APPENDIX B: ALTERNATIVES DEVELOPMENT REPORT

FINAL DRAFT

I-11 Las Vegas Metropolitan Area

Alternatives Development Report

Nevada Department of Transportation

Las Vegas, Nevada

April 29, 2022

Contents

Acronyms

APZs - Accident Potential Zones
ADR - Alternatives Development Report
ACEC - Area of Critical Environmental Concern
ADOT - Arizona Department of Transportation
BLM - Bureau of Land Management
CC - Clark County
CWG - Community Working Group
CANAMEX Corridor – Canada Mexico Trade Corridor
DoD - Department of Defense
EIS - Environmental Impact Statement
FHWA - Federal Highway Administration
FAST - Fixing America's Surface Transportation
GIS - Geographic Information System
ITS - Intelligent Transportation System
ISTEA - Intermodal Surface Transportation Efficiency Act
IWCS - Intermountain West Corridor Study
LMNRA - Lake Mead National Recreation Area
LVVWD - Las Vegas Valley Water District
LOS - Level of Service
MAP-21 - Moving Ahead for Progress in the 21st Century Act
NEPA - National Environmental Policy Act
NHS - National Highway System
NHSDA - National Highway Systems Designation Act of 1995
NPS - National Park Service
AFB - Nellis Air Force Base
NDOT - Nevada Department of Transportation
NDOW -Nevada Department of Wildlife
NAFTA - North American Free Trade Agreement
PEL - Planning and Environmental Linkages
RTC - Regional Transportation Commission of Southern Nevada
SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SNWA - Southern Nevada Water Authority
TAC - Technical Advisory Committee
USBR - U.S. Bureau of Reclamation
US 93 - United States Route 93
US 95 - United States Route 95
WAPA - Western Area Power Administration

1.0 Project Overview

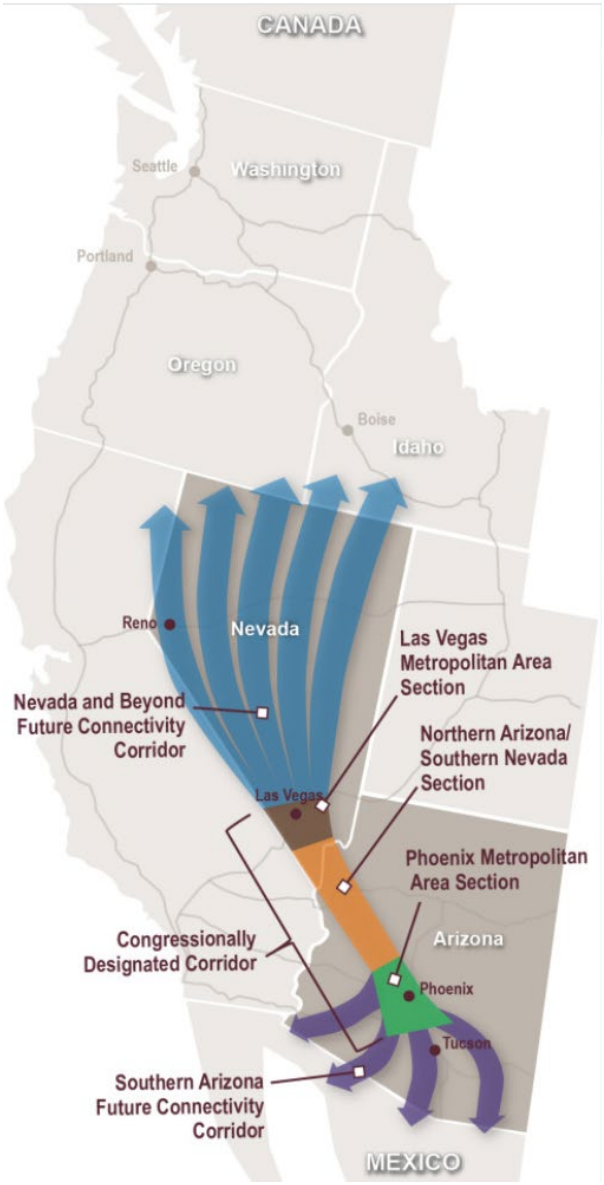
1.1 Introduction

The Nevada Department of Transportation (NDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing the Interstate 11 (I-11) Las Vegas Metropolitan Area Planning and Environmental Linkages (PEL) Study. The congressionally mandated Interstate I-11 corridor is envisioned as a new major north-south multimodal corridor that will provide enhanced transportation mobility while creating a foundation for robust economic vitality within the Las Vegas metropolitan area.

In 2014, NDOT and the Arizona Department of Transportation (ADOT) jointly completed the *I-11 and Intermountain West Corridor Study* (IWCS) that encompassed a broad study area for the Intermountain West region from Mexico to Canada. The I-11 and Intermountain West Corridor was identified as a critical piece of multimodal infrastructure that would diversify, support, and connect the economies of Arizona and Nevada. The I-11 and Intermountain West Corridor could also be connected to a larger north-south transportation corridor, linking Mexico and Canada. The push for an improved, north-south transportation corridor between Mexico and Canada traces back to the 1993 North American Free Trade Agreement (NAFTA).

In the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), Congress designated high priority corridors to be upgraded or constructed and become part of the Interstate Highway System. As amended through the 2015 Fixing America's Surface Transportation (FAST) Act, the high priority corridors included designation of the I-11 corridor from Nogales Arizona at the Mexico border, through Phoenix and Las Vegas, to I-80. Figure 1 provides an overview of the general I-11 corridor, the

Figure 1. I-11 and Intermountain Corridor



congressionally designated portion From Las Vegas through Phoenix, and future connections north and south.

The purpose of the IWCS was to determine whether sufficient justification exists for a new high-capacity priority transportation corridor, and if so, to establish the likely potential routes. The study established the corridor vision, developed justification, and defined an implementation plan to move forward. It was intended to provide a high-level overview of the corridor opportunities and foundation for subsequent corridor alternative and environmental studies.

The IWCS defined a “corridor vision” for the I-11:

> *Serving the nation’s north-south, multimodal transportation needs from Mexico to Canada, the I-11 and Intermountain West Corridor will provide a vital multimodal connection between the Arizona Sun Corridor and Las Vegas. It is also envisioned to promote freight linkages between the new and expanding ports in Mexico and Canada, existing U.S. West Coast ports, and future inland ports and commerce centers crucial to distributing goods across North America. These linkages will stimulate the development of new crossroads, spurring community and economic development opportunities spanning the entire corridor. Effective inclusion of multimodal infrastructure elements, such as natural resources, power, telecommunication, freight rail, and potentially passenger rail, serve as the foundation of a stronger and more diversified economy for the Western U.S. The I-11 and Intermountain West Corridor will become a major, multimodal, north-south, transcontinental corridor through the Intermountain West.*

In addition, the IWCS identifies the following purpose:

> *To provide an access-controlled, north-south transportation corridor that will connect important metropolitan areas and markets in the Intermountain West with Mexico and Canada to support improved regional mobility for people and freight, and to provide enhanced opportunities for trade and economic development.*

The purpose of this PEL is to identify a recommended I-11 corridor through the Las Vegas metropolitan area that would be a part of the overall I-11 as envisioned in the IWCS and the legislation that preceded that study. The development and evaluation of study alternatives to inform the identification of a recommended corridor is documented in this Alternatives Development Report.

1.2 Project History

The I-11 Las Vegas Metropolitan Area PEL Study is rooted in several legislative actions and agency decisions, starting in 1991.

1.2.1 Legislative Foundation

The following chronologically describes the legislative actions that laid the groundwork for the current study:

December 18, 1991: The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), Public Law 102-240, is a United States Federal law that posed a major change to transportation planning and policy as the first U.S. Federal legislation on the subject in the post-Interstate National Highway System (NHS) era of the 1950s. Section 1105 of ISTEA identified 21 High Priority Corridors to be part of the NHS and therefore eligible for assistance with funds appropriated through the Highway Trust Fund.

November 28, 1995: The National Highway Systems Designation Act of 1995 (NHSDA), Public Law 104-59, amended Section 1105 of ISTEA to include eight additional High Priority Corridors. In this Act, Corridor 26 (CANAMEX) was identified as extending from "Nogales, Arizona, through Las Vegas, Nevada, to Salt Lake City, Utah, to Idaho Falls, Idaho, to Montana, to the Canadian Border…". Subsection (26)(B) of the Act prescribed that "In the State of Nevada, the CANAMEX Corridor shall follow:

> "(i) United States Route 93 from the Arizona Border to Las Vegas; and
>
> "(ii) I-15 from Las Vegas to the Utah Border."

August 10, 2005: The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59, dated August 10, 2005, further amended Section 1105 of ISTEA to redefine a number of High Priority Corridors and to add Corridors 46 through 80. Corridor 68 in SAFETEA-LU was defined as "The Washoe County corridor, along Interstate Route 580/United States Route 95/United States Route 95A, from Reno, Nevada, to Las Vegas, Nevada".

July 6, 2012: The Moving Ahead for Progress in the 21st Century Act (MAP-21), Public Law 112-141, dated July 6, 2012, further amended Section 1105(e)(5)(C)(i) of ISTEA by adding at the end the following:

> "The routes referred to subparagraphs (A)(iii) and (B)(i) of subsection (c)(26) are designated as Interstate Route I-11"

This provision in MAP-21 re-designated that portion of the CANAMEX Corridor in the State of Arizona on United States Route 93 (US 93) in the vicinity of Phoenix to the Nevada Border ((A)(iii)) and that portion of the CANAMEX Corridor in the State of Nevada on US 93 from the Arizona Border to Las Vegas ((B)(i)) as Interstate Route I-11.

December 4, 2015: Section 1416 (High Priority Corridors on National Highway System) of Fixing America's Surface Transportation Act of 2014 (FAST), Public Law 114-95, dated December 4, 2015, amended ISTEA Public Law 102-240 as follows:

- In Section 1105(c) by striking paragraph (68) and inserting the following:
  - "(68)(B) for the Intermountain West Corridor, from the vicinity of Las Vegas, Nevada, north along United States Route 95 terminating at Interstate Route 80."
- In Section 1105(e)(5)(C)(i) by striking the first sentence and inserting the following:
  - "The routes referred to in subparagraphs (A) and (B)(i) of Subsection (c)(26) and in subsection (c)(68)(B) are designated as Interstate Route I-11."

Legislative Summary: The effect of the FAST Act in the above amendment was to replace the Washoe County corridor (Corridor 68 in SAFETEA-LU) with the Intermountain West Corridor as defined above, and to re-designate all remaining portions of the CANAMEX Corridor in the State of Arizona ((A)(i) and (A)(ii)), that portion of the CANAMEX Corridor in the State of Nevada on US 93 from the Arizona Border to Las Vegas, Nevada ((B)(i)), and the Intermountain West Corridor (formerly designated as the Washoe County corridor) ((68)(B)) as I-11.

With the above legislation in place, a continuous designation exists for I-11 from Nogales, Arizona to I-80 in northern Nevada. With respect to the alignment of I-11 through the Las Vegas metropolitan area, the use of the term “vicinity” in the above legislation defines a route that will follow US 93 to the south and US 95 to the north of Las Vegas. No further definition relative to the location of I-11 in the Las Vegas metropolitan area is provided in the legislation.

1.2.2 Project Background

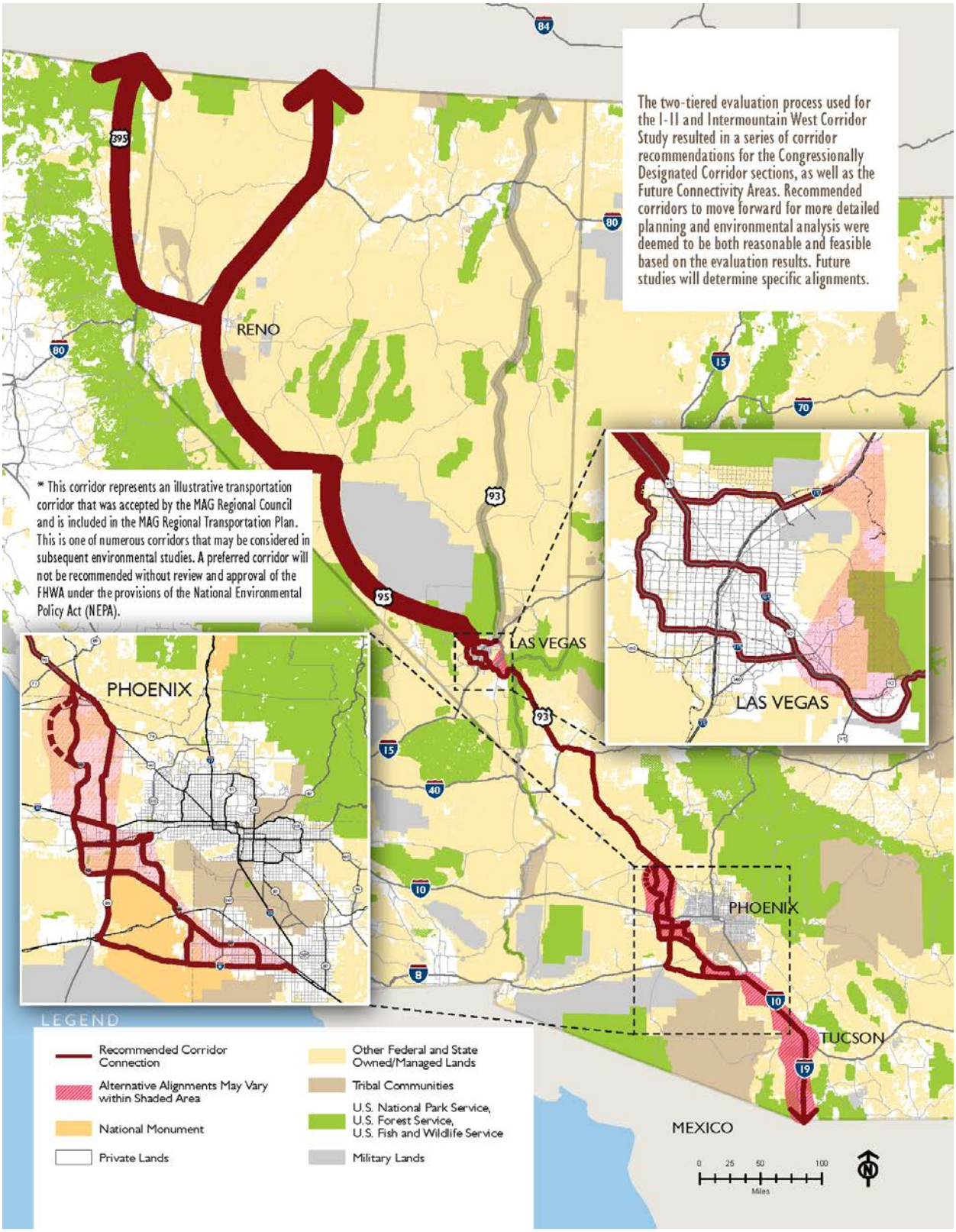
Following the designation of US 93 between Arizona and Nevada as the future I-11, as per MAP-21, NDOT and Arizona Department of Transportation (ADOT) advanced a number of studies and projects to realize the vision of I-11.

From 2012 through 2014, NDOT and ADOT jointly developed the IWCS. On January 15, 2015, FHWA NV Division approved the IWCS, which identified a western corridor and a central corridor through the Las Vegas metropolitan area, as well as a general eastern corridor area. The IWCS concludes that all three alternatives would be reasonable and feasible and should be carried forward for further study.

Figure 2 identifies the IWCS corridor recommendations through the Las Vegas metropolitan area and connections north and south of the Las Vegas region. At the completion of the IWCS, ADOT initiated the *I-11 Tier 1 Draft Environmental Impact Statement (Wickenburg to Nogales)* to evaluate potential corridors through the Phoenix metropolitan area and points both north and south. The corridor alternatives through the Phoenix region are also identified in Figure 2. The Draft Environmental Impact Statement (EIS) was released for public review in summer 2019 and the Final EIS is currently under development and review, with anticipated release in spring 2021.

In addition, NDOT initiated an Alternatives Analysis effort for the I-11 Corridor between the northwestern edge of Las Vegas and I-80 in western Nevada in 2017. The PEL study was completed in December 2018 with a recommendation that the I-11 corridor between the Las Vegas Metropolitan Area and I-80 in northern Nevada be along a westerly route that generally follows the US 95 corridor.

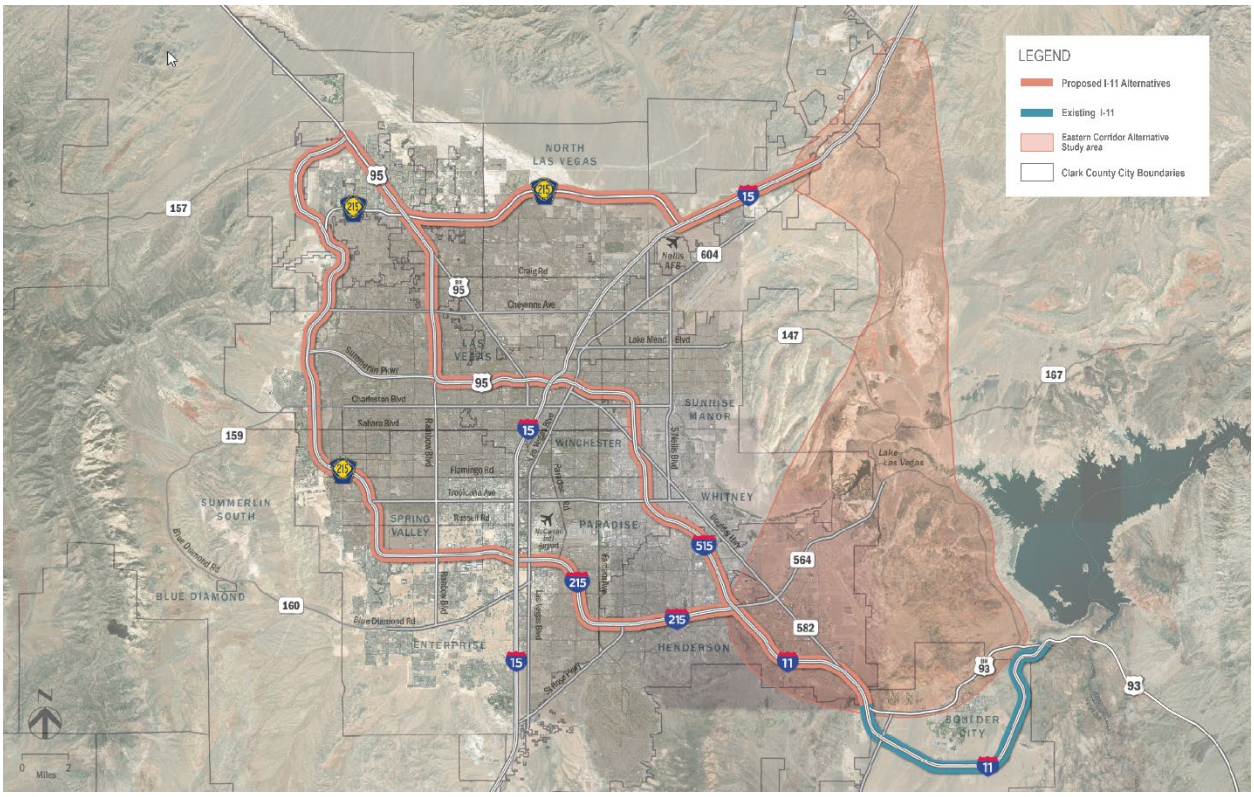
Figure 2. Recommended Corridor Alternatives in the I-11 and Intermountain West Corridor Study



Source: I-11 and Intermountain West Corridor Study, November 2014

In fall 2019, NDOT initiated a Tier 1 EIS to further develop and evaluate potential I-11 corridors through the Las Vegas metropolitan area, linking US 93 in the southeastern portion of the study area at the Arizona border with US 95 in the northwestern portion of the study area. The National Environmental Policy Act (NEPA) Tier 1 EIS was intended to develop and evaluate potential 500-foot-wide corridors within which the future I-11 would be located, and to recommend a preferred route to be advanced to a Tier 2 “project-level” NEPA environmental process. The preliminary study area, based on the 2014 IWCS corridor recommendations, is shown in Figure 3. The figure identifies defined corridors for a western alternative along I-215 and Clark County (CC) 215 and a central alternative along I-515 and US 95; however, it shows a shaded area within which potential eastern alternative options would be identified and evaluated as part of the Tier 1 EIS process.

