3.0 Introduction

This chapter provides the analysis of the potential project-related environmental effects that would occur with development of the DesertXpress project. **Sections 3.1, Land Use and Community Impacts,** through **Section 3.16, Cumulative Impacts,** of this Final Environmental Impact Statement (EIS) describe the affected environment of the project as it relates to each specific environmental issue, the environmental consequences resulting from implementation of the proposed action and alternatives, and mitigation measures that would reduce impacts of the Preferred Alternative.

The following environmental topics are addressed in this chapter:

3.1	Land Use and Community Impacts	3.9	Geology and Soils
3.2	Growth	3.10	Hazardous Materials
3.3	Farmlands and Grazing Lands	3.11	Air Quality and Global Climate Change
3.4	Utilities/Emergency Services	3.12	Noise and Vibration
3.5	Traffic and Transportation	3.13	Energy
3.6	Visual Resources	3.14	Biological Resources
3.7	Cultural and Paleontological Resources	3.15	Final Section 4(f) Evaluation
3.8	Hydrology and Water Quality	3.16	Cumulative Impacts

Each environmental issue section contains a discussion of changes to the Draft EIS and Supplemental Draft EIS analyses regarding the affected and regulatory environment which are incorporated into this Final EIS as well as an analysis of the environmental consequences of the Preferred Alternative and the associated mitigation measures and residual impacts following mitigation. Substantive updates and changes in response to comments are shown in **bold** **underline** and ~~strikeout~~ text.

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3.1 LAND USE AND COMMUNITY IMPACTS

This section describes the updates and changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential the land use and community impacts related to the Preferred Alternative compared to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.1.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, includes all comments on the Draft EIS and Supplemental Draft EIS related to land use and community impacts and provides responses to those comments. Several comments resulted in updates/changes to the land use and community impacts analysis as discussed below. Substantive updates and changes are shown in **bold** **underline** and ~~strikeout~~ text.

3.1.1.1 Affected Environment

Draft EIS **Section 3.1.3** and Supplemental Draft EIS **Section 3.1.1** describe in detail the affected environment for land use and community impacts for the DesertXpress project.

Existing Land Uses

The general community demographics and land development patterns of Victorville, Lenwood, Yermo, Baker, Primm, Jean, Sloan, and the metropolitan Las Vegas area have not changed since publication of the Draft EIS and Supplemental Draft EIS. While new developments have been constructed within the vicinity of the Preferred Alternative since publication of the Draft EIS, these developments are similar to the types of existing land uses considered in Draft EIS **Section 3.1.3.2** and Supplemental Draft EIS **Section 3.1.1** and thereby remain applicable to this Final EIS and the evaluation of the Preferred Alternative.

Land Use Designations

Comments 288, 289, 290, and 334 on the Draft EIS requested additional information related to land use planning within Barstow related to planned residential and industrial developments in western Barstow. These comments specifically requested a discussion of the P&V Enterprise development project, the Barstow Industrial Park, and the Walmart Distribution Center. To address these comments, this Final EIS amends Draft EIS **Section 3.1.3.2**, under the heading "Segments 2A/2B" and subheading "Rail Alignments-Land Use Designations" to include the following information:

The City of Barstow is planning for the P&V Enterprises development project, which would introduce 302 residential parcels on 12,299 acres west of the Interstate 15 (I-15) freeway near the intersection of the National Trails Highway and Hinkley Road in southwestern Barstow. This project would be approximately one mile west of Segment 2A/2B.

The City of Barstow has also planned for the Barstow Industrial Park development project, which would introduce industrial development and accessory use, such as food service, fuel stations, and similar commercial uses. The Barstow Industrial Park development would be located in western Barstow, located on the west side of Lenwood Road at Jasper Road, just north of the Burlington Northern Santa Fe Railroad (BNSF) railway tracks. The planned Barstow Industrial Park would be approximately one mile east of Segment 2A/2B.

The City of Barstow is also proposing a 1,078,000 square foot Walmart Distribution Center on approximately 143 acres of vacant, undeveloped land in southwestern Barstow on Lenwood Road between Jasper Road and Agate Road. The Walmart Distribution Center would be located in the same area as proposed for the Barstow Industrial Park. The Walmart Distribution Center would be located approximately one mile east of Segment 2A/2B.

To further address Comments 288, 289, 290, and 334 on the Draft EIS, **Figures S-3.1-6** and **S-3.1-7** in the Supplemental Draft EIS are revised in this Final EIS to show the industrial land use designation within the vicinity of these planned developments in Barstow. This Final EIS amends Supplemental Draft EIS **Figures S-3.1-6** and **S-3.1-7**. These revised figures are shown as **Figure F-3.1-1** and **F-3.1-2** at the end of this section.

BLM Mining Claims and Multiple Use Classifications

Comment 330 on the Draft EIS indicated that the DesertXpress project is not within the Bureau of Land Management (BLM) Multiple Use Class I designated lands. To address this comment, the Final EIS amends Draft EIS **Section 3.1.1.1**, under the heading "California Desert Conservation Area Plan Resource Management Plan," paragraph 9 as follows:

> **Figure 3-1.1 (of the Draft EIS)** depicts the multiple use classifications near the alignment. As shown in **Figure 3-1.1 (of the Draft EIS)**, the majority of the alignment that passes through the California Desert Conservation Area (CDCA) planning area is in either unclassified, Class M, or Class L land. ~~Near Victorville, a small portion of the alignment runs through Class I land.~~

In response to Comment 330 on the Draft EIS and Comment S-240 on the Supplemental Draft EIS, this Final EIS amends Draft EIS **Table 3.1-2** and Supplemental Draft EIS **Table S-3.1-2**. This revised table is provided as **Table F-3.1-1** below.

Table F-3.1-1 Compatibility with Adjacent Land Uses

	High Compatibility	Medium Compatibility	Low Compatibility
Rail Alignments, Utility Corridors	Transportation corridors, utility corridors, industrial areas, institutional, vacant/undeveloped**,** **airports (outside Runway Protection Zones and one-engine inoperative zones)**~~, airports, hotels/casinos, BLM Multiple Use Class I designated land~~	Agricultural lands, medium to high intensity commercial uses, **hotel/casinos,** administrative/ professional uses, BLM Multiple Use Class M designated land, **Airport Runway Protection Zones and one-engine inoperative zones**	Residential land uses, habitat/open space conservation areas, schools, hospitals, parks/recreational use, BLM Multiple Use Class L and C designated land
Stations/ Maintenance Facilities, Temporary Construction Areas	Commercial/industrial land uses, business park, transportation **corridors,** utility corridors, agricultural lands, **institutional**, vacant/undeveloped **lands**, airports **(outside Runway Protection Zones and one-engine inoperative zones)**, landfills**,** **hotel/casinos**~~, BLM Multiple Use Class I designated land~~	Residential land uses, BLM Multiple Use Class M designated land, **Airport Runway Protection Zones and one-engine inoperative zones**	Habitat/open space conservation areas, schools, parks/recreational use, BLM Multiple Use Class L and C designated land

Source: CirclePoint, 2011.

Comment 331 on the Draft EIS requested that reference to the BLM West Mojave Plan Habitat Conservation Plan (HCP) be removed from the Draft EIS. There were two alternatives considered for the BLM West Mojave Plan, and the approved alternative does not include the provision of an HCP. To address this comment, this Final EIS amends Draft EIS **Section 3.1.1.1**, under the heading "California Desert Conservation Area Plan Resource Management Plan" and subheading "West Mojave Plan," paragraph 1 as follows:

> The West Mojave Plan ~~is the largest habitat conservation plan (HCP) in the U.S. The Plan~~ covers 9.3 million acres in San Bernardino, Kern, Los Angeles, and Inyo counties. The BLM published the plan in 2005 and the Record of Decision (ROD) was signed in March 2006.[1]

[1] U.S. Department of the Interior, Bureau of Land Management. Final Environmental Impact Report and Statement for the West Mojave Plan: A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Volume 2. January 2005. Website accessed in 2007. <http://www.blm.gov/ca/pdfs/cdd_pdfs/wemo_pdfs/plan/wemo/Vol-2-Complete-Bookmarks.pdf>.

Comment S-241 on the Supplemental Draft EIS stated that **Figures S-3.1.3** and **S-3.1.4** incorrectly depict the Southern Nevada Supplemental Airport (SNSA) site as owned by the BLM and requested that the figures be revised to show this land as owned by Clark County. To address this comment, this Final EIS amends Supplemental Draft EIS **Figures S-3.1-3** and **S-3.1.4**. These revised figures are shown as **Figure F-3.1-6** and **F-3.1-7** at the end of this section.

Comment S-242 on the Supplemental Draft EIS requested that **Figure S-3.1-8** be revised to incorporate corrections to the legend and updated to reflect the land use designations identified in the Clark County, South County Land Use Plan. To address this comment and to provide updates to the most current land use plans in the project region, this Final EIS amends Supplemental Draft EIS **Figures S-3.1-6** through **S-3.1-10**. These revised figures are shown as **Figures F-3.1-1** through **F-3.1-5** at the end of this section.

To address comment S-242, this Final EIS also amends Supplemental Draft EIS **Section 3.1.1**, under the heading "Segment 4C," paragraph 2, as follows:

> ~~**Figure S-3.1-8**~~ **Figure F-3.1-3** shows the land use designations in the vicinity of Segment 4C. Within California, San Bernardino County has designated lands within the vicinity of Segment 4C for institutional use. Within Nevada, Clark County has designated lands within the vicinity of Segment 4C for **open lands** ~~residential use~~. Segment 4C would be located within the BLM Northern and Eastern Mojave Plan area.

To address comment S-242, this Final EIS also amends Supplemental Draft EIS **Section 3.1.1**, under the heading "Relocated Sloan MSF" (RSMSF), paragraph 2 as follows:

> Clark County has designated the RSMSF site for **open lands** ~~residential land uses~~. The RSMSF is also located within the BLM Las Vegas Field Office Resource Management Planning Area. ~~**Figure S-3.1-9**~~ **Figure F-3.1-4** shows the land use designations on and within the vicinity of the RSMSF. The BLM has not designated a Multiple Use Classification for the RSMSF site or surrounding lands.

To address comment S-242, this Final EIS also amends Supplemental Draft EIS **Section 3.1.1**, under the heading "Frias Substation," paragraph 3 as follows:

> ~~**Figure S-3.1-10**~~ **Figure F-3.1-5** shows the Enterprise Regional Land Use Plan designations for the Frias Substation site. The Enterprise Regional Land Use Plan designates the eastern portion of the Frias Substation site as **Administrative and Professional** ~~Business and Design Research Park~~. The Enterprise Regional Land Use Plan designates the western portion of the site as Residential. The Frias Substation site is also located within the BLM Las Vegas Field Office Resource Management Plan Area.

To address comment S-242, this Final EIS also amends Supplemental Draft EIS **Table S-3.1-1**. The revised table is provided as **Table F-3.1-2** below.

Table F-3.1-2 Existing Land Use Summary – Alignment Adjustment Areas (AAAs)

AAAs and Affected Segment	Land Ownership	Adjacent Land Uses	Land Use Designations	Environmental Justice Census Block
AAA 1 (Segment 2A/2B)	Private	Residential, Commercial, Vacant	Residential, Commercial, Institutional	None
AAA 2 (Segment 2A/2B)	BLM, Private	Residential, Commercial, Vacant	Residential, Institutional	None
AAA 3 (Segment 3B)	BLM, Private	Vacant, Transportation Corridor	Residential, Institutional	1 – Minority
AAA 4 (Segment 3B)	Private	Vacant, Transportation Corridor	Residential	1 – Minority
AAA 5 (Segment 3B)	BLM, Private	Vacant, Transportation Corridor	Residential, Institutional	1 – Minority
AAA 6 (Segment 3B)	BLM	Vacant, Transportation Corridor	Institutional	1 – Minority
AAA 7 (Segment 6B)	BLM, Private	Vacant, Transportation Corridor	**Open Space** ~~Residential~~, Planned Development/Mixed-Use	None
AAA 8 (Segment 6B)	Private	Commercial, Industrial, Hotel/Motel, Transportation Corridor	**Administrative and Professional,** Commercial**, Residential, Industrial-Manufacturing**	1 – Minority

Source: CirclePoint, 2011.

To address comment S-242, this Final EIS also amends Supplemental Draft EIS **Section 3.1.1**, under the heading "Wigwam MSF Modification" as follows:

> The orientation of the Wigwam **Avenue** MSF site has been modified, but the location of the Wigwam **Avenue** MSF site has not changed. **The Wigwam Avenue MSF site would be located on privately owned lands and lands designated for Commercial and Administrative and Professional uses.** ~~As such, the existing land ownership and land use designations have not changed from what is presented in **Section 3.1.3.2** the Draft EIS. **Figure S-3.1-5**~~

Figure F-3.1-12 illustrates the land ownership for the Wigwam **Avenue** MSF site and ~~**Figure S-3.1-10**~~ **Figure F-3.1-5** shows the land use designations on and surrounding the Wigwam **Avenue** MSF site. As shown in ~~**Figure S-3.1-13**~~ **Figure F-3.1-15**, the Wigwam **Avenue** MSF site is not located within a census block meeting the criteria for evaluation of environmental justice impacts.

3.1.1.2 Regulatory Environment

The regulatory environment for land use and community impacts for the DesertXpress project is described in detail in Draft EIS **Section 3.1.1**.

This Final EIS amends Draft EIS **Section 3.1.1**, to include the following regulation pertaining to the acquisition of private property:

If the DesertXpress project receives federal financial assistance, such as through a federal loan program, the acquisition of private property would be governed by the requirements of the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The Uniform Act was enacted by Congress to ensure that owners of real property to be acquired for federal and federally-assisted projects and persons displaced as a direct result of such projects are treated fairly, consistently, and equitably.

All property owners and any persons displaced by the Desert Xpress project will be informed in writing of their status and eligibility for any payments or assistance required by the Uniform Act and its implementing regulations. Such payments and assistance may include, but are not necessarily limited to, the following:

- **Just compensation for property acquired, whether in fee, easement, or other form of property rights acquisition. Just compensation will be established by an approved appraisal of fair market value or other processes defined in the Uniform Act and the regulations.**
- **An opportunity for the property owner to accompany the appraiser during inspection of the property.**
- **Eligible closing costs and other expenses related to the transfer of property.**
- **Assistance in finding and relocating to replacement property.**
- **Eligible expenses for moving personal property to a replacement site.**
- **Replacement housing payments and related expenses for displaced residential owners and tenants.**

- **Business reestablishment payments to small business and other defined eligible entities.**
- **Written noticed informing property owners and displaced persons of their rights and eligibility for assistance.**
- **A notice that no one will be required to move from the acquired property from which they are being displaced for a minimum of 90 days.**

Comment 333 on the Draft EIS and Comments S-243, S-244, and S-245 on the Supplemental Draft EIS requested that additional laws and regulations related to land ownership be addressed as relevant regulatory considerations. To address these comments, this Final EIS amends Draft EIS **Section 3.1.1.5,** to include a discussion of the Ivanpah Valley Airport Public Lands Transfer Act, Clark County Conservation of Public Lands and Natural Resources Act, Heliport Transfer Act, and the Clark County South County Land Use Plan as follows:

Ivanpah Valley Airport Public Lands Transfer Act (Public Law 106-362)

The Ivanpah Valley Airport Public Lands Transfer Act was enacted in October 2000. The intent of the Ivanpah Valley Airport Public Lands Transfer Act is to provide for the conveyance of Federal public lands in the Ivanpah Valley for the development of an airport facility under the jurisdiction of the Clark County Department of Aviation (CCDOA).

As part of the Ivanpah Valley Airport Lands Transfer Act, Congress directed the BLM to convey to CCDOA approximately 6,000 acres of land in the Ivanpah Valley between the communities of Jean and Primm and immediately east of the I-15 freeway for the purpose of developing the SNSA and related infrastructure. This land was transferred to CCDOA in 2004, whereby CCDOA paid fair market value for the transfer of lands.

Clark County Conservation of Public Lands and Natural Resources Act (Public Law 107-282)

The Clark County Conservation of Public Lands and Natural Resources Act (Clark County Lands Bill) was signed into law on November 6, 2002. The purpose of the Clark County Lands Bill is to establish wilderness area, promote conservation, improve public land, and provide high quality development in Clark County. The Clark County Land Bill established the Sloan Canyon National Conservation Area, expanded the Red Rock National Conservation Area, and preserved petroglyph sites near Sloan.

As part of the Clark County Lands Bill, Congress directed the BLM to transfer an additional 17,000 acres of land, the Airport Environs Overlay District (Noise Compatibility Area), to Clark County upon final approval of the future SNSA. Congress also directed BLM to establish a 2,640-foot wide transportation and utility corridor between the SNSA site and the Las Vegas Valley for the placement, on a non-exclusive basis, of utilities and transportation facilities for the SNSA. BLM formally identified the boundaries of that corridor in July 2007.

Heliport Transfer Act (Public Law 109-115, Section 180)

Under the Heliport Transfer Act, the U.S. Department of Interior (DOI) directed the transfer of 229 acres of BLM-managed land to Clark County for the purpose of operating a heliport facility.

The Federal Aviation Administration (FAA) issued a Finding of No Significant Impact/Record of Decision on the heliport in early 2009. The DOI also transferred the land title to Clark County in late 2009.

Clark County, South County Land Use Plan (2008)

The South County Land Use Plan was adopted in August 2008 and provides a guide for growth and development and contains goals and policies used to define development standards, guide public investment, and inform public and private decision making. The South County Land Use Plan encompasses approximately 1,218,130 acres in the southern portion of the Las Vegas Valley, including the communities of Cal-Nev-Ari, Eldorado Valley, Goodsprings, Jean, Nelson, Palm Garden, Primm, Sandy Valley, Searchlight, and Sloan.

The South County Land Use Plan includes reference to the Transportation and Utility Corridor identified as part of the Clark County Lands Bill. The South County Land Use Plan identifies the location of the Transportation and Utility Corridor within the Sloan area and provides policies designed to respect and be consistent with the Corridor.

Comments S-109, S-110, S-124, S-128, S-144, S-145, S-178, S-191, and S-240 on the Supplemental Draft EIS requested additional information relative to airport compatibility and conformance with Federal Aviation Administration (FAA) regulations. To address these comments, this Final EIS amends Draft EIS **Section 3.1.1.5** as follows to include a discussion of the FAA guidelines and regulations:

Federal Aviation Administration Guidelines

The Federal Aviation Administration (FAA) is responsible for the safety of civil aviation. The FAA establishes regulations related to air carriers and operators, pilots, and flight and ground instructors, as well as commercial space transportation. The FAA implements guidelines, policies, and regulations to protect and maintain the safe functioning of air carriers and airport activities. Specifically, the FAA Runway Protection Zone Policy states that FAA will resist or oppose objects or activities in the vicinity of an airport that conflict with an airport's planning or design, or recommendation to protect that public's investment in the national airport system. FAA Order 8260.19D, Section 11, provides standards related to airport obstacle evaluations. The primary purpose of obstacle evaluation is to determine how an object or activity will impact instrument flight procedures. Under FAA Order 8260.19D, the FAA has also established regulations pertaining to one-engine inoperative conditions, whereby an air carrier would attempt to take off with a non-operable engine. The one-engine inoperative regulations include specific slope requirements (distance and height) for air carrier take-off departures, which can limit the allowable height of structures within proximity to an airport runway within this one-engine inoperative zone.

3.1.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

Several comments on the Supplemental Draft EIS resulted in changes to the land use and community impact analysis in this Final EIS and are discussed below.

Comment S-237 on the Supplemental Draft EIS requested that the evaluation of land use compatibility include additional information and substantiation of the nature and extent of the incompatibility. Comment S-240 on the Supplemental Draft EIS also requested additional information related to airport compatibility. To address this comment, this Final EIS amends Supplemental Draft EIS, **Section 3.1.2**, following **Table S-3.1-3**, to include additional clarifying text regarding compatibility with adjacent land uses and land use designations. This Final EIS also amends Supplemental Draft EIS **Table S-3.1-3**, to capture all relevant land use designations within the area of analysis. This revised table is provided as **Table F-3.1-3** below.

Table F-3.1-3 Compatibility with Land Use Designations

Project Feature Type	Level of Compatibility		
	High	Medium	Low
Rail Alignments, Utility Corridors	Institutional, Public Facilities, Industrial/**Manufacturing**, Restrictive, ~~Hotel/Casino, Desert/Mountain~~	Commercial, Agricultural, **Civic,** ~~Business and Design Research~~, **Administrative and Professional, Planned Development/Mixed Use**	Residential**, Open Space**
Stations/Maintenance Facilities, Temporary Construction Areas	Institutional, Public Facilities, Commercial, Industrial**/Manufacturing**, ~~Hotel/Casino,~~ Commercial, **Civic,** ~~Business and Design Research,~~ **Administrative and Professional, Restrictive**	Residential**, Planned Development/Mixed Use**~~, Restrictive~~	Agricultural**, Open Space**

Source: CirclePoint, 2011.

Compatibility with Adjacent Land Uses

Table F-3.1-1 summarizes the compatibility of the DesertXpress project with existing adjacent land uses.

The evaluation of "compatibility with adjacent existing land uses" relates to what is currently built on the ground in the study area (defined as one mile on either side of the rail centerline).

Existing land uses within the study area were identified based on field reconnaissance, review of aerial mapping, and through coordination with agencies with jurisdiction in the project region. The evaluation of compatibility with existing land uses considers whether the project would conflict with the normal functioning of these existing developments.

The DesertXpress rail alignments, utility corridors, stations, maintenance facilities, and TCAs would be considered to have high compatibility with similar types of existing land uses, such as transportation corridors or industrial developments, or development types that do not contain sensitive receptors that could be affected by the DesertXpress project, such as vacant or undeveloped lands. The DesertXpress project would have medium compatibility with existing land uses that contain a mix of similar types of developments and/or a limited number of sensitive receptors, such as commercial

developments, hotels/casinos, or administrative and professional uses. With medium compatibility, the overall function of the existing land use would remain with operation of the DesertXpress project. The DesertXpress project would have low compatibility with existing land uses that contain sensitive receptors, such as residents at nearby residential developments, that could be affected by potential environmental effects, such as increased traffic or increased noise levels from the DesertXpress project.

Compatibility with Land Use Designations

Table F-3.1-3 summarizes the compatibility of the DesertXpress project with existing land use designations.

The evaluation of compatibility with land use designations relates to planned land use designations as defined by an adopted land use plan (for example, a general plan, a comprehensive plan, or similar). Land use designations of particular plans define the type and intensity of allowable development for a specific area, thus forming a "blueprint" for future development.

Land use designations within the study area were determined based on review of adopted plans in project area cities (Victorville, Barstow, and Las Vegas) and counties (San Bernardino County and Clark County). Federal agency land use plans, such as BLM's West Mojave Plan, were also reviewed. Due to the large scale of the project, land use designation types were collapsed into several generalized categories: Administrative/Professional, Agricultural, Commercial, Industrial/Manufacturing, Open Space, Residential, Restrictive, Public Facility, Civic, Planned Development/Mixed Use, and Institutional. The evaluation of compatibility with the land use designation considers whether the DesertXpress project would conflict with or otherwise impair the functioning of proposed land uses.

The DesertXpress project would be considered to have high compatibility with land use designations that would allow a similar type of utilitarian development. For example, the DesertXpress rail alignment and utility corridors would have high compatibility with Public Facility and Industrial/Manufacturing land use designations. The rail alignment and utility corridors would have medium compatibility with Commercial, Agricultural, Civic, Planned Development/Mixed Use, and Administrative/Professional land use designations, as these uses would not generally not permit transportation or utility features but would also not foster development that would host sensitive receptors. The rail alignment

and utility corridors would have low compatibility with land use designations that would introduce future sensitive receptors that could be adversely affected by the DesertXpress project, such as residents within Residential land use designations or sensitive biological species within Open Space land use designations.

The DesertXpress stations and maintenance facilities would have high compatibility with Institutional, Public Facility, Commercial, Civic, and Administrative/Professional land uses since the project facilities would be similar to the types of development allowed under these land use designations. The stations and maintenance facilities would have medium compatibility with Residential and Planned Development/Mixed Use land use designations, since the passenger stations could serve residents or visitors in the area, and would have low compatibility with Agricultural and Open Space land use designations, since construction of such facilities could disturb potential agricultural production or conservation of these lands.

Comment 382 on the Draft EIS and Comments S-109, S-110, S-122, S-124 through S-129, S-144, S-145, S-153, S-178, S-191, and S-240 on the Supplemental Draft EIS requested additional information relative to the DesertXpress project's compatibility with the one-engine inoperative zone and departure conditions and Runway Protection Zone regulations under FAA regulations. These comments also stated that a final determination on compatibility will need to be determined by the FAA. To address this comment, this Final EIS amends Draft EIS **Section 3.1.4.2**, under the heading "Interference with Normal Functioning of Adjacent Land Uses" to include the following new text:

The DesertXpress rail alignment would be located approximately 2,600 feet west of the existing McCarran International Airport (LAS) within metropolitan Las Vegas. According to the Clark County Department of Aviation (CCDOA), the DesertXpress rail alignment would cross through the one-engine inoperative zones (discussed in more detail below). The DesertXpress rail alignment would also be located immediately west of the planned Southern Nevada Supplemental Airport (SNSA).

According to FAA standards (FAA Order 8260.19D), the proximity and height of the DesertXpress rail alignment would conflict with the normal functioning of existing airlines at the LAS, whereby the rail alignment would not conform with the certified air carrier one-engine inoperative departure conditions. In other words, even though the proposed rail alignment is approximately ½ mile to the west of the airport property, the proximity and height of the Action Alternative rail

alignments would introduce a potential obstacle if an airplane were attempting a takeoff with a non-working engine. According to the airline operators (specifically Southwest Airlines), the height of the proposed DesertXpress rail alignment, if not lowered from its currently proposed design height, would require the airlines to substantially reduce air carrier weight loads, either by passenger or fuel load reductions, so that airlines could conform with FAA regulations governing one-engine inoperative requirements within the one-engine inoperative zones. The required reduction in passengers could render the operation of specific flights infeasible due to low passenger capacities. A reduction in fuel load could also place limitations on the available travel distances, such that specific destinations could no longer be reached via air carrier without refueling.

The DesertXpress project would generally have high compatibility with an airport, such as the LAS, because they are both transportation-related facilities. However, the DesertXpress rail alignment would have medium compatibility with an airport where the rail alignment would cross through the one-engine inoperative zone or an existing or planned Runway Protection Zone.

To address Comment 382 on the Draft EIS and Comments S-109, S-110, S-122, S-124 through S-129, S-144, S-145, S-153, S-178, S-191, , and S-240 on the Supplemental Draft EIS, this Final EIS amends Draft EIS **Table 3.1-2** and Supplemental Draft EIS **Table S-3.1-2**. This revised table is provided as **Table F-3.1-1** above.

To further address Comment 382 on the Draft EIS and Comments S-109, S-110, S-122, S-124 through S-129, S-144, S-145, S-153, S-178, S-191, , and S-240 on the Supplemental Draft EIS, this Final EIS amends Draft EIS **Section 3.1.5** and Supplemental Draft EIS **Section 3.1.4** to include additional mitigation measures related to compatibility with the one-engine inoperative zones at the LAS and existing and planned Runway Protection Zones:

Mitigation Measure LU-1: Rail Alignment Design in One-Engine Inoperative Zones at LAS

During the design-build process for the design plans in the vicinity of the LAS, the Applicant shall coordinate with the FAA, CCDOA, and airlines operating at the airport to develop and agree to a rail alignment design that avoids impacts to the one-engine inoperative zones and departure conditions under FAA standards. The Applicant shall provide written verification of the agreement with the FAA, CCDOA, and associated airlines prior to approval of project designs in this location.

Mitigation Measure LU-2: Rail Alignment Design in Existing and Planned Runway Protection Zones

During the design-build process, the Applicant shall coordinate with the FAA regarding any existing and planned airport uses and established Runway Protection Zones. The Applicant shall obtain a Part 77 determination from the FAA to confirm that the project does not present a hazard to air navigation.

Comment S-242 on the Supplemental Draft EIS requested that **Figure S-3.1-8** of the Supplemental Draft EIS be corrected to incorporate the Clark County, South County Land Use Plan land use designations. Several environmental consequences conclusions require revisions to account for the updates to the illustrations and descriptions of land use designations. The changes to the affected environment discussions in the Supplemental Draft EIS are shown in **Section 3.1.1.1** of this Final EIS. To address the land use designation corrections within the vicinity of Segment 4C, this Final EIS amends Supplemental Draft EIS **Section 3.1.3**, under the heading "Segment 4C" as follows:

> Segment 4C would have high compatibility with the existing vacant **and open** lands and ~~high to low compatibility with~~ the institutional ~~and residential~~ land use designations, respectively. Segment 4C would also have high compatibility with the BLM **Multiple Use** Class M **designated** lands and low compatibility with the BLM **Multiple Use** Class L **designated** lands. Segment 4C would not displace any residence or business, nor sever an established community due to the undeveloped nature of the area it would cross. Segment 4C would have similar effects on environmental justice populations as Segment 4B because it traverses through the same census block. However, development within this census block is sparse and is concentrated well outside the vicinity of the Segment 4 rail alignment options. No adverse effect on environmental justice populations would occur.

To address the land use designation corrections within the vicinity of the Relocated Sloan MSF, this Final EIS amends Supplemental Draft EIS **Section 3.1.3**, under the heading "Relocated Sloan MSF" and subheading "Conflict with Applicable Land Use Plans" as follows:

> As discussed in **Chapter 2.0, Alternatives**, the Applicant proposed the RSMSF in response to public comment from the Clark County Department of Aviation (CCDOA). The CCDOA identified potential adverse conflicts between the Sloan Road MSF as evaluated in the Draft EIS and the proposed "super arterial" roadway that would provide vehicular access to the planned Southern Nevada Supplemental Airport near Primm. As a result, the Applicant relocated the RSMSF approximately two miles south of the Sloan Road MSF to avoid potential conflicts with future planned airport-related uses. The RSMSF would have ~~high~~ **low**

compatibility with the ~~existing undeveloped, vacant~~ **Open Space** land~~s~~ **use designation** ~~and low compatibility with the residential land use designations~~ under the Clark County ~~Comprehensive Plan~~ **South County Land Use Plan.**

To address the land use designation corrections within the vicinity of the Frias Substation, this Final EIS amends Supplemental Draft EIS **Section 3.1.3**, under the heading "Frias Substation" and subheading "Conflict with Applicable Land Use Plans" as follows:

The Frias Substation would have medium compatibility with the Residential land use designations on the west side of Dean Martin Drive and high compatibility with the **Administrative/Professional** ~~Business and Design Research~~ land use designations to the east of Dean Martin Drive.

To address the land use designation corrections within the vicinity of the Alignment Adjustment Areas (AAA), this Final EIS amends Supplemental Draft EIS **Section 3.1.3**, under the heading "Alignment Adjustment Areas" and subheading "Conflict with Adjacent Land Uses and Land Use Plans and Displacement and Community Severance," bullet points 3 and 4 as follows:

- ***AAA7:*** AAA7 would shift Segment 6B to the outside (western) edge of the freeway right-of-way (ROW) so as to better accommodate potential future widening of I-15. Nearly all of the land adjacent to the west of Segment 6B is designated for residential use. The only area proximate to Segment 6B currently in residential use is north and west of Robert Trent Jones Lane, a minimum distance of 1,000 feet from the I-15 corridor. Due to this distance, the modified rail alignment would not result in any interference with existing land uses nor in any community severance or disruption. **The rail alignment would have low compatibility with land designated as Open Space and medium compatibility with lands designated as Planned Development/Mixed Use.**
- ***AAA8:*** AAA8 would shift portions of Segment 6B outside of the Nevada Department of Transportation (NDOT) ROW and into the adjacent Clark County ROW on Dean Martin Drive/Industrial Road. This adjustment would have high compatibility with the existing industrial developments, medium compatibility with the hotels/motels and commercial developments, and low compatibility with the nearby residential developments.

  In regards to land use designations, Segment 6B would continue to have **low compatibility with lands designated as Residential,** medium compatibilit**y with the lands designated as Commercial and Administrative /Professional, and high compatibility with lands designated as ~~the~~ Industrial/Manufacturing ~~land use de~~*~~signa~~*~~tions~~** with implementation of AAA8.

While the rail alignment would be shifted to the west towards existing industrial, commercial, residential, and hotel/motel developments, the adjustment associated with AAA8 would remain within existing transportation corridors and no residential or business displacements would occur. Where the alignment adjustment would traverse within the median of Dean Martin Drive/Industrial Road (between Hacienda Avenue and Tropicana Avenue), access to existing roadways and properties would be maintained. Therefore, no severance of an existing community would occur.

To address the land use designations corrections within the vicinity of the Wigwam Avenue MSF, this Final EIS amends Supplemental Draft EIS **Section 3.1.3**, under the heading "Wigwam MSF Modification" and subheading "Conflict with Applicable Land Use Plans" as follows:

~~The Wigwam MSF Modification would not result in additional or new conflicts to applicable land use plans from what was evaluated in the Draft EIS.~~ The Wigwam **Avenue** MSF would **have high compatibility with lands designated for Commercial and Administrative/Professional uses.** ~~maintain high compatibility with Clark County's planned development/mixed-use land use designations and medium compatibility with the commercial land use designations.~~

A study evaluating the economic impact of the DesertXpress project on the City of Barstow (Barstow Study) was prepared in response to several comments received on the Draft EIS and Supplemental Draft EIS relative to growth. The Barstow Study, included as **Appendix F-E,** evaluates the DesertXpress project's economic effect on the City of Barstow from freeway-related traffic and associated "passby" trips through Barstow being diverted to the high-speed passenger train. A detailed discussion of the economic and employment effects on the City of Barstow is contained in **Section 3.2, Growth**, of this Final EIS. This Final EIS amends Draft EIS **Section 3.1.4.2**, under the heading "Result in Environmental Effects Disproportionately Borne by a Low-Income or Minority Population" and subheading "Rail Alignment", to include additional analyses related to the potential economic effects on environmental justice communities in the Barstow area as a result of the Action Alternatives:

Operation of the Action Alternatives could result in negative employment and economic growth effects to the City of Barstow, which could affect a disproportionately low-income and minority community in Barstow. There are 13 environmental justice census block groups within the Barstow area in the vicinity of the Action Alternatives. The Action Alternatives would result in the diversion of I-15 freeway traffic between Victorville and Las Vegas to the high-speed passenger train. The Barstow economy is largely driven by taxable sales from freeway-related traffic and the diversion of these "passby" vehicle trips through

Barstow would have an indirect negative growth effect to Barstow's economy. Based on the DesertXpress ridership forecast, it is estimated that annually about two million private automobile passengers and 260,000 bus passengers would instead use DesertXpress.

Over time, the share of Barstow's economy affected by the DesertXpress project could slowly grow since ridership is expected to increase through year 2035. This reduction in economic growth from passengers being diverted to the high-speed passenger train would result in a loss to the City's economic base of funds that would have flowed into the economy from outside sources.

The Draft EIS identified year 2013 as the opening year for the DesertXpress project.[2] Since construction of the DesertXpress project would take three to four years, the exact opening year of the project is not determined at this time. The DesertXpress project is assumed to begin operations three to four years after commencing construction. Table F-3.1-4 summarizes the potential long-term negative economic growth effects on Barstow as a result of operation of the high-speed passenger train between the first year of operation and 18th year of operation. The baseline for the analysis presented below is a total of 10,463 jobs and $473.3 million in income, based on 2009 data.

Table F-3.1-4 Summary of Economic Impacts to Barstow During DesertXpress Operation (Year 1 Operation through Year 18 Operation)

Year	Change Over Time from Baseline *(Baseline Shown in Italics)*		
	Total Reduction in Economic Activity	Total Reduction in Job Activity (Percent)	Total Reduction in Income (Percent)
Baseline (2009)	*N/A*	*10,463*	*$473.3 million*
Year 1 Operation	-$18.7 million	-244 (-2.33%)	-$11.6 million (-2.45%)
Year 2 Operation	-$32.2 million	-421 (-4.02%)	-$16.9 million (-3.56%)
Year 3 Operation	-$41.6 million	-542 (-5.00%)	-$21.7 million (-4.59%)
Year 8 Operation	-$48.8 million	-636 (-6.07%)	-$25.5 million (-5.39%)
Year 18 Operation	-$51.9 million	-676 (-6.46%)	-$27.1 million (-5.73%)

Source: Economics & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[2] The year 2013 was selected because it was the year the DesertXpress high-speed train was expected to begin operations at the time when the Draft EIS was being prepared.

The Barstow economy could experience a gradual reduction in economic activity, jobs, and income, with an average annual loss during operation.[3] This reduction in economic growth from the freeway-traffic diversion would result in a loss to Barstow's economic base of funds, which could disproportionately affect minority and low-income communities during operation of the Action Alternatives. The reduction in economic activity could also result in reduced employment opportunities in Barstow. Operation of the Action Alternatives would result in the loss of about 542 jobs by the 3rd year of operation and up to 676 by the 18th year of operation.[4] The loss of jobs could adversely affect the Barstow economy, which already experiences disproportionately high levels of poverty.

While operation of the Action Alternatives could result in negative economic effects to Barstow, which includes 13 minority and poverty environmental justice communities, construction of the Action Alternatives would result in a temporary increase in employment and associated salaries. Within San Bernardino County, Barstow would be the most central city for construction of the DesertXpress project, particularly for the 113-mile stretch of the rail alignment between Barstow and Primm. It is assumed that a significant share of the construction jobs and associated revenue created by the DesertXpress project in San Bernardino County would flow into Barstow and its immediate environs. Construction of the DesertXpress project could result in about 2,470 direct jobs in Barstow during the three- to four-year construction period.[5] This would represent an annual average of 823 direct jobs per year, resulting in an eight percent increase in employment over the 2009 employment level of 10,463. These 2,470 direct jobs are anticipated to generate an average payroll (combination of salaries) of $59.5 million over the course of the construction period.[6] While the construction jobs would be temporary during the construction phase, the introduction of the new direct jobs and associated salaries could have a temporary positive effect on the City's

[3] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[4] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[5] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[6] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

employment rate and economic vitality, and could have a temporary positive economic effect on Barstow, includes 13 minority and poverty environmental justice communities.

Based on the analysis presented in the Barstow Study, the economic and employment effects would not result in urban decay, a process whereby a previously functioning city falls into disrepair or become decrepit.[7] Since the DesertXpress project would not result in urban decay or other interrelated physical environmental effects as a result of the negative effects on Barstow's economy, this economic effect is not considered adverse.

3.1.2 Analysis of Environmental Consequences

3.1.2.1 Methods of Evaluation

The land use and community impact methodology described in Draft EIS **Section 3.1.3.3** and **Section 3.1.4** remains applicable to this Final EIS and the evaluation of the Preferred Alternative. This same methodology was used in **Section 3.1, Land Use and Community Impacts**, in the Supplemental Draft EIS. A summary of the methodology is provided below.

Land Use

The area of analysis for land use effects considers existing and planned land uses within one mile of the Preferred Alternative, as measured from the center line of the rail alignment.

An adverse effect related to land use or community character would occur if the Preferred Alternative would:

- Interfere with the normal functioning of adjacent land uses;
- Conflict with any applicable land use plan, policy, or regulation;
- Cause displacement of a significant number of local residents; or
- Disrupt or sever community interactions or otherwise divide an established community.

The evaluation of "compatibility with adjacent existing land uses" examines what is currently built within the one-mile study area. Existing land uses within the one-mile study area were identified based on field reconnaissance, review of aerial mapping, and

[7] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

through coordination with agencies with jurisdiction in the project region.[8] The evaluation of compatibility with existing land uses considers whether the project would conflict with the normal functioning of these existing developments.

The evaluation of "compatibility with land use designations" examines planned land use designations as defined by an adopted land use plan (for example, a general plan, a comprehensive plan, or similar). Land use designations of particular plans define the type and intensity of allowable development for a specific area, thus forming a "blueprint" for future development. Land use designations within the one-mile study area were determined based on review of adopted plans in project area cities (Victorville, Barstow, and Las Vegas) and counties (San Bernardino County and Clark County). Federal agency land use plans, such as BLM's West Mojave Plan, were also reviewed. Due to the large scale of the project, land use designation types were collapsed into several generalized categories: Administrative/Professional, Agricultural, Commercial, Industrial/ Manufacturing, Open Space, Residential, Restrictive, Public Facility, Civic, Planned Development/Mixed Use, and Institutional. For example, the relevant land use plans include multiple Residential land use designations, with specific allowable densities for each type of residential use (i.e., low-density, medium-density, and high-density). For the purposes of this analysis, all of the Residential land use types were collapsed into one Residential land use category.

Additionally, the relevant land use plans include different types of Commercial land use designations, such as Commercial Neighborhood, Commercial General, and Commercial Tourist, which each allow a specific sub-set of commercial uses. All of the Commercial and Industrial land use types were similarly collapsed into single Commercial and Industrial categories.

The evaluation of compatibility with the land use designation considers whether the project would conflict with or otherwise impair the functioning of proposed land uses.

Local Land Use and Environmental Regulations

The Surface Transportation Board (STB) issued a declaratory order on June 25, 2007 regarding STB's authority under 49 United States Code (U.S.C.) 10901. In this order, STB found the project to be exempt from state and local land use and environmental regulations, including the California Environmental Quality Act (CEQA) and local/regional zoning ordinances. Therefore, the Preferred Alternative would not be subject to local land use plans. Thus while consistency with local policies is not required, an analysis of consistency with existing land use designations was conducted.

[8] Agencies include: BLM, San Bernardino County, City of Victorville, Clark County, City of Las Vegas, and the City of Barstow.

Section 3.1.2.2 and **Section 3.1.2.3** of this Final EIS below includes an evaluation of the environmental effects of the Preferred Alternative and the No Action Alternative as they relate to land use and community impacts.

Environmental Justice

The area of analysis for environmental justice considers the environmental justice communities within one-mile of the Preferred Alternative, as measured from the center line of the rail alignment.

A census block meeting the criteria for environmental justice analysis is defined as having a low-income population of greater than 25 percent or a minority population greater than 50 percent of the total community population. A census block also meets the criteria for environmental justice analysis if the low-income and/or minority population is more than 10 percentage points higher than the city or county average. In order to identify census blocks meeting these criteria, the 2000 U.S. Census block groups within a two-mile radius were examined.

An adverse environmental justice effect would occur if:

- An adverse environmental effect is predominately borne by a minority population and/or low-income population; or
- An adverse environmental effect suffered by the minority population and/or low-income population is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and/or non-low-income population.

3.1.2.2 No Action Alternative

The No Action Alternative would not involve the construction and operation of the high-speed train and associated facilities under the Preferred Alternative. The No Action Alternative would include the planned and programmed transportation improvements identified in **Section 2.3.1.2** of this Final EIS. The precise amount of land affected by the No Action Alternative is unknown at this time. Each project that is a part of the No Action Alternative would be subject to separate environmental review where specific land use impacts would be identified.

Interference with Normal Functioning of Adjacent Land Uses

The No Action Alternative would result in planned and programmed improvements primarily within the existing I-15 freeway ROW, using land that is currently in the median and/or existing ROW of the I-15 freeway. Similar to the Preferred Alternative, the No Action Alternative would intensify the use of the existing I-15 transportation corridor, but would not interfere with the normal functioning of adjacent land uses. The intent of the planned and programmed transportation improvements under the No Action Alternative would be to improve access along the I-15 freeway corridor primarily within the existing ROW and to improve traffic congestion, thereby maintaining the normal functioning of

adjacent land uses. However, the widening of the I-15 freeway corridor would add more travel lanes to the I-15 freeway, thereby increasing the footprint of the freeway corridor and allowing for more through vehicles. These improvements could conflict with existing land uses immediately adjacent to the I-15 freeway corridor, such as residential uses that could be affected by increased travel noise.

Conflicts with Applicable Land Use Plans

The planned and programmed improvements under the No Action Alternative would be located within the same land use plans identified for the Preferred Alternative. Since the No Action Alternative would not include the development of a high-speed train and would only involve highway improvements along the existing I-15 freeway corridor, it is not anticipated that the No Action Alternative would conflict with applicable land use plans.

Cause Displacement of a Significant Number of Local Residents and Disrupt or Sever Community Interactions or Otherwise Divide an Established Community

As previously stated, the No Action Alternative would result in transportation improvements primarily within the existing I-15 freeway ROW. For improvements within the I-15 freeway ROW, no displacements or existing residences would occur.

The I-15 freeway is intended to remain in its existing configuration for most of the distance between Victorville and Las Vegas, with the exception of capacity improvements in the urbanized areas. In addition to the highway capacity improvements on I-15, other transportation improvements near Victorville and within Clark County are anticipated.

However, as noted above, the precise amount of land affected by the No Action Alternative is unknown at this time and the extent of required displacements is unknown at this time. Each project that is a part of the No Action Alternative would be subject to separate environmental review where specific land use impacts would be identified.

Result in Environmental Effects Disproportionately Borne by a Low Income or Minority Population

The planned and programmed improvements under the No Action Alternative would be located within environmental justice census blocks. As previously stated, the precise amount of land affected by the No Action Alternative is unknown at this time and the extent of displacements within an environmental justice community is unknown. Each project that is a part of the No Action Alternative would be subject to separate environmental review where specific environmental justice impacts would be identified.

Since the improvements considered under the No Action Alternative are expected to occur whether or not the Preferred Alternative is implemented, the Preferred Alternative would have greater land use and community effects than the No Action Alternative.

3.1.2.3 Preferred Alternative

Section 3.1.4.2 of the Draft EIS and **Section 3.1.3** of the Supplemental Draft EIS describe in detail the land use and community impacts by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative.

Local Land Use Regulations

In San Bernardino County, the Preferred Alternative would be allowed under various County land use designations and zoning districts because it is a transportation facility that will be available to the public. The San Bernardino General Plan specifically allows public transportation uses in various land use districts.[9] The Preferred Alternative would not change this determination. In Clark County, the Clark County planning staff indicated that there are no goals or policies within the Clark County Comprehensive Plan that would specifically limit construction or implementation of the project features.[10]

Interference with Normal Functioning of Adjacent Land Uses

The evaluation of compatibility with adjacent existing land uses related to what is currently built on the ground in the study area (defined as one mile on either side of the Preferred Alternative). The evaluation considered whether the Preferred Alternative would conflict with the normal functioning of these existing developments. Refer to **Section 3.1.1.3** of this Final EIS for a detailed description of compatibility with adjacent land uses.

Since the Preferred Alternative rail alignment would be fully grade separated and located almost entirely within the existing I-15 freeway ROW, the rail alignment would not interfere with access to existing land uses. Existing traffic patterns would not change since existing roadway connections to and from lands along the rail alignment would be maintained.

Table F-3.1-1 above summarizes the compatibility of the Preferred Alternative with existing adjacent land uses. **Table F-3.1-1** distinguishes the compatibility of the rail alignment and associated utility corridors and the compatibility of the station and maintenance facilities of the Preferred Alternative.

Between Victorville and Barstow, the Preferred Alternative rail alignment would have medium to high compatibility with adjacent land uses since the area is mostly undeveloped.

[9] John Schatz, San Bernardino County Planning Department. Personal Communication, July 2007.

[10] Bob Klein, Clark County Planning Department. Personal Communication, July 2007.

Through Barstow, the Preferred Alternative rail alignment would result in high compatibility with industrial land uses, medium compatibility with the adjacent commercial uses, and low compatibility with the residential land uses due to its proximity to the existing urban development north of the Interstate 15 (I-15) freeway.

Between Barstow and Sloan, the rail alignment would have high compatibility with most adjacent land uses as the majority of these lands are undeveloped. The Preferred Alternative would be in close proximity to clusters of commercial, industrial, and residential developments near Yermo, Baker, Primm, and Jean. The rail alignment would have high compatibility with industrial developments, medium compatibility with the commercial developments, and low compatibility with nearby existing residential uses.

From Sloan to the Las Vegas Station (Las Vegas Southern Station or Central Station B) terminus, the Preferred Alternative rail alignment would have high compatibility near the industrial and undeveloped areas, medium compatibility with nearby commercial developments, and low compatibility with nearby residential areas.

Within Las Vegas, the Preferred Alternative rail alignment would diverge from the NDOT I-15 ROW in three locations, including between West Sunset Road and West Patrick Lane, between Hacienda Avenue and Tropicana Avenue, and between Tropicana Avenue to St. Harmon Avenue. These portions of the rail alignment would be located to the west of the I-15 freeway within the Clark County ROW on Dean Martin Drive/Industrial Road. This portion of the rail alignment would have high compatibility with the existing industrial developments, medium compatibility with the hotels/casinos and commercial developments, and low compatibility with the nearby residential developments.

Within Las Vegas, the Preferred Alternative rail alignment would be located approximately 2,600 feet west of the property boundary of LAS. According to the CCDOA, the Preferred Alternative rail alignment would cross through the one-engine inoperative zone. According to FAA standards (FAA Order 8260.19D), the proximity and height of the Preferred Alternative rail alignment would conflict with the normal functioning of the existing airport use, whereby the rail alignment would not be in conformance with the certified air carrier one-engine inoperative departure conditions. In other words, even though the proposed rail alignment is approximately ½-mile to the west of the airport property, the proximity and height of the Preferred Alternative rail alignment would introduce a potential obstacle if an airplane were attempting a takeoff with a non-working engine during an emergency situation. According to the airline operators (specifically Southwest Airlines), the height of the proposed Preferred Alternative rail alignment, if not lowered from its currently proposed design height, would require the airlines to substantially reduce air carrier weight loads, either by passenger or fuel load reductions, so that airlines could conform with FAA regulations governing one engine inoperative zone requirements.

The Preferred Alternative would generally have high compatibility with an airport, such as LAS, because they are both transportation-related facilities. However, the Preferred Alternative rail alignment would have medium compatibility with an airport where the rail alignment would cross through the one-engine inoperative zone or an existing or planned Runway Protection Zone. The Preferred Alternative station and maintenance facility site options would not be within a Runway Protection Zone or one-engine inoperative zone for the LAS and would not conflict with an existing airport use and would therefore have high compatibility.

The Preferred Alternative Victorville Station (Victorville Station Site 3 (VV3)) and Operations, Maintenance, and Storage Facility (OMSF) (OMSF Site Option 2, OMSF 2) would not interfere with the normal functioning of adjacent land uses insofar as adjacent lands are undeveloped and vacant, thereby demonstrating high compatibility. The Preferred Alternative Victorville Station would also be located immediately adjacent to access roads for several BLM mining claims located to the north of the site. Access to these dirt roads that extend from Dale Evans Parkway and provide access to the BLM mining claims would be maintained and the Victorville Station would not interfere with the functioning of these mining (industrial) land uses.

Similarly, the Preferred Alterative Las Vegas Maintenance and Storage Facility (MSF) (Wigwam Avenue MSF) would have high compatibility with the surrounding mixture of commercial, industrial, hotel/casino uses, and medium compatibility with the nearby residential land uses near Dean Martin Drive.

The Preferred Alternative Las Vegas Station site options (Southern Station or Central Station B) would have medium to high compatibility with existing land uses. The Las Vegas Southern Station would be located on vacant land surrounded by industrial uses and would therefore have high compatibility with adjacent land uses. The Las Vegas Central Station B would be developed on land in current industrial use and would be surrounded by other industrial uses as well as hotels/motels and nearby residential uses. The Las Vegas Central Station B would have high compatibility with the industrial and hotel/motel developments and medium compatibility with the residential land uses near Dean Martin Drive.

Figure F-3.1-13 shows the BLM Multiple Use Classification areas in relation to the Preferred Alternative. The Preferred Alternative would cross through BLM Multiple Use Class M, L, and C designated lands. As identified in **Table F-3.1-3** above, the Preferred Alternative would have medium compatibility with the BLM Multiple Use Class M designated lands and low compatibility with the BLM Multiple Use Class L and C designated lands. The BLM Multiple Use Class M lands allow for moderate use of lands with a balance of higher intensity uses, such as a high-speed rail, and the protection of public lands. The BLM Multiple Use Class L and C lands allow for more limited uses, with the intention of protecting sensitive resources.

Conflicts with Applicable Land Use Plans

Section 3.1.2.1 of this Final EIS stated that the Preferred Alternative is not subject to local land use plans; however, a discussion of the Preferred Alternatives' consistency with adjacent land use designations in provided herein. Refer to the revised **Figures F-3.1-1** through **F-3.1-5** at the end of this section for an illustration of the land use designations within proximity of the Preferred Alternative. While these figures show all of the Action Alternative components, the Preferred Alternative would be within these same areas and within the same land use designations.

The evaluation of compatibility with land use designations relates to planned land use designations as defined by an adopted land use plan (for example, a general plan, a comprehensive plan, or similar). Land use designations of particular plans define the type and intensity of allowable development for a specific area, thus forming a "blueprint" for future development. Refer to **Section 3.1.1.3** of this Final EIS for a detailed description of compatibility with applicable land use plans.

The land use designations within and adjacent to the Preferred Alternative were classified as having high, medium, or low compatibility with the rail alignment, stations, and maintenance facilities to measure the Preferred Alternatives' potential direct effects on adjacent land uses. **Table F-3.1-3** above shows the classification of land use designation compatibility.

The Preferred Alternative rail alignment would have high compatibility with the Institutional land use designations and low compatibility with the Residential land use designations between Victorville and Barstow.

Through Barstow, the Preferred Alternative rail alignment would have high compatibility with Institutional, medium compatibility with Commercial land use designations, and low compatibility with Residential land use designations. While the Preferred Alternative would intensify the use of the I-15 freeway corridor as a transportation corridor near Residential land use designations, the I-15 freeway already presents a major transportation corridor through central Barstow near these lands. Notably, the selection of the Segment 2C rail alignment option as part of the Preferred Alternative would avoid potential conflicts associated with Segments 2A/2B, which would traverse lands designated for Residential, Commercial, and Industrial uses that are not adjacent to existing transportation facilities. Segments 2A/2B are not part of the Preferred Alternative.

The Preferred Alternative rail alignment would be located to the east of the proposed residential (P&V Enterprise Development project) and commercial/industrial (Barstow Industrial Park and Walmart Distribution Center) developments within the western portion of Barstow and conflicts with these land use plans would be avoided. As stated above, inclusion of Segment 2C as part of the Preferred Alternative would avoid conflicts to these developments associated with Segments 2A/2B, as Segment 2C would be located within the existing I-15 freeway corridor.

The Preferred Alternative rail alignment would have high compatibility with the Institutional and Industrial/Manufacturing land use designations, medium compatibility with Commercial land use designations, and low compatibility with Residential land use designations between Barstow and the California/Nevada state line.

The Preferred Alternative rail alignment would have high compatibility with Public Facility, Institutional, and Industrial/Manufacturing land use designations, medium compatibility with the Commercial land use designations, and low compatibility with the Open Space land use designations between the California/Nevada state line and Sloan.

The Preferred Alternative rail alignment would have high compatibility with Public Facility and Industrial/Manufacturing land use designations, medium compatibility with Commercial, Planned Development/Mixed Use, and Administrative/Professional land use designations, and low compatibility with Residential and Open Space land use designations between Sloan and Las Vegas.

The Preferred Alternative Victorville Station and OMSF would have high compatibility with the Institutional/Manufacturing land use designations and low compatibility with nearby Residential land use designations. However, there are no residential developments within close proximity to the Preferred Alternative Victorville Station and OMSF; the nearest residential development is located approximately one mile to the east.

The Preferred Alternative Las Vegas Station site options would have varying levels of compatibility with land use plans. The Las Vegas Southern Station would have high compatibility with the Industrial/Manufacturing and Commercial land use designations. The Las Vegas Central Station B would also have high compatibility with the Industrial/Manufacturing and Commercial land use designations, and would have medium compatibility with nearby Residential land use designations.

The Preferred Alternative Las Vegas MSF (Wigwam Avenue MSF) would have high compatibility with the Industrial/Manufacturing and Administrative and Professional land use designations and medium compatibility with the nearby Residential land use designations west of the MSF site.

Section 3.1.2.3 of this Final EIS states that the San Bernardino County land use designations and zoning districts would allow for implementation of the Preferred Alternative because it is a transportation facility that will be available to the public and the Clark County Comprehensive Plan would not limit the construction or implementation of the Preferred Alternative.

Cause Displacement of a Significant Number of Local Residents

The Preferred Alternative rail alignment would not displace any housing and would therefore not displace any local residents. The Preferred Alternative rail alignment would primarily be located within the existing I-15 freeway corridor and would not traverse through existing residential developments. Where the Preferred Alternative rail alignment would diverge from the I-15 freeway corridor, such as in areas north of Yermo

and Mountain Pass, there are no existing residential developments and no residents would be displaced. The Preferred Alternative rail alignment would also diverge from the I-15 freeway corridor in metropolitan Las Vegas. The rail alignment would be located within an existing Clark County ROW and would traverse through the median of Dean Martin Drive/Industrial Road. Thus, the rail alignment would remain within an existing transportation facility and no residences would be affected.

The Applicant may acquire vacant lands designated for Residential use for the Preferred Alternative rail alignment ROW; however, this acquisition would not require the demolition of existing homes or the displacement of any existing residents.

Neither the Preferred Alternative Victorville Station nor the Victorville OMSF would result in the displacement of commercial, industrial, or residential uses.

The Preferred Alternative Las Vegas Station site options would result in different effects relative to displacement. The Las Vegas Southern Station would be developed on land that is currently vacant and thus would not result in the displacement of any existing use. The Las Vegas Central Station B would, however, displace existing industrial uses on the site, including staging and storage areas and a large warehouse with an indoor "kart" racing facility.

The Preferred Alternative Las Vegas MSF would result in the displacement of two businesses: the Southwest Rock and Landscape business (3020 West Wigwam Avenue) and the Little Baja Garden and Design business (3033 West Ford Avenue).

Disrupt of Sever Community Interactions or Otherwise Divide an Established Community

The Preferred Alternative rail alignment would not sever any established communities as it would be designed as fully grade separated and would be located primarily within the existing I-15 freeway corridor. The Preferred Alternative rail alignment would cross over or under existing roads and highways allowing existing connections within communities to remain unchanged. The majority of the Preferred Alternative rail alignment would not contribute to further severance of the communities or otherwise disrupt community interactions since the I-15 freeway corridor already creates an existing linear division. The Preferred Alternative rail alignment would not result in community severance in areas where the rail alignment would diverge from the existing I-15 freeway corridor, such as north of Yermo and Mountain Pass and within the metropolitan Las Vegas area. Where the Preferred Alternative rail alignment would diverge from the I-15 freeway corridor in the metropolitan Las Vegas area, the rail alignment would remain immediately adjacent to the existing I-15 freeway corridor within the existing Dean Martin Drive/Industrial Road transportation corridor. Access across the I-15 freeway and Dean Martin Drive/Industrial Road would be maintained in this urbanized area and no disruptions to community interactions would occur. Overall, the rail alignment would remain grade separated and would not disrupt any existing roadways or community access points. If the Southern

Station is selected as the Las Vegas Station, approximately 1.8 miles of this elevated trackway between Russell Road and Aldebaran Avenue would not be constructed, further reducing the extent of any potential severance.

The Preferred Alternative rail alignment would pass through the cities/communities of Lenwood, Barstow, Yermo, Baker, Sloan, and Las Vegas. A discussion of the community interaction effects to each of these cities/communities is provided below.

- ***Lenwood:*** The Preferred Alternative would pass through Lenwood within the existing I-15 ROW, on the north and west sides of the existing I-15 freeway lanes. As such, the Preferred Alternative would not introduce a new linear division and the existing connections within the community of Lenwood would remain and community interaction would be unchanged.
- ***Barstow:*** The City of Barstow is already divided by the I-15 freeway corridor. Several local roadways span over the I-15 freeway. Because the Preferred Alternative would be located within the I-15 ROW and involve no changes to local roadways, it would not contribute to further severance of the community or otherwise disrupt community interactions. Further, the Preferred Alternative rail alignment would not trespass into existing residential streets or developed residential lands; thus, the Preferred Alternative would not interfere with community intersections through Barstow.
- ***Yermo:*** The Preferred Alternative would create a divisional element in the community of Yermo, as the rail alignment would be outside of the I-15 freeway corridor to the north. However, as a grade separated rail alignment, the Preferred Alternative would cross over the two main roads in Yermo– Ghost Town Road and Calico Road – and connectivity along these roads would be maintained.
- ***Baker and Sloan:*** Through Baker and Sloan, the Preferred Alternative rail alignment would be located within the existing I-15 freeway ROW. As such, the Preferred Alternative would not introduce a new linear division and the existing connections within these communities would remain and community interaction would be unchanged. Further, the Preferred Alternative rail alignment would not encroach into existing residential streets or developed residential lands; thus, the Preferred Alternative would not interfere with community intersections through Baker and Sloan.

  The Baker MOW would be developed on vacant lands and would not place a barrier or built feature between existing groups of homes and/or businesses. The Baker MOW would also not disrupt access on the adjacent local roadways. Thus, no adverse effects related to existing communities would occur as a result of the Baker MOW.

- ***Las Vegas:*** Through Las Vegas, the Preferred Alternative rail alignment would be located primarily within the existing I-15 freeway ROW. As such, the Preferred Alternative would not introduce a new linear division and the existing connections within these communities would remain and community interaction would be unchanged.

  The Preferred Alternative rail alignment would diverge from the I-15 freeway corridor in metropolitan Las Vegas. If the Southern Station is selected as the terminus, the divergence would be limited to the area between West Sunset Road and West Patrick Lane only. If, however, Central Station B is selected, a second additional area of divergence would occur between West Hacienda Avenue and West Tropicana Avenue. In both circumstances, the (elevated) rail alignment would shift into the median of Dean Martin Drive/Industrial Road to the west of the I-15 freeway, which is within an existing Clark County ROW. The rail alignment would remain within an existing transportation corridor; the elevation of the trackway will ensure that access to existing roadways and properties would be maintained. Therefore, no severance of an existing community would occur.

The Preferred Alternative Victorville Station and OMSF would be located north of the developed area in Victorville, and would therefore not divide an established community.

Neither of the Preferred Alternative Las Vegas Station site options would divide an established community, since both the Southern Station and Central Station B site options would be located in highly developed areas near other large developments. Similarly, the Preferred Alternative Las Vegas MSF would be located within this same urbanized context in the metropolitan Las Vegas Area and would not divide an established community. The Preferred Alternative Las Vegas Station site options and the Las Vegas MSF would not block any existing transportation features or fall between groups of residential uses in an existing neighborhood. While business displacements would occur at the Las Vegas Central Station B site and the Las Vegas MSF site, the existing uses are primarily industrial in nature and it is not anticipated that the removal of the existing industrial uses would divide or sever a community. These uses would be replaced with similar uses, as the Preferred Alternative Las Vegas Central Station B option and the Las Vegas MSF would provide new industrial and maintenance-related uses.

Result in Environmental Effects Disproportionately Borne by a Low Income or Minority Population

The Preferred Alternative rail alignment would cross eight environmental justice communities with disproportionate low income and minority populations. **Figures F-3.1-14** and **F-3.1-15** show the locations of the environmental justice census blocks in relation to the Preferred Alternative. These environmental justice census blocks are located in Victorville, Barstow, between Baker and the California/Nevada state line, and within the Las Vegas metropolitan area. However, existing residential development

within the environmental justice block between Baker and the California/Nevada state line is sparse and is concentrated within Baker and outside of the Preferred Alternative rail alignment area.

The Preferred Alternative rail alignment would not directly affect (through displacement) a minority or low income resident. Residents within qualifying census block groups adjacent to the Preferred Alternative rail alignment are already exposed to substantial transportation infrastructure, such as the I-15 freeway and the associated environmental issues, such as traffic, noise, air quality, and aesthetics. Since the Preferred Alternative rail alignment would generally follow existing transportation infrastructure, the rail alignment would not introduce substantial new effects to environmental justice communities. The Preferred Alternative rail alignment, when taken into consideration with the existing I-15 freeway corridor, would not result in substantial environmental changes for the adjacent environmental justice communities and the communities would generally continue to experience the same environmental effects currently produced by the I-15 freeway transportation corridor.

Operation of the Preferred Alternative could result in negative employment and economic growth effects to Barstow, which could affect a disproportionately low-income and minority community in Barstow.[11] There are 13 minority and poverty environmental justice census block groups within the Barstow area in the vicinity of the Preferred Alternative rail alignment. **Section 3.2.1.3** of this Final EIS details the potential adverse economic impacts. The Preferred Alternative would result in the diversion of I-15 freeway traffic between Victorville and Las Vegas to the high-speed passenger train. The Barstow economy is largely driven by taxable sales from freeway-related traffic and this diversion of these "passby" vehicle trips through Barstow could have an indirect negative growth effect to Barstow's economy. Based on the DesertXpress ridership forecast, it is estimated that annually about two million private automobile passengers and 260,000 bus passengers would instead use the Preferred Alternative.

Over time, the share of Barstow's economy affected by the Preferred Alternative could slowly grow since ridership is expected to increase over time. The Barstow economy could experience a gradual reduction in economic activity, jobs, and income, with an average annual loss during operation.[12] This reduction in economic growth from the freeway-traffic diversion would result in a loss to Barstow's economic base of funds, which could disproportionately affect minority and low-income communities during operation of the Preferred Alternative. **Table F-3.1-4** summarizes the anticipated long-term negative

[11] The Draft EIS identified year 2013 as the opening year for the DesertXpress project. Since construction of the Preferred Alternative would take three- to four-years, the exact opening year of the Preferred Alternative is not determined at this time. The Preferred Alternative is assumed to begin operations three to four years after commencing construction.

[12] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

economic growth effects on Barstow as a result of operation of the high-speed passenger train. The reduction in economic activity could also result in reduced employment opportunities in Barstow. Operation of the Preferred Alternative would result in the loss of about 542 jobs by the 3rd year of operation and up to 676 by the 18th year of operation.[13] The loss of jobs could adversely affect the Barstow economy, including the 13 environmental justice communities within the Barstow area.

While operation of the Preferred Alternative could result in negative economic effects to an environmental justice community, construction of the Preferred Alternative could result in a temporary increase in employment and associated salaries. **Section 3.2.1.3** of this Final EIS also describes the beneficial employment and economic growth effects during construction of the Preferred Alternative. Within San Bernardino County, Barstow would be the most central city for construction of the Preferred Alternative, particularly for the 113-mile stretch of the rail alignment between Barstow and Primm. It is assumed that a disproportionate share of the construction jobs and associated revenue created by the Preferred Alternative in San Bernardino County would flow into Barstow and its immediate environs. Construction of the Preferred Alternative could result in about 2,470 direct jobs in Barstow during the three- to four-year construction period. This would represent an annual average of 823 direct jobs per year, resulting in an eight percent increase in employment over the 2009 employment level of 10,463.[14] These 2,470 direct jobs are anticipated to generate an average payroll (combination of salaries) of $59.5 million over the course of the construction period.[15] While the construction jobs would be temporary during the construction phase, the introduction of the new direct jobs and associated salaries could have a temporary positive effect on the City's employment rate and economic vitality, and could have a temporary positive economic effect on Barstow, which is an environmental justice community.

Based on the analysis presented in the Barstow study, the economic and employment effects would not result in urban decay, a process whereby a previously functioning city falls into disrepair or become decrepit.[16] Since the Preferred Alternative would not result in urban decay or other interrelated physical environmental effects as a result of the negative effects on Barstow's economy, this economic effect in not considered adverse and thus would not constitute an adverse economic effect to the existing environmental justice communities in the Barstow area.

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[13] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[14] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[15] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[16] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

The Baker Maintenance of Way (MOW) would be located within the same environmental justice census block crossed by the Preferred Alternative rail alignment. The Baker MOW would be developed on vacant land and would not displace any residents. The Baker MOW would be limited to a 2.4 acre site and would employ up to eight employees. With the use of the Electric Multiple Unit (EMU) train technology as part of the Preferred Alternative, the high-speed trains would not result in excessive diesel idling at this location. Thus, the Baker MOW would not introduce adverse effects to the environmental justice community.

