and tourism. While the conversion of US 93 to I-11 would require a separate NEPA action, the fact that the federal transportation law has selected US 93 as an Interstate candidate is recognition of the importance of this one key segment of the I-11 and Intermountain West Corridor to the entire corridor.

It should also be noted that Nevada also has High Priority Corridor 19 connecting Reno to Canada via US 395, and High Priority Corridor 68, the Washoe County corridor that connects Reno and Las Vegas using US 95/I-580. Another High Priority Corridor that could be important to this study is Corridor 43 which includes US 95 from the Idaho/Oregon state border to Canada.

System Linkage

By creating a continuous north-south transportation corridor between Mexico and Canada that intersects the existing network of east-west Interstates in Arizona and Nevada, the priority segments of the I-11 and Intermountain West Corridor would provide important connections in the regional transportation system. South

of Las Vegas, the proposed improvements would provide the missing link between Phoenix and Las Vegas. In Arizona, the proposed corridor would fill in the missing connection between I-10 and US 93, and in Nevada it would complete the planned Boulder City Bypass to provide a limited-access connection to Las Vegas. The new link between Phoenix and Las Vegas would address a major, longstanding deficit in the region's passenger and freight transportation network, allowing Phoenix and Las Vegas to emerge as major logistics centers in the Southwest. This region has weak ground-based transportation connectivity. There is no direct rail service between the two metropolitan areas, and minimal intercity bus service. Providing a safe and efficient connection between Phoenix and Las Vegas has the ability to prolong the need for additional airport expansions in Arizona and Nevada. More than 2.5 million air passengers traveled between Arizona and Nevada in 2011. The Phoenix to Las Vegas air corridor (256 miles) is ranked in the top 100 most traveled air corridors in the nation (Brookings Institution 2009). Many of the more than 2.5 million air passengers that traveled between Arizona and Nevada in 2011 might have used alternative modes of transportation if reliable and safe options existed.

Beyond its ability to strengthen ground-based transportation, the priority segments of the I-11 and Intermountain West Corridor could enhance the economies of Phoenix, Las Vegas and the region by also transporting electricity, fuel, water, commodities (via pipeline) and telecommunication data.

By improving the connection between Phoenix and Las Vegas, which would intersect I-8, I-10, I-40, and I-15 connecting Southern California, Arizona and Nevada, a critical leg of the I-11 and Intermountain West Corridor would be established, as would the missing third leg of what is known as the Southwest Triangle Megaregion (Figure 3). The emerging Southwest Triangle with a population approaching 30 million consists of three main centers of growth:

- Southern California, with more than 20 million residents from San Diego to Santa Barbara
- Arizona's Sun Corridor, which is comprised of the Phoenix, Tucson, Prescott, and Nogales metropolitan areas, with nearly 6 million people
- The Greater Mojave Region centered on Las Vegas with about 2.2 million people

Of the Sun Corridor's four metropolitan areas that extend into Mexico, the Phoenix metropolitan area (population 4,192,887) and the Tucson metropolitan area (population 980,263) are the centers of population. The Sun Corridor is one of the fastest growing in the country and is forecast to double in population by 2040. Completing the missing Phoenix-Las Vegas leg of the Southwest Triangle would strengthen the economic interdependencies the major regions in the Southwest Triangle share in sectors such as logistics, healthcare, entertainment, tourism, and technology. Las Vegas and the Sun Corridor are also actively engaged in wind and solar research and development, equipment manufacturing, and green energy production.

The I-11 and Intermountain West corridor would also provide connectivity to rural areas in both Arizona and Nevada, linking them to economic anchors, providing access to more jobs and needed services, and creating economic opportunities. Demands for freight mobility in rural communities are met by highway, rail, and air transportation, or a combination of these modes. This places a great premium on an efficient regional transportation system with a high level of intermodal connectivity.

North of Las Vegas, the proposed project would facilitate the connections envisioned in the CANAMEX Trade Corridor linking Nevada with other Intermountain West states and ultimately connecting to Canada. More information about the linkages created by the priority segments of the I-11 and Intermountain West Corridor is found in the section below.

Trade Corridor

Along with enhancing the mobility of people, enhancing mobility of freight in the region is an important benefit of the I-11 and Intermountain West Corridor. Arizona and Nevada have similar freight flow characteristics:

- Inbound freight is dominated by domestic freight, and a notable percentage of the domestic freight in both states is from California. Specifically, 90 percent of inbound freight to Arizona and 95 percent of inbound

freight to Nevada is domestic freight. In Arizona, 30 percent of domestic inbound freight is from California, while 40 percent of domestic inbound freight to Nevada is from California.

- In each state, there is a strong flow of outbound freight to California. Seventeen percent of total outflows by value from Arizona are destined for California, while 30 percent of total Nevada outflows are bound for California.
- Import freight (by value) is primarily from Mexico and Canada and transferred from California. In Arizona for the import freight, slightly more than 50 percent of imports by value were from Mexico, about 9 percent were from Canada, and slightly more than 20 percent of imported goods were transferred from California. In Nevada, about 40 percent of imported freight by value was from Mexico and Canada.
- Both states are expected to be net importers in the future. In Arizona, inbound freight was about 30 percent more than outbound freight by total value which reflects Arizona's continuing status as a net importer. Like Arizona, but even more pronounced, Nevada is a net importer, with its inbound freight almost doubling the outbound freight by total value.

Given Arizona's and Nevada's strong freight flows to California, Mexico and Canada, the I-11 and Intermountain West Corridor, which would complete the missing leg of the Southwest Triangle, is expected to increase the efficiency of freight movement to and from both states and to enhance the region's economy.

Moreover, development of the I-11 and Intermountain West Corridor positions Arizona and Nevada strategically to benefit from the growing land and water port activity in the region. As transportation costs continue to rise and firms increasingly value the speed to which they can deliver goods to the consumer market, the trend of near-shoring manufacturing facilities to Mexico can be expected to continue. Currently, the largest land ports of entry with Mexico are located in California and Texas, and those ports are well-connected to the National Highway System. However, these routes are growing increasingly congested, particularly in California as the Ports of Los Angeles and Long Beach handle the bulk of freight flows from East Asia which utilize portions of the same network as northbound flows from Mexico. Specifically, the major trade corridors I-5 and I-10 have grown more congested and less efficient, which will stimulate demand for additional north-south routes like the I-11 and Intermountain West Corridor to accommodate trade flows.