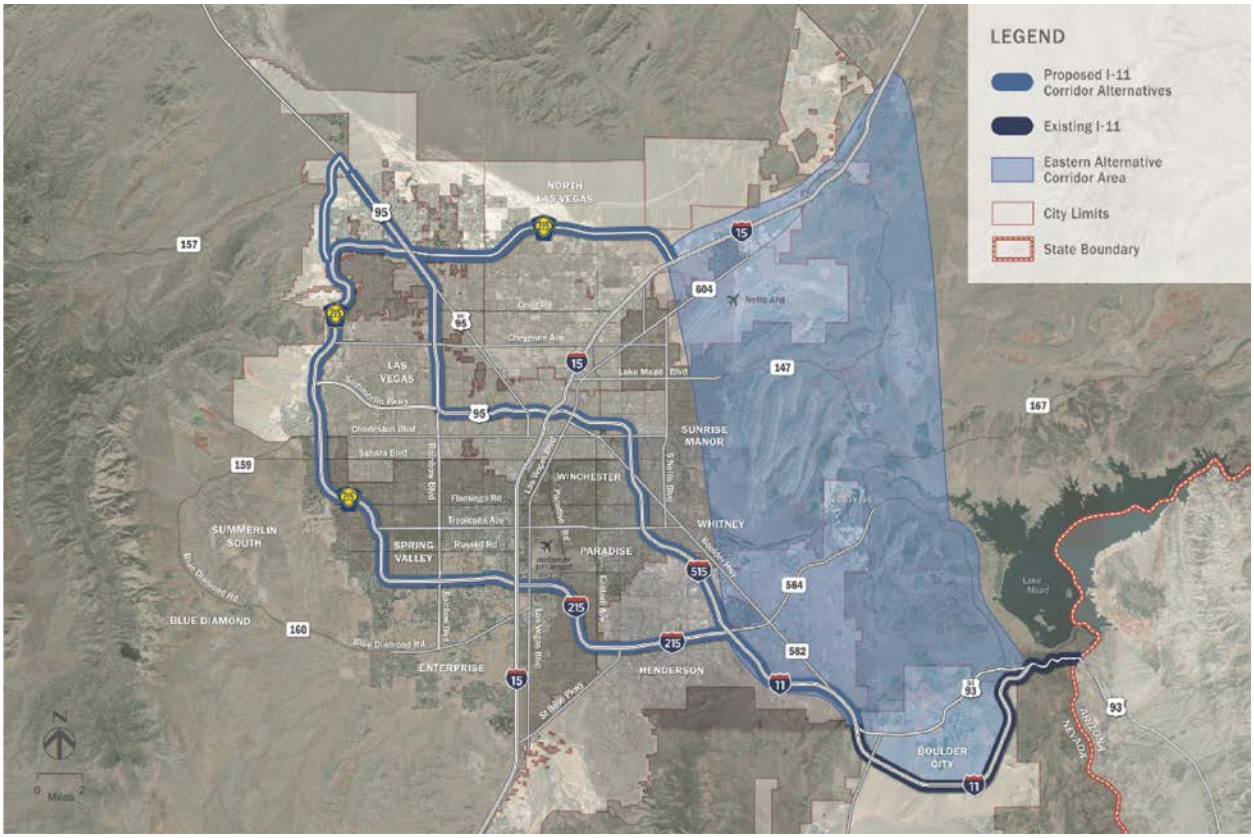
Figure 3. Preliminary I-11 Study Area



Early in the development of the Tier 1 EIS for the Las Vegas metropolitan area, it was acknowledged that there may be feasible Eastern Corridor options outside the area identified in the 2014 IWCS I-11 Study Area, including potential options that could be located west of Frenchman Mountain since it had been indicated by NDOT and FHWA that options east and west of the mountain be considered. Therefore, in order to generate additional potential Eastern Corridor options, the I-11 Study Area for this project was revised to expand the Eastern Corridor Area, as shown in Figure 4. Figure 4 also illustrates a variation in the northern part of the

Western Corridor, with I-11 utilizing CC-215 to US 95 through the “Centennial Bowl” interchange as an alternative to a new alignment connection to US 95 as shown in Figure 3.

Figure 4. Revised I-11 Study Area



Following the development of the I-11 Study Area, a number of additional alternatives were developed and refined, leading to the evaluation of potential alternatives that is documented in this Alternatives Development Report (ADR). This extensive alternative development process is discussed in Section 3.2 of this document.

1.2.3 Current Planning Effort: Planning and Environmental Linkages Study

In late 2020, NDOT and FHWA determined that a PEL study is the most appropriate approach moving forward to accomplish the goal of selecting a corridor for I-11 through the Las Vegas metropolitan area. The PEL study would be used to identify transportation issues and environmental concerns in the proposed corridor alternatives and refine the corridor alternatives. The 2014 IWCS, also a PEL study, was conducted for a much larger, regional corridor and not specifically focused on the Las Vegas metropolitan area. The current I-11 Las Vegas Metropolitan Area PEL study considers corridor alternatives through Las Vegas to further the progress beyond the 2014 IWCS. Although a Tier 1 EIS was initially considered to develop and evaluate corridor alternatives, and to recommend a preferred corridor to advance to a project-level Tier 2 environmental process for compliance with NEPA, NDOT and FHWA have recently determined that a focused PEL study would achieve the same objectives within a

shorter time period. At the conclusion of the I-11 PEL study, NDOT and FHWA will consider further actions that would designate I-11 through the Las Vegas metropolitan area.

1.3 Need and Purpose of the I-11 Project

As part of the collaborative PEL process, understanding the driving need for the proposed improvements is important in the development of criteria against which corridor options would be evaluated. The sections below summarize the need for the I-11 Project and the resulting purpose that directly informs this evaluation, based on the IWCS corridor vision presented on page 2.

1.3.1 Why Is the I-11 Project Needed?

Favorable transportation infrastructure is one key component for attracting and retaining industry and increasing an area's competitiveness and economic vitality. As discussed in the 2014 IWCS, the Intermountain West Corridor is one of the fastest growing regions in the US. Nevada and Arizona are looking to ensure that infrastructure is in place to support planned growth in the corridor as well as in the "Southwest Triangle" megapolitan formed by Las Vegas, the Arizona Sun Corridor, and Southern California. More than 160,000 jobs in Nevada and Arizona rely on trade with Mexico.

Economic return on investment analysis conducted for the IWCS predicted that the I-11 has the potential to make major contributions to the economic wellbeing of the region's residents bringing up to an additional 240,000 jobs and $22 billion in economic output to the region over the next 25 years. I-11 would connect regional economies to each other and to global markets creating opportunities for integrated manufacturing and advancement of the economic development initiatives of Nevada and Arizona.

The Las Vegas metropolitan area is comprised of separate and distinct activity centers for residents and visitors, such as Downtown Las Vegas, the Las Vegas Strip, McCarran International Airport, and the Las Vegas Convention Center, which account for over $57 billion in total annual output, supporting approximately 42 percent of private employment in Southern Nevada, and generating over $15 billion in wages and salaries (Las Vegas Economic Impact Series Report, 2019). The disparate locations of these facilities result in a variety of travel patterns of peak and off-peak travel. Major routes through the Las Vegas Valley, including I-215, Clark County (CC) 215, I-515, US 95, and I-15, experience bottlenecks during peak travel periods. Congestion is expected to increase through the year 2040 as a result of planned activity center expansions and other development.

Existing congestion in the Las Vegas Valley hinders access for emergency services and is of concern regarding efficiency for evacuations during natural or manmade disasters including flash floods, earthquakes, and wildfires. With Nellis Air Force Base, the premier training facility for the Air Force, located northeast of the city, mobility in support of national defense is also of concern.

1.3.2 What is the Purpose of the I-11 Project?

Based on the deficiencies and directives discussed above, the goals identified in the IWCS, and input from Technical Advisory Committee (TAC) members engaged in the project early on, the purpose of the I-11 Las Vegas Metropolitan Area PEL is to:

- Provide a high-capacity, access-controlled transportation corridor;
- Improve access to activity centers within the Las Vegas Valley;
- Support enhanced regional mobility for people and freight by improving travel time reliability and efficiency;
- Enhance opportunities within the Las Vegas Valley for economic development;
- Facilitate efficient mobility for emergency access, evacuation, and national defense; and
- Provide the Congressional mandated link through the Las Vegas Valley for a continuous I-11 Corridor that connects major metropolitan areas and markets in the Intermountain West Corridor with Mexico and Canada.

2.0 Existing Conditions

2.1 Study Area Overview

The I-11 Las Vegas Metropolitan Area Study Area (Study Area) includes the Las Vegas Valley (Valley) from the Nevada/Arizona border southeast of Las Vegas to northwest of Las Vegas. The Valley is largely constrained and bounded by mountains and desert, and its transportation network has been generally developed from a grid system, often allowing for numerous options in routes between any two points.

As shown in Figure 5, the major freeways and highways include:

- Interstate 15 (I-15) – also known as the Las Vegas Freeway, this is the predominant north-south route in the Valley
- I-515, US Highway 95 (US 95), US 93 – a main route that is oriented southeast to northwest through the Valley
- I-215, CC 215 – also known as Bruce Woodbury Beltway, a three-legged loop (missing eastern connection) around the Valley

In addition to these freeways, the roadway network consists of four system interchanges:

- I-15/I-215/CC 215 – just southwest of the McCarran International Airport
- I-11/I-515/I-215 – near Henderson, also known as the Henderson Spaghetti Bowl
- I-15/I-515/US 95 – near downtown Las Vegas, also known as the Las Vegas Spaghetti Bowl
- US 95/CC 215 – in the northwestern Valley, also known as the Centennial Bowl

2.2 Population Density and Activity Centers

According to the U.S. Census Bureau's 2019 American Community Survey 5-year estimates, there were 2,182,004 people and 899,870 households in Clark County. The population density was 270.7 inhabitants per square mile. The racial makeup of the county was 64.5 percent white, 13.7 percent black or African American, 12.1 percent Asian, 1.5 percent Pacific islander, 1.7 percent American Indian, 12.5 percent from other races, and 3.8 percent from two or more races. Those of Hispanic or Latino origin made up 31.1 percent of the population. Figure 6 shows the population density in the study area by census tract block group.

Activity Centers in the Valley defined as universities, colleges, casinos, libraries, shopping centers, shopping malls, Air Force base, airports, cultural centers, community centers, and hospitals are located throughout the Study Area, as shown in Figure 7. Major land uses in the study area are shown in Figure 8.