The Preferred Alternative Victorville Station would be located within two census blocks meeting the minority and low-income population criteria for evaluation of environmental justice effects. The Preferred Alternative rail alignment near Victorville (Segment 1) would also cross these same two environmental justice census blocks. The Preferred Alternative Victorville Station would be located in a portion of these census blocks that is currently undeveloped. There are no residences or community facilities within one mile of the Preferred Alternative Victorville Station site. Thus, the Victorville Station site would not present potential direct or indirect adverse effects to environmental justice communities.

The Preferred Alternative Victorville OMSF would not be located within an environmental justice census block.

The Preferred Alternative Las Vegas MSF would not be located within an environmental justice census block.

The Preferred Alternative Las Vegas Station site options would have varying effects to environmental justice communities. The Preferred Alternative Las Vegas Southern Station site option would not be located within an environmental justice census block but would be within one mile of three such qualifying census blocks. The closest environmental justice census block is located across the I-15 freeway to the east. The existing transportation corridor separates this environmental justice census block from the Las Vegas Southern Station site. Potential environmental effects associated with the Las Vegas Southern Station, such as noise, dust during construction, or visual effects, would be minimal to non-existent because of the intervening multi-lane transportation corridor. The other two nearby environmental justice census blocks are located to the west, with intervening urban development creating a barrier between the Las Vegas Southern Station site option and such communities. This intervening urban development would provide a barrier and reduce potential effects of the station to the disproportionate low-income and minority populations to the west. Therefore, the Las Vegas Southern Station would not result in a direct or indirect impact on an environmental justice community.

The Preferred Alternative Las Vegas Central Station B site option would be located within one environmental justice census block with a qualifying minority population. The Preferred Alternative rail alignment would also cross this same census block. Residential

uses are within approximately 300 feet of the Preferred Alternative Las Vegas Central Station B site option and the residents could be exposed to air quality, traffic, and noise impacts associated with the station. Residents in this area are already exposed to noise and air quality impacts from the I-15 freeway and the Preferred Alternative Las Vegas Central Station B site option would not result in a significant permanent noise or air quality effect on surrounding land uses.

As discussed in **Section 3.5, Traffic and Transportation**, of this Final EIS, adverse traffic effects would be mitigated. **Section 3.12, Noise and Vibration**, and **Section 3.11, Air Quality and Global Climate Change**, of this Final EIS also includes mitigation that would reduce adverse noise and air quality effects. With implementation of these mitigation measures, the adverse effects to environmental justice communities would be reduced; the Preferred Alternative would not result in disproportionate effects to such communities.

3.1.2.4 Comparison with Other Action Alternatives

Table F-3.1-5 below compares the land use and community impacts of the various Action Alternatives evaluated, as well as the No Action Alternative. Components of the Preferred Alternative are highlighted in yellow.

Interference with Normal Functioning of Adjacent Land Uses

The Preferred Alternative rail alignment would primarily implement the Action Alternative B rail alignment, in which the rail alignment would be located within the existing I-15 freeway ROW. The Segment 1 and Segment 3 Action Alternative B rail alignments would be located immediately adjacent to the I-15 freeway travel lanes, while the Segment 2, Segment 5, and Segment 6 Action Alternative B rail alignments would be located at the furthest edge of the existing I-15 ROW.

None of the Action Alternative A rail alignment options, in which the rail alignment would be located primarily in the median of the I-15 freeway, are part of the Preferred Alternative.

The Preferred Alternative rail alignment would be in closer proximity to adjacent land uses on the west or northern side of the I-15 freeway corridor relative to median options, since the Preferred Alternative rail alignment would be primarily adjacent to the western or northern edge of the existing I-15 freeway travel lanes. The majority of the Preferred Alternative rail alignment would be located at a greater distance from the adjacent land uses on the east or southern sides of the I-15 freeway corridor than would the median options.

Table F-3.1-5 Alternatives Comparison – Land Use and Community Impacts

Alternative	Compatibility with Adjacent Land Uses	Compatibility with Land Use Plans	Number of Housing Units Displaced	Extent of Community Disruption/Severance	Number of Environmental Justice (EJ) Communities Crossed by or Within One Mile of Facilities
No Action Alternative	High	High	Unknown	None Expected	Assumed Similar to Action Alternatives
Alignment Routings, including Temporary Construction Areas (TCAs) and Alignment Adjustment Areas					
Segment 1 Routing					
Segment 1	High	High	0	None Expected	Cross 2 EJ census blocks
Segment 2					
Segment 2A/2B, 2A	Low-High	Low-High	0	Linear division through Lenwood and Yermo	Within 1 mile of 4 EJ census blocks
Segment 2A/2B, 2B	Low-High	Medium-High	0	Linear division through Lenwood	Within 1 mile of 4 EJ census blocks
Segment 2C	Low-High	Medium-High	0	None Expected	Cross 2 EJ census blocks
Segment 3					
Segment 3A	Low-High	Low-High	0	None Expected	Cross 3 EJ census blocks
Segment 3B	Low-High	Low-High	0	None Expected	Cross 3 EJ census blocks
Segment 4					
Segment 4A	Low within Mojave National Preserve	Low-High	0	None Expected	Cross 2 EJ census blocks
Segment 4B	Low	Medium-High	0	None Expected	Cross 1 EJ census block
Segment 4C	Low-High	Medium-High	0	None Expected	Cross 1 EJ census block

Alternative	Compatibility with Adjacent Land Uses	Compatibility with Land Use Plans	Number of Housing Units Displaced	Extent of Community Disruption/Severance	Number of Environmental Justice (EJ) Communities Crossed by or Within One Mile of Facilities
Segment 5					
Segment 5A	High	Low-High	0	None Expected	Outside any EJ census block
Segment 5B	High	Low-High	0	None Expected	Outside any EJ census block
Segment 6					
Segment 6A	Low-High	Low-High	0	None Expected	Cross 4 EJ census blocks
Segment 6B	Low-High	Low-High	0	None Expected	Cross 4 EJ census blocks
Segment 6C	Low-High	Low-High	0	None Expected	Cross 2 EJ census blocks
Segment 7					
Segment 7A	Low-High	High	0	None Expected	Cross 6 EJ census blocks
Segment 7B	Low-High	High	0	None Expected	Cross 6 EJ census blocks
Segment 7C	Low-High	Low-High	0	None Expected	Cross 7 EJ census blocks
Victorville Station and Maintenance Facility Site Options					
Victorville Station Site 1	Medium	Medium-High	0	None Expected	Within 2 EJ census blocks
Victorville Station Site 2	High	Medium-High	0	None Expected	Within 1 mile of 2 EJ census blocks
Victorville Station Site 3	High	Medium-High	0	None Expected	Within 2 EJ census blocks
Victorville OMSF 1	Medium	Medium-High	0	None Expected	Within 1 EJ census block
Victorville OMSF 2	High	Medium-High	0	None Expected	Within 1 mile of 1 EJ census block

Alternative	Compatibility with Adjacent Land Uses	Compatibility with Land Use Plans	Number of Housing Units Displaced	Extent of Community Disruption/Severance	Number of Environmental Justice (EJ) Communities Crossed by or Within One Mile of Facilities
Las Vegas Area Station and Maintenance Facility Site Options					
Las Vegas Southern Station	High	High	0	None Expected	Within 1 mile of 3 EJ census blocks
Las Vegas Central Station A	High	High	0	None Expected	Within 1 mile of 9 EJ census blocks
Las Vegas Central Station B	Medium-High	Medium-High	0	None Expected	Within 1 EJ census block
Las Vegas Downtown Station	Medium-High	High	0	None Expected	Within 2 EJ census block
Sloan Road MSF[17]	High	Low	0	None Expected	Outside any EJ census block
Relocated Sloan MSF	High	Low	0	None Expected	Outside any EJ census block
Wigwam Avenue MSF	Medium-High	Medium-High	0	None Expected	Outside any EJ census block
Robindale Avenue MSF	Medium	Medium-High	1	None Expected	Outside any EJ census block
Frias Substation	Medium-High	Medium-High	0	None Expected	Outside any EJ census block
Other Facility					
Baker Maintenance of Way Facility	High	Medium-High	0	None Expected	Within 1 EJ census block
Technology Options					
DEMU (Diesel-Electric Multiple Unit)	N/A	N/A	0	N/A	N/A
EMU (Electric Multiple Unit)	N/A	N/A	0	N/A	N/A

Source: CirclePoint, 2011.

[17] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Overall, the Action Alternative A rail alignments would create less of a conflict with existing land uses immediately adjacent to the I-15 freeway than the Preferred Alternative. Since Action Alternative A would develop a high-speed rail through the middle of an existing freeway (an intensification of the existing transportation use), it would generally not conflict with immediately adjacent land uses. The Preferred Alternative would be adjacent to the freeway and one side of the rail alignment would be adjacent to land with another, potentially contrasting, land use designation.

Conversely, the Action Alternative A rail alignments would create a greater conflict with future expanded uses of the I-15 freeway, including widening of the I-15 freeway. The Federal Highway Administration (FHWA) has indicated that the use and maintenance of median rail alignments would introduce greater potential for conflict with the I-15 freeway corridor than would be Action Alternative B rail alignments that would be located adjacent to the existing I-15 freeway travel lanes.

The Preferred Alternative Segment 4 rail alignment (Segment 4C) would avoid intrusion into the Mojave National Preserve, as would Segment 4B. Segment 4A would traverse through a portion of the Mojave National Preserve. However, all Segment 4 rail alignment options would result in low compatibility with the BLM Multiple Use Class M and L lands.

The Preferred Alternative Victorville Station and OMSF would have greater compatibility with adjacent land uses than Victorville Station Site 1 (VV1) and Operations, maintenance, and Storage Facility Site 1 (OMSF 1) and similar compatibility as Victorville Station Site 2 (VV2). VV1 and OMSF 1 would be located near a residential neighborhood, and would therefore have medium compatibility with adjacent land uses, rather than the high compatibility of the Preferred Alternative Victorville Station and VV2 with the adjacent undeveloped and vacant lands.

The Las Vegas Southern Station site option would have high compatibility with the adjacent industrial uses, where as the Las Vegas Central Station B site option would have medium to high compatibility with the residential land uses and industrial and hotel/motel developments, respectively. The Southern Station site option would have compatibility similar to Central Station A; the Central Station B site option would have compatibility similar to the Downtown Station. The Preferred Alternative Las Vegas Southern Station and Las Vegas Central Station A would have the greatest compatibility with existing industrial/manufacturing and commercial land uses. The Preferred Alternative Las Vegas Southern Station and Las Vegas Central Station A would have high compatibility with industrial/manufacturing and commercial land uses since the facilities would be similar to the types of development allowed under these land use designations.

The Preferred Alternative Las Vegas MSF would be more compatible with existing land uses than the Robindale Avenue MSF but less compatible than the Sloan Road MSF and Relocated Sloan MSF. The Preferred Alternative Las Vegas MSF would have high compatibility with the industrial land uses and medium compatibility with the residential

land uses, where as the Robindale Avenue MSF would only have medium compatibility with the residential land uses. The Sloan Road MSF and Relocated Sloan MSF would have high compatibility with the undeveloped and vacant lands.

Conflicts with Applicable Land Use Plans

The Preferred Alternative Segment 2C rail alignment would avoid potential conflicts associated with Segment 2A/2B which would traverse lands designated by the City of Barstow for future residential and industrial development since Segment 2C would follow the existing I-15 freeway corridor. Segment 2C would avoid potential conflicts with the P&V Enterprise Development project, the Barstow Industrial Park project, and the Walmart Distribution Center project.

The Preferred Alternative Segment 4C rail alignment would have greater compatibility with land use plans than would Segment 4A and Segment 4B. The Preferred Alternative Segment 4C rail alignment would have high compatibility with the Institutional land use designations, where as Segment 4A would have low compatibility with Residential land use designations west of Mountain Pass along the I-15 freeway corridor. The Preferred Alternative Segment 4C would also avoid potential conflicts associated with Segment 4B which would traverse through the planned Ivanpah Solar Electric Generating System (ISEGS) project site. Refer to **Section 3.16, Cumulative Impacts**, of this Final EIS for additional information related to the ISEGS project..

The Preferred Alternative Victorville Station and OMSF would have similar compatibility with land use plans as would VV1, VV2, and OMSF 1. All of the Victorville station and maintenance facilities would have high compatibility with the Industrial/Manufacturing and Institutional land use designations and medium compatibility with the Residential land use designations.

The Preferred Alternative Las Vegas Southern Station site option would have similarly high compatibility with Industrial/Manufacturing and Commercial land use designations as would the Las Vegas Central Station A and Downtown Station. The Preferred Alternative Las Vegas Central Station B would also have high compatibility with such land use designations, but would also have medium compatibility with nearby Residential land use designations. Therefore, the Preferred Alternative Las Vegas Central Station B would have the lowest compatibility with land use plans as compared to the Las Vegas Station site options.

The Preferred Alternative Las Vegas MSF would have similar compatibility with land use plans as the Robindale Avenue MSF, as both sites would have high compatibility with the Commercial and Administrative and Professional land use designations and medium compatibility with nearby Residential land use designations. The Preferred Alternative Las Vegas MSF would have greater compatibility than the Sloan Road MSF and the Relocated Sloan MSF, which both would have low compatibility with the Open Space land use designations.

Cause Displacement of a Significant Number of Local Residents

The Preferred Alternative Las Vegas MSF would avoid the displacement of a residential use associated with the Robindale Avenue MSF. However, the Preferred Alternative Las Vegas MSF does involve the displacement of two industrial businesses, while the Sloan Road MSF and Relocated Sloan MSF would not result in any residential or business displacements. Thus, the Preferred Alternative Las Vegas MSF would have greater displacement effects than the Sloan Road MSF and Relocated Sloan MSF and lesser displacement effects than the Robindale Avenue MSF.

The Preferred Alternative Las Vegas Central Station B site option would result in the displacement of industrial uses, including a staging and storage area and a large warehouse. Similarly, the Las Vegas Downtown Station would result in the displacement of an industrial use. The Preferred Alternative Las Vegas Southern Station site option and the Las Vegas Central Station A would not result in any commercial, industrial, or residential displacements. Therefore, the Preferred Alternative Southern Station and Las Vegas Central Station A would have lesser effects relative to business displacement than would the Preferred Alternative Central Station B site option and the Las Vegas Downtown Station. None of the Las Vegas Station site options would cause residential displacement.

Disrupt or Sever Community Interactions or Otherwise Divide an Established Community

The Preferred Alternative Segment 2C rail alignment would be located within the I-15 ROW and would not involve any changes to local roadways. The Preferred Alternative Segment 2C rail alignment would avoid potential community disruption associated with Segments 2A/2B, which would create new linear features through Lenwood and Barstow. However, all of the rail alignments would be grade separated and would maintain the existing roadway and community connections.

The other Preferred Alternative components and Action Alternatives would have similar effects related to community disruption and severance.

Result in Environmental Effects Disproportionately Borne by a Low Income or Minority Population

The Preferred Alternative Segment 2C rail alignment would have greater effects on environmental justice populations than would Segments 2A/2B. Segment 2C would cross through two environmental justice census blocks with a disproportionate low income population, which Segments 2A/2B would not be located within any such census blocks.

The Preferred Alternative Segment 4C would have similar effects on environmental justice populations as Segment 4B because it traverses through the same census block. However, development within this census block is sparse and is concentrated well outside the vicinity of the Segment 4 rail alignment options.

The Preferred Alternative Victorville OMSF would not be located within an environmental justice census block with a disproportionate low income or minority population. The Preferred Alternative Victorville OMSF would avoid environmental justice effects associated with OMSF Site Option 1 (OMSF 1), which would be located within an environmental justice census block with a disproportionate low income population.

The Preferred Alternative Victorville Station would be located within one environmental justice census block with disproportionate minority and low-income populations. The Preferred Alternative Victorville Station would have lesser environmental justice effects than would VV1, which would be located within two environmental justice census blocks, and greater effects than VV2, which would not be within such as census block.

The Preferred Alternative Las Vegas Southern Station site option would not be located within an environmental justice census block, similar to the Las Vegas Central Station A. However, both of these station site options would be located within one mile of at least two such qualifying census blocks with disproportionate low-income and minority populations. The Preferred Alternative Las Vegas Central Station B site option would be located within an environmental justice census block with a disproportionate minority population. The Las Vegas Downtown Station would be located within two environmental justice census blocks with both disproportionate low-income and minority populations. Although the Preferred Alternative Southern Station site option and the Las Vegas Central Station A would not be located within an environmental justice census block, all Las Vegas Station site options would be in or within one mile of at least one census block meeting the environmental justice qualifying criteria. Low-income and minority populations could be exposed to air quality, traffic, and noise impacts from the Las Vegas Station site options. Mitigation measures identified in **Section 3.1.3** below would reduce these potentially adverse effects to such populations.

None of the Las Vegas MSF site options would be located within an environmental justice census block.

The other Preferred Alternative components and Action Alternatives would have similar effects related to environmental justice.

3.1.3 Mitigation Measures for the Preferred Alternative

The Preferred Alternative would not result in adverse direct land use effects relative to land use plans or community severance because the Preferred Alternative would be located primarily within existing transportation ROWs or currently undeveloped areas. Small amounts of industrial or commercial displacement would occur with the Las Vegas Central Station B site option and the Las Vegas MSF, but would not result in adverse land use or community effects as the displacement of these uses would not disrupt an existing community or displace residences.

The Preferred Alternative could conflict with designated one-engine inoperative zones and existing and planned Runway Protection Zones associated with airport land uses, such as the LAS. The following mitigation would be required to reduce effects related to the compatibility with the normal functioning of the airport:

Mitigation Measure LU-1: Rail Alignment Design in One-Engine Inoperative Zones at LAS

During the design-build process for the design plans in the vicinity of the LAS, the Applicant shall coordinate with the FAA, CCDOA, and airlines operating at the airport to develop and agree to a rail alignment design that avoids impacts to the one-engine inoperative zones and departure conditions under FAA standards. The Applicant shall provide written verification of the agreement with the FAA, CCDOA, and associated airlines prior to approval of project designs in this location.

Mitigation Measure LU-2: Rail Alignment Design in Existing and Planned Runway Protection Zones

During the design-build process, the Applicant shall coordinate with the FAA regarding any existing and planned airport uses and established Runway Protection Zones. The Applicant shall obtain a Part 77 determination from the FAA to confirm that the project does not present a hazard to air navigation.

Potential indirect land uses effects and adverse effects on environmental justice populations would be mitigated through measures specified in other environmental topic sections of **Chapter 3.0, Introduction,** of this Final EIS, including **Section 3.4, Utilities/Emergency Services**; **Section 3.5, Traffic and Transportation**; **Section 3.6, Visual Resources**; **Section 3.11, Air Quality and Global Climate Change**; and **Section 3.12, Noise and Vibration**.

Measures identified in these sections of the Draft EIS that would apply to the Preferred Alternative include:

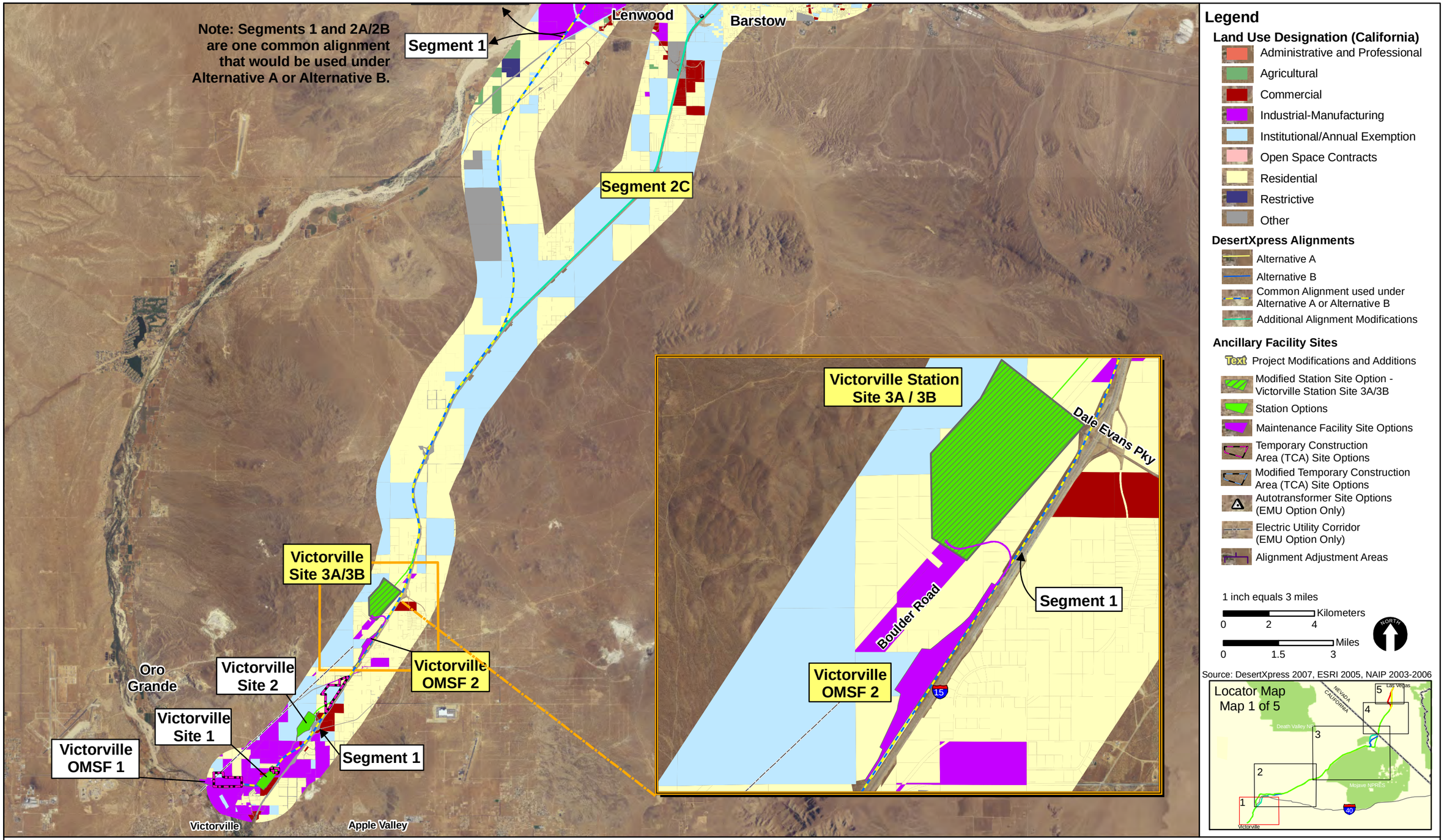
- **Section 3.4.5, Utilities/Emergency Services:** Avoidance or minimization of conflict with existing utility infrastructure (including coordination with existing utility providers).
- **Section 3.5.5, Traffic and Transportation:** The addition of signalization and/or lanes to the intersection approaches.
- **Section 3.6.5, Visual Resources:** Use of aesthetically pleasing materials for the rail alignment that minimize reflectivity, use of architecture and colors and the Victorville Station that reflect the surrounding desert landscape, design or signage at the Victorville Station to reflect the scale and character of the site and

surroundings, use of contour grading, orderly construction site management, minimization of light spillover during construction, and use of visual screening construction areas as appropriate.

- **Section 3.11.5, Air Quality and Global Climate Change:** Use of best management dust control practices to minimize air quality impacts during construction.
- **Section 3.12.7, Noise and Vibration:** Installation of noise barriers, use of sound and vibration reducing materials, relocation of crossovers or special track work, property acquisitions, limited construction times, limited locations of construction related activities, and use of sounds-reducing construction equipment.

3.1.4 Residual Impacts Following Mitigation

The incorporation of the mitigation measures would mitigate permanent effects related to project construction and operation. While the majority of the Preferred Alternative would be located within the existing I-15 freeway corridor, portions of the Preferred Alternative rail alignment north of Yermo and Mountain Pass would result in the permanent conversion of lands to transportation use. The portion of the Preferred Alternative rail alignment that would divert from the I-15 freeway corridor in metropolitan Las Vegas would already be located within an existing Clark County ROW intended for transportation use. The areas intended for the Preferred Alternative station and maintenance facilities would also result in the permanent conversion of lands to transportation uses, even with implementation of the above mitigation measures.



U.S. Department of Transportation Federal Railroad Administration

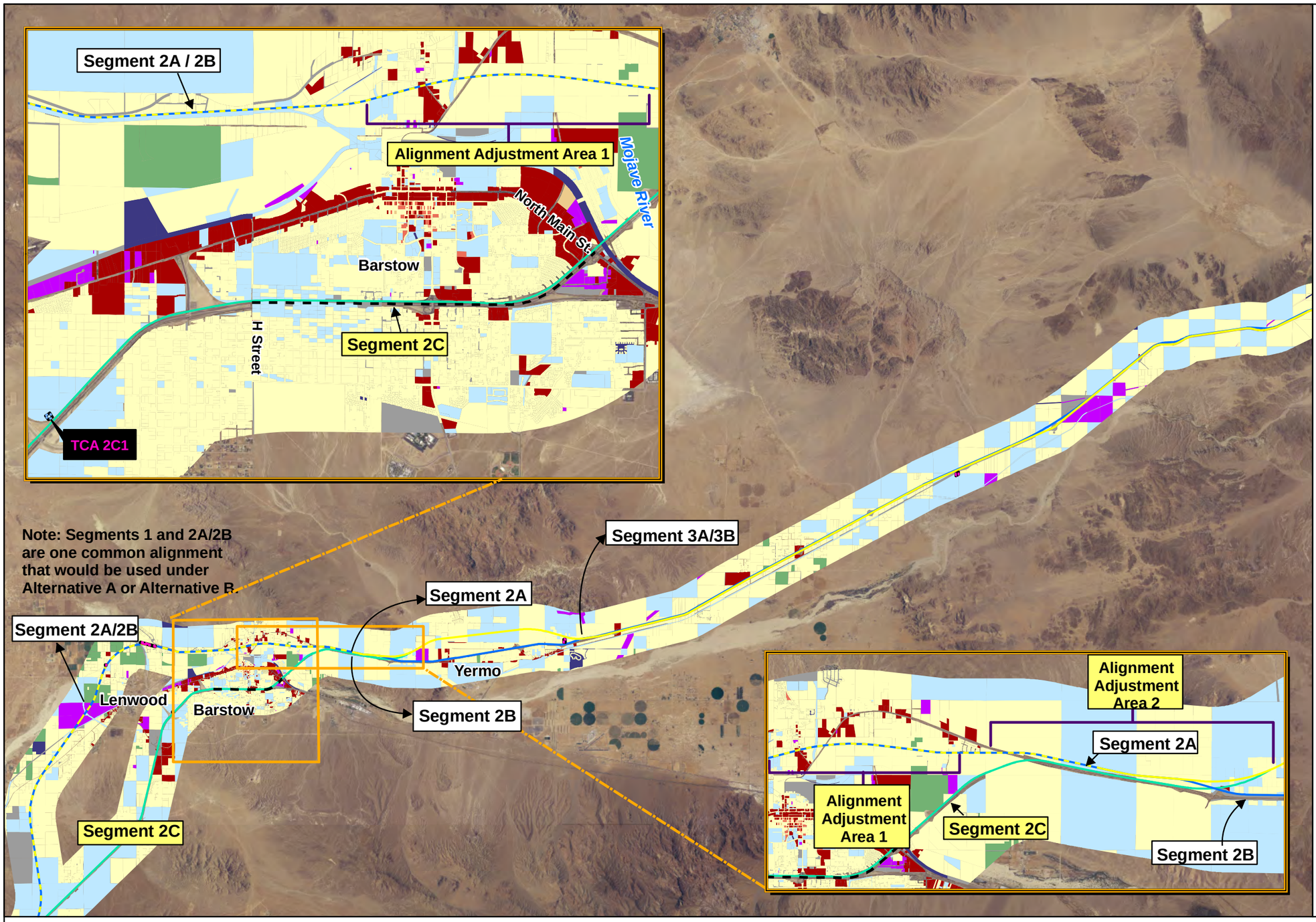
DesertXpress
Final EIS

Revision of Supplemental Draft EIS Figure S-3.1-6: Land Use/Zoning Designation (1)

FIG **F-3.1-1**

Geografika Consulting 01.25.11

* This figure, originally in the Supplemental Draft EIS, has been revised to show the industrial land use designations associated with planned industrial developments in western Barstow.



Legend

Land Use Designation (California)

- Administrative and Professional
- Agricultural
- Commercial
- Industrial-Manufacturing
- Institutional/Annual Exemption
- Open Space Contracts
- Residential
- Restrictive
- Other

DesertXpress Alignments

- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

Ancillary Facility Sites

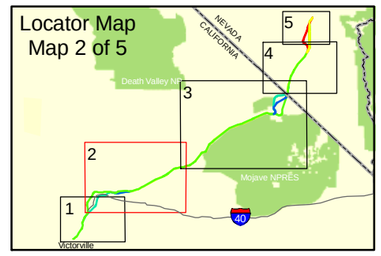
- Text — Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)
- Alignment Adjustment Areas

1 inch equals 4 miles

NORTH

0 4 8 Miles

Source: CirclePoint 2008, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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Federal Railroad Administration

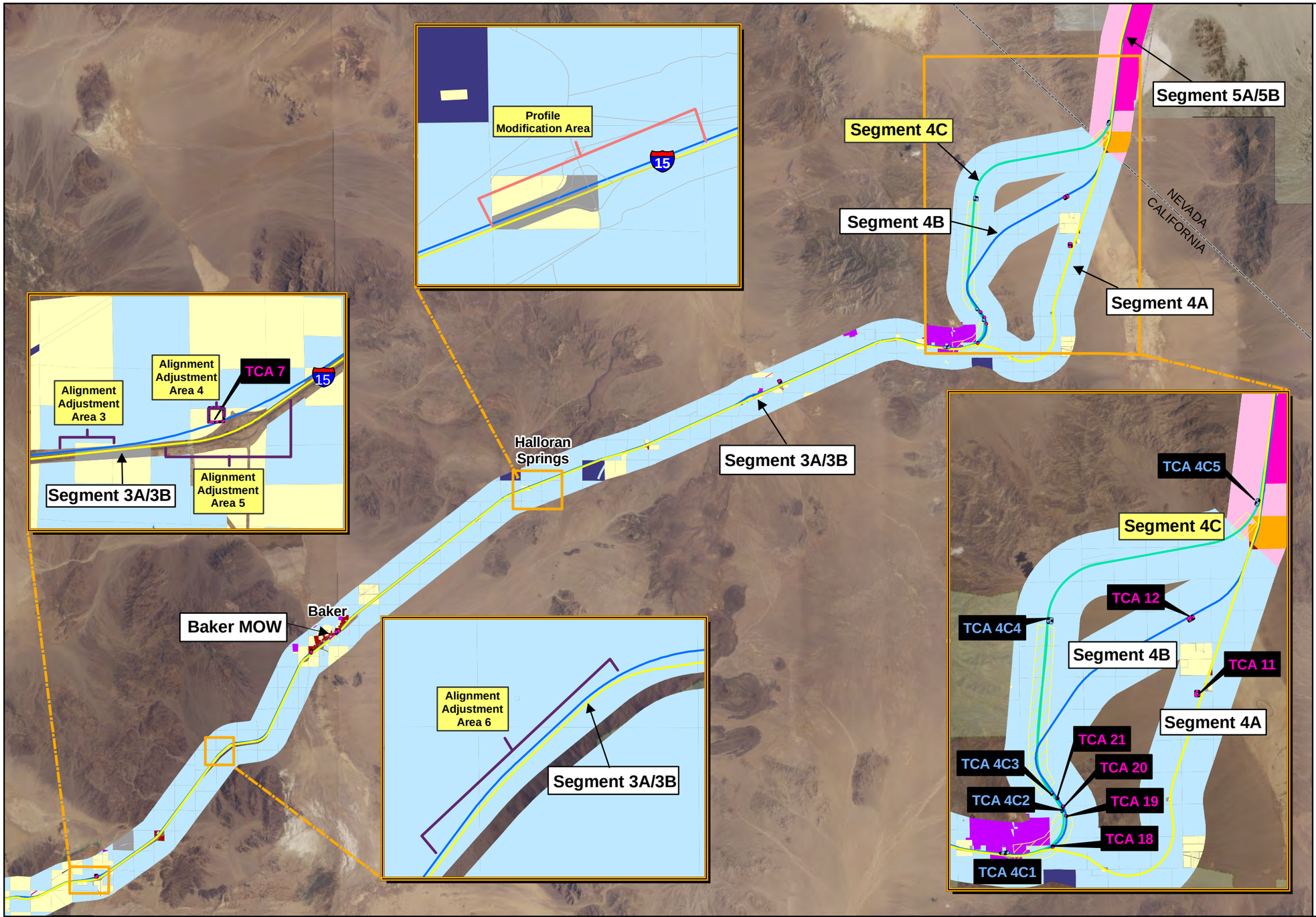
DesertXpress
Final EIS

Revision of Supplemental Draft EIS Figure S-3.1-7: Land Use/Zoning Designation (2)

FIG F-3.1-2

Geografika Consulting 01.25.11

*This figure, originally in the Supplemental Draft EIS, has been revised to show the industrial land use designations associated with planned industrial developments in western Barstow.



Legend

Land Use Designation (California)

- Administrative and Professional
- Agricultural
- Commercial
- Desert and Mountain
- Industrial-Manufacturing
- Institutional/Annual Exemption
- Open Space
- Residential
- Restrictive
- Other

Land Use Designation (Nevada)

- Planned Development/Mixed Use
- Public Facilities
- Residential

DesertXpress Alignments

- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

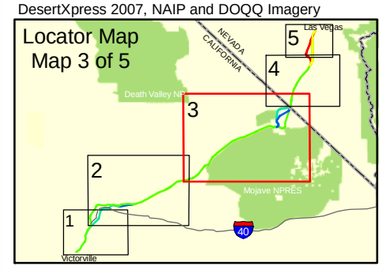
Ancillary Facility Sites

- Text — Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)
- Alignment Adjustment Areas
- Tunnels

1 inch equals 4 miles

0 4 8 Miles

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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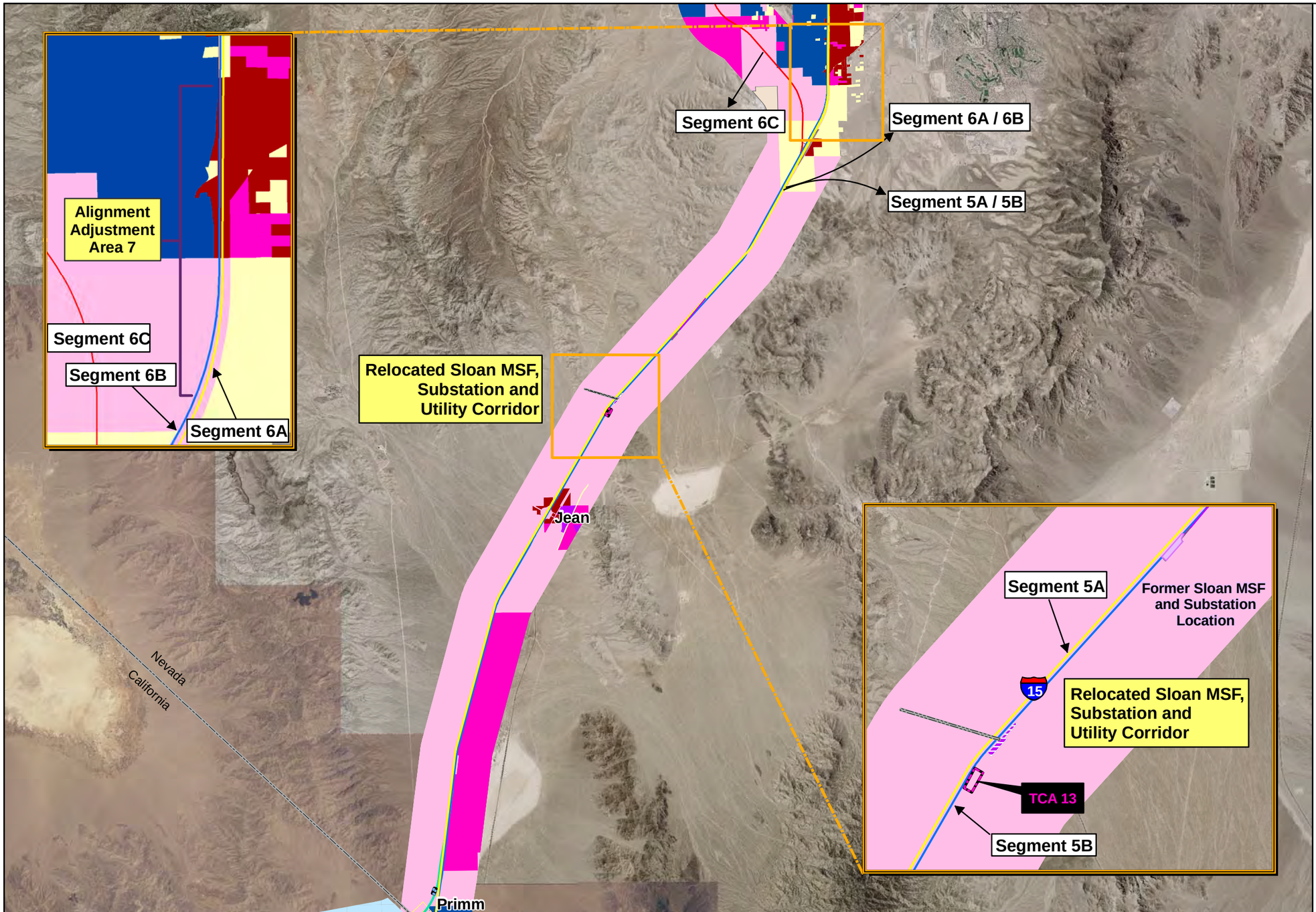
DesertXpress Final EIS

Revision of Supplemental Draft EIS Figure S-3-1-8: Land Use / Zoning Designation (3)

FIG F-3.1-3

* This figure, originally in the Supplemental Draft EIS, has been revised to reflect the most current land use designations in Nevada, as defined in the Clark County, South County Land Use Plan.



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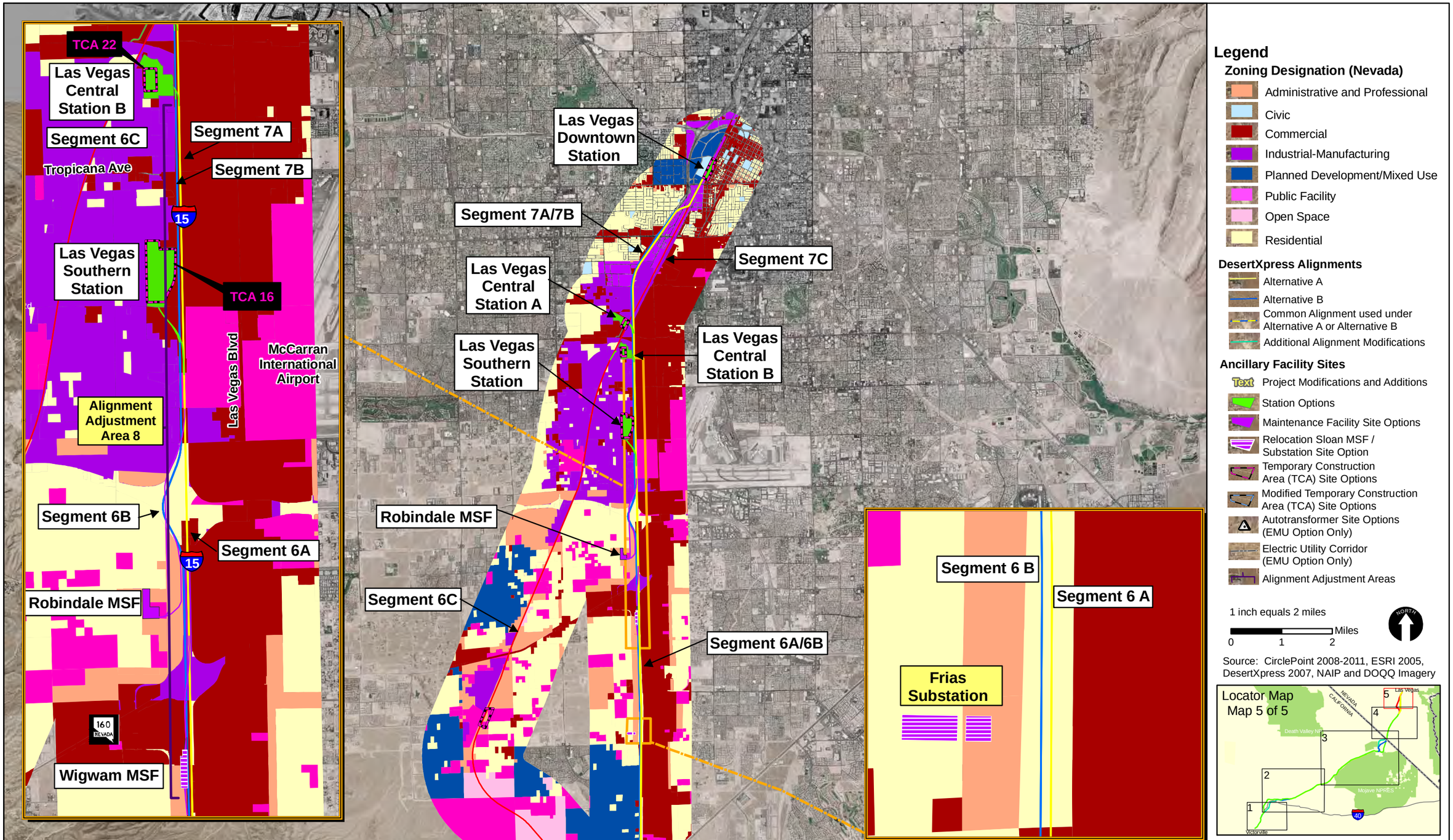
Federal Railroad Administration

DesertXpress
Final EIS

Revision of Supplemental Draft EIS Figure S-3.1-9:
Land Use / Zoning Designation (4)

FIG **F-3.1-4**

* This figure, originally in the Supplemental Draft EIS, has been revised to reflect the most current land use designations in Nevada, as defined in the Clark County, South County Land Use Plan and the Enterprise Land Use Plan.



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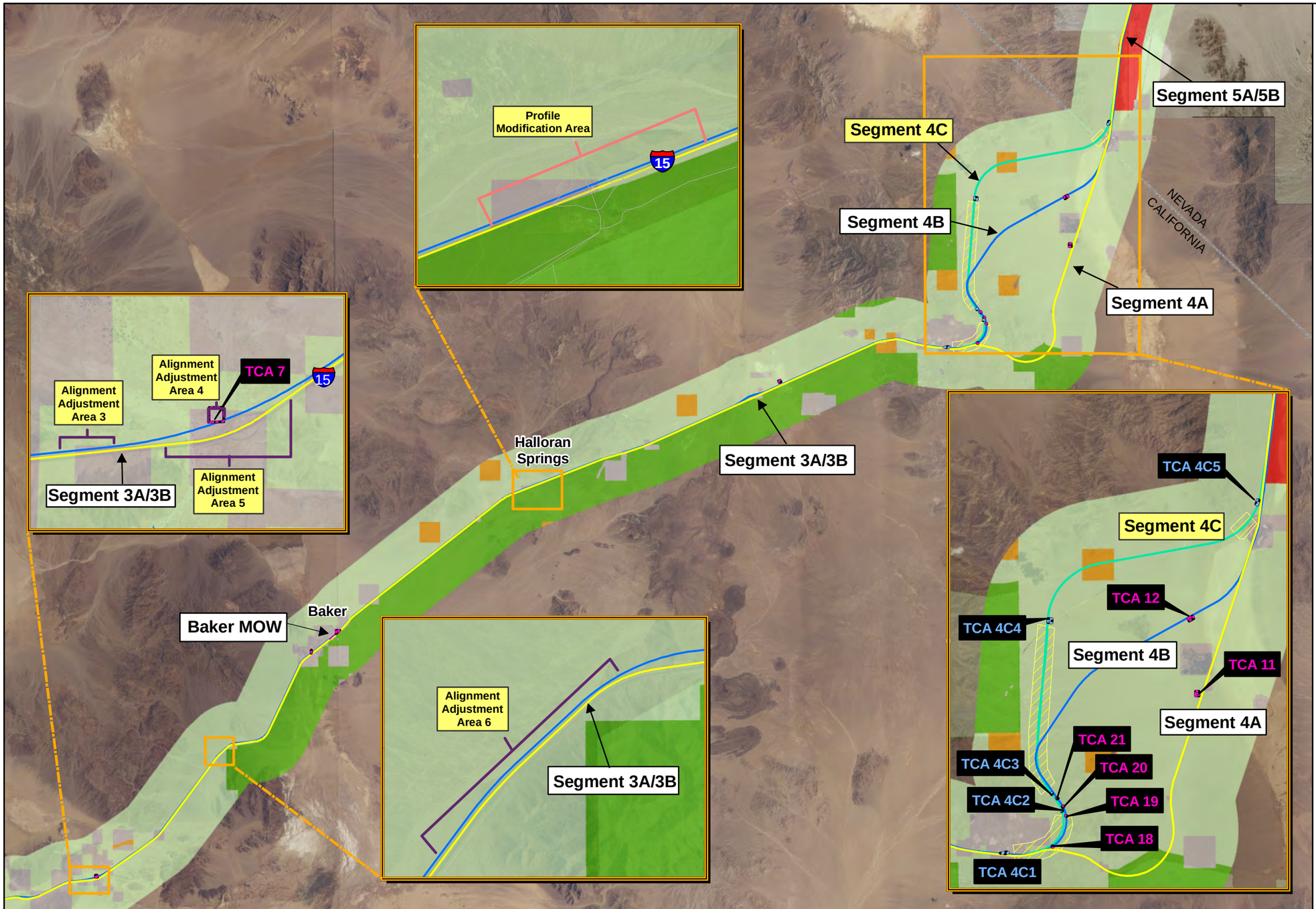
Federal Railroad Administration

DesertXpress - Supplemental EIS

Revision of Supplemental Draft EIS Figure S-3.1-10: Land Use / Zoning Designation (5)

FIG F-3.1-5

* This figure, originally in the Supplemental Draft EIS, has been revised to reflect the most current land use designations in Nevada, as defined in the Clark County, South County Land Use Plan and the Winchester Land Use Plan.



Legend

Land Ownership

- Bureau of Land Management
- Clark County (Nevada)
- Department of Defense
- National Parks Service
- Private
- State of California

DesertXpress Alignments

- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

Ancillary Facility Sites

- Text — Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)
- Alignment Adjustment Areas
- Tunnels

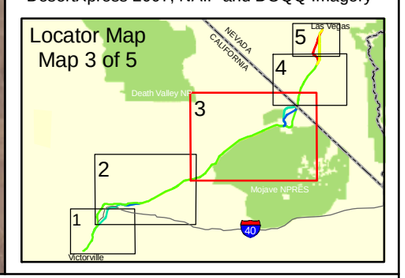
NORTH

1 inch equals 4 miles

Kilometers: 0 5 10

Miles: 0 4 8

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



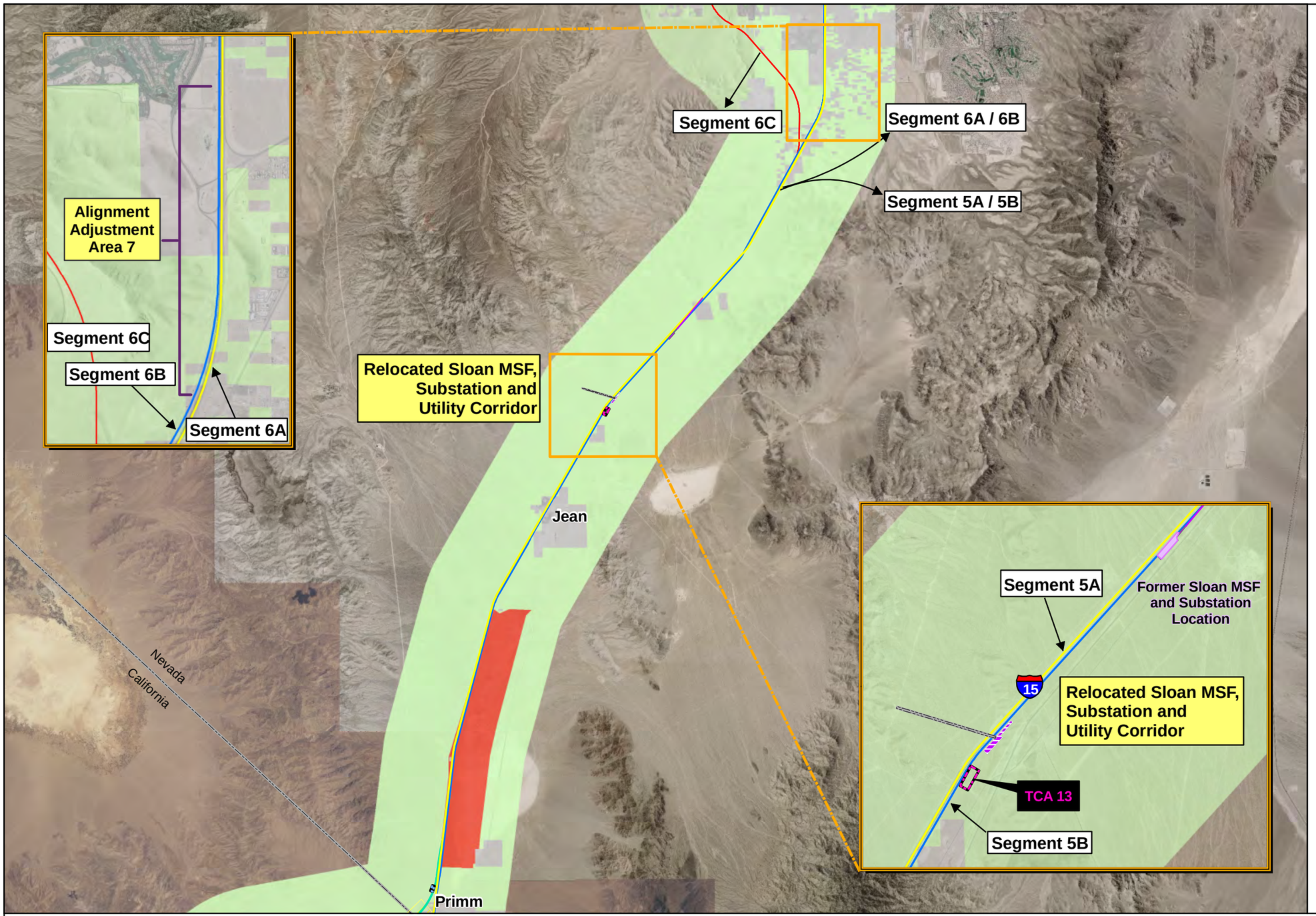
U.S. Department of Transportation Federal Railroad Administration

DesertXpress Final EIS

Revision of Supplemental Draft EIS Figure S-3.1-3: Land Ownership (3)

FIG **F-3.1-6**

* This figure, originally in the Supplemental Draft EIS, has been revised to correctly depict the Southern Nevada Supplemental Airport (SNSA) site as owned by Clark County.



Legend

Land Ownership

- Bureau of Land Management
- Clark County (Nevada)
- Department of Defense
- National Parks Service
- Private
- State of California

DesertXpress Alignments

- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

Ancillary Facility Sites

- Text — Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Relocation Sloan MSF / Substation Site Option
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)
- Alignment Adjustment Areas
- Tunnels

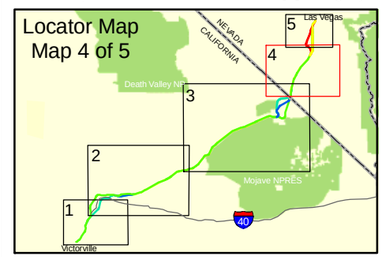
1 inch equals 3 miles

Kilometers: 0 2.5 5

Miles: 0 3 6

NORTH

Source: CirclePoint 2008, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



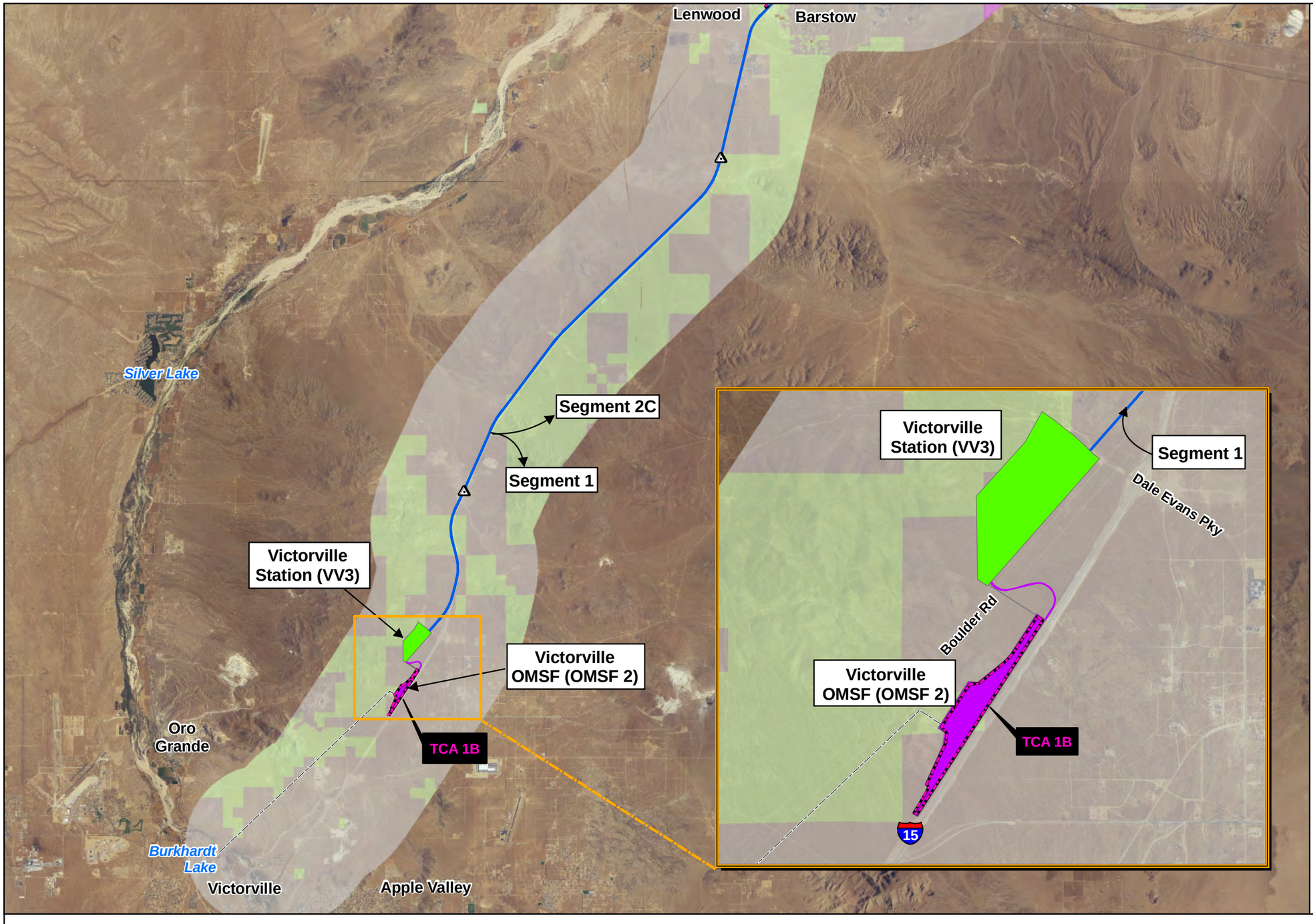
U.S. Department of Transportation Federal Railroad Administration

DesertXpress Final EIS

Revision of Supplemental Draft EIS Figure S-3.1-4: Land Ownership (4)

FIG **F-3.1-7**

* This figure, originally in the Supplemental Draft EIS, has been revised to correctly depict the Southern Nevada Supplemental Airport (SNSA) site as owned by Clark County.



Legend

Land Ownership/Management

- Bureau of Land Management
- Clark County (Nevada)
- Department of Defense
- National Parks Service
- Private
- State of California

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

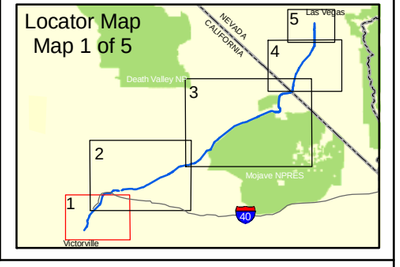
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 3 miles

Kilometers: 0 2 4

Miles: 0 1.5 3

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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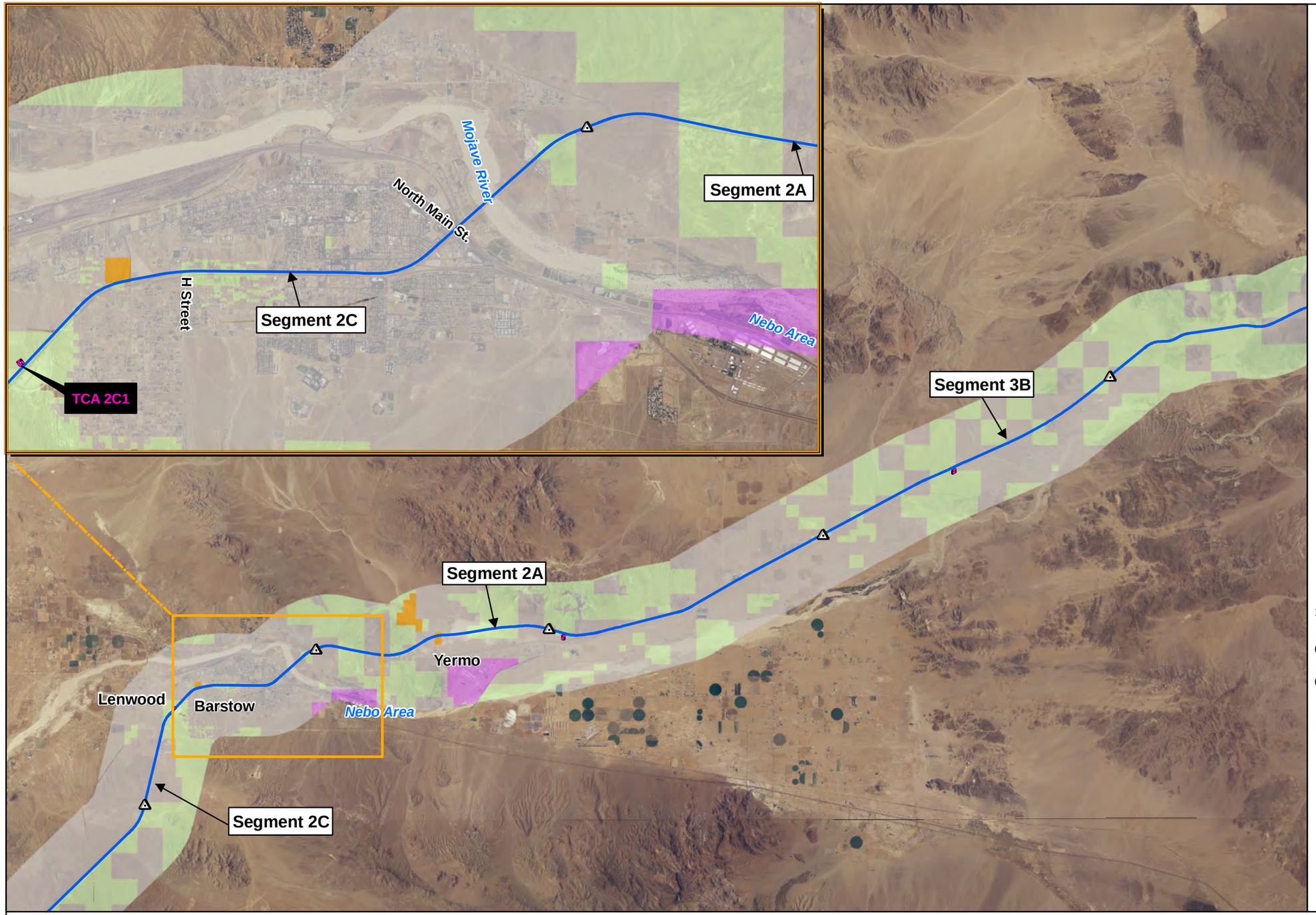
Federal Railroad Administration

DesertXpress
Final EIS

Land Ownership/Management (1)

FIG F-3.1-8

Geografika Consulting 01.26.11



Legend

Land Ownership/Management

- Bureau of Land Management
- Clark County (Nevada)
- Department of Defense
- National Parks Service
- Private
- State of California

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

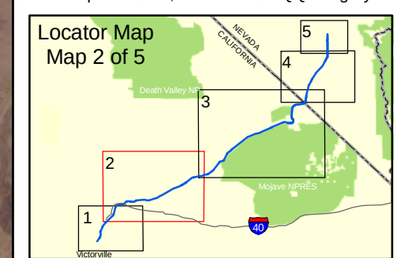
1 inch equals 4 miles

NORTH

Kilometers
0 5 10

Miles
0 4 8

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



U.S. Department of Transportation
Federal Railroad Administration

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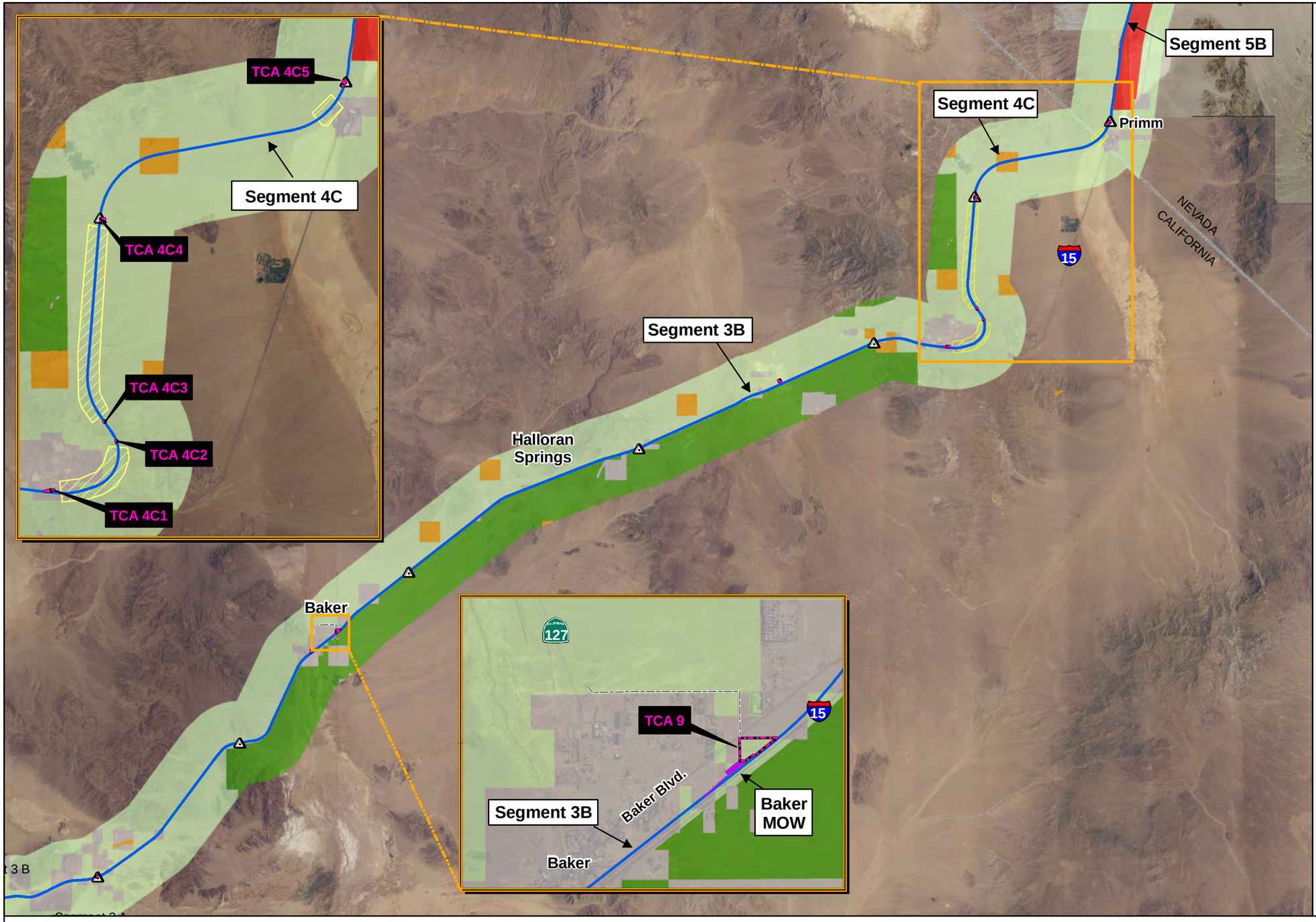
Final EIS

Land Ownership/Management (2)

FIG F-3.1-9

Geografika Consulting 01.26.11



Legend

Land Ownership/Management

- Bureau of Land Management
- Clark County (Nevada)
- Department of Defense
- National Parks Service
- Private
- State of California

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

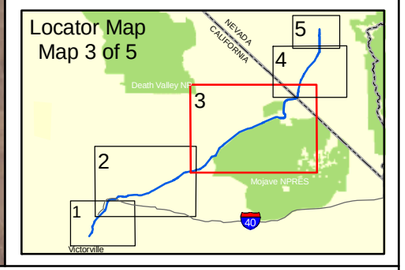
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

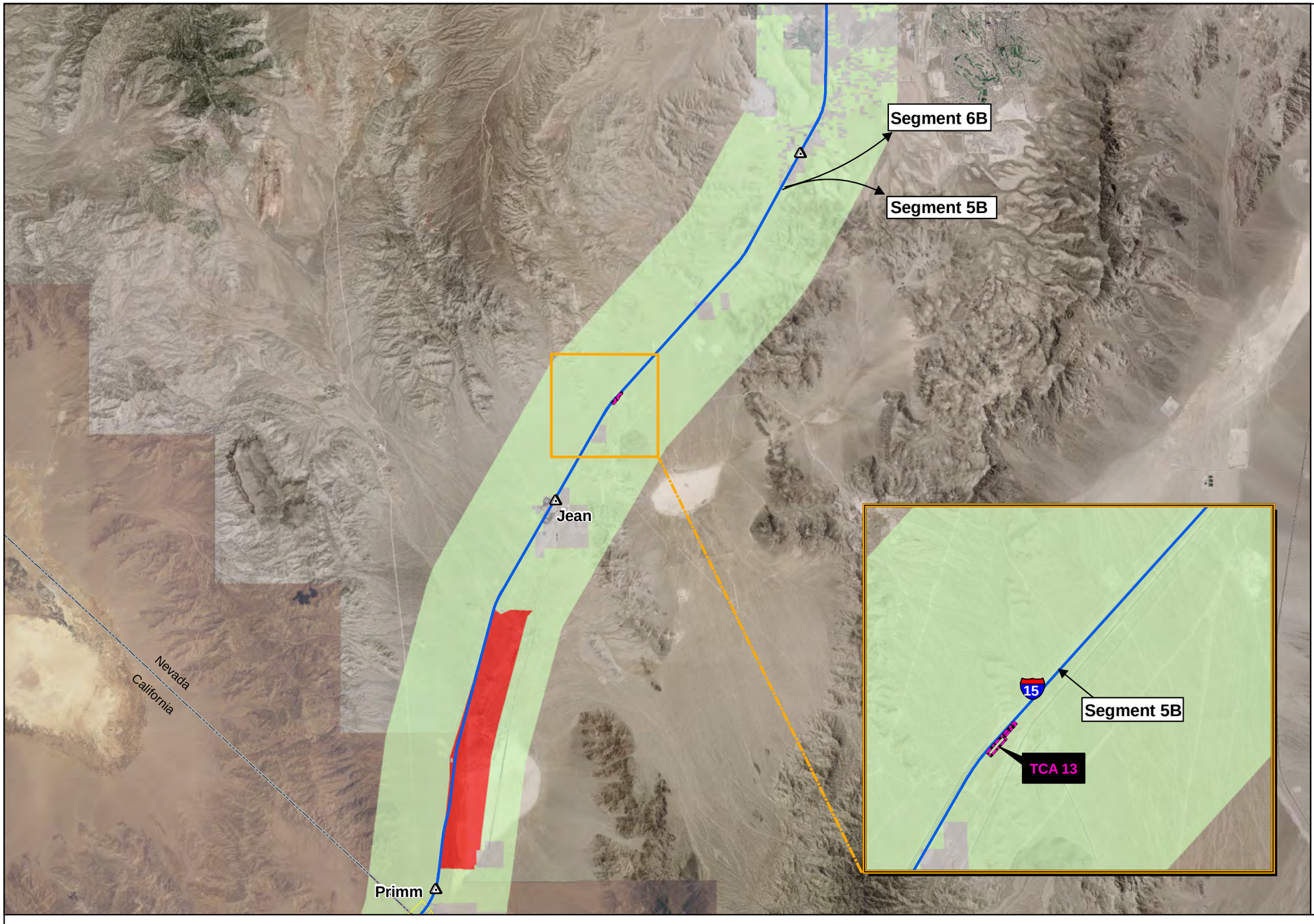
1 inch equals 5 miles

0 3 6 Kilometers

0 2.5 5 Miles

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery





Legend

Land Ownership/Management

- Bureau of Land Management
- Clark County (Nevada)
- Department of Defense
- National Parks Service
- Private
- State of California