A reliable infrastructure investment in the Intermountain West has the potential to attract north-south freight flows both from California and Texas. These freight flows create a crossroad of opportunities for the region's economies, as the freight flows increase demand for commercial activity centers, distribution and logistics centers, and inland ports and reloading facilities.

Modal Interrelationships

The priority segments of the I-11 and Intermountain West Corridor have established multimodal connections and a commitment from Arizona and Nevada, at the planning level, to continue promoting multimodal opportunities in the study area. A small sample of multimodal connections in the study area includes:

- The BNSF Railroad has a north-south branch line that connects one of their major east-west lines in northern Arizona to the Mobest Yard, Glendale Intermodal Facility, and other transloading (rail-to-truck) facilities.
- Tucson, with its connections to I-10 and I-8, is an inland port rail facility that is also a foreign trade zone bonded warehouse district that serves NAFTA and CANAMEX Corridor markets. The UPRR operates a north-south branch route from Tucson to Nogales, the Nogales Branch, which connects to Ferrocarril Mexicano (Ferromex) in Mexico, heavily used for accessing numerous auto assembly plants and industries in Hermosillo, Mexico.
- Nevada has two freight intermodal facilities where trailer on flat car or container on flat car can be transferred between railcars and/or trucks, the UPRR Sparks Intermodal Facility in northern Nevada and the UPRR Las Vegas Intermodal Facility.

- Arizona and Nevada have airports with cargo facilities that are considered inland ports of entry. Complete customs services allow foreign goods to clear customs. These air cargo facilities have positioned Phoenix Sky Harbor and Las Vegas McCarran airports as major West Coast air-truck distribution centers.

Examples of transportation planning studies that have set the stage for development of a multimodal I-11 and Intermountain West Corridor include:

- **Statewide Transportation Plans.** bqAZ established the 40-year multimodal transportation vision for the State of Arizona. Connecting Nevada is setting the same type of vision for Nevada. Both states include the proposed Phoenix-Las Vegas corridor as a critical element of their transportation systems and both envision the corridor to include multimodal facilities.
- **State Rail Plans in Nevada and Arizona** recommend similar outcomes, including passenger rail systems that offer a reliable alternative to automobile and air travel, as well as economically competitive freight transportation that accommodates interstate and intrastate shipping modes, helping to relieve highway congestion and improve traveler safety.
- **Passenger Rail.** ADOT is planning for intercity/commuter passenger rail service between Phoenix and Tucson. The XpressWest (formerly known as the DesertXpress) is a planned high-speed rail connection between the Las Vegas and Los Angeles metropolitan areas. The Federal Railroad Administration is completing the Southwest Rail Study to establish a near-term vision for higher-speed passenger rail in the Southwest. A passenger rail connection between Las Vegas and Phoenix is a key recommendation under study.
- **International Border Crossings.** ADOT is completing the Arizona-Sonora Border Master Plan, recommending transportation solutions to increase border crossing efficiency and safety. This will be done in coordination with the federal governments of the U.S. and Mexico, which are determining a logical location for a future freight rail crossing between Baja California and the Southwest U.S.

The proposed north-south transportation corridor connecting Mexico, Phoenix and Las Vegas would enhance highway connections with ports, rail intermodal facilities, and the region's airports. Possibly the most notable intermodal improvement that could result from the proposed improvements between Phoenix and Las Vegas would be the region's ability to efficiently accommodate freight from the Ports of Los Angeles and Long Beach by rail and/or highway. As noted, the improved Phoenix-Las Vegas corridor, with its connections to I-8 and I-10, would provide the missing leg for the Southwest Triangle connecting the I-11 and Intermountain West Corridor with Southern California. The Southwest Triangle is on a trajectory to be the only American region that maintains links to the world's fastest emerging economies in Asia (through the Ports of Los Angeles and Long Beach) and Latin America (through Arizona's connection to Mexico). International trade through Los Angeles and Long Beach is the largest in the country, with the Port of Long Beach alone handling more than $140 billion worth of goods each year (POLB 2013). Most goods from the Ports of Los Angeles and Long Beach destined for cities to the north and east are shipped on congested California freeways, including I-5. Shifting trade trends from Asia to Latin America may increase demand for corridors like the I-11 and Intermountain West Corridor that not only have the ability to provide efficient north-south freight movement, but also provide connections to east-west Interstates serving markets east of the Intermountain West. The West, in general, and the Southwest Triangle are underserved by efficient north-south capacity.

About half of the bilateral trade flows by value and volume through Arizona's border crossings with Mexico were multimodal, and by 2040, imports from Mexico through Arizona are expected to more than double to more than 13.4 million tons (FHWA 2012). In spite of that, the lack of connections and transportation infrastructure linking Mexico, Phoenix and Las Vegas and the Southwest Triangle, in general, make freight flows from and to Latin American/Mexico more attractive through Texas border crossings than through Arizona border crossings such as Nogales. Texas trade with Mexico is roughly 10 times greater than that between Arizona and Mexico. Less than 10 percent of land freight between the U.S. and Mexico flowed through Arizona, and approximately 90 percent of goods that flowed through Arizona crossed at Nogales. Providing an alternate north-south connection in the western U.S. is crucial to ensure timely, efficient, and competitive trade. The I-11 and Intermountain West

Corridor provides an opportunity to fill this transportation gap in terms of efficient high-speed, domestic north-south travel. It would also provide multimodal linkages between existing and future foreign ports and critical east-west, high-speed transportation corridors in the U.S., the junctions of which can provide significant regional economic development opportunities.

Capacity/Congestion

As noted in the *Corridor Justification Report*, congestion has impacts on commuters and truckers, affecting businesses, suppliers, manufacturers, and the overall economy. If congestion affects truck productivity and delivery times, costs are passed on to consumers, affecting areas far from the region where the congestion occurs. Congestion can result in unreliable trip times and missed deliveries. If the infrastructure supporting freight traffic is reliable, manufacturing and retail firms can carry fewer inventories because they can rely on goods being delivered on time.