Figure 5. Major Highways and Freeways in the Study Area

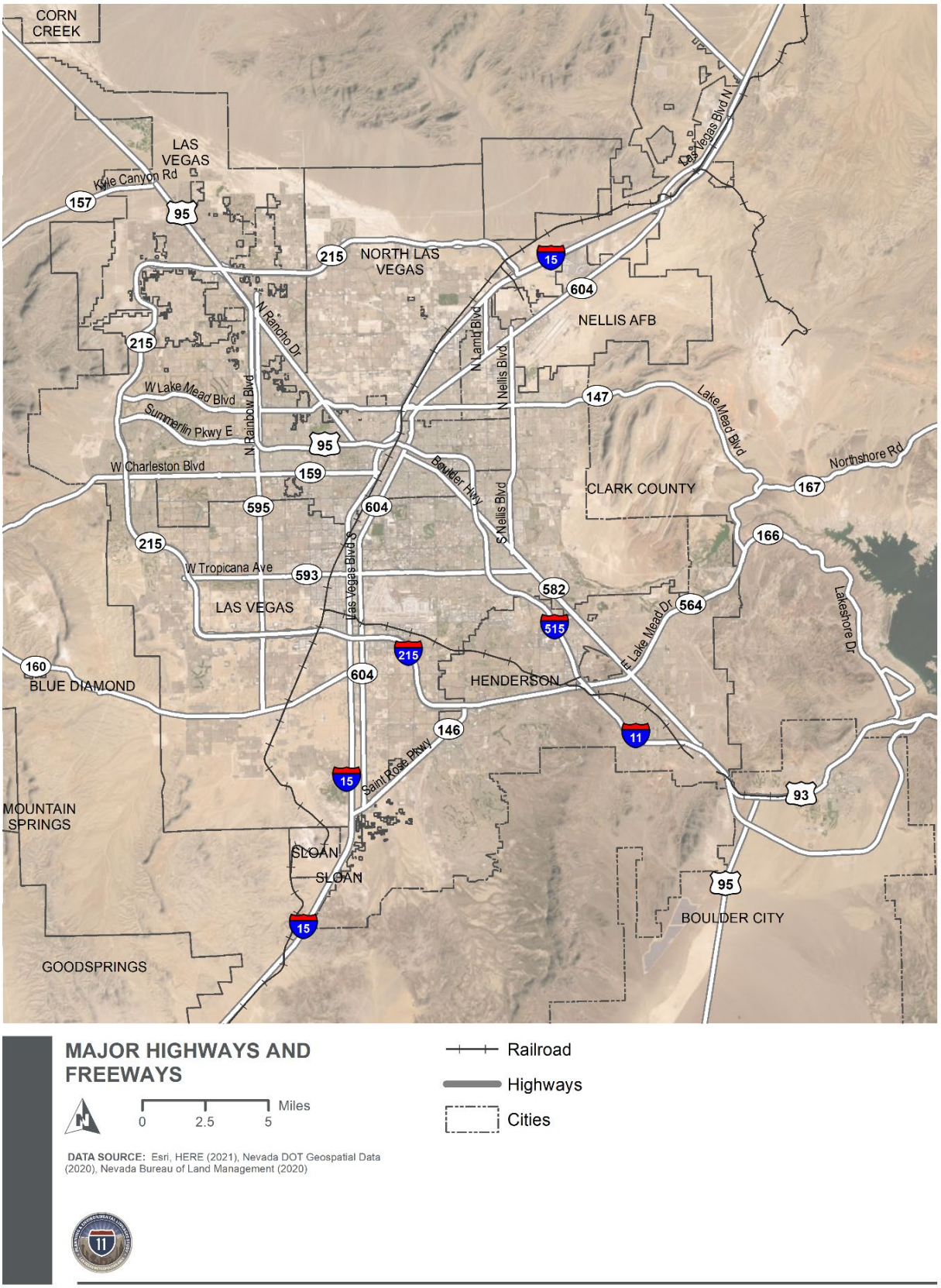


Figure 6. Population Density by Census Block Group in the Study Area

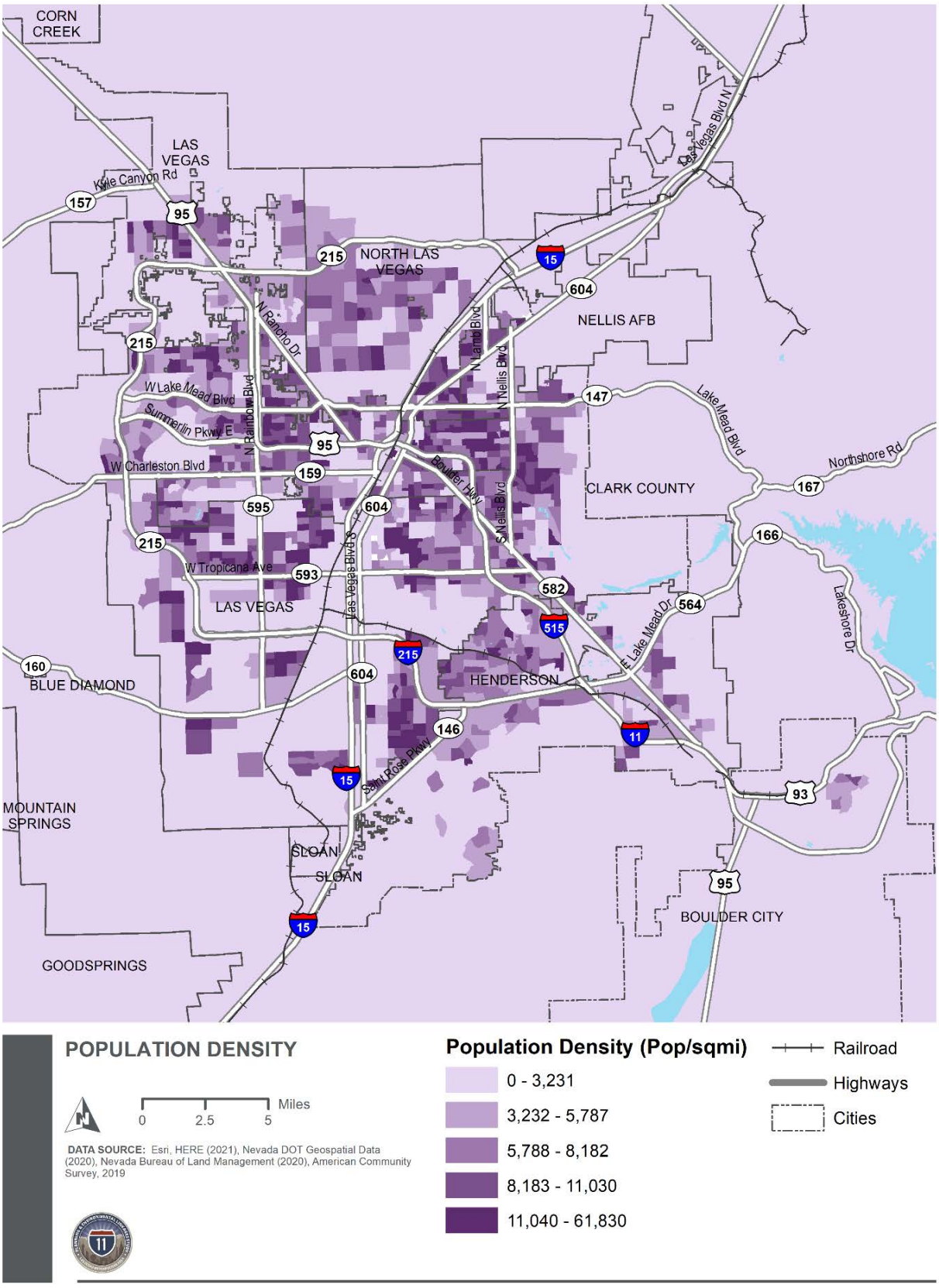


Figure 7. Community Facilities in the Study Area

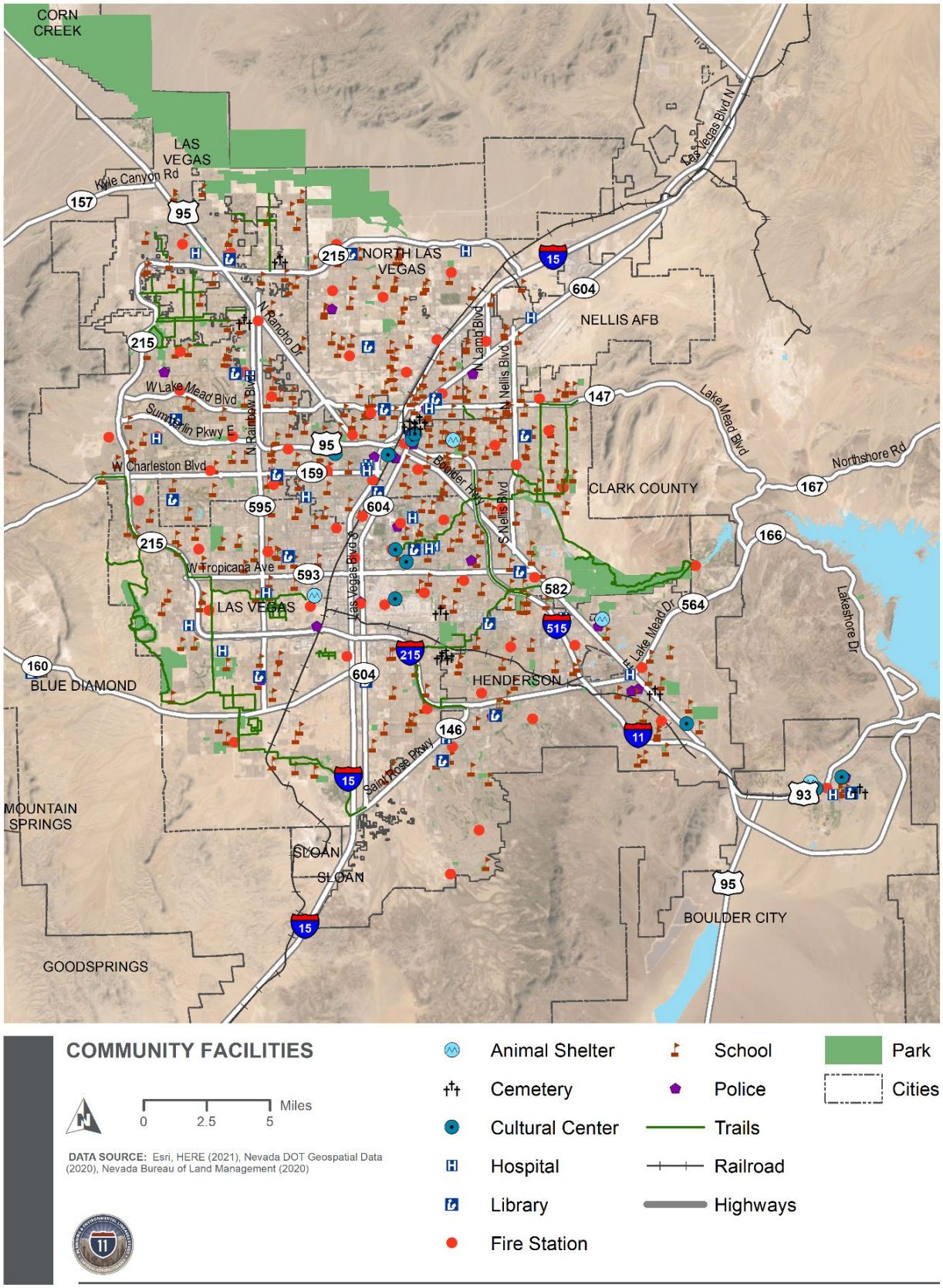
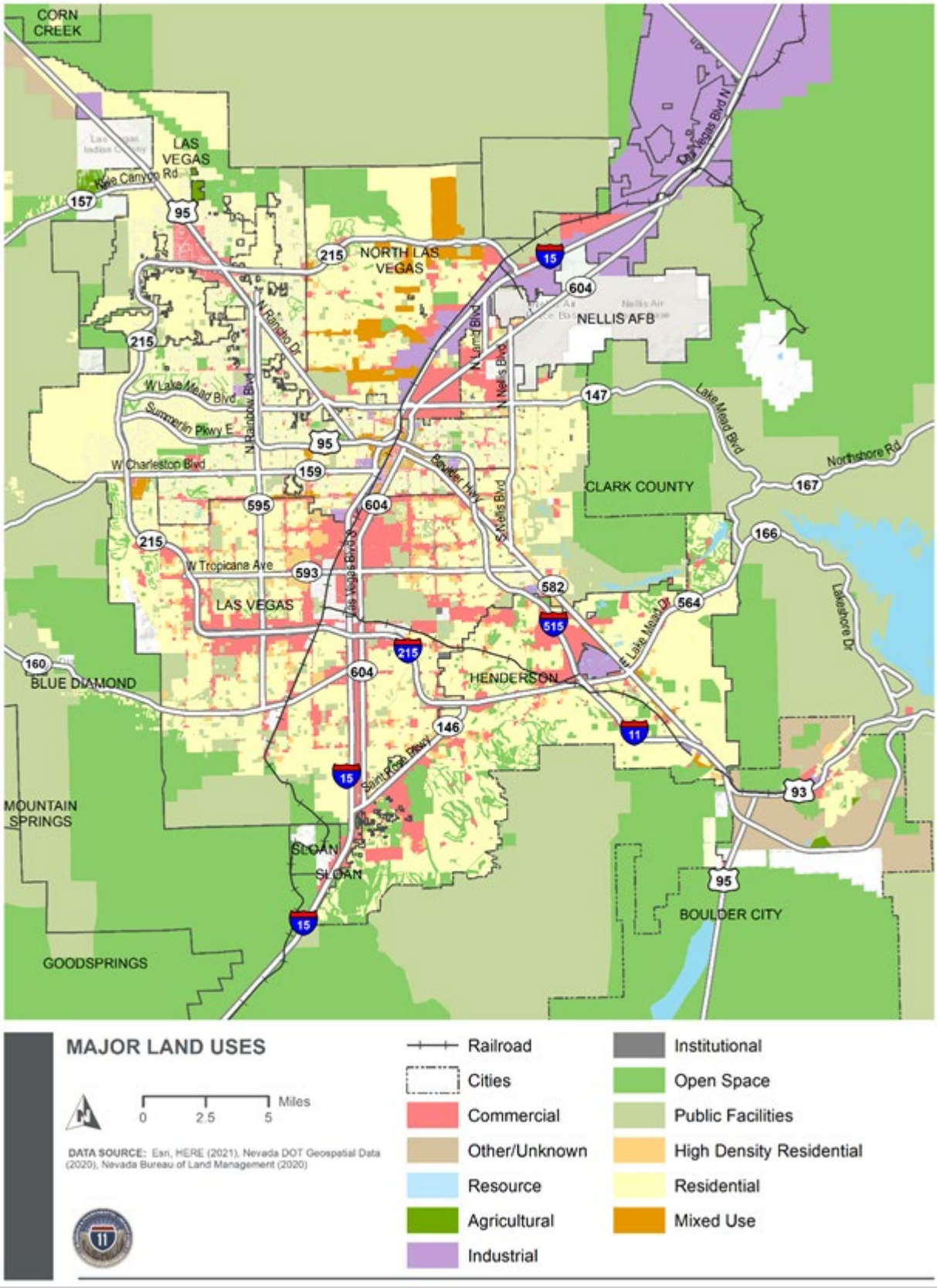


Figure 8. Major Land Uses in the Study Area

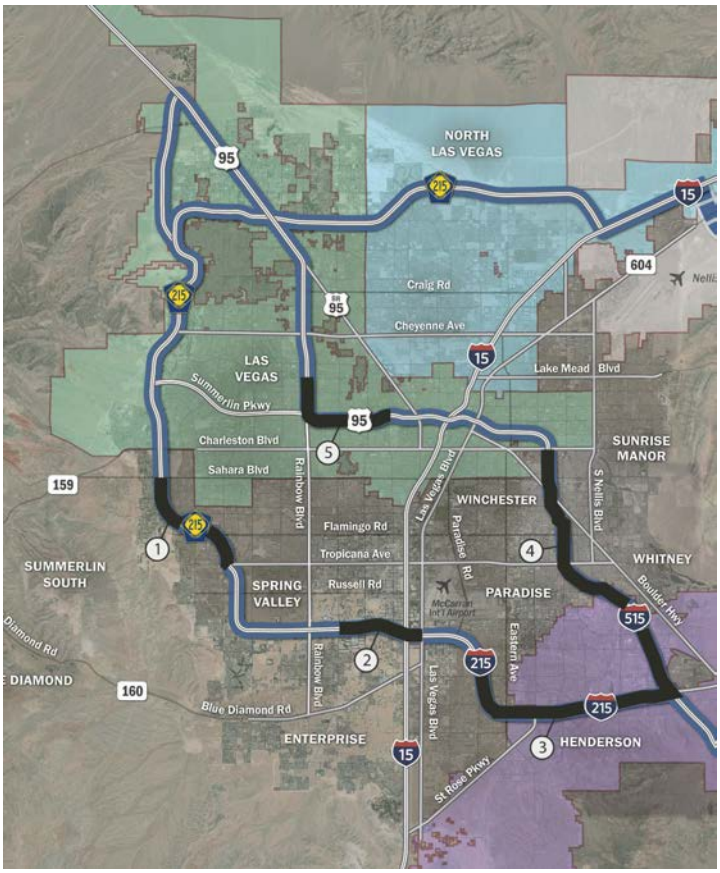


2.3 Existing Freeway Congestion

The roadway network throughout the Study Area regularly experiences traffic congestion and degraded system performance. There is much background traffic prevalent in the network's arterials and streets and the overall traffic is not restricted to only major freeways. Figure 9 illustrates in black the freeway segments that currently experience typical congestion. Furthermore, analysis of the Study Area has identified common bottlenecks at the following locations:

1. *CC 215*: Moderate congestion from Russell Road to Charleston Boulevard; Heavy southbound congestion from Sahara Avenue to Flamingo Road in the morning commuting period
2. *CC 215*: Moderate congestion in both directions from the McCarran Airport Connector to Jones Boulevard
3. *I-215*: Moderate westbound congestion from Stephanie Street to Windmill Lane; Moderate eastbound congestion from Windmill Lane to Henderson Spaghetti Bowl
4. *I-515*: Heavy congestion from Henderson Spaghetti Bowl to Charleston Boulevard
5. *US 95*: Light to moderate congestion in both directions from Lake Mead Boulevard to Valley View Boulevard

Figure 9. Existing Congested Segments in the Study Area



2.4 Characteristics of Eastern Corridor Study Area

The Eastern Corridor Study Area, as shown in Figure 4, encompasses a large swath of land at the eastern edge of the Valley and within the undeveloped lands farther east. This area is generally comprised of federal land, including U.S. Bureau of Land Management (BLM), National Park Service (NPS) Lake Mead National Recreation Area (LMNRA), U.S. Bureau of Reclamation (USBR), and Department of Defense (DoD) Nellis Air Force Base (AFB). The undeveloped lands are remote from the Valley's established infrastructure and transportation network. Access to this area is scarce, with the following roadway facilities being the main thoroughfares and linking arterials offering connections to the core system:

- Lake Mead Parkway
- East Lake Mead Boulevard
- North Las Vegas Boulevard
- Boulder Highway
- Nellis Boulevard
- Hollywood Boulevard

Figure 10. Las Vegas Wash

The Eastern Corridor Study Area is also defined by its lack of development and generally mountainous terrain, including Frenchman Mountain, Sunrise Mountain, and River Mountains. Lake Mead borders the area to the southeast, and the Nellis AFB occupies much land in the northeast quadrant of the Valley, east of I-15. The Las Vegas Wash runs through the central portion of the Eastern Corridor Study Area, and the Clark County Wetlands Park occupies a portion of its length. Figure 10 provides a photo of the Las Vegas Wash west of Lake Las Vegas and the Wetlands Park.

Additionally, vast parts of the central part of the area include BLM Areas of Critical Environmental Concern (ACECs). ACEC designations highlight areas where special management attention is needed to protect important natural, historical, cultural, and scenic resources. Figure 11 shows the typical terrain in the Rainbow Gardens ACEC and Figure 12 shows the typical terrain in the River Mountains ACEC.

Figure 11. BLM Rainbow Gardens ACEC

Figure 12. BLM River Mountains ACEC

In an effort to urge Congress to protect public lands including and adjacent to Sunrise Mountain, Frenchman Mountain, and Rainbow Gardens, Senate Joint Resolution (SJR) 10 was introduced in the 81st Session (2021) of the Nevada Legislature. This SJR was enrolled and delivered to the Secretary of State on May 18, 2021. SJR 10 enjoys broad local support including a letter on file from the Toyabe Chapter of the Sierra Club. SJR 10 urges Congress to "protect the public lands including and adjacent to Sunrise Mountain, Frenchman Mountain 9 and Rainbow Gardens by designating them for federal protection, which may include, without limitation, designating all or portions of the area as a national conservation area, national recreation area or national monument, or applying other federal protections that Congress deems appropriate for these important and scenic lands…"

3.0 Development and Refinement of Eastern Corridor Options

3.1 Development of Initial Eastern Corridor Options

In spring 2020, NDOT, FHWA, and the project study team initiated a series of meetings with the TAC, federal landowners, and other key stakeholders as part of a due diligence effort to identify potential Corridor options that would be feasible and could advance through the evaluation process. The Central Corridor, as defined in the IWCS, was established as I-515 and US-95, with no other options. The Western Corridor, as defined in the IWCS, was established as I-215 and CC 215; however, there remained two options in the northwestern part of the study area – one option to use the existing CC 215 east to US-95 north (the "Centennial Bowl" interchange) and one option to use a route that would follow CC 215 north along a previously planned segment of Sheep Mountain Parkway. For the Eastern Corridor, the study area identified in Figure 4 provided the basis for further exploration of a range of potentially reasonable and feasible options. This section describes the process to develop and refine the various options that are evaluated in this ADR.

The process to develop Eastern Corridor options was based on the identification of an Eastern Alternative from the IWCS, the revised I-11 study area shown in Figure 4, and input from the TAC members at a TAC meeting held on March 12, 2020[1]. At this meeting, the TAC members provided input on the purpose and need as well as their thoughts on environmental and technical concerns with an Eastern Corridor. The technical and environmental concerns identified at the TAC meeting, focused on identifying any fatal flaws within the Eastern Corridor study area, included:

- BLM ACECs
- NPS LMNRA
- USBR land
- River Mountains Loop Trail
- Gypsum Cave
- Las Vegas Wash and Wetlands Park
- Southern Nevada Water Authority (SNWA) facilities
- Wilderness areas
- Existing and future utility corridors
- Wildlife and plant concerns

1 TAC members present at this meeting included: City of Henderson, City of Las Vegas, City of North Las Vegas, Clark County Planning, Clark County Public Works, Bureau of Land Management, Southern Nevada Regional Transportation Commission, Clark County Regional Flood Control District, Southwest Gas, Southern Nevada Water Authority, Bureau of Reclamation, McCarran Airport, Nellis Air Force Base, Western Area Power Administration, and National Park Service Lake Mead National Recreation Area.

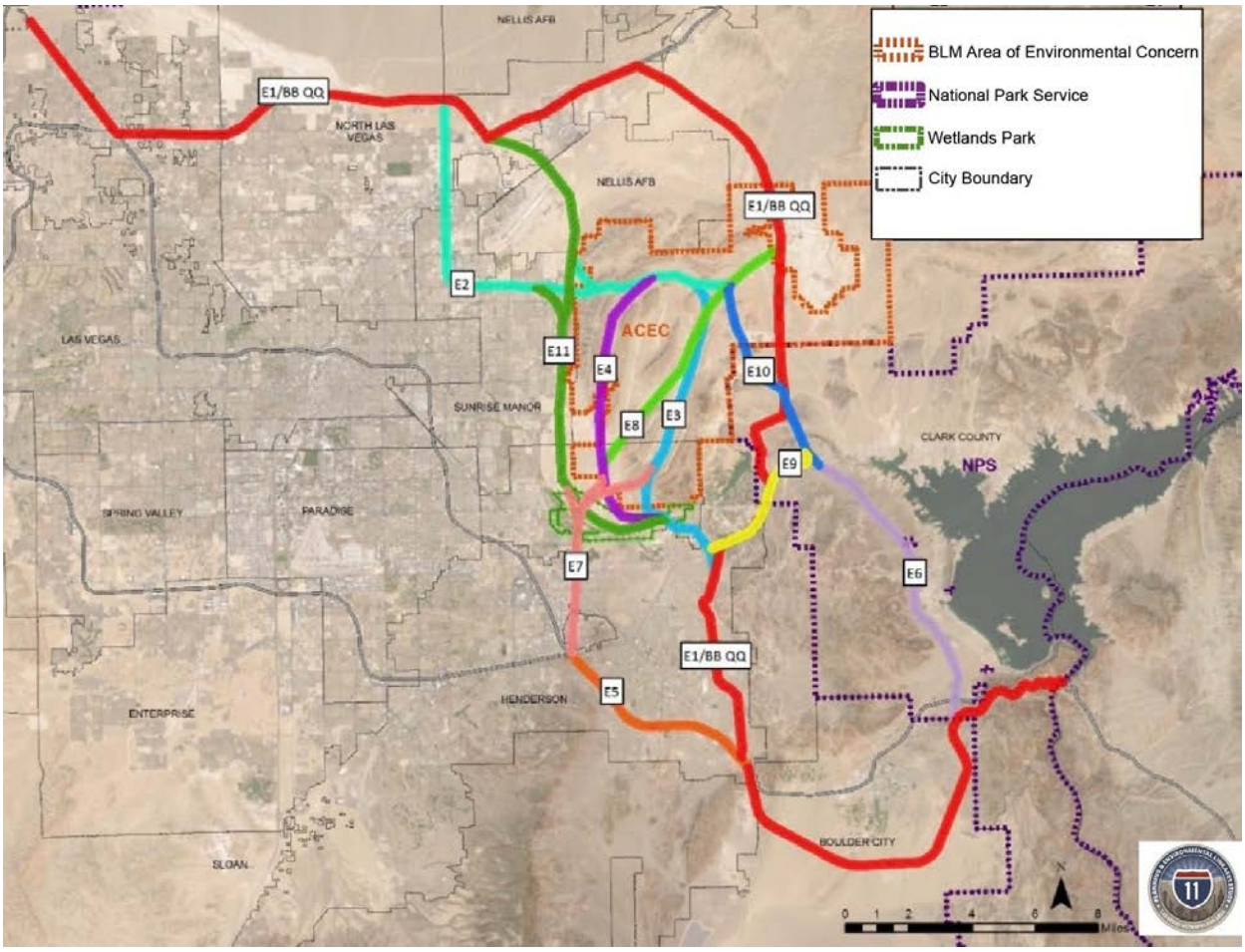
Following the March TAC meeting, the project team held meetings with NPS (March 26, 2020) and Nellis Air Force Base (AFB) (March 27, 2020), two of the key landowners in the Eastern Corridor Area, to focus on any concerns or interests they may have; these individual meetings informed the development of the initial set of Eastern Corridor options. NPS emphasized its mission for resource protection and visitor enjoyment, and they generally remained open to a potential Eastern Corridor stating that "it would depend on where the final alignment would be and if it had benefit or impact on resources."

Nellis AFB indicated an interest in I-11 provided that the interstate does not hamper its mission, does not endanger civilians, and does not introduce incompatible development adjacent to the base. Nellis AFB staff identified a lack of infrastructure to serve the base; accordingly, to provide improved base access they noted they would favor a more westerly route for a potential east link aligned with Lamb Boulevard or a route east of the Frenchman Mountains towards Apex. They also cited several concerns with potential options aligned either through or on the perimeter of the base, noting the presence of a small arms range north of I-15, delineated accident-potential zones around runways, munitions storage areas to the east of the runways, and a Metropolitan Police (Metro) firing range, and future training facility at the Carey Avenue and Los Feliz Street intersection. They also noted safety, security, and terrorism concerns with options that bisect the base, either at or below grade.