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

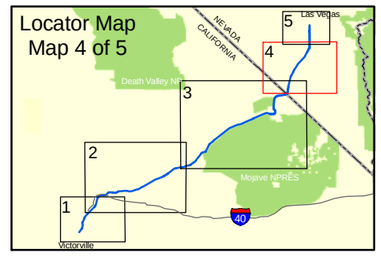
1 inch equals 3 miles

NORTH

0 2.5 5 Kilometers

0 3 6 Miles

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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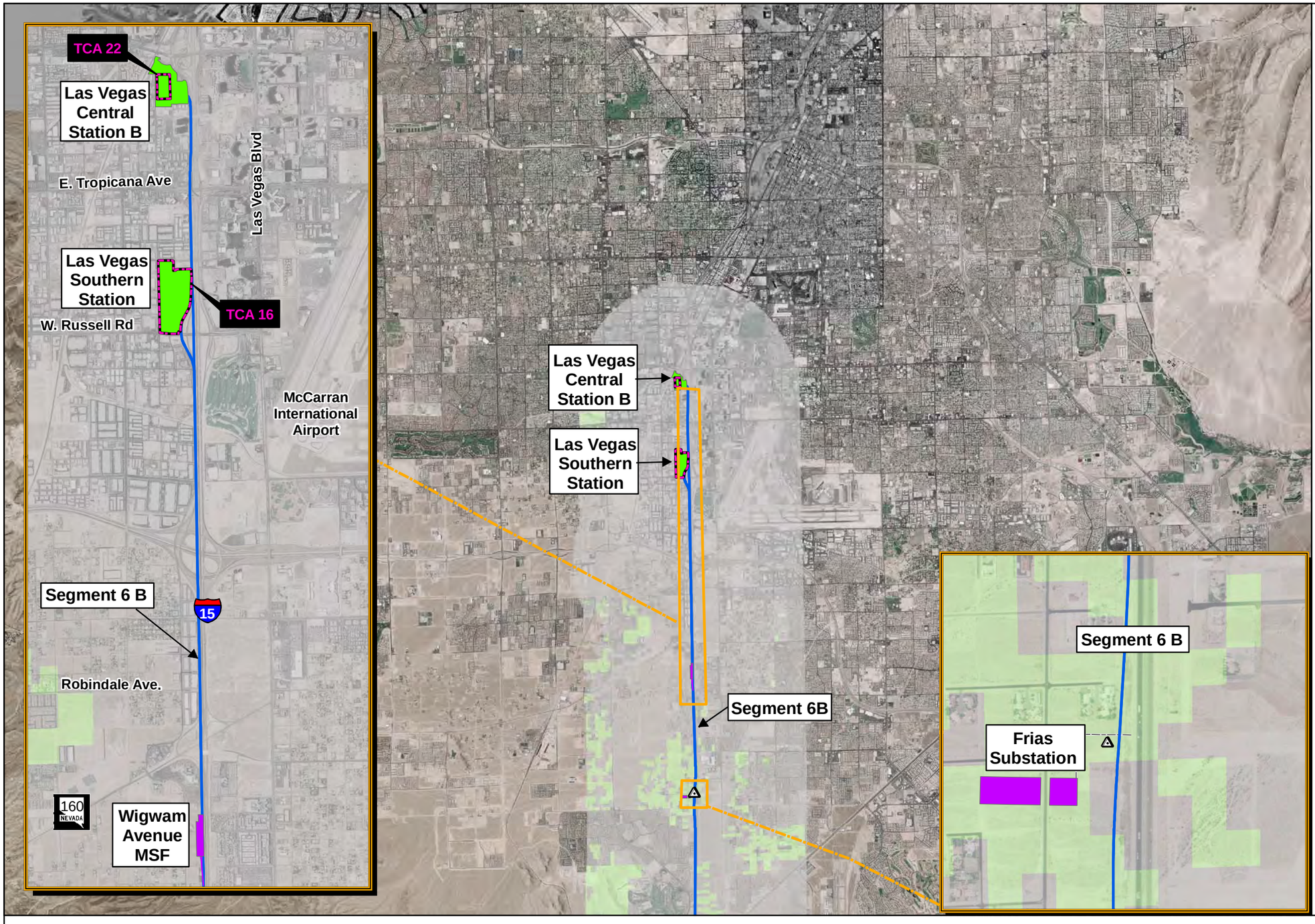
DesertXpress
Final EIS

Land Ownership/Management (4)

FIG **F-3.1-11**

Geografika Consulting 01.17.11



U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Land Ownership/Management (5)

FIG **F-3.1-12**

Geografika Consulting 02.28.11

Inyo County
Kern County
Inyo County
San Bernardino County
Ridgecrest
California City
Jean
Primm
Segment 4C
Segment 5B
Mountain Pass
Halloran Springs
Segment 3B
NEVADA
CALIFORNIA
Baker
Mojave
Mojave National Preserve
(National Park Service)
National
Preserve
Segment 2A
Yermo
Barstow
Segment 1
Segment 2C
Stoddard to Johnson Valley
Ludlow
Adelanto
Victorville
Apple Valley
Hesperia
Johnson Valley-Parker

Legend

California Desert Conservation Area

- Class I Intensive Use
- Class M Moderate Use
- Class L Limited Use
- Class C Controlled Use
- CDCA Boundary
- # Planning Units

Other Features

- Private, State and Other Federally Managed Lands
- County Lines
- Military Boundary
- National Park Boundary
- Competitive Even Corridor

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

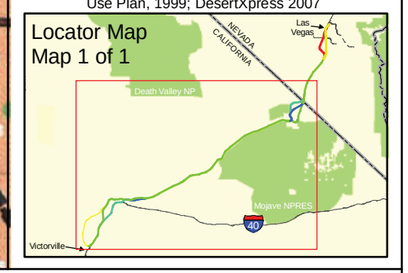
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals 13 miles

0 5 10 Miles

Source: Bureau of Land Management, California Desert Conservation Area Land Use Plan, 1999; DesertXpress 2007

Locator Map
Map 1 of 1



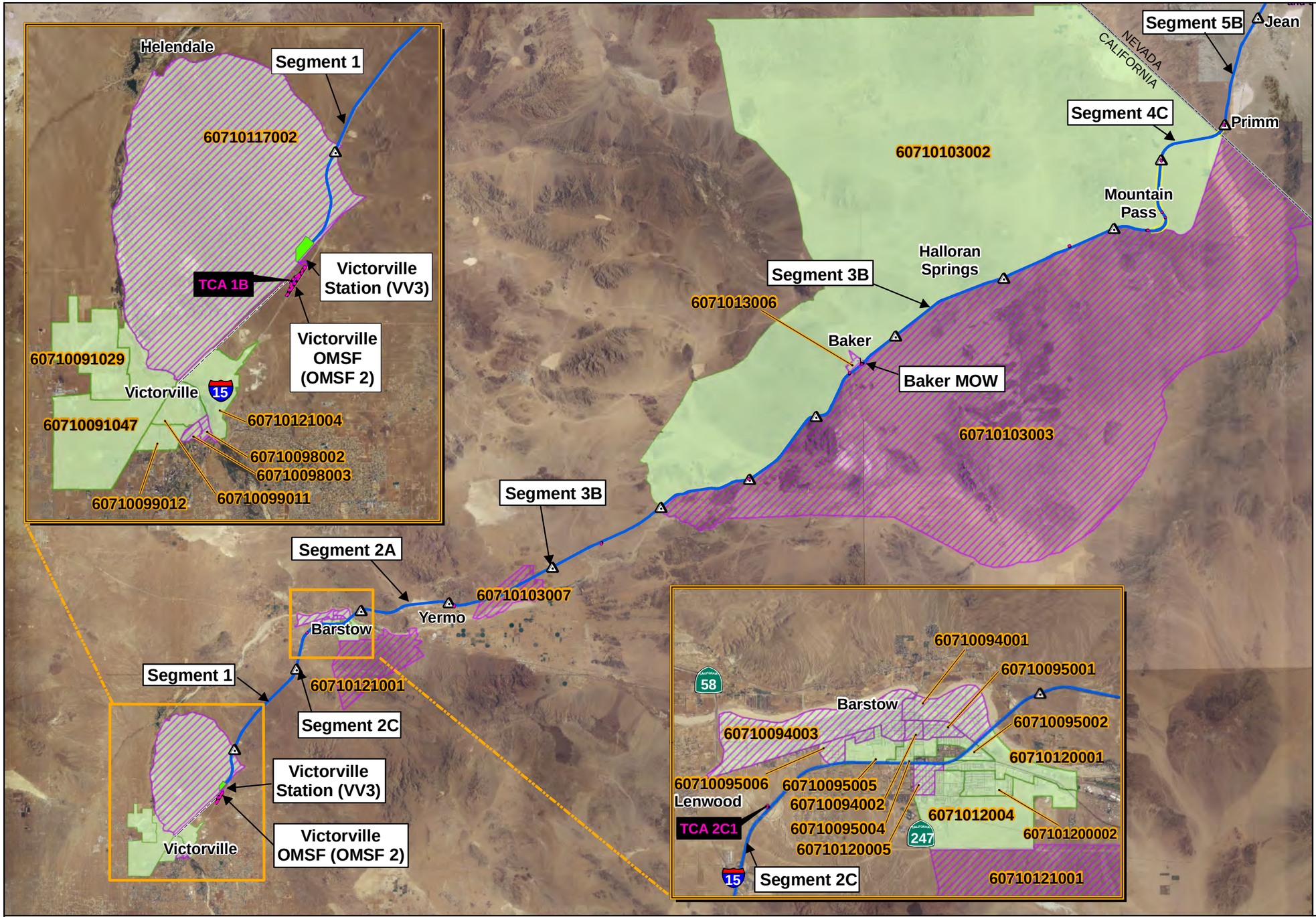
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Bureau of Land Management (BLM) Multiple Use Classifications, California Desert Conservation Area

FIG F-3.1-13

Geografika Consulting 01.25.11



Legend

Environmental Justice Data

Census Block Groups That Meet Environmental Criteria For:

- Minority Population
- Poverty Level

60700000001 Census Block Number

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals10.5 miles

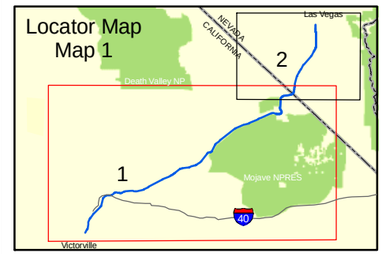
0 10 20 Kilometers

0 5 10 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau

Locator Map
Map 1



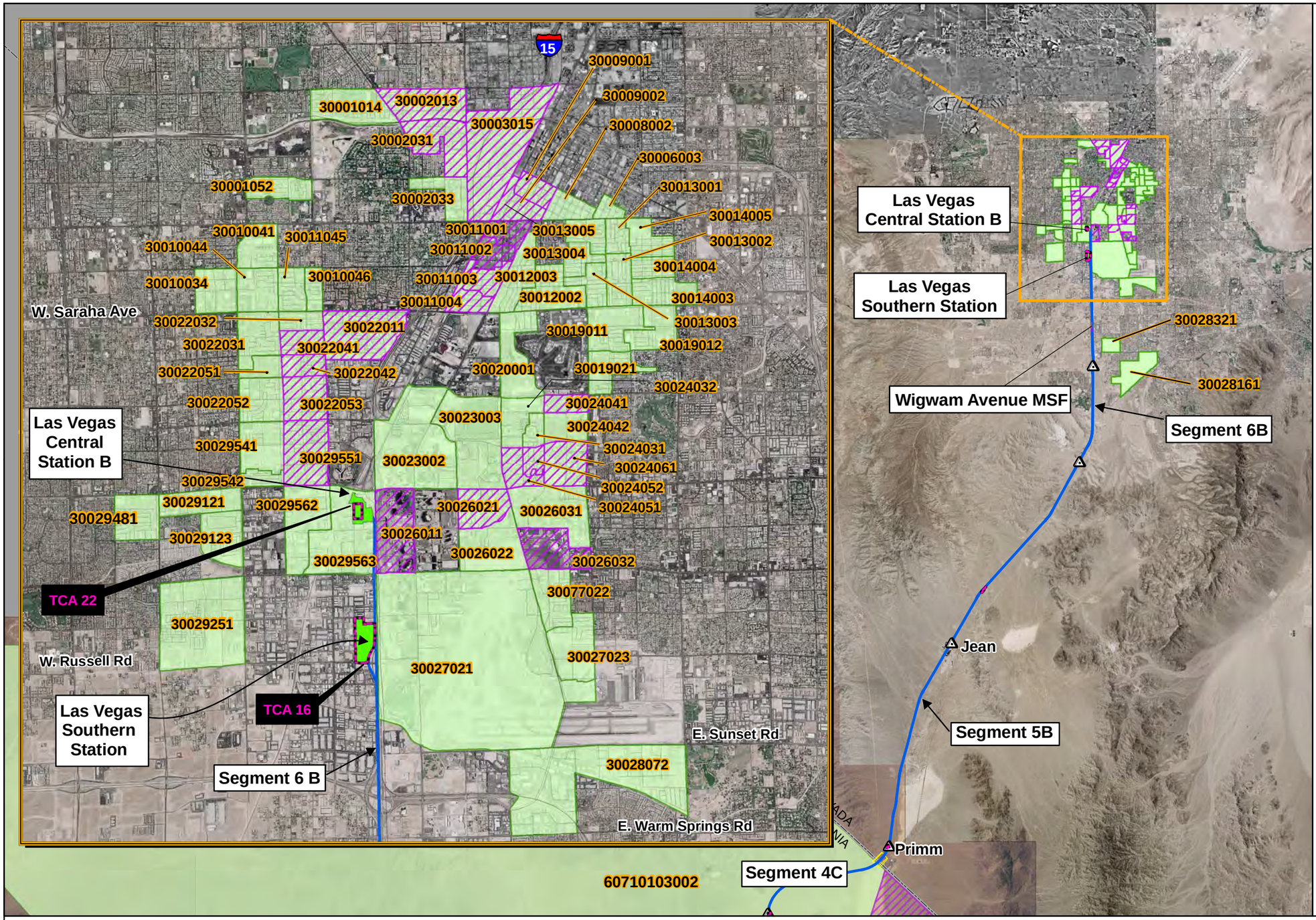
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Environmental Justice: California (1)

FIG F-3.1-14

Geografika Consulting 01.25.11



Legend

Environmental Justice Data

Census Block Groups That Meet Environmental Criteria For:

- Minority Population
- Poverty Level

60700000001 Census Block Number

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

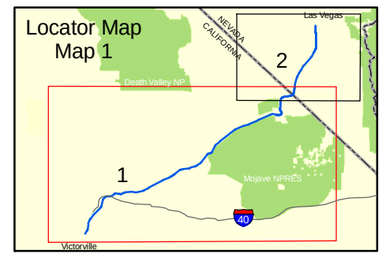
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals10.5 miles

0 5 10 Kilometers

0 2.5 5 Miles

Source: DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau



U.S. Department of Transportation Federal Railroad Administration

DesertXpress Final EIS

Environmental Justice: Nevada (1)

FIG F-3.1-15

Geografika Consulting 02.27.11

3.2 GROWTH

This section describes the updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the growth effects related to the Preferred Alternative in comparison to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.2.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Comments on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to growth and provides responses to those comments. Several comments resulted in updates/changes to the growth analysis in this Final EIS and are discussed below. Following publication of the Supplemental Draft EIS and in response to comments, the Federal Railroad Administration (FRA) commissioned a study of potential economic impacts to the City of Barstow (Barstow Study).[1] The Barstow Study is included as **Appendix F-E** to this Final EIS. The Barstow Study utilized information from an additional report that evaluated the predicted employment and economic impact in San Bernardino County and Clark County.[2] This employment and economic impact analysis is included as **Appendix F-F** to this Final EIS. Additional information from the Barstow Study and the employment and economic impact report have been incorporated into this Final EIS. Substantive updates and changes in response to comments on the Draft and Supplemental Draft EIS are shown in **bold** **underline** and ~~strikeout~~ text.

3.2.1.1 Affected Environment

Section 3.2.3 of the Draft EIS and **Section 3.2.1** of the Supplemental Draft EIS describe in detail the affected environment for growth effects for the DesertXpress project.

The geographies examined within the Draft EIS and the Supplemental EIS include the regional and local environments of San Bernardino County, Clark County, the City of Victorville, and the City of Las Vegas. The regional and local growth projections and forecasts included in Draft EIS **Section 3.2.3.1** were updated in the Supplemental Draft EIS **Section 3.2.1** to reflect the most current growth projections. The regional and local growth projections for San Bernardino County, Clark County, Victorville, and Las Vegas, have not changed since publication of the Supplemental Draft EIS and the information in Supplemental Draft EIS **Section 3.2.1** remains applicable to this Final EIS and the evaluation of the Preferred Alternative.

---

[1] Economics and Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 2010.

[2] Thomas Carroll and Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

Comment 304 on the Draft EIS and Comments S-195 through S-200, S-205, S-206, S-209, S-212 through S-215, S-219, S-220, and S-221 on the Supplemental Draft EIS requested additional information related to potential socioeconomic impacts of the DesertXpress project on the City of Barstow. To address these comments, this Final EIS amends Draft EIS **Section 3.2.3.1** as follows to incorporate information from the Barstow Study and the associated employment and economic impact report.

City of Barstow

Population: **Barstow's population was essentially unchanged from 1990 to 2000. The City's General Plan indicates that Barstow experienced a slower growth rate as compared to the San Bernardino County growth rate. The City's General Plan attributes this slower growth rate to the distance between Barstow and other urban growth centers and the outward migration of populations and economic activities to outlying areas in southern California.** [3]

Between 2000 and 2010, population growth in Barstow accounted for only 2.3 percent of the 46.9 percent growth rate in the High Desert area of San Bernardino County, which includes the Victor Valley cities of Adelanto, Apple Valley, Hesperia, and Victorville. In terms of population growth between 2000 and 2010, the population increase in Barstow was the 8th lowest of the 50 inland cities in the County.[4]

Table F-3.2-1 summarizes population growth projections for Barstow through year 2030. A combination of the Southern California Association of Governments (SCAG) Growth Projections, San Bernardino Associated Governments (SANBAG), and the City of Barstow staff data estimate that Barstow's population was about 24,010 in 2008.[5] **These projections expect Barstow to grow to 29,771 by year 2020, an annual growth rate of about 1.8 percent. Based on this growth rate, Barstow is expected to have a population of 35,370 by year 2030.**[6]

This projected growth shows some effect of outward migration of Southern California, but relatively little. Barstow can thus be thought of as a location that still has a mainly self-contained economy, and one

[3] City of Barstow. City of Barstow General Plan. July 7, 1997.

[4] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[5] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[6] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

that will likely remain in that condition for a least a decade, if not longer. This means that Barstow's economy will largely be separated from the forces now shaping the Victor Valley area of the High Desert.[7]

Table F-3.2-1 Existing and Projected Population, City of Barstow

Year	Population / Percent Growth[a]		Households / Percent Growth[a]		Employment / Percent Growth[a]	
2005 (actual)	24,010 *(year 2008)*	NA	8,123	NA	12,209	NA
2010	25,101	+ 4.5	10,516	+ 29	16,536	+ 35
2015	27,360	+ 9	13,869	+32	20,088	+ 20
2020	29,771	+ 9	16,894	+ 22	22,924	+ 14
2025	32,450	+ 9	19,802	+ 17	26,244	+ 14
2030	35,370	+ 9	22,520	+ 14	29,945	+14

Source: Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010; SCAG Projections, 2008.

[a] Percent Growth from last measured year (5-year increments)

Housing: **Barstow has historically experienced a slow growth rate relative to housing. Between 2000 and 2007, the household growth rate was about 8.7 percent, substantially below the rate for San Bernardino County (12.6 percent) over the same period.**[8]

Consistent with expected population growth, the City's General Plan and SCAG's 2008 Growth Projections estimate the number of households to nearly double by 2020. Table F-3.2-1 summarizes the estimated household growth within Barstow through 2030. SCAG estimates a faster growth rate for households than the anticipated population growth rate in Barstow.

With regard to Barstow's housing market, sales volume was relatively static between 1988 to the end of 2002, with 81 sales on average per year. The housing boom between 2004 and 2006 raised average

[7] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[8] City of Barstow. City of Barstow General Plan, Housing Element Update 2006-2014. 2008.

annual sales to about 200, but the economic downturn that began in 2008 brought sales volumes back down to historic averages.[9]

Employment: **As described above, Barstow is a relatively small, slow growing city that remains largely isolated from the major economic forces shaping San Bernardino County, including proximity to the Los Angeles region. Barstow's economic base primarily consists of two employment sections - transportation and government.[10] The US military and Burlington Northern Santa Fe (BNSF) Railway remain the two largest employers within the Barstow area, with a number of employees working civilian jobs or in the classification yard, respectively.**

Table F-3.2-1 summarizes the anticipated employment growth in Barstow. SCAG's 2008 Projections estimate that the number of jobs in Barstow will continue to increase through year 2030. SCAG estimated a job growth of about 35 percent between 2005 and 2010, with a total of 16,536 jobs in Barstow in 2010. By 2030, Barstow is expected to have 29,945 jobs, an average annual increase of about 6 percent.[11]

In 2009, total income of all people in Barstow was approximately $473.3 million, the 9th lowest amount among San Bernardino County's 50 inland cities. Barstow's poverty level in 2008 was reported at 19.9 percent, approximately double the rate in San Bernardino County as a whole.[12]

Barstow's economic condition is largely driven by variations in flow of funds. Variations include the number of travelers on Barstow's freeways. Annually, about 17.6 million travelers pass through Barstow, with the vast majority using the I-15 freeway, but others on I-40 and SR-58.[13] Of these 17.6 million, it is estimated that nearly 70 percent (12.1 million) are traveling through Barstow en route to or from Las Vegas.[14]

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[9] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[10] City of Barstow. City of Barstow General Plan, Housing Element Update 2006-2014. 2008.

[11] SCAG. SCAG 2008 Projections. 2008.

[12] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[13] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[14] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

Retail activity, including sales at service stations and food and clothing stores, represents a large portion of Barstow's economy. Between 2000 and 2007, Barstow's taxable sales grew from $415.6 million to $596.9 million, or approximately 38.4 percent. Due to the economic downturn of 2008-2009, taxable sales in 2009 fell by 12.4 percent to $523.1 million. Barstow's taxable sales are heavily related to passengers on the I-15 freeway. Freeway-related sales are estimated to have comprised about 65 percent, or $340.5 million, of the City's total taxable sales in 2009.[15]

Of this $340.5 million attributed to freeway-related sales, sales of fuel, food, and related items at service station represent the largest single component. About $54.2 million of this total is attributed to diesel fuel sales, almost entirely related to the trucking industry (i.e., not attributable to passenger vehicles).[16]

3.2.1.2 Regulatory Environment

The regulatory environment related to growth for the DesertXpress project is described in detail in Draft EIS **Section 3.2.1** and Supplemental Draft EIS **Section 3.0-1**. These regulatory environment discussions remain applicable to this Final EIS and the evaluation of the Preferred Alternative.

Draft EIS **Section 3.2.1** and Supplemental Draft EIS **Section 3.0-1** focused on the regulatory environment in San Bernardino County, Clark County, Victorville, and Las Vegas. This Final EIS amends Draft EIS **Section 3.2.1.2** as follows to include a discussion of the regulations and standards related to growth in the City of Barstow:

City of Barstow General Plan

The City of Barstow General Plan, adopted in July 1997, identifies long-range goals and guidance for future development of the City, with specific intent to ensure orderly growth while ensuring the health and safety of residents and visitors. The General Plan indicates the general location of land uses, presents information concerning the potential maximum development for given areas, shows the interrelationships of various land use patterns, and provides tools to manage future growth.

[15] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[16] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

The General Plan assumes that the community will continue to growth through year 2020 at rates consistent with historic trends since the nineteen sixties. The General Plan assumes that Barstow will grow at a rate of three percent per year between 1996 and 2020 based on region wide trends. However, growth trends in Barstow have been markedly slower than those of San Bernardino County as a whole. This slower growth reflects Barstow's relative isolation from fast-growing urban areas to the south and west.

The General Plan identifies five principal growth areas, including the Barstow Road/Rimrock Road, Outlet Mall, Lenwood Specific Plan, Highway 58/West Main Street, and the Mojave River/I-15 areas. The DesertXpress project would be in close proximity to five growth areas.

The General Plan also identifies redevelopment areas within the City. These redevelopment areas are intended to eliminate or alleviate blighting conditions by providing public improvements and seek to facilitate development consistent with the City land use policy. These areas extend throughout the City and would be within close proximity to the DesertXpress project.

3.2.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

Several comments on the Draft EIS and Supplemental Draft EIS resulted in changes to the growth evaluation in the EIS and are discussed below.

Draft EIS and Supplemental Draft EIS **Section 3.2, Growth**, each focused on growth effects in San Bernardino County, Clark County, Victorville, Baker, and Las Vegas. These sections of the Draft EIS and Supplemental Draft EIS did not include a discussion of the growth effects to Barstow, as no station or maintenance facilities would be developed. To address Comment 304 on the Draft EIS and Comments S-195 through S-200, S-205, S-206, S-209, S-212 through S-215, S-219, S-220, and S-221 on the Supplemental Draft EIS, this Final EIS amends Draft EIS **Sections 3.2.2** and **3.2.4** to include a discussion of the growth effects of the DesertXpress project in Barstow.

This Final EIS amends Draft EIS **Section 3.2.2** to update the methodology for evaluating growth effects, specifically related to the growth effects in Barstow.

The area of analysis for growth effects includes the cities of Victorville, Barstow, Baker, and Las Vegas, as well as the regions of San Bernardino County and Clark County within proximity to the DesertXpress project. This analysis is focused primarily on the areas surrounding station and maintenance facility site options near and/or in Victorville and Las Vegas**, as well as the City of Barstow**.

The reason for this focus **on the areas near the proposed station and maintenance facility site options** is that potential population and employment growth related to the Action Alternatives would most likely occur near the station and maintenance facility sites. The station and maintenance facilities are the only "interfaces" of the project where passengers would board or exit trains and where the vast majority of DesertXpress employees would be located. With the exception of the MOW facility proposed for the community of Baker, which would house eight employees, there are no other "entry points" to the DesertXpress project that could foreseeably add to employment and/or induce population growth.

Another factor affecting growth would be the mode shift, or shift from automobile traffic on I-15 freeway to high-speed rail that would occur under the Action alternatives. This mode shift could reduce the potential number of "pass-by" visitors to communities along the corridor, including Barstow, Baker, Primm, and Jean. While these communities would have no direct public interface with the DesertXpress project, local economies of each community include substantial areas of "visitor-serving" uses, such as outlet malls, restaurants, and gas stations which rely heavily on automobile traffic on I-15 corridor as their primary source of customers. Since the Action Alternatives could reduce the number of trips on the I-15 freeway assumed with the No Action Alternative and because the Action Alternatives do not include any stops or direct interface with these communities, the Action Alternatives could have a negative effect on the future growth in these communities.

The City of Barstow is the only urban area through which DesertXpress would pass with no such entry point. Notwithstanding, potential economic impacts to the City of Barstow have been examined.

The impact evaluation for Barstow focuses on potential effects related to the expected diversion of automobile traffic that would occur with implementation of high-speed passenger rail service as a result of potential automobile travelers opting to use the DesertXpress high-speed passenger rail system. Diversion of vehicle traffic from the I-15 freeway to the high-speed train could reduce the potential number of "pass-by" visitors to communities along the corridor, including Barstow. While Barstow would have no direct public interface with the DesertXpress project (i.e., no station or maintenance facility), the local economy includes substantial areas of "visitor-serving" uses, such as outlet malls, restaurants, and gas stations which rely heavily on vehicle traffic on the I-15 freeway corridor as their primary source of

customers. With this reduction in I-15 freeway traffic, there could potentially be economic effects to Barstow in regards to economic conditions, housing, and employment.

To evaluate the direct and indirect growth effects of the Action Alternatives, state, regional, and local growth projections of population, housing, and employment were used as the baseline. The anticipated employment from the DesertXpress project was then added to these baseline numbers to determine if the Action Alternatives would result in substantial growth **or adverse economic effects**.

The analysis in the Barstow Study and the associated employment and economic impact report considers the economic conditions in Barstow that are a result of money being brought into the market by non-truck traffic moving between southern California and Barstow. The Barstow Study and employment and economic impact report are included as Appendix F-E and Appendix F-F to this Final EIS, respectively.

The Action Alternatives are also evaluated as to whether they could foster employment or population growth through the removal of any existing impediments to growth. Lack of utilities and urban facilities are the most common impediments to growth of undeveloped areas. While the DesertXpress project would traverse significant areas of undeveloped lands which have little to no utilities or urban services, it would not extend utilities to these areas in a way that would remove an impediment to growth. In other words, while the project would construct additional transportation, electrical and communications infrastructure, this infrastructure would not remove an impediment to growth because it would not be readily available to adjacent land uses, with the exception of areas in close proximity to stations and maintenance facilities.

~~Another factor affecting growth would be the mode shift, or shift from automobile traffic on I-15 to high-speed rail that would occur under the action alternatives. This mode shift could reduce the potential number of "pass-by" visitors to communities along the corridor, including Barstow, Baker, Primm, and Jean. While these communities would have no direct public interface with the DesertXpress project, local economies of each community include substantial areas of "visitor-serving" uses, such as outlet malls, restaurants, and gas stations which rely heavily on automobile traffic on I-15 corridor as their primary source of customers. Since the action alternatives could reduce the number of trips on I-15 assumed with the No Action Alternative and because the action alternatives does not include any stops or direct interface with these communities, the action alternatives could have a negative effect on the future growth in these communities.~~

This Final EIS amends Draft EIS **Section 3.2.4.1**, under the heading "Action Alternatives" and subheading "Direct Regional Effects: Construction Employment" as follows to include additional information related to construction job creation in the project study area:

> ***Direct Regional Effects: Construction Employment:*** Construction of the Action Alternatives would be temporary, occurring over an anticipated **three- to** four-year time frame. ~~According to the applicant, the anticipated number of workers to be employed directly by DesertXpress to~~ **Approximately 45,853 jobs are anticipated to be created during the construction phase of the DesertXpress project, which includes workers directly employed to** design and construct all proposed facilities, including design, supply, manufacturing, testing, and training for the trains and system elements and heavy civil construction**.**[17] ~~, would vary from about 1,730 to 3,000 per year, depending on the construction phase. At any given time up to 260 of the design, supply, manufacturing, testing, and training positions would be filled by Bombardier employees from other locations worldwide, some of whom might be temporarily relocated to the local Victorville and/or Las Vegas area (some design, supply and manufacturing work would be done at the project site and some would be done remotely).~~ **The construction phase of the DesertXpress project is estimated to generate 28,384 direct jobs in San Bernardino County and 17,469 direct jobs in Clark County over the three- to four-year period. In total, the DesertXpress project would introduce 45,853 new employment opportunities in the project area during construction.[18] It is assumed that existing Bombardier employees from other locations worldwide would fill some of the design, supply, manufacturing, testing, and training job positions and that these employees may be temporarily relocated to the local Victorville, Barstow, or Las Vegas area. Some design, supply, and manufacturing work would be done at the specific construction sites along the Preferred Alternative and some would be done remotely.** The remainder of design and construction jobs~~, approximately 3,900 in all at the highest employment peak,~~ would **likely** come from the local construction labor force in San Bernardino County and Clark County. Construction would thus result in a short-term increase in construction related job opportunities.

[17] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[18] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

As of ~~2006~~ **2009**, the construction industry comprised approximately ~~7.1%~~ **7.8 percent** of the labor force, or about ~~62,000~~ **63,000** jobs, in San Bernardino County.[19] Construction jobs in Clark County during this same year comprised approximately ~~13~~ **8.9** percent of the labor force, totaling ~~112,300~~ **79,007** jobs.[20] New construction jobs created by the Action Alternatives could help ameliorate local employment impacts in San Bernardino County and Clark County associated with the **continued** 2008 economic downturn. This downturn has resulted in increased unemployment, particularly in the construction sector ~~within Las Vegas~~. Thus, the Action Alternatives could have a **temporary** beneficial effect to the region by providing job opportunity for local residents. This would minimize the need to draw on labor resources from outside the project area during the anticipated **three- to** four-year construction period. As such, construction of the action alternatives is anticipated to have a beneficial effect on local employment and growth and would not be anticipated to result in significant permanent relocation of construction workers from outside the project area to inside the project area.

It is also reasonably foreseeable that salaries to construction workers and related spending on construction activities from local/regional suppliers could contribute to additional economic growth in the communities along the proposed route. Construction jobs are expected to generate approximately $2.2 billion in salaries in San Bernardino County and $1.3 billion in Clark County.[21] In total, construction is expected to result in about $3.5 billion in new direct salaries over three- to four- years, contributing to beneficial local economic impacts in adjacent and nearby communities.[22] These effects would however, be temporary, lasting for the duration of the construction period, and would therefore not be anticipated to have permanent effects on growth.

~~It is also reasonably foreseeable that salaries to construction workers and related spending on construction activities from local/regional suppliers could contribute to additional economic growth in the communities along the action alternatives. These indirect effects would however, be temporary, lasting for the duration of the construction period, and would therefore not be anticipated to have permanent effects on growth.~~

[19] U.S. Census Bureau, 2009 American Community Survey 1-Year Estimates. 2009.

[20] U.S. Census Bureau, 2009 American Community Survey 1-Year Estimates. 2009.

[21] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[22] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

This Final EIS amends Draft EIS **Section 3.2.4.1**, under the heading "Action Alternatives" as follows to include a discussion of the direct local growth effects in Barstow:

> ***Direct Local Effects: Barstow:*** **Construction of the DesertXpress project would have direct temporary effects on employment and economic growth in Barstow. Within San Bernardino County, Barstow would be the most central city for construction of the DesertXpress project, particularly for the 113-mile stretch of the rail alignment between Barstow and Primm. It is assumed that a significant share of the construction jobs and associated revenue created by the DesertXpress project in San Bernardino County would flow into Barstow and its immediate environs. Similar to the regional effects to San Bernardino County, construction of the DesertXpress project would result in significant job generation within Barstow and associated increases in salaries. Construction of the DesertXpress project would result in about 2,470 direct jobs in Barstow during the three- to four-year construction period. This would represent an annual average of 823 direct jobs per year, resulting in an eight percent increase in employment over the 2009 employment level of 10,463.[23]**
>
> **These 2,470 direct jobs are anticipated to generate an average payroll (combination of salaries) of $59.5 million over the course of the construction period.[24] While the construction jobs would be temporary during the construction phase, the introduction of the new direct jobs and associated salaries would have a temporary positive effect on the City's employment rate and economic growth.**

This Final EIS amends Draft EIS **Section 3.2.4.2**, under the heading "No Action Alternative" to include the following discussion of indirect local growth effects in Barstow under the No Action Alternative:

> **As the No Action Alternative would not involve the construction of the DesertXpress project, future vehicle trips would not be diverted from the I-15 freeway to the high-speed passenger train. Motorists traveling between Victorville and Las Vegas on the I-15 freeway would continue to pass through Barstow and contribute to the local economy growth, specifically related to retail and service station purchases. While the No Action Alternative would introduce improvements to the I-15**

[23] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[24] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

freeway to increase capacity, no specific capacity improvements have been identified within the developed area of Barstow and it is not anticipated that there would be a substantial change to the passenger traffic traveling through Barstow. As such, the No Action Alternative would not be assumed to have a substantial short-term or long-term effect, positive or negative, to the economic growth in Barstow.

This Final EIS amends Draft EIS **Section 3.2.4.2**, under the heading "Action Alternatives" and subheading "Indirect Local Effects: San Bernardino County/City of Victorville" as follows to include the following paragraph related to the indirect employment and economic growth effects in San Bernardino County associated with construction of the DesertXpress project:

Construction of the DesertXpress project could result in beneficial indirect employment and economic growth effects to San Bernardino County during the three- to four-year construction period. Services and associated employment opportunities could become available to serve the jobs directly created by project construction. Construction of the DesertXpress project would introduce to San Bernardino County a total of 26,699 indirect or induced jobs.[25] These new indirect and induced jobs would result in approximately $1.5 billion in indirect salaries, which could have a positive, temporary indirect effect on the economic growth in San Bernardino County.[26] These indirect construction effects to employment and economic growth in the County would, however, be limited to the three- to four-year construction time period.

This Final EIS amends Draft EIS **Section 3.2.4.2**, under the heading "Action Alternatives" as follows to include a discussion of the indirect growth effects in Barstow:

Indirect Local Effects: Barstow: **The Segment 2 rail alignment alternatives would traverse directly through Barstow, but with no station or maintenance facility.**

The DesertXpress project would result in the diversion of non-truck I-15 freeway traffic between Victorville and Las Vegas to the high-speed passenger train. As a passenger train, the DesertXpress project would not be expected to affect the amount of fleet truck traffic traveling through Barstow,

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[25] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[26] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.; Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

The Barstow economy is largely driven by taxable retail sales from freeway-related traffic. With the shift of non-truck freeway-related traffic to the high-speed passenger train, the DesertXpress project would have an indirect negative growth effect to Barstow's economy during operation.

Based on the DesertXpress ridership forecast, it is estimated that annually, about two million private automobile passengers and 260,000 bus passengers would instead use DesertXpress. This rate of freeway traffic diversion is expected to translate into a loss of about $41.6 million total economic activity from the Barstow economy by the first year of operation of the high-speed passenger train. This reduction represents about seven percent of Barstow's economy in 2009. Additionally, the DesertXpress project would cause a 4.6 percent reduction in total City income, a 1.7 percent reduction in property tax revenue, and a 7.4 percent reduction in total sales tax revenue by the 3rd year of operation. The Barstow economy would experience a loss in economic activity of approximately $51.9 million by the 18th year of operation, and increased losses in income, sales taxes, and property taxes.[27] This reduction in economic growth from passengers being diverted to the high-speed passenger train would result in a loss to the City's economic base of funds that would have flowed into the economy from outside sources. This would result in a reduced flow of funds from the retail sector to its local suppliers and service firms. This reduction would also reduce the flow of funds from the retail sector and its suppliers and service firms to households, thereby lowering the ability for households to spend money in the local economy. This cycle could result in further negative indirect growth effects to the Barstow economy.[28]

As a result of this reduction in economic activity, operation of the DesertXpress project is anticipated to result in the loss of 542 jobs within Barstow by the 3rd year of operation of the high-speed passenger train. This represents a 5.2 percent job loss in Barstow, based on a total of 10,463 jobs reported in 2009.[29]

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[27] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[28] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[29] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

Over time, the share of Barstow's economy affected by the DesertXpress project will slowly grow since the high-speed passenger train ridership is expected to increase over time.[30] Table F-3.2-2 summarizes the anticipated long-term potential adverse economic impacts on Barstow as a result of operation of the high-speed passenger train for the 1st, 3rd, and 18th year of operation.

Table F-3.2-2 Summary of Economic Impacts to Barstow During DesertXpress Operation (Year 1, Year 3, and Year 18 Operation)

Impact	2009 (Baseline)	Change Over Time from Baseline		
		Year 1 Operation – Total Reduction (Percent)	Year 3 Operation – Total Reduction (Percent)	Year 18 Operation – Total Reduction (Percent)
Economic Activity	N/A	-$18.7 million	-$41.6 million	-$51.9 million
Job Activity	10,463	-244 (-2.33%)	-542 (-5%)	-676 (-6.46%)
Income	$473.3 million	-$11.6 million (-2.45%)	-$21.7 million (-4.59%)	-$27.1 million (-5.73%)
Sales Taxes	$5.2 million	-$174,826 (-3.34%)	-$387,564 (-7.41%)	-$483,929 (-9.25%)
Property Taxes	$1.3 million	-$9,791 (-0.75%)	-$21,706 (-1.67%)	-$27,102 (-2.08%)

Source: Economics & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

Overall, the operation of the DesertXpress project would have a downward influence on Barstow's economic growth, but no change to population. The magnitude of economic loss for all sources would be less than 10 percent, ranging from a low of a 1.7 percent loss on property taxes by the 3rd year of operation to a high of a 9.25 percent loss on sales taxes by the 18th year of operation.[31] While these are potential adverse economic growth effects to Barstow, they are not at a level that would result in secondary physical environmental effects, such as urban decay. "Urban decay" is understood to occur when an otherwise previously functioning city, or part of a city, falls into disrepair or becomes decrepit.[32] Since the negative economic effects to Barstow would not result in urban decay, no adverse physical economic growth effects would occur. However, the Applicant has

[30] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[31] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[32] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

proposed a voluntary mitigation measure to address concerns raised by the City of Barstow regarding potential economic impacts of the DesertXpress project. Voluntary Mitigation Measure GRO-1 could be applied to reduce the negative economic effects to Barstow.

The potential adverse economic impacts during operation of the DesertXpress project could also affect housing values in Barstow. However, historic data indicates that the behavior of Barstow's housing market has been primarily influenced by factors other than local economic fluctuations. As such, the loss of jobs in Barstow as a result of operation of the DesertXpress project would not be anticipated to substantially affect housing growth and no adverse effects would occur.[33]

While operation of the DesertXpress project would have a negative growth effect during operation, construction of the DesertXpress project could result in beneficial indirect employment and economic growth effects during the three- to four-year construction period. Services and associated employment opportunities could become available to serve the jobs directly created by project construction. Construction of the DesertXpress project would introduce about 2,322 indirect or induced jobs to Barstow. These new indirect and induced jobs would result in approximately $126.3 million in indirect salaries, which could have a positive temporary indirect effect on the economic growth in Barstow. These indirect construction effects to employment and economic growth in Barstow would, however, be limited to the three- to four-year construction time period.

This Final EIS amends Draft EIS **Section 3.2.4.2**, under the heading "Action Alternatives" and subheading "Indirect Local Effects: Clark County/City of Las Vegas" as follows to include the following paragraph related to the indirect employment and economic growth effects in Clark County associated with construction of the DesertXpress project:

Construction of the DesertXpress project could result in beneficial indirect employment and economic growth effects to Clark County during the three- to four-year construction period. Services and associated employment opportunities could become available to serve the jobs directly created by project construction. Construction of the DesertXpress project would introduce a total of 16,432 indirect or

[33] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

induced jobs to Clark County.[34] These new indirect and induced jobs would result in approximately $852.4 million in indirect salaries, which could have a positive temporary indirect effect on the economic growth in Clark County.[35] These indirect construction effects to employment and economic growth in the County would, however, be limited to the three- to four-year construction time period.

This Final EIS adds Draft EIS **Section 3.2.5** as follows to include a voluntary mitigation measure proposed by the Applicant to address concerns raised by the City of Barstow regarding potential economic impacts of the DesertXpress project:

3.2.5 Mitigation Measures

As the Preferred Alternative would not result in any adverse direct or indirect growth effects at the regional or local levels, no mitigation measures would be required. However, the Applicant has proposed a voluntary mitigation measure to address concerns raised by the City of Barstow regarding potential economic impacts of the DesertXpress project.

Voluntary Mitigation Measure GRO-1: Voluntary Applicant Coordination with City of Barstow and San Bernardino County for Employment

The Victorville OMSF site options (OMSF 1 and OMSF 2) would be located approximately 20 miles south of Barstow. Either OMSF will require hundreds of skilled railroad labor. The Applicant will coordinate with the appropriate City of Barstow and San Bernardino County economic development departments to ensure job opportunities at the maintenance facility are made available to Barstow residents.

In addition to permanent jobs during operations, preliminary planning has identified Barstow as a key location for staging and construction support services during the construction, testing, and commissions phases of the Desert Xpress project. The Applicant will work with the City of Barstow to ensure its residents are informed of job opportunities both during construction and operation of the DesertXpress project. The Applicant will also work closely with the City of Barstow to identify appropriate and beneficial construction and

[34] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[35] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

staging activities to be located within the City. Additionally, the Applicant will work with the City of Barstow to identify and jointly develop programs for job training and technical skills training to support the DesertXpress project in all phases of design, construction, testing, and commissioning, and operations.

3.2.2 Analysis of Environmental Consequences

3.2.2.1 Methods of Evaluation

Draft EIS and Supplemental Draft EIS **Sections 3.2.2** described the growth impact methodology for the DesertXpress project. Since publication of the Draft EIS and Supplemental Draft EIS, the growth impact methodology has been updated in response to public and agency comment on the Draft EIS and Supplemental Draft EIS. Refer to the amended discussion to Draft EIS **Section 3.2.2** and **Section 3.2.1.3** of this Final EIS.

3.2.2.2 No Action Alternative

Potential Direct Effects

The No Action Alternative would not involve the construction of the proposed high-speed passenger train between Victorville and Las Vegas. There would be no associated diversion of automobile or airplane trips between Southern California and Las Vegas.

While the No Action Alternative consists of planned and programmed transportation improvement projects that would be in place by the year 2030, these improvements primarily consist of the expansion of existing highways and roadways in and around the I-15 freeway between Victorville and Las Vegas. These improvements would directly generate construction period jobs. These projects would also incrementally increase the number of permanent jobs at the California Department of Transportation (Caltrans), NDOT, and local agencies to maintain new and/or expanded facilities. In sum, the No Action Alternative would have the potential to contribute to growth within the region. This employment growth under the No Action Alternative would be small in comparison to the overall anticipated growth in Victorville, San Bernardino County, Las Vegas, and Clark County.

No new housing or substantial permanent employment would be directly created as part of the No Action Alternative, but it is reasonably foreseeable that local and regional transportation improvements could have the ability to indirectly influence growth through the extension or expansion of transportation infrastructure that could facilitate growth in presently undeveloped or inaccessible areas. Regional growth forecasts are developed in part based on regional transportation improvement plans. The No Action Alternative is expected to entail the construction of projects as identified in these regional transportation plans. Therefore, the No Action Alternative would be expected to result in population and economic growth commensurate with regional growth forecasts.

The No Action Alternative would have a direct effect related to population if one of the projects under this alternative would require the removal of housing located in its building footprint. However, it is unknown at this time if these projects would displace housing. Any improvement under the No Action Alternative would require project-specific environmental review to determine effects from housing displacement. Since the majority of the improvements under the No Action Alternative would require expansions and improvements to existing roadway infrastructure, direct displacement of housing is expected to be limited.

Potential Indirect Effects

Indirect growth effects most often occur when a project removes an existing obstacle to growth, positive or negative growth in local/regional economic vitality, and/or positive or negative growth in population numbers or patterns.

As discussed in **Chapter 2.0, Alternatives**, of this Final EIS, the No Action Alternative consists of planned and funded transportation improvement projects that would be in place by the year 2030. As these improvements primarily consist of improvements to existing roadways and interchanges, there would be very limited effects in terms of opening new lands to development. As a result, the No Action Alternative would not indirectly induce growth beyond that which is already envisioned in regional growth forecasts. These roadway improvements would serve to reduce congestion and improve traffic flows between Victorville and Las Vegas.

A potential roadway improvement would involve expanding the width of the I-15 freeway between Primm and Las Vegas. Refer to **Section 2.3.1** of this Final EIS for further discussion of the programmed transportation improvements. Although the Primm to Las Vegas corridor is already served by a freeway, any such expansion of roadway capacity would have the potential to influence growth patterns. Such an expansion could make areas along the I-15 freeway more attractive for new residential and commercial development depending on the availability of infrastructure and water supply. Any improvement under the No Action Alternative would likely require project-specific environmental review to determine specific environmental effects.

As the No Action Alternative would not involve the construction of the DesertXpress project, future vehicle trips would not be diverted from the I-15 freeway to the high-speed passenger train. Motorists traveling between Victorville and Las Vegas on the I-15 freeway would continue to pass through Barstow and contribute to the local economy growth, specifically related to retail and service station purchases. While the No Action Alternative would introduce improvements to the I-15 freeway to increase capacity, no specific capacity improvements have been identified within the developed area of Barstow and it is not anticipated that there would be a substantial change to the passenger traffic traveling through Barstow. As such, the No Action Alternative would not be assumed to have a substantial short-term or long-term effect, positive or negative, to the economic growth in Barstow.

3.2.2.3 Preferred Alternative

Draft EIS **Section 3.2.4** and Supplemental Draft EIS **Section 3.2.3** describe in detail the growth impacts of the DesertXpress project. These sections consider the DesertXpress project as a whole, rather than by individual project components. The discussion below parallels the discussions in Draft EIS **Section 3.2.4** and Supplemental Draft EIS **Section 3.2.3** and summarizes the growth effects specific to the Preferred Alternative.

Potential Direct Effects

The Preferred Alternative would result in direct growth effects to the regional and local environments during both the construction and operational phases.

Direct Regional Effects: Construction Employment

Construction of the Preferred Alternative would occur over an anticipated three- to four-year timeframe. Approximately 45,853 jobs are anticipated to be created during the construction phase of the Preferred Alternative, which includes workers directly employed to design and construct all proposed facilities, including design, supply, manufacturing, testing, and training for the trains and system elements and heavy civil construction.[36] The construction phase of the Preferred Alternative is estimated to generate 28,384 direct jobs in San Bernardino County and 17,469 direct jobs in Clark County over the three- to four-year period. In total, the Preferred Alternative would introduce 45,853 new employment opportunities in the project area during construction.[37] It is assumed that existing Bombardier employees from other locations worldwide would fill some of the design, supply, manufacturing, testing, and training job positions and that these employees may be temporarily relocated to the local Victorville, Barstow, or Las Vegas area. Some design, supply, and manufacturing work would be done at the specific construction sites along the Preferred Alternative and some would be done remotely. The remainder of design and construction jobs would likely come from the local construction labor force in San Bernardino County and Clark County. Construction of the Preferred Alternative would thus result in a short-term increase in construction related job opportunities.

As of 2009, the construction industry comprised approximately 7.8 percent of the labor force, or about 63,000 jobs, in San Bernardino County.[38] Construction jobs in Clark County during this same year comprised approximately 8.9 percent of the labor force, totaling 79,007 jobs.[39] Construction of the Preferred Alternative could help create new

[36] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[37] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[38] U.S. Census Bureau, 2009 American Community Survey 1-Year Estimates.

[39] U.S. Census Bureau, 2009 American Community Survey 1-Year Estimates.

jobs and stimulate employment growth during the current economic recession. The ongoing economic recession that began in 2007-2008 has resulted in increased unemployment in San Bernardino County and Clark County, particularly in the construction sector. As such, construction of the Preferred Alternative is anticipated to have a beneficial direct effect on local employment and growth and would not be anticipated to result in significant permanent relocation of construction workers from outside the project area to inside the project area.

It is also reasonably foreseeable that salaries to construction workers and related spending on construction activities from local/regional suppliers could contribute to additional economic growth in the communities along the Preferred Alternative rail alignment. The Preferred Alternative construction jobs are expected to generate approximately $2.2 billion in salaries in San Bernardino County and $1.3 billion in Clark County.[40] In total, construction of the Preferred Alternative would result in $3.5 billion in new direct salaries in San Bernardino and Clark Counties during the three to four years, contributing beneficial local economic impacts in adjacent and nearby communities.[41] These effects would however, be temporary, lasting for the duration of the construction period, and would therefore not be anticipated to have permanent effects on growth.

Direct Regional Effects: Permanent Employment

Table F-3.2-3 shows the estimated total permanent jobs expected to be created by the Preferred Alternative in the Victorville, Baker, and Las Vegas areas respectively.

Table F-3.2-3 Estimated Operation Employment by Location

Location	Opening Year Number of Employees	Buildout Year Number of Employees
Victorville Area Jobs	361	463
Baker Area Jobs	8	8
Greater Las Vegas Jobs (MSF, Passenger Station)	154	251
Grand Total	*523*	*722*

Source: DesertXpress, 2007; CirclePoint, 2008.

Direct Local Effects: San Bernardino County/City of Victorville

The Preferred Alternative Victorville Station Site 3 (VV3) and OMSF (OMSF 2) would employ approximately 361 people at the opening year of rail operations and about 460 people in the buildout year (2030). Robust population and employment growth is anticipated in Victorville and the surrounding unincorporated areas. More than 38,000

[40] Thomas Carroll & Associates, *DesertXpress: Predicted Employment and Economic Impact Analysis*, October 2010.

[41] Thomas Carroll & Associates, *DesertXpress: Predicted Employment and Economic Impact Analysis*, October 2010.

new jobs are expected in these local areas by the year 2030. The increase in jobs associated with the Preferred Alternative would constitute approximately 1.2 percent of all anticipated job growth in the area by 2030. No adverse direct growth effects would occur.

Direct Local Effects: Barstow

Construction of the Preferred Alternative would have direct temporary effect on employment and economic growth in Barstow. Within San Bernardino County, Barstow would be the most central city for construction of the Preferred Alternative, particularly for the 113-mile stretch of the rail alignment between Barstow and Primm. It is assumed that a disproportionate share of the construction jobs and associated revenue created by the Preferred Alternative in San Bernardino County would flow into Barstow and its immediate environs. Similar to the regional effects to San Bernardino County, construction of the Preferred Alternative would result in significant job generation within Barstow and associated increases in salaries. Construction of the Preferred Alternative would result in about 2,470 direct jobs in Barstow during the three- to four-year construction period.[42] This would represent an annual average of 823 direct jobs per year, resulting in an eight percent increase in employment over the 2009 employment level of 10,463.[43] These 2,470 direct jobs are anticipated to generate an average payroll (combination of salaries) of $59.5 million over the course of the construction period.[44] While the construction jobs would be temporary during the construction phase, the introduction of the new direct jobs and associated salaries would have a temporary positive effect on the City's employment rate and economic growth.

Direct Local Effects: Baker

The Preferred Alternative includes the construction and operation of a MOW facility near unincorporated Baker. The Applicant anticipates that this facility would employ a staff of eight employees. Due to the small size of the MOW facility, the Preferred Alternative is not anticipated to have an adverse growth effect.

Direct Local Effects: Clark County/City of Las Vegas

The Preferred Alternative Las Vegas Station (Southern Station or Central Station B) would be located within the Las Vegas metropolitan area of unincorporated Clark County. The station site areas for either the Las Vegas Southern Station or Central Station B are heavily urbanized and are in close proximity to the "Las Vegas Strip," a stretch of Las Vegas

[42] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[43] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[44] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

Boulevard along which most of the region's major casino and hotels are located. The Preferred Alternative Las Vegas MSF (Wigwam Avenue MSF) would be located near the current southern edge of the greater Las Vegas metropolitan area.

The Preferred Alternative Las Vegas Station (either the Southern Station or Central Station B), along with the Las Vegas MSF would have the combined potential to create about 138 jobs at the opening year and 251 jobs in the buildout year. The growth potential for the Las Vegas Southern Station and the Las Vegas Central Station B would be the same as both would provide the same number of permanent employment opportunities. These jobs would constitute less than one percent of the anticipated growth in Clark County and Las Vegas by 2030 and therefore would not exceed current growth projections. The minimal population and housing growth as a result of either Las Vegas Station site option and the Las Vegas MSF operation would be well within the growth projections for the City of Las Vegas and Clark County.

Potential Indirect Effects

The Preferred Alternative would result in indirect growth effects to the regional and local environments during both the construction and operational phases.

Indirect Regional Effects: Transit-Oriented Development Potential

Rail transit projects often foster a mixture of residential and commercial development in a synergistic, clustered arrangement (sometimes referred to "transit-oriented development"). Such developments will typically occur around areas where people commute multiple times per week from a residential area to an employment center. A transit-oriented development (TOD) in a primarily residential area would include a mix of commercial and service oriented businesses typically geared to the daily needs of commuters (coffee shops, dry cleaners, grocery stores, etc.). By locating such business in close proximity to both transit and housing, TOD is encouraged in many jurisdictions as a means of reducing automobile trips.

The Preferred Alternative could foster some TOD within the vicinity of the station facilities, but the amount is anticipated to be small. Unlike other TODs, the Preferred Alternative would primarily serve non-work trips between two stations only – Victorville and Las Vegas. Given the travel time (at least 100 minutes between stations), anticipated $50 or greater one-way fare, and focus on serving resort-bound travelers from southern California to Las Vegas destinations, it is anticipated that the use of the rail line for frequent commute trips would be minimal. Notwithstanding, the Preferred Alternative could potentially attract people to live in the nearby vicinity of one of the stations in order to take advantage of high-speed rail transit between the two ends.

Indirect Regional Effects: Economic Vitality

The economies of several communities along the I-15 freeway are heavily dependent on visitor-serving retail and commercial uses. In particular, the communities of Barstow, Baker, Primm, and Jean each feature a variety of businesses geared to attract people driving through the I-15 freeway.

The ridership study prepared by the Applicant (**Appendix F-D**) estimates that by 2035, as many as five million annual automobile trips between southern California and Las Vegas would be diverted to high-speed rail. This diversion would reduce the potential pool of customers from visitor-serving businesses located in these communities. This could in turn have a potentially negative effect on the economic vitality of these communities. The discussion under heading "Indirect Local Effects: Barstow" below discusses the specific anticipated economic effects in Barstow as a result of the Preferred Alternative.

While the communities of Primm and Jean would have no direct public interface with the Preferred Alternative, local economies of these communities include substantial areas of "visitor-serving" uses, such as outlet malls, restaurants, and gas stations which rely heavily on automobile traffic on I-15 corridor as their primary source of customers. Since the Preferred Alternative could reduce the number of trips on the I-15 freeway and because the Preferred Alternative does not include any stops or direct interface with these communities, the Preferred Alternative could have a negative effect on the future economic growth in these communities. The traffic analysis shows that although the Preferred Alternative would accommodate a large number of trips between Victorville and California/Nevada state line, automobile traffic on the I-15 freeway would remain high. The number of automobiles traveling on the I-15 freeway between Victorville and the California/Nevada state line would be reduced at the inception of the Preferred Alternative, however the number of cars travelling on the I-15 freeway between Victorville and the California/Nevada state line by the year 2030 would increase back to near or in some cases higher volumes that under existing conditions.[45] Traffic volumes in 2030 on the I-15 freeway would be reduced by 5 to 12 percent during the AM and PM peak hours, as compared to existing traffic levels. The reason the traffic volumes on the I-15 freeway would rebound and in the future exceed existing levels even with the Preferred Alternative is because the projected increase in travel demand between southern California and Las Vegas by the year 2030. As a result, communities oriented toward visitor-serving businesses in the I-15 freeway could see a drop off in customers in the early years of the initiation of the Preferred Alternative, but traffic levels would rebound overtime so that businesses would continue to have substantial pools of potential customers on the I-15 freeway to draw from. Potential adverse effects to the economic vitality of these communities is acknowledged, but anticipated to be relatively minor in nature.

[45] DMJM Harris|AECOM. Final Report – DesertXpress Traffic Impact Analysis. February 2009.

Indirect Local Effects: San Bernardino County/City of Victorville

Operation of the Preferred Alternative has the potential for indirect growth effects relative to local economic vitality and local population patterns.

The addition of new permanent jobs with the operation of VV3 and OMSF would have the potential to indirectly affect the economic vitality of the local economy in the Victorville area. With new employment opportunities, spending in the area could increase, thus contributing to the growth in the local economy. Growth in the local economy could be beneficial to the Victorville region. However, as the job growth associated with the Preferred Alternative constitutes such a small percentage of the anticipated employment growth in the region that there would be no adverse indirect effect on the economic vitality of San Bernardino County and the City of Victorville.

While the employment growth as a result of the Preferred Alternative is relatively small in scale when compared to the anticipated growth rates for the City of Victorville and San Bernardino County, the Preferred Alternative could have the potential to induce population and housing growth as a result of the new employment opportunities. However, such growth would occur in an area where tremendous population growth has already been projected for 2030. Specifically, incorporated Victorville is anticipating a population increase of more than 100,000 people between 2010 and 2035.[46] Much of this growth would be accommodated in currently undeveloped areas to be annexed to the City by 2030. As of January 2010, Victorville expanded the City's sphere of influence limits to include an additional 37,000 acres (57 square miles). In the future, some or all of this sphere of influence are may be annexed to the City. In sum, the Preferred Alternative would create new jobs and housing in the Victorville area, but in relatively miniscule numbers when compared to anticipated growth projections.

VV3 and OMSF are likely to generate complementary, synergistic development. The OMSF may foster businesses supporting train operations, ranging from manufacturing to security and maintenance. Moreover, VV3 is likely to attract to the area a number of visitor-serving businesses, catering to passengers. As noted in the Applicant's ridership study (**Appendix F-D**), by 2035 up to seven million annual passengers would travel from other areas in southern California to Victorville in order to board Las Vegas-bound trains. It is reasonable to expect that businesses catering to the needs of rail travelers would seek to locate in the vicinity of the passenger station. Such uses could include restaurants, gas stations, auto washing and service, retail, and related visitor-serving businesses. In addition, the Victorville Station and OMSF would employ about 463 people at buildout (2030). The presence of employees could create demand for businesses and services catering to a working population, such as restaurants, day care centers, and personal services.

[46] City of Victorville. City of Victorville General Plan 2030, Draft Program EIR. August 2008.

The Victor Valley Area Transportation Study and the Regional Transportation Commission travel demand forecasting model indicates that future growth is anticipated around the station areas (see **Section 3.5, Traffic and Transportation**, of this Final EIS). However, this indirect growth would be channeled by Victorville and San Bernardino County land use plans and would occur within the anticipated growth "envelope." The general areas surrounding VV3 and OMSF are anticipated to experience significant growth. According to the City of Victorville General Plan, Victorville has assigned land use designations for the areas within the City's sphere of influence. The designations allow for more than 17 million square feet of commercial and industrial development.

Future development, if any, in the vicinity of VV3 and OMSF would be subject to the land use regulations of Victorville and/or San Bernardino County. These jurisdictions would evaluate development proposals according to relevant general plan and zoning regulations, all of which take growth projections into account. The level of indirect growth associated with VV3 and OMSF would be comfortably within regional growth projections. Moreover, the Victorville and San Bernardino County land use regulatory authority would ensure that indirect growth of jobs and housing as a result of the Preferred Alternative would conform to regional growth projections.

Construction of the DesertXpress project could result in beneficial indirect employment and economic growth effects to San Bernardino County during the three- to four-year construction period. Services and associated employment opportunities could become available to serve the jobs directly created by project construction. Construction of the DesertXpress project would introduce to San Bernardino County a total of 26,699 indirect or induced jobs. These new indirect and induced jobs would result in approximately $1.5 billion in indirect salaries, which could have a positive temporary indirect effect on the economic growth in San Bernardino County.[47] These indirect construction effects to employment and economic growth in the County would, however, be limited to the three- to four-year construction time period.

Indirect Local Effects: Barstow

The Preferred Alternative rail alignment would traverse directly through Barstow within the existing I-15 freeway. No station or maintenance facility is planned for Barstow at this time. The Preferred Alternative would result in the diversion of non-truck I-15 freeway traffic between Victorville and Las Vegas to the high-speed passenger train. As a passenger train, the DesertXpress project would not be expected to affect the amount of fleet truck traffic traveling through Barstow, as they would continue to provide their commercial transportation services using the roadway network.

[47] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.; Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

The Barstow economy is largely driven by taxable retail sales from freeway-related traffic. With the shift of non-truck freeway-related traffic to the high-speed passenger train, the Preferred Alternative would have an indirect negative growth effect to Barstow's economy during operation.

Based on the DesertXpress ridership forecast (**Appendix F-D**), it is estimated that annually about two million private automobile passengers and 260,000 bus passengers would instead use the Preferred Alternative. This rate of freeway diversion is expected to translate into a loss of about $41.6 million of total economic activity from the Barstow economy by the 3rd year of operation of the Preferred Alternative.[48] This reduction represents about a seven percent of Barstow's economy in 2009. Additionally, the Preferred Alternative would cause a 4.6 percent reduction in total City income, a 1.7 percent reduction in property tax revenue, and a 7.4 percent reduction in total sales tax revenue by the 3rd year of operation of the Preferred Alternative.[49] The Barstow economy would experience a loss in economic activity of approximately $51.9 million by the 18th year of operation of the Preferred Alternative, and increased losses in income, sales taxes, and property taxes.[50] This reduction in economic growth from passengers being diverted to the high-speed passenger train would result in a loss to the City's economic base of funds that would have flowed into the economy from outside sources. This would result in a reduced flow of funds from the retail sector to its local suppliers and service firms. This reduction would also reduce the flow of funds from the retail sector and its suppliers and service firms to households, thereby lowering the ability for households to spend money in the local economy. This cycle could result in further negative indirect growth effects to the Barstow economy.

As a result of this reduction in economic activity, operation of the Preferred Alternative is anticipated to result in the loss of 542 jobs within Barstow by the 3rd year of operation. This represents a 5.2 percent job loss in Barstow, based on a total of 10,463 jobs reported in 2009.[51]

Over time, the share of Barstow's economy affected by the Preferred Alternative will slowly grow since the high-speed passenger train ridership is expected to increase over time.[52]

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[48] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[49] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[50] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[51] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[52] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

Table F-3.2-2 summarizes the anticipated long-term potential adverse economic growth impacts on Barstow as a result of operation of the high-speed passenger train for Year 1, Year 3, and Year 18 operation.

Overall, the operation of the Preferred Alternative would have a downward influence on Barstow's economic growth, but not change to population. The magnitude of economic loss for all sources would be less than 10 percent, ranging from a low of a 1.7 percent loss on property taxes by the 3rd year of operation to a high of a 9.25 percent loss on sales taxes by the 18th year of operation. While these are potential adverse economic growth impacts to Barstow, they are not at a level that would result in secondary physical environmental effects, such as urban decay. "Urban decay" is understood to occur when an otherwise previously functioning city, or part of a city, falls into disrepair or becomes decrepit.[53] Since the negative economic effects to Barstow would not result in urban decay, no adverse physical economic growth effects would occur. However, the Applicant has proposed a voluntary mitigation measure to address concerns raised by the City of Barstow regarding potential economic impacts of the Preferred Alternative. **Voluntary Mitigation Measure GRO-1** could be applied to reduce the negative economic effects to Barstow.

The potential adverse economic growth impacts during operation of the Preferred Alternative could also affect housing values in Barstow. However, historic data indicates that the behavior of Barstow's housing market behavior has been primarily influenced by factors other than local economic fluctuations. As such, the loss of jobs in Barstow as a result of operation of the Preferred Alternative would not be anticipated to substantially affect housing growth.[54]

While operation of the Preferred Alternative would have a negative growth effect during operation, construction of the Preferred Alternative could result in beneficial indirect employment and economic growth effects during the three- to four-year construction period. Services and associated employment opportunities could become available to serve the jobs directly created by the Preferred Alternative construction. Construction of the Preferred Alternative would introduce about 2,322 indirect or induced jobs to Barstow.[55] These new indirect and induced jobs would result in approximately $126.3 million in indirect salaries, which could have a positive temporary indirect effect on the

[53] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[54] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

[55] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

economic growth in Barstow.[56] These indirect construction effects to employment and economic growth in Barstow would, however, be limited to the three- to four-year construction time period.