In 2012, the U.S. Conference of Mayors published a report on the outlook of U.S. metropolitan economies and the critical role of transportation infrastructure. The metropolitan areas of Las Vegas and Phoenix rank in the top 50 cities for congestion costs per auto commuter, with Las Vegas ranked 41st and Phoenix 16th. In 2010, the annual congestion cost per auto commuter was $532 in Las Vegas and $821 in Phoenix. Focusing on specific congestion locations, five locations in Arizona and Nevada appear in FHWA's annual report on congestion at freight-significant highway locations. The majority of locations currently monitored are urban Interstate interchanges, and they are ranked according to congestion's impact on freight (American Transportation Research Institute 2011):

- I-15 at I-515 in Las Vegas
- I-10 at I-19 in Tucson
- I-10 at SR 51/SR 202 in Phoenix
- I-17 at I-40 in Flagstaff
- I-80 at US 395 in Reno

Currently, there is congestion through the project area's urban areas (Tucson, Phoenix, Las Vegas, and Reno) and the segment of US 93 near Wickenburg is approaching capacity. Figure 4 shows existing congestion on the major highways in Arizona and Nevada.

While existing highly congested areas in the Arizona and Nevada study area tend to be found along segments of urban Interstates and associated interchanges, traffic modeling suggests that, without improvements such as the I-11 and Intermountain West Corridor, higher congestion levels would also be experienced on rural highway segments. As part of the *Corridor Justification Report*, the project team went beyond the traditional comparison of existing roadway capacity to future traffic volumes in determining congestion levels. The project team evaluated potential congestion levels in the project area associated with three trade/economic scenarios. These scenarios are based on important current trends that, should they continue, will alter the needs for transportation, levels of trade, and overall development in the region. Each scenario was defined by comparison to a baseline scenario, which assumes that trade and freight flows, both international and domestic, grow as forecast by the USDOT. To assess the impact of each trade scenario on regional highway congestion, truck traffic volumes for each scenario were compared to the forecast values for the Baseline Scenario. For each route considered, the baseline traffic volumes were determined by:

- Adding the change in average annual daily traffic for the scenario using the scenario population growth rate
- Computing the scenario truck volume increment by using the scenario percentage increase of truck origins or destinations in the study area
- Adding the scenario truck volume increment to the baseline value on each segment evaluated.

This analysis provided an estimated average annual daily traffic volume for each scenario for each roadway segment analyzed. Then, the level of service (LOS) was determined using the thresholds for rural routes. LOS, which is a measure of a highway's ability to handle traffic demand, is influenced by factors such as average daily traffic volumes, truck percentages and number of driving lanes. LOS ranges from "A" to "F" in order of decreasing operational quality. The percentage of these segments demonstrating congestion (LOS D to F) was then determined. The baseline and three trade scenarios are described below.

- **Baseline Scenario** reflects a continuation of recent background growth in the region and of current trends, without major structural changes. It is presented as the highly probable economic future of the region, in the absence of significant changes from the recent past. It assumes that transport and trade continue as forecast. This includes international trade forecasts, continuation of the trends in balance of trade, continuation of the distribution of trade between major trading partners, and continuation of existing trade route distribution.
- **Growth in Asia-Pacific Trade Scenario** is based on the continued growth of the trade flows with Asia that have characterized West Coast trade during recent decades. This scenario is predicated on the continued growth in U.S. imports of a wide array of low-cost consumer goods from China and other low-cost Asian sources. It assumes that trends in manufacturing in the Asia-Pacific region continue and that the U.S. continues to receive a growing volume of goods from Asia.
- **Expanded Trade with Mexico Scenario** assumes that Asia-Pacific manufacturing for the U.S. market flattens, and that significant production growth occurs in Mexico. The trend of moving manufactured goods production to Mexico, much previously done in Asia, is known as nearshoring. Since the enactment of NAFTA, bilateral trade between Mexico and the U.S. has grown exponentially.
- **Fully Realized State Economic Development Plans Scenario** assumes that Arizona and Nevada are able to realize their major economic development goals, including growing their economies through an industry cluster-based strategy and increasing trade with Mexico and Canada.

Each scenario could make a major contribution to the economic well-being of the region's residents, bringing up to 500,000 people and 240,000 employees to the region. Table 1 summarizes the modeled increases in economic output, population, employment, and congested highways.

TABLE 1
Key Modeled Results Corresponding to Each Trade Scenario

Scenario	Economic Output ($ billions)	Population Increase (high range)	Employment Increase (high range)	Unacceptably Congested Highways (%)
Baseline	911	15,078,114 (base)	6,934,707 (base)	28 (base)
Growth in Asia-Pacific Trade	924 to 937	320,574 (2.1%)	147,342 (2.1%)	34
Expanded Trade with Mexico	928 to 953	521,435 (3.5%)	239,464 (3.5%)	Up to 43
Fully Realized State Economic Development Plans	919 to 927	186,587 (1.2%)	85,700 (1.2%)	34

The range of current and anticipated trends in U.S. trade, together with the natural geographic advantages of the Intermountain West region, suggests that under the entire range of alternative trade scenarios considered, the region will experience significant sustained growth in the regional economy, accompanied by corresponding growth in travel demand. The level of highway congestion associated with some of these economic futures suggests that additional investment in transportation infrastructure is likely required to realize the full extent of these benefits. The percentage of unacceptably congested highways ranges from 28 percent with the Baseline Scenario to up to 43 percent with the Expanded Trade with Mexico Scenario (Figure 5). Note that in each trade scenario, California's

primary north-south route, I-5, and the primary connection to Nevada, I-15, are highly congested. By strategically enhancing regional transportation infrastructure, particularly efficient north-south routes, the I-11 and Intermountain West Corridor, with its connections to east-west Interstates in Arizona, Nevada and throughout the Intermountain West, has the opportunity to attract freight shipments from less efficient travel corridors and experience economic growth, particularly at the transportation hubs that develop around the intersection of the north-south and east-west routes.

Economics

The population growth of the Intermountain West states—particularly Arizona and Nevada—is outpacing growth of the U.S. and the capacity of the regional transportation network. In addition, regional economic development trends are creating demands for new transportation links. Between 2000 and 2010, the rate of growth for the Intermountain West states was 19.6 percent—double that of the U.S. as a whole, which grew at a rate of 9.8 percent. According to the U.S. Census Bureau, between 2010 and 2030, the Intermountain West is projected to grow by 28.5 percent, to 32.1 million people, which exceeds the forecasted U.S. growth rate of 17.7 percent over the same time frame. By the middle of the century, the Intermountain West's population is expected to nearly double from 22 million to 40 million (Arizona Republic, 2010). Of the Intermountain West states, the highest growth rate is expected in Arizona. In the next 30 years, the Conference of Mayors projects that the Phoenix metropolitan area will see the greatest proportionate population growth in the country – with an anticipated 88 percent increase from 2012 to 2042. Las Vegas also ranks high, with a 67 percent increase expected (IHS Global Insight 2012).