With input from the March 2020 TAC and stakeholder meetings, a review of NDOT's 2019 Road Design Guide, and topography available from GIS sources, the project team prepared an initial set of Eastern Corridor options that addressed the request by NDOT and FHWA to provide options east and west of Frenchman Mountain, as well as a more westerly corridor alternative was included in response to comments received from Nellis AFB. Figure 13 illustrates the complete set of initial Eastern Corridor options that were then further vetted with the agencies and public. As shown in Figure 12, some of the *key* features of the Eastern Corridor options include:

- Segment E1 which generally follows the Alternative BB-QQ alignment that was developed in the IWCS
- Segment E2 to provide an option to avoid the Nellis AFB property with a southerly and westerly route
- Segment E11 to provide a "foothills" option west of Frenchman Mountain
- Segment E6 to provide a shorter Eastern Corridor option that would not use existing I-11
- Segments E3, E4, and E8 to provide options to traverse the Rainbow Gardens ACEC in an attempt to identify one that may minimize environmental impacts
- Segments E5 and E7 to combine to provide an option that connects to the I-15/I-515/I-215 Interchange ("Henderson Spaghetti Bowl")

Figure 13. Initial I-12 Eastern Corridor Options



3.1.1 Stakeholder and Public Review of Initial Eastern Corridor Options

The initial set of Eastern Corridor options was shared with the key stakeholders for their review and input. On May 12, 2020, NDOT and FHWA conducted the first meeting with the Cooperating and Participating (C&P) Agencies[2] during which these options were presented and discussed. Cooperating and Participating Agencies were identified and invited to participate in the project at the time when NDOT and FHWA planned to advance the I-11 project through a Tier 1 EIS. Following the C&P Agency meeting, the project team provided the GIS files for the initial set of corridor alternatives to several agencies for their review, upon request, including NPS, BLM, USBR, SNWA, McCarran International Airport, Nevada Department of Wildlife (NDOW), City of Henderson, and Western Area Power Administration (WAPA).

[2] Agencies in attendance at the May 12, 2020 C& P Agency meeting included: U.S. Environmental Protection Agency, BLM, NPS/LMNRA, Nellis AFB, U.S. Army Corps of Engineers, U.S. Department of Fish and Wildlife Service, Federal Aviation Administration, City of Las Vegas, City of Henderson, City of North Las Vegas, City of Boulder City, Clark County, Clark County Department of Aviation, SNWA, NDOW, Nevada Division of State Lands, Nevada Division of Forestry, Governor's Office of Economic Development, and WAPA

In late May and early June 2020, the project team engaged in a number of meetings to gather further input on the initial Eastern Corridor options. These meetings and key issues are summarized below.

Community Working Group

On May 28, 2020, the project team met with the Community Working Group (CWG)[3] that was formed to represent a variety of voices in the I-15 study area. The interactive discussions provided the study team deeper insight into local interests and concerns with a future I-11, such as congestion relief, economic development, and preservation of communities.

Henderson Development Association

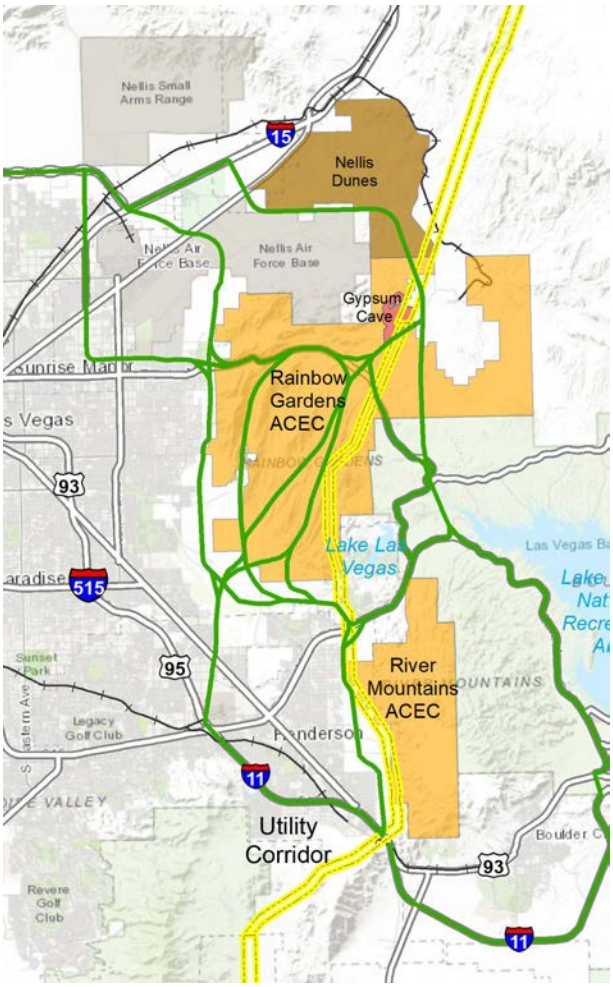
On June 15, 2020, the project team presented at a Zoom virtual meeting of the Henderson Development Association. This meeting included representatives from business and industry sectors in the Henderson, Nevada area. The I-11 study was presented. Participants were provided with forums to provide comments and to remain engaged in the study's progress.

Bureau of Land Management

Input was received from the BLM after their review of the initial Eastern Corridor options. On June 3, 2020, BLM provided the project team with documents that described the environmental features within their properties, including two ACECs and a utility corridor through which a transmission line is currently located and an expansion is planned (Figure 14).

During a follow-up meeting with BLM on June 4, 2020, BLM indicated the difficulty with potentially siting I-11 through their ACECs, given the presence of sensitive plants, such as the Las Vegas bearpoppy in the Rainbow Gardens ACEC and Bighorn Sheep habitat in

Figure 14. BLM's Major Environmental Features and Utility Corridor



[3] Organizations in attendance at the May 28, 2020 CWG meeting included Boulder City Chamber of Commerce, City of Henderson, City of Las Vegas, City of North Las Vegas, City of Boulder City, Henderson Chamber of Commerce, Southern Nevada Regional Transportation Commission, Southern Nevada Health District, Las Vegas Convention and Visitors Authority, Northwest Area Residents Association, Nevada Resort Association, Downtown Vegas Alliance, Sierra Club

the River Mountains ACEC. The project team obtained GIS files of key BLM resources for use in the refinement of corridor options.

In a follow-up meeting on July 15, 2020, discussions between BLM and the I-11 project team focused on the potential viability of using the utility corridor for the Eastern Corridor. Coupled with the avoidance of Nellis Dunes (an off-road vehicle park north of Nellis Air Force Base), Gypsum Cave (listed in the National Register of Historic Places), and other sensitive features within their properties, use of the existing transmission line utility corridor would be preferred over use of undisturbed grounds for the I-11 facility. Figure 15 shows two photographs of the utility corridor, and Figure 16 shows two photos of the Gypsum Cave.

Figure 15. Sections of the BLM Utility Corridor

Figure 16. Gypsum Cave Area

BUREAU OF RECLAMATION

On June 5, 2020, the project team met with the USBR to discuss their interests and concerns regarding the Eastern Corridor options. The agency provided the team with information pertaining to the development of a First Solar photovoltaic solar facility on USBR property just east of the City of Henderson and adjacent to Alternative BB-QQ. The project team obtained the GIS files of this development so it would be avoided as modifications to the Eastern Corridor options were made. The USBR also noted that large underground water supply pipes are in the area of the Eastern Corridor options and the study team should coordinate with SNWA on these specific locations. In addition, USBR informed the study team of a Clark County project to extend Hollywood Boulevard southeast, potentially in conflict with one or more of the Eastern Corridor options. Soon after the meeting, the project team obtained a map of the proposed Hollywood Boulevard Extension Project, as shown in Figure 17.

Figure 17. Clark County Proposed Hollywood Boulevard Extension Project

Source: Clark County; WSP USA, Inc.

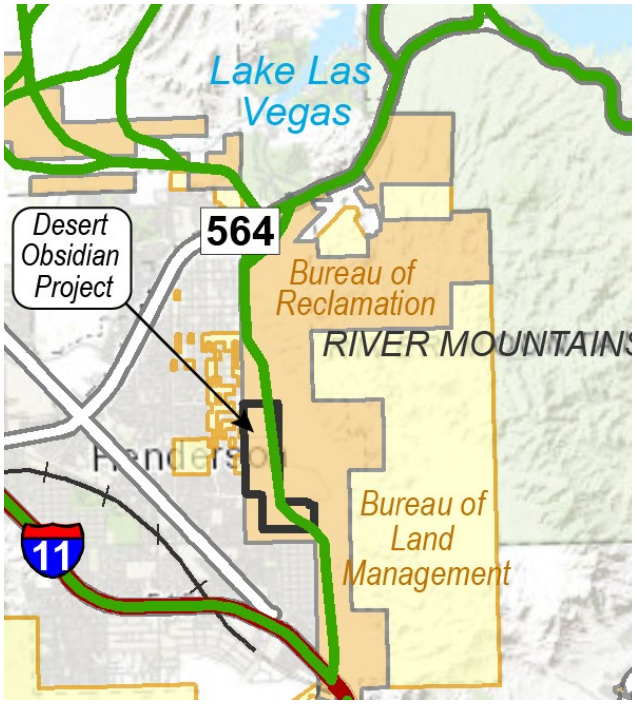
Following a review of this map, the team met on September 19, 2020, with the Landwell Company, developers of the Cadence community which is located south of the Las Vegas Wash and generally east of the proposed Hollywood Boulevard extension. Cadence recently completed its entitlement processes for residential uses and would be impacted by the introduction of an I-11 corridor in this area. The I-11 Study was also presented to the Las Vegas Wash Coordination Committee on January 26, 2021. Participants were interested in opportunities to provide feedback on the alternatives.

In a follow-up meeting with USBR on July 22, 2020, the agency provided an update on the First Solar project (Notice of Intent scheduled for late 2020). USBR indicated that the use of their land for I-11 would likely take precedence over First Solar's proposed use, if in fact an Eastern Corridor is selected to advance in a timely manner. The agency also shared that SNWA is proposing a new pipeline in this area and they wanted the I-11 project team to be aware of that potential project. In addition, USBR noted that there is a popular local bike trail, the River Mountains Loop Trail, and that the River Mountains Loop Trail Users Group is very active.

First Solar

Following the initial meeting with USBR in June 2020, coordination with First Solar through email communications on June 9 and June 10, 2020, and a meeting on June 11, 2020 provided the project team with valuable information on the location and nature of their project. Alternative BB-QQ would be in conflict with the proposed project. The study team obtained GIS files for the First Solar Development, called Desert Obsidian, which is shown in Figure 18.

Figure 18. First Solar's Proposed Desert Obsidian Project



Nellis Air Force Base

On July 21, 2020, the project team met with Nellis AFB to further explore the potential for Eastern Corridor options either through or around Air Force property. Nellis AFB staff explained the clear zones for accident potential adjacent to the runways in greater detail. No buildings are allowed within 1,500 feet. Accident Potential Zones (APZs) are delineated at distances of 3,000 feet, 8,000 feet, and 15,000 feet from the runways, depending on degrees of severity. It was further discussed that Nellis AFB would have minimal concern with the I-11 facility located outside of the 15,000-foot APZ, and their concern would be greater with a facility located within the 8,000-foot APZ. The 5,000-foot APZ would be completely off-limits.

Nellis AFB representatives provided information with regard to a future joint training facility to be located on the north side of East Lake Mead Boulevard at the foothills of the Frenchman Mountains. The Nevada Joint Training Facility is planned to be a complex for first-response training for the Las Vegas Metropolitan Police Department (Metro) and North Las Vegas Police Department. This planned site, show in Figure 19, includes 200 acres of Nellis AFB land and would likely be bisected by an eastern corridor alternative that extends north of East Lake Mead Boulevard on the west side of Frenchman Mountain.

Figure 19. Nellis AFB / Metro Future Joint Training Facility

Nellis AFB also indicated opposition to any Eastern Corridor option that would be routed through the base, citing concerns with safety and security. An option north of the base may be possible but would need to be shifted farther north to create a more acceptable buffer. Figure 20 shows the typical terrain just north of Nellis AFB and south of the Nellis Dunes off-road vehicle park that could be suitable for an I-11 corridor.

Figure 20. Typical Terrain North of Nellis AFB

VIRTUAL PUBLIC MEETING

On July 31, 2020, NDOT launched a 30-day online public meeting to obtain comment on the initial set of corridor options under consideration for I-11, including the Western Corridor Alternative (I-215 and CC 215), the Central Corridor Alternative (I-515 and US 95), and the Eastern Corridor options shown in Figure 10 and shared with the various stakeholders. The purpose of this meeting was to solicit comments from the public, and due to the public-gathering restrictions with the COVID-19 pandemic, a virtual meeting and Telephone Town Hall on August 27, 2020 were used to engage the various communities in the Las Vegas Metropolitan Area. Sixteen ads were placed to advertise the public meeting, including social media and local newspapers.

The meeting was hosted on the project website, i11nv.com, and throughout the 30 days there were over 1,300 on-line meeting visitors. In addition, there were 95 Telephone Townhall attendees. NDOT received 437 comments and 188 on-line surveys were completed.

A comment map was provided as part of the on-line meeting upon which visitors were able to leave a comment on the project map. Moreover, visitors were able to view previously entered comments and identify if they agreed or disagreed with the comments made. Figure 21 provides the project map that was provided to the public.

Figure 22 illustrates the resulting map showing the locations of all comments received. Comments received through the public outreach process were analyzed and several themes emerged from the comments. The project team identified the theme of each comment, or top two when a commenter indicated multiple themes) and these themes are shown in Table 1. The main themes that emerged from the comments include environmental issue, recreational use of lands, traffic congestion, economic impact, and general issues.

Figure 21. Virtual Public Meeting Comment Map

Figure 22. Comments Collected by Corridor

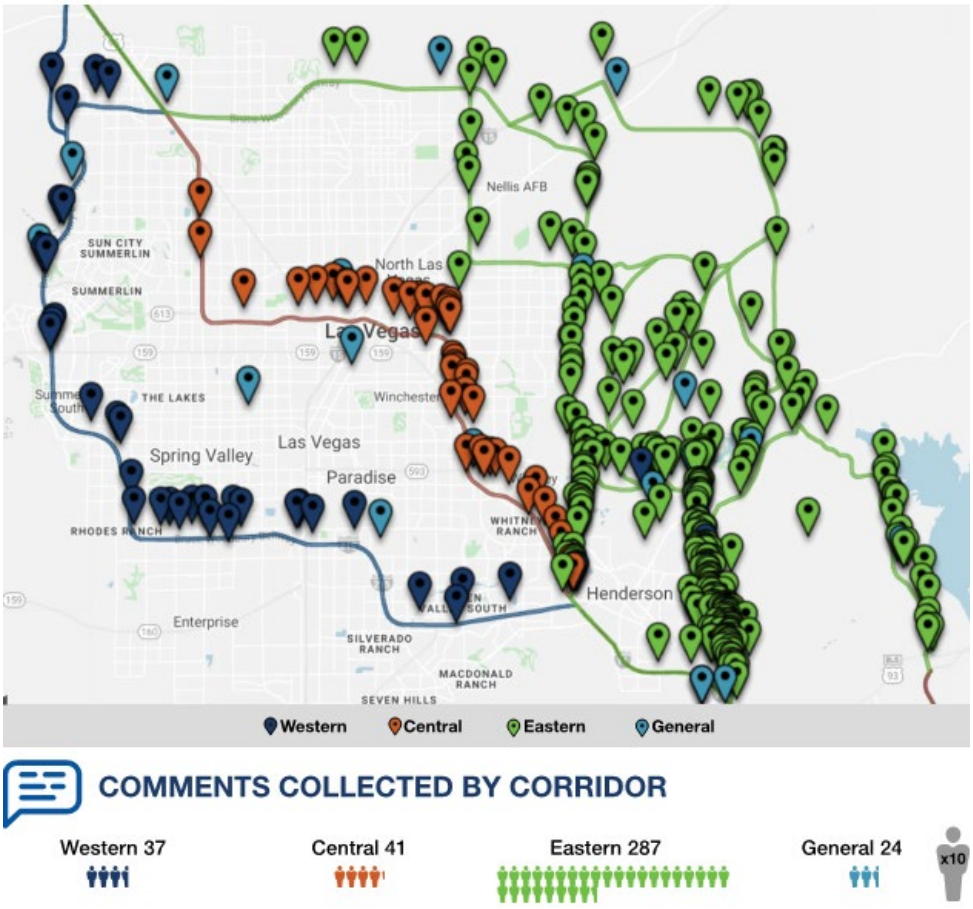


Table 1. Summary of Comments based on Themes

Theme	Total Comments [1]	% of Total Comments [1]
Environmental	157	35.9%
Recreational Use	74	16.9%
Traffic / Congestion	36	8.2%
Financial / Economic Impact	35	8.0%
Use of Existing Highway	26	5.9%
Need for Access and Improvements	17	3.9%
Property Value	17	3.9%
Traffic / Reduction	15	3.4%
Avoid Spaghetti Bowl	7	1.6%
General	79	18.1%

Note: Based on 437 total comments received. Since these themes are not all-inclusive and multiple themes from one commenter may have been identified, the total number of comments noted do not sum to 437 nor do these percentages sum to 100%.

Appendix A includes the Preliminary Draft Public Involvement Summary that presents all stakeholder and public engagement activities completed to date to inform the development and evaluation of corridor alternatives. Lists of all agency and organization groups, dates of meetings, and contact personnel are included. In addition, details regarding the public outreach activities are described in Appendix A.

3.2 Development of Refined Eastern Corridor Options

3.2.1 Stakeholder Input into Refinement of Eastern Corridor Options

Concurrent with the public review of the initial set of Eastern Corridor options, the project team continued to meet with key stakeholders to assemble as much data as possible to inform refinements to the Eastern Corridor options. These informative engagement efforts are summarized below.

CITY OF HENDERSON

During an August 4, 2020 meeting with the City of Henderson, the City expressed opposition to Eastern Corridor options that would be located close to development and impact residences. Moreover, some Henderson rural neighborhoods have the expectation of maintaining their rural nature and access to adjacent open lands; the location of I-11 near these areas would be unpopular with residents.

The City noted a Cadence master-planned community development south of the Las Vegas Wash, near the proposed Hollywood Boulevard extension; I-11 located in this vicinity would potentially be incompatible with these planned projects. The City suggested that other Eastern Corridor options be considered that would be located farther away from developed neighborhoods or planned projects. These corridor options located farther away from developed neighborhoods were added to other Eastern Corridor Alternatives.

CITY OF NORTH LAS VEGAS

On August 5, 2020, the project team met with the City of North Las Vegas. While the Central Corridor was also discussed – the City noted that this option may not be viable – they did express support for the Eastern Corridor option that was routed along Lamb Boulevard, provided that local connections and access would be preserved. The City has invested heavily in improving the Lamb Boulevard corridor and this option makes the most sense to increase connectivity. However, they did acknowledge the challenges with this option due to intensity of existing development along Lamb Boulevard and Carey Avenue.

CLARK COUNTY

The project team provided an I-11 update to Clark County Public Works on August 12, 2020, during which the County also provided an update on the Hollywood Boulevard extension project. The next phase of the project is environmental review and construction could begin the following year. The initial phase of the project is the southerly portion.

During the August 12th meeting, the Eastern Corridor options around Frenchman Mountain were discussed, and the County expressed difficulty with public feedback for any options on the west side of Frenchman Mountain, and with Section 4(f)[4] requirements for any eastern option. The County also noted the potential conflict with schools and a Clark County Public Works project along the Carey Avenue / Lamb Boulevard option. During the meeting, the County also noted the importance in protecting the Wetlands Park. With wildlife habitat and trails in the area, it may not be appropriate for an interstate facility to be adjacent to the local resource. Figure 20 shows a typical location within the Wetlands Park, along the Las Vegas Wash.

During the meeting, the I-11 project team inquired about the status of the Nellis AFB / Metro Nevada Joint Training Facility. On August 19, 2020, the project team received information from Clark County's Planning Department indicating that the land use approvals for the Metro training facility had been approved. This approved project presents a conflict with Eastern Corridor options west of Frenchman Mountain.