Indirect Local Effects: Baker

The Preferred Alternative would not stop along the rail corridor at this location nor would the Preferred Alternative remove a barrier to growth; minimal indirect growth is anticipated in Baker. Additionally, the small size of the MOW facility, staffing eight employees, would be unlikely to induce any indirect growth.

Indirect Local Effects: Clark County/City of Las Vegas

The Preferred Alternative Las Vegas Station site options (Southern Station or Central Station B) and the Las Vegas MSF would be infill developments, surrounded by existing commercial, industrial, and/or institutional uses. The Las Vegas Southern Station and Las Vegas Central Station B would have similar indirect growth effects given their similar urban context within the metropolitan Las Vegas area and that both stations would provide the same number of permanent employment opportunities. There are some currently vacant and/or underutilized areas within close proximity to these station and facility sites, which could potentially become more intensively developed as a result of construction and operation of the passenger station at either site option. This would have the potential to indirectly affect the economic vitality of the local economy through the addition of new permanent employees. Indirect growth could result from the new salaries of these permanent jobs, as the employees would potentially spend in the local economy. While there would be potential for indirect growth of business to support riders and stations, the urbanized areas surrounding the Preferred Alternative Las Vegas Station site options and the Las Vegas MSF are anticipated to see significant positive growth in economic vitality with local and regional growth projections. Potential indirect growth effects of the Preferred Alternative would therefore be minimal in comparison to the local and regional growth projections.

While the employment growth as a result of the Preferred Alternative is small in scale when compared to the anticipated growth rates for the City of Las Vegas and Clark County, the Preferred Alternative could have the potential to induce population and housing growth as a result of the new employment opportunities. However, such growth would occur in an area where tremendous population growth is anticipated by 2030. City and County projections through 2030 indicate a continuation of the exponential growth patterns each has followed over the past several decades. Therefore, even if the all of the

[56] Economic & Politics, Inc. Potential Economic Impact of DesertXpress on the City of Barstow. December 18, 2010.

proposed Las Vegas area jobs by buildout (about 250) were to be filled by people who would have to migrate to Las Vegas, this migration would be miniscule relative to overall anticipated in-migration to the Las Vegas metropolitan area.

Construction of the Preferred Alternative could result in beneficial indirect employment and economic growth effects to Clark County during the three- to four-year construction period. Services and associated employment opportunities could become available to serve the jobs directly created by project construction. Construction of the Preferred Alternative would introduce a total of 16,432 indirect or induced jobs to Clark County.[57] These new indirect and induced jobs would result in approximately $852.4 million in indirect salaries, which could have a positive temporary indirect effect on the economic growth in Clark County.[58] These indirect construction effects to employment and economic growth in the County would, however, be limited to the three- to four-year construction time period.

3.2.2.4 Comparison with Other Action Alternatives

Table F-3.2-4 compares the growth effects of the various Action Alternatives evaluated, as well as the No Action Alternative. Components of the Preferred Alternative are highlighted in yellow.

The Preferred Alternative would have similar growth effects as the Action Alternatives, since the evaluation of direct and indirect growth effects is regional in nature.

The Action Alternative rail alignments would not result in substantially varied growth effects, as they would all provide high-speed passenger rail service between Victorville and Las Vegas under the same ridership assumptions. However, the Preferred Alternative Segment 2C rail alignment through Barstow would avoid potential negative indirect growth effects to planned industrial development in Barstow. Segments 2A/2B would cross through land designated by the City of Barstow for future industrial development (Barstow Industrial Park), which could have resulted in a loss of future economic growth in the industrial sector. The Preferred Alternative Segment 2C rail alignment would avoid conflicts with the future development site and associated future potential adverse economic growth impacts, as the rail alignment would follow the I-15 freeway.

The Victorville Station and OMSF site options would also result in similar direct and indirect growth effects due to their proximity and location in primarily undeveloped areas just north of the urbanized area of Victorville.

[57] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

[58] Thomas Carroll & Associates. DesertXpress: Predicted Employment and Economic Impact Analysis. October 2010.

Table F-3.2-4 Alternatives Comparison – Growth Effects

Alternative	Estimated Permanent Employment	Removal of Obstacles to Growth	Extent of Effects to TOD Potential	Extent of Effects to Economic Vitality
No Action Alternative	None Expected	None Expected	None Expected	None Expected
Alignment Routings, including Temporary Construction Areas (TCAs), and Alignment Adjustment Areas				
Segment 1 Routing				
Segment 1	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 2				
Segment 2A/2B, 2A	n/a	None Expected	n/a	Construction Period Employment; Negative Economic Growth Effects in Barstow During Operation
Segment 2A/2B, 2B	n/a	None Expected	n/a	Construction Period Employment; Negative Economic Growth Effects in Barstow During Operation
Segment 2C	n/a	None Expected	n/a	Construction Period Employment; Negative Economic Growth Effects in Barstow During Operation
Segment 3				
Segment 3A	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 3B	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 4				
Segment 4A	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 4B	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 4C	n/a	None Expected	n/a	Beneficial Construction Period Employment

Alternative	Estimated Permanent Employment	Removal of Obstacles to Growth	Extent of Effects to TOD Potential	Extent of Effects to Economic Vitality
Segment 5				
Segment 5A	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 5B	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 6				
Segment 6A	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 6B	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 6C	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 7				
Segment 7A	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 7B	n/a	None Expected	n/a	Beneficial Construction Period Employment
Segment 7C	n/a	None Expected	n/a	Beneficial Construction Period Employment
Victorville Station and Maintenance Facility Site Options				
Victorville Station Site 1	361 to 463 Permanent Jobs in the Victorville Station and OMSF, Regardless of Location	None Expected	Beneficial Effect	Beneficial Construction and Operational Employment Effects Similar for All Victorville Station and OMSF Sites
Victorville Station Site 2		None Expected	Beneficial Effect	
Victorville Station Site 3		None Expected	Beneficial Effect	
Victorville OMSF 1		None Expected	Beneficial Effect	
Victorville OMSF 2		None Expected	Beneficial Effect	

Alternative	Estimated Permanent Employment	Removal of Obstacles to Growth	Extent of Effects to TOD Potential	Extent of Effects to Economic Vitality
Las Vegas Area Station and Maintenance Facility Site Options				
Las Vegas Southern Station	154 to 251 Permanent Jobs in the Las Vegas Station and MSF, Regardless of Location	None Expected	Beneficial Effect	Beneficial Construction and Operational Employment Effects Similar for All Las Vegas Station and MSF Sites
Las Vegas Central Station A		None Expected	Beneficial Effect	
Las Vegas Central Station B		None Expected	Beneficial Effect	
Las Vegas Downtown Station		None Expected	Beneficial Effect	
Sloan Road MSF[59]		None Expected	None Expected	
Relocated Sloan MSF		None Expected	None Expected	
Wigwam Avenue MSF		None Expected	None Expected	
Robindale Avenue MSF		None Expected	None Expected	
Frias Substation		None Expected	None Expected	
Other Facility				
Baker Maintenance of Way Facility	8 Permanent Jobs	None Expected	None Expected	Beneficial Construction and Operational Employment Effects
Technology Options, including Autotransformer Sites (EMU Only)				
DEMU (Diesel-Electric Multiple Unit)	n/a	n/a	n/a	n/a
EMU (Electric Multiple Unit)	n/a	n/a	n/a	n/a

Source: CirclePoint, 2011.

[59] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF", located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

The Las Vegas Station and MSF site options would also result in similar direct and indirect growth effects due to their location within the existing urbanized metropolitan Las Vegas area. While the Sloan Road MSF and Relocated Sloan MSF[60] would be located south of the major urbanized areas of the Las Vegas area, similar to the other Las Vegas MSF site options, they would not result in substantial growth due to the limited numbers of employees that would serve any MSF site.

3.2.3 Mitigation Measures for the Preferred Alternative

As the Preferred Alternative would not result in any adverse direct or indirect growth effects at the regional or local levels, no mitigation measures would be required. However, the Applicant has proposed a voluntary mitigation measure to address concerns raised by the City of Barstow regarding potential economic impacts of the Preferred Alternative.

Voluntary Mitigation Measure GRO-1 : Voluntary Applicant Coordination with City of Barstow and San Bernardino County for Employment

The Preferred Alternative includes Victorville OMSF 2, which would be located less than 20 miles south of Barstow. The Preferred Alternative Victorville OMSF will require hundreds of skilled railroad labor. The Applicant will coordinate with the appropriate City of Barstow and San Bernardino County economic development departments to ensure job opportunities at the maintenance facility are made available to Barstow residents.

In addition to permanent jobs during operations, preliminary planning has identified Barstow as a key location for staging and construction support services during the construction, testing, and commissions phases of the Preferred Alternative. The Applicant will work with the City of Barstow to ensure its residents are informed of job opportunities both during construction and operation of the Preferred Alternative. The Applicant will also work closely with the City of Barstow to identify appropriate and beneficial construction and staging activities to be located within the City. Additionally, the Applicant will work with the City to identify and jointly develop programs for job training and technical skills training to support the project in all phases of design, construction, testing, and commissioning, and operations.

[60] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF", located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

3.2.4 Residual Impacts Following Mitigation

Construction of the Preferred Alternative would result in a beneficial economic growth effect during the three- to four-year construction period. The Preferred Alternatives would result in a temporary increase in the construction industry employment, helping to alleviate unemployment levels in the project area. Within California, it is assumed that Barstow would experience the greatest economic and employment growth during construction of the Preferred Alternative due to its central location along the rail alignment. The cities along the Preferred Alternative rail alignment, specifically Victorville, Barstow, and Las Vegas, would experience indirect economic benefits to the local economies during the temporary construction period.

The diversion of non-truck I-15 freeway traffic to the high-speed passenger train would result in residual potential adverse economic growth impacts to Barstow. While these losses would not be considered to result in urban decay or adverse physical environmental effects, retail sales previously assumed from non-truck freeway-related traffic traveling between southern California and Las Vegas would be lost, thereby resulting in a decline in funds entering the local economy during operation of the Preferred Alternative.

3.3 FARMLANDS AND GRAZING LANDS

This section describes updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential farmland and grazing land impacts associated with the Preferred Alternative in comparison to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.3.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to farmland and grazing land impacts and provides responses to those comments. Substantive updates and changes in response to comments on the Draft EIS and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

3.3.1.1 Affected Environment

Draft EIS **Section 3.3.3** and Supplemental Draft EIS **Section 3.3.1** describe in detail the affected environment for farmland and grazing land impacts for the DesertXpress project.

Since publication of the Supplemental Draft EIS, there has been no change to the affected environment regarding farmlands and grazing lands. As a note, the farmland data in the Draft EIS was updated as part of the Supplemental Draft EIS. The Draft EIS used 2006 Farmland Mapping and Monitoring Program (FMMP) data, which was the most current available data at the time of publication in March 2009. The California Department of Conservation released the 2008 FMMP data in April 2009 (after publication of the Draft EIS in March 2009). The Supplemental Draft EIS updated the affected environment discussion for farmlands with the 2008 FMMP data. The 2008 FMMP data used in **Section 3.3, Farmlands and Grazing Lands**, of the Supplemental Draft EIS remains applicable to this Final EIS and reflects the most current information available from the California Department of Conservation.

3.3.1.2 Regulatory Environment

The regulatory environment for farmlands and grazing lands for the DesertXpress project is described in detail in Draft EIS **Section 3.3.1**. In addition, no comments received during the public review period required changes to the regulatory environment discussion in the Draft EIS. This regulatory environment discussion remains applicable to this Final EIS and the evaluation of the Preferred Alternative.

3.3.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

One comment on the Draft EIS resulted in changes to the farmland and grazing land analysis in this Final EIS as discussed below.

Comment 184 on the Draft EIS requested clarification of the term "severance payments" in **Mitigation Measure FAR-2**. To address this comment, this Final EIS amends Draft EIS, **Mitigation Measure FAR-2** in **Section 3.3.5** to include the following footnote:

> **[2] The mitigation measure discusses the potential for the project to have "severance" impacts—in other words, dividing an existing parcel in current agricultural use such that one or both sides of the divided parcel is too small a size to be viably farmed. The mitigation measure stipulates that as a first course of action where such severance might occur, the Applicant identify ways for the project to avoid dividing property in this manner, such as through an underpass. Where such solutions are not viable, the mitigation recommends compensation to farmers for the economic loss associated with the severance.**

3.3.2 Analysis of Environmental Consequences

3.3.2.1 Methods of Evaluation

The methodology described in Draft EIS **Section 3.3.2** used to evaluate direct and indirect impacts to farmland and grazing lands remains applicable to this Final EIS and the evaluation of the Preferred Alternative. This same methodology was used in the Supplemental Draft EIS. Direct effects would occur on any farmland or grazing land crossed by the rail alignment or on sites proposed for stations or other permanent facilities. Indirect effects would occur within a 37.5-foot buffer on either side of the rail alignment as a result of parcel severance (including blocking water resources for livestock) or cutting off access to a farmed or grazed parcel.

3.3.2.2 No Action Alternative

Under the No Action Alternative, no privately-sponsored high-speed passenger rail system would be constructed or operated in the study area.

This alternative would include roadway widening/expansion projects such as the widening of the bridge over the Mojave River in Victorville, widening approximately one mile of the freeway to six lanes and reconstruction of an interchange in Barstow, adding several truck lanes in California along the highway sections with steep grades, and several roadway projects in Nevada. These projects would not directly affect farmland, as there is no farmland identified along the I-15 freeway in these areas. However, roadway widening and interchange construction in Barstow as well as the addition of truck lanes in steeply graded sections of the I-15 freeway in California could result in direct and indirect impacts

to farmland. Since development would occur in the ROW of existing roadways, resulting effects to farmland would likely be minimal. Subsequent environmental review by the project proponent would be conducted to identify the impacts to farmland from each of these roadway projects.

Since the Action Alternatives include all of the actions proposed under the No Action Alternative plus construction of the DesertXpress project, the No Action Alternative would result in the least amount of development. Overall, farmland would be affected the least by the No Action Alternative.

3.3.2.3 Preferred Alternative

Draft EIS **Section 3.3.3.2** and Supplemental Draft EIS **Section 3.3.3** describe in detail the farmland and grazing land impacts by individual project components. The discussion below summarizes the aggregated effect for the components that comprise the Preferred Alternative.

Direct Effects to Farmlands

Within the project area, farmland occurs only in California and only as far east as Newberry Springs. Eastward from Newberry Springs through Las Vegas, there are no farmlands in proximity to the Preferred Alternative. The Preferred Alternative would not result in a direct effect to farmlands as there is no Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, Unique Farmland, nor any lands under Williamson Act contracts in the project area. Although prime farmland is located near Segment 3B (see **Figure F-3.3-1**), the project would occur within the I-15 freeway corridor and this would not entail the direct use of any farmland.

Indirect Effects to Farmlands

Prime Farmland and Farmland of Statewide Importance are located near Segment 3B of the Preferred Alternative (see **Figure F-3.3-1**). The Preferred Alternative would potentially result in indirect impacts to Prime Farmland due to the alignment's proximity to a pistachio nut orchard in the Newberry Springs area. Construction activity would result in temporary increases in dust that could affect those portions of the orchard closest to the proposed rail alignment, (a total of less than 1/1000th of an acre).

Table F-3.3-1 shows the acreage of the farmland indirectly affected by the Preferred Alternative. The direct and indirect impacts are related to the proposed rail alignment segments of the Preferred Alternative. None of the proposed sites for stations, maintenance facilities, nor TCAs would be located on farmland.

Table F-3.3-1 Indirect Effects to Farmland

Farmland Type	Indirect Effects (acreage)
Prime Farmland	0.008
Unique Farmland	0
Farmland of Statewide Importance	0
Farmland of Local Importance	0
Total Farmlands Affected	0.008
Lands Under Williamson Act Contract	N/A

Source: California Department of Conservation, Farmland Mitigation and Monitoring Program, 2008.

Direct Effects to Grazing Lands

Grazing land in the project area only occurs in California (see **Figure F-3.3-2**). The Preferred Alternative would be located on lands under grazing allotments by the BLM. The Preferred Alternative would result in the permanent conversion of approximately 442 acres of grazing land to transportation uses. The majority of the permanent conversion would occur at the Preferred Alternative Victorville Station Site 3 (VV3) which would result in approximately 205 acres of grazing land impacted and Segment 4C which would result in approximately 176 acres of grazing land impacted in the Mountain Pass area. Construction and operation of the Preferred Alternative would result in the permanent conversion of grazing lands to transportation uses.

Indirect Effects to Grazing Lands

Some areas of the Preferred Alternative rail alignment would potentially result in indirect effects to grazing lands by cutting off livestock access to available water sources or result in the removal of livestock fencing, which would allow livestock to trespass, become lost, or potentially struck by vehicles on nearby roadways, including the I-15 freeway (see **Figure F-3.3-3**). Within areas to the north of Mountain Pass, the primary sources of water for cattle within the joint BLM/NPS grazing allotment area are located within the Clark Mountains Allotment of the Mojave National Preserve (Preserve). The Preferred Alternative rail alignment would thus form a barrier within the allotment, concentrating cattle closer to the water sources and thus resulting in overuse of the Clark Mountain Unit of the Preserve for grazing activities. Thus, the Preferred Alternative would result in adverse indirect effects to existing grazing lands.

3.3.2.4 Comparison with Other Action Alternatives

Tables F-3.3-2 summarizes the comparison of farmlands and grazing lands effects for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow.

Farmlands

Prime Farmland and Farmland of Statewide Importance are located near Segment 3A/3B. The Preferred Alternative would result in minor indirect impacts to the Prime Farmland due to Segment 3B's proximity to a pistachio nut orchard in the Newberry Springs area. Segment 3A would also be in the vicinity of the pistachio nut orchard but would be located in the median of the I-15 freeway and would not result in any indirect effect, thereby avoiding the potential 0.008 acres of indirect effect created by Segment 3B of the Preferred Alternative.

Segment 2A/2B would be adjacent to and cross Prime Farmland. This Action Alternative would result in increased direct effects to 3.37 acres of farmland when compared to Segment 2C of the Preferred Alternative that would avoid farmlands otherwise impacted by Segment 2A/2B.

Grazing Lands

Segment 4A would greatly reduce the direct effect on grazing lands because it would avoid impacts to grazing lands in the Mountain Pass area by following the existing I-15 freeway ROW rather than creating a new linear barrier across undeveloped lands. Segment 4A would also avoid the indirect effects of the Preferred Alternative on grazing lands in the Mountain Pass area.

Similar to the Preferred Alternative, Segment 4B would travel through BLM grazing allotments and would result in the permanent conversion of grazing lands to transportation uses, although the amount of grazing land converted to other uses would be less under Segment 4B when compared to Segment 4C.

VV1 and OMSF 1 site option would avoid BLM grazing allotments altogether and would not result in any direct or indirect effects to grazing lands. VV2 would be located on BLM grazing allotments and would result in similar direct and indirect effects to grazing lands as the Preferred Alternative Victorville Station Site 3.

Table F-3.3-2 Alternatives Comparison – Farmlands and Grazing Lands

Alternative	Acres of Directly Impacted Farmland	Acres of Indirectly Impacted Farmland	Potential Severance of Grazing Allotment
No Action Alternative	None expected	None expected	None expected
Alignment Routings, including Temporary Construction Areas (TCAs), Alignment Adjustment Areas, and Autotransformer Sites (EMU Only)			
Segment 1 Routing			
Segment 1	None	None	Yes, would traverse a BLM grazing allotment
Segment 2			
Segment 2A/2B, 2A	3.37 acres	6.75 acres	None
Segment 2A/2B, 2B	3.37 acres	6.75 acres	None
Segment 2C	None	None	None
Segment 3			
Segment 3A	None	0.3 acres	No, adjacent to grazing lands
Segment 3B (Modified)	None	0.008 acres	No, adjacent to grazing lands
Segment 4			
Segment 4A	None	None	None
Segment 4B	None	None	Yes, would traverse an allotment
Segment 4C	None	None	Yes, would traverse an allotment
Segment 5			
Segment 5A	None	None	None
Segment 5B	None	None	None

Alternative	Acres of Directly Impacted Farmland	Acres of Indirectly Impacted Farmland	Potential Severance of Grazing Allotment
Segment 6			
Segment 6A	None	None	None
Segment 6B	None	None	None
Segment 6C	None	None	None
Segment 7			
Segment 7A	None	None	None
Segment 7B	None	None	None
Segment 7C	None	None	None
Victorville Station and Maintenance Facility Site Options			
Victorville Station Site 1	None	None	All Victorville Station/OMSF Site options are on land identified as a grazing allotment but are immediately adjacent to the I-15 freeway, minimizing severance potential
Victorville Station Site 2	None	None	
Victorville Station Site 3	None	None	
Victorville OMSF 1	None	None	
Victorville OMSF 2	None	None	
Las Vegas Area Station and Maintenance Facility Site Options			
Las Vegas Southern Station	None	None	None
Las Vegas Central Station A	None	None	None
Las Vegas Central Station B	None	None	None

Alternative	Acres of Directly Impacted Farmland	Acres of Indirectly Impacted Farmland	Potential Severance of Grazing Allotment
Las Vegas Downtown Station	None	None	None
Sloan Road MSF[1]	None	None	None
Relocated Sloan Road MSF	None	None	None
Wigwam Avenue MSF	None	None	None
Robindale Avenue MSF	None	None	None
Frias Substation	None	None	None
Other Facility			
Baker Maintenance of Way Facility	None	None	No, adjacent to grazing lands
Technology Options			
DEMU (Diesel-Electric Multiple Unit)	None	None	None
EMU (Electric Multiple Unit)	None	None	None

Source: CirclePoint, 2011.

[1] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

3.3.3 MITIGATION MEASURES FOR THE PREFERRED ALTERNATIVE

Mitigation Measures FAR-1, FAR-3, and **FAR-4** identified in **Section 3.3.5** of the Draft EIS and **Mitigation Measures FAR-5** and **FAR-6** identified in **Section 3.3.4** of the Supplemental Draft EIS would be applied to all facilities and rail alignments of the Preferred Alternative to reduce the adverse effects related to farmlands and grazing lands. **Mitigation Measure FAR-2** of the Draft EIS would not be required for the Preferred Alternative. These mitigation measures are included below.

Mitigation Measure FAR-1: Direct and Indirect Conversion of Protected Farmland

Prior to construction, the Applicant shall acquire conservation easement(s) over agricultural lands of equal quality to mitigate for direct and indirect impacts related to the permanent conversion of protected agricultural lands (Prime Farmlands, Unique Farmlands, and Farmlands of Statewide and/or Local Importance). This conservation easement(s) shall provide for the conservation of agricultural uses in perpetuity, and be held in trust by a public agency or other appropriate entity. These easements shall be located within the limits of San Bernardino County. Lands to be placed under conservation easement shall be procured on a ratio of 1 acre for each 1 acre of protected farmland converted directly and indirectly to non-agricultural use.

Mitigation Measure FAR-3: Livestock Access to Water

Prior to issuance of the permit to construct, the Applicant shall consult with BLM range resource managers to determine if the Preferred Alternative will affect livestock access to water on grazing lands. If BLM range resource managers determine that construction would block livestock access to critical water sources, the applicant shall provide alternative water sources as approved by the BLM or implement **Mitigation Measure FAR-6**.

Mitigation Measure FAR-4: Fencing and Gate Modifications

Prior to issuance of the permit to construct, the Applicant shall coordinate with BLM range resource managers and permittees to locate range improvements that might require special attention when fencing or gates are modified. Gates that do not require removal shall be closed directly after construction traffic has passed though them. The Applicant shall replace all range improvements damaged or removed during construction activities as determined necessary by the BLM.

Mitigation Measure FAR-5: Provide Adequate Cattle Access in Areas of the Joint NPS/BLM Grazing Allotment

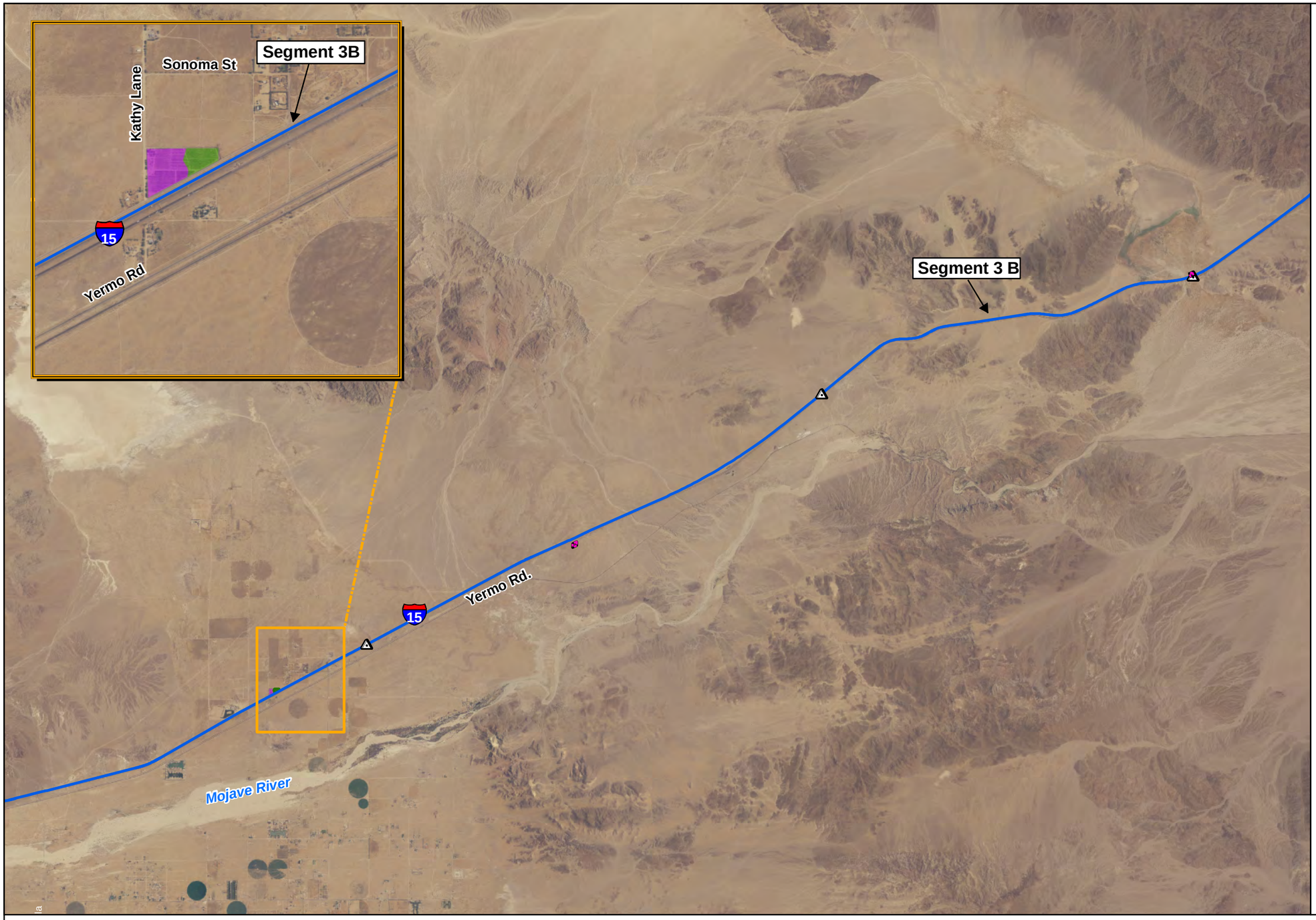
Prior to issuance of the permit to construct, the Applicant shall prepare revised plans for Segment 4C which include adequate cattle crossings to allow movement of cattle within the joint BLM/NPS grazing allotment or implement **Mitigation Measure FAR-6**. The location, number and design of the crossings shall be reviewed and approved by the General Manager of the Mojave National Preserve.

Mitigation Measure FAR-6: Purchase Grazing Allotment

Prior to issuance of the permit to construct, the Applicant shall purchase the rights to the grazing allotment(s) directly affected by VV3, OMSF2, and Segment 4C and discontinue grazing activities if determined necessary, based on implementation of **Mitigation Measure FAR-3** and **Mitigation Measure FAR-5**. The purchase of the rights and discontinuing of grazing activities shall be reviewed and approved by the BLM and the General Manager of the Mojave National Preserve as appropriate.

3.3.4 Residual Impacts Following Mitigation

Implementation of **Mitigation Measures FAR-1** and **FAR-3** through **FAR-6** would minimize effects to farmlands and grazing lands, including indirect effects to grazing lands and activities. However, even with mitigation, the Preferred Alternative would result in the direct conversion of 442 acres of grazing lands to transportation uses.



Legend

Farmland Types

- Prime Farmlands
- Statewide Important Farmlands

NOTE: Maps depict only those farmlands within the direct and indirect impact areas (25- and 75-foot buffers on either side of the proposed rail centerline).

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

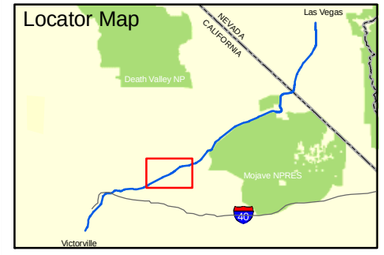
NORTH

Kilometers
0 3 6

Miles
0 1.5 3

Source: DesertXpress 2007, ESRI 2005, NAIP, Farmland Mapping & Monitoring Program

Locator Map



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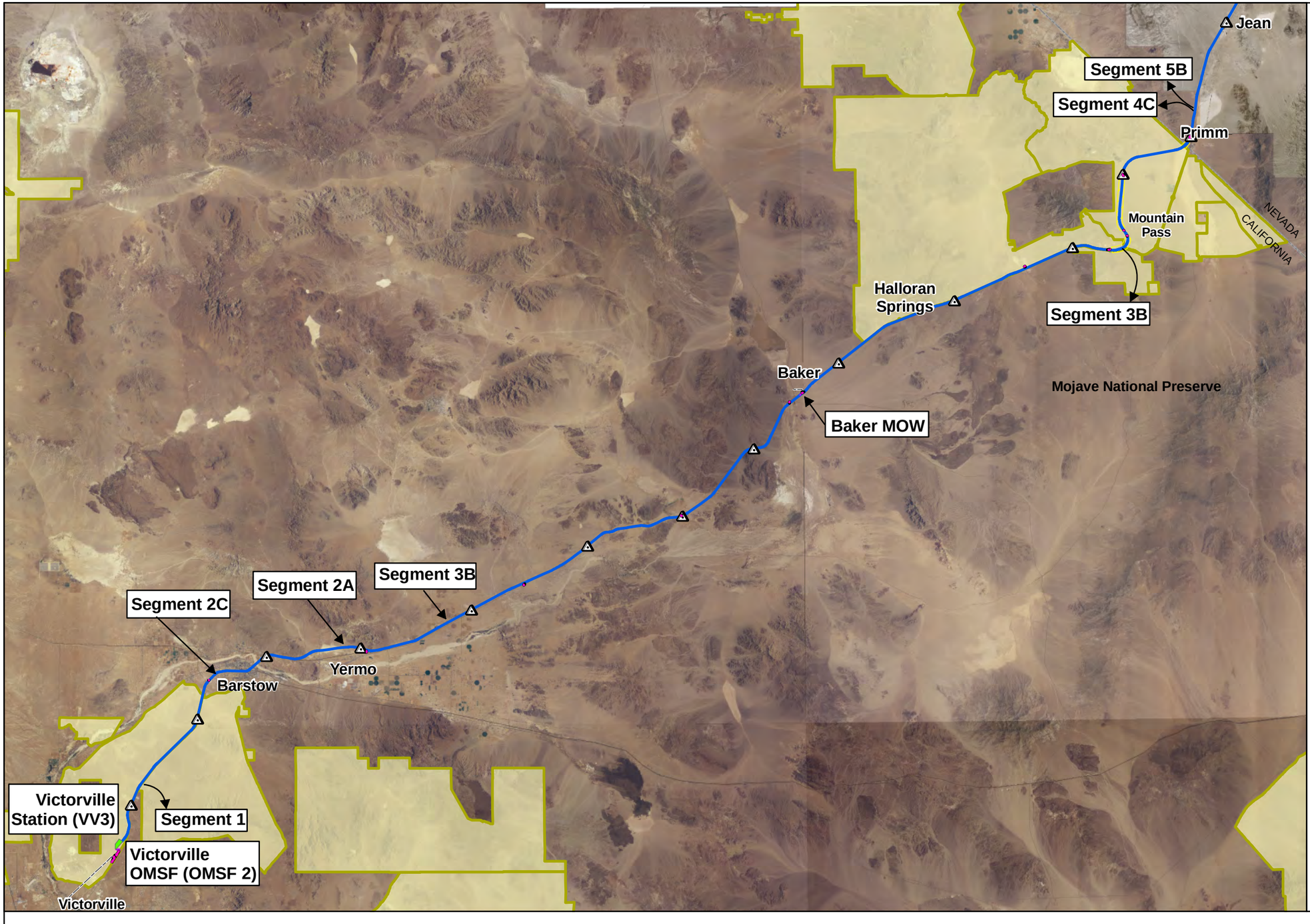
Farmlands within Direct / Indirect Impact Areas, Preferred Alternative - Segment 3B

FIG **F-3.3-1**

Geografika Consulting 01.17.11



Legend

DesertXpress Alignment

- Preferred Alternative
- Grazing Allotment

Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals 13 miles

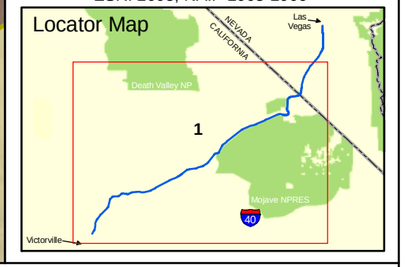
NORTH

0 10 20 Kilometers

0 5 10 Miles

Source: BLM 2008, DesertXpress 2007, ESRI 2005, NAIP 2003-2006

Locator Map



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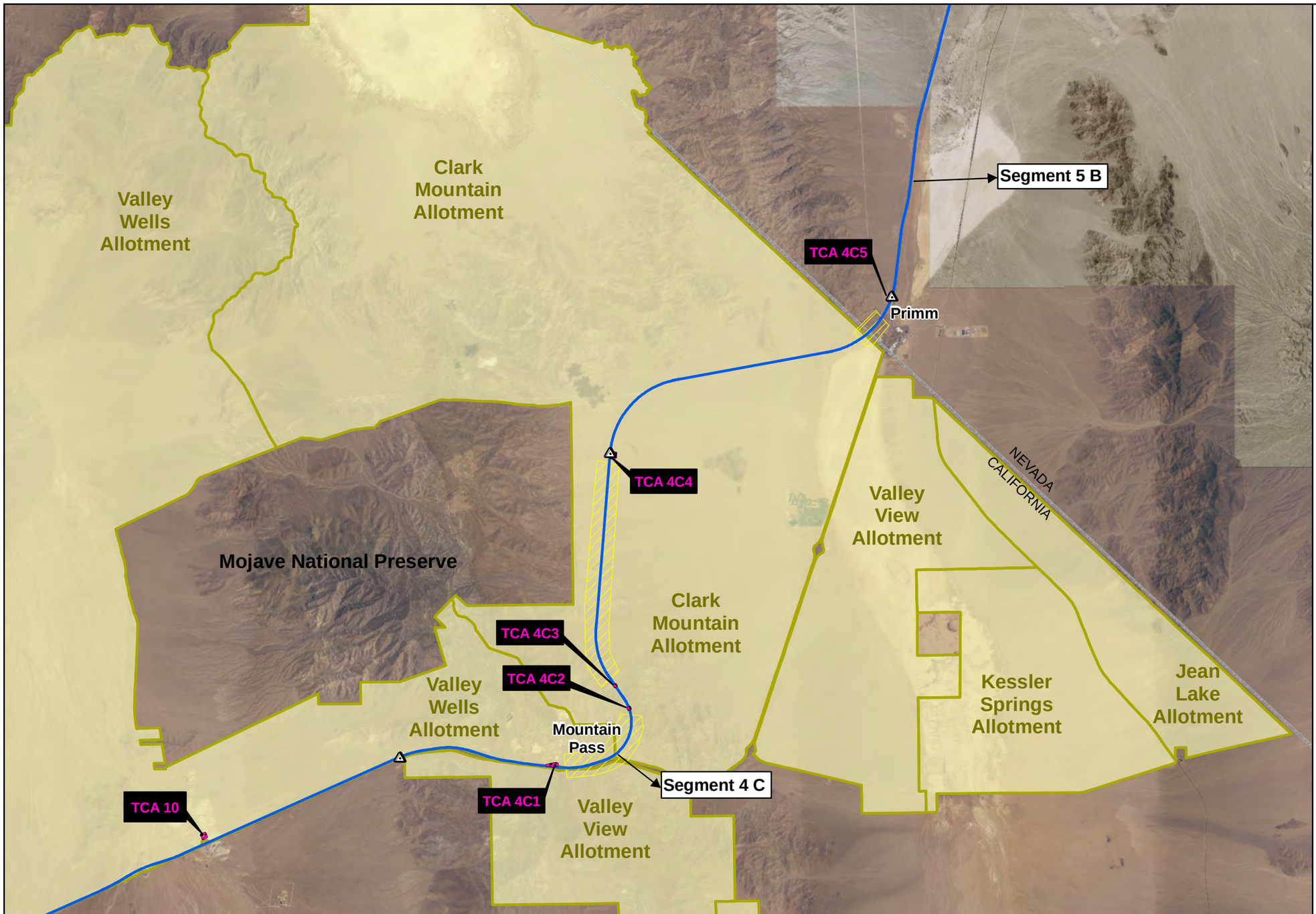
Grazing Allotment

FIG F-3.3-2

Geografika Consulting 01.25.11



Legend

DesertXpress Alignment

- Preferred Alternative
- Grazing Allotment

Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

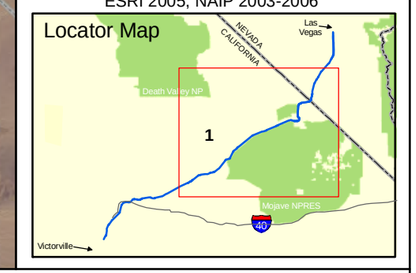
1 inch equals 13 miles

NORTH

0 2.5 5 Kilometers

0 1.5 3 Miles

Source: BLM 2008, DesertXpress 2007, ESRI 2005, NAIP 2003-2006



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Preferred Alternative, Segment 4C - Grazing Land Allotments

FIG F-3.3-3

Source: Geografika Consulting 01.17.11

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3.4 UTILITIES/EMERGENCY SERVICES

This section describes updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential utilities and emergency service impacts associated with the Preferred Alternative compared to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

The potential utility impacts addressed in this section relate to the existing system capacities in the project area. Potential impacts to water quality as a result of stormwater runoff from the proposed project improvements are discussed in **Section 3.8, Hydrology and Water Quality**, of this Final EIS.

3.4.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, includes all comments on the Draft EIS and Supplemental Draft EIS related to utilities and emergency services and provides responses to those comments. Several comments resulted in changes to the analysis of utilities and emergency services in the EIS and are discussed below. Substantive updates and changes made in response to comments on the Draft and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

3.4.1.1 Affected Environment

Draft EIS **Section 3.4.3** and Supplemental Draft EIS **Section 3.4.1** describe in detail the affected environment for utilities and emergency services for the DesertXpress project.

The study area for public services and utilities includes the areas in which the track infrastructure and associated project stations, maintenance facilities, and other features would be constructed and operated. These areas are served by a variety of public and private utilities, which provide electricity, natural gas, potable water, wastewater conveyance, and solid waste disposal services. The areas are also served by numerous entities providing law enforcement, fire protection, and emergency medical services. Since publication of the Draft EIS and Supplemental Draft EIS, there has been no change to the utilities and emergency services providers that would serve the project. Thus the affected environment discussions from these previous documents remain applicable to the Preferred Alternative. **Table F-3.4-1** provides a summary of existing utilities and service providers for the Preferred Alternative.

3.4.1.2 Regulatory Environment

The regulatory environment for utilities and emergency services for the DesertXpress project is described in detail in Draft EIS **Section 3.4.1**.

Since publication of the Draft EIS, there has been no change to the Regulatory Environment regarding utilities and emergency services. Thus the regulatory environment discussion remains applicable to the Preferred Alternative. In addition, this Final EIS amends Draft EIS **Section 3.4.1** to include the following discussion of Federal requirements for passenger train emergency preparedness:

> **Passenger Train Emergency Preparedness**
>
> **FRA is the Federal agency responsible for promoting the safety of the nation's passenger and freight railroads. FRA fulfills this responsibility by developing programs that identify, monitor, and address railroad safety issues, and by promulgating and enforcing regulations that prescribe minimum rail safety standards. On May 4, 1998, FRA published rail safety regulations for the preparation, adoption, and implementation of emergency preparedness plans by railroads connected with the operation of passenger trains, including railroads hosting the operations of rail passenger service. These regulations became effective on July 6, 1998, and are codified in Part 239 of Title 49 of the Code of Federal Regulations (CFR).**
>
> **The DesertXpress project would be subject to the provisions set forth in FRA's most current *Guide to Developing a Passenger Train Emergency Preparedness Plan*.[1] The Applicant retains the responsibility for developing and implementing an emergency preparedness plan that complies with the regulations, based on the specific circumstances of the proposed railroad's operations (see Mitigation Measure UTIL-7).**

[1] Federal Railroad Administration. *Guide to developing a passenger train emergency preparedness plan*. January 2010.

Table F-3.4-1 Utilities and Public Service Providers to the Preferred Alternative

Project Area/Location	*Service Providers*					
	Electric/Gas	**Water**	**Sewage/Storm Water**	**Solid Waste**	**Police**	**Fire/Emergency Response**
Victorville Passenger Station and OMSF Site	Southern California Edison Southwest Gas Corporation	Victorville Water District	Victor Valley Wastewater Reclamation Authority	San Bernardino County Solid Waste Management Division	San Bernardino County Sheriff (includes contract "Victorville Police Department")	San Bernardino County Fire Department
Segment 1	LA Department of Water and Power	NA	NA	NA	San Bernardino County Sheriff Barstow Police Department California Highway Patrol	Barstow Fire Protection District San Bernardino County Fire Department
Segment 2C Side Running/ Segment 2A	Southern California Edison Southwest Gas Corporation	N/A	N/A	N/A	San Bernardino County Sheriff California Highway Patrol	Barstow Fire Protection District San Bernardino County Fire Department
Segment 3B	Southern California Edison Southwest Gas Corporation	N/A	N/A	N/A	San Bernardino County Sheriff California Highway Patrol	San Bernardino County Fire Department

Project Area/Location	*Service Providers*					
	Electric/Gas	**Water**	**Sewage/Storm Water**	**Solid Waste**	**Police**	**Fire/Emergency Response**
Segment 4C	Southern California Edison Southwest Gas Corporation	NA	NA	NA	San Bernardino County Sheriff California Highway Patrol	Portion of Segment 4a only: Mojave National Preserve: Interagency Fire Center San Bernardino County Fire Department
Segment 5B	Nevada Power Southwest Gas Corporation	NA	NA	NA	Las Vegas Metropolitan Police Department Nevada Highway Patrol	Clark County Fire Department
Segment 6B	Nevada Power Southwest Gas Corporation	N/A	N/A	N/A	Las Vegas Metropolitan Police Department Nevada Highway Patrol	Clark County Fire Department Las Vegas Fire and Rescue
Las Vegas Southern Station or Central Station B	Nevada Power Southwest Gas Corporation	Las Vegas Valley Water District	Clark County Water Reclamation District	Republic Services of Southern Nevada	Las Vegas Metropolitan Police Department	Las Vegas Fire and Rescue
Wigwam MSF and Frias Substation	Nevada Power Southwest Gas Corporation	Las Vegas Valley Water District	Clark County Water Reclamation District	Republic Services of Southern Nevada	Las Vegas Metropolitan Police Department	Las Vegas Fire and Rescue

Source: CirclePoint, 2010

3.4.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

The Utilities and Emergency Services mitigation measures in **Section 3.4, Utilities/ Emergency Services**, of the Draft EIS and **Section 3.4, Utilities/Emergency Services**, of the Supplemental Draft EIS utilized only numbers to identify the mitigation measures. To be consistent with the rest of the Final EIS, the mitigation measures in this section will hereinafter be numbered in a format that identifies the Final EIS section as well as the mitigation number. The following lists the revisions to the numbering of the Utilities and Emergency Services mitigation measures in this Final EIS:

Mitigation Measure 1 becomes **Mitigation Measure UTIL-1**

Mitigation Measure 2 becomes **Mitigation Measure UTIL-2**

Mitigation Measure 3 becomes **Mitigation Measure UTIL-3**

Mitigation Measure 4 becomes **Mitigation Measure UTIL-4**

Mitigation Measure 5 becomes **Mitigation Measure UTIL-5**

Mitigation Measure 6 becomes **Mitigation Measure UTIL-6**

Mitigation Measure 7 becomes **Mitigation Measure UTIL-7**

Mitigation Measure 8 becomes **Mitigation Measure UTIL-8**

As discussed above, this Final EIS amends Draft EIS **Section 3.4.1** to include a discussion of Federal requirements for passenger train emergency preparedness. Consistent with the provisions of these Federal requirements, this Final EIS also amends **Mitigation Measure UTIL-7** of the Draft EIS to include a discussion of the Applicant's responsibility to conform with FRA's emergency preparedness plan requirements.

Mitigation Measure UTIL-7 - Develop a comprehensive emergency operations plan

The Applicant shall develop and implement an emergency preparedness plan that complies with the provisions set forth in FRA's most current *Guide to Developing a Passenger Train Emergency Preparedness Plan*.[2] ~~To protect life safety for passengers and people traveling in the vicinity of the proposed rail alignments, the project applicant shall develop and periodically update and test a comprehensive emergency operations plan.~~ This plan shall set forth protocols in the event of train derailments and other catastrophic events. The applicant shall be responsible for conducting briefings and/or trainings on the plan with all appropriate employees, as well as with representatives of local first responders and transportation agencies. This may

[2] Federal Railroad Administration. *Guide to developing a passenger train emergency preparedness plan.* January, 2010.

include a training of local first responders regarding proposed rail facilities, including train sets, any catenary structures, and other unique features. The plan shall set forth appropriate lines of communication in the event of emergency events. The plan shall specifically identify protocols in the event an emergency involving a train derailment and blockage of any freeway lanes, an emergency in the proposed tunnels within Segment 4C, and emergencies involving loss of locomotive power ~~in the event the EMU option is selected~~.

The Applicant shall file one copy of the proposed emergency preparedness plan with the head of FRA's Office of Railroad Safety, FRA's Associate Administrator for Railroad Safety/Chief Safety Officer, not less than 45 days prior to commencing the passenger train service described in the proposed plan. FRA will conduct a review of the proposed plan to determine whether the elements prescribed in Part 239 of Title 49 of the CFR are sufficiently addressed and discussed in the proposed plan. FRA must issue a final approval letter to the Applicant prior to opening services to the public.

Comments S-320, S-321, and S-322 were received from Southern California Edison (SCE) during the public review period for the Supplemental Draft EIS, and assert that further coordination will be needed with the Applicant to determine if the company's existing equipment and facility conditions are adequate to serve the future needs of the project's passenger stations [Victorville Station (VV3) and Las Vegas Central Station B].

As a result, this Final EIS amends the text on Draft EIS page 3.4-31 as follows:

Victorville passenger station and OMSF site options, Baker Maintenance of Way Facility: All of these proposed facilities would utilize natural gas and electricity. Southern California Edison (SCE) provides electrical services to the project area. SCE reports ~~sufficient equipment and facility conditions~~ **that it is able** to serve the existing and future needs of the project's passenger station, OMSF, and Maintenance of Way facility. **However, further coordination with SCE, including formal submittals, will be necessary for SCE to determine the precise needs of the project.**

The San Bernardino County Land Use Services division submitted comments requesting discussion of the potential impacts of train operations related to various public utilities. The San Bernardino County Department of Public Works also requested that a discussion of the project's solid waste generation during construction be addressed in the Final EIS. As a result, this Final EIS amends Draft EIS **Section3.4.4.2** to include the following information:

Water Supply and Service

Railroad Segments 1-7: The proposed rail alignments would not generate demand for water. There would not be any landscaping nor any other water related use associated with the rail segments that would create an ongoing demand for water. **The trains would be equipped with restrooms for the passengers that would provide a small amount of potable water from a closed system in the train. This water would be collected at the passenger stations and/or maintenance facility sites. Water usage on the trains would be related to potable and lavatory uses and is accounted for within the demand assumed for the station building.** ~~Water usage would be limited to built facilities, discussed below.~~

Sewage and Wastewater

Railroad Segments 1-7: As the proposed rail segments would not generate demand for water, nor would they produce wastewater or trigger the need for wastewater services. **The trains would be equipped with a closed water system that would provide small amounts of potable water for the restrooms on the trains. It is also likely that the restrooms on the trains would be equipped with ultra-low flow toilets that would generate very small amounts of wastewater. Sewage and wastewater from the trains would be stored in the closed system while in operation, and would ultimately be released at the passenger stations and/or maintenance facilities. The wastewater would be appropriately discharged into the wastewater systems that serve the stations and/or maintenance facilities. Wastewater generation on the trains is accounted for within the assumed demand of the passenger stations and maintenance facilities, discussed below.** ~~Wastewater would be generated only at built facilities, as discussed below.~~

Solid Waste

Construction Waste: **Construction of the Preferred Alternative would generate solid waste. Most of the rail alignment will be located within the I-15 right of way and would thus not require substantial demolition. Similarly, several built facilities, including the Victorville Station, and the Baker Maintenance of Way facility would be constructed on substantially vacant and/or undeveloped lands, minimizing the potential for demolition related waste. However, the construction of the Preferred Alternative can reasonably be assumed to generate a mixed waste stream including but not limited to hardscapes, plant material, metals, and other wastes.**

Where such materials would not be recycled or reused, area landfills, in particular the Victorville Landfill and the Apex Regional Landfill, each indicate substantial remaining capacity to accept new waste such that the one-time generation of project-related construction waste could be accommodated.

Railroad Segments 1-7: The proposed rail alignments would not generate solid waste. Daily maintenance-of-way activities may be required to dispose of waste items that may have strayed onto the tracks. However, this amount of waste is expected to be incidental/negligible. Maintenance of the rail trackway over time would generate waste railroad ties and scrap and hardware that would typically be recycled. **Solid waste generated by the passengers on the trains would is assumed to be within the amount of waste anticipated by activity at the passenger stations and maintenance facilities, which is further discussed below.**

Draft EIS **Section 3.4.4.2** stated that a Water Supply Assessment (WSA) was recommended by the Victorville Water District (VWD) prior to project construction to better determine the size of water facilities needed to adequately serve the Victorville Station and OMSF at buildout. However, this requirement was not folded into the mitigation measures. As part of this Final EIS, the requirement to prepare a WSA has been included as part of **Mitigation Measure UTIL-2** of **Section 3.4, Utilities/ Emergency Services**. This Final EIS amends the text on Draft EIS page 3.4-41 as follows:

Mitigation Measure UTIL-2*:* Minimize water usage through the incorporation water saving devices wherever required or feasible; require drought-tolerant landscaping at all facilities. In addition to the preparation of a Water Supply Assessment, stations and maintenance facilities will utilize water for consumption, operations, and landscaping purposes. Wherever feasible, low water usage practices should be implemented, including in restrooms and landscaping. As the stations and maintenance facilities are located in regions with very low annual rainfall, any landscaping of such facilities shall feature drought-tolerant and/or xeriscape (low- and/or no-water) landscape features that will minimize and/or avoid the need for any landscape watering.

Mitigation Measure UTIL-5 of the Draft EIS did not include descriptive text under the main mitigation header. For further clarification of the measure, this Final EIS amends Draft EIS **Mitigation Measure UTIL-5** to include the following information:

Mitigation Measure UTIL-5 - Develop appropriate stormwater conveyance structures/systems at station and maintenance facility sites, as well as points along railroad segments, where it is not possible to connect to existing systems: All of the components that comprise the Preferred Alternative have the potential to generate additional

stormwater requiring discharge. Where it is not possible to connect to existing systems, the Applicant shall coordinate with the local agencies to develop appropriate stormwater conveyance structures/systems in the areas of the proposed improvements. The Applicant shall either fund the upsizing of existing facilities or create new facilities that comply with local stormwater regulations.

Comment S-324 on the Supplemental Draft EIS requested that additional language be incorporated into the avoidance, minimization, and mitigation measures to clarify that, if the adjustment or relocation of any existing utility or pipeline or any permitted encroachment is unavoidable, the Applicant shall be responsible for all costs to the utility facility. In addition, Comment S-304 requested that additional language be incorporated into the avoidance, minimization, and mitigation measures to clarify that, if grading activity affects the transmission line access roads, the Applicant shall replace the affected access roads using the Los Angeles Department of Water and Power (LADWP) Access Road Design Criteria, as appropriate. This Final EIS amends Draft EIS **Mitigation Measure UTIL-8** as follows:

Mitigation Measure UTIL-8 - Avoid or minimize conflicts with existing utility infrastructure: For water, wastewater, communications, local gas pipelines, and other physical facilities that the proposed rail alignments and/or stations would cross, the following measures in **Table F-3.4-2** would avoid or minimize any adverse effects. **If the adjustment or relocation of any existing utility or pipeline or any permitted encroachment is unavoidable, the Applicant shall be responsible for all costs to the utility facility.**

Additional mitigation for electrical transmission lines and major petroleum pipelines is provided below.

Electrical transmission lines: Continue to coordinate closely with all electric utilities as design moves forward to ensure that final design meets any design requirements that may be set forth for development beneath electrical transmission lines.

When grading activity affects the LADWP's transmission line access roads, the Applicant shall replace the affected access roads using the LADWP's Access Road Design Criteria.

Petroleum pipelines: Continue to coordinate with pipeline companies into next phase of design and construction. Encase/protect all pipelines as needed to minimize any possible conflict, including any possible concerns about stray electrical current.

3.4.2 Analysis of Environmental Consequences

3.4.2.1 Methods of Evaluation

The utilities and emergency services impact methodology described in Draft EIS **Section 3.4.2** remains applicable to this Final EIS and the evaluation of the Preferred Alternative. As noted above, the study area for utilities and emergency services includes the areas in which physical alignments and associated project stations, maintenance facilities, and other features would be constructed and operated.

The utilities evaluated in this section include electricity and gas, water, wastewater facilities, and solid waste providers. Emergency services evaluated in this section include police, fire, and emergency response. The analysis also covers potential physical impacts to existing pipelines and electrical transmission infrastructure.

The Preferred Alternative would result in adverse effects if:

- Utility or service demands of the Preferred Alternative exceeded the existing or planned capacity of existing or planned utility and service systems, or
- The Preferred Alternative would physically interrupt or otherwise constrain or impede existing utilities distribution systems.

3.4.2.2 No Action Alternative

The No Action Alternative would not involve the construction and operation of the high-speed train and associated facilities described above under the Preferred Alternative. The No Action Alternative consists of planned and programmed transportation improvement projects that would be in place by the year 2030, which primarily include of the expansion of existing highways and roadways in and around the I-15 freeway between Victorville and Las Vegas. Improvements under the No Action Alternative would be located in the same vicinity as the Preferred Alternative, and would thus contend with many of the same utilities and emergency services impacts described herein.

Future changes in demand for utilities and service systems in the study area may still occur but would be related to projected population and economic growth in Victorville, Las Vegas, and other locations, even if the high-speed rail project is not constructed. See **Chapter 3.2, Growth**, for information on area growth projections. Transportation improvements associated with the No Action Alternative would most likely be located adjacent to existing highway facilities, posing the potential for a similar degree of conflict with utility infrastructure located nearby.

3.4.2.3 Preferred Alternative

Draft EIS **Section 3.4.4** and Supplemental Draft EIS **Section 3.4.3** each contain detailed analysis of potential effects to utilities and emergency services by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative.

Electricity and Gas Services

The stations and maintenance facilities would require electrical energy for regular operations. Additionally, the EMU technology option that would be implemented under the Preferred Alternative would need electricity to power the trains. Draft EIS **Section 3.4.4.2** noted that SCE and Nevada Power reported the ability to serve the existing and future needs of the project's passenger stations.[3,4] However, further coordination with SCE and Nevada Power will be needed with the Applicant to determine if the company's existing equipment and facility conditions are adequate to serve the future needs of the project's passenger stations.

Southwest Gas Corporation (SGC) has provided a "will-serve" letter for the project.[5] SGC states that current operating conditions are sufficient to serve existing needs plus those associated with the project. Therefore, the demands that would be created by the Preferred Alternative would not exceed the capacity of service providers.

The amount of energy needed to operate the Preferred Alternative is evaluated in Draft EIS **Section 3.4.4.2**. Please also see **Section 3.13, Energy**, of this Final EIS for a discussion of energy use associated with the Preferred Alternative.

Water Supply and Service

The track infrastructure would not generate demand for water. There would not be any landscaping nor any other water related use associated with the rail segments that would create an ongoing demand for water. The trains would be equipped with restrooms for the passengers that would provide a small amount of potable water from a closed system in the train. This water would be collected at the passenger stations and/or maintenance facility sites. Water usage on the trains would be minimal when compared to the anticipated water demands of the passenger stations and maintenance facilities, discussed below.

The passenger stations and the maintenance facilities would generate a demand for water. Passenger station water demand would be associated with restrooms, restaurant/food service uses, and landscaping. At the maintenance facilities, water demand would be

[3] Nancy Jackson, Southern California Edison. Personal communication, January 16, 2007.

[4] Nitin Modi, Nevada Power. Personal communication June 8, 2010.

[5] Letter from Southwest Gas Corporation, June 12, 2008.

associated with train washing and associated maintenance, providing an on-board drinking water supply, landscaping, and routine employee usage for consumption and restrooms.

Water for the Victorville Station and maintenance facility (OMSF 2) would be provided by the VWD. Water for the Las Vegas Station (Southern Station or Central Station B) and maintenance facility (Wigwam MSF) would be provided by the Las Vegas Valley Water District (LVVWD). At the direction of the water districts, a water consumption rate based on an assumed commercial land use was utilized to determine water demands of the proposed passenger stations and maintenance facilities that would be constructed under the Preferred Alternative. Refer to Draft EIS **Section 3.4.4.2** for detailed water demand estimates associated with the project.

According to VWD and LVWWD, the estimated water demands of the stations and maintenance facilities are within the service capabilities of water districts. Although VWD would have adequate water supply to serve the Victorville Station and maintenance facility, there are no existing pipelines that could deliver water to the site. Consultation with VWD following the publication of the Draft EIS clarified that the construction of the Victorville Station and OMSF would not be adequately served by existing water facilities due to their distance from existing water mains. The nearest existing water facility is approximately 7 miles south at a substantially lower elevation. The existing main does not extent far enough to serve the station and OMSF. Therefore, the Preferred Alternative would require the construction and/or expansion of new water facilities, including storage facilities, wells, and/or transmission and distribution pipelines.

The preparation of a Water Supply Assessment is recommended by the VWD prior to project construction to better determine the size of water facilities needed to adequately serve the Preferred Alternative at buildout. VWD further encourages that the project incorporate low water use desert landscaping, install low flow toilets, and otherwise implement water-saving fixtures and devices.[6]

LVVWD indicated that the amount of water demanded by the Las Vegas passenger station (Southern Station or Central Station B) and MSF would not require the construction of additional infrastructure specific to the project.[7] However, the LVVWD has established a "water commitment" application process, which is included as **Mitigation Measure UTIL-3**.

Sewage and Wastewater

The track infrastructure would not generate a significant demand for water, nor would it produce wastewater or trigger the need for wastewater services. However, as previously discussed, the trains would be equipped with a closed water system that would provide

[6] Laine Ruzicka, VictorvilleWater District. Personal communication, July 10, 2008.

[7] Akash Sehdev, LVVWD Engineering. Personal communication, August 8, 2008.

small amounts of potable water for the restrooms on the trains. It is also likely that the restrooms on the trains would be equipped with ultra-low flow toilets that would generate very small amounts of wastewater. Sewage and wastewater from the trains would be stored in the closed system while in operation, and would ultimately be released at the passenger stations and/or maintenance facilities. The wastewater would be appropriately discharged into the wastewater systems that serve the stations and/or maintenance facilities. Wastewater generation on the trains would be minimal when compared to the anticipated demands of the passenger stations and maintenance facilities, discussed below.

The passenger stations and the maintenance facilities would generate wastewater associated with anticipated water usage (restrooms, restaurant/food service use, etc.). Wastewater services at the Victorville Station and maintenance facility are provided by the Victor Valley Wastewater Reclamation Authority (VVWRA). Wastewater services at the Las Vegas passenger station (Southern Station or Central Station B) and MSF are provided by the Clark County Water Reclamation District (CCWRD).

According to VVWRA, the Preferred Alternative would not create a substantial need for additional waste water equipment, facilities, or personnel. In its 2005 Sewerage Facilities Plan Update, as well as a policy adopted in August 2005 regarding anticipated community growth, VVWRA anticipates the robust growth projections forecast for the Victor Valley area. Specifically, the sewerage plan projects the City of Victorville's population will double between 2005 and 2025 and that wastewater flows from the City would more than double over the same period.[8] However, the Victorville Station OMSF is currently outside of the established VVWRA service area. A service area expansion would be required to serve the Victorville Station maintenance facility.

In its review of preliminary project plans, CCWRD indicated that it has adequate capacity to serve the Las Vegas passenger station and maintenance facilities without any need to add personnel, equipment, or other facilities.[9]

Stormwater

Rainwater would fall on track infrastructure under the Preferred Alternative, and would run off as stormwater. Although rail track beds will have a degree of porosity related to the spacing of railroad ties, the proposed alignment areas nevertheless have the potential to generate stormwater, particularly during the short in duration, but high intensity rainfall events typical in the Mojave Desert.

[8] VVWRA 2005 Sewerage Facilities Plan, p. 1-3.

[9] Julie Chadbourn, CCWRD, written correspondence, March 17, 2007.

The components of the rail alignments include culverts, bridges, or aerials at drainage crossings to allow the conveyance of surface flows across the rail alignment right-of-way. The placement of these drainage crossings would match the existing drainage crossings along the I-15 freeway where the rail alignment is within or adjacent to the freeway.

In locations where the proposed rail alignment is at a distance from the I-15 where connection to existing storm drainage facilities is not feasible, there is the potential that new railroad alignments could create new stormwater conveyances. Culverts would be installed at natural drainage features and at regular intervals to allow for wildlife passage under the proposed rail grade. The drainage design for these portions of the rail alignment would be developed as part of the project design-build phase. The culverts would be designed through coordination with U.S. Fish and Wildlife Service (USFWS), BLM, California Department of Fish and Game (CDFG), and NDOT, to address the need for wildlife movement (See **Appendix F-M**, Biological Assessment).

The areas proposed for the Victorville Station and OMSF, as well as the Las Vegas Southern Station, are largely unimproved at present. The construction and operation of these facilities will convert unimproved lands to paved and/or built facilities, decreasing permeability and potentially creating stormwater runoff.

However, the Las Vegas Central Station B passenger station and MSF are largely developed and would therefore not contribute significant volumes of additional stormwater runoff.

Solid Waste

The track infrastructure under the Preferred Alternative would not generate solid waste. Daily maintenance-of-way activities may be required to dispose of waste items that may have strayed onto the tracks. However, this amount of waste is expected to be incidental/negligible and would be gathered at a central facility (OMSF, MOW, or MSF) for disposal. Maintenance of the rail alignment over time would generate waste railroad ties and scrap and hardware that would typically be recycled. Solid waste generated by the passengers on the trains would be minimal when compared to the anticipated waste generation of the passenger stations and maintenance facilities, discussed below.

The passenger stations and maintenance facilities would generate solid waste related to ongoing operations, including passenger and employee usage, food service, and related uses. A waste generation rate for these facilities was estimated based on commercial waste disposal rates in the City of Victorville, as estimated by the California Integrated Waste Management Board (CIWMB). This rate is a measurement which encompasses waste generated from all commercial activities, including from commercial enterprise customers. This rate was also used for the Las Vegas facilities, as waste generation rates for commercial uses were not available from the Nevada Division of Environmental Protection (NDEP). Refer to **Section 3.4.4.2** of the Draft EIS for detailed solid waste generation estimates associated with the project.

According to the CIWMB, the nearest landfills to the passenger stations and maintenance facilities under the Preferred Alternative (the Victorville Landfill and Apex Regional Landfill) appear to have sufficient existing capacity to accommodate the predicted solid waste generated by the operation of the project.

Construction of the Preferred Alternative would generate solid waste. Most of the rail alignment will be located within the I-15 right of way and would thus not require substantial demolition. Similarly, several built facilities, including the Victorville Station, and the Baker Maintenance of Way facility would be constructed on substantially vacant and/or undeveloped lands, minimizing the potential for demolition related waste. The geology and geotechnical conditions of the project corridor indicate that, due to the relatively high quality of the subsurface matter, most or all of it will be used for fill material and sub-ballast for the construction of the Preferred Alternative, thereby reducing the amount of wasted fill material from earth-moving and tunneling activities. Although reduced, the construction of the Preferred Alternative can reasonably be assumed to generate a mixed waste stream including but not limited to hardscapes, plant material, metals, and other wastes.

Where such materials would not be recycled or reused, area landfills, in particular the Victorville Landfill and the Apex Regional Landfill, each indicate substantial remaining capacity to accept new waste such that the one-time generation of project-related construction waste could be accommodated.

Police Services

The Victorville Station and OMSF, portions of Segment 1 and 5B, and all of Segments 3B, 4C would be located in the service area of the San Bernardino County Sheriff's Department (SBCSD), which includes the contract "Victorville Police Department." Project alignments immediately adjacent to or within freeway corridors would also receive police response services from the California Highway Patrol (CHP).

The SBCSD anticipates that current and projected staffing would be sufficient to serve the Preferred Alternative, but express concern that future high levels of human activity at the passenger station could lead to increased needs for police response/services there.[10] SBCSD has also expressed concern that a catastrophic event, such as a train derailment, could result in a blockage of one or both sides of the I-15 freeway. Such a blockage would be especially problematic if it were to occur in remote portions of the I-15 corridor, where no secondary access or alternate parallel routes exist. Although unlikely, such a situation could occur.

[10] Dan Riser, Operations Lieutenant, San Bernardino County Sheriff's Department. Personal communication, October 9, 2009.

The Las Vegas passenger station (Southern Station or Central Station B) and MSF facility, portions of Segment 5B, and all of Segments 6B would be located under the jurisdiction of the Las Vegas Metropolitan Police Department (METRO).[11] In addition, the portions of Segments 5B and 6B within the I-15 corridor would also be within the jurisdictional area of the Nevada Highway Patrol (NHP).

Based on additional consultation with METRO following publication of the Draft EIS, METRO indicated that there has been a temporary suspension on the hiring of additional police officers due to the economic downtown. Draft EIS **Section 3.4.4.2** of noted that although METRO is not considered understaffed, it is seeking to hire more personnel to meet local initiatives and it is not anticipated that the project would impact service to the community.[12] With the hiring freeze, the primary concern expressed by the METRO following publication of the Draft EIS was that of police services for the Las Vegas Station site options because an emergency event could draw officers away from the existing needs of the community and that additional officers may be required. [13]

NHP reports that its current staffing levels are sufficient to handle present needs and that the proposed action would not adversely affect NHP's ability to provide service.[14] However, NHP anticipates that most police service needs associated with the project would be provided by METRO.[15]

Fire and Emergency Response Services

The Victorville Station and OMSF facility, Segment 1, Segments 3B, 4C, and portions of Segments 5B would receive fire and emergency services from the San Bernardino County Fire Department (SBCFD). As of July 2008, the City of Victorville dissolved its own fire department, opting to contract with the County for fire and emergency response services. Based on additional consultation following publication of the Draft EIS, the SBCFD has indicated that the implementation of the Preferred Alternative would require additional staffing, training, equipment, vehicles, and facilities to adequately serve the project in the event of an emergency. Specific to Segment 4C, a new station facility may be needed near Mountain Pass due the segment's distance from an existing SBCFD fire station.