Economic growth is strongly and positively correlated with overall transportation demand, both for freight and personal vehicles. Development trends in Arizona and Nevada indicate that the economies of both states are expected to continue to outpace the U.S. average. Gross domestic product (GDP) is a principal indicator of the health of an economy or industry. GDP measures the value of final goods and services produced during a given period. According to the U.S. Bureau of Economic Analysis, the GDP for Arizona is $258.4 million and for Nevada is $130.3 million. The Phoenix ($194.7 million) and Las Vegas ($92.7 million) metropolitan areas are the largest contributors to each state's economy, followed by Tucson and Reno. An Interstate highway (I-10) connects Tucson and Phoenix, yet there is not a continuous high-speed limited access corridor between Phoenix and Las Vegas.

Fifty-one percent of employees in Nevada and 43 percent of employees in Arizona work in industries that depend on a reliable regional transportation network for transporting goods and tourists. While manufacturing jobs represent only 5.0 percent of all jobs in Arizona and 2.8 percent of all jobs in Nevada, the growth of manufacturing in both states exceeded the U.S. GDP of 1.5 percent, with Arizona at 8.9 percent and Nevada at 3.7 percent. When examining employment projections by industry, Arizona is expected to see gains in transportation and logistics, manufacturing, healthcare, and professional services. Likewise, Nevada is projecting job growth in mining, transportation and logistics, and manufacturing—most of which rely on an efficient regional transportation network.

To enhance the region's competitiveness, a robust transportation system is needed to facilitate the growth of business and its attraction to the area and to offer a means to connect to other markets. Industry targets such as aerospace, aviation, and defense; advanced manufacturing; mining, materials, and manufacturing; transportation and logistics; and tourism, gaming, and entertainment are critically dependent upon their supply chain and the regional movement of people and finished goods. Both states recognize that to be successful in their economic development endeavors, many simultaneous strategies−including developing the transportation systems that these industry clusters require−must be implemented.

Project Status/Public Policy

From the CANAMEX Trade Corridor designation in the 1990s through ADOT's current capacity expansion project on US 93 between I-40/US 93 Interchange in Flagstaff and Vista Royale in Wickenburg, numerous studies and construction projects have furthered the development of the I-11 and Intermountain West Corridor. Critical to the creation of the priority segments of the I-11 and Intermountain West Corridor has been Nevada's and Arizona's cooperation since the early 1990s, planning for improved access from Las Vegas south to Phoenix and a potential

northern extension to Reno, creating a better connected Intermountain West with greater economic opportunities. Listed below are brief descriptions of key ADOT and NDOT activities that will lead to a limited access, 4-lane divided roadway between Phoenix and Las Vegas. Appendix A (Past Planning Studies and Strategies) of the May 2013 *Corridor Justification Report* lists the full range of construction projects, multi-state planning studies and statewide planning studies conducted in Arizona and Nevada that have a connection to the I-11 and Intermountain West Corridor. The entire Draft *Corridor Justification Report* is attached as an appendix to this document.

Contributing Arizona Improvements

ADOT has invested nearly $500,000,000 to upgrade the US 93 corridor to a 4-lane divided highway, seeking to expand the 200-mile stretch between Wickenburg and the Hoover Dam to a safer and more efficient facility for commercial trucks and passenger vehicles. The segment between the Mike O'Callaghan–Pat Tillman Memorial Bridge and I-40 is complete, as are many segment improvements south of I-40. Only 5 highway improvement projects remain, leaving about 45 miles of highway to be widened to at least 4 lanes.

In Arizona's most recent update of the *Long Range Transportation Plan* (2011), the Hassayampa Freeway, from I-10 to US 93, is designated as an "example of a significant transportation infrastructure project," a facility that could qualify as a new roadway under the recommended funding scheme. Completion of the Hassayampa Freeway would close the I-10 to US 93 gap in the CANAMEX Trade Corridor, creating a continuous route.

Several ideas have been advanced for a southern extension to Mexico, including using the I-10 and I-19 corridors, although many capacity and environmental constraints are present in the Tucson metropolitan area and near the Arizona-Sonora border. Passenger rail and freight rail have been recommended as components of the new corridor, either within the same right-of-way, closely parallel, or diverging to connect to alternate destinations (for example, rail and highway may cross the international border at different locations).

Additionally, the *Arizona-Sonora Border Master Plan*, led by ADOT and in coordination with the Arizona-Mexico Commission, is studying the border transportation network to improve connectivity and efficiency.

Contributing Nevada Improvements

NDOT is continuing the Connecting Nevada process, a statewide, long-range transportation plan that will guide Nevada's transportation investments for the next 40 years and establish policies for preserving transportation corridors. This effort initiated multimodal transportation discussions among stakeholders and could be the catalyst to unite I-15, I-80, and the proposed I-11 into one transportation triangle serving the state.

NDOT recently completed a multi-state planning effort for the I-15 corridor. The *I-15 Corridor System Master Plan* defines a long-range, multimodal transportation system vision, governance, and implementation strategy, and provides a prioritized program of projects needed to serve all modes of transportation. Defining that vision involved a unique regional partnership among government and private interests in Nevada, California, Arizona, and Utah–the I-15 Mobility Alliance.

NDOT and ADOT worked together to construct the Hoover Dam Bypass and to conduct US 93 corridor improvements on both sides of the bridge. When the Mike O'Callaghan–Pat Tillman Memorial Bridge opened to traffic in late 2010, it attracted many vehicles that had previously avoided, or had been prohibited from, crossing over the Hoover Dam. This resulted in significant congestion through Boulder City, especially on weekends when tourist travel to Las Vegas peaks. NDOT fast-tracked the design and construction of a project to widen US 93 to 2 lanes in each direction, including some operational and safety improvements, between the bridge and Boulder City. The ultimate solution in this area is a new alignment around Boulder City (referred to as the Boulder City Bypass), connecting US 95 to the Hoover Dam Bypass. The Boulder City Bypass Phases 1 and 2 (Figure 6) are two segments of a future 4-lane limited access freeway that will reduce traffic congestion along US 93 and intersecting streets in Boulder City, Nevada.

Phase 1 is roughly 3 miles long and will extend from I-515 at Foothills Drive to US 95. Phase 1 is being developed by the NDOT. Phase 2 is roughly 12 miles long and will extend from US 95 to the recently completed Nevada Interchange at SR 172 (the road to Hoover Dam). Phase 2 is being developed by the RTC.