FIRST SOLAR

On August 24, 2020, members of the project team met with representatives of First Solar / Arevon Energy to share update on the proposed Desert Obsidian project (see Figure 15). The project study team had been drafting refinements to the Eastern Corridor options to avoid the development and align an option farther west along the existing utility corridor. First Solar followed up the next day by providing updated GIS files of their site plan, confirming that proposed refinements to the I-11 option at this location would avoid the development.

[4] Section 4(f) of the U.S. Department of Transportation Act considers the use of park and recreation lands, wildlife and waterfowl refuges, and historic sites during transportation project development. Before approving a project that uses Section 4(f) property, FHWA must determine that there is no feasible and prudent alternative that avoids the Section 4(f) properties and that the project includes all possible planning to minimize harm to the Section 4(f) properties; or, FHWA makes a finding that the project has a de minimis impact on the Section 4(f) property.

BUREAU OF LAND MANAGEMENT

On August 25 and 26, 2020, the members of the project study team toured the potential Eastern Corridor options, with BLM staff joining on August 26th. During the August 25th tour, the project team identified several additional options and refinements to existing options based on the field visit, including: relocation of the tie-in point from existing I-11 (Boulder City Bypass) to a tie-in off of US 93 based on topographical challenges with an interchange along existing I-11; introduction of new options that traverse the River Mountains ACEC while avoiding use of National Park Service property; relocation of the segment north of Nellis AFB to more closely follow the property line between the base and the Nellis Dunes off-road vehicle park; introduction of a new option across Sunrise Mountain to provide a more direct connection to I-15 and CC 215 in the northern section if this proves feasible; and opportunities for refinements to other options to eliminate redundancy, straighten out curves, and/or avoid sensitive land uses.

During the August 26th tour with BLM, the group explored the constraints and opportunities of the utility corridor, previously acknowledged by BLM as a viable option for an Eastern Corridor. In addition, the group toured several areas within the Rainbow Gardens ACEC (with multiple segments part of the initial set of Eastern Corridor options) and the River Mountains ACEC within which potential new options could be routed. All options traverse challenging terrain for an interstate facility and present challenges locating the facility with respect to preserving existing power transmission facilities. With careful routing to minimize impacts, the utility corridor may still be a viable option; however, there would be an additional layer of BLM environmental approvals to advance this option. Figure 23 shows typical BLM terrain as well as the opportunity to site the I-11 corridor to minimize impacts and engineering challenges.

Figure 23. Example Location along Utility Corridor with Opportunity to Route I-11 Corridor

NATIONAL PARK SERVICE

On August 27, 2020, the project team met with NPS to solicit feedback from the agency on the initial set of Eastern Corridor options and to obtain information on environmental resources within their property boundary. The agency noted that NPS is not in a position to support or

oppose any aspect of the project at this time, but they would be willing to share information that would aid in the decision-making process. NPS indicated that much of the area within which the Eastern Corridor options are located has not been surveyed; therefore, they may not have specific data to share. The agency did note that they would have resource concerns with the historic Railroad Trail and the historic Visitor Center should any of the options be located near these features.

One week later, on September 3, 2020, NPS and the project team met again to specifically discuss the feasibility of any Eastern Corridor option located within park property. NPS staff present included the Superintendent of the LMNRA who clarified that the park is subject to Section 4(f) of the U.S. Department of Transportation Act and has the highest level of protection, with the goal of preservation. If there is another feasible and prudent option, a route cannot go through NPS land.

SOUTHERN NEVADA WATER AUTHORITY AND LAS VEGAS VALLEY WATER DISTRICT

On September 24, 2020, NDOT received a letter from SNWA identifying concerns with the potential initial Eastern Corridor options from SNWA and the Las Vegas Valley Water District (LVVWD). These concerns include:

- Aboveground facility sites within or adjacent to proposed I-11 corridors include pumping stations, reservoirs, rate of flow control stations, and water treatment facilities;
- Numerous buried large-diameter pipelines within or adjacent to the proposed I-11 corridors which are difficult/extremely expensive or not feasible to relocate; and
- Several erosion control weirs in the Las Vegas Wash which are within or adjacent to proposed I-11 corridors.

The letter noted the SNWA major capital program to enhance water delivery to the southern part of the Las Vegas Valley. If the proposed E3 corridor (as per Figure 10) is selected, the new I-11 must provide sufficient space for the planned Horizon Lateral alignment in this area.

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

On January 27, 2021, the project team met with representatives of the Nevada Division of Environmental Protection (NDEP). NDEP staff provided an overview of the Three Kids Mine, a former manganese mine that operated until the 1960 on land managed by the BLM. This site is adjacent to an eastern corridor alternative developed as part of the 2014 IWCS shown in Figure 24. NDEP, the BLM, and the City of Henderson are working with potential developers for this site who would be responsible to provide a clean-up plan approved by NDEP.

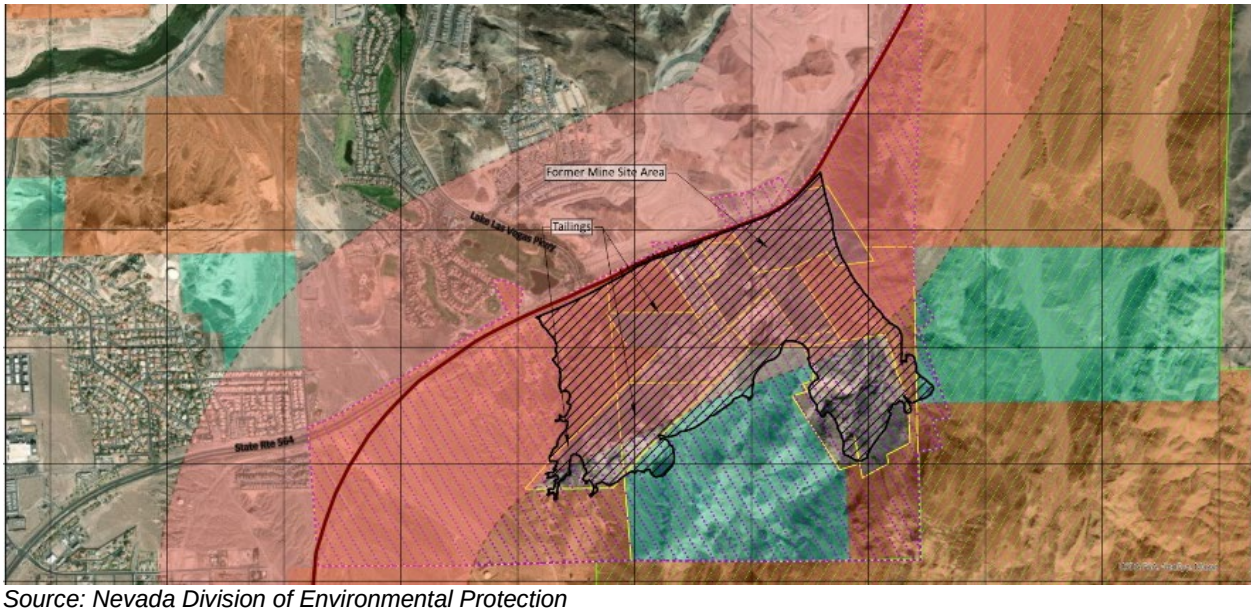
Additionally, NDEP provided information regarding contaminated materials that are stockpiled immediately north of the Black Mountain Industrial (BMI) Complex site that could potentially be impacted by an I-11 corridor alternative extending north from the Henderson Interchange.

REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA (RTC)

RTC participated in the kick-off meeting on October 2, 2019, TAC Meeting #1 on November 20, 2019, NDOT/ADOT I-11 Coordination Workshop on November 25, 2019, I-11 Traffic

Forecasting Meeting on December 11, 2019, TAC Meeting #2 on March 12, 2020, and the I-11 Community Working Group Meeting on May 28, 2020.

Figure 24. Former Three Kids Mine I-11 Alternate Overlay



Source: Nevada Division of Environmental Protection

3.2.2 Refined Eastern Corridor Options to Be Evaluated

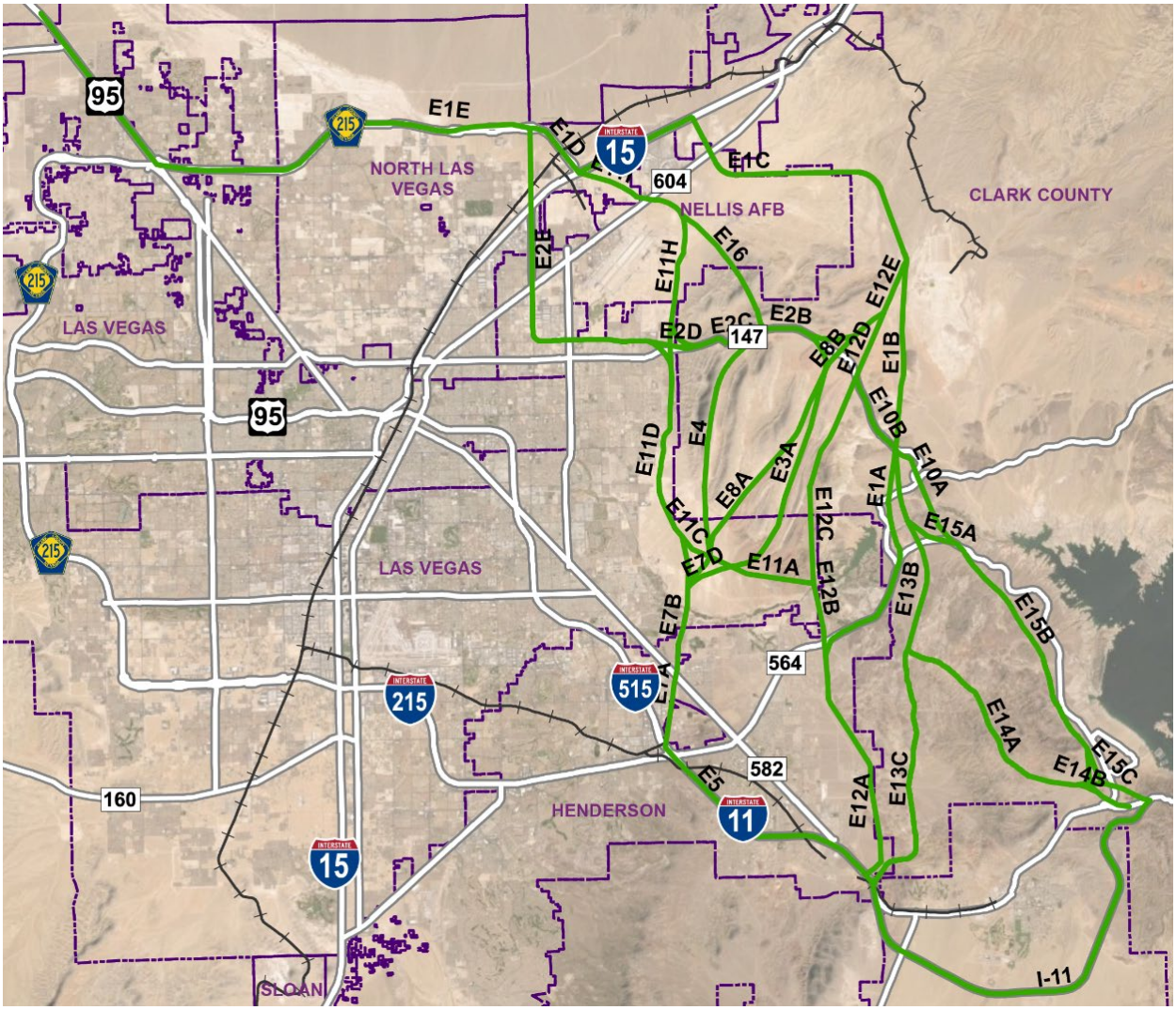
Based on the feedback from the stakeholders early in the planning process, leading up to the public meeting in late July 2020, the project team started to consider modifications to the initial Eastern Corridor options, including adjustments to existing options to avoid known impacts and the addition of new segments to help meet project objectives. During the post-public meeting stakeholder meetings, the project team advanced an iterative process to modify the options, incorporating additional input as it became available. As a result, the project team made the following modifications:

- Addition of new option routed along the BLM utility corridor
- Addition of new options through River Mountain ACEC
- Realignment of tie-in points at southeastern terminus to US 93, not existing I-11
- Realignment of several segments to avoid or minimize impacts to known resources, such as Nellis Dunes, Gypsum Cave, Wetlands Park, NPS property, and the planned Desert Obsidian development
- Addition of new option traversing Sunrise Mountain
- Elimination or consolidation of redundant segments

The resulting Eastern Corridor options are illustrated in Figure 25. Each of the segments identified in green and labeled in the figure have advanced to the Level 1 screening described in the next chapter. Due to the substantial number of revisions to the segment names, and the

need to facilitate an assessment of each segment in the Level 1 screening, the segment names had been adjusted as well.

Figure 25. Refined Eastern Corridor Options Advancing to Level 1 Screening



4.0 Alternatives Evaluation

4.1 Alternatives Development and Evaluation Approach

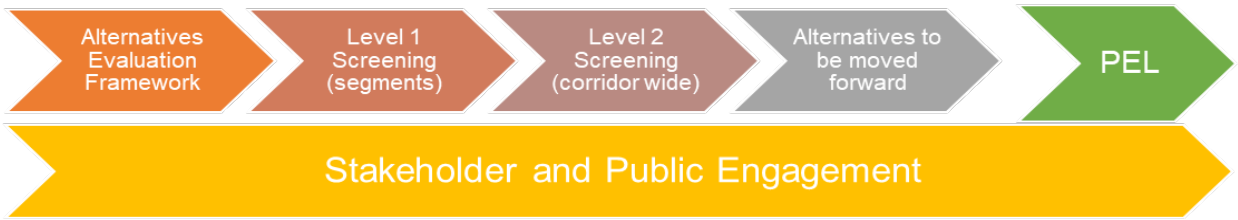
The process to develop, refine, and evaluate the corridor alternatives considered for the I-11 PEL was based on information gathered from key agencies, such as the federal landowners, cities, county, and other agencies that were engaged both individually and collectively through a Technical Advisory Committee. In addition, a public review process held in summer 2020 provided insight into the communities' interests and concerns, which also informed the alternatives development and evaluation process. Based on this tapestry of input, multiple modifications to the set of potential options for an Eastern Corridor Alternative, and the factors that drove decisions along the way, a two-leveled evaluation process is being used for the ADR.

The first level of corridor development and evaluation is the screening of the various options that could comprise a continuous I-11 corridor through the Las Vegas metropolitan area. Based on the preliminary Study Area shown in Figure 4 and the coordination efforts summarized in Chapter 3, the Eastern Corridor segment options shown in Figure 18, the Central Corridor, and the Western Corridor were screened to identify the engineering feasibility and potential environmental fatal flaws associated with each option.

The second level of analysis evaluates the Western, Central, and any full length Eastern Corridor Alternative(s) that pass Level 1 screening. Based on the analysis presented herein, only one full-length Eastern Corridor Alternative has the potential to be a viable corridor, advancing through the Level 1 screening. In the Level 2 Evaluation, one Eastern Corridor Alternative is compared against a Central Corridor Alternative (along I-515 and US 95) and a Western Corridor Alternative (along I-215 and CC 215). This analysis is more quantitative and considers access, mobility, and connectivity objectives related to the project's need and purpose, as well as its financial feasibility and degree of public support. The Level 2 evaluation concludes with a recommendation of one or more full-length corridor alternatives to advance forward in the PEL study in which an environmental analysis, including an environment justice evaluation, would be completed.

The general process to evaluate potential corridor options as described in this ADR is outlined in Figure 26. Throughout the process, a project website continues to provide information on the status of the study, and both stakeholder agency and public meetings provide the basis of the analysis and decision-making framework.

Figure 26. Alternatives Development Approach



4.2 Level 1 Screening Approach and Criteria

The corridor segments in the Level 1 screening incorporate 500-foot-wide corridors either along existing roadways and highways or along new routes, with 1000-foot squares at interchanges. These wider corridors, referred to as Resource Evaluation Corridors, were discussed with agency and other stakeholders and presented to the public during the project's virtual public meeting and 30-day review period. Follow-up segment adjustments as coordination continued with key stakeholders during and after the public review period to further refine the segments. The Level 1 screening considers the various segments separately, with the understanding that they would be combined to create full-length corridor alternatives based on the screening results of each segment.

Proposed Level 1 screening criteria align with the environmental and engineering feasibility factors considered as the identification, development, and refinement of corridor options advanced. Through stakeholder and public input, the important factors in screening options were identified and incorporated into this analysis. The project team solicited input on environmental considerations and engineering feasibility which informed the refinement of the initial set of options.

Table 2 identifies the screening criteria for the Level 1 assessment of all corridor segment options. While quantitative data were used to help inform some of the analyses, the assessment of each corridor across all criteria is based on a low, medium, and high risk-based rating scale. A full description of these criteria follows the table.

Table 2. Level 1 Screening Criteria

General Evaluation Criterion	Performance Measure	General Methodology and Data Used
Environmental Feasibility	Connectivity to other segments	Consider the ability for a segment to be a component of a connected linkages of segments to form a continuous I-11 route through the Las Vegas Valley.
	Section 4(f) Property Constraints	Utilize GIS data on publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites to assess potential "use" by each option
	Presence of Protected Resources	Utilize GIS data on BLM Areas of Critical Environmental Concern and other environmental resources to identify risk of impacts on protected resources with each option
	Residential and Community Impacts	Utilize land use and GIS data to identify potential residential and community impacts with each option
	Business and Institutional Impacts	Utilize land use and GIS parcel data to identify potential commercial, industrial, and institutional impacts with each option
Engineering Feasibility	Construction Feasibility	Qualitative assessment of the relative engineering and construction feasibility of each option
	Ancillary Operational Impacts	Qualitative assessment of likely impacts to tangential operations with each option, such as disruption to existing utility infrastructure, highway operations, and connections.

CONNECTIVITY TO OTHER SEGMENTS

This criterion considers the over-arching requirement that there be a continuous I-11 facility through the Las Vegas metropolitan area, connecting the US 93 Arizona border and the US 95 corridor in the northwest Las Vegas Valley. This key criterion assesses the ability of a segment to be a component of a connected linkage of segments to form a continuous I-11 route; therefore, it considers the viability of the adjacent segments in addition to each segment itself.

SECTION 4(F) PROPERTY CONSTRAINTS

For this criterion, GIS data on publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites were used. This criterion considers if a corridor segment would occupy a major Section 4(f) property, such as NPS LMNRA, Nellis Dunes, the Wetlands Park, or other Section 4(f) parks, trails, or recreation facilities. A resulting low, medium, and high risk-based scale was used to assess segments' potential to use Section 4(f) properties. A low risk rating was assigned to segments that would likely avoid the use of Section 4(f) properties, a medium risk rating was assigned to segments are likely to use few or small portions of Section 4(f) properties, and a high risk rating was assigned to segments likely to use multiple or substantial portions of Section 4(f) properties.

PRESENCE OF PROTECTED RESOURCES

For this criterion, BLM's GIS data on their ACECs were used. Encroachment into property with other protected resources was also examined. A resulting low, medium, and high risk-based scale was used to assess segments' potential to impact protected environmental resources. A low risk rating was assigned to segments that are not likely to impact protected environmental resources, a medium risk rating was assigned to segments that may substantially impact protected environmental resources, and a high risk rating was assigned to segments very likely to substantially impact protected environmental resources.

RESIDENTIAL AND COMMUNITY IMPACTS

For this criterion, aerial imagery, land use, and parcel GIS data were used. This criterion is qualitative, and a low, medium, and high risk-based scale was used to assess segments' potential for the acquisition of residential property, displacement of residents, and community cohesion impacts. A low risk rating was assigned to segments within which few residential properties are located adjacent to the existing freeway (for segments that are existing freeways) or within the 500-wide corridor (for a new facility), indicating a low potential for the acquisition of residential properties that may result in community impacts. For a medium risk rating, there would be a larger number or such properties, and for a high risk rating, there would be a majority of such properties.