The SBCFD also expressed concern of the rail alignment within the I-15 freeway median.[16] While Segment 2C would incorporate cross-median emergency access, the SBCFD expressed concern that the use of the median with the rail alignment would affect the

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[11] The Draft EIS defined the Las Vegas Metropolitan Police Department as both METO and LVMPD. For the purposes of this Supplemental Draft EIS, the acronym METRO will be used in reference to the Las Vegas Metropolitan Police Department.

[12] Las Vegas Police Department, Personal Communication, January 2007.

[13] A.J. Delap, Office of Intergovernmental Services, Las Vegas Metropolitan Police Department, June 18, 2010.

[14] Ibid.

[15] Personal communication with Trooper Kevin Hones, May 6, 2008.

[16] Pat A. Dennen, San Bernardino County Fire Department. Personal Communication, November 2, 2009.

SBCFD's ability to use the median during an emergency response. The SBCFD also expressed concern regarding access to the track infrastructure where the rail alignment would be outside the I-15 freeway corridor or within a tunnel, as it may be difficult to pinpoint the exact location of the train in the event of an emergency.

The portion of the Segment 2C alignment options through Barstow would be served by the Barstow Fire Protection District (BFPD). The BFPD has indicated that present staffing levels are insufficient to meet present demands. The BFPD indicates that a new facility north of the Mojave River would be required to meet acceptable emergency response times in the area. Existing and future staff also would need to be trained for fire and other emergencies that might be associated with a high-speed passenger train.[17] However, the Preferred Alternative rail alignment through the City of Barstow will be in close proximity to the BFPD's existing facilities at 861 Barstow Road and 2600 West Main Street. This centrally located alignment would be readily served by existing stations.

Portions of Segments 5B and 6B would receive fire and emergency response services from the Clark County Fire Department (CCFD). Current staffing levels of the department are at 0.89 responders per 1,000 residents, which is below CCFD's desired staffing level. CCFD states that implementation of the project would further strain staffing levels and require new staff, equipment and most likely, a new station located nearby the I-15 corridor outside of the right of way in the unincorporated portions of Clark County.[18]

The Las Vegas passenger station (Southern Station or Central Station B) and MSF, and portions of Segment 5B would be served by Las Vegas Fire and Rescue (LVFR). LVFR reports that its staffing levels are sufficient to serve the Preferred Alternative.[19]

Utility Infrastructure Crossings

Many of the components that comprise the Preferred Alternative overlap and/or intersect with numerous utility conveyance systems, such as gas pipelines, electric transmission lines, and water/wastewater infrastructure. Although utilities infrastructure is a common feature within both rail and roadway corridors, some of the facilities within the I-15 corridor are major interstate facilities for the transport of petroleum products, electricity, and telecommunications. There is the concern that proposed rail alignments would conflict with such utility conveyance in a manner that would limit the effectiveness of the conveyance and/or threaten human health or safety. Mitigations are included in **Section 3.4.3**, below, to address potential conflicts.

[17] Barstow Fire Protection District, Personal Communication, April 2008.

[18] Girard Page, Senior Deputy Fire Chief, Clark County Fire Department. Personal communication, June 8, 2010.

[19] Letter of inquiry with Las Vegas Fire and Rescue, January 2007.

The Victorville passenger station layout avoids use of the lands under the overhead LADWP lines, locating surface parking to areas northwest of the station building. In addition, the Victorville OMSF facility would not have the potential to cross any utility lines. As a result, no interruption or impediment of utility services would occur.

3.4.2.4 Comparison with Other Action Alternatives

Table F-3.4-2 summarizes the comparison of utility and emergency services effects for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow.

Electricity and Gas Services

Whereas the EMU locomotive power option would require a substantial supply of electricity, the DEMU locomotive power option would not generate a demand for electrical service for the rail alignments.

Under either locomotive power option, the station and maintenance facility alternatives would require energy for general operation. Demands associated with the stations and maintenance facility options for any of the action alternatives would be similar to the Preferred Alternative, and therefore result in similar effects to the electricity and gas service providers of the study area.

Water Supply and Service

Similar to the Preferred Alternative, there are no existing VWD pipelines that could deliver water to the other Victorville Station options (VV1 and VV2). The construction of either of the Victorville Station options and associated maintenance facilities would not be adequately served by existing water facilities due to their distance from existing water mains. VWD states that in order to accommodate anticipated water needs for planned residential and commercial development in the vicinity of the station and maintenance facility site options, substantial expansion of water delivery infrastructure will be necessary.[20] The extent of necessary expansions would be determined through individual water supply assessments and periodic urban water management plans.

All Las Vegas area station and maintenance facility site options would be located within the jurisdiction of the LVVWD. While small differences in the overall footprint of the Las Vegas Station options would result in changes in the demand for water services, these differences would be minimal. The overall effect on water service from the LVVWD would be the same under any of the action alternatives.

Water demands associated with the track infrastructure and passenger trains under any of the action alternatives would be the same as the Preferred Alternative, and are not expected to result in substantial demands for water services.

[20] Laine Ruzicka, Associate Engineer, Victor Valley Water District. Personal communication, August 9, 2007.

Sewage and Wastewater

Similar to the Southern Station and Central Station B, Central Station A and the other maintenance facility sites considered would be located within the jurisdiction of the CCWRD. In its review of preliminary project plans, CCWRD indicated that it has adequate capacity to serve the Las Vegas Stations and maintenance facilities proposed under the action alternatives, without any need to add personnel, equipment, or other facilities.[21]

Wastewater services at the Downtown Las Vegas passenger station site would be provided by the City of Las Vegas Public Works Department (LVPWD). According to LVPWD, existing wastewater treatment facilities are adequate to treat the incremental increase in wastewater associated with the Downtown Las Vegas option. Site-specific plans would need to be reviewed to determine whether local wastewater infrastructure is sufficient to serve the demand associated with the proposed action.[22]

Wastewater demands associated with the track infrastructure and passenger trains under any of the action alternatives would be the same as the Preferred Alternative, and are not expected to result in substantial demands for sewage and wastewater services.

Stormwater

Similar to the Preferred Alternative, the other Victorville Station options (VV1 and VV2) are located in largely unimproved areas. With the exception of the Las Vegas Southern Station option, the areas proposed for the Las Vegas passenger stations are largely developed or are paved over and used for surface parking. The MSF site options are each partially developed, with the exception of Sloan Road and the Relocated Sloan Road sites, both of which are fully undeveloped. Additional volumes of stormwater would result in areas where the proposed facilities would convert pervious undeveloped surfaces to impervious surface. While the size of the footprints for these facilities are slightly different, creating differences in the overall amount of stormwater generation, the effect on stormwater systems from the options under the action alternatives would generally be the same as the Preferred Alternative.

However, because the Las Vegas Southern Station site is undeveloped, selection of this station option would result in the generation of larger volumes of stormwater (due to the conversion of undeveloped surfaces to impervious surface) when compared to the other Las Vegas passenger station options. **Section 3.8.2.3** of this Final EIS discusses stormwater discharge for the Preferred Alternative Las Vegas stations.

The rail alignments under the action alternatives would have the same effect on stormwater conveyance systems as the Preferred Alternative. Any rail alignment that would be adjacent to the I-15 freeway corridor would have an opportunity to tie into the

[21] Julie Chadbourn, CCWRD, written correspondence, March 17, 2007.

[22] Dan Fischer, LVPWD. Personal communication, July 30, 2008.

existing stormwater discharge systems associated with the freeway. Where the rail alignments traverse through undeveloped areas, new stormwater conveyance may be required.

Solid Waste

The waste generation rates for the stations proposed under the action alternative were estimated based on disposal rates by employees. Due to the fact that the facilities proposed under the either action alternatives or the Preferred Alternative would have similar numbers of employees, the overall solid waste generation would be the same. Construction waste for the action alternatives would also be generally similar, with the exception of Segment 4. The Preferred Alternative rail alignment for Segment 4 (Segment 4C) is the longest of the Segment 4 routing options and includes three tunnels. Segment 4B includes two tunnels; there are none associated with Segment 4A. Tunneling activity will generate construction debris that would not be generated with Segment 4A.

Police Services and Fire and Emergency Services

The facilities proposed under the action alternatives would be within the same police and emergency service jurisdictions as the Preferred Alternative, and would result in similar effects related to emergency response. Any rail alignment that would be within the median of the I-15 freeway corridor would reduce the ability to use the median during an emergency response. Because the Preferred Alternative would have the least amount of rail alignment running within the I-15 freeway median, it would have lesser effects on this type of emergency response than the action alternatives with more median-running alignment options. Where the rail alignments would be outside the I-15 freeway corridor or within a tunnel, it may be difficult to pinpoint the exact location of the train in the event of an emergency.

Utility Infrastructure Crossings

The overall effects related to utility infrastructure crossings would be the same under the action alternatives or the Preferred Alternative.

Draft EIS **Section 3.16.4** noted that Segment 4B would conflict with a proposed solar project located to the west of Ivanpah Dry Lake. Because of this potential conflict, the Applicant proposed Segment 4C as the Preferred Alternative, which avoids the conflicts with the proposed solar project.

Table F-3.4-2 Alternatives Comparison – Utilities/Emergency Services

Alternative	Exceed capacity of utility or service systems:							Potential Conflict with existing utility distribution systems
	Electricity and Gas	Water Supply	Sewage/ Wastewater	Stormwater	Solid Waste	Police Services	Fire/ Emergency Services	
No Action Alternative	None Expected	None Expected	None Expected	None Expected	None Expected	None Expected	None Expected	Assumed yes, and that conflicts can be mitigated
Alignment Routings, including Temporary Construction Areas (TCAs), Alignment Adjustment Areas, and Autotransformer Sites (EMU Only)								
Segment 1 Routing								
Segment 1	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 2								
Segment 2A/2B, 2A	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	SBCPD concern of train derailment emergency	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 2A/2B, 2B								
Segment 2C								
Segment 3								
Segment 3A	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 3B								

Alternative	Exceed capacity of utility or service systems:							Potential Conflict with existing utility distribution systems
	Electricity and Gas	Water Supply	Sewage/ Wastewater	Stormwater	Solid Waste	Police Services	Fire/ Emergency Services	
Segment 4								
Segment 4A	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 4B								
Segment 4C								
Segment 5								
Segment 5A	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 5B								
Segment 6								
Segment 6A	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 6B								
Segment 6C								
Segment 7								
Segment 7A	Would require electrical power for vehicle propulsion.	No demand associated	No demand associated	Would require connections to existing and/or new facilities	No generation	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Segment 7B								
Segment 7C								

Alternative	Exceed capacity of utility or service systems:							Potential Conflict with existing utility distribution systems
	Electricity and Gas	Water Supply	Sewage/ Wastewater	Stormwater	Solid Waste	Police Services	Fire/ Emergency Services	
Victorville Station and Maintenance Facility Site Options								
Victorville Station Site 1	No	No	No	New conveyance systems would be required	No	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Victorville Station Site 2								
Victorville Station Site 3								
Victorville OMSF 1								
Victorville OMSF 2								
Las Vegas Area Station and Maintenance Facility Site Options								
Las Vegas Southern Station	No	No	No	No	No	New staff may be required	No	Yes, but conflicts can be mitigated
Las Vegas Central Station A								
Las Vegas Central Station B								
Las Vegas Downtown Station								
Sloan Road MSF [23]	No	New conveyance systems would be required	New conveyance systems would be required	No	No	No		

[23] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF", located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Alternative	Exceed capacity of utility or service systems:							Potential Conflict with existing utility distribution systems
	Electricity and Gas	Water Supply	Sewage/ Wastewater	Stormwater	Solid Waste	Police Services	Fire/ Emergency Services	
Relocated Sloan MSF	No	New conveyance systems would be required	New conveyance systems would be required	No	No	No	No	Yes, but conflicts can be mitigated
Wigwam Avenue MSF	No	No	No	No	No	No		
Robindale Avenue MSF	No	No	No	No	No	No		
Frias Substation	No	No	No	No	No	No		
Other Facility								
Baker Maintenance of Way Facility	No	No	No	New conveyance systems would be required	No	No	New staff, equipment and facility	Yes, but conflicts can be mitigated
Technology Options								
DEMU (Diesel-Electric Multiple Unit)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
EMU (Electric Multiple Unit)	Would require electrical power for vehicle propulsion	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: CirclePoint, 2011

3.4.3 Mitigation Measures for the Preferred Alternative

The following avoidance, minimization, and mitigation measures will be incorporated to reduce adverse effects related to utilities and emergency services.

Mitigation Measure UTIL-1: Payment of connection and or user/service/tipping fees

The costs of any needed connections to utilities and service systems, as well as any usage fees, shall be borne by the Applicant, according to fee schedules as may be established by each utility/service system. Where such fees have not been established, the Applicant shall enter in development agreements with the controlling utility/service system. This shall also include fees associated with any required annexations to utilities or service districts.

Mitigation Measure UTIL-2: Minimize water usage through the incorporation water saving devices wherever required or feasible; require drought-tolerant landscaping at all facilities

In addition to the preparation of a Water Supply Assessment, stations and maintenance facilities will utilize water for consumption, operations, and landscaping purposes. Wherever feasible, low water usage practices should be implemented, including in restrooms and landscaping. As the stations and maintenance facilities are located in regions with very low annual rainfall, any landscaping of such facilities shall feature drought-tolerant and/or xeriscape plantings that will minimize and/or avoid the need for any landscape watering.

Mitigation Measure UTIL-3: Obtain a water commitment from the Las Vegas Valley Water District during the design phase

The LVVWD has indicated that anticipated water demand associated with the proposed action would not exceed regional projections. However, LVVWD will not provide any Applicant with an assurance of water availability until the applicant obtains a "water commitment" from LVVWD to ensure that the proposed action would be served by enough water for usage and to meet fireflow requirements.

Mitigation Measure UTIL-4: Rail segments within freeway rights-of-way shall tie into existing freeway stormwater conveyance devices

Along the I-15 corridor, stormwater is discharged from roadways and median areas primarily through culverts or natural and/or manmade channels. New rail segments within the freeway corridor will have the potential to generate additional stormwater requiring discharge. The Applicant shall coordinate with the state transportation agencies in California and Nevada to ensure that the proposed rail alignments connect to existing stormwater discharge facilities. Wherever the

addition of project-generated stormwater would exceed the capacity of existing discharge facilities, the Applicant shall either fund the upsizing of existing facilities or create new facilities that comply with local stormwater regulations.

Mitigation Measure UTIL-5: Develop appropriate stormwater conveyance structures/systems at station and maintenance facility sites, as well as points along railroad segments, where it is not possible to connect to existing systems

All of the components that comprise the Preferred Alternative have the potential to generate additional stormwater requiring discharge. Where it is not possible to connect to existing systems, the Applicant shall coordinate with the local agencies to develop appropriate stormwater conveyance structures/systems in the areas of the proposed improvements. The Applicant shall either fund the upsizing of existing facilities or create new facilities that comply with local stormwater regulations.

Mitigation Measure UTIL-6: Payment of impact fees for police, fire, and emergency services

The proposed action will create incremental demand for additional police, fire, and emergency services at proposed stations and maintenance facilities, as well as along rail alignments in times of emergencies. For each affected agency, the Applicant shall pay any development impact fees that may have been established by affected agencies at the time the applicant seeks a permit to construct.

Mitigation Measure UTIL-7: Develop a comprehensive emergency operations plan

The Applicant shall develop and implement an emergency preparedness plan that complies with the provisions set forth in FRA's most current *Guide to Developing a Passenger Train Emergency Preparedness Plan*.[24] This plan shall set forth protocols in the event of train derailments and other catastrophic events. The applicant shall be responsible for conducting briefings and/or trainings on the plan with all appropriate employees, as well as with representatives of local first responders and transportation agencies. This may include a training of local first responders regarding proposed rail facilities, including train sets, any catenary structures, and other unique features. The plan shall set forth appropriate lines of communication in the event of emergency events. The plan shall specifically identify protocols in the event an emergency involving a train derailment and blockage of any freeway lanes, an emergency in the proposed tunnels within Segment 4C, and emergencies involving loss of locomotive power.

[24] Federal Railroad Administration. *Guide to developing a passenger train emergency preparedness plan.* January, 2010.

The Applicant shall file one copy of the proposed emergency preparedness plan with the head of FRA's Office of Railroad Safety, FRA's Associate Administrator for Railroad Safety/Chief Safety Officer, not less than 45 days prior to commencing the passenger train service described in the proposed plan. FRA will conduct a review of the proposed plan to determine whether the elements prescribed in 49 CFR 239 are sufficiently addressed and discussed in the proposed plan. FRA must issue a final approval letter to the Applicant prior to opening services to the public.

Mitigation Measure UTIL-8: Avoid or minimize conflicts with existing utility infrastructure

For water, wastewater, communications, local gas pipelines, and other physical facilities that the proposed rail alignments and/or stations would cross, the following measures in **Table F-3.4-2** would avoid or minimize any adverse effects. If the adjustment or relocation of any existing utility or pipeline or any permitted encroachment is unavoidable, the Applicant shall be responsible for all costs to the utility facility.

Table F-3.4-3 Measures to Avoid or Minimize Conflicts with Existing Utility Infrastructure

Utility Type Intersected/Crossed	Mitigation Strategy
Water utilities	Protect pipelines/canals in place; span any crossings of open canals.
Local natural gas distribution systems	Protect/encase pipelines in place. Utilize alternating current if EMU locomotive option is selected.
Fiber optic/communications lines	Protect line, as appropriate

Source: CirclePoint, 2010

Additional mitigation for electrical transmission lines and major petroleum pipelines is provided below.

Electrical transmission lines: Continue to coordinate closely with all electric utilities as design moves forward to ensure that final design meets any design requirements that may be set forth for development beneath electrical transmission lines.

When grading activity affects the LADWP's transmission line access roads, the Applicant shall replace the affected access roads using the LADWP's Access Road Design Criteria.

Petroleum pipelines: Continue to coordinate with pipeline companies into next phase of design and construction. Encase/protect all pipelines as needed to minimize any possible conflict, including any possible concerns about stray electrical current.

3.4.4 Residual Impacts Following Mitigation

The incorporation of mitigation measures would minimize permanent effects related to the adequate provision of services and conflicts from utility crossings. Where proposed modifications and additions require the expansion of utility infrastructure, their location would be determined during the final design phase of the project. Separate environmental review of the water facilities' construction and operation would be required if additional facilities were located outside of the footprint of the project features or were fundamentally different in nature to previous proposals. Additionally, if groundwater wells or other sources of water are considered during project operation or construction, development of these features would be subject to subsequent environmental review.

3.5 TRAFFIC AND TRANSPORTATION

This section describes the changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential traffic and transportation impacts related to the Preferred Alternative compared to the No Action Alternative and other Action Alternatives and identifies appropriate mitigation measures.

3.5.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to traffic and provides responses to those comments. However, no comments received during the public review period required changes to the traffic and transportation analysis contained in the Draft EIS and Supplemental Draft EIS.

Supplemental Draft EIS **Figures S-3.5-3** and **S-3.5-4** have been updated to include turning movement volumes at intersections surrounding Victorville passenger station (VV3). These revised figures are shown as **Figure F-3.5-1** and **F-3.5-2** at the end of this section. This Final EIS also includes new figures illustrating the future turning movement volumes at the intersections surrounding the Las Vegas passenger station options (Southern Station or Central Station B). These new figures are shown as **Figures F-3.5-5** through **F-3.5-12** at the end of this section.

Safety Analysis

FRA, in coordination with the Federal Highway Administration (FHWA), the California Department of Transportation (Caltrans), and the Nevada Department of Transportation (NDOT) has conducted additional safety analysis of the Preferred Alternative. The safety analysis is included in **Section 3.5.2.3** below. It is recognized that the level of this analysis reflects the conceptual design completed to evaluate the alternatives considered, and that additional information will be provided as further project development activities continue.

The Applicant has prepared a separate Highway Interface Manual to identify the design requirements, regulations, and guidance that would be applied to reduce potential safety risks for drivers on I-15. The document describes the protection against intrusion and emergency access aspects noted in this section, as well as providing typical sections that show the median and side running conceptual designs. The Highway Interface Manual has undergone several revisions, with the latest version attached as **Appendix F-B** to this Final EIS.

Given the proposed design-build procurement/construction method anticipated for the project, minor refinements to these provisions may be necessary over time. Any changes from the current concepts will be compared to those used for the basis of this environmental analysis, and additional review provided to assure that highway safety concerns continue to be addressed.

3.5.1.1 Affected Environment

Draft EIS **Section 3.5.3** and Supplemental Draft EIS **Section 3.5.1** describe in detail the affected environment for traffic and transportation for the DesertXpress project.

There have been no substantive changes in the study area roadways and baseline conditions since publication of the Draft EIS and Supplemental Draft EIS. As such, there has been no change to the Affected Environment regarding traffic and transportation.

In addition, no comments were received during the public review period that required changes to the traffic and transportation affected environment discussions contained in the Draft EIS and Supplemental Draft EIS. Thus, the previous affected environment discussions remain applicable to the Preferred Alternative.

3.5.1.2 Regulatory Environment

The regulatory environment for traffic and transportation for the DesertXpress project is described in detail in Draft EIS **Section 3.5.1**. Since publication of the Draft EIS, there has been no change to the regulatory environment regarding traffic and transportation. In addition, no comments were received during the public review period that required changes to the traffic and transportation regulatory environment discussion contained in the Draft EIS and Supplemental Draft EIS. Thus the regulatory environment discussions from these previous documents remain applicable to the Preferred Alternative.

3.5.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

An additional mitigation measure has been added that encompasses the conclusions of a safety evaluation conducted for the project by the cooperative effort of FRA, FHWA, and the Applicant.

> **Mitigation Measure TRAF-4: Conduct a Design Review within the Parameters Defined in the Highway Interface Manual**
>
> **The Applicant shall coordinate with Caltrans, NDOT, and FHWA for the design review and approval of specific project components within the existing I-15 right-of-way. The design review shall be conducted within the parameters defined in the Highway Interface Manual (see Appendix F-B). The procedures for the design review shall be agreed to by the Applicant and transportation agencies in a separate agreement.**

The design review shall be used to determine the following:

- **Permanent placement of visual barriers from a motorist perspective;**
- **Need for standard highway work area traffic control measures both within and beyond the clear zone; and**
- **Appropriate protocols for access to the railroad from I-15, for operations, maintenance, or operations, and ensure meet codes.**

Project components within the I-15 right-of-way that require approval by the highway agencies for traffic safety, and to avoid vehicle intrusion into the railroad right-of-way, include the following:

- **Clear zone modifications**
- **Barriers**
- **Bridges and tunnels**
- **Vertical clearance**
- **Retaining walls**
- **Drainage**
- **Median crossings**
- **Sight distance**
- **Security plans**
- **Fencing**
- **Visual screening**
- **Locked-gate access**
- **Temporary construction access**
- **Freeway interchanges or ramps and modifications**
- **Signing and striping**
- **Emergency preparedness plans**

No comments were received during the public review period that required changes to the traffic and transportation analysis contained in the Draft EIS and Supplemental Draft EIS.

3.5.2 Analysis of Environmental Consequences

This section summarizes the potential traffic and transportation impacts of the Preferred Alternative based on information contained in the previous environmental documents (inclusive of errata discussed above in this section), the rail ridership study, and Traffic Impact Analysis (TIA) reports prepared as part of the Draft EIS and Supplemental Draft EIS (see **Appendix F-G** of this Final EIS).

3.5.2.1 Methods of Evaluation

The traffic and transportation impact methodology described in Draft EIS **Section 3.5.2** remains applicable to this Final EIS and the evaluation of the Preferred Alternative. Estimated traffic levels for the project were based on projections of expected ridership (see **Appendix F-D** of this Final EIS).[1] These traffic levels were in turn added to existing and expected future traffic levels on freeway segment and at local intersections.

[1] Cambridge Systematics, Inc. *DesertXpress Ridership Forecast Review*. February 2008.

The traffic analysis focused on three separate areas, which were selected based on likely changes in traffic patterns. One focus area is the I-15 freeway mainline, which would experience a reduction in traffic due to implementation of the DesertXpress project. The other two focus areas are around the proposed passenger station sites in Victorville and Las Vegas; specifically, the local roadway intersections in these areas. Stations would result in increased numbers of vehicles on local roadways around proposed station sites.

Scenarios Evaluated

Under the impact methodology described in **Section 3.5.2** of the Draft EIS, two horizon years were selected for the traffic analysis: 2013 and 2030. The year 2013 was selected because it was the year the DesertXpress high speed passenger train was expected to begin operations at the time when the Draft EIS was being prepared. The year 2030 was selected to evaluate cumulative conditions because it is roughly 20 years after the start of construction and because it was the farthest year in the future for which regional travel forecasts were available for the metropolitan Las Vegas area. The traffic analysis for 2030 also includes an increase in vehicles diverted from the I-15 freeway to the DesertXpress project when compared to the 2013 traffic analysis. This is due to an assumed increase in ridership over time often referred to as a "ramp up" period as travelers learn about the new high speed rail project.

In order to maintain consistency in the evaluation of project modifications and additions, the two horizon years were retained in the Supplemental Draft EIS. However, due to a longer than expected environmental review process, 2013 may no longer be the opening year for the project. However, this Final EIS assumes this minor change of opening year to be less than significant and continues to use the existing 2013 traffic analysis in the evaluation of project impacts. It is not anticipated that substantially different findings would result under an opening year of 2014 or 2015. Similarly, regional travel forecasts for the year 2030 remain applicable to this Final EIS and also provide consistency between the previous Draft and Supplemental Draft EIS documents.

Level of Service

The same Level of Service (LOS) thresholds used in **Section 3.5.2.2** the Draft EIS are used here.

Victorville Area

According to the City of Victorville and the San Bernardino County Congestion Management Plan (CMP), the LOS at the study intersections for this analysis would be considered unacceptable if it falls below LOS D or adds five percent or more to the peak hour traffic volumes of an intersection.

Las Vegas Area

As determined by the Regional Transportation Commission of Southern Nevada (RTC), an LOS at an intersection would be considered unacceptable if it falls below LOS D.

Forecasting Methodology

In order to determine traffic effects from the project in the two horizon years, future background traffic volumes were obtained (see **Section 3.5.3.2** of the Draft EIS). The predicted traffic volumes generated by the action alternatives were then added to the future background traffic volumes. With this information, comparisons of I-15 mainline and intersection operations were made between the action alternatives and No Action Alternative scenarios. The comparison results are discussed in **Sections 3.5.2.2** through **3.5.2.4** below. A discussion of effects under the Preferred Alternative is included in **Section 3.5.2.3**.

3.5.2.2 No Action Alternative

The No Action Alternative consists of planned and programmed transportation improvement projects that would be in place by the year 2030, which primarily include of the expansion of existing highways and roadways in and around the I-15 freeway between Victorville and Las Vegas. **Section 3.16.2.2** of this Final EIS provides a detailed discussion of the transportation projects that were assumed would be made between the year 2013 and 2030. In the future, I-15 is anticipated to remain in its existing configuration for most the distance between Victorville and Las Vegas, except for capacity improvements in the urban areas.

The 2013 and 2030 baseline conditions presented in the **Tables F-3.5-1** through **F-3.5-5**, below, are intended to demonstrate conditions along the freeway sections and selected intersections in the event that no high speed passenger rail system with stations is constructed and operated. Both the Las Vegas and Victorville areas have experienced high population growth rates over the past decade, and the forecasts show a continuation of this trend (see **Section 3.2, Growth**). This growth generates increases in traffic volumes in these areas that result in adverse effects to the intersections near the proposed passenger stations as well as along the I-15 mainline.

Passenger Station Areas

Several of the identified intersection impacts evaluated under the Preferred Alternative would also occur under the No Action Alternative. However, the No Action Alternative would result in overall lesser impacts to the intersections in the proposed passenger station areas than compared to the Preferred Alternative (see **Tables F-3.5-1** through **Table F-3.5-4**).

Table F-3.5-1 2013 & 2030 Baseline plus Project- LOS Conditions Victorville Station

Intersection		2013 Baseline Conditions[a]		2013 Baseline Plus Project Conditions[a]		2030 Baseline Conditions[a,e]		2030 Baseline Plus Project Conditions[a,e]	
		LOS	Delay[b]	LOS	Delay[b]	LOS	Delay[b]	LOS	Delay[b]
1	I-15 Northbound Ramps & Dale Evans Parkway	B (NB)[c]	12.0	**F(NB)[c]**	**---**	C	30.8	**F**	**162.3**
2	I-15 Southbound Ramps & Dale Evans Parkway	C (SB)[c]	15.5	**F(SB)[c]**	**---**	C	24.3	**F**	**150.6**
3	Station Access #1 & Dale Evans Parkway	NA	NA	**F(NB)[c]**	**65.1**	NA	NA	C	31.4
4	Station Access #2 & Dale Evans Parkway	NA	NA	B(NB)[c]	13.0	NA	NA	B	13.6
5	Future Street & Dale Evans Parkway	C (SB)[c]	16.0	**F(NB)[c]**	**---**	D	49.3	**E**	**58.7**
6	Future Street & Station Access #3[d]	B (EB)[c]	11.9	D(EB)[c]	29.9	A	7.4	A	9.5
7	Future Street & Station Access #4[d]	B (EB)[c]	13.2	**E(EB)[c]**	**40.7**	B	12.4	B	15.8
8	Future Street & Station Access #5	NA	NA	B(WB)[c]	12.0	NA	NA	A	8.2

Source: AECOM. DesertXpress Traffic Impact Report—Victorville Station Location Option 3. April 2010.

Notes:

a) LOS and Delay reported for worst approach
b) Delay reported in seconds per vehicle
c) NB = Northbound, SB=Southbound, EB = Eastbound, WB=Westbound
d) Intersections 6 and 7 are T-intersections under 2013 and 2030 Baseline conditions
e) Signalization of all intersection occurs only under 2030 Baseline conditions

Bold text indicates unacceptable conditions.

Table F-3.5-2 2013, & 2030 Baseline plus Project – LOS Conditions on I-15/Dale Evans Parkway Ramp Junctions

		2013 Baseline		2013 Baseline Plus Project		2030 Baseline		2030 Baseline Plus Project	
	Ramp Junction	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]
1	I-15 NB[a] Off-ramp to Dale Evans Parkway	B	18.8	C	25.3	D	28.2	C	21.2
2	I-15 SB[a] Off-ramp to Dale Evans Parkway	D	28.8	D	29.1	**E**	**35.5**	**E**	**35.7**
3	I-15 NB[a] On-ramp from Dale Evans Parkway	B	18.8	C	23.6	D	29.1	D	33.7
4	I-15 SB[a] On-ramp from Dale Evans Parkway	D	29.6	D	34.8	**F**	**41.6**	**F**	**46.5**

Source: AECOM. DesertXpress Traffic Impact Report—Victorville Station Location Option 3. April 2010.

Notes:

a) SB = Southbound; NB = Northbound
b) Density, reported in vehicles per mile per lane (pc/mi/ln)

Bold text indicates unacceptable conditions

Table F-3.5-3 2013 & 2030 Baseline plus Project- LOS Conditions at Las Vegas Southern Station

	Intersection[c]	2013 Baseline Conditions		2013 Baseline plus Project Conditions		2030 Baseline Conditions		2030 Baseline plus Project Conditions	
		LOS	Delay[b]	LOS	Delay[b]	LOS	Delay[b]	LOS	Delay[b]
1	W. Tropicana/S. Valley View	**E**	**70.3**	**E**	**76.4**	**F**	**425.2**	**F**	**422.4**
2	W. Tropicana/ Dean Martin Dr	**E**	**59.8**	**E**	**76.7**	**F**	**80.0**	**F**	**103.2**
3	W. Tropicana/I-15 NB[a] Ramps	C	31.3	C	31.6	**E**	**78.3**	**E**	**78.4**
4	Dean Martin Dr/ Circulation	C (EB)[a]	18.2	C (EB)[a]	19.0	C (EB)[a]	24.9	D (EB)[a]	26.5
5	Circulation-Aldebaran/W. Hacienda	B (SB)[a]	13.8	**F (NB)**[a]	**-**	C (SB)[a]	17.3	**F (SB)**[a]	**-**
6	W. Hacienda/Polaris Ave	**F (NB)[a]**	**336.9**	**F (NB)**[a]	**-**	**F (NB)**[a]	**-**	**F (NB)**[a]	**-**
7	W. Hacienda/S. Valley View	D	35.2	D	42.4	**F**	**618.8**	**F**	**617.2**
8	W. Russell/Polaris	D	52.9	**F**	**550.8**	**F**	**81.3**	**F**	**818.7**
9	W. Russell/I-15 SB[a] Ramps	**F**	**83.1**	**F**	**94.9**	**F**	**144.1**	**F**	**164.8**
10	W. Russell/I-15 NB[a] Ramps	D	36.4	D	38.9	**E**	**67.7**	**F**	**103.6**
11	W. Tropicana/I-15 SB[a] Ramps	B	16.2	B	19.0	C	20.7	C	25.3

Source: AECOM. Final Report—DesertXpress Traffic Impact Analysis. February 2009.

Notes:

a) SB = Southbound; NB = Northbound; EB = eastbound
b) Delay reported in seconds per vehicle. LOS and Delay reported for worst approach.
c) All intersections are signalized

Bold indicates unacceptable conditions.

Table F-3.5-4 2013 & 2030 Baseline plus Project- LOS Conditions at Las Vegas Central Station B

Intersection[c]		2013 Baseline Conditions		2013 Baseline plus Project Conditions		2030 Baseline Conditions		2030 Baseline plus Project Conditions	
		LOS	Delay[b]	LOS	Delay[b]	LOS	Delay[b]	LOS	Delay[b]
1	W. Flamingo Rd/Hotel Rio Dr	D	39.0	**F**	**293.4**	D	39.1	**F**	**301.2**
2	Flamingo/I-15 SB[a]	A	7.5	A	7.7	A	8.6	A	9.0
3	Flamingo/I-15 NB[a]	C	29.0	D	45.5	D	37.9	**E**	**64.4**
4	Hotel Rio Dr/Dean Martin Dr	C	24.5	**F**	**87.6**	C	26.6	**F**	**87.0**
5	W. Harmon Ave/Polaris Ave	C	20.6	C	25.7	B	18.7	C	27.5
6	W. Tropicana Ave/Polaris Ave	B	12.7	C	26.5	B	17.6	D	35.0
7	W. Tropicana Ave/Dean Martin Dr	**E**	**60.2**	**F**	**149.7**	**F**	**80.2**	**F**	**181.2**
8	Tropicana/I-15 SB[a] Ramp	B	16.2	B	15.4	C	20.7	C	20.1
9	Tropicana/I-15 NB[a] Ramp	C	31.2	D	35.7	**E**	**77.0**	**F**	**87.6**
10	W. Harmon Ave/Aldebaran Ave	B	11.6	C	23.7	B	11.8	C	23.8

Source: AECOM. Final Report—DesertXpress Traffic Impact Analysis. February 2009.

Notes:

a) SB = Southbound; NB = Northbound
b) Delay reported in seconds per vehicle. LOS and Delay reported for worst approach.
c) All intersections are signalized

Bold indicates unacceptable conditions.

Table F-3.5-5 Freeway Mainline Level of Service: 2013 and 2030 Baseline plus Project Conditions

Section		Peak Hour	2013 Baseline Conditions				2013 Baseline plus Project Conditions				2030 Baseline Conditions				2030 Baseline plus Project Conditions			
			NB[a]		SB[a]		NB[a]		SB[a]		NB[a]		SB[a]		NB[a]		SB[a]	
			LOS	Density[b]	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]	LOS	Density[b]
1	North Stoddard Wells to Junction I-40	AM	C	21.9	C	18.3	C	18.8	B	15.3	D	27.4	C	22.2	C	18.7	B	14.4
		PM	B	14.7	D	33.3	B	11.7	D	28.1	B	17.8	F	>45.0	A	10.1	D	30.4
2	Junction I-40 to Nevada State line	AM	C	25.4	C	20.8	C	20.3	B	16.3	**E**	**35.8**	D	27.0	C	19.6	B	14.5
		PM	B	16.7	**E**	**43.6**	B	12.2	D	32.2	C	21.0	**F**	**>45.0**	A	9.5	**E**	**35.6**
3	Primm to Sloan	AM	D	26.9	D	30.5	C	23.3	D	26.2	**E**	**40.6**	**F**	**>45.0**	D	29.0	**E**	**40.3**
		PM	**F**	**>45.0**	**E**	**39.1**	**E**	**39.3**	D	32.6	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**

Source: AECOM. Final Report—DesertXpress Traffic Impact Analysis. February 2009.

Notes:

a) SB = Southbound; NB = Northbound
b) Density, reported in vehicles per mile per lane (pc/mi/ln)

Bold text indicates unacceptable conditions

I-15 Mainline

As shown in **Figure F-3.5-3**, Interstate 15 (I-15) mainline conditions were evaluated for the following sections for weekday AM and PM peak hours.[2]

1. North Stoddard Wells to Junction Interstate 40 (I-40) (California)
2. Junction I-40 to Nevada State Line (California)
3. Primm to Sloan (Nevada)
4. Sloan to I-215 (Nevada)

Even with planned and programmed transportation improvement projects that would be in place by the year 2030, the No Action Alternative is expected to result in a deterioration of future I-15 mainline operations. The adverse impacts to freeway mainline operations under the No Action Alternative would be greater than when compared to the impacts under the Preferred Alternative (see **Table F-3.5-5**).

3.5.2.3 Preferred Alternative

Draft EIS **Section 3.5.4** and Supplemental Draft EIS **Section 3.5.3** describe in detail the traffic and transportation impacts by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative.

The Preferred Alternative would have no interface with passengers or employees (e.g. station or maintenance facility) other than those at the Victorville and Las Vegas Stations (VV3, and in Las Vegas, either the Southern Station or the Central Station B) and the maintenance facilities (OMSF 2 and Wigwam MSF). No at-grade crossings of roadways would be created, nor would the project require modifications or changes to existing roadways that would affect existing capacity. Therefore, the project's impact on traffic and transportation would be limited to roadways surrounding passenger stations, maintenance facilities, and the I-15 freeway mainline.

The number of trips generated by the Victorville OMSF would be less than 50 peak hour trips in 2013 and less than 100 peak hour trips in 2030. Based on the San Bernardino County CMP and Caltrans guidelines, intersection analysis would not be necessary at the Victorville OMSF. The number of trips generated by the Las Vegas MSF would be approximately 30 peak hour trips under both 2013 and 2030 conditions. The Las Vegas MSF is not located in a high traffic volume area and while the RTC in Nevada does not

[2] These sections do not correspond to the railway segments of the Preferred Alternative and should be considered separately.

have guidelines on the minimum number of trips required for analysis, based on the location of the Las Vegas MSF and criteria used in California for this project, a trip generation of 30 peak hour trips would not warrant intersection analysis.

I-15 Mainline

Operation of the Preferred Alternative would reduce traffic volumes on I-15, thereby improving traffic conditions. This reduction would be approximately 500 vehicles per peak hour in the peak direction in 2013, increasing to 1,400 vehicles in 2030. **Table F-3.5-4** shows future plus project conditions on the I-15 freeway mainline.

The Preferred Alternative would improve unacceptable LOS on several freeway segments to acceptable conditions. Segments that would experience beneficial effects are:

- Junction of I-40 to Nevada State Line, in southbound direction during the PM peak hour
- Primm to Sloan, in southbound direction during the PM peak hour

Victorville Station Area

Dale Evans Parkway is the only existing street that would serve the proposed station site. **Figures F-3.5-1** and **F-3.5-2** show that the intersection geometry surrounding the Victorville Station would change between 2013 and 2030, with the addition of station access roads. **Figure F-3.5-4** shows the overall trip distribution for the station.

The following intersections were evaluated under future conditions:

- Intersection 1: I-15 Northbound (NB) Ramps/Dale Evans Parkway
- Intersection 2: I-15 Southbound (SB) Ramps/Dale Evans Parkway
- Intersection 3: Station Access #1/Dale Evans Parkway
- Intersection 4: Station Access #2/Dale Evans Parkway
- Intersection 5: Future Street/Dale Evans Parkway
- Intersection 6: Future Street/Station Access #3
- Intersection 7: Future Street/Station Access #4
- Intersection 8: Future Street/Station Access #5

Table F-3.5-1 shows future conditions at the intersections listed above under both baseline (No Project) and with project conditions of the Preferred Alternative. **Table F-3.5-2** summarizes the future conditions at the I-15/Dale Evans Parkway ramp junctions.

2013 Plus Project – Adverse Effects

The addition of traffic generated by the Preferred Alternative to 2013 Baseline Conditions would change LOS from acceptable to unacceptable at five study area intersections, resulting in adverse effects. The affected intersections would be the I-15 NB Ramps/Dale Evans Parkway, I-15 SB Ramps/Dale Evans Parkway, Station Access #1/Dale Evans Parkway, Future Street/Dale Evans Parkway, and Future Street/Station Access #4 intersections. As shown in **Table F-3.5-1**, all other study intersections would continue to operate at acceptable LOS.

Implementation of the Preferred Alternative with the proposed Victorville Station site would worsen delays at the I-15 and Dale Evans Parkway ramp junctions in year 2013. However, the LOS would still remain acceptable at all ramp junctions.

2030 Plus Project – Adverse Effects

The addition of traffic generated by the Preferred Alternative to 2030 Baseline Conditions would change LOS from acceptable to unacceptable at three study area intersections, resulting in adverse effects. The affected intersections would be the I-15 NB Ramps/Dale Evans Parkway, I-15 SB Ramps/Dale Evans Parkway, and Future Street/Dale Evans Parkway intersections. As shown in **Table F-3.5-1**, no cumulative effects would occur at the other study intersections since they would continue to operate at acceptable LOS.

Under the 2030 Baseline Conditions, NB ramp junctions are expected to operate at acceptable conditions (LOS D), while SB ramp junctions would operate at unacceptable conditions (LOS E and F). When compared to the 2030 Baseline Conditions, the SB ramp junctions would continue to operate at unacceptable conditions with implementation of the Preferred Alternative, while the NB ramp junctions would continue to operate at an acceptable LOS D.

Las Vegas Station Area: Southern Station

Figure F-3.5-5 shows the intersection geometry surrounding the Las Vegas Station (Southern Station). Auto access to the Southern Station would be via I-15 ramps located at West Russell Road. **Figure F-3.5-6** shows the overall trip distribution for the station. **Figures F-3.5-7** and **F-3.5-8** show how intersection turning volumes at the Southern Station would change between 2013 and 2030.

The following intersections were evaluated under future conditions with the Southern Station:

- Intersection 1: W. Tropicana/S. Valley View
- Intersection 2: W. Tropicana/ Dean Martin Dr
- Intersection 3: W. Tropicana/I-15 NB Ramps
- Intersection 4: Dean Martin Dr/ Circulation
- Intersection 5: Circulation-Aldebaran/W. Hacienda

- Intersection 6: W. Hacienda/Polaris Ave
- Intersection 7: W. Hacienda/S. Valley View
- Intersection 8: W. Russell/Polaris
- Intersection 9: W. Russell/I-15 SB Ramps
- Intersection 10: W. Russell/I-15 NB Ramps
- Intersection 11: W. Tropicana/I-15 SB Ramps

Table F-3.5-3 shows future conditions at the intersections listed above under both baseline (No Project) and with project conditions of the Preferred Alternative, assuming the Southern Station is the rail terminus.

2013 Plus Project (Terminating at Southern Station) – Adverse Effects

The addition of traffic generated by the Preferred Alternative to 2013 baseline conditions would result in failing LOS operations at two study intersections: Circulation-Aldebaran Avenue/West Hacienda Avenue and West Russell Road/Polaris Avenue.

In 2013, the Preferred Alternative would contribute to traffic at the following already failing intersections:

- Intersection 1: W. Tropicana/S. Valley View
- Intersection 2: W. Tropicana/ Dean Martin Dr
- Intersection 6: W. Hacienda/Polaris Ave
- Intersection 9: W. Russell/I-15 SB Ramps

The Preferred Alternative would contribute additional traffic at these already failing intersections, thereby contributing to cumulative adverse effects.

2030 Plus Project (Terminating at Southern Station) – Adverse Effects

The addition of traffic generated by the Preferred Alternative to 2030 baseline conditions would result in failing LOS operations at the intersection of Circulation-Aldebaran Avenue/West Hacienda Avenue.

In 2030, the Preferred Alternative would contribute to cumulative adverse effects at the following intersections:

- Intersection 1: W. Tropicana/S. Valley View
- Intersection 2: W. Tropicana/ Dean Martin Dr
- Intersection 3: W. Tropicana/I-15 NB Ramps
- Intersection 6: W. Hacienda/Polaris Ave
- Intersection 7: W. Hacienda/S. Valley View
- Intersection 8: W. Russell/Polaris

- Intersection 9: W. Russell/I-15 SB Ramps
- Intersection 10: W. Russell/I-15 NB Ramps

Las Vegas Station Area: Central Station B

Figure F-3.5-9 shows the intersection geometry surrounding Las Vegas Station Central Station B. Auto access to the Central Station B would be via I-15 ramps located at Flamingo Road and Tropicana Avenue. **Figure F-3.5-10** shows the overall trip distribution for the station. **Figures F-3.5-11** and **F-3.5-12** show that the intersection turning volumes at Central Station B would change between 2013 and 2030.

The following intersections were evaluated under future conditions with Central Station B:

- Intersection 1: W. Flamingo Road/Hotel Rio Drive
- Intersection 2: Flamingo/I-15 SB Ramps
- Intersection 3: Flamingo/I-15 NB Ramps
- Intersection 4: Hotel Rio Drive/Dean Martin Drive
- Intersection 5: W. Harmon Avenue/Polaris Avenue
- Intersection 6: W. Tropicana Avenue/Polaris Avenue
- Intersection 7: W. Tropicana Avenue/Dean Martin Drive
- Intersection 8: Tropicana Avenue/I-15 SB Ramp
- Intersection 9: Tropicana Avenue/I-15 NB Ramp
- Intersection 10: W. Harmon Avenue/Aldebaran Avenue

Table F-3.5-4 shows future conditions at the intersections listed above under both baseline (No Project) and with project conditions of the Preferred Alternative, assuming Central Station B is the rail terminus.

2013 Plus Project (Terminating at Central Station B) – Adverse Effects

The addition of traffic generated by the Preferred Alternative to 2013 baseline conditions would result in failing LOS operations at two study intersections: Flamingo Road/Hotel Rio Drive and Hotel Rio Drive/Dean Martin Drive.

In 2013, the Preferred Alternative would contribute to traffic at the already failing intersection of West Tropicana Avenue/Dean Martin Drive, thereby contributing to cumulative adverse effects.

2030 Plus Project (Terminating at Central Station B) – Adverse Effects

The addition of traffic generated by the Preferred Alternative to 2030 baseline conditions would result in failing LOS operations at three study intersections: Flamingo Road/Hotel Rio Drive, Flamingo Road at I-15 northbound ramps, and Hotel Rio Drive/Dean Martin Drive.

In 2030, the Preferred Alternative would contribute to cumulative adverse effects at the West Tropicana Avenue/Dean Martin Drive and Tropicana Avenue/I-15 northbound ramps intersections.

Safety Analysis

FHWA identified potential risks to freeway traffic created by locating DesertXpress within the I-15 ROW. Existing freeway conditions were considered, as well as other planned and programmed transportation improvement projects, and compared to the proposed alignment of the high speed passenger railroad.

Traffic accident history was reviewed, using data supplied by both Caltrans and NDOT, to determine if there were any locations where the proposed alignment of the railroad posed a greater safety risk to users of the freeway. It was recognized that I-15 is a heavily traveled rural route for much of the DesertXpress alignment, with traffic accident patterns that will continue with or without the proposed project. The traffic accident history generally reflected run-off-road crashes typical of rural interstates, but also include congestion-related crashes from the peak travel demand in this corridor. Similar issues were found in the urban portions, where more congestion-related crashes occur. The safety analysis was therefore concerned with the changes resulting from the project.

As shown in Highway Interface Manual developed for the project (**Appendix F-B**), plans for the Preferred Alternative show a concrete barrier, and at some locations, a wall between the railroad and the freeway. At locations where the alignment of the railroad is elevated, the aerial structures include bridge piers. These facilities would be new obstacles on the roadside and present a potential increase in the severity of run-off-road crashes. They may also obstruct drivers' sight distances, thus reducing the amount of time drivers have to perceive and react to changing roadway conditions. The presence of trains running in the highway right-of-way, and especially the train lights, could become a visual distraction for motorists where none exist today.

Clear Zone

The highway engineering concept of the "clear zone" was used in this analysis. The term clear zone refers to the distance between the edge of the travel lane and any obstacles, including steep slopes, and reflects actual paths should a vehicle leave the roadway. Most drivers are able to regain control within the clear zone and avoid any obstacles beyond it. Risks associated with run-off-road crashes are significantly reduced when the width of the clear zone increases, with a 30 foot clear zone often expected on freeways. A more conservative value of 40 feet was used for the DesertXpress review that recognized the high speeds of traffic in this corridor. It was the consensus of the highway agencies that in locations where the DesertXpress facilities were more than 40 feet from an existing or planned highway travel lane the potential increase in safety risk was considered negligible. For locations where the DesertXpress facilities are within 40 feet, crash data were reviewed to identify clusters of crashes that would indicate areas where the alignment of

the railroad poses a greater safety risk to users of the Interstate. These locations are shown in **Table F-3.5-6**, and were subject to site-specific discussions that considered the contributing factors of the crashes and evaluated options.

Table F-3.5-6 Areas along I-15 with less than 40-foot-width Clearance

Location	Description	Stationing		Approximate Post-Mile		Length		Segment
		Begin	End	Begin	End	Feet	Mile	
California								
3	Dale Evans Pkwy. (North)	STA 730+00	STA 794+00	52.7	54.0	6,400	1.21	Segment 1
5	Wild Wash Rd. (South)	STA 816+00	STA 832+00	54.4	54.7	1,600	0.30	Segment 1
8	Wild Wash Rd. (North)	STA 906+00	STA 928+00	56.1	56.5	2,200	0.42	Segment 1
17	End of Segment 2C	STA 2070+00	STA 2090+60	78.1	78.5	2,060	0.39	Segment 2
18	End of Segment 2C	STA 2240+00	STA 2264+00	78.5	79.0	2,400	0.45	Segment 2
30	Harvard Rd. to Field Rd.	STA 3204+00	STA 3540+00	96.8	103.2	33,600	6.36	Segment 3
47	Zzyzx Rd. (West)	STA 4930+00	STA 4948+00	129.5	129.9	1,800	0.34	Segment 3
51	Zzyzx Rd. (East)	STA 5038+00	STA 5050+00	131.6	131.8	1,200	0.23	Segment 3
58	Baker Blvd. (overcrossing)	STA 5412+00	STA 5420+00	138.6	138.8	800	0.15	Segment 3
60	Halloran Springs Rd. (East)	STA 6006+00	STA 6016+00	149.9	150.1	1,000	0.19	Segment 3
66	Bailey Rd. (West)	STA 6994+00	STA 7008+00	168.6	168.9	1,400	0.27	Segment 3
70	Bailey Rd. (West)	STA 7092+00	STA 7122+00	170.5	171.0	3,000	0.57	Segment 3
72	Bailey Rd. (East)	STA 7154+00	STA 7170+00	171.6	171.9	1,600	0.30	Segment 3
Nevada								
83	West Silverado Ranch (South)	STA 9470+00	STA 9597+00	214.6	217.0	12,700	2.41	Segment 6

Source: DesertXpress and FHWA 2011.

The vast majority of the nearly 200-mile project alignment is beyond the 40-foot clear zone. However, a total length of 15.8 miles at various locations along the I-15 corridor would have less than 40' of spacing between the freeway travel lanes and the DesertXpress barrier. In the five years of crash data collected for the corridor, 12 locations were identified where there were records of any run-off-the-road crashes. A total number of 65

run-off-the road crashes occurred at those locations during that time period. Of those 65 crashes, 19 resulted in an impact with a fixed object, and 35 resulted in an overturned vehicle.

Each site was considered individually to identify patterns or clusters of crashes and features of the highway that, when combined with the proposed DesertXpress project, may increase the safety risk on the I-15 corridor. At locations where there were increased numbers of run-off-the-road crashes, it was determined that DesertXpress cross-section could be narrowed or shifted to provide some additional space between the freeway and barrier. It was determined that the safety risk at other locations could be appropriately mitigated with various measures to be determined through coordination during the design phase (See **Mitigation Measure TRAF-4**). These potential measures include:

- Installing rumble strips on the I-15 shoulder
- Installing delineators on the barrier or along roadside
- Wider lane or shoulder striping

The design guidelines and standards for these measures are outlined further in a project Highway Interface Manual included in **Appendix F-B**.

In addition to the clear zone analysis for the permanent facilities, the highway agencies had concerns for the temporary reduction in both horizontal and vertical clearances during the construction phase of the project. These reductions are often seen in traditional highway construction projects. However, standard highway work area traffic control measures can be employed to protect both motorists and workers within the clear zone. Construction activity beyond the clear zone but within the freeway right-of-way would undergo similar review to assure highway safety would not be compromised.

Clear zone requirements were also discussed for the maintenance and operations phases of the project, and during any emergencies. FRA and FHWA were concerned that the safety needs of the travelling public, both on the railroad and on the freeway, be of prime importance. Consideration of rail maintenance and operations on the highway will be part of the design review process, as well as the emergency plan development (see **Mitigation Measure UTIL-7**).

Drivers' Sight Distance

The possible reduction in drivers' sight distance was investigated in the review of the Preferred Alternative. The additional preliminary design drawings were found not to reduce the widths of any existing or planned travel lanes or shoulders, producing no decrease in sight distances. The planned locations of barriers, walls and bridge piers beyond the edge of the shoulders are not likely to reduce the sight distance below the standards for the main lanes of the freeway. Bridge piers and walls may have an impact on sight distance for ramp intersections at some interchanges. Any DesertXpress aerial structures have the potential to restrict sight distance to highway signs, both overhead and

ground mounted. However, the final placement of any DesertXpress facilities will be determined during design and can be adjusted to provide adequate sight distance. No degradation in highway safety is anticipated.

Visual Distraction

The highway agencies' concerns over the potential for visual distractions of drivers from the nearby high speed trains was initially raised due to the proximity of both modes in the median running alternative, which also had more encroachments within the clear zone. The side running option of the preferred alternative moves the modes further apart, lowering the potential for visual distractions. The relative speeds of the two modes was a concern as well, with trains expected to reach speeds of 150 miles per hour (mph), and highway traffic at 70 mph or higher. Highway traffic would therefore be passed at 80 mph, and closing speeds could be over 220 mph. Daytime distractions could be evident for some drivers. At night, the presence of high speed train lights could be a distraction as well. FHWA's discussions with the Applicant and FRA indicated that deployments of high speed rail systems have not resulted in a degradation of highway safety. However, to minimize the possibility of such an occurrence along I-15, it was agreed that visual screening be placed on the top of the barrier between the freeway and the railroad along corridor. Analysis during the design phase will determine the specific details for the screening and if there are locations where it may not be needed.

The purpose for visual screening is to block the glare from headlights observed by drivers approaching from the opposite direction. The screens often have gaps or openings that only partially obstruct sight lines when viewed from the side. However, when viewed from an oblique angle, such as a driver would be looking ahead while driving, the screen blocks the view. Similarly, the screen blocks the light from traffic that is travelling parallel, or near parallel, to the screen. A solid fence or wall may also be used for screening; however, it would block all views from any angle and would be subject to wind loads.

Various products have been used for this purpose in highway applications between opposing highway traffic. Examples include a series of paddles set on top of concrete barrier, and expanded metal mesh fence, as shown in **Figure F-3.5-13**. There are some unique characteristics of glare conditions with the DesertXpress project that will need verification during design. The position of train headlights is significantly higher than in highway vehicles. Therefore, the height of the screening will probably need to be increased to screen the glare of the train headlights. Additionally, the train follows a different vertical alignment than the freeway and is elevated in places. As such, there are locations where the elevated train would be travelling on a downgrade, allowing the train headlight to shine down over a screen into the eyes of a driver on the highway. These locations will have to be identified during design and the specifications for the screen will need to be tailored to the site conditions.

Section 3.6, Visual Resources, includes provisions for the installation of visual screening that would be placed on the top of the crash barriers to mitigate any potential visual distraction to motorists from the trains and train lights (see **Mitigation Measure VIS-1**). Installation of visual screening would avoid potential safety risks associated with the visual distraction of the passing trains.

3.5.2.4 Comparison with Other Action Alternatives

Table F-3.5-7 summarizes the comparison of traffic and transportation effects for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow.

The action alternatives would involve the construction and operation of rail alignments and associated facilities similar to those described above under the Preferred Alternative. The greatest potential safety risks would be created by the barriers and overpasses associated with the rail alignments within the I-15 right-of-way. Given that the components of the action alternatives would occur largely in the same area as the Preferred Alternative, safety impacts associated with the rail alignments would be similar.

Victorville Station Area

All three station site options (VV1, VV2, and VV3) would result in local intersection impacts (unacceptable level of service) under 2030 plus project conditions. In general, these impacts can be mitigated by adding signalization and/or adding lanes to the intersection approaches. **Table F-3.5-8** summarizes the mitigation measures recommended for VV3 station option under the Preferred Alternative. Similarly, for VV2, **Section 3.5.5** of the Draft EIS included mitigation measures to reduce intersection impacts at year 2030 to less than significant conditions.

However, under the VV1 station option, implementation of the mitigation measures developed as part of the Draft EIS would not reduce the 2030 traffic impacts at the Stoddard Road intersections to less than significant conditions.

Las Vegas Station Area

The traffic impacts of the Las Vegas Station (Southern Station or Central Station B) on surrounding streets are generally similar to those of Central Station A and the Downtown station alternative, in that all stations would result in several intersections surrounding the stations operating at unacceptable LOS under 2030 traffic conditions. However, for all Las Vegas station site options, implementation of mitigation measures would reduce the impacts so that all intersections surrounding the station areas would operate at acceptable LOS under 2030 traffic conditions.

Table F-3.5-7 Alternatives Comparison – Traffic and Transportation

Alternative	Result in substantial traffic increases:	
	Freeway Mainlines	**Station Area Intersections**
No Action Alternative	LOS would degrade from D to F between Victorville and I-40	None expected
Alignment Routings, including Temporary Construction Areas (TCAs), Alignment Adjustment Areas, and Autotransformer Sites (EMU Only)		
Segment 1 Routing	Between Victorville and I-40, traffic reduction associated with either technology option would reduce freeway volumes and positively affect LOS	N/A
Segment 1		
Segment 2		
Segment 2A/2B, 2A		
Segment 2A/2B, 2B		
Segment 2C		
Segment 3		
Segment 3A		
Segment 3B		
Segment 4		
Segment 4A		
Segment 4B		
Segment 4C		
Segment 5		
Segment 5A		
Segment 5B		
Segment 6		
Segment 6A		
Segment 6B		
Segment 6C		
Segment 7		
Segment 7A		
Segment 7B		
Segment 7C		

Alternative	Result in substantial traffic increases:	
	Freeway Mainlines	Station Area Intersections
Victorville Station and Maintenance Facility Site Options		
Victorville Station Site 1	Between Victorville and I-40, traffic reduction associated with either technology option would reduce freeway volumes and positively affect LOS	Delays would worsen at 4 intersections (EMU and DEMU)
Victorville Station Site 2		Delays would worsen at 2 intersections (EMU) Delays would worsen at 1 intersections (DEMU)
Victorville Station Site 3		Delays would worsen at 3 intersections (EMU) Delays would worsen at 5 intersections (DEMU)
Victorville OMSF 1		Same as VV1
Victorville OMSF 2		Same as VV2
Las Vegas Area Station and Maintenance Facility Site Options		
Las Vegas Southern Station	Between Victorville and I-40, traffic reduction associated with either DEMU or EMU levels of traffic would reduce freeway volumes and positively affect LOS	Would change the LOS to unacceptable at 2 intersections and contribute to failing LOS at others
Las Vegas Central Station A		Would change the LOS to unacceptable at 3-4 intersections depending on the technology option and contribute to failing LOS at others
Las Vegas Central Station B		Would change the LOS to unacceptable at 2 intersections and contribute to failing LOS at others
Las Vegas Downtown Station		Would change the LOS to unacceptable at 1 intersection and contribute to failing LOS at others
Sloan Road MSF[3]	n/a	n/a
Relocated Sloan Road MSF	n/a	n/a
Wigwam Avenue MSF	n/a	n/a

[3] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Alternative	Result in substantial traffic increases:	
	Freeway Mainlines	Station Area Intersections
Robindale Avenue MSF	n/a	n/a
Frias Substation	n/a	n/a
Other Facility		
Baker Maintenance of Way Facility	n/a	n/a
Technology Options		
DEMU (Diesel-Electric Multiple Unit)	Up to 1100 vehicles/hour in peak hours by 2030	At least 2 California interactions plus at least 24 Nevada intersections would degrade in service
EMU (Electric Multiple Unit)	Up to 1400 vehicles/hour during peak hours by 2030	At least 3 California interactions plus at least 28 Nevada intersections would degrade in service

Source: CirclePoint, 2011.

3.5.3 Mitigation Measures for the Preferred Alternative

The traffic analysis indicates that implementation of the Preferred Alternative would result in a reduction in traffic on I-15 between Victorville and Las Vegas, when compared to the No Action Alternative. As a result, the Preferred Alternative would result in a beneficial effect on I-15 mainline traffic volumes. No mitigation is required.

In the areas around the proposed stations, the Preferred Alternative would result in higher traffic volumes at local intersections. In general, these higher volumes can be mitigated by adding signalization and/or adding lanes to the intersection approaches. **Table F-3.5-8** summarizes the mitigation measures recommended for Victorville and Las Vegas Station areas. Mitigation for impacts at ramp junctions near the Victorville station area are the same as the mitigation listed for the Victorville site option intersections. The Applicant shall be required to contribute to these mitigation measures equal to their fair-share of the adverse effect associated with the Preferred Alternative, as determined by the appropriate jurisdictional authority.

Table F-3.5-8 Preferred Alternative Traffic Mitigations

Station Site Option	Intersection	2013	2030
Mitigation TRAF-1: Victorville Station Site Option 3 The Project Applicant shall be responsible to contribute to these mitigations equal to their fair-share of the adverse effect as determined by the appropriate jurisdictional authority.	1. I-15 Northbound Ramps/Dale Evans Parkway	▪ Add two northbound left turn lanes[a]	▪ Add northbound left turn lane[a]
	2. I-15 Southbound Ramps/Dale Evans Parkway	▪ Add eastbound right turn lane ▪ Add second westbound through lane ▪ Add westbound left turn lane	▪ Add second eastbound right turn lane
	3. Station Access #1/Dale Evans Parkway	▪ Signalize ▪ Add second westbound left turn lane	N/A
	5. Future Street/Dale Evans Parkway	▪ Signalize ▪ Add second westbound left turn lane	▪ Add third westbound left turn lane
	7. Future Street/Station Access #4	▪ Signalize	N/A
Mitigation TRAF-2: Las Vegas Southern Station The Project Applicant shall be responsible to contribute to these mitigations equal to their fair-share of the adverse effect as determined by the appropriate jurisdictional authority.	1. Tropicana/ Valley View	▪ Add exclusive southbound free right turn lane.	▪ Add exclusive westbound right turn lane. ▪ Add second southbound left turn lane.
	2. Tropicana/Dean Martin Drive-Industrial	▪ Optimize signal offset along Tropicana	▪ Add fourth eastbound through lane. ▪ Add fourth westbound through lane.
	3. Tropicana/I-15 NB Ramps	N/A	▪ Add second northbound right turn lane.
	6. Hacienda/Polaris	▪ Signalize this intersection.	N/A
	7. Hacienda/Valley View	N/A	▪ Add second eastbound left turn lane. ▪ Add exclusive eastbound right turn lane. ▪ Add third eastbound through lane. ▪ Add exclusive westbound right turn lane. ▪ Add third westbound through lane. ▪ Add second northbound left turn lane.

Station Site Option	Intersection	2013	2030
	7. Hacienda/Valley View, continued.		▪ Add third northbound through lane.
	8. Russell/Polaris	▪ Add exclusive westbound right turn lane. ▪ Add exclusive northbound right turn lane. ▪ Add southbound dual left turn lanes. ▪ Add exclusive southbound right turn lane.	▪ Add third southbound left turn lane.
	9. Russell/I-15 SB ramps	▪ Optimize signal offset along Russell Road	N/A
	10. Russell/I-15 NB ramps	N/A	▪ Optimize signal offset along Russell Road.
Mitigation TRAF-3: Las Vegas Central Station B The Project Applicant shall be responsible to contribute to these mitigations equal to their fair-share of the adverse effect as determined by the appropriate jurisdictional authority.	1. W. Flamingo Road/Hotel Rio Drive	▪ Add fourth eastbound through lane. ▪ Add second westbound left turn lane. ▪ Add fourth westbound through lane. ▪ Add second northbound right turn lane.	▪ Stripe existing northbound through lane as a share through/right turn lane.
	3. W. Flamingo/I-15 NB ramps	N/A	▪ Add fourth westbound through lane.
	4. Hotel Rio Drive/Dean Martin Drive	▪ Modify eastbound right turn to have overlap phasing.	▪ Add second northbound left turn lane.
	7. W. Tropicana Avenue/Dean Martin Drive	▪ Add exclusive eastbound right turn lane. ▪ Add exclusive westbound right turn lane. ▪ Add exclusive northbound right turn lane. ▪ Add third southbound left turn lane.	▪ Add fourth eastbound through lane. ▪ Add fourth westbound through lane.
	9. Tropicana Avenue/I-15 NB Ramp	N/A	▪ Add second northbound right turn lane.

Source: AECOM. DesertXpress Traffic Impact Report—Victorville Station Location Option 3. April 2010.

Note: The number of each improvement needed corresponds with the intersection numbers as discussed in the body of this section and in the referenced 2010 TIA.

[a] The 2013 geometry at intersection 1 is assumed to be unsignalized (the same as existing geometry) and the 2013 mitigation measure reflects what is needed to improve the intersection under these conditions. By 2030, the intersection geometry would change and the intersection is expected to be signalized with one left-turn lane and two through lanes. The 2030 mitigation reflects changes needed to the anticipated 2030 intersection geometry.

Mitigation Measure TRAF-4: Conduct a Design Review within the Parameters Defined in the Highway Interface Manual

The Applicant shall coordinate with Caltrans, NDOT, and FHWA for the design review and approval of specific project components within the existing I-15 right-of-way. The design review shall be conducted within the parameters defined in the Highway Interface Manual (see **Appendix F-B**). The procedures for the design review shall be agreed to by the Applicant and transportation agencies in a separate agreement.