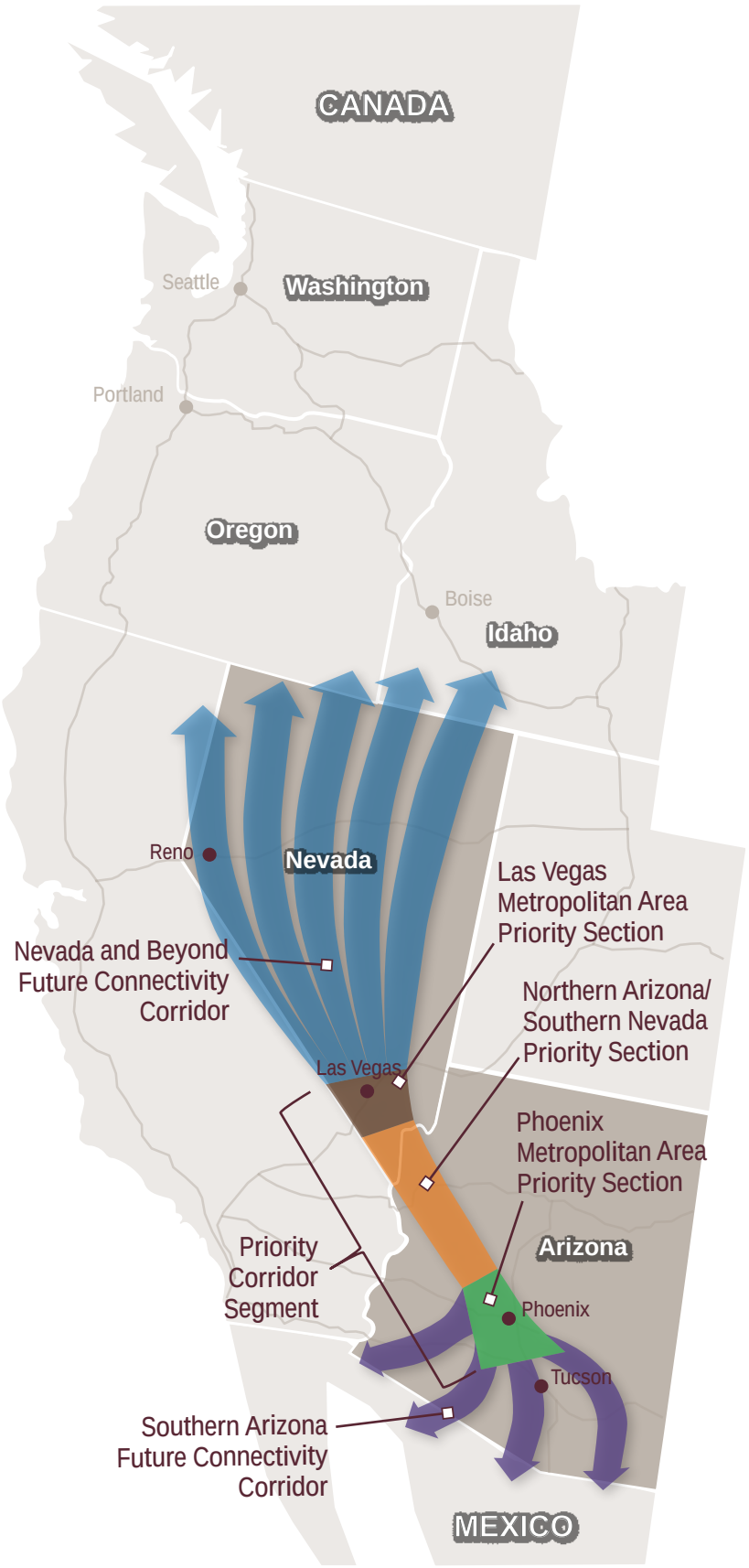


Figure 1
Study Area Segments

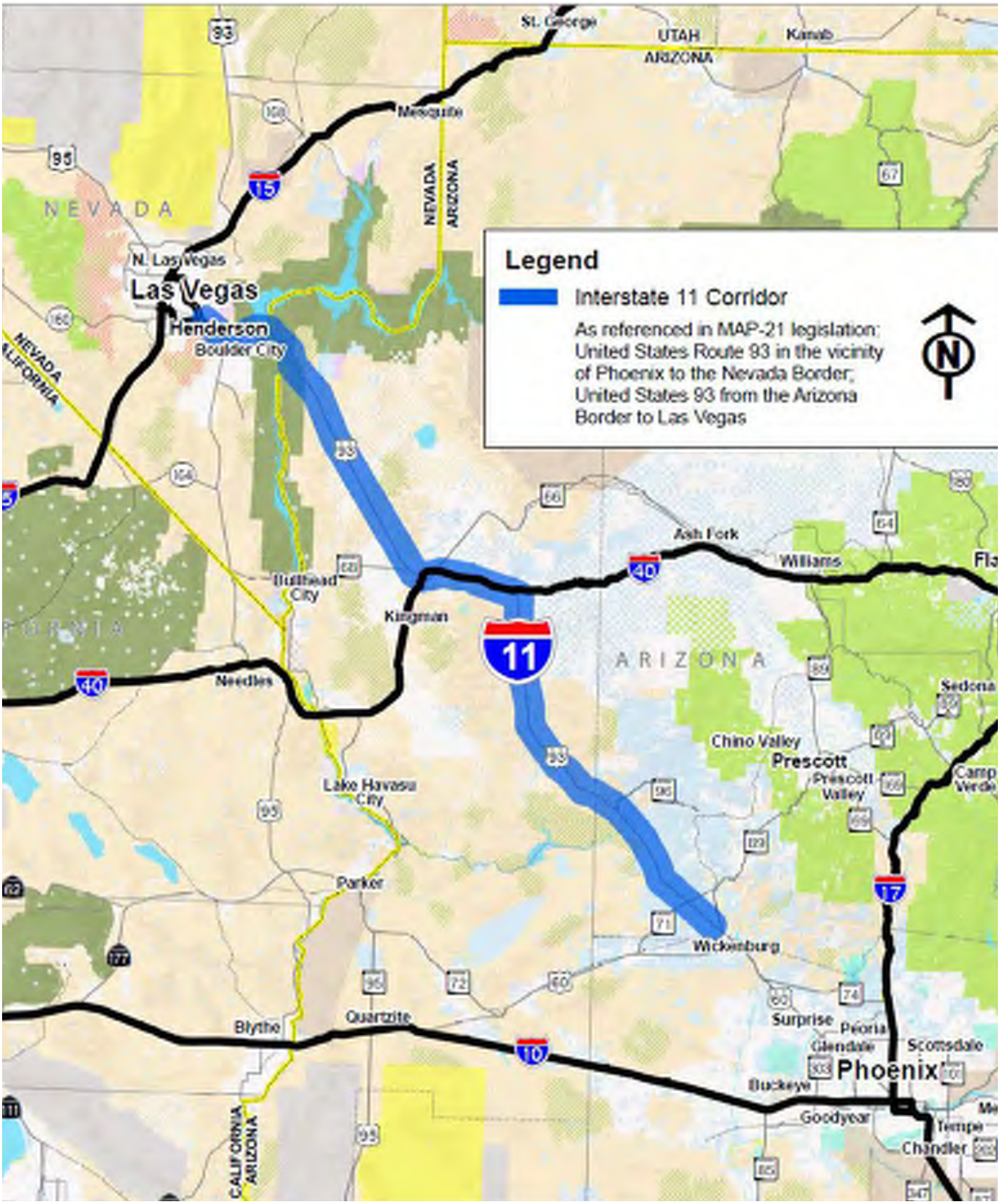


Figure 2
I-11 Corridor as Identified in MAP-21 Legislation

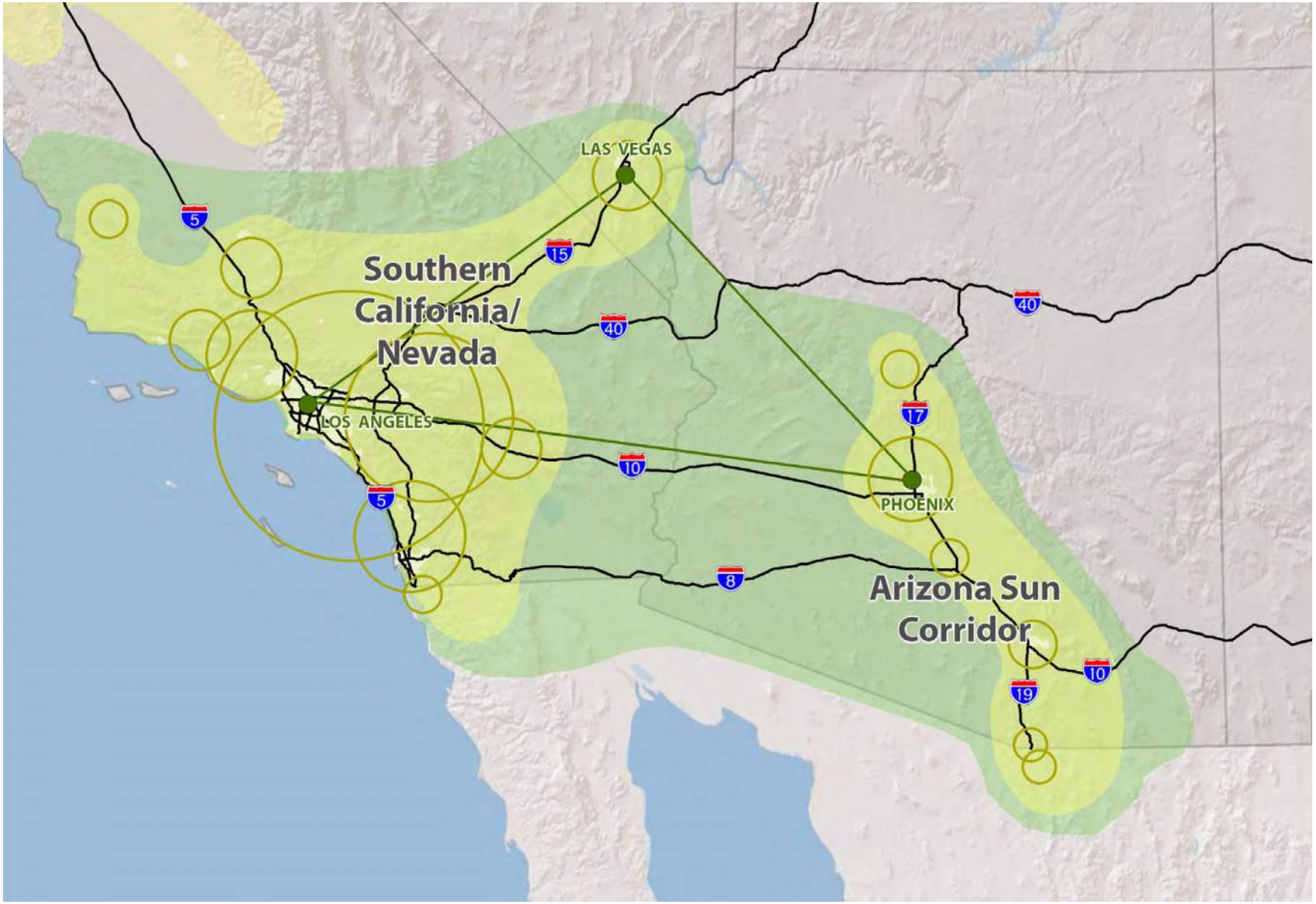


Figure 3
The Southwest Triangle: Expanding Megapolitans

Level of Service

- LOS C or better
- LOS D
- LOS E
- LOS F

0 50 100 200

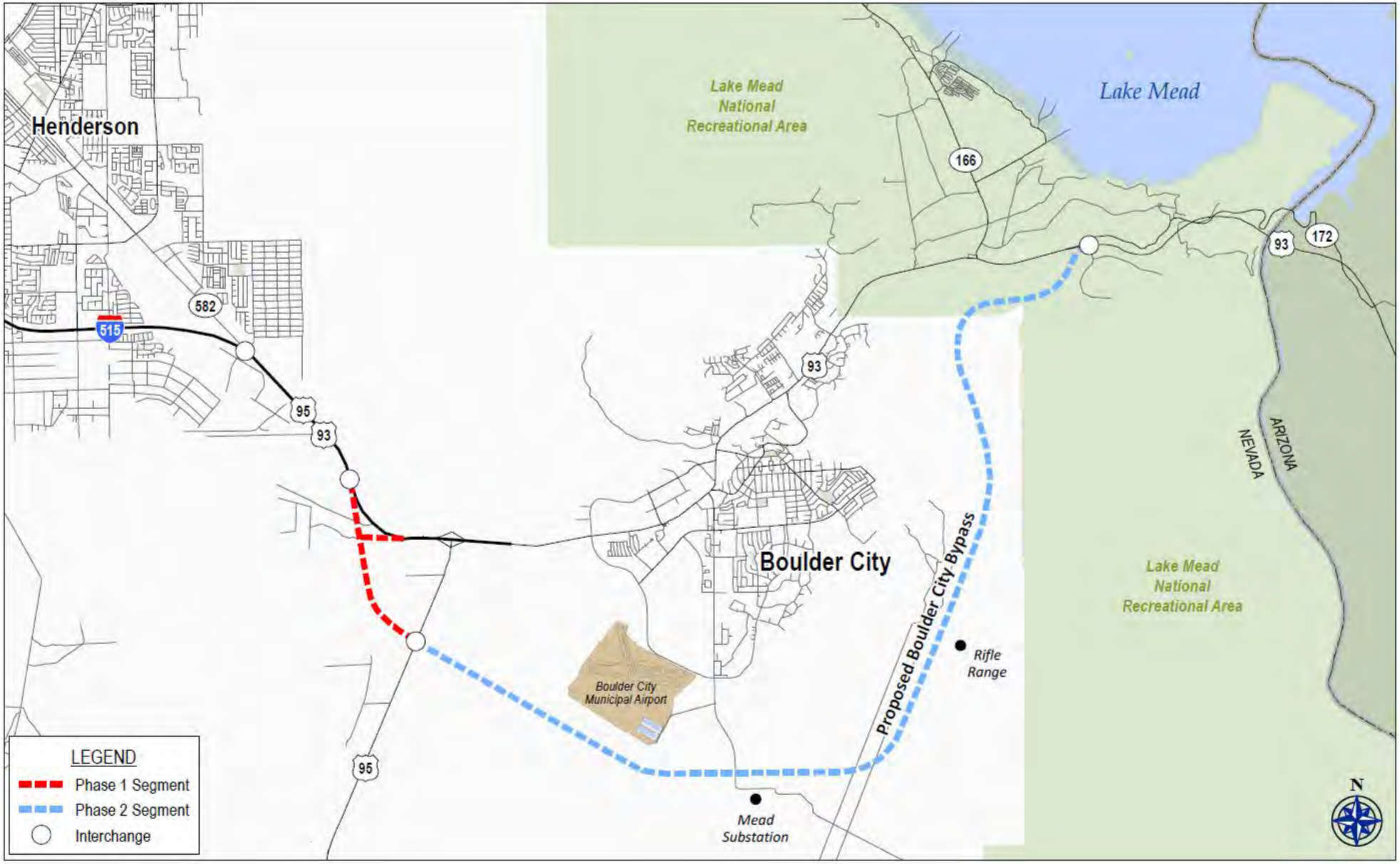
Miles

Notes:

1. LOS in rural areas is based on Generalized Annual Average Daily Volumes from Florid Handbook Tables
2. Existing LOS shown for urbanized areas are estimated using existing traffic counts an
3. Future LOS shown for urbanized areas are from 2030 Nevada Statewide Travel Dema
4. LOS for US 395 corridor, from SR 178 to California/Nevada State Line and California/ State Line are based on estimated AADT that are based on future growth of affected c
5. Future LOS in rural areas is based on existing capacity and future traffic projections
6. State/US highways are only illustrated for those showing LOS

Figure 4
Existing Congestion on Major Highways in Arizona and Nevada

Figure 5
Regional Highway Congestion Levels With Four Trade Scenarios



Source: RTC of Southern Nevada, Boulder City Bypass Sketch Level Traffic and Revenue Study, CDM Smith, November 2012

Figure 6
Boulder City Bypass Phases 1 and 2

Appendix B
White Pine County Comment Letter