BUSINESS AND INSTITUTIONAL IMPACTS

For this criterion, land use GIS data and aerial imagery were used. This criterion is qualitative, and a low, medium, and high risk-based scale was used to assess segments' potential for impacts to major land uses. Included in this assessment is the potential use of Nellis AFB and/or any impact on its facilities or operations. A low risk rating was assigned to segments with very few adjacent major land uses (commercial, industrial, institutional), a medium risk rating was

assigned to segments with a moderate number, and a high risk rating was assigned to segments that would likely impact major land uses, including Nellis AFB.

CONSTRUCTION FEASIBILITY

For this criterion, aerial imagery was used to assess construction access and ease of construction of each segment. This criterion is qualitative, and a low, medium, and high risk-based scale was used to assess the potential challenges associated with constructing each segment. A low risk rating was assigned to segments that could be constructed with standard practices with few to no construction challenges, a medium risk rating was assigned to segments with greater engineering challenges, and a high risk rating was assigned to segments with substantial engineering challenges.

ANCILLARY OPERATIONAL IMPACTS

For this criterion, aerial imagery was used to assess likely impacts to tangential operations with each option, such as disruption to existing utility infrastructure, highway operations, and transportation connections. This criterion is qualitative, and a low, medium, and high scale was used to assess segments' potential impact on these other operations. A low risk rating was assigned to segments with minor ancillary operational impacts, a medium risk rating was assigned to segments with moderate ancillary operational impacts, and a high risk rating was assigned to segments with substantial ancillary operational impacts.

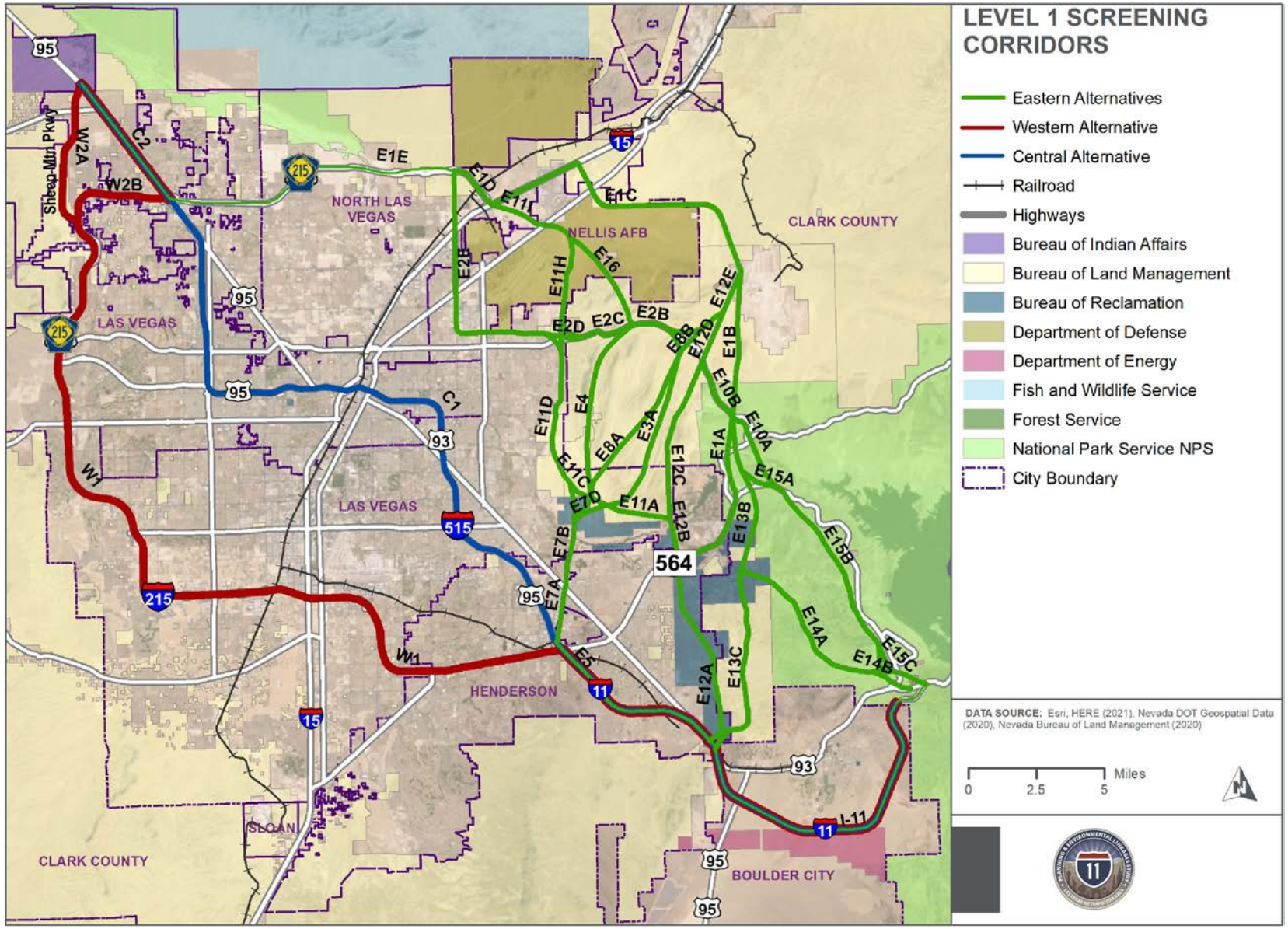
4.3 Level 1 Screening Results

4.3.1 Corridor Segments Included in Level 1 Screening

Figure 27 shows the 53 individual corridor segments that were assessed in the Level 1 screening, including the following:

- Existing I-11 – Boulder City Bypass
- Central Corridor – I-515 from I-11 to I-15; US 95 from I-15 to north of Kyle Canyon Road
    - C1 – I-515 from I-11 to I-15; US 95 from I-15 to CC 215
    - C2 – US 95 from CC 215 to north of Kyle Canyon Road
- Western Corridor – I-215 from I-11 to I-15; CC 215 from I-15 to Ann Road; two options to north of Kyle Canyon Road
    - W1 – I-215 from I-11 to I-15; CC 215 from I-15 to Ann Road
    - W2A – new Sheep Mountain Parkway alignment from Ann Road to US 95 north of Kyle Canyon Road
    - W2B – CC 215 from Ann Road to US 95 (Centennial Bowl)
    - C2 – US 95 from CC 215 to north of Kyle Canyon Road
- Eastern Corridor
    - 47 individual corridor segments as shown in Figure 18
    - C2 – US 95 from CC 215 to north of Kyle Canyon Road

Figure 27. Level 1 Screening Corridors



The detailed results of the Level 1 screening for all corridor segments are included in Appendix B and a summary of the findings of the analysis is provided below. Key reasons why segments are eliminated from further consideration are discussed and those segments recommended to advance to Level 2 evaluation are identified.

4.3.2 Level 1 Screening Results: Existing I-11

The Boulder City Bypass (existing I-11) segment from Bruce Woodbury Beltway (I-215) to Boulder City Parkway (US 93) scores acceptably across all Level 1 screening criteria. Since this corridor is on an existing freeway and would likely not require improvement through the 2040 horizon traffic forecast year by virtue of its designation as I-11, it does not use any Section 4(f) property, does not displace existing communities, and does not encroach upon protected resources. Segment E5 from West Lake Mead Parkway to South Boulder Highway (582) is part of existing I-11, and it, too, has low risk of impacts. Existing I-11 passes Level 1 screening and is recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

4.3.3 Level 1 Screening Results: Central Corridor

This corridor scores acceptably across most Level 1 screening criteria. Since this corridor is on an existing freeway, there is a low risk of impacts on protected environmental resources. However, with numerous parks, trails, schools with recreational facilities, and other recreational community resources in close proximity to the freeway, there may be the potential for Section 4(f) impacts. Freeway improvements may not require right-of-way acquisition and any potential widening of the freeway may impact communities and other major land uses. Although there are some potential impacts with the Central Corridor, Segments C1 and C2 pass Level 1 screening and are recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

4.3.4 Level 1 Screening Results: Western Corridor

This mainline corridor scores acceptably across all Level 1 screening criteria. It does not use any major Section 4(f) property, although several parks and trails are located adjacent to the freeway. Freeway improvements may require right-of-way acquisition; however, the existing right-of-way is sufficiently wide in most locations such that substantial property impacts would be minimized. Segment W1 passes Level 1 screening and is recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

The option to connect the Western Corridor to US 95 with the proposed new Sheep Mountain alignment places I-11 in large portions of BLM property. Moreover, there are several trails and trailheads in the vicinity of this segment, which elevates the risk of Section 4(f) impacts. These concerns do not preclude the viability of this option, as more detailed analysis and coordination with BLM during the PEL analysis would be required. Considering the potential risks, Segment W2A passes Level 1 screening and is recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

The option to connect the Western Corridor to US 95 using the existing Centennial Bowl interchange scores acceptably across most Level 1 screening criteria. Similar to the Central Corridor, this segment is on an existing freeway; therefore, there would be low risk of impacts on protected resources. There is one park and two school recreational facilities that can likely be avoided, minimizing the risk of Section 4(f) impacts. However, with close proximity to developed areas, there is the potential for impacts to communities and businesses with freeway improvements that may be necessary. Although there are some potential impacts with this option, Segment W2A passes Level 1 screening and is recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

4.3.5 Level 1 Screening Results: Eastern Corridor Options

The 47 individual Eastern Corridor segment options have varying effects on the natural and built environment, with 37 of these segments eliminated form further consideration as a result of the Level 1 screening. The specific reasons for elimination of various segments is presented below:

SECTION 4(F) PROPERTY CONSTRAINTS

Three major properties protected by Section 4(f) comprise the basis for eliminating several Eastern Corridor segments: use of lands owned by NPS, use of Nellis Dunes' recreational areas, and traversing Wetlands Park, as described below. NPS has indicated that they would not permit the use of LMNRA park property for the I-11 facility; therefore, any segments within LMNRA boundaries have a high risk of not obtaining NPS approval due to the requirements of Section 4(f). Also, the segments that would traverse Wetlands Park would likely impact the recreational features of the park and have a high risk of non-approval by the USBR.

In addition to LMNRA property and the Wetlands Park subject to Section 4(f), Nellis Dunes is also a recreational property that is protected; however, since the one segment (E1C) that traverses part of the property avoids the recreational attributes, there would be lesser risk of not obtaining approval to use this property. The segments eliminated as a result of this criterion include: E1A, E1B, E7B, E7C, E7D, E10A, E10B, E13A, E13B, E14A, E14B, E15A, E15B, E15C, and E15D.

PRESENCE OF PROTECTED RESOURCES

Several of the segments are located within BLM land with special designation as an ACEC and administered through a Resource Management Plan. BLM approval to use the land would be necessary, and to date the agency has only expressed the potential for approving use of the already developed Utility Corridor. Therefore, the following segments that fall within BLM lands outside of the Utility Corridor would have a high risk of not obtaining BLM approval and are eliminated as a result of this criterion: E1B, E2A, E2B, E2C, E3A, E3B, E4, E8A, E8B, E8C, E11A, E11B, E11C, E13C, and E16.

Another key constraint with the Eastern Corridor options is the Wetlands Park, a highly valued and sensitive community resource subject to several regulatory requirements that protect Waters of the U.S, threatened and endangered species, critical habitats, and recreational features. A transportation facility would be incompatible with the Wetlands Park and would

therefore have a high risk of impacts to the resource. An additional crossing of the Las Vegas Wash and Wetlands Park for I-11 is incompatible with the planned crossing for the Hollywood Boulevard extension project and would introduce a cumulative impact with multiple crossings of these sensitive areas. Clark County has indicated that I-11 and the Hollywood Boulevard extension would not be able to share an alignment. In addition to the segments noted above, eliminated because of the use of BLM ACEC lands, segments eliminated as a result of this criterion due to other environmental factors include: E7B, E7C, and E7D.

Residential and Community Impacts / Business and Institutional Impacts

Since the Eastern Corridor would be a newly constructed facility between existing I-11 in the south and CC 215 or I-15 in the north, placement of the facility in developed neighborhoods would have substantial adverse impacts on communities. The facility would not only require the acquisition of homes, businesses, and other developed properties which could displace hundreds of residents and businesses but would also create a physical barrier in neighborhoods disrupting the community character and cohesion for the remaining residents. This high risk of residential, business, and institutional impacts results in the elimination of the following segments from further consideration: E2D, E2E, E11F, and E11I.

Moreover, use of Nellis AFB property would also be a challenge to obtain approvals given their siting requirements. Also, several Eastern Corridor segments may impact Nellis AFB operations. As a result, additional segments eliminated as a result of this criterion include: E11H, E11I, and E16.

Construction Feasibility and Ancillary Operational Impacts

Finally, the engineering challenges to construct and operate the I-11 facility were considered qualitatively. Segments that traverse particularly treacherous terrain, require substantial elevation gains and descents, or are not easily accessible by construction vehicles were eliminated from further consideration due to the high risk of not being constructible. These segments include: E3A, E4, E8A, E10A, E10B, E11D, E13A, E13B, E13C, E14A, and E16.

Connectivity to Other Segments

In light of the results of the screening based on the other Level 1 criteria, the following segments remain, having not been eliminated due to other factors: E1C, E1D, E1E, E5, E7, E12A, E12B, E12C, E12D, and E12E. Among these, all except E7 can combine to form a continuous I-11 route between the two identified termini for the Las Vegas metropolitan area portion of I-11. E5 would not be part of an Eastern Corridor Alternative; however, it would comprise part of both Central and Western Corridor Alternatives. Therefore, E7 is eliminated from further consideration due to its lack of connectivity to other segments.

Eastern Corridor Segments Conclusion

Segments E1C, E1D, E1E, and E5 use existing freeways, and any required widening would be designed to minimize impacts to adjacent developed properties. The part of Segment E1C farther east avoids use of Nellis AFB and the recreational attributes of Nellis Dunes. Therefore,

these four segments pass Level 1 screening and are recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

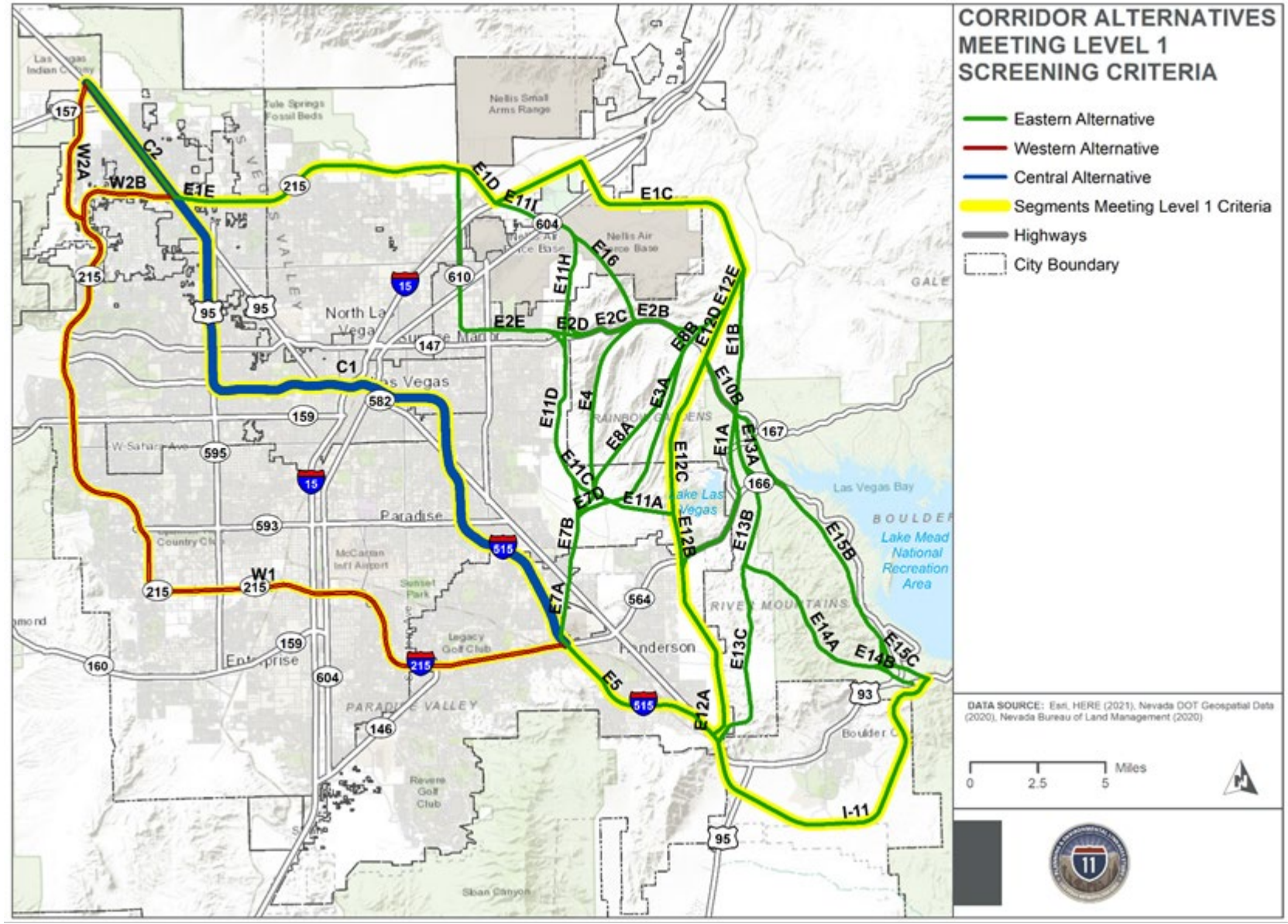
Segments E12A, E12B, E12C, E12D, and E12E are routed along the BLM Utility Corridor. Since the agency has indicated the potential for approval of use of this corridor, these segments pass Level 1 screening and are recommended to be considered part of one or more full-length corridor alternatives in the Level 2 evaluation.

4.3.6 Summary of Results

A total of 15 segments scored acceptably across the Level 1 screening criteria, as illustrated in Figure 28. The following full-length corridors are considered potentially feasible based on the Level 1 screening and advance to the Level 2 evaluation:

- Central Corridor, utilizing existing I-11 (including E5), existing I-515 (Segment C1), and existing US 95 (Segments C1 and C2) to north of Kyle Canyon Road
- Western Corridor, utilizing existing I-11 (including E5), existing I-215 Segment W1), and existing CC 215 (Segment W1), with two options:
    - New Sheep Mountain Parkway alignment (segment W2A) from Ann Road to north of Kyle Canyon Road
    - Existing CC 215 and US 95 (Segments W2B and C2) to north of Kyle Canyon Road
- Eastern Corridor, utilizing existing I-11, the BLM Utility Corridor (Segments E12A, E12B, E12C, E12D, and E12E), connecting Segment E1C, existing I-15 (Segment E1C), existing CC 215 (Segments E1D and E1E), and existing US 95 (Segment C2) to north of Kyle Canyon Road

Figure 28. Segments Scoring Acceptably in Level 1 Screening



4.4 Level 2 Evaluation Approach and Criteria

The Level 2 evaluation is a more quantitative assessment of the full-length corridor alternatives developed from the individual segments that performed sufficiently well in the Level 1 screening. As a result of the Level 1 screening, three full-length, continuous routes through the Las Vegas metropolitan area were identified – *a Central Corridor, a Western Corridor and an Eastern Corridor* – as indicated in Section 5.3.6. Based on a number of quantitative and qualitative evaluation metrics, one or more full-length corridor alternative would be recommended to advance into detailed evaluation in the PEL study.