The design review shall be used to determine the following:

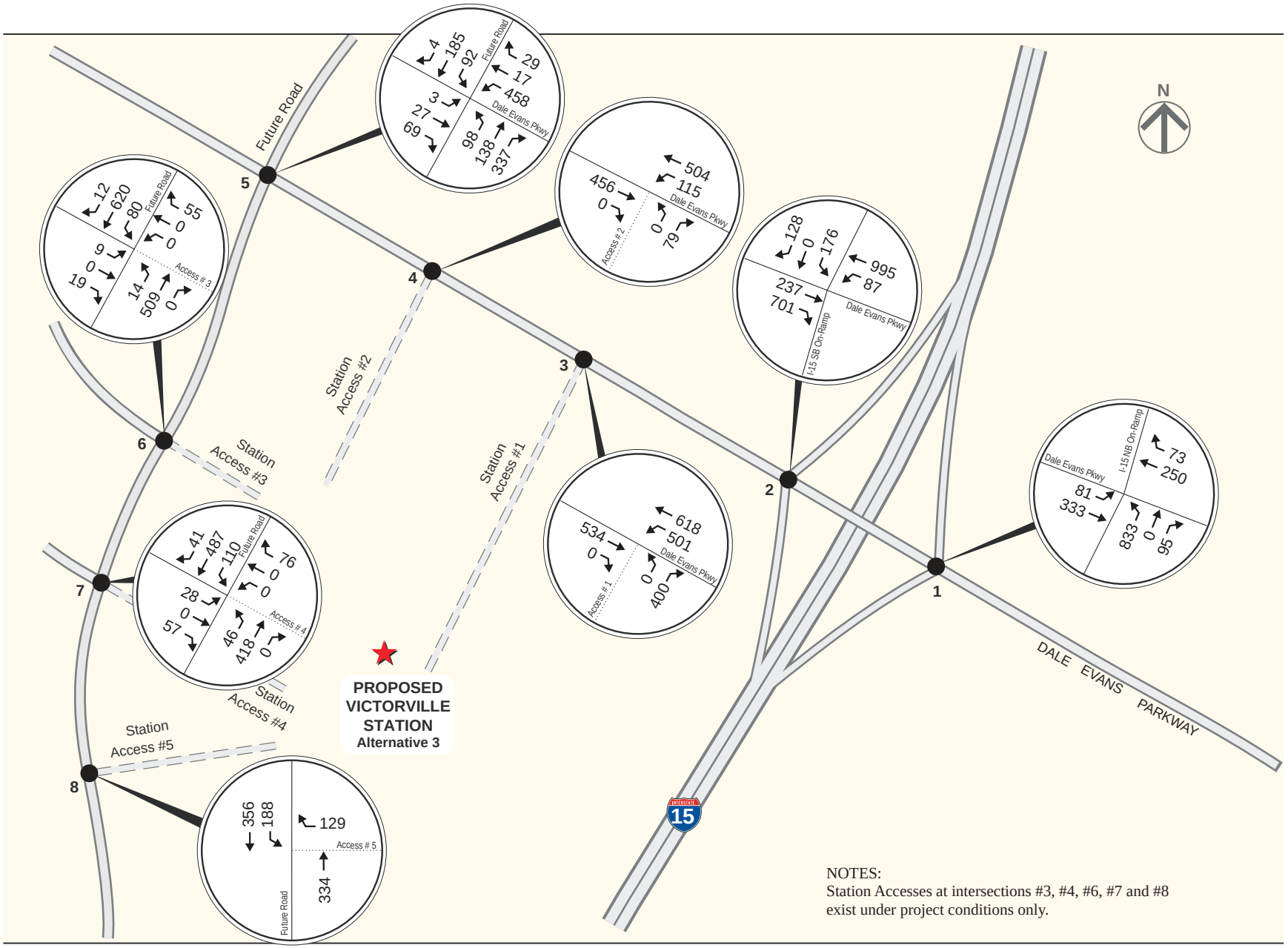
- Permanent placement of visual barriers from a motorist perspective;
- Need for standard highway work area traffic control measures both within and beyond the clear zone; and
- Appropriate protocols for access to the railroad from I-15, for operations, maintenance, or operations, and ensure meet codes.

Project components within the I-15 right-of-way that require approval by the highway agencies for traffic safety, and to avoid vehicle intrusion into the railroad right-of-way, include the following:

- Clear zone modifications
- Barriers
- Bridges and tunnels
- Vertical clearance
- Retaining walls
- Drainage
- Median crossings
- Sight distance
- Security plans
- Fencing
- Visual screening
- Locked-gate access
- Temporary construction access
- Freeway interchanges or ramps and modifications
- Signing and striping
- Emergency preparedness plans

3.5.4 Residual Impacts Following Mitigation

The mitigation measures identified in **Table F-3.5-7** would reduce the delay at the affected intersections so that the LOS would operate at an acceptable LOS (LOS D or better) at all intersections. **Mitigation Measure TRAF-4** would reduce any potential transportation safety impacts. Therefore, all potential traffic and transportation effects can be successfully reduced through the implementation of the mitigation measures. No residual impacts from the project are anticipated after implementation of mitigation.



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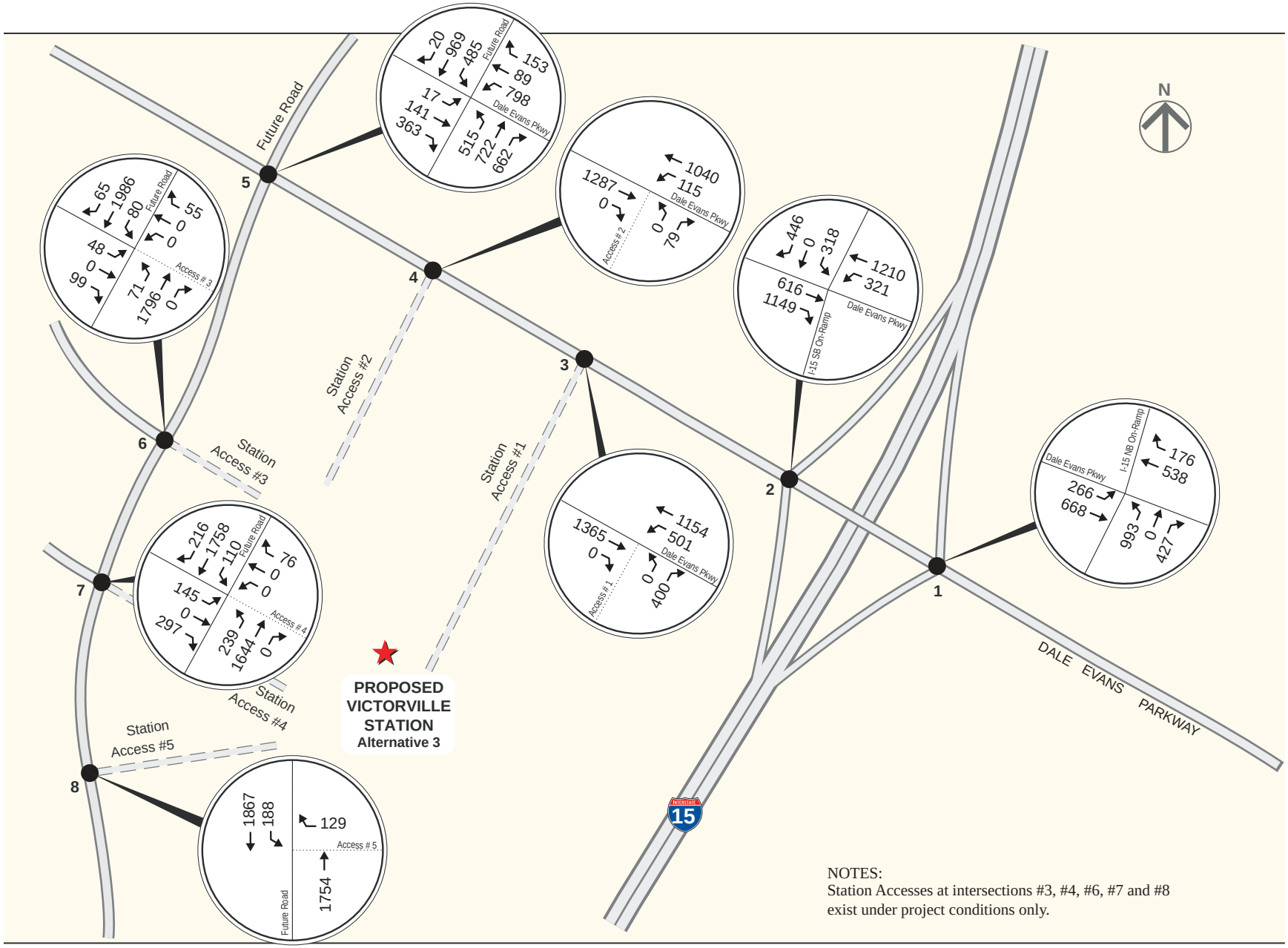
DesertXpress Final EIS

Revision of Supplemental Draft EIS Figure S-3.5-3: Future Year 2013 Intersection Geometry and Turning Volume, Victorville Station (VV3)

FIG F-3.5-1

* This figure, originally in the Supplemental Draft EIS, has been revised to include turning movement volumes at intersections surrounding VV3 station site for year 2013.

Source: AECOM, 2009



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Revision of Supplemental Draft EIS Figure S-3.5-4
Future Year 2030 Intersection Geometry and Turning Volume, Victorville Station (VV3)

FIG F-3.5-2

* This figure, originally in the Supplemental Draft EIS, has been revised to include turning movement volumes at intersections surrounding VV3 station site for year 2030.

Source: AECOM, 2010.

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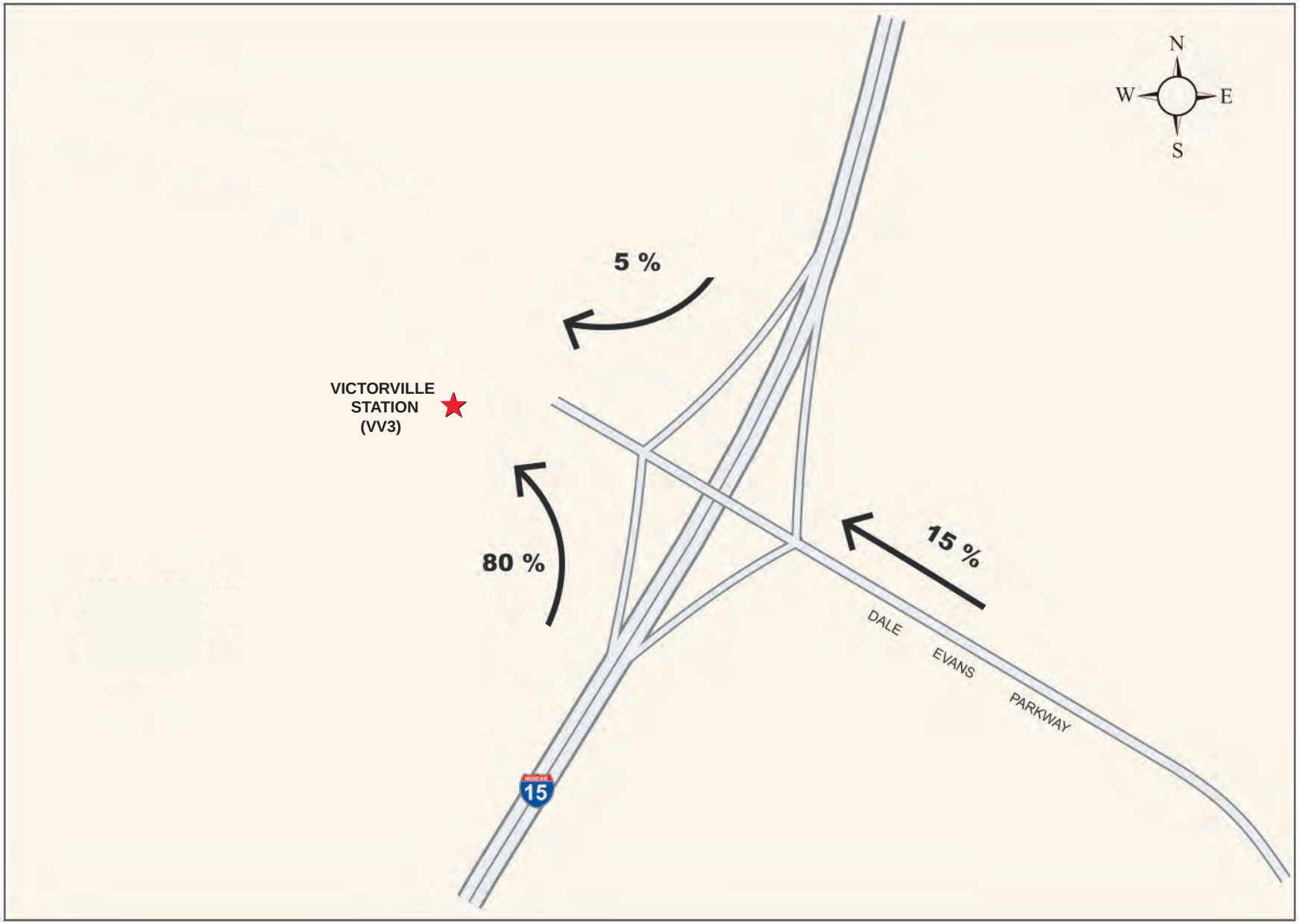
Freeway Sections Evaluated

FIG **F-3.5-3**

Source: DMJM Harris, 2008.



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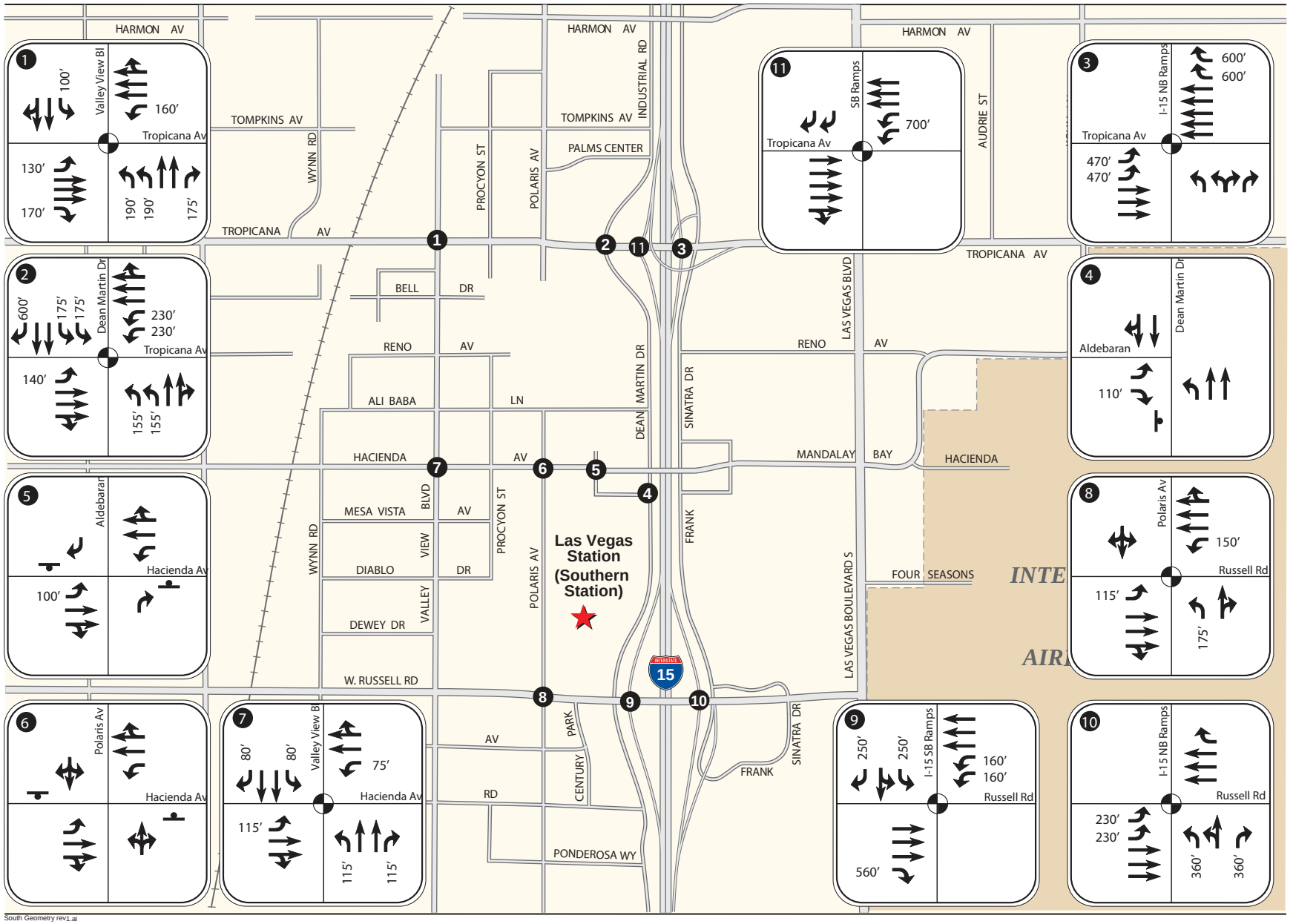
Trip Distribution
Victorville Station (VV3)

FIG **F-3.5-4**

Source: AECOM, 2009.



South Geometry rev1.ai

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Existing Intersection Geometry
Las Vegas Station (Southern Station)

FIG **F-3.5-5**

Source: AECOM, 2011.

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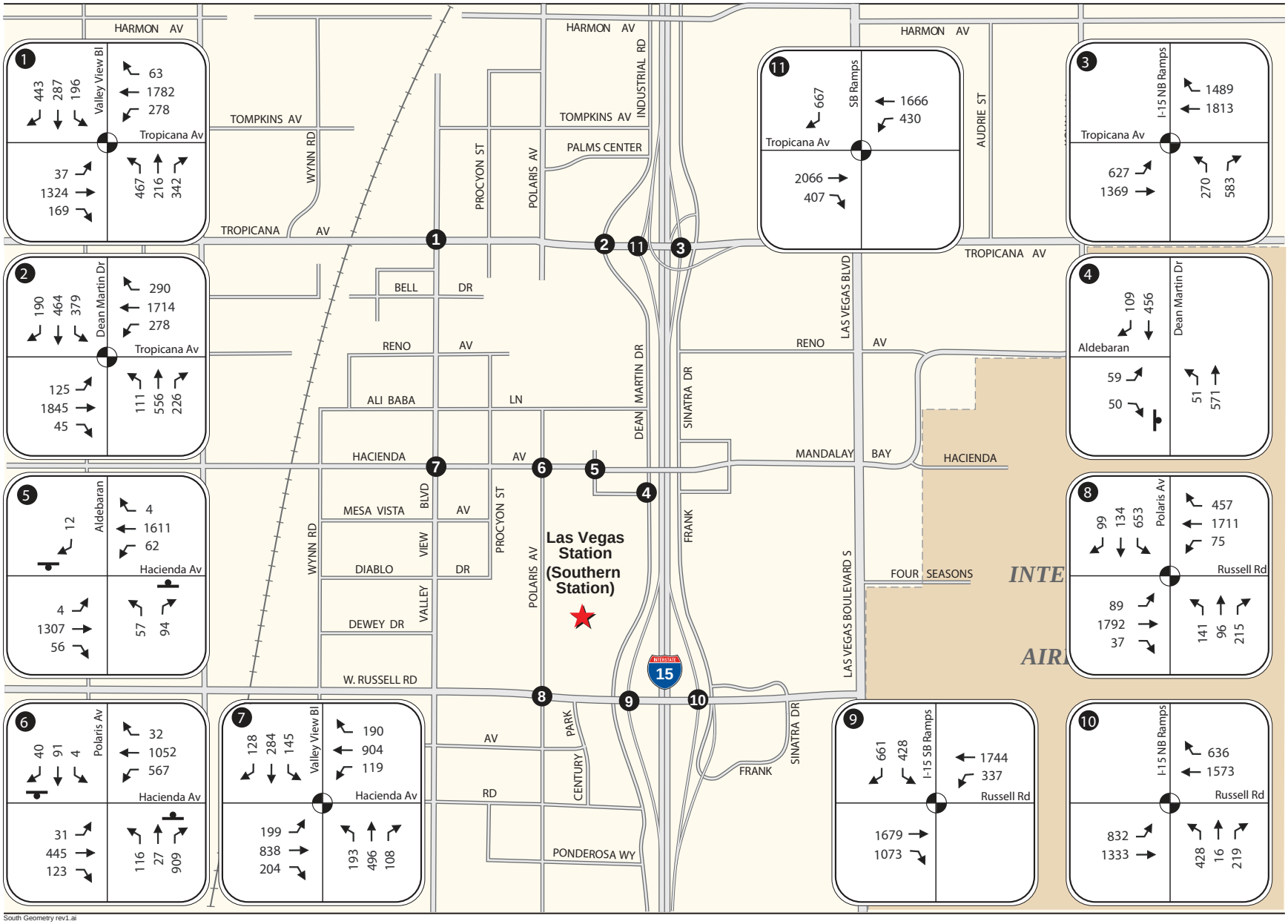
Las Vegas Station (Southern Station) Trip Distribution

FIG **F-3.5-6**

Source: AECOM, 2011.



South Geometry rev1.ai

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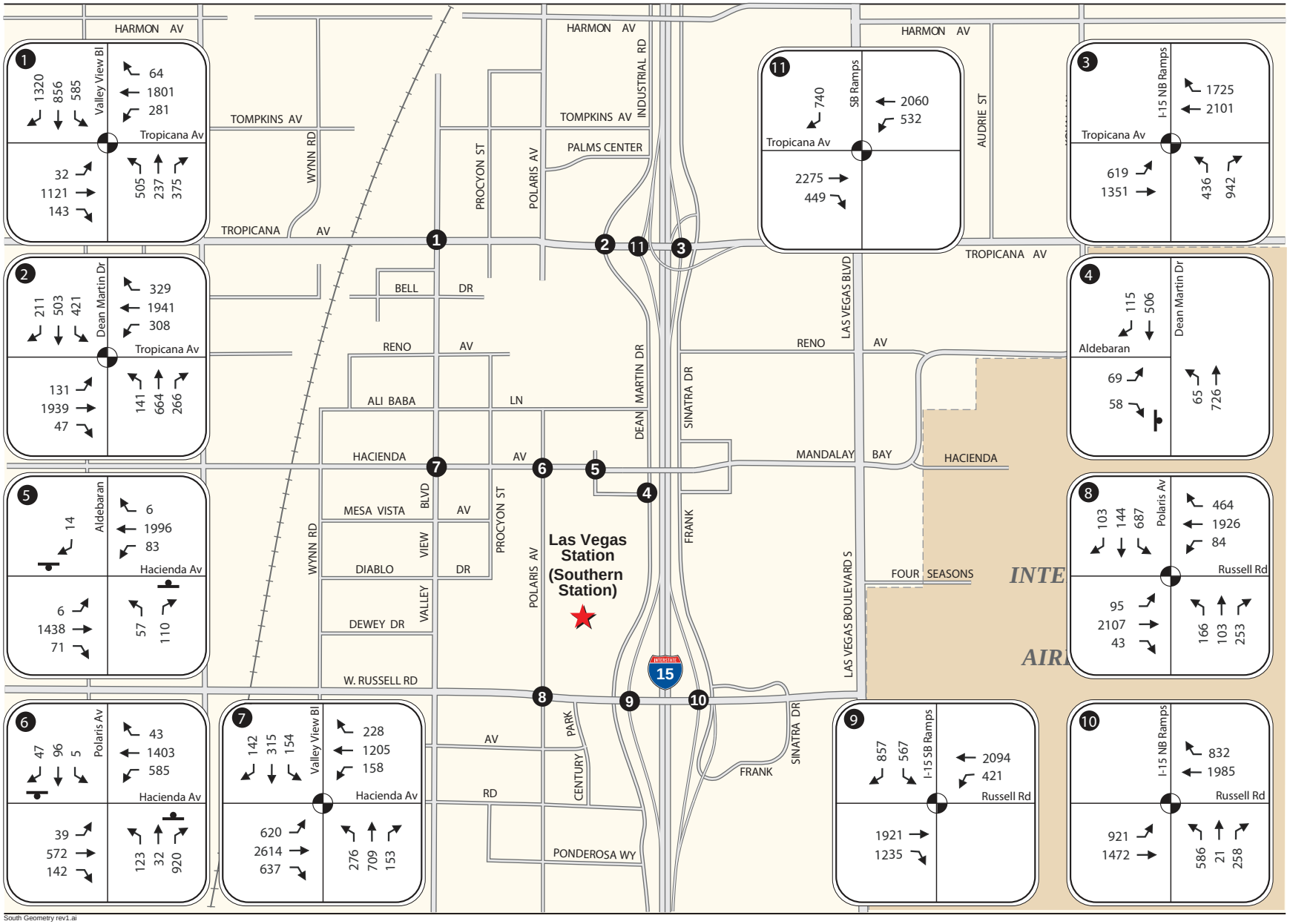
Future Year 2013 Intersection Geometry and Turning Volumes
Las Vegas Station (Southern Station)

FIG **F-3.5-7**

Source: AECOM, 2011.



South Geometry rev1.ai

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Future Year 2030 Intersection Geometry and Turning Volumes
Las Vegas Station (Southern Station)

FIG **F-3.5-8**

Source: AECOM, 2011.

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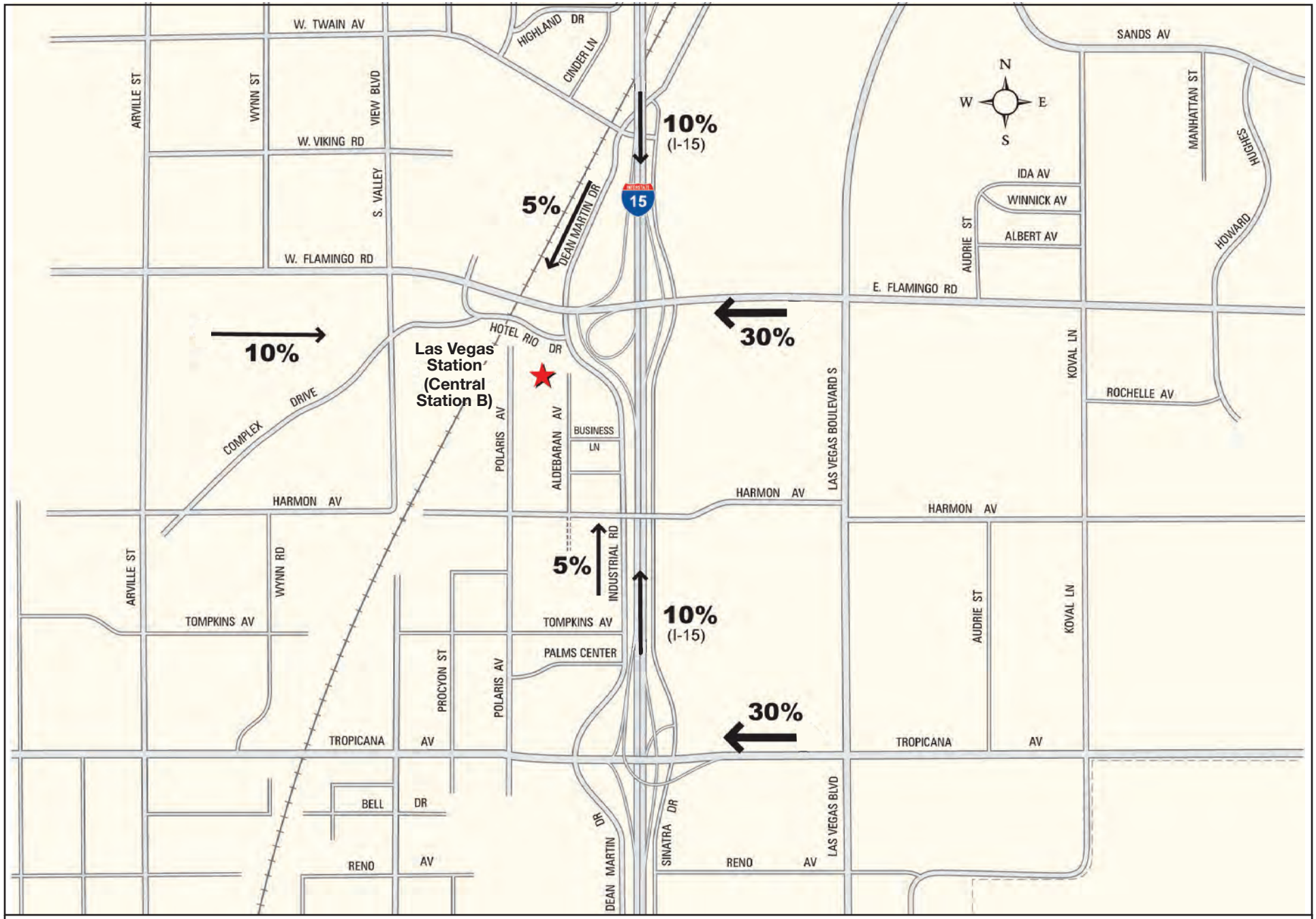
Existing Intersection Geometry
Las Vegas Station (Central Station B)

FIG **F-3.5-9**

Source: AECOM, 2011.



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Trip Distribution
Las Vegas Station (Central Station B)

FIG **F-3.5-10**

Source: AECOM, 2011.

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Future Year 2013 Intersection Geometry and Turning Volumes
Las Vegas Station (Central Station B)

FIG F-3.5-11

Source: AECOM, 2011.

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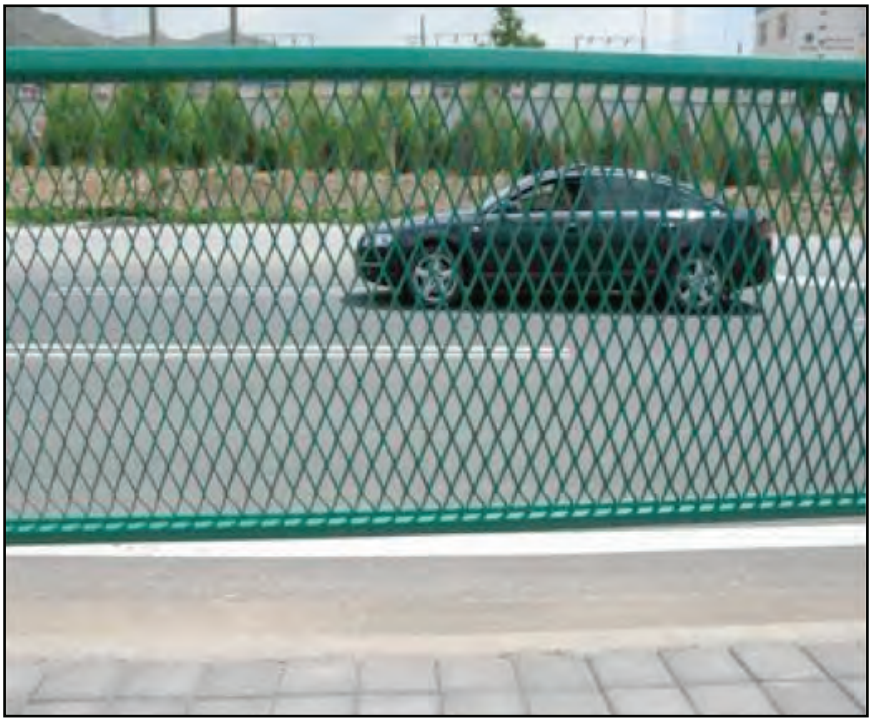
Future Year 2030 Intersection Geometry and Turning Volumes
Las Vegas Station (Central Station B)

FIG F-3.5-12

Source: AECOM, 2011.

Paddle Screen



Expanded Metal Mesh

Source: Gulf Industries, Inc, 2011; Steellong, 2011.

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3.6 VISUAL RESOURCES

This section describes updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential visual impacts associated with the Preferred Alternative in comparison with the No Action and other Action Alternative and identifies appropriate mitigation measures.

3.6.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comment on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to visual quality impacts and provides responses to those comments. Several comments resulted in changes to the visual analysis in the EIS and are discussed below. Substantive updates and changes in response to comments on the Draft and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

3.6.1.1 Affected Environment

Draft EIS **Section 3.6.2** and Supplemental Draft EIS **Section 3.6.1** describe in detail the affected environment for visual quality and visual resources for the DesertXpress project.

Since publication of the Draft EIS and Supplemental Draft EIS, there has been no change to the affected environment regarding visual resources. The urban, built-up visual elements remain concentrated within Barstow, Baker, Primm, Jean, Sloan, and the metropolitan Las Vegas area. The portions between these urbanized areas are primarily characterized by undeveloped lands with low lying shrubs and desert soils and the I-15 transportation corridor. The affected environment discussion from these previous documents remains applicable to this Final EIS and the Preferred Alternative.

3.6.1.2 Regulatory Environment

The regulatory environment related to visual resources for the DesertXpress project is described in detail in Draft EIS **Section 3.6.1**.

Comments S-328 and S-330 on the Supplemental Draft EIS requested that the EIS include a discussion of the NDOT Landscape and Aesthetics Master Plan (LAMP). To address these comments, this Final EIS amends Draft EIS **Section 3.6.1.5** to include a discussion of the LAMP as follows:

> **Nevada Department of Transportation, Landscape and Aesthetics Master Plan**
>
> **The Nevada Department of Transportation adopted the Landscape and Aesthetics Master Plan (LAMP) in June 2002. The LAMP seeks to establish a landscape and aesthetics program for the Nevada state**

highway system to provide aesthetically pleasing highways that are safe and cost effective.

The LAMP also includes planning guidelines related to urban freeways, city streets, rural highways, open spaces, rest areas, gateways, and transportation art. Aesthetic guidelines for urban freeways include guidelines related to slope treatments, bridges and interchanges, and sound walls and retaining walls. The aesthetic guidelines for rural highways include, but are not limited to, incorporating the roadway into the curves and hills of the land, blending cut-and-fill slopes, using earth toned design coloring, and maintaining natural vegetation. The aesthetic guidelines also seek to protect the high visual sensitivity of designated scenic byways within rural settings.

Funding issues and revenue sources associated with landscape and aesthetic treatments are also presented. NDOT requires that three percent of the total project construction cost on new construction and capacity improvements be allocated to landscape and aesthetic treatments, with NDOT funding the consultant cost for landscape and design.

3.6.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

Several comments on the Draft EIS and Supplemental Draft EIS resulted in changes to the visual analysis in the EIS and are discussed below.

Comment 440 on the Draft EIS requested that the reference to Segment 2A as the preferred action alternative should be deleted since a preferred action alternative was not identified at the time of publication of the Draft EIS. To address this comment, this Final EIS amends Draft EIS **Section 3.6.2.2** under the heading Segments 2A/2B, paragraph 4 as follows:

> Segments 2A and 2B would diverge about ¼-mile west of Fort Irwin Road. Segment 2A ~~(the preferred action alternative within segment 2)~~ would traverse a generally flat desert region with sparse vegetation, including an area where several alluvial fans converge. This area has patches of rural residential development, including buildings, billboards/signs, and utility lines.[1] This area has a moderate visual sensitivity, particularly in undeveloped portions.

[1] Detailed information on land use can be found in **Section 3.1, Land Use and Community Impacts**, of this Final EIS.

Comment S-329 on the Supplemental Draft EIS requested a revision to the description of the location of the Segment 6B rail alignment with AAA 8 to clarify that the rail alignment would not be immediately adjacent to the I-15 mainlines. To address this comment, this Final EIS amends Supplemental Draft EIS **Section 3.6.3**, under the heading "Alignment Adjustment Areas" and the subheading "Evaluation under BLM Criteria," paragraph 1 as follows:

> ***Portions of AAA 8 Within I-15 Freeway Corridor:*** Although implementation of AAA 8 would shift portions of Segment 6B to the west, much of the rail alignment would remain within the existing I-15 freeway corridor**. The rail alignment would be located at the westernmost edge within the I-15 ROW.** ~~(immediately adjacent to I-15 southbound travel lanes).~~ The rail alignment shift in this area would not result in new visual effects beyond those previously considered for Segment 6B in **Section 3.6.4.2** of the Draft EIS. Although passing trains in this area would temporarily block views from the freeway, this effect would be temporary and AAA 8 would not dominate views for motorists on I-15. Since greater visual change is allowed by BLM Class IV lands, the portions of AAA 8 within the I-15 freeway corridor would not be inconsistent with the existing urban visual landscape.

In response to comments from the Cooperating Agencies, this Final EIS amends Draft EIS **Section 3.6.5**, **Mitigation Measures VIS-1** and **VIS-6** to provide additional clarifying text as follows:

> **Mitigation Measure VIS-1: Rail Features**
>
> Rail features, including pillars, raised tracks, trains, catenary structures, crash barriers, and embankments, shall be designed to blend with or represent the surrounding desert environment. Features shall be created in muted desert colors. Bright colors and highly reflective materials shall be avoided. Rail features defined in the design-build process shall include visual elements, which create a sense of place and a memorable experience for both motorists and pedestrians. Concrete shall be embossed with symbols or patterns, where appropriate, which create a visual link between rail features and the surrounding communities and/or the non-urbanized landscape. **Visual screening shall be placed on the top of the crash barriers along the entire project corridor to mitigate any potential visual distraction to motorists from the trains and train lights. Analysis during the design-build process shall determine the specific details for the screening and if there are locations where it may not be needed.** The design of rail features in the I-15 freeway ROW shall be reviewed by Caltrans or NDOT as appropriate.

Mitigation Measure VIS-6: Educational Displays

Within California, the Applicant shall ~~P~~**p**rovide interpretive displays and artwork in station pedestrian areas in order to create a coherent pedestrian landscape and sense of place. Such displays shall be consistent with the Desert Managers Group's Caltrans Safety Roadside Rest Stop Interpretive Exhibit Design.

To further address Comments S-328 and S-330 on the Supplemental Draft EIS regarding the NDOT LAMP, this Final EIS amends Draft EIS **Section 3.6.5.2** as follows to incorporate additional requirements to the freeway landscaping mitigation:

Mitigation Measure VIS-10: Freeway Landscaping

The Applicant shall replace landscaping that will be removed during construction as directed by Caltrans or NDOT as appropriate. Landscaping in Nevada along the I-15 freeway shall follow NDOT's *I-15 Landscape and Aesthetics Corridor Plan,* 2005. Replacement landscaping shall occur in the median, along the shoulder, and in other ROW areas along the I-15 freeway, as appropriate within six months of the completion of construction. **In accordance with the NDOT LAMP, up to three percent of the total construction cost of the DesertXpress project may be allocated to landscape and aesthetic treatments, with NDOT funding the consultant cost for landscape and design.**

3.6.2 Analysis of Environmental Consequences

3.6.2.1 Methods of Evaluation

The same methodology used in Draft EIS **Section 3.6.3** remains applicable to this Final EIS and the evaluation of the Preferred Alternative. This methodology sets forth a comparison of existing visual character to conditions following implementation of the Preferred Alternative. The same blended methodological approach of incorporating key aspects of BLM and FHWA visual guidance documents and regulations is utilized. FRA, FHWA, and BLM identify the visual quality and sensitivity of visual landscapes using ratings of low, medium (or moderate), and high. **Figures F-3.6-1** through **F-3.6-5** show the visual quality and sensitivity surrounding the Preferred Alternative.

The BLM also established visual management land classifications, using ratings of Class I through Class IV. Class I and II lands are relatively undisturbed and have vistas towards undeveloped natural areas. The objective of these classes of lands is to preserve and retain the existing visual character of the landscape. Class III lands include areas with established transportation corridors, but which look out onto landscaped area with moderate to low visual disruption. The objective of this class is to partially retain the existing character of the landscape. Class IV lands represent visually disturbed areas and look out onto other visually disturbed areas. The objective of this class is to provide for

management activities which require major modification of the existing character of the landscape. Intrusion into Class I and II lands would generally be considered to result in adverse visual effects.

The BLM also established a number of Areas of Critical Environmental Concern (ACEC) throughout the desert region.[2] Refer to Draft EIS **Section 3.6.2.1** for more information on ACEC. The BLM considers Desert Wildlife Management Areas (DWMAs) to also be an ACEC. Visual intrusions into an ACEC would generally be considered to result in adverse visual effects.

The FHWA assesses visual impacts by considering the vividness, intactness, and unity of the landscape. Vividness refers to the memorability of the visual impression received from contrasting landscaped elements as they combine to form a striking and distinctive visual pattern. Intactness is the visual integrity of the natural and human-built landscape, especially as it relates to intrusive encroachment. Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. The resulting level of visual impact is determined by combining the severity of resource changes with the degree to which people are likely to oppose the change. Intrusions into areas of high vividness, intactness, and/or unity would generally be considered to result in adverse visual effects, depending on the extent of available viewer duration.

The area of analysis for effects related to visual quality and resources includes the available viewshed, or the visible environment, surrounding the Preferred Alternative. The visual evaluation of the Preferred Alternative considers views from the proposed rail alignment and station and maintenance facilities as well as from publicly accessible viewpoints toward these project features. The available viewsheds from any given viewpoint depend on the surrounding topography and existing level of development. In flat, undeveloped areas, the viewshed is typically larger than the available viewshed in a dense urban environment with existing buildings or an area with substantial changes in topography, such as hills or mountains.

FRA selected multiple key viewpoints for visual representation in this Final EIS based on BLM and FHWA guidance. The key viewpoints were selected to reflect a variety of criteria, including different project segments, population centers, known areas of visual sensitivity, and locations where stations or maintenance facilities are proposed. The key viewpoints illustrate the existing visual conditions in the specific viewshed. Key viewpoints were selected based on the public accessibility of the viewpoint, angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions. Visual simulations were prepared for the key viewpoints to provide a comparison of the visual features before and after construction of

[2] The BLM's West Mojave Plan established Areas of Critical Environmental Concern as a land use overlay designation indicating the presence of one or more sensitive resources. ACEC are designated to protect biological, cultural, and scenic resources.

the DesertXpress project. The visual simulations depict the relative scale and extent of the project from the available viewshed. The key viewpoints and visual simulations are used to evaluate potential changes to color, line, form, and the texture of the viewshed.

3.6.2.2 No Action Alternative

Under the No Action Alternative, no high-speed passenger railroad would be constructed and operated and, therefore, no rail infrastructure and associated facilities would be built.

The No Action Alternative would include roadway widening/expansion projects. **Section 2.3.1** of this Final EIS provides a summary of these planned and programmed transportation improvements. All of these improvements would occur to accommodate future traffic volumes. Visual impacts from these transportation projects would occur in Victorville, Baker, and along the I-15 freeway in Nevada. However, little to no change is anticipated to occur along the majority of the alignment in California by 2030, as no freeway expansion is contemplated between Barstow and the California/Nevada state line.

Since the Preferred Alternative includes all of the actions proposed under the No Action Alternative plus construction of the DesertXpress project, the No Action Alternative would result in the least amount of development. Overall, the visual impacts from the No Action Alternative would be less severe than the Preferred Alternative since the No Action Alternative would result in the least amount of visual change to the existing environment.

3.6.2.3 Preferred Alternative

Draft EIS **Section 3.6.4** and Supplemental Draft EIS **Section 3.6.3** each contain detailed analyses of visual quality effects by individual project component. The discussion below summarizes the aggregated visual effects for the components that comprise the Preferred Alternative.

The analysis is divided into an evaluation of the visual effects outside of the existing urban areas crossed by the Preferred Alternative, such as Barstow, Baker, Primm, Jean, and metropolitan Las Vegas, and an analysis of the visual effects within these existing urban areas.

Development of the Preferred Alternative would create a new rail alignment through a variety of existing landscapes, primarily within existing freeway corridors. Visual effects would vary depending on the existing visual quality and the design of the railway at any particular location (raised, at grade, or within retaining walls). At grade portions of the rail alignment would appear less visually dominant than raised track portions, but would include highly visible components such as crash barriers and graded areas along the side of the I-15 freeway. Since the rail alignment would be completely grade-separated, overpasses or underpasses would be constructed at intersections with existing roadways. Raised portions of track would be elevated on pillars or an embankment.

The Preferred Alternative train technology option would typically require 25-foot-tall catenary supports and overhead wiring along the entire rail alignment. The 25-foot-tall narrow, metallic catenary structures would stand out in color, pattern, and form from the surrounding landscape in undeveloped areas along the majority of the rail alignment, which are characterized by non-urbanized lands with low lying shrubs and desert soils and rolling dunes. In many areas the catenary structures would also decrease the vividness and intactness of existing views. These catenary features would be located primarily within the existing I-15 transportation corridor since the Preferred Alternative rail alignment would generally follow the existing I-15 freeway. These catenary features would present a developed and utilitarian visual element into the non-urbanized landscape outside existing urban areas.

The Preferred Alternative would also include autotransformers along the rail corridor, as well as three substations.[3] Autotransformers would include junction boxes, circuit breakers modules, and control buildings fit within a fenced area approximately 3,000 square feet in size. Autotransformers would be located about every 10 miles along the rail alignment. **Figures F-2-1** through **F-2-5** show the approximate locations of the autotransformers. **Appendix F-C** shows the specific autotransformer locations. Autotransformers would include poles, wires, and cabinet-like control buildings immediately adjacent to the proposed rail alignment areas. Similar to the overhead catenary structures in areas outside of existing urban environments, the autotransformers have the potential to stand out from the surrounding non-urbanized lands and potentially decrease the vividness and intactness of existing views of low lying shrubs, desert soils, and rolling dunes.

The Preferred Alternative would create a new viewer group of approximately four to five million train passengers per year. These new passengers would be considered a more sensitive viewer group than motorists since train passengers would not need to focus on driving, but could instead concentrate on views from the window. Train passengers would have very different views depending on their location in the train. Passengers on one side of the train would have views of the I-15 freeway in the foreground and the landscape in the background. Passengers on the other side of the train would have relatively uninterrupted views of the existing landscape, particularly when the rail alignment is outside of existing urban areas (i.e., Barstow, Baker, and Las Vegas). Any views from the I-15 freeway that would be altered, partially blocked, or degraded by development of the Preferred Alternative would be visible in their current condition from the train. Views from the train would be especially scenic where the alignment travels through the Clark Mountains.

[3] Two substations would be incorporated with the Victorville OMSF and the Baker MOW. The third substation, the Frias Substation, would be located in the southern metropolitan Las Vegas area.

Outside Existing Urban Areas

Motorists traveling on the I-15 freeway would be primary viewers of the Preferred Alternative in the non-urbanized areas outside of Barstow, Baker, and Las Vegas where the rail alignment would follow the existing I-15 freeway. Where the rail alignment would divert from the I-15 freeway, such as the area north of the Clark Mountains between Mountain Pass and the California/Nevada state line, readily accessible vantage points of the Preferred Alternative would be limited to views from the wilderness areas of the Mojave National Preserve (Preserve) to the west, from the air, or from the peaks of the Clark Mountains.

Evaluation under FHWA Criteria

The Preferred Alternative would reduce the vividness of the existing landscape in areas outside of existing urbanized areas. In areas where the rail alignment would be adjacent to the existing I-15 freeway, the concrete barriers, trackway, bridges, overpasses, underpasses, and passing trains would detract from the vividness, intactness, and unity of views from the I-15 freeway towards the non-urbanized lands with low lying shrubs, desert soils, and rolling hills. The Preferred Alternative rail alignment would be visible to motorists traveling in either direction on the I-15 freeway and would decrease the visual quality in these undeveloped areas. The overhead catenary features and fencing structures would hinder views of the existing low lying shrubs, desert soils, dunes, and distant mountains. However, since the majority of these views would remain relatively unobstructed when a train is not present, the overall visual quality rating for the undeveloped portions of the Preferred Alternative rail alignment would remain moderate.

In the vicinity of the I-15 freeway/Halloran Springs interchange the rail alignment would cross over the I-15 freeway as it transitions from the north side to the south side of the freeway. The rail alignment would then be depressed about 10 feet below grade for a distance of about ½-mile. As the rail alignment heads east it would then cross back under the I-15 freeway to the north side in an open retained cut in the vicinity of the I-15 freeway/Halloran Summit interchange. While the rail alignment would be visible as it crosses over the I-15 freeway in this area, it would quickly become less visible when it would be located in a depressed or retained cut configuration. Associated trackway would not be highly visible to motorists traveling on the I-15 freeway with only the walls and upper portions of the overhead catenary features being visible to motorists on the I-15 freeway. Views towards the distant mountains to the north and west would remain unchanged and highly vivid. As a result the existing visual quality in the Halloran Springs to Halloran Summit area would remain moderate.

The Preferred Alternative rail alignment would not generally be visible to motorists traveling on the I-15 freeway in areas where the rail alignment would deviate from the I-15 freeway through the Clark Mountains, just north of Mountain Pass to the California/Nevada state line. The northern portions of this segment of the Preferred

Alterative rail alignment (Segment 4C) would be visible to motorists on the I-15 freeway, as the rail alignment would approach the I-15 freeway corridor near the California/Nevada state line. The rail alignment could also be seen from wilderness areas of the Preserve to the west, from aerial views, or from the peaks of the Clark Mountains. Views of the Preferred Alternative rail alignment from these locations would be seen in the distant background and the rail alignment would be a distinctly subordinate visual feature in the overall landscape. Regardless, the intactness, unity, and vividness of the existing environment would be slightly diminished due to the placement of a rail alignment in a generally undeveloped area within proximity to the Preserve, thereby reducing the existing high quality visual environment to a moderate visual environment, representing an adverse effect. According to the NPS, this portion of the Preferred Alternative rail alignment would negatively affect the Preserve's scenery, aesthetic, and wilderness values.[4]

The Victorville Station Site 3 (VV3) and OMSF (OMSF 2) would reduce the vividness of the existing non-urbanized landscape visible to the west from the I-15 freeway. **Figure F-3.6-6** shows a visual comparison of the existing Victorville Station site and the conceptual development of the Victorville Station. The facilities would not result in a change to the already low unity of the visual environment due to the presence of the overhead electric transmission lines and adjacent I-15 freeway transportation corridor. However, the associated light and glare would result in a less intact desert setting, thereby decreasing the intactness of the existing setting. Due to the brief viewer duration from motorists on the I-15 freeway, visual effects from lighting would not be considered adverse.

Evaluation under BLM Criteria

The rail trackway, concrete pillars, and trains associated with the Preferred Alternative would contrast with the form, color, and texture of the open desert areas and hillsides within the undeveloped areas surrounding the project area. The majority of these lands are also designated as BLM Class II and III lands, which intend to retain the existing character of the landscape. BLM Class I lands are also present on portions of the Mojave National Preserve within close proximity to the Preferred Alternative rail alignment. While these visual elements would attract attention, the Preferred Alternative would not dominate the landscape due to its small size relative to the non-urbanized landscape.

In areas where the Preferred Alternative rail alignment would be located adjacent to the existing I-15 freeway, the I-15 freeway already creates a substantial contrast in the visual environment and the rail alignment would not constitute a substantially new visual feature within the existing landscape. The Preferred Alternative would maintain the intended purpose of the I-15 freeway as a transportation corridor. Passing trains would briefly

[4] U.S. Department of the Interior, National Park Service. The DesertXpress High-Speed Train and the Mojave National Preserve Memorandum. February 9, 2011.

block views from the I-15 freeway; however, this view blockage would be for only short durations due to the expected train frequency and speeds, resulting in a minor effect on views from the I-15 freeway.

Portions of the trackway, passing trains, and roadway overcrossings near the Preserve would be visible from wilderness areas within the Preserve, posing a notable contrast to the BLM Class I land.

A portion of the Preferred Alternative rail alignment would also be located within BLM Class I lands where the rail alignment would deviate from the I-15 freeway through the Clark Mountains north of Mountain Pass to the California/Nevada state line. The rail alignment would traverse diverse landscapes, including rocky hills, mountains, open desert terrain and a mesa just north of the Ivanpah Dry Lake bed. While this portion of the Preferred Alternative rail alignment would contrast with the natural landscape of the non-urbanized area, the rail line would be located in a generally remote area. The northern portions of this segment of the Preferred Alternative rail alignment (Segment 4C) would be visible to motorists on the I-15 freeway, as the rail alignment would approach the I-15 freeway corridor near the California/Nevada state line.

While the Preferred Alternative would contrast with the existing natural, non-urbanized landscape in this location, the California Energy Commission approved the Ivanpah Solar Electric Generating System (ISEGS) project in August 2010 for the same area. The ISEGS project would introduce future utilitarian visual features into the existing undeveloped visual landscape. **Figure F-3.6-7** shows a visual simulation of the Ivanpah Solar Electric Generating System in this area from the Clark Mountain range (from Benson Mine), as well as a simulation with the addition of the Preferred Alternative rail alignment to the future viewshed. The Preferred Alternative would be a subordinate visual feature with implementation of the ISEGS. Refer to **Section 3.16, Cumulative Impacts**, of this Final EIS for further discussion of the Ivanpah Solar Electric Generating System and the associated cumulative visual effects.

The Victorville Station and OMSF would dominate the middle ground, partially obstructing views to distant hills and non-urbanized lands with low lying shrubs and desert soils for motorists on the I-15 freeway. **Figure F-3.6-6** shows a visual comparison of the existing Victorville Station site and the conceptual development of the Victorville Station. However, with the presence of the I-15 freeway and overhead electric transmission lines, the facilities would not substantially detract from the existing, somewhat degraded landscape. The Victorville Station and OMSF would also be located approximately six miles north of central Victorville and would not be visible from the City's more developed/populated portions, resulting in very few stationary, non-motorist views of the station. The Victorville Station and OMSF would also be located within close proximity to a Victorville landfill, which is a prominent urban visual feature in the area.

Within Existing Urbanized Areas (Barstow, Baker, Primm, Jean, Las Vegas)

Motorists traveling on the I-15 freeway would be the primary viewers of the Preferred Alternative. Motorists and pedestrians on the local roadways would also represent primary viewers groups where the Preferred Alternative traverses through existing urban areas.

Evaluation under FHWA Criteria

Within Barstow, the Preferred Alternative would introduce railway elements such as elevated trackways and passing trains into motorists' views from the I-15 freeway. Although these elements would change existing views, they would not block scenic views or break up the intactness of the urban landscape. **Figure F-3.6-8** shows that the elevated crossing at the I-15 freeway/Main Street interchange in central Barstow would disrupt the unity of the existing visual environment, as a new overhead trackway and concrete pillars would be visible. Existing views in central Barstow from the I-15 freeway are not highly vivid, as manmade development, including residential and commercial developments and billboards, dominate the views. The Preferred Alternative rail alignment would not substantially degrade the relatively low visual quality of the I-15 freeway area.

Within Baker, the MOW facility, which would include a mix of building and ancillary facilities, would be visible from the northbound and southbound I-15 freeway. Development of the MOW facility would be consistent with the existing visual character and would not substantially alter the existing moderate quality of views since views of scattered development are already visible from the I-15 freeway in Baker. Viewer duration of the MOW facility would also be brief due to the high travel speeds on the I-15 freeway. However, the utility corridor connecting the Baker MOW facility to an existing power source would degrade the existing visual quality since 95 to 135 foot metal utility towers and power lines would run through the community of Baker. The tall metal towers would disrupt views from local roadways northerly towards undeveloped areas, thereby resulting in an adverse effect to visual quality.

Within Primm and Jean, the rail alignment, crash barriers, and quickly passing high-speed trains would be visible from the I-15 freeway. These features would not block scenic views or breakup the intactness or unity of the landscape. Existing views from I-15 freeway are not very vivid, manmade development appears randomly placed, and natural elements are present in the background. The addition of rail elements would not lower this already low level of visual quality.

Within the metropolitan Las Vegas area, the Preferred Alternative would travel through an area of low visual quality. The existing visual environment along the I-15 freeway consists of many buildings, lights, billboards, and other manmade elements of varying colors, shapes, and sizes. Since the existing scene is not unified or intact, the addition of the Preferred Alternative would not detract from the intactness or unity of the view. Vividness

of views from the I-15 freeway would change as passing trains block views of developed areas to the west. However, view blockage would be temporary and the overall visual quality would remain low. If the Preferred Alternative Las Vegas Southern Station site option is ultimately selected as the Las Vegas Station, approximately 1.8 miles of elevated railway would not be constructed, further reducing the extent of visual effects.

While the Preferred Alternative Frias Substation would be located immediately adjacent to the I-15 corridor, views of the substation from motorists traveling on I-15 would be blocked in part by a concrete wall constructed along the Preferred Alternative rail alignment. The substation would introduce new overhead electric transmission lines; however, these new transmission lines would be immediately adjacent to existing overhead transmission lines that cross I-15 near West Frias Avenue. The Frias Substation would also be visible to motorists and/or pedestrians traveling on nearby residential streets, including West Frias Avenue, West Haleh Avenue, and South Dean Martin Drive. Views of the substation would also be available from nearby single-family homes. While the substation would introduce new utility towers, the towers would be of the same scale, form, and color as the existing overhead electric transmission lines that parallel West Frias Avenue and cross over just north of the Frias Substation site. Further, the I-15 transportation corridor is already visible from these locations and the addition of new substation would not represent a substantial contrast from the existing environment. Due to the disturbed nature of views at this location with the presence of suburban development and overhead electric transmission lines, the addition of the Frias Substation would not introduce a new type of development to the area. The vividness, intactness, and unity of the visual environment would remain low with the addition of the substation. The Frias Substation would be a co-dominant element in the landscape and no adverse visual effect would occur.

Neither of the Preferred Alternative Las Vegas Station site options (Southern Station or Central Station B) would have an adverse effect on visual quality. The two station site options would be visible from the I-15 freeway, as well as from other surrounding roadways. Views from the I-15 freeway are dominated by extensive urbanized development, including brightly lit buildings, billboards, and the expanse of other roadways. The existing vividness, intactness, and unity would remain low and implementation of the station structures would not substantially alter existing views and no adverse effect would occur.

Similarly, the Preferred Alternative Las Vegas MSF (Wigwam Avenue MSF) would not have an adverse effect on visual quality since the facility would be built within an existing metropolitan area with existing urban structures, billboards, and utilitarian visual features such as overhead transmission lines. **Figure F-3.6-9** shows the visual comparison of the existing visual character of the proposed MSF site and the conceptual development of the Preferred Alternative Las Vegas MSF. The existing vividness, intactness, and unity would remain low and existing views would not be substantially altered. No adverse effect would occur.

Evaluation under BLM Criteria

The majority of lands within the urbanized areas are designated as BLM Class III or IV, which allow for partial to major modifications to the existing character of the landscape, respectively.

Within Barstow, the Preferred Alternative would be highly visible to motorists on the I-15 freeway but would not be out of character with the surrounding urban landscape. **Figure F-3.6-8** shows that the Preferred Alternative rail alignment would be visible in the foreground for motorists, pedestrians, and visitors near the I-15 freeway/Main Street interchange. The elevated trackway would be highly visible in this commercial and urban landscape but would not block significant views. The rail alignment bridge crossing over the Mojave River would be immediately adjacent to the existing I-15 freeway bridge and would not stand out or create a substantial new visual element in the immediate landscape.

Within Baker, the MOW facility would be located on BLM Class II land since it is immediately adjacent to the highway in an undeveloped area. The Baker MOW facility would be consistent with the I-15 freeway visual character. However, the MOW facility would be visible from wilderness areas in the Preserve, which are classified as BLM Class I lands, and would introduce contrast under BLM criteria. The MOW signal tower would also be visible at night, which would contrast with nighttime views from the Preserve.

Within Primm and Jean, the Preferred Alternative rail alignment would maintain consistency with the BLM Class IV lands since the rail alignment would be within the existing transportation corridor of the I-15 freeway in a highly developed area.

As previously stated, the Frias Substation would not be seen by motorists on I-15 but would be seen by motorists on surrounding roadways. Due to the proximity to the single-family homes and lands designated for future commercial and residential development, the Frias Substation could create some limited visual incompatibility with surrounding uses. However, the I-15 transportation corridor is already visible from these locations and the addition of new substation would not represent a substantial contrast from the existing environment.

Within the Las Vegas metropolitan area, the Preferred Alternative would be located on Class III and IV lands. The existing visual character would be partially retained since the rail alignment would be located along the existing I-15 transportation corridor. The alignment would not conflict with any natural landscape features because this area is already highly developed. If the Preferred Alternative Las Vegas Southern Station site option is ultimately selected as the Las Vegas Station, approximately 1.8 miles of elevated rail alignment would not be constructed, further reducing the extent of visual effects.

Neither the Preferred Alternative Las Vegas Station site options nor the Las Vegas MSF would dominate existing views or change the existing landscape, as these facilities would be surrounded by numerous manmade elements and would blend with the urban

character of Las Vegas. As such, these elements would be consistent with the BLM Class IV criteria, which allows for changes to the landscape character.

Construction Period Effects

TCAs are located along the Preferred Alternative rail alignment as an area to concentrate temporary construction equipment and activities. Construction activities would involve the use of heavy equipment, stockpiling of soils and materials, and other visual signs of construction.

Construction activities would likely take place in phases such that the entire Preferred Alternative would not be under construction all at one time. It is assumed that the phases would occur through the earthmoving and grading, track construction, and testing and operation stages of construction. The Preferred Alternative construction period visual effects would vary over time and would depend on the location of the construction activities.

Construction of the passenger stations and maintenance facilities would be similar to the construction of typical commercial/industrial facilities and would include site preparation and foundation work, framing and structural construction, and finishing work. These facilities will also include construction of track way connecting the station to the rail alignment, where construction period visual effects would be similar to those noted above for the rail alignment.

All construction-related visual changes associated with the Preferred Alternative would be temporary in nature.

3.6.2.4 Comparison with Other Action Alternatives

Table F-3.6-1 compares the visual effects of the various Action Alternatives evaluated, as well as the No Action Alternative. Components of the Preferred Alternative are highlighted in yellow.

Rail Alignment Options

The Preferred Alternative rail alignment would primarily implement Action Alternative B options, where the rail alignment would be located immediately adjacent to the existing I-15 freeway within the I-15 freeway ROW. The Alternative B, I-15 side running rail alignment would result in greater visual effects than the Action Alternative A rail alignment options. The Action Alternative A rail alignment options would obstruct motorists' views from either side of the highway when they are looking towards the center of the freeway due to its location within the median of the I-15 freeway. The change in visual character would be minimal, however, since the center of the I-15 freeway is already a developed transportation corridor. In contrast, many areas adjacent to the I-15 freeway, specifically those areas outside of existing urbanized areas, are non-urbanized landscapes with low lying shrubs, desert soils, and distant views of mountains. Motorists looking towards the Action Alternative B rail alignment, especially from the side of the highway

adjacent to the rail alignment, would experience a greater disruption of existing views, since views of the non-urbanized landscapes would be partially blocked by the rail alignment. While both the Action Alternative A and B rail alignments would be at grade for the majority of the corridor outside of the existing urbanized areas, the Preferred Alternative rail alignment would have greater visual effects than the Action Alternative A rail alignments.

The Preferred Alternative Segment 2C rail alignment would avoid adverse visual effects associated with Segment 2A/2B. Segments 2A/2B would traverse through moderate to high visual quality areas of western and northern Barstow. These areas do not contain dense urban development and are surrounded by non-urbanized lands with views towards distant mountains. Segments 2A/2B would reduce the areas of high visual quality to moderate visual quality, representing an adverse effect. The Preferred Alternative Segment 2C would follow the existing I-15 freeway and would avoid traveling through areas of high visual quality. The existing visual quality through central Barstow is considered low and the placement of the Preferred Alternative rail alignment within the existing transportation corridor would not degrade the low visual quality. All three rail alignment options in Segment 2 would require the construction of a new crossing over the Mojave River. The Preferred Alternative Segment 2C rail alignment would cross over the Mojave River adjacent to the existing I-15 freeway bridge. Given this location, this new bridge would not stand out or create a substantial new visual element in the immediate landscape. However, Segments 2A/2B would require the construction of a bridge over the Mojave River in an area where no major transportation corridors exist, thereby introducing a substantially new visual element into the landscape. Overall, the Preferred Alternative Segment 2C would have lesser visual effects through Barstow than would Segments 2A/2B.

The Preferred Alternative Segment 3B rail alignment would result in lesser visual effects than would Segment 3A. The Segment 3A rail alignment would be located within the I-15 freeway median and would disrupt views to the south for southbound motorists on the I-15 freeway and views to the north for northbound motorists on the I-15 freeway.

The Preferred Alternative Segment 4C would result in greater visual effects than would Segment 4A. According to the NPS, the Preferred Alternative Segment 4C rail alignment would negatively affect the Mojave National Preserve scenery, aesthetic, and wilderness values.[5] The Segment 4A would also result in negative effects to the visual quality of the Preserve, but the area proposed for the Segment 4A rail alignment has already been disturbed and used for a local mine and as ROW for several underground utilities.[6] The

[5] U.S. Department of the Interior, National Park Service. The DesertXpress High-Speed Train and the Mojave National Preserve Memorandum. February 9, 2011.

[6] U.S. Department of the Interior, National Park Service. The DesertXpress High-Speed Train and the Mojave National Preserve Memorandum. February 9, 2011.

Segment 4A rail alignment would also remain within close proximity to the I-15 freeway corridor, rather than traversing through undisturbed desert resources, as would the Preferred Alternative Segment 4C rail alignment. The Preferred Alternative Segment 4C rail alignment and Segment 4B rail alignment would have similar visual effects, given their close proximity in the area north of the Clark Mountains outside of the I-15 freeway corridor.

Passenger Stations and Maintenance Facilities

The Preferred Alternative Victorville Station and OMSF would have similar visual effects as VV1, VV2, and OMSF 1. While all Victorville Station and OMSF site options would decrease the vividness of the existing undeveloped landscape visible from the I-15 freeway corridor, the facilities would not be incongruous in character with the existing transportation corridor, existing railroad facilities (near VV1 and OMSF 1), and existing overhead transmission lines (VV2, VV3, and OMSF 2). The Victorville Station and OMSF site options would remain somewhat consistent with the existing visual environment and the visual quality would remain moderate.

The Preferred Alternative Las Vegas Station site options (Southern Station or Central Station B) would have similar visual effects as the Central Station A and Downtown Station. Each station would be considered infill development and would be surrounded by existing urban features, such as tall buildings, billboards, and overhead utility transmission lines. Visual effects would be the same for all Las Vegas Station site options since all of these sites are within similar highly urbanized, complex visual landscapes. The Las Vegas Station site options would remain consistent with the existing visual environment and the visual quality would remain low.

The Preferred Alternative Las Vegas MSF would have similar visual effects as the Robindale Avenue MSF, but lesser visual effects than the Sloan Road MSF and Relocated Sloan MSF. The Preferred Alternative Las Vegas MSF and the Robindale Avenue MSF would be developed within similar highly urbanized visual landscape immediately adjacent to the I-15 freeway corridor. These MSF site options would remain consistent with the existing visual landscape and the visual quality would remain low. The Sloan Road MSF and Relocated Sloan MSF site options would be located within an undeveloped visual landscape adjacent to the I-15 freeway corridor, surrounded by vacant lands with desert soils and shrubs. However, an existing utility corridor is located within proximity of both MSF sites. Given that motorists, traveling at freeway speeds of about 65 mph, would only view the Sloan Road MSF and Relocated Sloan MSF for several seconds and that a utility corridor already existing in the general vicinity, these MSF site options would be somewhat consistent with the existing character and would only slightly reduce the visual quality. Regardless, the visual quality would remain moderate at these locations.