The White Pine County Board of County Commission have reviewed the proposed I-11 Intermountain West Corridor project and acknowledges our Congress has recognized the importance of the portion of the Corridor between Phoenix and Las Vegas and designated it as future I-11 in the recent transportation authorization bill, Moving Ahead for Progress in the 21st Century Act (MAP-21).

Developing a new north-south trade corridor through Nevada and Arizona could supplement the existing system and relieve freight congestion on I-5, one of only two (including I-15) continuous north-south Mexico-to-Canada interstate routes west of Texas. In reviewing the different alternatives for routing beyond Las Vegas, our Commission would like to bring to your attention important data collected by our staff.

The three alternative routes being reviewed for Nevada's link from Las Vegas to Canada are as followed.

Leaving Las Vegas per US-95 to Fallon, then into Reno, Nevada, up US-395 into California and terminating on I-5 at Eugene, Oregon: This route encompasses **(872) miles** of roadway that will need to address **(142) obstacles** that will need attention; i.e. bridges, railroad and highway crossing, per under and overpasses, narrow Right of Ways through townships, culverts, etc. In addition, the Las Vegas I-215 Beltway along the northern region of Las Vegas will need to be reconstructed to remove all traffic lights currently in place.

Leaving Las Vegas per US-95 to Fallon, continuing up US-95 to I-80 into Winnemucca, then into Oregon per US-20, terminating onto I-5 at Portland, Oregon: This route encompasses **(1,018) miles** of roadway that will need to address **(31) obstacles just in Nevada alone,** that will need attention; i.e. bridges, railroad and highway crossing, per under and overpasses, narrow Right of Ways through townships, culverts, etc. In addition, the Las Vegas I-215 Beltway along the northern region of Las Vegas will need to be reconstructed to remove all traffic lights currently in place.

Leaving Las Vegas per US-93, traveling north onto US-318 through Hiko and Lund, then onto US-6 for a short trip back onto US-93 north through Ely, continuing to Wells, Nevada and terminating on I-84 in Twin Falls, Idaho: This route encompasses **(535) miles** of roadway that will need to address **(41) obstacles along its entire length** that will need attention; i.e. bridges, railroad and highway crossing, per under and overpasses, narrow Right of Ways through townships, culverts, etc. In addition, the Las Vegas I-215 Beltway along the northern region of Las Vegas will not be utilized and therefore, will not need reconstruction costs allocated.