The Level 2 Evaluation compares the three full-length corridors to one another to reveal their advantages and disadvantages compared to the others. The Level 2 evaluation criteria, shown in Table 3, include performance measures for: transportation access, mobility, and connectivity; financial feasibility; and public support. A full description of these criteria follows the table.

Table 3. Level 2 Screening Evaluation Criteria

General Evaluation Criterion	Performance Measure	General Methodology
Access, Mobility, and Connectivity	Corridor Length	Approximate measure of the corridor length for each corridor alternative
	Estimated Volume	Estimated traffic volume for each corridor alternative based on traffic modeling forecasts for 2040 conditions performed as part of this Study
	Travel Time Estimates	Travel time estimates for each corridor alternative as a result of traffic modeling forecasts for 2040 conditions performed as part of this Study
	Corridor Resiliency	Metric describing corridor resiliency by quantifying the number of parallel arterials within one mile of each corridor alternative
	Access to Activity Centers	Metric describing accessibility and trip generation by quantifying the number of activity centers within three miles of each corridor alternative
Financial Feasibility	Capital Cost	High-level capital cost estimate (or range) to account for typical construction elements, such as pavement, earthwork, structures, traffic, drainage, and others
	Cost per Mile	Estimated metric relaying the relationship between the estimated capital cost and the corresponding corridor length
	Cost per User	Estimated metric relaying the relationship between the estimated capital cost and the corresponding anticipated traffic volumes
Public Support	Documented Public Support or Opposition	Metric that is reporting the percentage breakdown of the public review process and locations comments in support of or opposition to the various segments (for ALL comments, not just Eastern, as for Level 1)
	Community comment trends	Qualitative measure sharing the community comment trends for each corridor alternative

TRANSPORTATION BENEFITS – ACCESS, MOBILITY, AND CONNECTIVITY

These criteria address some of the key elements of the I-11 project's purpose that are based on transportation needs, as described below.

- Improve access to activity centers within the Las Vegas Valley
    - The Level 2 evaluation looks at the number of major activity centers, as well as other community resources, within three miles of each corridor alternative, indicating improved access to these destinations.
- Support enhanced regional mobility for people and freight by improving travel time reliability and efficiency
    - The Level 2 evaluation estimates traffic volumes for each corridor alternative based on forecasted traffic modeling for 2040 conditions
    - The Level 2 evaluation includes travel time estimates for each corridor alternative as a result of the forecasted traffic modeling for 2040 conditions
- Facilitate efficient mobility for emergency access, evacuation, and national defense
    - The Level 2 evaluation includes a metric that describes corridor resiliency by quantifying the number of parallel arterials within one mile of each corridor alternative, indicating improved mobility for emergency access, evacuation, and national defense.

Corridor length is also described in this section to inform other criteria such as travel time and capital costs.

FINANCIAL FEASIBILITY

These criteria include estimated capital costs to construct each corridor alternative based on typical construction elements, such as pavement, earthwork, structures, traffic, drainage, and others. The corridor alternatives are evaluated based on the assumption that it would be feasible to construct the improvements associated with each. However, more challenging construction conditions would increase capital costs; therefore, these challenges are generally captured within this metric.

By combining estimated capital cost and the corresponding corridor length, the Level 2 evaluation includes a cost per mile metric. Similarly, by combining estimated capital cost and the corresponding anticipated traffic volumes, the Level 2 evaluation includes a cost per user metric.

PUBLIC SUPPORT

Based on the results of the virtual on-line public meeting and Telephone Town Hall conducted in summer 2020, the Level 2 evaluation includes two public support metrics that report how the public views each corridor alternative. The first considers the documented public support or opposition in quantified total numbers of commenters on the project via the virtual public meeting indicating support of or opposition to each corridor. The second is a qualitative measure of the comment trends for each corridor.

4.5 Level 2 Evaluation Results

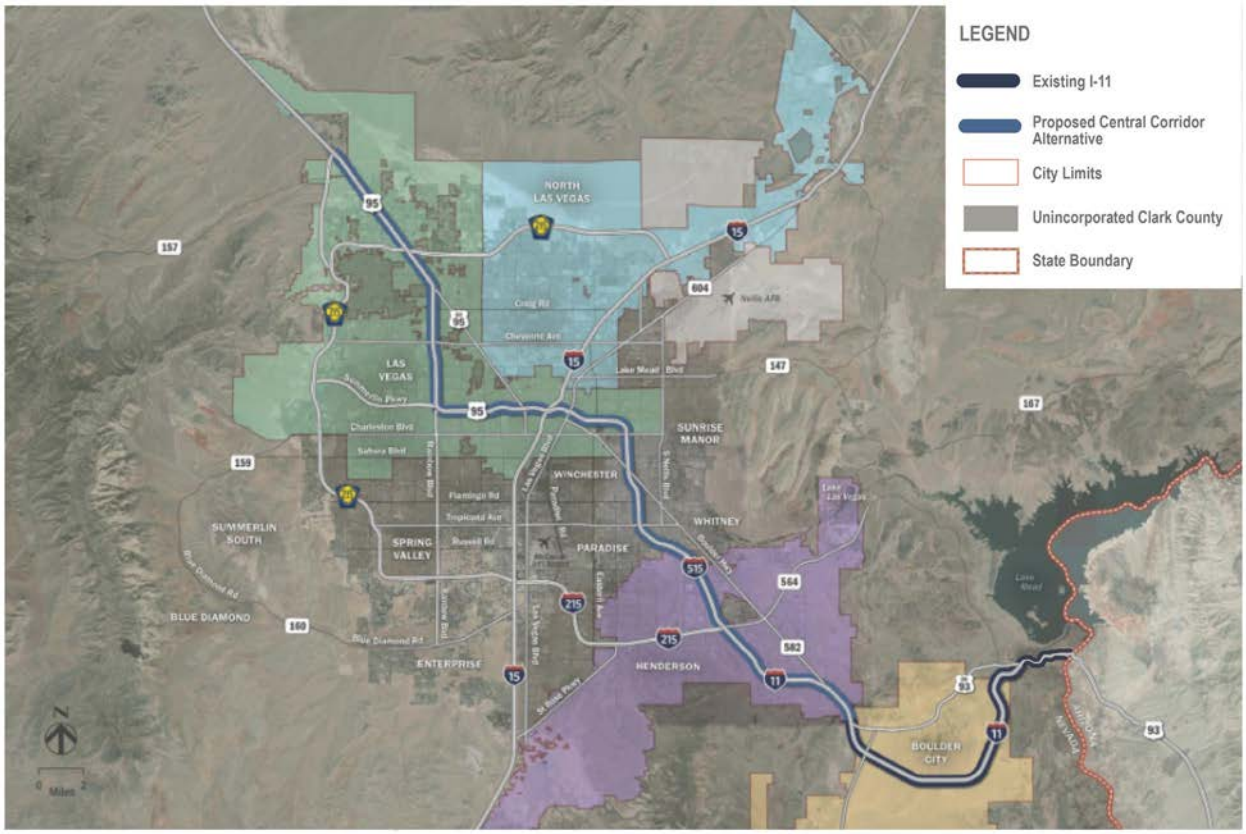
4.5.1 Corridor Alternatives Included in Level 2 Evaluation

At the conclusion of Level 1 screening, three primary and potentially feasible full-length corridor alternatives have been identified, as described below.

CENTRAL CORRIDOR ALTERNATIVE

The Central Corridor Alternative shown in Figure 29 would travel along US 93 and the existing 4-lane I-11 Corridor, then follow I-515 through downtown Las Vegas. The I-515 section of the Corridor is generally 6-lanes before switching at the US-95/I-15/I-515 interchange to continue west on the 8-lane US 95 corridor from downtown Las Vegas to Kyle Canyon Road northwest of the metropolitan area.

Figure 29. Central Corridor Alternative



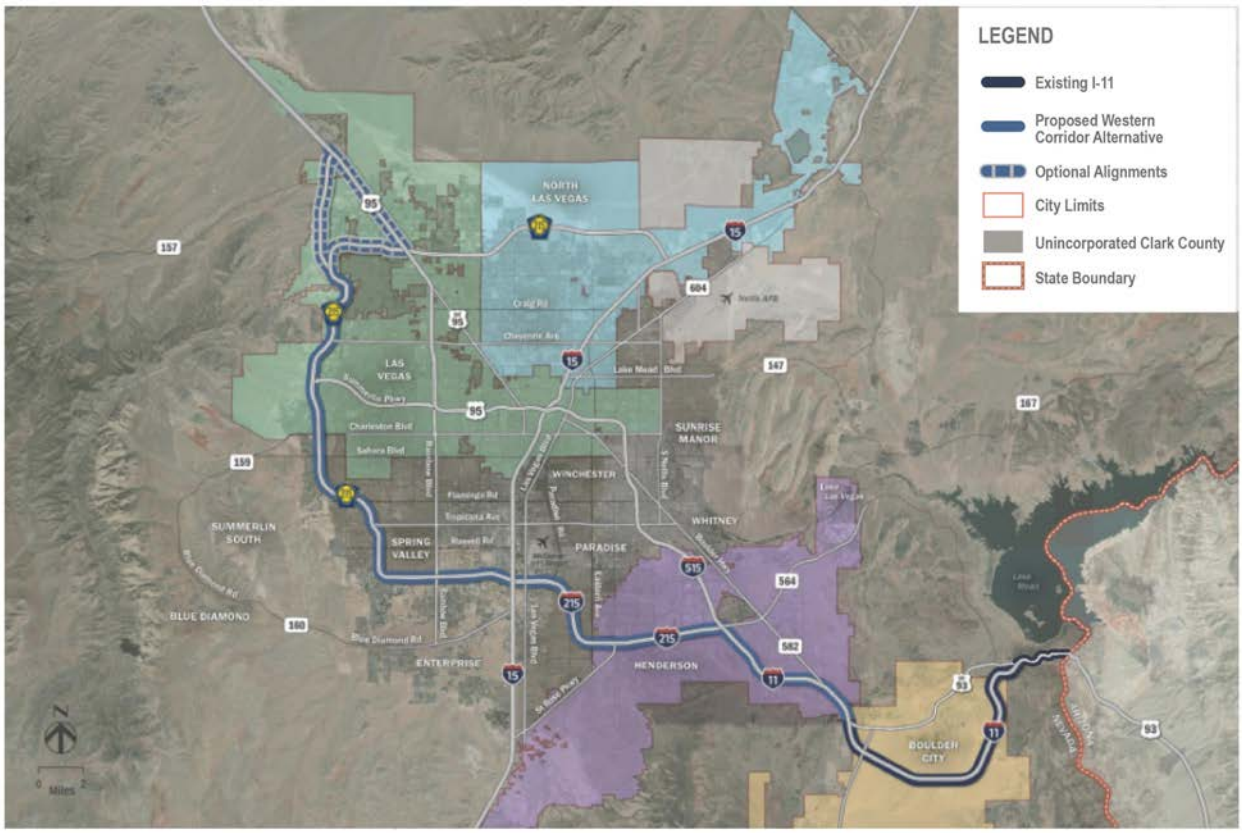
This Corridor spans approximately 43.2 miles from the southern analysis terminus to the northern terminus north of Kyle Canyon Road. This includes approximately 7.2 miles of existing I-11 south of I-515/I-215, 14.4 miles along I-515 from the I-215 interchange to the I-15 interchange, and approximately 21.6 miles along US 95 from I-15 to the northern terminus about a half mile north of the Kyle Canyon Road interchange.

This Central Corridor Alternative consists of three system interchanges and 30 service interchanges. The approximately 15.7-mile section of I-11 from the US 93 Business Loop interchange to the Nevada-Arizona border is not included in the analysis. The Central Corridor is routed through densely developed communities in the City of Henderson, unincorporated Clark County, and City of Las Vegas. The corridor alternative passes through downtown Las Vegas and connects to the major interstate freeway, I-15, in the center of the Las Vegas Valley.

WESTERN CORRIDOR ALTERNATIVE

The Western Corridor Alternative show in Figure 30 would travel along I-11 and the existing 4-lane I-11 Corridor bypassing Boulder City. At the I-11/I-215/I-515 interchange, the Corridor would turn west and follow I-215 and CC 215 around the southern and western edges of the metropolitan area, which is generally a 6-8-lane corridor. The Corridor can follow two possible routes in the northwest. The first corridor alternative route would follow a future highway facility known as Sheep Mountain Parkway, traveling north from the northwest elbow of CC 215, connecting to US 95 north of Kyle Canyon Road. The second corridor alternative route would continue along CC 215 to the CC 215/US 95 interchange where the Corridor would turn northwest and follow 4-lane US 95 to the northwest, about a half mile past the Kyle Canyon Road interchange.

Figure 30. Western Corridor Alternative



The Corridor's southern terminus, for analysis purposes, is located along existing I-11 approximately 7.2 miles south of the I-515/I-215 interchange, just northwest of the existing I-11/US 93 Business Loop interchange west of Boulder City. The approximately 15.7-mile section of I-11 from the US 93 Business Loop interchange to the Nevada-Arizona border is not included in the analysis. The Corridor follows I-215 for approximately 11.2 miles to I-15, followed by approximately 22.6 miles along CC 215 to the proposed Sheep Mountain Parkway interchange. Following Sheep Mountain Parkway to the northern terminus on US 95 north of Kyle Canyon Road would cover an additional 7.8 miles. The alternate route, following CC 215 and US 95, would cover approximately 11.8 miles. The total analysis corridor spans approximately 48.8 miles via Sheep Mountain Parkway and 52.8 miles via CC 215/US 95, which excludes the southern 15.7-mile section of I-11 to the Arizona border.

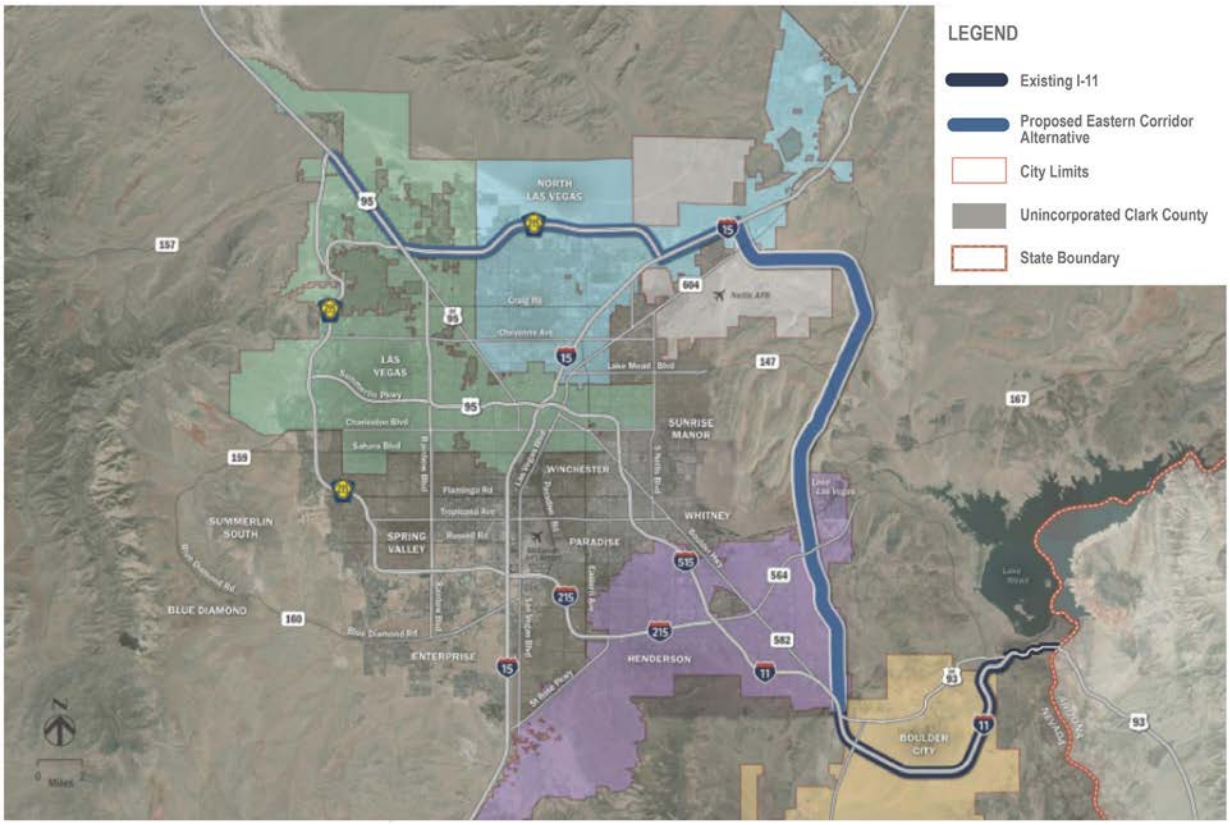
The Western Corridor Alternative has three system and 33 service interchanges. The Western Corridor is routed through the southern and western portions of the Las Vegas Valley, through the City of Henderson, unincorporated Clark County, and City of Las Vegas. The corridor alternative passes to the immediate south of McCarran International Airport and connects to the major interstate freeway, I-15, at the southern end of the Resort Corridor. Figure 23 illustrates the Western Corridor Alternative.

EASTERN CORRIDOR ALTERNATIVE

The Eastern Corridor Alternative would follow a combination of existing freeway in the north and new alignment east of the Las Vegas Valley. The southern end of the Eastern Corridor Alternative would connect approximately 1.5 miles to the north of the US 95/US93 Business interchange. The approximately 15.7-mile section of I-11 from the US 93 Business Loop interchange to the Nevada-Arizona border is not included in the analysis. The Corridor would travel north along the eastern bypass for approximately 26 miles along an existing transmission utility corridor, and then curving westward along the north border of Nellis AFB property. The Corridor would connect to I-15 northwest of the Speedway Boulevard and I-15 interchange and would turn west and travel 4 miles along I-15 South to the Northern Beltway (CC 215). It would then travel approximately 12.6 miles westward along the Northern Beltway to US 95, and then follow US 95 for 9.2 miles to the northwest. Figure 31 illustrates the Eastern Corridor Alternative.

These roadways are generally 4-lane facilities and the total estimated length for the corridor alternative is 58.9 miles, excluding the southern 15.7-mile section. In addition to crossing federal lands, this corridor alternative is routed through the City of Henderson, City of North Las Vegas, unincorporated Clark County, and City of Las Vegas. This corridor alternative provides access to the Las Vegas Speedway and Nellis AFB in the northeastern part of the Las Vegas Valley.

Figure 31. Eastern Corridor Alternative



4.5.2 Level 2 Evaluation Results

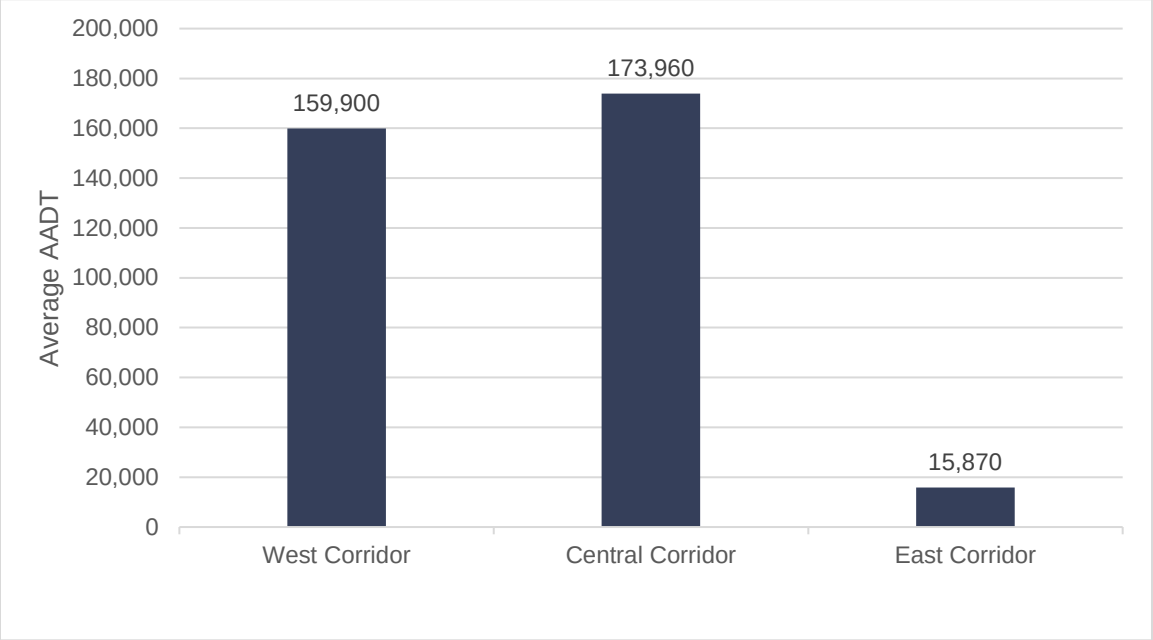
ACCESS, MOBILITY, AND CONNECTIVITY

This evaluation criterion includes performance measures such as corridor lengths, estimated volumes, travel time estimates, corridor resiliency, and access to activity centers. These performance measures assess the transportation effectiveness of each corridor alternative.