Table F-3.6-1 Alternatives Comparison – Visual Resources

Alternative	Consistency with BLM Criteria	Consistency with FHWA Visual Quality/Sensitivity
No Action Alternative	Consistent if Impacts Remain in Existing Corridor	Consistent if Impacts Remain in Existing Corridor
Alignment Routings, including Temporary Construction Areas (TCAs) and Alignment Adjustment Areas		
Segment 1 Routing		
Segment 1	Somewhat Consistent	Visual Quality Would Reduce From Moderate to Low
Segment 2		
Segment 2A/2B, 2A	Somewhat Consistent	Visual Quality Reduced from Moderate/High to Moderate Outside Existing Urban Areas. Visual Quality Remains Low/Moderate Within Existing Urban Areas.
Segment 2A/2B, 2B	Somewhat Consistent	Visual Quality Reduced from Moderate/High to Moderate Outside Existing Urban Areas. Visual Quality Remains Low/Moderate Within Existing Urban Areas.
Segment 2C	Somewhat Consistent	Somewhat Consistent – Visual Quality Remains Low/Moderate
Segment 3		
Segment 3A	Somewhat Consistent. Not Consistent Near Mojave National Preserve Wilderness Areas	Visual Quality Reduced from High to Moderate in Mojave National Preserve. Visual Quality Reduced from Moderate/High to Moderate Outside Mojave National Preserve.
Segment 3B	Somewhat Consistent. Not Consistent Near Mojave National Preserve Wilderness Areas	Visual Quality Reduced from High to Moderate in Mojave National Preserve. Visual Quality Reduced from Moderate/High to Moderate Outside Mojave National Preserve.
Segment 4		
Segment 4A	Not Consistent	Visual Quality Reduced from High to Moderate within Mojave National Preserve. Visual Quality Remains Moderate Outside Mojave National Preserve.
Segment 4B	Not Consistent	Visual Quality Reduced from High to Moderate

Alternative	Consistency with BLM Criteria	Consistency with FHWA Visual Quality/Sensitivity
Segment 4C	Not Consistent	Visual Quality Reduced from High to Moderate
Segment 5		
Segment 5A	Consistent Within Existing Urban Areas. Somewhat Consistent Outside Existing Urban Areas.	Visual Quality Remains Moderate, With Slight Reduction in Quality
Segment 5B	Consistent Within Existing Urban Areas. Somewhat Consistent Outside Existing Urban Areas.	Visual Quality Remains Moderate, With Slight Reduction in Quality
Segment 6		
Segment 6A	Consistent Within Existing Urban Areas. Somewhat Consistent Outside Existing Urban Areas.	Visual Quality Remains Low
Segment 6B	Consistent Within Existing Urban Areas. Somewhat Consistent Outside Existing Urban Areas.	Visual Quality Remains Low
Segment 6C	Consistent	Visual Quality Remains Low
Segment 7		
Segment 7A	Consistent	Visual Quality Remains Low
Segment 7B	Consistent	Visual Quality Remains Low
Segment 7C	Consistent	Visual Quality Remains Low
Victorville Station and Maintenance Facility Site Options		
Victorville Station Site 1	Somewhat Consistent	Visual Quality Remains Moderate
Victorville Station Site 2	Somewhat Consistent	Visual Quality Remains Moderate
Victorville Station Site 3	Somewhat Consistent	Visual Quality Remains Moderate
Victorville OMSF 1	Somewhat Consistent	Visual Quality Remains Moderate
Victorville OMSF 2	Somewhat Consistent	Visual Quality Remains Moderate

Alternative	Consistency with BLM Criteria	Consistency with FHWA Visual Quality/Sensitivity
Las Vegas Area Station and Maintenance Facility Site Options		
Las Vegas Southern Station	Consistent	Visual Quality Remains Low
Las Vegas Central Station A	Consistent	Visual Quality Remains Low
Las Vegas Central Station B	Consistent	Visual Quality Remains Low
Las Vegas Downtown Station	Consistent	Visual Quality Remains Low
Sloan Road MSF[7]	Somewhat Consistent	Visual Quality Remains Moderate, With Slight Reduction in Quality
Relocated Sloan MSF	Somewhat Consistent	Visual Quality Remains Moderate, With Slight Reduction in Quality
Wigwam Avenue MSF	Consistent	Visual Quality Remains Low
Robindale Avenue MSF	Consistent	Visual Quality Remains Low
Frias Substation	Consistent	Visual Quality Remains Low
Other Facility		
Baker Maintenance of Way Facility	Somewhat Consistent.	Visual Quality Remains Moderate
Technology Options, Including Autotransformer Sites (EMU Only)		
DEMU (Diesel-Electric Multiple Unit)	N/A	N/A
EMU (Electric Multiple Unit)	Greater Visual Effects from Overhead Catenaries, Autotransformers, and Utility Corridors	Greater Visual Effects from Overhead Catenaries, Autotransformers, and Utility Corridors

Source: CirclePoint, 2011.

[7] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF", located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

3.6.3 MITIGATION MEASURES FOR THE PREFERRED ALTERNATIVE

Mitigation Measures VIS-1 through **VIS-10** identified in Draft EIS **Section 3.6.5** would be applied to the Preferred Alternative to reduce and avoid adverse effects to visual resources. These mitigation measures relate to the operational and construction period of the Preferred Alternative and are provided below.

3.6.3.1 Operational Period Mitigation Measures

Mitigation Measure VIS-1: Rail Features

Rail features, including pillars, raised tracks, trains, catenary structures, crash barriers, and embankments, shall be designed to blend with or represent the surrounding desert environment. Features shall be created in muted desert colors. Bright colors and highly reflective materials shall be avoided. Rail features defined in the design-build process shall include visual elements, which create a sense of place and a memorable experience for both motorists and pedestrians. Concrete shall be embossed with symbols or patterns, where appropriate, which create a visual link between rail features and the surrounding communities and/or the non-urbanized landscape. Visual screening shall be placed on the top of the crash barriers along the entire Preferred Alternative rail corridor to mitigate any potential visual distraction to motorists from the trains and train lights. Analysis during the design-build process shall determine the specific details for the screening and if there are locations where it may not be needed. The design of rail features in the I-15 freeway ROW shall be reviewed by Caltrans, NDOT, and FHWA, as appropriate (see **Mitigation Measure TRAF-3**).

Mitigation Measure VIS-2: Victorville Station Features

The Victorville Station and associated elements, such as the parking garage and pedestrian walkways, shall be developed with architecture, muted colors, and landscaping that reflect the surrounding non-urbanized aesthetic. The landscaping plan shall include the use of drought resistant desert plants, gravel, and stone. Pedestrian elements such as pathways and portals in both the station building and the associated garage shall incorporate desert elements such as landscaping, muted colors and the use of desert-related symbols and patterns. Signage shall be consistent with the scale and character of the site and surroundings and avoid the use of highly reflective materials or bright neon lights.

Mitigation Measure VIS-3: Maintenance Facility Features

Maintenance facilities shall be designed to be aesthetically appropriate for the surrounding non-urbanized landscape through the use of muted colors and desert landscaping. The use of highly reflective materials shall be avoided. Concrete may be embossed with desert symbols and patters.

Mitigation Measure VIS-4: Contour Grading

Where feasible contour grading techniques should be employed to reduce the visual appearance of cuts and fill slopes. Grades, cuts, and fills shall be shaped so as to appear consistent and continuous with the natural landscape forms.

Mitigation Measure VIS-5: Light and Glare Reduction

Lighting at stations and maintenance facilities outside of metropolitan Las Vegas shall be designed to minimize disruption of the natural dark at night in the non-urbanized landscape. The final lighting plan for these stations and maintenance facilities shall incorporate light and glare screening measures such as the use of plantings to screen well-lit areas, use of downward cast lighting, and the use of motion sensor lighting where appropriate.

Mitigation Measure VIS-6: Educational Displays

Within California, the Applicant shall provide interpretive displays and artwork in station pedestrian areas in order to create a coherent pedestrian landscape and sense of place. Such displays shall be consistent with the Desert Managers Group's Caltrans Safety Roadside Rest Stop Interpretive Exhibit Design.[8]

3.6.3.2 Construction Period Mitigation Measures

Mitigation Measure VIS-7: Construction Site Management

Construction shall be maintained in an orderly manner, including proper containment and disposal of litter and debris to prevent dispersal onto adjacent properties or streets.

Mitigation Measure VIS-8: Construction Site Lighting

Construction crews working at night shall direct any artificial lighting onto the work area to minimize the spillover of light or glare onto adjacent areas. Where feasible, construction lighting shall be screened from viewer groups - such as motorists on the freeway or residents in nearby towns and communities to prevent visible lighting overflow into the natural dark of the desert at night.

Mitigation Measure VIS-9: Visual Screening

Visual screening shall be erected along construction and staging areas as appropriate.

[8] The geographic scope of this mitigation is limited to California, insofar as the Las Vegas Station (Southern Station or Central Station B) –would be the only station in Nevada – is not bound by the Caltrans criteria referenced above.

Mitigation Measure VIS-10: Freeway Landscaping

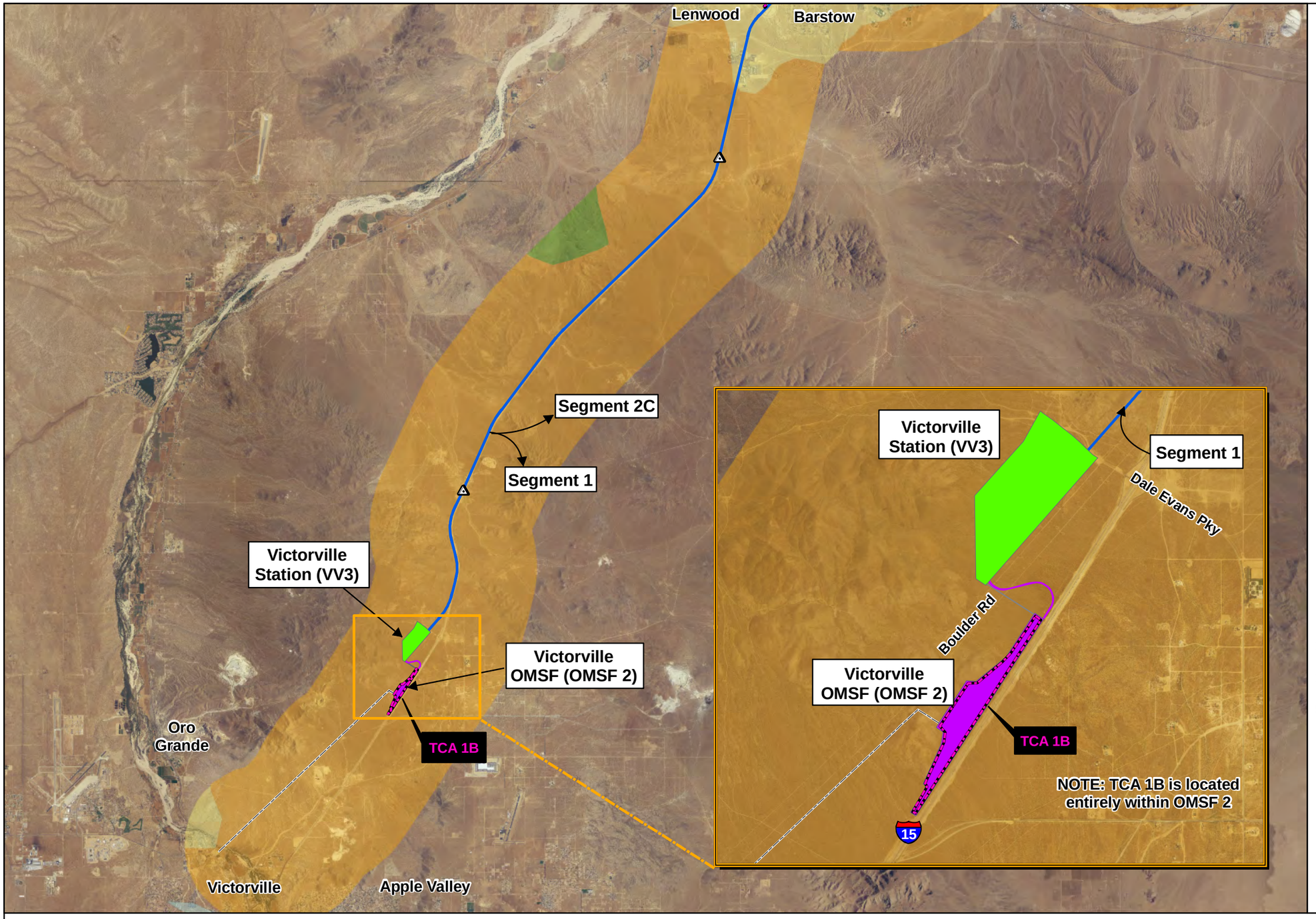
The Applicant shall replace landscaping that will be removed during construction as directed by Caltrans or NDOT as appropriate. Landscaping in Nevada along the I-15 freeway shall follow NDOT's I-*15 Landscape and Aesthetics Corridor Plan,* 2005. Replacement landscaping shall occur in the median, along the shoulder, and in other ROW areas along the I-15 freeway, as appropriate within six months of the completion of construction. In accordance with the NDOT LAMP, up to three percent of the total construction cost of the Preferred Alternative may be allocated to landscape and aesthetic treatments, with NDOT funding the consultant cost for landscape and design.

In addition to **Mitigation Measure VIS-10** above, effects from tree and plant removal will be mitigated through **Mitigation Measure BIO-6,** which ensures that disturbed areas of native vegetation will be restored to preconstruction site conditions. See **Section 3.14.3** of this Final EIS for a complete discussion of this mitigation measure.

3.6.4 Residual Impacts Following Mitigation

Despite the incorporation of the aforementioned mitigation measures, the Preferred Alternative would result in the permanent introduction of new elements to the project area, ultimately resulting in a permanent visual change within the viewshed.

The primary residual impacts would be expected to occur in areas with the greatest visual quality and sensitivity, such as areas designated as having high visual quality or areas designated as BLM Class I and II lands. These areas are generally located outside of the existing urbanized areas and outside of the I-15 freeway. While the majority of the Preferred Alternative rail alignment would be within the I-15 freeway, residual visual impacts to the sensitive visual environments north of Yermo and north of the Clark Mountains would experience the greatest residual visual effects.



Legend

Visual Quality / Sensitivity (Representative Locations)

- High
- Medium
- Low

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

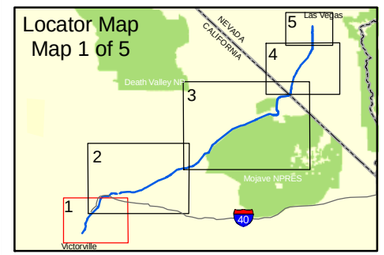
1 inch equals 3 miles

Kilometers
0 2 4

Miles
0 1.5 3

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



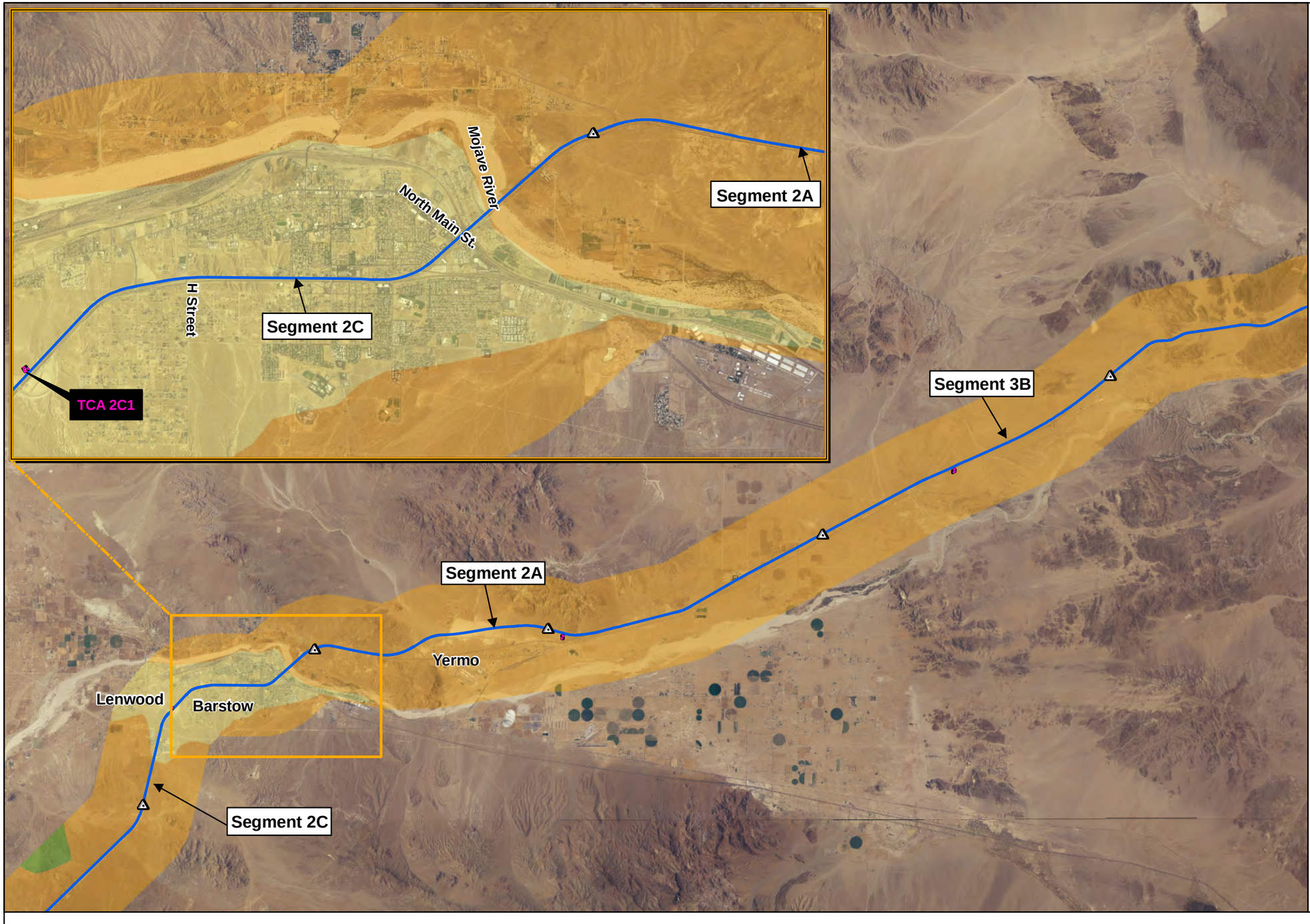
U.S. Department of Transportation Federal Railroad Administration

DesertXpress Final EIS

Visual Quality / Sensitivity (1)

FIG **F-3.6-1**

Geografika Consulting 01.17.11



Legend

Visual Quality / Sensitivity (Representative Locations)

- High
- Medium
- Low

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

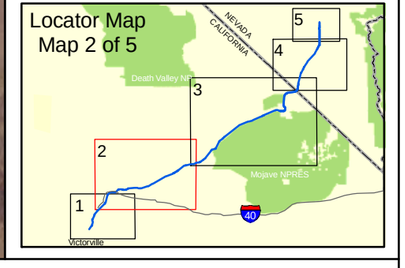
1 inch equals 4 miles

NORTH

0 5 10 Kilometers

0 4 8 Miles

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery



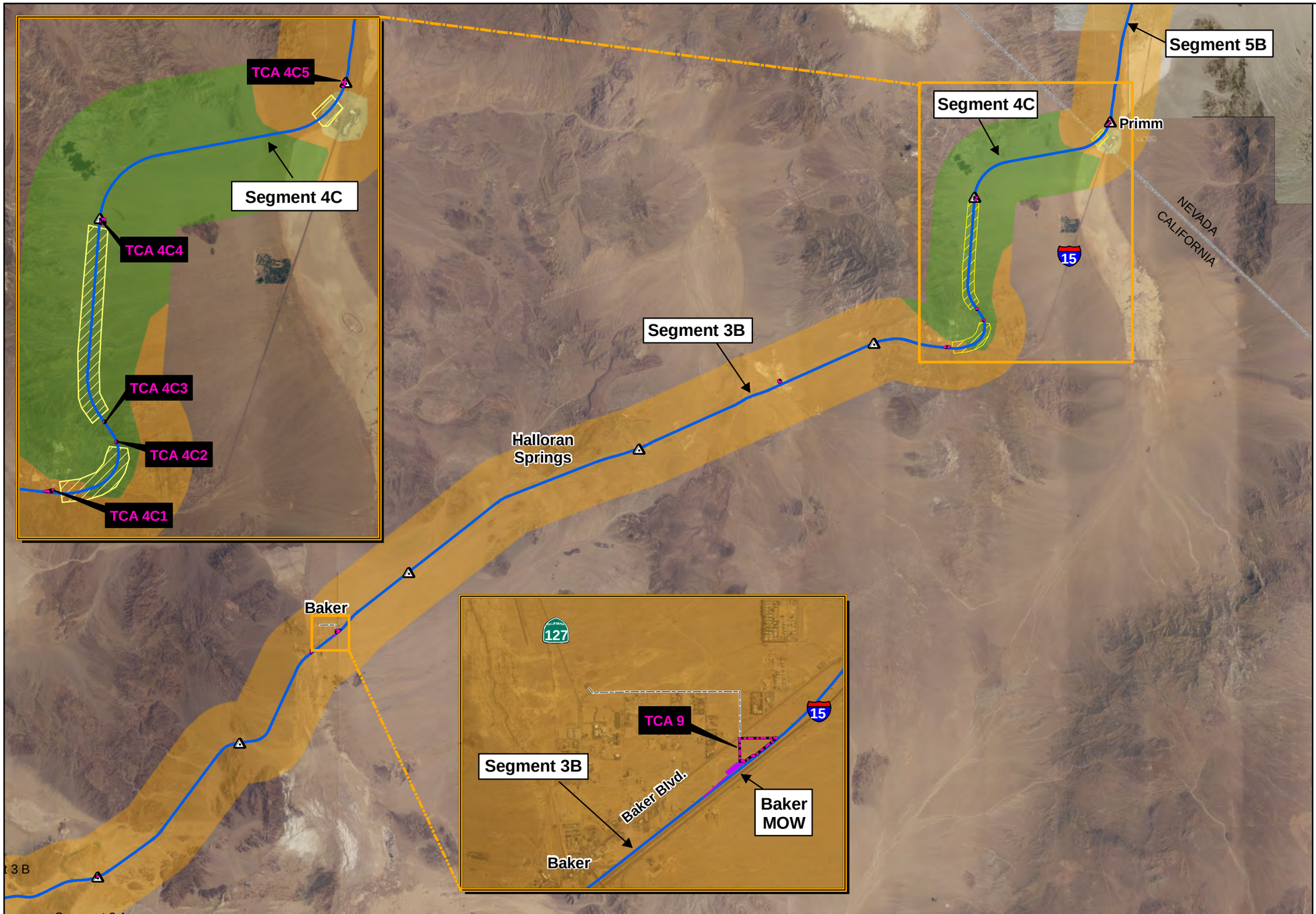
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Visual Quality / Sensitivity (2)

FIG F-3.6-2

Geografika Consulting 01.11.11



Legend

Visual Quality / Sensitivity (Representative Locations)

- High
- Medium
- Low

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

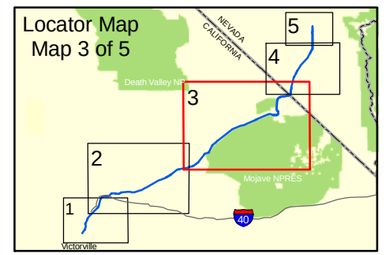
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

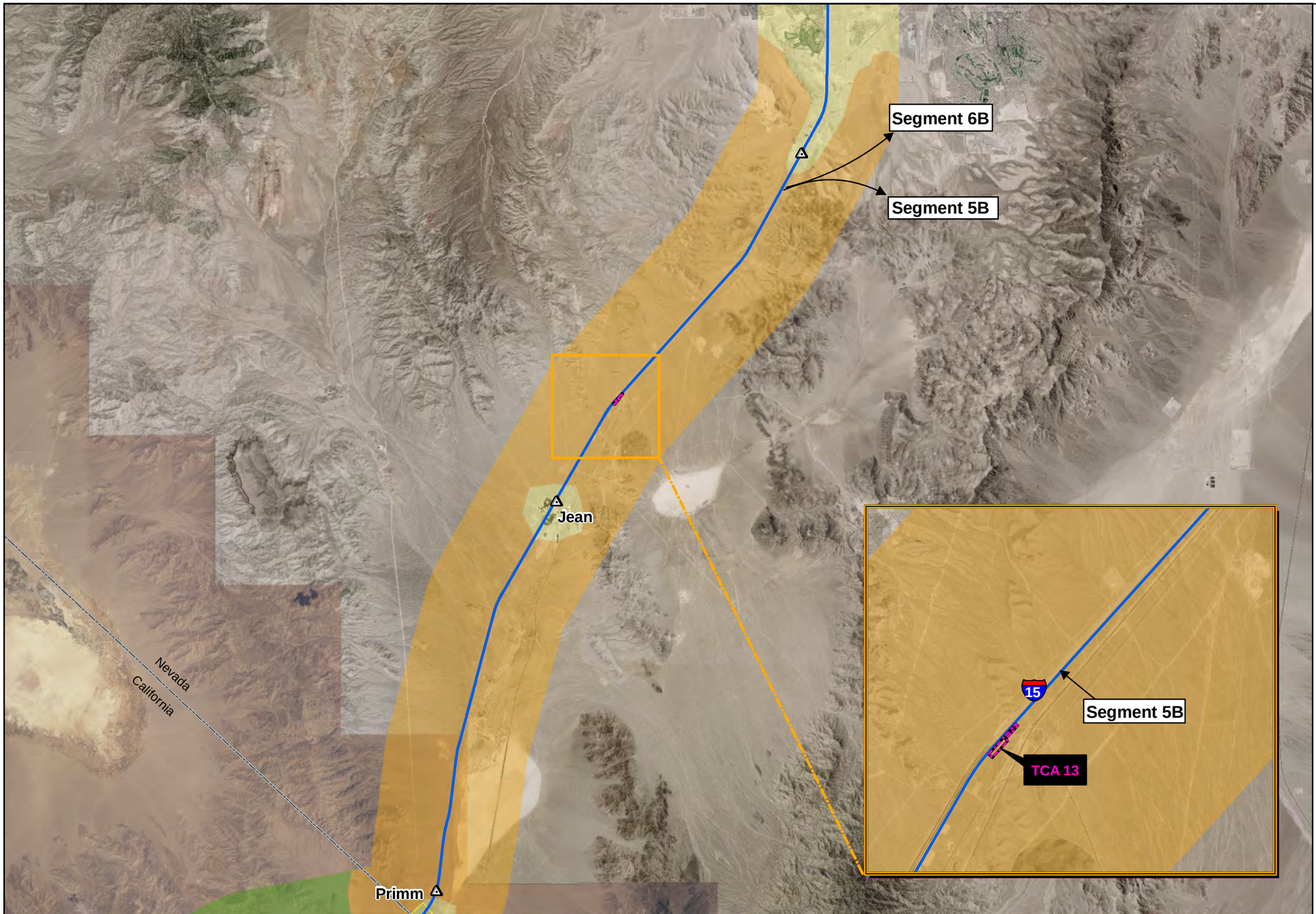
1 inch equals 5 miles

Kilometers
0 3 6

Miles
0 2.5 5

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery





Legend

Visual Quality / Sensitivity (Representative Locations)

- High
- Medium
- Low

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

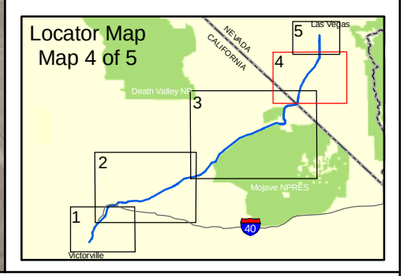
1 inch equals 3 miles

NORTH

0 2.5 5 Kilometers

0 3 6 Miles

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



U.S. Department of Transportation
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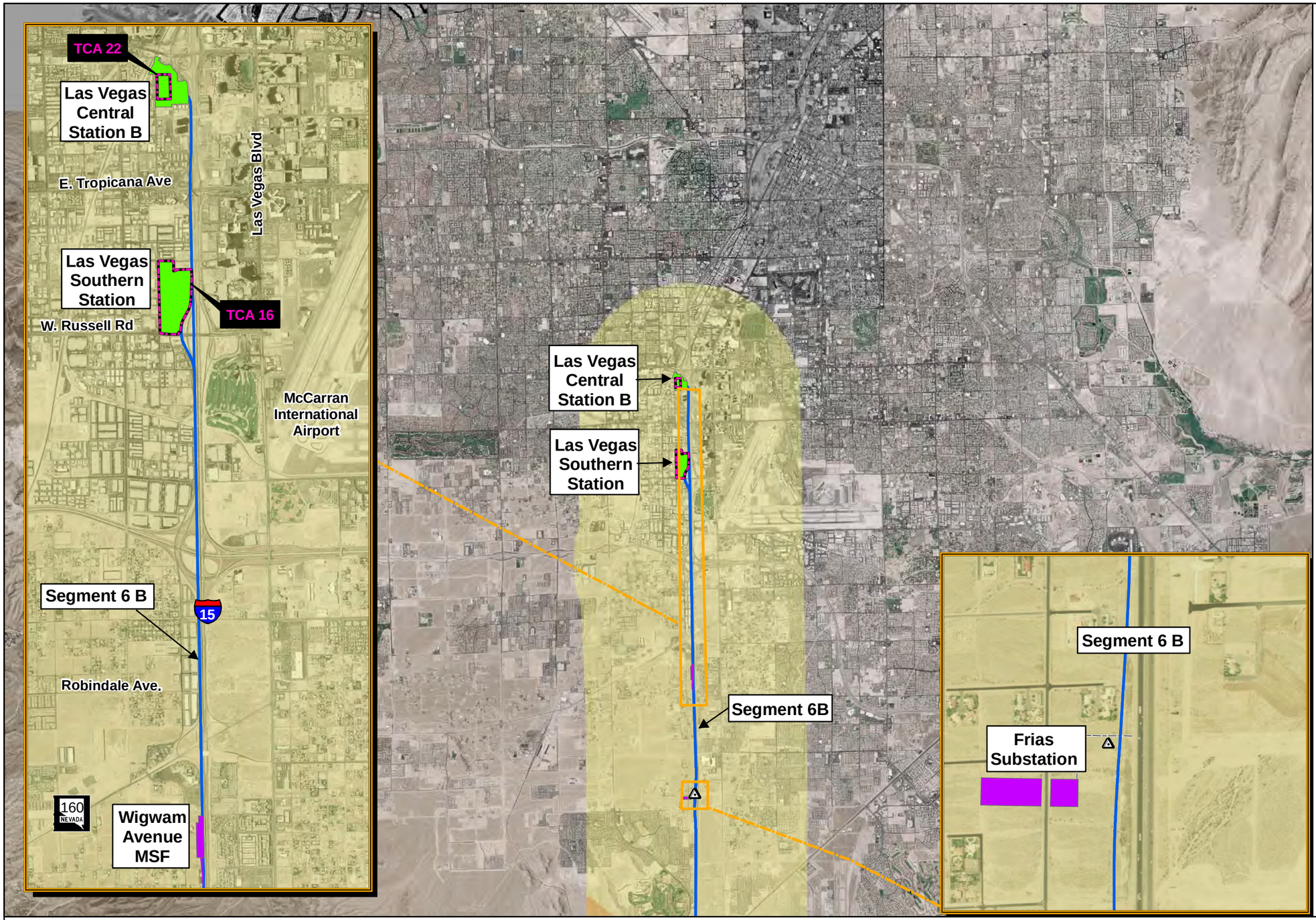
Final EIS

Visual Quality / Sensitivity (4)

FIG F-3.6-4

Geografika Consulting 01.17.11



Legend

Visual Quality / Sensitivity (Representative Locations)

- High
- Medium
- Low

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

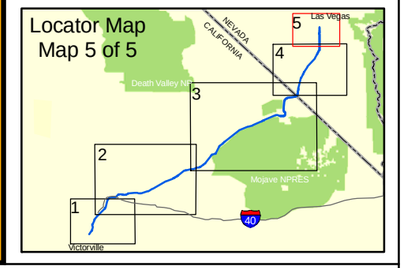
1 inch equals 2 miles

0 1.25 2.5 Kilometers

0 1 2 Miles

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery



U.S. Department of Transportation
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DesertXpress Final EIS

Visual Quality / Sensitivity (5)

FIG **F-3.6-5**

Geografika Consulting 02.28.11

Existing view from I-15 eastbound

Visual simulation of Victorville Station (VV3)

Source: Environmental Vision, 2009

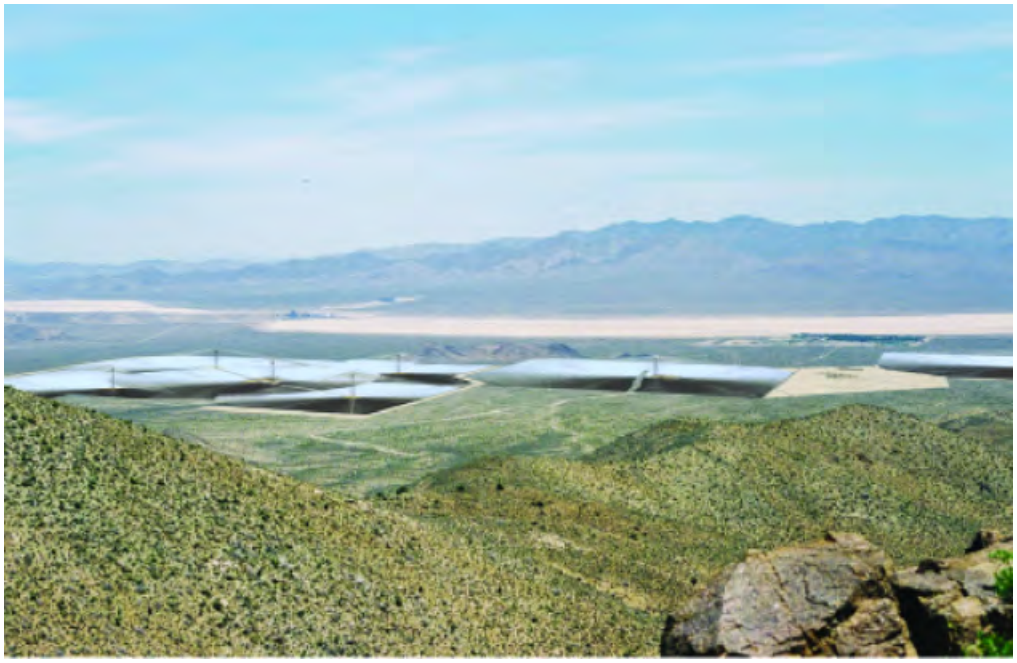
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

View Comparison, Victorville Station (VV3)

FIG **F-3.6-6**

Geografika Consulting 01.10.11



Simulated Existing Conditions: Ivanpah Solar Electric Generation System from Mojave National Preserve

Source: CH2M Hill

Visual Simulation - DesertXpress Segment 4C and Ivanpah Solar Electric Generation System

Source: Environmental Vision, 2009

Existing view, City of Barstow, Main Street looking southeast

Visual Simulation of Segment 2C Side Running at Main Street Overcrossing

Source: Environmental Vision, 2009

U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

View Comparison, Central Barstow

FIG **F-3.6-8**

Geografika Consulting 01.25.11

Existing View from Westbound I-15 of Las Vegas MSF (Wigwam Avenue MSF)

Visual Simulation of Las Vegas MSF (Wigwam Avenue MSF)

Source: Environmental Vison, 2008.

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3.7 CULTURAL AND PALEONTOLOGICAL RESOURCES

This section describes updates /changes made in response to comments on the Draft EIS and Supplemental Draft EIS related to potential cultural and paleontological impacts resulting from the DesertXpress project. This section also describes the cultural and paleontological impacts associated with the Preferred Alternative in comparison to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.7.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, includes all comments on the Draft EIS and Supplemental Draft EIS related to cultural and paleontological impacts and provides responses to those comments. Substantive updates and changes from comments on the Draft and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

3.7.1.1 Affected Environment

Draft EIS **Section 3.7.3** and Supplemental Draft EIS **Section 3.7.1** describe in detail the affected environment for cultural and paleontological resources for the DesertXpress project. The prehistoric, ethnographic, and historic context related to the study area has not changed since publication of the Draft EIS and Supplemental Draft EIS. However, minor shifts in the Segment 3B rail alignment have occurred following the publication of the Supplemental Draft EIS to reduce potential impacts to a known resource in the project area. **Table F-3.7-1**, below, provides a summary of the cultural and paleontological resources located within the area of potential effect (APE) for the Preferred Alternative. Updates and changes related to cultural resources within the APE are shown in **bold underline** and ~~strikeout~~ text within **Table F-3.7-1**.

3.7.1.2 Regulatory Environment

The regulatory environment for cultural and paleontological resources for the DesertXpress project is described in detail in Draft EIS **Section 3.7.1**. Since publication of the Draft EIS and Supplemental Draft EIS, there have been no changes to the Regulatory Environment regarding cultural and paleontological resources. In addition no comments were received during the public review period that required changes to the cultural and paleontological resources regulatory discussion contained in the Draft EIS and Supplemental Draft EIS. Thus the regulatory environment discussions from these previous documents remain applicable to the Preferred Alternative.

3.7.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

As discussed in **Section 2.4.1** of this Final EIS, additional consultation following publication of the Supplemental Draft EIS led to a further modification of Segment 3B to avoid sensitive resources. This modification of Segment 3B in the vicinity of the Halloran Springs/Halloran Summit area resulted in a change of the APE for the Preferred Alternative. See also **Section 3.15.4.5** of this Final EIS.

Several comments related to cultural resources were received during the public comment period for the Draft EIS. These comments generally requested additional information regarding the status of the project's Section 106 compliance and related agency and tribal consultation updates. None of the comments identified the need for any correction or additions to the information presented in the Draft EIS and Supplemental Draft EIS.

The Preferred Alternative would not affect any historic architectural resources because there are no historic architectural resources with the APE for the Preferred Alternative. However, because various action alternative elements evaluated in the Draft EIS (e.g. Segment 7 routings and the Las Vegas Downtown Station) would have been in proximity to historic architectural resources, the Draft EIS included **Mitigation Measure CR-4** to address potential adverse effects on historic architectural resources. Since the Preferred Alternative does not include Segment 7 nor the Las Vegas Downtown Station, this mitigation measure is no longer applicable and has not been carried forward into this Final EIS.

Mitigation Measure CR-4 has been replaced by the following mitigation measure which requires preconstruction training as set forth in the Programmatic Agreement (PA), which is included as **Appendix F-H** of this Final EIS.

> **Mitigation Measure CR-4: Preconstruction Meeting and Worker Awareness Training**
>
> **The Applicant shall ensure that all persons meeting the Secretary of the Interior's *Professional Qualifications Standards* who are supervising activities conducted as prescribed in the PA and all contracted field personnel, including construction workers, meet with one or more Consulting Tribes for a briefing on traditional customs and culturally sensitive protocols and procedures.**

In addition, the following reporting requirements from the Programmatic Agreement developed for the project have been called out as mitigation measures.

> **Mitigation Measure CR-5: Annual Reporting**
>
> **Consistent with Administrative Stipulation IV.B of the PA, FRA shall require the Applicant to submit an annual report documenting the completion status of the stipulations outlined in the PA. The Annual Report shall include, at a minimum:**

a. A list of all studies, reports, actions, evaluations, or monitoring reviewed or generated under the Stipulations of this PA.

b. Efforts to identify and/or evaluate potential historic properties, monitoring efforts, archaeological management assessments or research designs, and treatment of historic properties.

c. Any recommendations to amend this PA or improve communications among the parties.

d. A discussion of any inadvertent effects to historic properties occurring during the course of the year.

FRA shall ensure that the annual report is made available to the public and that members of the public are invited to provide comments to FRA, as well as to the ACHP and SHPOs.

Mitigation Measure CR-6: Quarterly Reporting

FRA shall require the Applicant to prepare quarterly progress reports on the status of project construction. As lead agency, FRA will be responsible for coordinating and submitting the report to Tribal representatives. The Quarterly report shall include, at a minimum, anticipated needs for Tribal representative monitors in the upcoming months.

In an effort to consolidate and streamline project requirements, the mitigation measures presented in the cultural resources section of the Draft EIS were reorganized. Draft EIS **Mitigation Measures CR-5**, **CR-6**, and **CR-7**, regarding paleontological resources, were combined into one overarching requirement for further evaluation of the geologic units in the study area. Subsequent measures were renumbered accordingly. The following lists the revisions to the numbering of the cultural and paleontological mitigation measures in this Final EIS:

Draft EIS	Final EIS
Mitigation Measure CR-1	No change
Mitigation Measure CR-2	No change
Mitigation Measure CR-3	No change
Mitigation Measure CR-4	Replaced (Training)
Mitigation Measure CR-5	Replaced (Annual Reporting)
Mitigation Measure CR-6	Replaced (Quarterly Reporting)
Mitigation Measure CR-7	Revises **Mitigation Measure CR-6** from Draft EIS
Mitigation Measure CR-8	No change

Mitigation Measure CR-9 No change

Mitigation Measure CR-10 No change

Mitigation Measure CR-11 No change

Consistent with these changes, the text on starting on Draft EIS page 3.7-70 has been revised as follows:

~~**Mitigation Measure CR-5: Site-Specific Confirmation of Impact Potential**~~

~~The project sponsor will ensure that the site-specific engineering geologic studies prepared for project construction confirm all geologic units potentially affected by each segment of the project, including Quaternary and bedrock units. This information will be used to guide mitigation requirements on a site-specific basis during construction and during maintenance activities that require ground disturbance, as follows.~~

- ~~Mitigation Measure CR-7 will apply to all ground-disturbing construction and maintenance activities, although this measure will likely only need to be implemented once, during project design.~~
- ~~Mitigation Measures CR-8, CR-9, and CR-11 will apply to all ground-disturbing construction and maintenance activities.~~
- ~~Mitigation Measures CR-10 will apply to all ground-disturbing construction activities that affect geologic units identified as highly sensitive for paleontological resources, and to all maintenance activities that would involve new or extended ground disturbance in highly sensitive units.~~

Mitigation Measure CR-~~6~~7: Further Evaluation of Geologic Units ~~with "Undetermined" Sensitivity~~

Before ground-disturbing activities begin, the Applicant shall retain a qualified paleontologist as defined by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) or other appropriate personnel (e.g., California licensed professional geologist with appropriate experience and expertise) to conduct further literature review and discussion with subject area experts in order to resolve the paleontological sensitivity of the geologic units identified in **Table 3.7-2** as "undetermined" **and the areas with strata of Holocene age exposed at the surface.** If site-specific engineering geologic or geotechnical studies for the project identify additional units likely to be affected by project construction and not included in **Table 3.7-2**, they shall also be evaluated for paleontological sensitivity under this measure.

This information shall be used to guide mitigation requirements on a site-specific basis during construction and during maintenance activities that require ground disturbance, as follows.

- **Mitigation Measures CR-8, CR-9, and CR-11 shall apply to all ground-disturbing construction and maintenance activities.**
- **Mitigation Measures CR-10 shall apply to all ground-disturbing construction activities that affect geologic units identified as highly sensitive for paleontological resources, and to all maintenance activities that would involve new or extended ground disturbance in highly sensitive units.**

~~The results of the evaluation conducted for this mitigation measure will be used to guide the application of mitigation during project construction and maintenance activities.~~

~~**Mitigation Measure CR-7: Evaluation of Site-Specific Impact Potential in Areas of Holocene Substrate**~~

~~The project sponsor will retain appropriately qualified and licensed personnel (e.g., California licensed professional geologist with appropriate experience and expertise) to evaluate the potential for impacts on paleontologically sensitive strata that may be present in the subsurface in areas with strata of Holocene age exposed at the surface. The evaluation will be based on available geologic and geotechnical information; project design; proposed construction and/or maintenance methods, including anticipated depth of disturbance; and existing site conditions, including pre-existing disturbance, if any. In areas where highly sensitive strata would be involved in project-related ground disturbance, Mitigation Measures CR-9, CR-10, and CR-11 will apply.~~

Chapter 4.0, Comments and Coordination, of this Final EIS includes an updated discussion of the Section 106 interagency meetings and tribal consultations over the course of the project.

3.7.2 Analysis of Environmental Consequences

Cultural resources customarily include archaeological resources, such as artifacts and archaeological sites; ethnographic resources; and those of the historic built environment (historic architectural resources). Paleontological resources, which include the fossilized remains of vertebrates, invertebrates, and plants, as well as fossil tracks and trackways, are also considered in this section.

Information in this section is based on the archaeological, architectural, and paleontological resources investigations described in **Section 3.7.2** of the Draft EIS. As part of the Supplemental Draft EIS, project archaeologists conducted field surveys of the expanded study area, consistent with methods described in **Section 3.7.2** of the Draft

EIS. Additional archaeological resources surveys were also conducted as part of this Final EIS in order to identify any resources present in the area of the Segment 3B shift near Halloran Springs Road. Information from the archaeological surveys conducted after the publication of the Draft EIS has been incorporated into this section of the Final EIS.

Programmatic Agreement

As discussed in Draft EIS **Section 3.7.1.1**, the FRA and the cooperating agencies, with input from DesertXpress Enterprises, Inc. and Native American Tribes, developed a Programmatic Agreement (PA) for the project in compliance with Section 106 (see **Appendix F-H**) to identify the process for formal determination of the eligibility of cultural resources. For NEPA purposes, survey work was conducted for all alternatives, all potentially affected cultural resources have been considered, and an assumption of their eligibility has been presented in the EIS to inform the selection of the Preferred Alternative.

The purpose of the PA for the project is multi-fold. The PA sets forth numerous requirements intended to ensure appropriate treatment of historic resources is employed during project construction. The PA also stipulates protocols for how and when formal eligibility determinations would be made. Specifically, while extensive efforts have occurred to identify potential historic resources, the PA describes a phased implementation approach consistent with 36 C.F.R. 800.4(b)(2) permitting formal eligibility determinations to be made after the Preferred Alternative is identified and ratified by the lead and cooperating agencies via Records of Decision on the proposed action. Eligibility determinations will be made by the appropriate agency (in this region, either BLM or a SHPO) based on information presented in completed state-appropriate site records forms.

3.7.2.1 Methods of Evaluation

The cultural and paleontological resource impact methodology described in **Section 3.7.2** of the Draft EIS remains applicable to this Final EIS and the evaluation of the Preferred Alternative. A summary of the methods of evaluation is provided below. This information was integrated from the Draft EIS and Supplemental Draft EIS, and is summarized here for the convenience of the readers. No new methodology was introduced as part of this Final EIS.

Area of Potential Effect

The APE is defined in 36 CFR § 800.16(d) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. As described in Draft EIS **Section 3.7.2.1**, the APE was defined for the project consistent with Section 106 of the National Historic Preservation Act (NHPA). FRA, in consultation with BLM, STB, and the California and Nevada State Historic Preservation Officers (SHPOs), has defined the APE as all areas of ground that would be disturbed by construction or construction staging of the Preferred

Alternative. This includes up to 200 feet on either side (up to a total of 400 feet) of the rail alignment centerline, which includes the actual construction area and buffer, or to the nearest paved area (freeway shoulder). In most locations, the total width of the finished rail alignment will be 60 feet. The APE includes areas that were left undisturbed by Interstate construction within the I-15 right-of-way and within the I-15 median (i.e., medians of great width, rights-of-way that extend well beyond the shoulder or rest areas, etc.). The APE also includes the facility footprints for stations, maintenance and storage facilities, and areas to be used for TCAs. The APE also includes transformer and autotransformer sites, as well as up to 100 feet on either side of the proposed electrical utility corridors.

For the purposes of the analysis of the Preferred Alternative, the APE as a whole has been divided into areas of potential direct and indirect effects.

The Direct APE has been defined as follows:

- Rail alignments: 115 feet on either side of rail alignment centerlines.
- Stations/maintenance facilities: facility footprint.
- Utility corridors: 50 feet on either side of utility corridors.

The Indirect APE has been defined as follows:

- Rail alignments: 116 to 200 feet on either side of rail alignment centerlines.
- Utility corridors: 51 to 100 feet on either side of utility corridors.

Significance Criteria

NEPA and NHPA require Federal agencies to consider the effect of their undertakings on significant resources, known as historic properties. The Federal significance of an archaeological site or an architectural resource is defined by the National Register of Historic Places (National Register). These criteria, defined in 36 CFR § 60.4, state that a resource must be at least 50 years old (unless meeting exceptional criteria) and possess the quality of significance in American history, architecture, archaeology, engineering, and culture and is present in districts, sites, buildings, structures, or objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of history;
2. Is associated with the lives of persons significant in the past;
3. Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

If a particular resource meets one of these criteria and retains integrity, it is considered as an eligible "historic property" for listing in the National Register.[1] To comply with Section 106 of the NHPA, any effects of the proposed undertaking on properties listed in or determined eligible for inclusion in the National Register must be analyzed by applying the Criteria of Adverse Effect, as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration is given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties include, but are not limited to:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long term preservation of the property's historic significance.

[1] "Integrity" refers to the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.

After undertaking the resource investigations described in **Section 3.7.2** of the Draft EIS, project archaeologists made preliminary assessments of the eligibility of the resource identified within the APE for the National Register. These preliminary assessments were made in close consultation with the appropriate BLM field office (Barstow, Needles, or Las Vegas).

All cultural resources were assigned a preliminary assessment of eligibility as follows:

- **Eligible:** Previously identified sites for which eligibility was previously and formally established are noted as "eligible."
- **Not Eligible:** Previously identified sites for which non-eligibility had been previously and formally established were noted as "not eligible."
- **Assumption of Eligibility:** Newly discovered resources (for which no previous, formal determination had been made) were deemed "assumed eligible."

The assumption of eligibility relates to the use of a PA to fulfill Section 106 obligations. **Appendix F-H** includes the executed PA for the DesertXpress project.

Impacts on paleontological resources were evaluated following guidelines published by the Society of Vertebrate Paleontology (SVP).[2] Paleontological resources can be affected from soil disturbing activities during construction. Construction of the project would likely result in adverse effects on paleontological resources in the following two situations:

- Where the proposed rail alignment or facility crosses paleontologically sensitive geologic units exposed at the surface.
- Where the rail alignment or facility is situated on Holocene materials that overlie highly sensitive materials, and ground disturbance would be deep enough to affect underlying sensitive strata.

3.7.2.2 No Action Alternative

Under the No Action Alternative, no privately-sponsored high speed passenger rail system would be constructed or operated in the project area. However, under the No Action Alternative, public agencies in California and/or Nevada are anticipated to move forward with physical and/or operational roadway improvements to increase the capacity of the I-15 corridor. Given that the planned improvements under the No Action Alternative would occur largely in the same area as the Preferred Alternative, impacts associated with cultural resources would likely be similar. Project-specific environmental review to be undertaken by the sponsoring lead agency/agencies would more precisely determine the environmental effects associated with such improvements.

[2] Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee, 1995

3.7.2.3 Preferred Alternative

Cultural Resource Setting

The following discussion summarizes the cultural resources within the APE of the Preferred Alternative. The majority of the information provided in the following tables was integrated from the Draft EIS and Supplemental Draft EIS and summarized here for the convenience of the readers. However, as described in **Section 2.4.1** of this Final EIS, a shift to the Segment 3B was developed to avoid a sensitive resource area. This shift causes a corresponding shift to the APE. Field visits to the revised APE identified other resources not associated with the previous APE. **Table F-3.7-1**, further below, provides a summary of the cultural and paleontological resources related to the location of the Preferred Alternative, including the shift of the Segment 3B rail alignment

Archaeological Resources

As a result of the records search and field surveys conducted for the Draft EIS and Supplemental Draft EIS, prehistoric and historic archaeological sites were identified within the APE. A total of 254 sites were identified within the APE for the Preferred Alternative as part of the records search and field survey work conducted for the Draft EIS and Supplemental Draft EIS. Of these 254 sites, 193 are historic, 54 are prehistoric, and 7 contain a mix of prehistoric and historic resources. While final determinations of archaeological resource eligibility for the National Register will occur after the environmental document is completed (through the PA), a preliminary evaluation indicates that 99 of the sites are assumed eligible, 36 have previously been determined eligible, and 119 would not be eligible.

Table F-3.7-1 provides a summary of these resources related to the location of the components that comprise the Preferred Alternative.

Table F-3.7-1 Archaeological Resources within the APE – Preferred Alternative

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
VV3				
JSA-CS-S-005H	Historic	Habitation site with foundation, refuse deposits, and privy.	Assumption of Eligibility	Direct
JSA-CS-S-073H	Historic	Historic fence line	Not Eligible	Direct
JSA-CS-S-074H	Historic	Domestic refuse deposit with glass, ceramics and metal	Not Eligible	Direct
JSA-CS-S-076H	Historic	Habitation site with road, mound, fire ring, and refuse deposits	Assumption of Eligibility	Direct
JSA-CS-S-212H	Historic	Habitation site with refuse deposits, privy, chimney remnant, and rock alignments	Assumption of Eligibility	Direct
JSA-CS-S-213H	Historic	US BLM cadastral marker	Not Eligible	Direct
JSA-CS-S-214H	Historic	Segment of historic dirt road	Not Eligible	Direct
JSA-CS-S-215H	Historic	Domestic refuse deposit	Not Eligible	Direct
JSA-CS-S-216H	Historic	Refuse deposit associated with construction of National Register eligible transmission line (CA-SBR-7694H)	Assumption of Eligibility	Direct
CA-SBR-3161H	Historic	Habitation site with rock alignments, privy, cellar, and refuse deposits	Assumption of Eligibility	Direct
CA-SBR-7694H	Historic	Boulder power transmission line	Eligible	Direct
CA-SBR-10315H	Historic	Boulder to Hoover power transmission line	Eligible	Direct
Victorville OMSF				
JSA-CS-S-86H	Historic	Rock Cairn	Not Eligible	Direct
JSA-CS-S-87H	Historic	Prospector Pit	Not Eligible	Direct
JSA-CS-S-88H	Historic	Habitation Site	Assumption of Eligibility	Direct
Segment 1				
CA-SBR-10315H	Historic	Power Transmission Line	Eligible	Direct
CA-SBR-9358H	Historic	Habitation Site	Not Eligible	Direct
CA-SBR-9359H	Historic	Mine Site	Not Eligible	Direct

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
CA-SBR-8700H	Historic	Mine, habitation Site	Assumption of Eligibility	Direct
JSA-CS-S-3H	Historic	Mine, Refuse Deposit and Rock Cairn	Not Eligible	Direct
JSA-CS-S-4H	Historic	Mine and Refuse Deposit	Not Eligible	Direct
JSA-CS-S-5H	Historic	Habitation Site	Assumption of Eligibility	Direct
JSA-CS-S-6H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-7H	Historic	Habitation Site	Assumption of Eligibility	Direct
JSA-CS-S-8H	Historic	Survey Marker	Not Eligible	Indirect
JSA-CS-S-9H	Historic	Survey Marker	Not Eligible	Indirect
JSA-CS-S-10H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-11H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-12H	Historic	Refuse Deposit	Assumption of Eligibility	Direct
JSA-CS-S-13H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-14H	Historic	Habitation Site	Not Eligible	Direct
JSA-CS-S-15H	Historic	Habitation Site	Not Eligible	Direct
JSA-CS-S-16H	Historic	Refuse Deposit	Assumption of Eligibility	Direct
JSA-TC-S-8H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-TC-S-19	Prehistoric	Lithic Scatter	Assumption of Eligibility	Indirect
JSA-TC-S-20H	Historic	Habitation Site	Not Eligible	Direct
JSA-CS-S-76H	Historic	Habitation Site	Assumption of Eligibility	Direct
JSA-CS-S-78H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-88H	Historic	Habitation Site	Assumption of Eligibility	Direct
JSA-KT-S-2H	Historic	Marker	Not Eligible	Indirect
JSA-KT-S-3H	Historic	Marker	Not Eligible	Indirect
JSA-KT-S-4H	Historic	Hearth	Assumption of Eligibility	Indirect
Temporary Construction Area #1B				
JSA-CS-S-086H	Historic	Rock cairn	Not Eligible	Direct
JSA-CS-S-87H	Historic	Prospector's pit with two spoils piles	Not Eligible	Direct
JSA-CS-S-88H	Historic	Domestic refuse deposit	Not Eligible	Direct

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
Segment 2C – Side Running				
JSA-CS-S-229H	Historic	Homestead site with tree lines and redeposited trash and structural debris	Not Eligible	Direct
JSA-CS-S-230H	Historic	Concrete road monument	Not Eligible	Direct
JSA-CS-S-231H	Historic	Segment of transmission line	Not Eligible	Direct
JSA-CS-S-232H	Historic	Rock cairn	Not Eligible	Indirect
JSA-CS-S-233	Prehistoric	Cobble quarry	Assumption of Eligibility	Direct
JSA-CS-S-234H	Historic	Historic refuse deposit containing cans, wire, metal and glass	Assumption of Eligibility	Direct
JSA-CS-S-235H	Historic	Foundation and light scatter of debris	Not Eligible	Indirect
JSA-CS-S-236H	Historic	Foundation and light scatter of debris	Not Eligible	Direct
JSA-CS-S-237H	Historic	Foundation and light scatter of debris	Not Eligible	Direct
JSA-CS-S-238H	Historic	Foundation and scatter of debris and artifacts	Not Eligible	Direct
JSA-CS-S-239H	Historic	Redeposited refuse deposit of glass, ceramics, and metal	Not Eligible	Direct
JSA-CS-S-240H	Historic	Two foundations and light scatter of debris	Not Eligible	Direct
JSA-CS-S-241H	Historic	Foundation and scatter of debris and artifacts	Not Eligible	Direct
JSA-CS-S-242H	Historic	Foundation and light scatter of debris	Not Eligible	Direct
JSA-CS-S-243H	Historic	Foundation and light scatter of debris	Not Eligible	Indirect
JSA-CS-S-244H	Historic	Foundation, fence line and light scatter of debris	Not Eligible	Indirect
JSA-CS-S-245H	Historic	Redeposited residential debris	Not Eligible	Direct
JSA-CS-S-246H	Historic	Dense refuse deposit with cans, ceramics, metal, glass, and firearm cartridges	Assumption of Eligibility	Direct
CA-SBR-2910H	Historic	Segment of Route 66, part of the old National Trails Highway	Eligible	Direct
CA-SBR-3485	Prehistoric	Prehistoric lithic quarry and reduction site; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-3486	Prehistoric	Prehistoric lithic quarry and reduction site; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
CA-SBR-3548	Prehistoric	Prehistoric rock rings	Assumption of Eligibility	Direct
CA-SBR-4525H	Historic	Road Segment	Assumption of Eligibility	Direct
CA-SBR-6693H	Historic	Atchison, Topeka & Santa Fe railroad	Eligible	Direct
CA-SBR-8313H	Historic	Fence line	Assumption of Eligibility	Direct
CA-SBR-8321	Prehistoric	Prehistoric lithic quarry and reduction site; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-8322	Prehistoric	Prehistoric lithic quarry and reduction site; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-9361H	Historic	Sidewinder Road wagon trail	Assumption of Eligibility	Direct
P-36-13644	Prehistoric	Lithic scatter and reduction site	Eligible	Direct
P-36-20375	Prehistoric	Sidewinder Quarry Archaeological District, with 45 identified contributing elements	Eligible	Direct
CA-SBR-10398H	Historic	Road	Assumption of Eligibility	Direct
CA-SBR-4085H	Historic	Railroad	Assumption of Eligibility	Direct
JSA-CS-S-32	Prehistoric	Prehistoric quarry site	Assumption of Eligibility	Indirect
JSA-CS-S-34	Prehistoric	Quarry	Assumption of Eligibility	Direct
JSA-CS-S-39H	Historic	Habitation Site	Not Eligible	Direct
JSA-CS-S-40H	Historic	Habitation Site	Assumption of Eligibility	Direct
JSA-CS-S-45H	Historic	Habitation Site	Assumption of Eligibility	Direct
JSA-CS-S-47/H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-48/H	Historic / Prehistoric	Refuse Deposit and Lithic Scatter	Assumption of Eligibility	Indirect
JSA-CS-S-49H	Historic	Rock Cairn and Rock Alignment	Not Eligible	Direct
JSA-CS-S-50H	Historic	Rock Cairn and Refuse Deposit	Not Eligible	Indirect
JSA-CS-S-52H	Historic	Hearth	Not Eligible	Indirect
JSA-CS-S-53H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-54H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-55H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-57H	Historic	Habitation Site	Not Eligible	Indirect

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
JSA-CS-S-58H	Historic	Rock Cairn	Not Eligible	Direct
JSA-CS-S-59H	Historic	Rock Alignment	Not Eligible	Direct
JSA-CS-S-63H	Historic	Rock Cairn and Road	Not Eligible	Direct
JSA-CS-S-64H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-65H	Historic	Rock Cairn	Not Eligible	Direct
JSA-CS-S-68H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-69H	Historic	Rock Cairn	Not Eligible	Direct
JSA-CS-S-72H	Historic	Habitation Site	Not Eligible	Direct
JSA-CS-S-101H	Historic	Berm	Assumption of Eligibility	Direct
JSA-CS-S-218H	Historic	Rock Rings and historic refuse deposit	Not Eligible	Direct
JSA-CS-S-219H	Historic	Concrete foundation	Note Eligible	Direct
JSA-CS-S-222H	Historic	Residential refuse deposit with cans, glass, ceramics, and faunal remains	Assumption of Eligibility	Direct
JSA-RN-S-5H	Historic	Flume	Assumption of Eligibility	Direct
Temporary Construction Area #2C1				
None				
Temporary Construction Area #5				
None				
Segment 3B (Modified)				
PSBR-64H	Historic	Water Transmission Line	Assumption of Eligibility	Direct
CA-SBR-7694H	Historic	Power Transmission Line	Eligible	Direct
CA-SBR-2129	Prehistoric	Quarry	Assumption of Eligibility	Direct
CA-SBR-4272H	Historic	Spanish Trail	Assumption of Eligibility	Direct
CA-SBR-2591	Prehistoric	Quarry	Assumption of Eligibility	Direct
CA-SBR-2092	Prehistoric	Cobble Reduction Site	Assumption of Eligibility	Direct
CA-SBR-223	Prehistoric	Quarry	Assumption of Eligibility	Direct
CA-SBR-10315H	Historic	Power Transmission Line	Eligible	Direct
CA-SBR-3694	Prehistoric	Village Site	Eligible	Direct
CA-SBR-4198	Prehistoric	Habitation site with pottery, lithics, fire affected rock, faunal remains, and ground stone	Assumption of Eligibility	Direct

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
CA-SBR-5128	Prehistoric	Habitation site	Assumption of Eligibility	Direct
CA-SBR-5329	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct
PSBR-52	Prehistoric	Trail System	Assumption of Eligibility	Direct
P2044-12H	Historic	Refuse Deposit	Assumption of Eligibility	Direct
CA-SBR-7689H	Historic	Segments of the Arrowhead Trail Highway	Assumption of Eligibility	Direct
CA-SBR-885	Prehistoric	Rock alignment	Assumption of Eligibility	Direct
CA-SBR-4054/H	Historic/ Prehistoric	Refuse Deposit / Groundstone	Assumption of Eligibility	Direct
P2262-2H	Historic	Habitation Site	Assumption of Eligibility	Direct
CA-SBR-541	Prehistoric	Quarry	Assumption of Eligibility	Direct
CA-SBR-2340H	Historic	Railroad	Assumption of Eligibility	Direct
P2284-6H	Historic	Town Site	Assumption of Eligibility	Direct
~~P2272-2*~~	~~Prehistoric~~	~~Rock Art Area~~	~~Assumption of Eligibility~~	~~Direct~~
CA-SBR-2532	Prehistoric	Pottery Scatter	Assumption of Eligibility	Direct
P2271-2H	Historic	Town Site	Assumption of Eligibility	Direct
CA-SBR-1074H	Historic	Refuse Deposit	Not Eligible	Direct
JSA-CS-S-42H	Historic	Refuse Deposit	Assumption of Eligibility	Indirect
JSA-CS-S-43H	Historic	Rock Cairn and Refuse Deposit	Not Eligible	Direct
JSA-CS-S-44H	Historic	Refuse Deposit and Well	Not Eligible	Direct
JSA-RN-S-3H	Historic	Refuse Deposit	Assumption of Eligibility	Indirect
JSA-RN-S-4H	Historic	Habitation Site	Not Eligible	Direct
JSA-CS-S-46H	Historic	Refuse Deposit	Not Eligible	Indirect
JSA-CS-S-124	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct
JSA-CS-S-125	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct
JSA-CS-S-126H	Historic	Construction Refuse Deposit	Assumption of Eligibility	Indirect
JSA-CS-S-129H	Historic	Refuse Deposit	Not Eligible	Indirect
JSA-CS-S-130H	Historic	Well	Assumption of Eligibility	Indirect
JSA-CS-S-131	Prehistoric	Cobble Reduction Site	Assumption of Eligibility	Direct
JSA-CS-S-132H	Historic	Rock Cairn	Assumption of Eligibility	Indirect
JSA-CS-S-133	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
JSA-CS-S-134	Prehistoric	Cobble Reduction Site	Assumption of Eligibility	Direct
JSA-CS-S-135	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct
JSA-CS-S-136	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct
JSA-CS-S-137H	Historic	Power Transmission Line	Not Eligible	Direct
JSA-CS-S-138	Prehistoric	Lithic Scatter	Assumption of Eligibility	Direct
JSA-CS-S-144H	Historic	Fence line	Not Eligible	Direct
~~JSA-CS-S-145H~~	~~Historic~~	~~Prospector Pit~~	~~Assumption of Eligibility~~	~~Indirect~~
JSA-CS-S-146H	Historic	Cadastral Marker	Not Eligible	Direct
JSA-CS-S-151	Prehistoric	Hearth	Assumption of Eligibility	Indirect
JSA-CS-S-152	Prehistoric	Hearth	Assumption of Eligibility	Indirect
JSA-CS-S-153	Prehistoric	Trail	Assumption of Eligibility	Direct
JSA-CS-S-154	Prehistoric	Trail	Assumption of Eligibility	Direct
JSA-CS-S-250H	**Historic**	**Mine Site and Refuse Deposit**	**Not Eligible**	**Indirect**
JSA-CS-S-251H	**Historic**	**Prospector's Pit**	**Not Eligible**	**Indirect**
JSA-CS-S-252H	**Historic**	**Mine Site and Refuse Deposit**	**Not Eligible**	**Direct**
JSA-CS-S-253H	**Historic**	**Dirt Road and Scattered Refuse**	**Assumption of Eligibility**	**Indirect**
JSA-CS-S-254H	**Historic**	**Utility Line**	**Not Eligible**	**Direct**
JSA-CS-S-255H	**Historic**	**Fence Line and Historic Pictograph**	**Not Eligible**	**Indirect**
JSA-CS-S-256H	**Historic**	**Residence**	**Not Eligible**	**Direct**
JSA-CS-S-257H	**Historic**	**Refuse Deposit**	**Not Eligible**	**Direct**
JSA-CS-S-258H	**Historic**	**Refuse Deposit**	**Assumption of Eligibility**	**Direct**
JSA-CS-S-259H	**Historic**	**Refuse Deposit**	**Not Eligible**	**Indirect**
JSA-CS-S-260H	**Historic**	**Road Monuments**	**Not Eligible**	**Indirect**
JSA-CS-S-261H	**Historic**	**Road Monuments and Refuse Deposit**	**Not Eligible**	**Direct**
JSA-CS-S-262H	**Historic**	**Refuse Deposit**	**Assumption of Eligibility**	**Indirect**
JSA-CS-S-263H	**Historic**	**Road Monument**	**Not Eligible**	**Indirect**
JSA-CS-S-264H	**Historic**	**Road Monument**	**Not Eligible**	**Indirect**
JSA-RN-S-6H	Historic	Well	Not Eligible	Indirect
JSA-RN-S-7H	Historic	Refuse Deposit	Assumption of Eligibility	Direct
~~JSA-RN-S-8H~~	~~Historic~~	~~Refuse Deposit~~	~~Assumption of Eligibility~~	~~Direct~~

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
JSA-RN-S-9H	Historic	Refuse Deposit	Assumption of Eligibility	Indirect
~~JSA-RN-S-14H~~	~~Historic~~	~~Claim Marker~~	~~Not Eligible~~	~~Direct~~
Baker Maintenance of Way Facility				
JSA-CS-S-196H	Historic	Habitation Site	Assumption of Eligibility	Direct
Temporary Construction Area #6				
CA-SBR-2131	Prehistoric	Lithic Reduction Site	Assumption of Eligibility	Direct
Temporary Construction Area #7				
None				
Temporary Construction Area #8				
None				
Temporary Construction Area #9				
None				
Temporary Construction Area #10				
None				
Segment 4C				
JSA-CS-S-108H	Historic	Road segment	Assumption of Eligibility	Direct
JSA-CS-S-109H	Historic	Road segment	Not Eligible	Direct
JSA-CS-S-111H	Historic	Road segment	Not Eligible	Direct
JSA-CS-S-112H	Historic	Rock cairn	Not Eligible	Direct
JSA-CS-S-113H	Historic	Road segment	Assumption of Eligibility	Direct
JSA-CS-S-116H	Historic	Rock cairn	Not Eligible	Indirect
JSA-CS-S-117H	Historic	Rock cairn	Not Eligible	Direct
JSA-CS-S-118H	Historic	Rock cairn	Assumption of Eligibility	Direct
JSA-CS-S-200H	Historic	Utility pole	Assumption of Eligibility	Direct
JSA-CS-S-201H	Historic	Rock cairns	Not Eligible	Direct
JSA-CS-S-203H	Historic	Rock cairn	Not Eligible	Direct
JSA-CS-S-204H	Historic	Mining site with adit and rock cairn	Assumption of Eligibility	Indirect
JSA-CS-S-205H	Historic	Rock cairn	Not Eligible	Direct
JSA-CS-S-206H	Historic	Rock cairn	Not Eligible	Indirect

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
JSA-CS-S-207H	Historic	Cobble support for water conveyance pipe	Assumption of Eligibility	Direct
JSA-CS-S-208H	Historic	US GLO cadastral marker	Not Eligible	Direct
JSA-CS-S-210H	Historic	Road segment	Not Eligible	Direct
CA-SBR-3048H	Historic	Road segment and refuse deposit	Assumption of Eligibility	Direct
CA-SBR-6835H	Historic	Survey marker, part of Von Schmidt Line	Assumption of Eligibility	Direct
CA-SBR-6955/H	Multi-component	Prehistoric habitation site with lithics, hearth features, and a projectile point; and a historic refuse deposit and fire ring	Assumption of Eligibility	Direct
CA-SBR-7098/H	Multi-component	Prehistoric habitation site with lithics, ground stone and hearth ; historic well and refuse deposits	Assumption of Eligibility	Indirect
CA-SBR-7347H	Historic	Road segment	Assumption of Eligibility	Direct
CA-SBR-10315H	Historic	Boulder to Hoover power transmission line	Eligible	Direct
CA-SBR-10872	Prehistoric	Habitation site with lithics, projectile points, ground stone, and pottery.	Eligible	Indirect
Temporary Construction Area #4C1				
None				
Temporary Construction Area #4C2				
None				
Temporary Construction Area #4C3				
JSA-CS-S-201H	Historic	Rock cairn	Not Eligible	Direct
Temporary Construction Area #4C4				
None				
Temporary Construction Area #4C5				
None				
Segment 5B				
26CK3540	Historic	Railroad Camp	Eligible	Direct
26CK3541	Historic	Railroad Construction Camp	Eligible	Direct
26CK5685	Historic	Railroad Grade	Eligible	Direct
26CK3808	Prehistoric	Lithic Scatter	Eligible	Direct
26CK3820	Prehistoric	Habitation	Eligible	Indirect

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
26CK3821	Prehistoric	Habitation	Eligible	Indirect
26CK3822	Prehistoric	Habitation	Eligible	Direct
26CK3823	Prehistoric	Habitation	Eligible	Indirect
26CK3824	Prehistoric	Habitation	Eligible	Indirect
26CK3825	Prehistoric	Habitation	Eligible	Direct
26CK3832	Prehistoric	Lithic Scatter	Eligible	Direct
26CK3833	Prehistoric	Lithic Scatter	Eligible	Direct
26CK3834	Prehistoric	Lithic Scatter	Eligible	Direct
26CK3836	Prehistoric	Lithic Scatter	Eligible	Indirect
26CK4958	Historic	Road	Eligible	Indirect
26CK5180	Historic	Transmission Line	Eligible	Direct
26CK6715	Prehistoric/ Historic	Railroad Construction Camp and Groundstone	Eligible	Direct
26CK7166	Prehistoric / Historic	Habitation Site	Eligible	Direct
26CK7167	Prehistoric	Habitation Site	Eligible	Indirect
26CK7181	Prehistoric	Lithic Scatter	Not Eligible	Indirect
26CK7212	Historic	Road	Eligible	Direct
26CK7214	Historic	Road	Not Eligible	Indirect
26CK7217	Historic	Road and Refuse Deposit	Eligible	Indirect
26CK7218	Historic	Road	Eligible	Direct
26CK7223	Historic	Transmission Line	Not Eligible	Indirect
26CK8273	Historic	Mine Site	Not Eligible	Indirect
26CK8276	Historic	Refuse Deposit	Not Eligible	Indirect
26CK8347	Historic / Prehistoric	Railroad Construction Camp and Lithic Scatter	Not Eligible	Indirect
JSA-CS-S-160H	Historic	Refuse Deposit	Assumption of Eligibility	Indirect
JSA-CS-S-161H	Historic	Habitation Site and Refuse Deposit	Assumption of Eligibility	Direct
JSA-CS-S-162H	Historic	Refuse Deposit	Assumption of Eligibility	Direct
JSA-CS-S-163H	Historic	Rock Cairn	Not Eligible	Indirect

Site Number	Period	Type	National Register Eligibility	Impact (Direct or Indirect)
JSA-CS-S-164H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-165H	Historic	Rock Cairn	Not Eligible	Indirect
JSA-CS-S-166H	Historic	Cobble Piles	Not Eligible	Indirect
JSA-CS-S-190H	Historic	Railroad Camp	Assumption of Eligibility	Indirect
Segment 6B				
26CK3542	Historic	Railroad Berm	Not Eligible	Indirect
26CK5369	Prehistoric	Lithic Scatter	Not Eligible	Indirect
26CK5374	Prehistoric	Lithic Scatter	Not Eligible	Indirect
26CK1995	Prehistoric	Lithic Scatter	Not Eligible	Indirect
JSA-CS-S-167H	Historic	Cadastral Marker	Assumption of Eligibility	Indirect
Temporary Construction Area #13				
None				
Temporary Construction Area #22				
None				
Las Vegas Southern Station				
None				
Las Vegas Central Station B				
None				
Wigwam MSF				
None				

Source: ICF/Jones & Stokes, 2008; EDAW, 2008; ICF/Jones & Stokes, 2010.