Our Commission supports the Alternative Route QQ along the eastern region of Las Vegas but only if it terminates at I-15 North and continues north per Alternative AA as previously removed from consideration. Utilizing US-93 not only saves construction costs per lane per mile at $5M average times four lanes equaling $20M per interstate roadway mile, it provides the least amount of private and tribal land interference, requiring land acquition dollars.

When comparing the alternative through Reno, Nevada to Eugene, Oregon as compared to Twin falls, Idaho, there is a difference of (337) roadway miles. Based at an assumption of an average cost at $20M per mile per a (4) lane interstate, the project could incur an additional **$6.74B US Dollars plus the costs to address a difference of (101) obstacles**, i.e. railroad and highway under and overpass, culverts, and large traffic bridge reconstruction projects, etc.

Based on economic drivers, the intent of this initiative was to include an upgraded highway, but could be paired with rail and other major infrastructure components—such as energy and telecommunications—to serve the nation's needs in the West. White Pine County currently has the only major wind farm in Nevada, with the potential to utilize biomass, hydro and solar for future energy projects on the horizon. Oil and Gas exploration is an industrial cluster developing in White Pine County with over 1.5M acres of public lands currently leased for exploration; more than most counties in the US. And finally, the linear mileage for rail improvements along US-93 compared to US-95 are less than half of the linear miles.

Secondly, US-93 provides two access points into Canada, not just one as per the Reno – Eugene connection. US-93 enters into Twin Falls, Idaho per I-84, which extends west into Portland, Oregon then up into Vancouver, Canada. Per conversations with ODOT, the highway is under capacity and may be able to support additional traffic per I-11 commuters. If you go east on I-84 from Twin Falls, you will join I-87, which connects to I-15 from Salt Lake City, Utah and then proceeds north into Calgary, Canada. This preferred route would allow economic benefits to Nevada, Oregon, Idaho, and Montana, states with much needed boost to their economy.

Its no doubt Eastern Nevada is on the forefront of new energy development and will continue to provide a strong tax base for the State of Nevada with its Mining, Oil and Gas, and Renewable Energy Industries. Please consider the data provided to reconsider US-93 as a viable player for the most effective cost estimates to not only utilize Nevada for a section of I-11 Intermountain West Corridor, but to support the initiative to see the interstate help extend traffic flows into Canada per two destination points, Vancouver and Calgary.

Appendix B: Environmental Data

DATA AND INFORMATION OBTAINED TO DATE (as of 3/2/18)

BLM Resource Management Plans and other data

- RMPs for Carson City and Southern Nevada BLM Districts (GIS layers from internet)
- Data layers available on the BLM Navigator (https://navigator.blm.gov/home)
- Tonopah and Shoshone-Eureka BLM Districts Resource Management Plans (Hard-copies only)

U.S. Forest Service

- General data on some resource and land management planning for the area crossed. Additional information needed.

Nevada Natural Heritage Program

- NNHP Geodatabase of sensitive species provided via NDOT for sensitive species in the project area

Nevada State Historic Preservation Office

- Review of the data contained in the Nevada Cultural Resources Information System.

Nevada Department of Wildlife

- Mapped habitats and species distribution data available on-line (http://gis.ndow.nv.gov/ndowdata/)
- Multiple habitat, distribution, and exclusion zones for Sage Grouse available on-line
- Sensitive species data from a request through NDOW system (including general sage grouse lek information – non-digital) (http://www.ndow.org/Nevada_Wildlife/Maps_and_Data/Data/)
- Additional sage grouse maps and data from the "Sage Grouse Initiative," NDOW, and BLM.

US Fish and Wildlife Data

- Accessed data from the Information for Planning and Consultation (iPaC) on-line data system
- Accessed data from the USFWS Threatened & Endangered Species Active Critical Habitat Mapper on the USFWS Environmental Conservation Online System (ECOS)

Waters and Floodplains

- Accessed data available from the USFWS National Wetland Inventory Wetlands Mapper
- Accessed Federal Emergency Management Agency (FEMA) Flood Mapper to identify locations of 100-year floodplains (data from Mineral and Esmerelda Counties missing)
- U.S. Geological Survey Topographic maps used to identify potential water bodies

Department of Defense

- Proposed Withdrawal Areas for the Nevada Test and Training Range (PDF and hard copies) from recent Public Meetings for the Draft EIS
- Proposed Withdrawal Areas for the Fallon Range Training Complex (PDF and hard copies) from 2014 Scoping Meetings for the NEPA process for expansion and modernization

Local and Regional Land Use Plans

- Northwest Clark County Land Use Plan, 2013 Indian Springs Detail Area Planned Land Use Map

- Nye County 2011 Comprehensive Land Use Plan: Map 3 - BLM Lands Suitable for Disposal; Map 4 - Nye County Existing Land Use
- Beatty Area Plan, Existing Land Use and Future Land Use Maps (2014)
- Esmeralda County Master Plan (2011)
- Churchill 2015 Master Plan, Master Land Use Plan/Growth Management Plan Map
- Lyon County Master Plan, Land Use Chapter and Smith Valley Use Map
- Second Draft 2017 Douglas County Master Plan Update, Land Use Chapter, Topaz Ranch Estates/Holbrook Junction Plan Land Use Map (and 2011 Master Plan, Land Use Maps)
- Washoe County Master Plan (2011), 2010 South Valleys Area Plan Springs, Master Plan Map
- Mineral County Master Plan (2010)
- Walker River Paiute Tribe's Long Term Comprehensive Community Plan (2017?)
- City of Fernley Master Plan, Land Use Map

KNOWN GAPS IN DATA AND INFORMATION

BLM Resource Management Plans and other data
- GIS layers from BLM for Shoshone/Eureka and Tonopah RMP areas with land use management and constraints.

U.S. Forest Service
- GIS layers or other digital data related to land planning and resource management.

Nevada Natural Heritage Program
- None

Nevada Department of Wildlife
- Any additional data (preferably digital) on locations of key habitat or movement corridors for special status species.

US Fish and Wildlife Service Data
- None identified.

Waters and Floodplains
- Digital data on floodplains for Esmerelda and Mineral County if such data exists.

Department of Defense
- Digital data (GIS) of Proposed Withdrawal Areas for the Nevada Test and Training Range
- Digital data (GIS) of currently Proposed Withdrawal Areas for the Fallon Range Training Complex expansion and modernization

Local and Regional Land Use Plans
- Updates to any of the plans mentioned above.
- Esmeralda County Master Plan Map
- Mineral County Master Plan Map
- Walker River Paiute Tribe's Long Term Comprehensive Community Plan