Corridor Lengths – The Western Corridor has an analyzed length of 48.8 miles. The Central Corridor is the shortest corridor alternative with a length of 43.2 miles. The Eastern Corridor is currently the corridor alternative with the least existing infrastructure, but once the freeway is constructed it would be the longest at 58.9 miles.

Estimated Volumes – The modeled 2040 daily traffic volume on each corridor is compared at two representative east-west cut lines: Location 1 is at approximately Craig Road, and Location 2 is at approximately Warm Springs Road. In order to share a single metric, Figure 32 represents the average of the two estimates. As shown in the figure, the Eastern Corridor serves notably less volume than the Western or Central Corridors, as it is situated away from the developed areas of the region and requires out-of-direction travel for some trips. Traffic volumes would increase in the Las Vegas area by 2040 due to regional growth and would not significantly increase due to I-11 corridor identification and designation.

Figure 32. Estimated Volumes for 2040 Condition

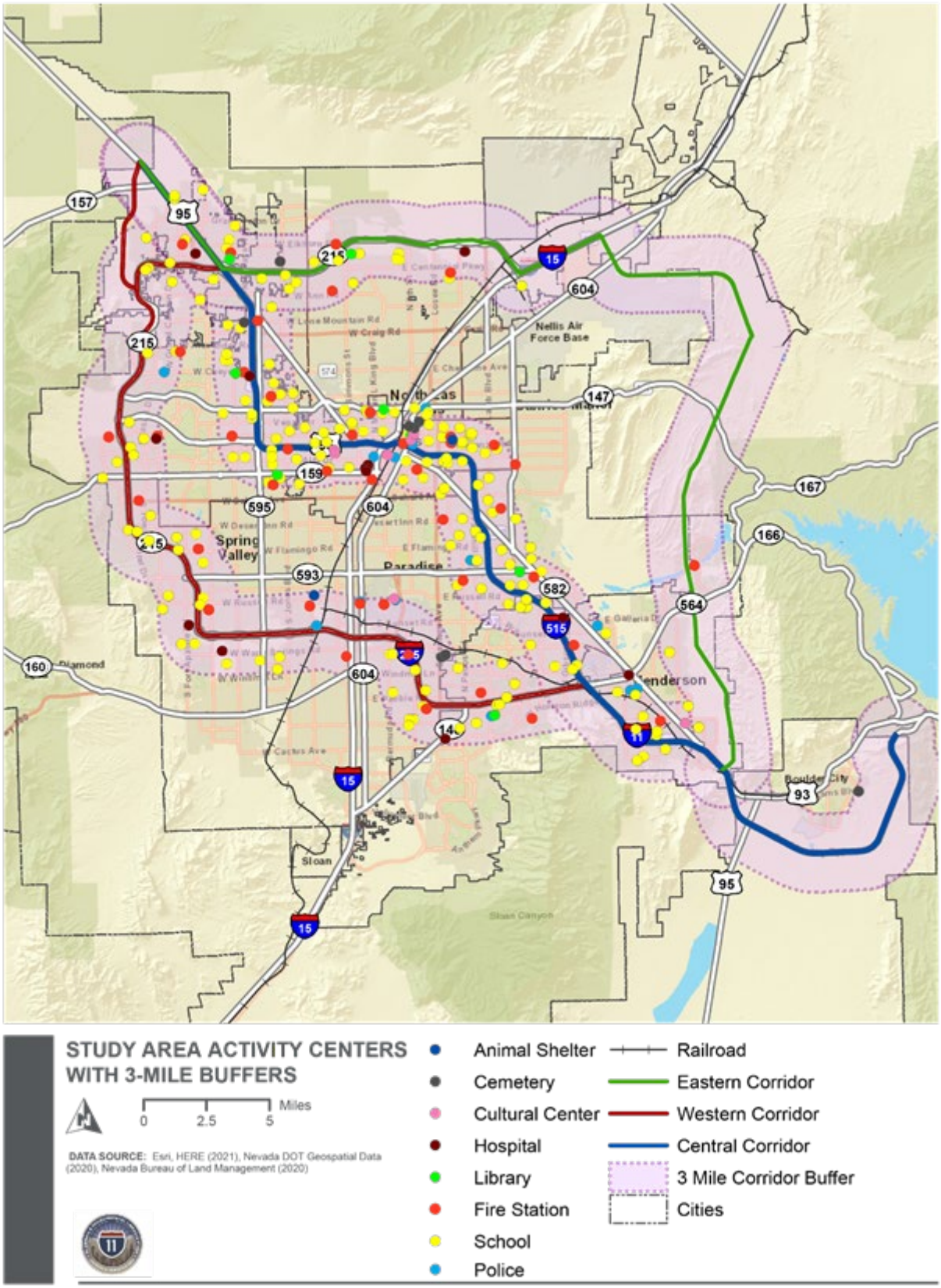


Travel Time Estimates – Modeled 2040 travel times along the corridors were estimated considering the peak and off-peak periods. In order to generate a single metric, these values were averaged. 2040 travel time averages for the Western Corridor are 62.7 minutes, for the Central Corridor are 48.9 minutes, and for the Eastern Corridor are 55.7 minutes.

Corridor Resiliency – Corridor resiliency offers alternative access and connections to core destinations in the community so that people can connect with local resources and so that traveling vehicles, including emergency response vehicles, have options in the event of necessary re-routing or traffic diversion. This metric is quantified by the approximate number of parallel principal arterials within a one-mile radius per mile length of the corridor. Consequently, the Western and Central Corridors were shown to be more resilient corridor alternatives, with corresponding measures of 1.67 and 1.71, respectively. Conversely, the Eastern Corridor exhibits low resiliency with a value of 0.56.

Access to Activity Centers – This metric is quantified by the approximate number of activity centers within a 3-mile radius per mile length of the corridor. Activity Centers in the study area are defined as universities, colleges, casinos, libraries, shopping centers, shopping malls, Air Force base, airports, cultural centers, community centers, and hospitals. Key activity centers include Downtown Las Vegas, the Las Vegas Strip, McCarran International Airport, and the Las Vegas Convention Center. As shown in Figure 33, due to circumventing the center of the Las Vegas metropolitan area, the Western Corridor serves 50 activity centers, including many significant centers such as McCarran International Airport. The Central Corridor serves 69 trip-generating activity centers, including Downtown Las Vegas. The isolation of the Eastern Corridor results in low connectivity with activity centers, serving only 15.

Figure 33. Activity Centers with 3-mile Buffers for Level 2 Corridor Alternatives



FINANCIAL FEASIBILITY

High-level and approximate conceptual capital cost estimates were developed for the corridors using the NDOT Wizard Project Estimation Tool. Various design and construction elements were considered in the estimation, accounting for items necessary in upgrading existing infrastructure to interstate standards or creating entirely new alignments. Note that the costs for right-of-way acquisition are not included in the cost estimation.

In 2022 dollars, the preliminary conceptual capital cost estimate for the corridors is as follows:

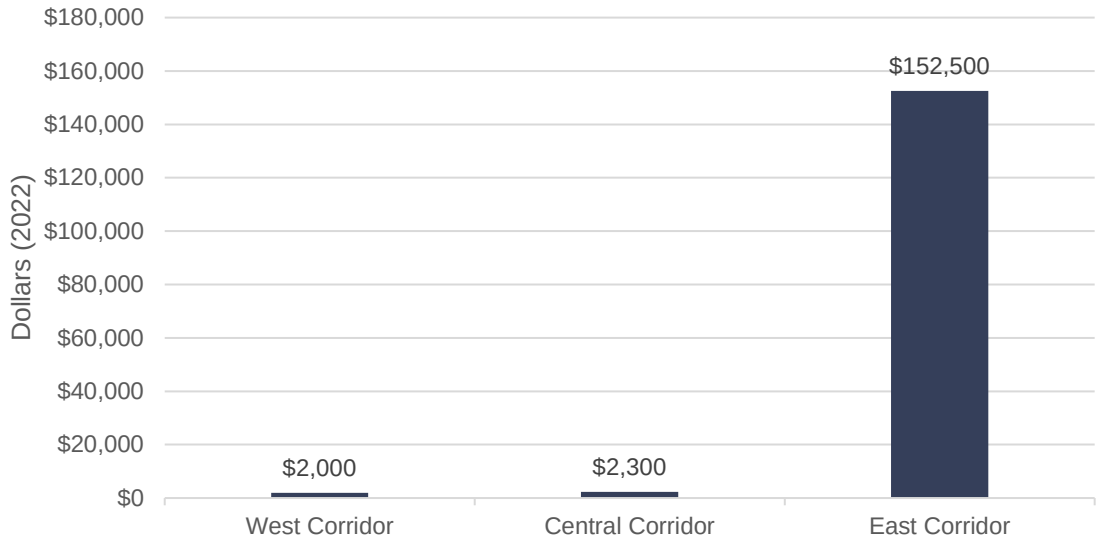
- Western Corridor (alignment via CC 215 and US 95) – roughly $66 million
- Central Corridor – roughly $ 400,000
- Eastern Corridor – roughly $2.42 billion

Table 4 provides a breakdown of the estimated capital costs for each corridor alternative in the Level 2 evaluation in millions of dollars. As the table indicates, the Eastern Corridor Alternative would cost substantially more than the other two corridors as a result of the need for new roadway, new bridges, and new interchanges. The level of complexity to construct the interstate facility through the undeveloped and mountainous area west of the Las Vegas Valley also adds additional risk that may further escalate the costs associated with construction.

Furthermore, when combining resulting metrics from the 2040 modeled analysis (as presented in the Access, Mobility, and Connectivity discussion) with the costs provided above, Figure 34 and Figure 35 below show performance measures representing the approximate capital cost estimate per corridor mile and approximate capital cost estimate per modeled user, respectively.

Figure 34. Capital Cost Estimate per Corridor Mile

Figure 35. Capital Cost Estimate per Modeled User



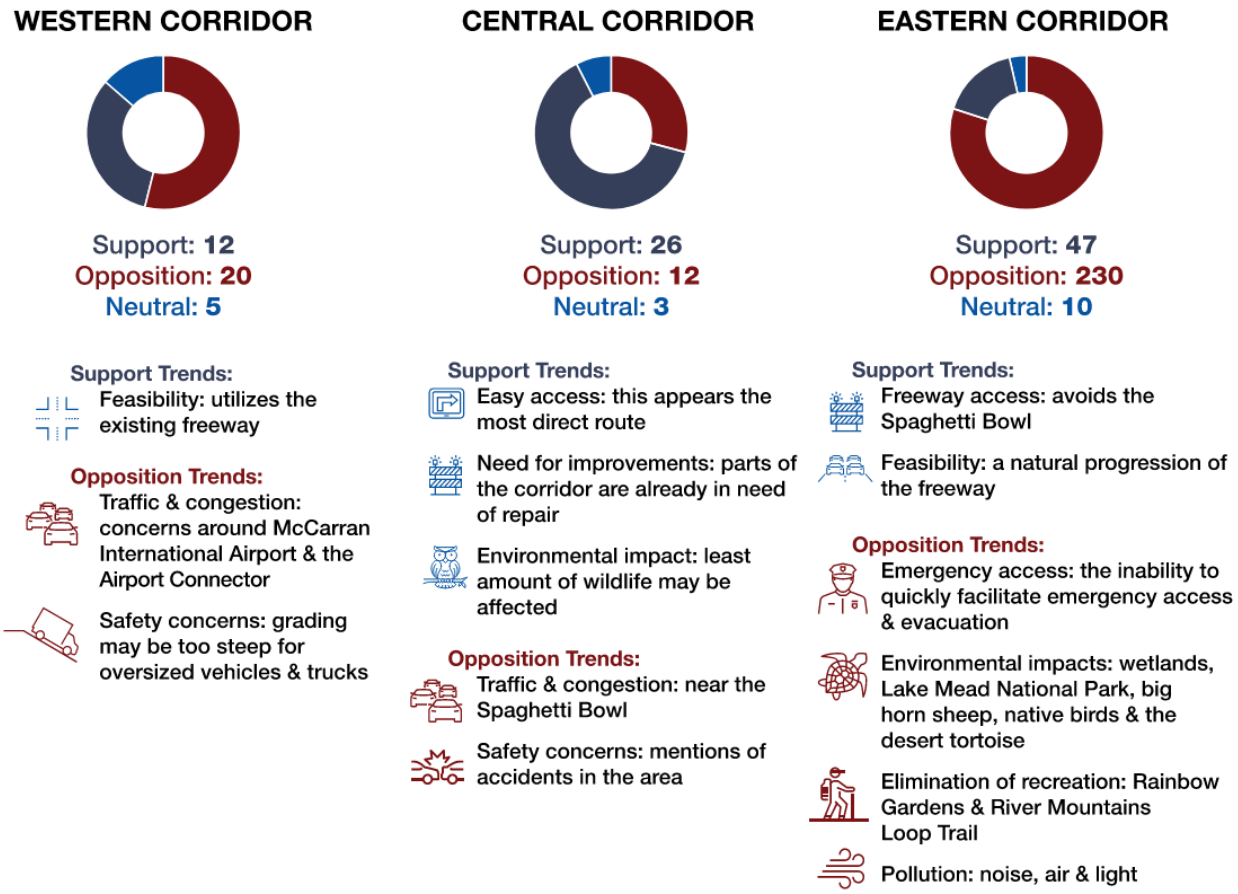
PUBLIC SUPPORT

Between July 31 and August 31, 2020, an online community outreach event was held to solicit input from the general public. This public outreach period garnered over 1,300 online meeting visitors, as well as over 430 comments from online and telephone public meetings, website, project email, and hotline sources. Figure 36 summarizes the numbers of commenters in support of or opposed to the corridors, as well as the recurring community comments and trends.

As the figure indicates, the vast majority of the comments were regarding the Eastern Corridor (78.6 percent of all comments received), and 80.1 percent of those comments on the Eastern Corridor were in opposition to that option. The percentage of those commenting on the Western Corridor that were either in support of or neutral on the Western Corridor was 45.9 percent; the percentage of those commenting on the Central Corridor that were either in support of or neutral on the Central Corridor was 70.7 percent.

Those in opposition to the Eastern Corridor generally noted the impacts on the natural environment and recreation, as well as lack of emergency access. Those in opposition to the Western and Central Corridors shared many of the same concerns for traffic operations, congestion, and safety.

Figure 36. Recurring Community Comments and Trends



4.5.3 Results Summary

The Level 2 screening criteria provides a more quantitative evaluation of the proposed corridor alternatives. Key performance measures of this analysis consider transportation mobility and connectivity objectives, financial feasibility, and public support, as described above and summarized below in Table 5**.**

Table 5. Level 2 Evaluation Results

Evaluation Criteria	Performance Measure	Western Corridor [2]	Central Corridor	Eastern Corridor
Access, Mobility, and Connectivity [1]	Corridor Length (mi)	48.8	43.2	58.9
	Estimated Traffic Volume	159,900	173,960	15,870
	Travel Time Estimates (min)	62.7	48.9	55.7
	Corridor Resiliency [3]	1.67	1.71	0.56
	Access to Activity Centers	50	69	15
Financial Feasibility	Capital Cost ($)	65,566,200	400,000	2,420,417,000
	Cost per Mile ($/mi)	1,352,459	8,333	41,094,000
	Cost per User ($/veh)	2,000	2,300	152,500
Public Support	Documented Public Support or Opposition	Support = 32%; Opposition = 54%; Neutral = 14%	Support = 63%; Opposition = 29%; Neutral = 7%	Support = 16%; Opposition = 80%; Neutral = 3%
	Community comment trends	SUPPORT: feasibility OPPOSITION: traffic and congestion, safety concerns	SUPPORT: easy access, need for improvements, environmental impact OPPOSITION: traffic and congestion, safety concerns	SUPPORT: freeway access, feasibility OPPOSITION: emergency access, environmental impacts, elimination of recreation, pollution

Notes:

1. Data were used from the Traffic Report; refer to this document for more information.
2. For the Western Corridor, the alignment via CC 215 and US 95 (rather than via the Sheep Mtn Pkwy option) was used for analysis
3. Refer to Section 4.4 for a description of this performance measure

5.0 Conclusions and Recommendations

5.1 Alternatives Recommended to Advance

Based on the Level 2 screening results, it is recommended to advance the **Western** and **Central Corridor Alternatives** with further analysis and evaluation in the PEL study (see Figure 37). As existing alignments, the Western and Central Corridor Alternatives benefit from already being an integral part of the existing transportation network. These corridor alternatives have shorter corridor lengths, higher daily traffic volumes, good corridor resiliency, and increased access to activity centers. Also, the Western and Central Corridor Alternatives are more financially feasible and would have fewer difficulties in obtaining environmental clearances and permits. Moreover, these corridor alternatives have received more positive or neutral public support. Thus, a proposed reclassification as I-11 and improvements of the existing infrastructure as necessary to meet interstate standards for the Central and Western corridor alternatives are recommended to move forward to a complete PEL evaluation. Based on infrastructure improvement needs, the elimination of Eastern Corridor Alternative is further explained in Figure 37.

5.2 Alternatives Dismissed from Further Consideration

Based on the Level 2 evaluation results, it is recommended to dismiss the Eastern Corridor Alternative from further consideration. The following summarizes the Level 2 results that informed the recommendation to dismiss the Eastern Corridor Alternative from further consideration as the I-11 corridor through the Las Vegas metropolitan area:

- *Access, mobility, and connectivity* – The Eastern Corridor is the longest of the three corridor alternatives and is anticipated to carry substantially lower daily traffic volumes (less than 10 percent of modeled daily traffic volumes for the other options). Additionally, due to its relative isolation from the greater transportation network and population clusters of the Las Vegas Valley, the Eastern Corridor performs poorly when considering corridor resiliency and access to activity centers.
- *Financial Feasibility* – The approximate conceptual capital cost estimate for the Eastern Corridor is orders of magnitude more expensive as the Central Corridor Alternative and Western Corridor Alternative. Nearly 45 percent of the proposed route consists of a new alignment, which requires the construction of new bridges and interchanges within mountainous and treacherous terrain. The very high cost per corridor mile and cost per user render this corridor alternative imprudent.
- *Public Support* – The Eastern Corridor garnered the most oppositional community comments, in number and content, during the outreach period.

Moreover, the Eastern Corridor Alternative would significantly impact more environmental resources than the other two corridors. While the Utility Corridor (a large part of the Eastern

Corridor) may receive BLM approvals, there would be impacts to sensitive ACEC resources and to Section 4(f) recreational properties that would require substantial mitigation.

Figure 37. Decision Tree Based on Infrastructure Improvement Needs by Alternative

Figure 38. Corridor Alternatives Recommended to Advance to Complete PEL