Notes: Direct APE impacts would relate to resources located within 115 feet of either side of the DesertXpress alignment centerline, within 50 feet on either side of the utility corridors, and within the footprint of project facilities. Indirect APE impacts, related to construction, relate to resources within 116 to 200 feet on either side of the DesertXpress alignment centerline and within 51 to 100 feet on either side of the utility corridor.

* P2272-2 was a preliminary identifier used to indicate a site that is more properly identified as CA-SBR-2535. This site was within the APE for alternatives contemplated in the Draft EIS and Supplemental Draft EIS. However, this site is outside the APE for the Preferred Alternative, owing to project modifications.

Historic Architectural Resources

No National Register-eligible historic architectural resources were identified within the project APE. The APE between the Mojave River, near Victorville in California and Sloan in Nevada contains little development aside from I-15 and areas around Barstow, Baker, Primm and Jean. Segment 2C traverses central Barstow, which includes several notable architectural features. However, as discussed in Supplemental EIS **Section 3.7.1**, none of these structures are National Register-eligible or assumed eligible historical architectural resources. Through Baker, the APE for Segment 3 parallels I-15 and would be east of the developed areas, which includes a nearby cluster of abandoned residences that were determined to be ineligible for the National Register. A more urban environment occurs along Segment 6, which extends into suburban Clark County and into the City of Las Vegas proper. However, none of the existing structures in this area were determined to be National Register-eligible.

Paleontological Resources

Table F-3.7-2 lists the geologic units potentially involved in construction along each segment of the Preferred Alternative; identifies their paleontological resources, if any; and evaluates their paleontological sensitivity based on the SVP criteria.[3] Geology along the project alignment is shown in the figures in **Section 3.9, Geology and Soils**.

Table F-3.7-2 Geology and Paleontology of the DesertXpress Alignment, by Segment

Segment	Geologic Unit*	Age	Fossil Content and Paleontological Sensitivity**
1 (See Draft EIS Figure 3.9-3)	**Q, Qa** Younger alluvial valley sediments	Holocene	Low sensitivity. Materials of Holocene age (i.e., those younger than about 10,000 years) are not typically considered sensitive for paleontological resources because biological remains are not considered fossils unless they are older than 10,000 years. However, note that materials of Holocene age may occur as a thin veneer covering more paleontologically sensitive older units in the subsurface.
	Qw Younger alluvial river/wash deposits	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive deposits in the subsurface.
	Qo, Qoa, Qod Older alluvial valley and fan sediments	Pleistocene	High sensitivity. Pleistocene non-marine deposits are almost universally considered highly sensitive for paleontological resources in California, because of their potential to contain vertebrate materials. California is home to the type sections for the two North American Land Mammal Stages within the Pleistocene (Rancholabrean, type section in the Los Angeles area; and Irvingtonian, type section in

[3] Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee, 1995.

Segment	Geologic Unit*	Age	Fossil Content and Paleontological Sensitivity**
	Qo, Qoa, Qod (continued).		Fremont), and the literature is rich in examples of vertebrate faunas unexpectedly discovered as a result of excavations in Pleistocene materials. Strata mapped as Qo, Qoa, and Qod are may be at least in part correlative with deposits of Pleistocene Lake Mojave/Lake Manix, which include numerous scattered localities with mammalian remains, including horses, mammoths, and cotton rat (e.g., Bowen 1954, Reynolds and Reynolds 1994, Scott et al. 1997, and Walker et al. 2002).
	Qof Older fanglomerate deposits	Pleistocene	High sensitivity. Pleistocene non-marine deposits. Strata mapped as Qof may be at least in part correlative with deposits of Pleistocene Lake Mojave/Lake Manix, discussed above.
	KJgm, Qm, Ggm, Hd Quartz monzonite and allied intrusive igneous rocks.	Late Jurassic–Cretaceous	Intrusive igneous (plutonic) rocks; not sensitive for paleontological resources.
	Mzv, Lp, Pf Metavolcanic and volcanic rocks with sedimentary/ metasedimentary interbeds; includes Sidewinder Volcanic Series (Bowen 1954) and Oro Grande Formation (Hershey 1902)	Paleozoic and Mesozoic	Undetermined, but includes several potentially sensitive units: limestone interbeds of Oro Grande Formation contain corals and crinoids; those of Fairview Valley Formation (contains corals, brachiopods, gastropods, echinoids, bryozoans, archaeocyathans) (Bowen 1954).
2C Side Running/2A (Supplemental Draft EIS Figure S-3.9-6)	**Qs** Aeolian sand deposits	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qo, Qoa Older alluvial sediments	Pleistocene	High sensitivity; Pleistocene non-marine deposits. Strata mapped as Qo and Qoa may be at least in part correlative with deposits of Pleistocene Lake Mojave and Lake Manix, which include numerous scattered localities with mammalian remains, including horses, mammoths, and cotton rat (e.g., Bowen 1954, Reynolds and Reynolds 1994, Scott et al. 1997, and Walker et al. 2002).
	Qof, Qoc, Qt Older alluvial valley sediments, including fanglomerate (Qof), other continental gravel, sand, silt, and clay deposits (Qt), and clay and marl (Qoc)	Pleistocene	High sensitivity; Pleistocene non-marine deposits. Strata mapped as Qof, Qoc, and Qt may be at least in part correlative with deposits of Pleistocene Lake Mojave and Lake Manix, discussed above.
	Jhd, Qm, Hd Granitic rocks	Late Jurassic–Cretaceous	Intrusive igneous (plutonic rocks); not sensitive for paleontological resources.
	Mzv, Ql, Ap Primarily metavolcanic and volcanic rocks	Mesozoic	Low sensitivity. Very unlikely to contain fossils; no known fossil resources.
	Wg Waterman Gneiss of Bowen (1954) (quartz diorite gneiss)	Paleozoic	High-grade metamorphic rock; not sensitive for paleontological resources.

Segment	Geologic Unit*	Age	Fossil Content and Paleontological Sensitivity**
3B (Draft EIS Figures 3.9-3 through 3.9-5)	**Q, Qa, Qal** Younger alluvial valley and fan sediments	Holocene	Low sensitivity because of Holocene age. Note however that materials of Holocene age may occur as a thin veneer covering more paleontologically sensitive older units in the subsurface.
	Qw, Qrs Younger alluvial river/wash sediments	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qf Younger alluvial fan sediments	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Ql Younger lake and play deposits	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qof, Qt Older alluvial valley sediments	Pleistocene	High sensitivity; Pleistocene non-marine deposits. Strata mapped as Qof and Qt may be at least in part correlative with deposits of Pleistocene Lake Mojave/Lake Manis, which contains remains of fishes, turtles, numerous species of birds, and mammals (ground sloth, mammoth, jackrabbit, mouse, dire wolf, coyote, short-faced bear, mountain lion, black bear, scimitar-toth cat, horse, extinct camels, llama, pronghorn, mountain sheep, and antique bison), as well as invertebrates (ostracodes freshwater clams and snails) (Jefferson 2003).
	Qms, Qol Older lacustrine deposits, including Manix Lake sediments	Pleistocene	High sensitivity; Pleistocene non-marine deposits. Strata mapped as Qms include the Manix Lake deposits, which contain a rich and abundant vertebrate fauna, including remains of fishes, turtles, numerous species of birds, and mammals (ground sloth, mammoth, jackrabbit, mouse, dire wolf, coyote, short-faced bear, mountain lion, black bear, scimitar-toth cat, horse, extinct camels, llama, pronghorn, mountain sheep, and antique bison), as well as invertebrates (ostracodes freshwater clams and snails) (Jefferson 2003).
	Qpv, Qeb Basalt flows	Pleistocene	Very unlikely to contain fossils; no known fossil resources. Low sensitivity.
	Qc, Qp, Qo, Qoa, Qt Older alluvial and terrace deposits	Pleistocene, Plio-Pleistocene	High sensitivity; Pleistocene non-marine deposits.
	Tv, Tc Volcanic and sedimentary rocks (rhyolite flows, continental sedimentary rocks)	Tertiary	Sensitivity varies with lithology; some Tertiary sedimentary units are highly sensitive for vertebrate and other remains. Portions of the units mapped as Tv and Tc may be related to and/or include the Barstow Formation of Miocene age, which contains remains of camels, horses, mastodons, and flamingos, as well as various invertebrates (Lindsay 1972, Bureau of Land Management 1992, University of California Museum of Paleontology 2008), and is the principal fossiliferous unit at Rainbow Basin National Natural Landmark near Barstow.

Segment	Geologic Unit*	Age	Fossil Content and Paleontological Sensitivity**
	Gr, Tkg Granitic rocks; includes Teutonia Quartz Monzonite of Hewett (1956)	Tertiary and Mesozoic	Intrusive igneous (plutonic) rocks; not sensitive for paleontological resources.
	Gr-M Granitic and metamorphic rock	Mesozoic	Intrusive igneous (plutonic) and metamorphic rocks; not sensitive for paleontological resources.
	Cm Marine sedimentary and meta-sedimentary rocks; includes Monte Cristo Limestone of Hewett (1956)	Paleozoic (Carboniferous)	Undetermined; potentially high. Reported to be fossiliferous by Stewart (1980). Monte Cristo Formation contains echinoderm remains (University of California Museum of Paleontology 2008).
	Ds, Dsv, Dsi Marine sedimentary and meta-sedimentary rocks; includes Sultan Limestone of Hewett (1956)	Paleozoic (Devonian)	Undetermined; potentially high. Sultan Formation contains stromatolites, conodonts (Cooper 1987, Miller and Cameron 1982), and brachiopods (Zenger 1982).
	lp/Ls, Dєg, Dєgu, Dєgb1 Marine sedimentary and meta-sedimentary rocks; includes Upper Cambrian Goodsprings Dolomite of Hewett (1956).	Paleozoic (Upper Cambrian and Devonian)	Undetermined; potentially high. Goodsprings Formation contains corals, crinoid columnals (stem segments), and conodonts (University of California, Riverside 2008). Bird Springs Formation contains remains of crinoids, corals, sharks, primitive mollusks (University of California, Riverside 2008), and fusulinid foraminifera (Rich 1961).
	Epє, Pєg, Pєga, Pєgc Pєgb Metamorphic rocks (gneiss, schist)	Precambrian	High-grade metamorphic rocks; not sensitive for paleontological resources.
	Pєgr Granitic rocks	Precambrian	Intrusive igneous (plutonic) rocks; not sensitive for paleontological resources.
4C (Supplemental DEIS Figure S-3-9.8)	**Qal** Younger alluvial stream and wash deposits	Holocene	Low sensitivity because of Holocene age. Note however that materials of Holocene age may occur as a thin veneer overlying more paleontologically sensitive older units in the subsurface.
	Ql Younger lake and playa sediments; includes Ivanpah Lake deposits	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Epє, Pєg Metamorphic rocks () Metamorphic rocks.	Precambrian	High-grade metamorphic rocks; not sensitive for paleontological resources.
5B (Draft EIS Figures 3.9-5 and 3.9-6)	**Qx** Areas of disturbed and modified substrate (artificial fill, commercial development areas, I-15 corridor)	Latest Holocene	Not sensitive for paleontological resources because of Holocene age and highly disturbed condition or anthropogenic origin.
	Qay3 Youngest alluvium () Active wash and alluvial fan deposits	Late Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.

Segment	Geologic Unit*	Age	Fossil Content and Paleontological Sensitivity**
	Qa, Qal, Qay Young alluvial fan and wash deposits	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qpf Playa fringe deposits	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qay2 Young alluvium of intermittently active alluvial fans and washes	Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qay1 Alluvium of inactive alluvial fans and washes	Early Holocene	Low sensitivity because of Holocene age. May locally overlie more sensitive units in the subsurface.
	Qai "Intermediate Alluvium" (deposits of inactive alluvial fans)	Pleistocene	High sensitivity; Pleistocene non-marine deposits. Strata mapped as Qai likely at least in part correlative with deposits known to be highly fossiliferous (Lake Manix/Lake Mojave deposits, Las Vegas Formation).
	Qao, Qta Older alluvial fan deposits	Pleistocene–Late Miocene	High sensitivity; Pleistocene non-marine deposits. Strata mapped as Qao, Qta may be at least in part correlative with deposits known to be highly fossiliferous (Lake Manix/Lake Mojave deposits, Las Vegas Formation).
	Tao Fluvial sedimentary rocks	Tertiary	Undetermined, potentially high. May be in part related to/correlative with Barstow Formation and/or other vertebrate-bearing Miocene units.
	Tv, Tsf Volcanic rocks ranging from basalt to rhyolite	Tertiary	Low sensitivity; no known fossil content.
	Pbs, Ppmb, Mzpzs Marine sedimentary and metasedimentary rocks; includes Bird Spring Formation	Mesozoic–Paleozoic (Carboniferous)	Undetermined; potentially high. Bird Spring Formation contains crinoids, corals, sharks, primitive mollusks (University of California, Riverside 2008), and fusulinid foraminifera (Rich 1961).
	Dcg, Mzpzs Marine sedimentary and meta-sedimentary rocks; includes Good Springs Dolomite and Carbonate Rocks of Hewett (1956)	Paleozoic (Cambrian, Devonian)	Undetermined; potentially high. Goodsprings Formation contains corals, crinoids columnals (stem segments), and conodonts (University of California, Riverside 2008).
6B (Figure 3.9-6 of the Draft EIS)	**Qa, Qal, Qs** Younger alluvial deposits of active fans and washes	Holocene	Low sensitivity because of Holocene age. Note however that materials of Holocene age may occur as a thin veneer overlying more paleontologically sensitive older units in the subsurface.
	Qai Intermediate alluvial deposits of inactive fans	Pleistocene–Holocene	Pleistocene portions of this sequence are highly sensitive. Pleistocene portions may be correlative with the richly fossiliferous Las Vegas Formation, which contains remains of the following: toad (*Bufo* sp.), tree frogs (*Hyla* spp.), frog (*Rana* sp.), tortoise (*Gopherus* sp.), lizards (*Sceloporus* sp., *Callisaurus* sp.), horned lizard (*Phyrnosoma* sp.), non-venomous snakes (family Colubridae), widgeon (*Mareca americana*), ring-necked duck (*Aythya collaris*), lesser scaup (*A. affinis*), common merganser (*Mergus merganser*),

Segment	Geologic Unit*	Age	Fossil Content and Paleontological Sensitivity**
	Qai (continued).		extinct teratorn (*Teratornis merriami*), American coot (*Fulica americana*) and extinct small coot (*F. Americana minor*), owl (*Bubo* sp.), an unidentified soaring hawk (Buteoninae), ground sloths, Columbian mammoth (*Mammuthus columbi*), cottontail (*Sylvilagus* sp.), jackrabbit (*Lepus* sp.), various rodents, coyote (*Canis latrans*), muskrat (*Ondatra zibethicus*), badger (*Taxidea taxus*), large cats, including a probable lynx *(?Lynx* sp.) and one similar to the modern mountain lion (Felidae cf. *Puma concolor*), extinct horses (*Equus* spp.), an extinct large camel (*Camelops* sp.), a large bovid (Bovidae), and extinct bison (*Bison* sp. cf. *B. antiquus*) (Simpson 1933, Mawby 1967, Reynolds et al. 1991, San Bernardino County Museum 2008)
	Qoa Older alluvial deposits	Pleistocene	High sensitivity; Pleistocene non-marine deposits. Likely at least in part correlative with/related to Las Vegas Formation, described above.
	Qts Consolidated sediments	Pliocene–Pleistocene	Pleistocene portion—high sensitivity; Pleistocene non-marine deposits. Pleistocene portion may be in part related to Las Vegas Formation (see above).
	Mmc, Mm Marine sedimentary and metasedimentary rocks; includes Monte Cristo Limestone of Hewett (1956)	Paleozoic (Carboniferous)–Mesozoic	Undetermined; potentially high. Monte Cristo Formation contains echinoderms (University of California, Museum of Paleontology 2008).

Sources: Bowen 1954; Bureau of Land Management 1992; California Division of Mines and Geology 1987 [Kingman sheet];Cooper 1987; Jefferson 2003; Lindsay 1972; Mawby 1967; Miller and Cameron 1982; Nevada Bureau of Mines and Geology, 1985, 1987, 2006; Ninyo & Moore (2007); Reynolds and Reynolds 1994; Reynolds et al. 1991; Rich 1961; San Bernardino County Museum 2008; Scott et al. 1997; Simpson 1933; Stewart 1980; University of California, Riverside 2008; University of California Museum of Paleontology 2008; Walker et al. 2002; Zenger 1982.

* Map symbols are the same as those used in the geologic maps in Figures 3.9-3 through 3.9-6.

** Paleontological sensitivity was evaluated using the criteria of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995).

In general, the following geological units along the project alignment are considered highly sensitive for paleontological resources:

- *Non-marine continental (alluvial fan, fluvial, lakebed) deposits of Pleistocene age.*
  - In California, these include the deposits of the Pleistocene Mojave River–Lake Mojave–Lake Manix system, which contain a rich and diverse vertebrate assemblage (e.g., Bowen 1954, Reynolds and Reynolds 1994, Scott et al. 1997, Walker et al. 2002).
  - Along the Nevada portion of the alignment, a key Pleistocene deposit is the Las Vegas Formation, also documented as containing abundant vertebrate remains (Simpson 1933, Mawby 1967, Reynolds et al. 1991, San Bernardino County Museum 2008).

- Other non-marine strata of Pleistocene age along the alignment should also be considered highly sensitive for paleontological resources in California. Some of them are known to contain vertebrate materials, but even those not documented as fossiliferous are likely sensitive. California's Pleistocene non-marine deposits are generally considered highly sensitive because of their potential to contain vertebrate materials. California is home to the type sections for the two North American Land Mammal Stages within the Pleistocene (Rancholabrean, type section in the Los Angeles area; and Irvingtonian, type section in Fremont), and the literature is rich in examples of vertebrate faunas unexpectedly discovered as a result of excavations in Pleistocene materials.

- *Barstow Formation of Miocene age and correlative deposits*. The Barstow Formation is the principal fossiliferous unit at Rainbow Basin Natural Area near Barstow, and preserves remains of numerous vertebrate and invertebrate taxa (reference).

Several marine sedimentary units of Paleozoic age, including the Cambrian Monte Cristo Formation (Monte Cristo Limestone), Devonian Sultan Formation (Sultan Limestone) and Goodsprings Formation, and the Pennsylvanian Bird Spring Formation, are also known to be fossiliferous. Their sensitivity is undetermined and requires further evaluation, but could be high.

Archaeological Resources

Impacts to archaeological resources are largely the result of the physical destruction of or damage to all or part of the property. Such damage can be caused by ground disturbance during construction or operation of improvements.

The greatest potential for damage to archaeological resources within the APE would be during the construction of the Preferred Alternative, which would involve extensive ground-disturbing activities. Operation of the DesertXpress rail line, stations, and maintenance facilities would not result in ground-disturbing activities that could directly impact these resources. However, the presence of trains travelling in close proximity to these resources could result in adverse indirect effects related to noise, vibration, and visual impacts.

Table F-3.7-3 summarizes the potential direct and indirect impacts to known National Register eligible or assumed eligible archaeological resources within the APE for the Preferred Alternative.

Architectural Resources

Throughout the entirety of the APE, no architectural resources were either determined or are recommended to be eligible for the National Register. Therefore, no architectural resources would be adversely affected or subject to significant impacts from the Preferred Alternative.

Table F-3.7-3 Known National Register Eligible or Assumed Eligible Archaeological Resources in the APE

Project Component (Including TCAs)	Archaeological Resources Directly Affected[a] Number	Archaeological Resources Indirectly Affected Number
VV3	12	0
OMSF 2	3	0
Segment 1	24	6
Segment 2C Side Running	45	14
Segment 3B (Modified)	45	13
Baker Maintenance of Way Facility	1	0
Segment 4C	20	5
Segment 5B	15	20
Segment 6B	0	5
Las Vegas Southern Station	0	0
Las Vegas Central Station B	0	0
Frias Substation	0	0

Source: ICF/Jones & Stokes, 2008 and 2010.

[a] Direct APE impacts would likely occur within 115 feet on either side of the DesertXpress alignment centerline, within 50 feet on either side of the utility corridor, and within the footprint of project facilities. Indirect APE impacts, related to construction, would likely occur within 116 to 200 feet on either side of the DesertXpress alignment centerline and within 51 to 100 feet on either side of the utility corridor.

Paleontological Resources

Table F-3.7-2, above, identifies the paleontologically sensitive geologic units along the alignment of the Preferred Alternative. Construction of the Preferred Alternative would likely result in adverse effects on paleontological resources in the following two situations:

- Where the proposed rail alignment or facility crosses paleontologically sensitive geologic units exposed at the surface; and
- Where the rail alignment or facility is situated on Holocene materials that overlie highly sensitive materials, and ground disturbance would be deep enough to affect underlying sensitive strata.

More specifically, adverse effects would be possible in all areas of Pleistocene substrate, in any portions of the project immediately underlain by the Barstow Formation or correlative strata of Miocene age, and in areas where Holocene materials form a thin veneer and ground disturbance would involve underlying Pleistocene strata, Barstow Formation, or Barstow correlatives.

Adverse effects could also occur during construction in portions of Preferred Alternative immediately underlain by fossiliferous Paleozoic strata and in portions where a Holocene veneer is present but ground disturbance would involve underlying Paleozoic strata. The sensitivity of these units is currently undetermined and would need to be further evaluated on a site-specific basis, as discussed in **Section 3.7.5.3** of the Draft EIS.

The potential for adverse effects would be lessened only somewhat in previously disturbed areas —for instance, Segment 3B (Modified) would be within the I-15 corridor—if all ground disturbance is confined to the previously disturbed envelope (area and depth). However, given the highly sensitive nature of some of the deposits involved in construction (e.g., the Lake Mojave/Lake Manix deposits, Las Vegas Formation, and Barstow Formation), there may be some potential for adverse effects even in previously disturbed substrate.

Like construction, ground-disturbing maintenance activities in areas of sensitive substrate would have some potential for adverse impacts on paleontological resources. The majority of maintenance activities are expected to take place within the corridor already disturbed by construction; most maintenance would not involve more extensive or deeper ground disturbance than construction, and is therefore unlikely to result in new adverse impacts even in areas of sensitive substrate. Accordingly, maintenance activities confined to the pre-existing (construction-related) disturbance envelope do not require mitigation for effects on paleontological resources. However, maintenance activities that "break new ground," resulting in disturbance of previously undisturbed substrate of high or undetermined sensitivity, could result in adverse effects on paleontological resources.

3.7.2.4 Comparison with Other Action Alternatives

Table F-3.7-5 summarizes the comparison of cultural and paleontological resources effects for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow. For a list of resources located with the APE for other action alternatives not carried forward into the Final EIS, please consult Draft EIS **Tables 3-7.6** through **3-7.11** and Supplemental Draft EIS **Table S-3.7-1**.

Archaeological Resources

The action alternatives would involve the construction and operation of rail alignments and associated facilities similar to those described above under the Preferred Alternative. Components with the least potential to impact archaeological resources would be those that are located in developed areas. Rail alignments within the I-15 freeway median would be less likely to impact resources, as freeway construction activities in the past have most likely resulted in the degradation of archaeological resources within the right-of-way.

None of the Las Vegas station options evaluated under Preferred Alternative and the action alternatives would affect archaeological resources in the study area. However, all of the Victorville station options would have some affect on archaeological resources. Construction of the Victorville Station proposed under the Action Alternative would

impact the largest number of archaeological resources when compared to the action alternatives. All OMSF options would generally impact the same number of archaeological resources.

While archival and field surveys conducted to date indicate that some of the components of the action alternatives could be located in areas with fewer known cultural resources, the actual number and extent of buried archaeological resources cannot be fully determined without subsurface investigation. As a result, it is possible that components of the action alternatives that appear to impact fewer known resources could result in more significant impacts once subsurface investigation or construction were to begin. With this in mind FRA considered the information gathered during the archival research and field surveys to assess the relative sensitivity of the APE and potential impacts of the Preferred Alternative compared to the other action alternatives, which in most cases would be very similar.

Paleontological Resources

Similar to the potential risks associated with archaeological resources, components with the least potential to impact paleontological resources would be those that are located in developed areas. Given that the components of the action alternatives would occur largely in the same sensitive geological units as the Preferred Alternative, impacts associated with paleontological resources would be similar.

Architectural Resources

As previously discussed, no architectural resources would be adversely affected or subject to significant impacts from the Preferred Alternative. However, several architectural resources were identified within the APE for Segments 7A, 7B and 7C (see Figure 3-7.1 of the Draft EIS). These resources would be subject to potential adverse effects under the other action alternatives. In addition, the contemplated Las Vegas Downtown Station site would have been located across Main Street from a National Register-eligible building. Depending on the degree of noise and vibration during the construction phase of the Las Vegas Downtown Station, there would be potential to damage the adobe construction material of this building, a potentially significant adverse effect.

Table F-3.7-4 Alternatives Comparison – Cultural and Paleontological Resources

Alternative	Number of Eligible or Assumed Eligible Archaeological Resources Directly Affected	Number of Eligible or Assumed Eligible Archaeological Resources Indirectly Affected	Number of Historic Architectural Resources Directly/Indirectly Affected
No Action Alternative	Assumed to be same as Preferred Alternative – approximately 165	Assumed to be same as Preferred Alternative – approximately 63	Assumed None
Alignment Routings, including Temporary Construction Areas (TCAs), Alignment Adjustment Areas, and Autotransformer Sites (EMU Only)			
Segment 1 Routing			
Segment 1	24	6	0
Segment 2			
Segment 2A/2B, 2A	16	3	0
Segment 2A/2B, 2B	23	7	0
Segment 2C	45	14	0
Segment 3			
Segment 3A	19	6	0
Segment 3B (Modified)	45	13	0
Segment 4			
Segment 4A	7	1	0
Segment 4B	8	1	0
Segment 4C	20	5	0
Segment 5			
Segment 5A	4	2	0
Segment 5B	15	20	0

Alternative	Number of Eligible or Assumed Eligible Archaeological Resources Directly Affected	Number of Eligible or Assumed Eligible Archaeological Resources Indirectly Affected	Number of Historic Architectural Resources Directly/Indirectly Affected
Segment 6			
Segment 6A	1	0	0
Segment 6B	0	5	0
Segment 6C	19	4	0
Segment 7			
Segment 7A	0	0	0
Segment 7B	0	0	0
Segment 7C	0	0	0
Victorville Station and Maintenance Facility Site Options			
Victorville Station Site 1	2	0	0
Victorville Station Site 2	1	0	0
Victorville Station Site 3	12	0	0
Victorville OMSF 1	5	0	0
Victorville OMSF 2	3	0	0
Las Vegas Area Station and Maintenance Facility Site Options			
Las Vegas Southern Station	0	0	0
Las Vegas Central Station A	0	0	0
Las Vegas Central Station B	0	0	0

Alternative	Number of Eligible or Assumed Eligible Archaeological Resources Directly Affected	Number of Eligible or Assumed Eligible Archaeological Resources Indirectly Affected	Number of Historic Architectural Resources Directly/Indirectly Affected
Las Vegas Downtown Station	0	0	2
Sloan Road MSF[4]	0	0	0
Relocated Sloan MSF	1	0	0
Wigwam Avenue MSF	0	0	0
Robindale Avenue MSF	0	0	0
Frias Substation	0	0	0
Other Facility			
Baker Maintenance of Way Facility	1	0	0
Technology Options			
DEMU (Diesel-Electric Multiple Unit)	None	5 additional resources in utility corridor	n/a
EMU (Electric Multiple Unit)	None	5 additional resources in utility corridor	n/a

Source: CirclePoint, 2011.

[4] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

3.7.3 MITIGATION MEASURES FOR THE PREFERRED ALTERNATIVE

Archaeological Resources

Appendix F-H contains the executed Programmatic Agreement (PA) for the project. The PA describes a phased implementation approach consistent with 36 C.F.R. 800.4(b)(2) permitting formal eligibility determinations to be made after the Preferred Alternative is identified and ratified by the lead and cooperating agencies via Records of Decision on the proposed action. (Such Records of Decision would follow from the Lead and Cooperating Agencies, subsequent to publication of this Final EIS).

The PA sets forth detailed procedures for the identification and evaluation of cultural resources within the APE for the Preferred Alternative. The procedures include steps to determine if measures can be take to further avoid or reduce impacts to cultural resources and in doing so requires consultation with Tribes consulted during development of the PA. If the Preferred Alternative is determined to adversely affect one or more cultural resources a Historic Properties Treatment Plan(s) (HPTPs) will be prepared. An outline of the contents of an HPTP is included with the PA in **Appendix F-H.** The HPTPs will include additional evaluation of possible avoidance and minimization measures (e.g. protective measures) that could be taken to reduce impacts. If impacts cannot be fully avoided the HPTP will require detailed recording of the resource before it is impacted and data recovery. The final step in the process will be to curate the records and any artifacts collected in accordance with federal law and the HPTP.

The PA includes specific requirements and procedures in the event human remains are encountered during construction. The first step will be to prepare a Plan of Action (POA) pursuant to the Native American Graves and Repatriation Act (NAGPRA). An outline of the POA is included with the PA in **Appendix F-H**. The purpose of the POA is to ensure the treatment and disposition of remains and associated grave goods will follow applicable Federal and state laws and health and safety codes and that appropriate Tribal representatives are contacted and consulted regarding the disposition of remains and associated grave goods.

While the PA sets forth specific procedures and requirements to comply with Section 106 including the identification, evaluation, assessment of effects and mitigation/treatment of cultural resources, the following mitigation measures have been included to support and enforce the procedures and requirements of the PA.

Mitigation Measure CR-1: Avoidance of Archaeological Resources

When detailed construction information becomes available, it may be possible to avoid resources through project design. Prior to determining whether avoidance is feasible however, it may be necessary to conduct test excavations to determine the vertical and horizontal extent of resources. Once avoidance can be assured, resource location information would be placed on construction drawings as

locations to be monitored during construction. If during monitoring it was determined that avoidance was infeasible then the process outlined below under Evaluation and Data Recovery would be followed.

Mitigation Measure CR-2: Evaluation and Data Recovery/Other Measures

It is presumed that it will not be possible to avoid the majority of archaeological resources within the APE. Resources that cannot be avoided shall be subject to test excavations to determine their significance and if determined significant, subject to data recovery. Resources that are determined to be significant under National Register Criteria A, B, and C (36 CFR 60.4) shall be subject to mitigation that will likely include recordation such as the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) program. The process that shall be followed to determine resource significance and conduct data recovery/other mitigation will be outlined in the HPTP as stipulated in the PA. All archaeological work on National Register-eligible properties shall be conducted in accordance with "Treatment of Archaeological Properties: A Handbook"[5] and "Archaeology and Historic Preservation: the Secretary of the Interior's Standards and Guidelines."[6] Investigations shall be performed under the supervision of professionals whose education and experience meet or exceed the Secretary of the Interior's "Professional Qualifications Standards."[7]

Should human remains be found during archaeological investigation, either state or Federal laws regarding the discovery of human remains shall be followed. On Federal land, the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) shall be followed. If the remains are found on state or private land within California, the requirements of Public Resources Code (PRC) 5097 shall be met. If human remains are identified on state or private land within Nevada, the requirements of Nevada Revised Statutes (Section 383.160) and (Section 383.170) shall be followed.

Mitigation Measure CR-3: Monitoring

Portions of the APE have been determined to have the potential for buried resources. During construction, Native American monitor(s) designated in consultation with the Consulting Tribes shall be present within those sections identified in the HPTP as moderately to highly sensitive for prehistoric and historical archaeological deposits. The HPTP shall also outline the locations of monitoring, frequency and duration as well as the process to follow when

[5] ACHP 1990.

[6] 48 FR 44716-44742.

[7] 48 FR 44738-44739.

monitoring results in an unanticipated discovery. Specifically, any unanticipated resources that are identified during monitoring shall be evaluated and treated in accordance with the requirements of the HPTP and PA. If human remains are discovered during monitoring, the regulatory requirements described above shall be followed.

Mitigation Measure CR-4: Preconstruction Meeting and Worker Awareness Training

The Applicant shall ensure that all persons meeting the Secretary of the Interior's *Professional Qualifications Standards* who are supervising activities conducted as prescribed in the PA and all contracted field personnel, including construction workers, meet with one or more Consulting Tribes for a briefing on traditional customs and culturally sensitive protocols and procedures.

Mitigation Measure CR-5: Annual Reporting

Consistent with Administrative Stipulation IV.B of the PA, FRA shall require the Applicant to submit an annual report documenting the completion status of the stipulations outlined in the PA. The Annual Report shall include, at a minimum:

a. A list of all studies, reports, actions, evaluations, or monitoring reviewed or generated under the Stipulations of this PA.
b. Efforts to identify and/or evaluate potential historic properties, monitoring efforts, archaeological management assessments or research designs, and treatment of historic properties.
c. Any recommendations to amend this PA or improve communications among the parties.
d. A discussion of any inadvertent effects to historic properties occurring during the course of the year.

FRA shall ensure that the annual report is made available to the public and that members of the public are invited to provide comments to FRA, as well as to the ACHP and SHPOs.

Mitigation Measure CR-6: Quarterly Reporting

FRA shall require the Applicant to prepare quarterly progress reports on the status of project construction. As lead agency, FRA will be responsible for coordinating and submitting the report to Tribal representatives. The Quarterly report shall include, at a minimum, anticipated needs for Tribal representative monitors in the upcoming months.

Architectural Resources

As previously discussed, no architectural resources would be adversely affected or subject to significant impacts from the Preferred Alternative. However, the Draft EIS did evaluate an action alternative that included the Las Vegas Downtown Station, which was found to have a potential adverse effect to one architectural resource. **Mitigation Measure CR-4** in the Draft EIS was developed to reduce the potential effect to this resource. As the Preferred Alternative does not include the Las Vegas Downtown Station, this measure is not longer applicable to the Final EIS, and is not included as part of the required mitigation measures of the project. **Mitigation Measure CR-4** of this Final EIS has been revised to address impacts to archaeological resources, as described above.

Paleontological Resources

This section presents the mitigation measures developed to address the adverse effects of project construction and maintenance on paleontological resources. In general, mitigation for each segment shall apply to all ground disturbing activities within that segment, during both construction and operational periods, as stipulated in individual measures.

Mitigation Measure CR-7: Further Evaluation of Geologic Units

Before ground-disturbing activities begin, the Applicant shall retain a qualified paleontologist as defined by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) or other appropriate personnel (e.g., California licensed professional geologist with appropriate experience and expertise) to conduct further literature review and discussion with subject area experts in order to resolve the paleontological sensitivity of the geologic units identified in **Table F-3.7-2** as "undetermined" and the areas with strata of Holocene age exposed at the surface If site-specific engineering geologic or geotechnical studies for the project identify additional units likely to be affected by project construction and not included in **Table F-3.7-2**, they shall also be evaluated for paleontological sensitivity under this measure.

This information shall be used to guide mitigation requirements on a site-specific basis during construction and during maintenance activities that require ground disturbance, as follows.

- **Mitigation Measures CR-8, CR-9**, and **CR-11** shall apply to all ground-disturbing construction and maintenance activities.
- **Mitigation Measures CR-10** shall apply to all ground-disturbing construction activities that affect geologic units identified as highly sensitive for paleontological resources, and to all maintenance activities that would involve new or extended ground disturbance in highly sensitive units.

Mitigation Measure CR-8: Preconstruction Meeting and Worker Awareness Training

The Applicant shall ensure that all construction and maintenance personnel receive paleontological resources awareness training that includes information on the possibility of encountering fossils during construction; the types of fossils likely to be seen, based on finds in the site vicinity; and proper procedures in the event fossils are encountered.

Worker training shall be prepared and presented by a qualified paleontologist as defined by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) or other appropriate personnel (e.g., California licensed professional geologist with appropriate experience and expertise) experienced in teaching non-specialists. It may be delivered at the same time as other pre-planned construction worker education, or it may be presented separately.

Mitigation Measure CR-9: Paleontological Monitoring

Full-time paleontological monitoring shall be conducted for all ground-disturbing activities in portions of the proposed rail alignment and facilities with substrate materials identified as highly sensitive for paleontological resources (see **Table F-3.7-2** above). Full-time monitoring will also be required where Holocene materials overlie highly sensitive strata and site-specific investigations have identified the potential for project activities to involve the underlying sensitive strata.

A trained paleontological monitor shall oversee all ground-disturbing activities that affect highly sensitive substrate materials, including vegetation removal, site preparation, construction grading and excavation, and any drilling for piers or pilings. Paleontological monitoring shall consist of observing operations and periodically inspecting disturbed, graded, and excavated surfaces. The monitor shall have authority to divert grading or excavation away from exposed surfaces temporarily in order to examine disturbed areas more closely, and/or recover fossils. The responsible paleontologist shall coordinate with the construction manager to ensure that monitoring is thorough but does not result in unnecessary delays.

If additional personnel are needed for effective monitoring, the responsible paleontologist may train other consultant or in-house staff in paleontological monitoring. Once training is complete, individuals trained by the qualified paleontologist may then monitor the proposed project construction independently, and shall have the same responsibilities as described above.

Mitigation Measure CR-10: Stop Work Requirement

If fossil materials are discovered during any project-related activity, including but not limited to project grading and excavation, all ground-disturbing work in the vicinity of the find shall stop immediately until the responsible paleontologist can assess the nature and importance of the find and recommend appropriate treatment. Assessment shall occur in a timely manner, and recommendations for treatment shall be consistent with SVP guidelines (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). Treatment may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and may also include preparation of a report for publication describing the finds. If no report is required, the Applicant will nonetheless ensure that information on the nature, location, and depth of all finds is readily available to the scientific community. The responsible paleontologist and all paleontological monitors shall be empowered to temporarily halt or redirect the excavation equipment away from fossils to be salvaged.

Mitigation Measure CR-11: Fossil Recovery and Curation

If fossil materials are discovered during project-related activities, the responsible paleontologist shall determine whether recovery and curation is warranted, and shall be empowered to confer with local area experts as needed to arrive at a determination. All materials warranting recovery shall be stabilized on the site and then salvaged consistent with currently accepted procedures and the prevailing standard of care for paleontological excavations. The responsible paleontologist shall coordinate with the construction manager to ensure that specimen recovery proceeds in a timely manner.

Recovered fossils shall be prepared for identification consistent with currently accepted procedures and the prevailing standard of care. They shall then be identified by competent specialists, potentially including, but not necessarily limited to, the responsible paleontologist. If possible, identification shall include genus, species, and, if applicable, subspecies. If species-level identification is not feasible, the maximum feasible level of specificity shall be provided. The fossil assemblage shall then be analyzed by stratigraphic occurrence and any other applicable parameters, such as size, taxa present, and/or taphonomic conditions. A faunal list shall be developed.

Any specimens (fossils) of paleontological significance found during construction shall be temporarily housed in an appropriate museum or university collection. If curation is required, the responsible paleontologist shall develop appropriate curation agreements, consistent with applicable protocols and the prevailing standard of care.

The responsible paleontologist shall prepare a final report that includes at least the following components:

- Information on site geology and stratigraphy, including a stratigraphic column;
- A description of field and laboratory methods;
- A faunal list, with stratigraphy ranges/occurrences for each taxon;
- A concise discussion of the significance of the site and its and relationship to other nearby and/or similar fossil localities;
- A list of references consulted during the project, including published geologic maps for the site and vicinity; and
- A complete set of field notes, field photographs, and any new geologic maps developed for or during the project.

Full copies of the final report, including any appended materials, shall be put on file with any repository institution(s). Depending on the nature of the materials recovered, it may also be appropriate to prepare a report for publication in an appropriate peer-reviewed professional journal. Such publication shall be at the discretion of the responsible paleontologist.

3.7.4 Residual Impacts Following Mitigation

All effects to cultural resources associated with the Preferred Alternative can be mitigated through avoidance, evaluation and data recovery, or other mitigation through archaeological investigation and monitoring during construction as described above. These measures will form the basis of the stipulations to be outlined in the HPTP and the PA to resolve the adverse effects of the project to archaeological resources.

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3.8 HYDROLOGY AND WATER QUALITY

This section describes updates and changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the hydrology and water quality impacts related to the Preferred Alternative compared to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.8.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, includes all comments on the Draft EIS and Supplemental Draft EIS related to hydrology and water quality and provides responses to those comments. Several comments resulted in changes to the hydrology and water quality analysis in the Draft EIS and Supplemental Draft EIS and are discussed below. Substantive updates and changes in response to comments on the Draft EIS and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

Concurrently with the NEPA process, the Applicant initiated the Clean Water Act (CWA) Section 404 permitting process with the USCAE in May 2010. The CWA Section 404 established a program to regulate the discharge of dredged or fill material into waters of the US, including wetlands. As part of this CWA Section 404 permitting process, the Applicant prepared six formal jurisdictional delineation reports for the Death Valley area,[1] the Cuddeback Lakes watershed,[2] the Ivanpah Valley area,[3] the Jean Dry Lake area,[4] the Las Vegas watershed,[5] and the Roach Dry Lake area.[6] These six delineation reports are included as **Appendix F-I** to this Final EIS. The delineation reports investigate the presence of wetlands and other waters potentially subject to USACE regulation under CWA Section 404. The delineation reports were conducted in accordance with the CFR

[1] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California. July 2010.

[2] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California. July 2010.

[3] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California. July 2010.

[4] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada. July 2010.

[5] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Las Vegas Watershed, Clark County, Nevada. July 2010.

[6] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

definitions of jurisdictional waters, USACE regulations, and supporting guidance documents. The delineation reports make recommendations to the USACE relative to the presence of waters of the US for a final jurisdictional determination. The delineation reports were submitted to the USACE in July 2010. While the preparation of the delineation reports is a separate process undertaken by Applicant, the information from these delineation reports has informed this Final EIS. Although the FRA and the Cooperating Agencies are not adopting the methodology underlying the CWA Section 404 permit process, this Final EIS incorporates the quantitative analysis and other relevant information into the substantive updates and changes in response to comments on the Draft EIS and Supplemental Draft EIS as appropriate. **Section 3.8.2.3** below also incorporates this information as it relates to the Preferred Alternative.

Jurisdictional determination and issuance of a permit for the discharge of fill material into waters of the US associated with construction of the DesertXpress project will be part of the CWA Section 404 permit process administered by the USACE. In addition to the CWA Section 404 permit, the Applicant will apply for certification under Section 401 of the CWA.[7] Section 401 Certification is administered in California through the Regional Water Quality Control Boards (in the case of the DesertXpress project the Lahontan Regional Water Quality Control Board) and in Nevada by the Nevada Division of Environmental Protection. Issuance of the CWA Section 404 permit by the USACE, and Section 401 Certification, are anticipated to follow issuance of the Records of Decision on the project by the Cooperating Agencies.

Impacts to waters of the US and water quality resulting from the DesertXpress project identified in this Final EIS may also be addressed in the CWA Section 404 permit and Section 401 Certification. The Applicant will be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit and Section 401 Certification, as well as **Mitigation Measures HYD-1** through **HYD-11** stipulated in **Section 3.8.3** of this Final EIS. These defined mitigation measures would require the incorporation of site-specific water quality treatment devices and BMPs to protect water quality, require the implementation of a stormwater pollution prevention program and a spill prevention, control, and countermeasure plan, require the proper design of drainage systems and flood protection measures, and minimizing impacts on water availability during construction.

[7] Under federal CWA Section 401, every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with USACE CWA section 404 permits for dredge and fill discharges.

3.8.1.1 Affected Environment

Draft EIS **Section 3.8.3.4** and Supplemental Draft EIS **Section 3.8.1** describe in detail the affected environment for water resources, groundwater, and floodplains for the DesertXpress project. These sections, in combination with the text revisions shown below, remain applicable to this Final EIS and the evaluation of the Preferred Alternative.

Comment 314 on the Draft EIS requested revisions to the characterization of a series of drainages in relation to I-15. To address this comment, this Final EIS amends Draft EIS **Section 3.8.3.4** under the heading "Segment 5," as follows:

> ***Water Resources***: There are many small, unnamed drainages along Segment 5 that drain from the Toiyabe National Forest to the northwest, and the North McCullough Mountains Wilderness Study Area to the east (see ~~**Figure 3-8.6**~~ **Figure F-3.8-5**). The primary named drainages in the study area of Segment 5 include the Bonanza Wash and the Porter Wash. ~~These washes appear to connect to other unnamed drainages that stop just prior to I-15~~. **Water from several ephemeral drainages flow perpendicular into the roadway ROW and then is funneled down-slope collecting other small drainages and eventually a culvert transfers the water across to the other side of the I-15 freeway ROW.**

Comment 315 on the Draft EIS stated that the floodplains within Segment 5 have not been properly identified. To address this comment, this Final EIS amends Draft EIS **Figure 3.8-6** to show the floodplains within the vicinity of Segment 5. **Figure F-3.8-1** at the end of this section shows this revision.

Comment S-226 on the Supplemental Draft EIS requested identification of the beneficial uses of surface waters within the project area. To address this comment, this Final EIS amends Draft EIS **Section 3.8.3.3** under the heading "Regional Surface Water Quality", to add additional text as follows:

> **The Lahontan Regional Water Quality Control Board Basin Plan identifies the beneficial uses of the waters in the vicinity of the DesertXpress project in California to include:**
>
> - **waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened or endangered,**
> - **waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers, and**
> - **waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.**

Based on revised floodplain data in the Las Vegas metropolitan area obtained following publication of the Supplemental Draft EIS, this Final EIS amends Supplemental Draft EIS **Section 3.8.1** under the heading "Frias Substation," paragraph 3, as follows:

> The **eastern portion of the** Frias Substation site would ~~not~~ be located within a designated 100-year floodplain **of Duck Creek**. ~~However, the western limit of the 100-year floodplain for Duck Creek is immediately adjacent to the eastern boundary of the site.~~

Based on revised floodplain data in the Las Vegas metropolitan area obtained following publication of the Supplemental Draft EIS, this Final EIS amends Supplemental Draft EIS **Section 3.8.1** under the heading "Wigwam MSF Modification", paragraph 1, as follows:

> The orientation, not the location of the Wigwam MSF has been changed. Therefore, existing water resources, **and** groundwater resources, ~~and flooding hazards~~ are the same as presented for the Wigwam MSF in **Section 3.8.3.4** of the Draft EIS. The Wigwam MSF would not cross any existing drainages**.** ~~and would not be located in the 100-year floodplain.~~ **Based on revised floodplain data since publication of the Draft EIS, portions of the Wigwam Avenue MSF site would be located within the 100-year floodplain.**

Based on revised floodplain data in the Las Vegas metropolitan area obtained following publication of the Draft EIS, this Final EIS amends Draft EIS **Section 3.8.3.4** under the heading "Segments 6 and 7" and subheading "Flooding" as follows:

> Within in Segment 6, 100-year floodplains are located along an unnamed wash between West Cactus Avenue and East Silverado Ranch Boulevard. This wash becomes the Duck Creek Drainage Canal moving east to west. The Tropicana Wash runs from southwest to northeast through natural and lined canals before it converges with the Flamingo Wash and drains to Lake Las Vegas. ~~Within the area between I-15 and the UPRR tracks is the Tropicana Wash 100-year floodplain which extends south of East Tropicana Avenue, west of I-15, and along the railway tracks east of Wynn Road and north of West Oquendo Road. However, according to the Clark County Regional Flood Control District, several new conveyances and basins have been completed within this area, which have significantly reduced the area of the 100-year floodplain.~~ Above the Tropicana Wash and east of I-15, there is another 100-year floodplain that extends south of West Flamingo Road, west of South Las Vegas Boulevard, north of West Tropicana Avenue, and east of I-15. The Clark County Regional Flood Control District has constructed and proposed new conveyances within this area that have significantly reduced the area of the 100-year floodplain.

Based on revised floodplain data in the Las Vegas metropolitan area obtained following publication of the Supplemental Draft EIS, this Final EIS amends Draft EIS **Figure 3.8-7**, which shows the Las Vegas Southern Station and Las Vegas Central Station B within the

100-year floodplain. Draft EIS **Figure 3.8-7** has been revised to show the most current floodplain data in the Las Vegas metropolitan area, whereby the Las Vegas Southern Station and Las Vegas Central Station B are not located within the 100-year floodplain. Supplemental Draft EIS **Figure S-3.8-6** has also been revised to show the most current floodplain data in the Las Vegas metropolitan area. **Figure F-3.8-6** shows these revisions.

3.8.1.2 Regulatory Environment

Draft EIS **Section 3.8.1** and Supplemental Draft EIS **Section 3.0-2** describe the regulatory environment for hydrology and water quality for the DesertXpress project in detail. These sections, as modified by the text revision shown below, remain applicable to this Final EIS and the evaluation of the Preferred Alternative.

Comment 310 on the Draft EIS requested clarification that the Water Quality Certification required under CWA Section 401 would be issued by the state. To address this comment, this Final EIS amends Draft EIS **Section 3.8.1.1** under the heading "Clean Water Act" as follows:

> ***CWA Section 401 Water Quality Certification***: Under CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate, or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect the quality of the state's waters (including projects that require federal agency approval, such as issuance of a CWA Section 404 permit) must also comply with CWA Section 401.
>
> **The Applicant will apply for and obtain Section 401 Certification for the DesertXpress project. As of February 2011, the Applicant is in the process of submitting the Section 401 application to the appropriate authorities within each state, namely the Lahontan Regional Water Quality Control Board in California and the Nevada Division of Environmental Protection in Nevada. The Applicant will be required to comply with all conditions and mitigation requirements that result from the Section 401 Certification, as well as Mitigation Measures HYD-1 through HYD-11 stipulated in Section 3.8.3 of this Final EIS.**

Comment S-222 on the Supplemental Draft EIS requested discussion of the Lahontan Region Basin Plan. To address this comment, this Final EIS amends Draft EIS **Section 3.8.1.2** under the heading "Porter-Cologne Water Quality Control Act", paragraphs 2 and 3, as follows:

The Porter-Cologne Act also provides for the development and periodic review of basin plans that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Basin plans are primarily implemented by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met (see discussion of the NPDES system in the Clean Water Act section above). Basin plans are updated every three years, and provide the technical basis for determining waste discharge requirements and taking enforcement actions. The Lahontan Region Basin Plan covers the project study area within California.

The Lahontan Region Basin Plan includes water quality standards and control measures for surface and groundwater for the Lahontan Region. The Lahontan Region Basin Plan designates beneficial uses for water bodies and established water quality objective, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. As part of the Basin Plan, the LRWQCB has set water quality objectives, both narrative and numeric, for both surface waters and groundwater in its region. **The Applicant is committed to working with the LRWQCB to ensure the protection of water quality and mitigate impacts as appropriate.**

3.8.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

Several comments on the Draft EIS and Supplemental Draft EIS resulted in updates and changes to the hydrology and water quality analysis in the EIS and are discussed below.

Comments 313, 316, 324, and 325 on the Draft EIS and Comments S-225 and S-234 on the Supplemental Draft EIS requested that project features (rail alignments, built facilities, etc.) should span drainage channels or be constructed so as to allow for broad crossings, provide adequate natural buffers for flood control, and ensure that post-construction hydrologic conditions match pre-construction hydrologic conditions relative to drainage capacity. The comments also stated that design elements of project features should ensure that runoff is not concentrated and that post-construction hydrologic conditions match the pre-construction hydrologic conditions. The comments also requested additional hydrological modeling to ensure that downstream flows will not be disrupted due to changes to natural washes. To address these comments, this Final EIS amends Draft EIS **Section 3.8.4.3**, under the heading "Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite," as follows:

Permanent Impacts: When complete, the action alternatives would bridge over the Mojave River, and numerous ~~intermittent~~ **ephemeral** streams, washes, and ditches that would be crossed along the 200-mile corridor. Based on **a review of** preliminary design information from the Applicant, the **bridging and culverted**

crossings of these water resources would not permanently alter their courses or flows**. Hydrological modeling will be initiated and completed as part of the project final engineering design. The design will incorporate the use of existing natural drainage features, as appropriate, in order to minimize disruption of natural flow and function. Stormwater runoff would be conveyed under the proposed rail facility with adequate free-board to ensure water is not concentrated by the DesertXpress project.** Stormwater runoff from the trackway would generally be directed away from the trackway ~~and into existing drainage facilities associated with the I- 15 freeway or~~ **using natural and other local drainage systems in their present location and unmodified form as feasible**. ~~Along Segment 3A in Alternative A, and other I-15 median running alignments,~~ drainage for the trackway would be designed to integrate with the existing I-15 drainage system. **As recommended in Mitigation Measure HYD-6,** t**he rail alignment would connect with and mirror the existing I-15 freeway culverts where the rail alignment would be located within the I-15 freeway corridor.**

Where the rail alignment would deviate from the I-15 freeway corridor, culverts would be installed at natural drainage features. Drainage facilities would be sized accordingly to accommodate adequate peak flows to reduce erosion or other downstream effects. Where the rail alignment would divert from the existing I-15 freeway, such as within the Ivanpah Valley just north of Mountain Pass, the DesertXpress project would include clear span crossings for all ephemeral drainages equal to or greater than four feet in width (as measured by the distance between the ordinary high water mark on each side of the drainage). The crossings would retain natural, earthen bottoms to minimize changes to the natural flow, erosion, and sedimentation patterns. Figure F-3.8-7 shows the preliminary location of ephemeral drainage crossings within the Ivanpah Valley, just north of Mountain Pass.

To further address Comment S-234 on the Supplemental Draft EIS, this Final EIS amends Draft EIS **Section 3.8.5**, paragraph 1, as follows:

To address the potential hydrologic and water quality related impacts described above, mitigation measures have been developed. Mitigation measures are classified by impact type and are further divided by measures to address impacts during the operational and construction periods, respectively. These measures are intended to apply to any project features (**rail alignments,** stations, OMSFs, MSFs, etc.) located within each segment unless otherwise noted. **The Record of Decision for the DesertXpress project will incorporate these mitigation measures, making them conditions of approval to construct and operate the DesertXpress project.**

Comments S-227 and S-302 on the Supplemental Draft EIS requested additional information related to stormwater runoff and a description of the required measures to ensure provision of adequate drainage for post-construction stormwater runoff. Comments S-230 and S-233 on the Supplemental Draft EIS also requested information regarding drainage mitigation for the temporary impacts to waters of the US. Comment 326 on the Draft EIS also requested that the Draft EIS identify opportunities to improve obstructed natural flows as a result of the I-15 freeway corridor. To address these comments, this Final EIS amends Draft EIS **Section 3.8.5** and Supplemental Draft EIS **Section 3.8.4**, **Mitigation Measure HYD-6**, as follows:

> **Mitigation Measure HYD-6: Proper Design of ~~Station and Maintenance Facility~~ Drainage Systems**
>
> Most of the rail segments would not result in a large amount of impervious surface that could concentrate and redirect stormwater flow causing onsite erosion. Runoff from the rail alignment would be captured and directed to existing designated drainage features. Where necessary, the Applicant shall redesign **and resize the** existing drainage facilities to accommodate the potential increase in runoff along the rail alignment. **The rail alignment shall connect with and mirror the existing culverts along the I-15 freeway. Where the rail alignment deviates from the I-15 freeway, the Applicant shall install culverts at natural drainage features.**
>
> However, the stations and maintenance facilities would have parking lots that could concentrate and redirect stormwater flows. In order to determine the adequate size of drainage facilities, the total increase in impervious surface of the design of the facilities will be included in a Rational Method (a way of calculating flow intensity) calculation to determine the increase in peak storm discharges resulting from the action alternatives. The 100-year, 24-hour storm event will be used to determine the appropriate size of drainage facilities needed for the action alternatives. Drainage facilities will need to retain flows and not contribute to additional flows in the Mojave River or other streams and washes. This could be achieved with several detention basins.
>
> Drainage facilities **for both the rail alignment and station and maintenance facilities** will need to be sized accordingly to handle adequate flow. It is important to note that when a culvert is used, the footprint of the rail will need to be reinforced with rip-rap, and the culvert will need to be large enough to handle the 100-year 24-hour storm flow so on site flooding can be avoided. Other drainage features such as bridge crossings will need to be designed to not increase the size of the floodplain.

Additionally, the Applicant shall create either a new ephemeral drainage or restore, where feasible, through the reestablishment of former ephemeral drainages to compensate for temporary construction impacts to waters of the US.

The Applicant will be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit and Section 401 Certification, as well as Mitigation Measures HYD-1 through HYD-11 stipulated in this Final EIS.

For clarification purposes, **Mitigation Measure HYD-7** has been revised as follows:

Mitigation Measure HYD-7: Reduce Encroachment into the 100-Year Floodplain

When selected project features are located within the 100-year floodplain, the base elevation of rail and stations, including maintenance facilities, should be elevated above the 100-year floodplain or relocated **within the facility footprint or APE** to avoid any impact. ~~This may be achieved by elevating or relocating the rail alignment out of the 100-year floodplain (Victorville station site 1, Victorville OMSF Option 1, Las Vegas Central Station B, Las Vegas Southern Station, and Wigwam Avenue MSF).~~ Portions of the rail alignment may utilize track support columns that are located in the 100-year floodplain. Specific engineering plans and modeling, using **Hydraulic Engineering Centers-River Analysis System** (HEC-RAS) or similar, shall be completed by a registered professional during the design-build process. **The design plans shall incorporate all feasible recommendations of the HEC-RAS analysis.**

Based on revised floodplain data in the Las Vegas metropolitan area since publication of the Supplemental Draft EIS, this Final EIS amends Supplemental Draft EIS **Section 3.8.3** under the heading "Frias Substation" and subheading "Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows" as follows:

The **eastern portion of the** Frias Substation would ~~not~~ be located within the designated 100-year floodplain**. The Frias Substation would affect 0.86 acres of the 100-year floodplain which would not substantially** ~~and would therefore not place any structures within the 100-year floodplain that would~~ impede or redirect flood flows. ~~However, the western boundary of the 100-year floodplain of Duck Creek is located immediately east of the Frias Substation.~~

Based on revised floodplain data in the Las Vegas metropolitan area since publication of the Supplemental Draft EIS, this Final EIS amends Supplemental Draft EIS **Section 3.8.3** under the heading "Wigwam MSF Modification" as follows:

> The Wigwam Avenue MSF would not impact any drainage, washes, or channels ~~and would not be located within the 100-year floodplain~~; thus, no construction or operation effects relative to water quality standards, **or** drainage patterns~~, or flood flows~~ would occur over what was assumed in Draft EIS **Section 3.8.4.3**. **However, the Wigwam Avenue MSF would affect approximately 5.1 acres of the 100-year floodplain, which could impede or redirect flows.** While the Wigwam Avenue MSF modification would result in an increase in impervious surface, it is assumed that the majority of the site would not be paved and that the increase in associated runoff would not be substantial.

Based on revised floodplain data in the Las Vegas metropolitan area since publication of the Draft EIS, this Final EIS amends Draft EIS **Section 3.8.4.3** under the heading "Place Housing Structures Within a 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows" and subheading "Permanent Impacts", paragraph 4, as follows:

> Alternative B would increase the size of the 100-year floodplain and impede or redirect flood flows. Within Segment 1, the Victorville Station site option 1 would be adjacent to and encroach upon the 100-year floodplain and result in a potential impact of 13.5 acres along the Bell Mountain Wash. Similar to Segment 2A, where Segment 2B crosses the Mojave River floodplain, the bridge or structure that would cross has been designed to not impede or redirect flows within the 100-year year floodplain; therefore, minimal impact is anticipated at this location. Segment 3B would cross the 100-year floodplain of Silver Lake and Soda Dry Lake when passing through Baker. These two lakes remain dry for most of the year, but in the unlikely chance of a 100-year storm event the trackway could be submerged or impede and redirect flood flows. Portions of Segment 5B will be crossing or banking up against the 100-year floodplain north of Jean. Portions of Segment 6B will be crossing or banking up against the 100-year floodplain of multiple drainages including Duck Creek and Tropicana Wash. While this segment would be elevated, column placement would likely fall within the floodplain. ~~The Las Vegas Southern station site and the Las Vegas Central B station site would both fall within the 100-year floodplain.~~ If Option C were utilized in an alignment otherwise comprised of Alternative B segments, this would reduce impacts to the 100-year floodplain by **approximately 26 to 32** ~~16.6 to 19.6~~ acres, ~~depending on station, OMSF, and MSF options selected~~. Option 6C would have substantially less impact on the floodplain than Segment 6B.

3.8.2 Analysis of Environmental Consequences

3.8.2.1 Methods of Evaluation

The hydrology and water quality effect methodology described in Draft EIS **Section 3.8.2** remains applicable to this Final EIS and the evaluation of the Preferred Alternative.

The evaluation of surface hydrology and water quality effects is based on professional standards and the conclusions of relevant technical reports, such as the California Department of Water Resources (CDWR) Bulletin 118 reports. The key effects were identified and evaluated based on the physical characteristics of the DesertXpress project study area and the magnitude, intensity, and duration of activities. The evaluation considers direct and indirect effects to drainages, including the Mojave River, ephemeral washes, and ditched, and the 100-year floodplain.

Direct impacts can be either permanent or temporary. Direct permanent impacts occur when the hydrology resource is removed or altered by permanent project features. Direct temporary impacts occur when the resource is altered during the construction phase but then restored to pre-construction conditions once construction is complete. Direct temporary impacts for the Preferred Alternative were calculated to include an additional 62.5 feet on either side of the direct permanent impact area to account for construction activities. The permanent and temporary direct impact area equates to a 200-foot wide corridor from the centerline of the Preferred Alternative rail alignment. Based on the Applicant's most recent plans, this 200-foot wide corridor is considered conservative (in other words, overestimates). It is likely that permanent and temporary impacts associated with the Preferred Alternative will be less than the estimates stated below. As stated in Final EIS **Section 2.3.2.1**, the typical permanent impact area associated with the rail alignment under the EMU technology is 60 feet in width.

Indirect effects to hydrology and water quality are those effects caused by the Preferred Alternative that may occur either later in time or some distance from the Preferred Alternative. Examples include downstream effects, implementation of mitigation measures for other resources that may result in residual impacts, and/or the growth that may be caused or accelerated by the Preferred Alternative. Indirect effects as a result of construction could involve runoff from activities involving soil disturbance affecting downstream water quality, erosion, and sedimentation.

The Preferred Alternative would have an adverse effect on hydrology and water quality and would require mitigation if it would:

- Violate any water quality standards or waste discharge requirements, or substantially degrade water quality;
- Place structures within a 100-year floodplain or place structures that would impede or redirect flood flows;

- Substantially alter existing drainage patterns in a manner that would result in substantial erosion, siltation, or flooding onsite or offsite;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff; or
- Use surface groundwater in a wasteful or inefficient manner resulting in a reduction in water availability.

3.8.2.2 No Action Alternative

Under the No Action Alternative, no privately-sponsored high-speed passenger rail system would be constructed or operated in the project study area. However, public agencies in California and/or Nevada would be expected to implement various physical and/or operational improvements to increase the I-15 freeway's capacity and improve its operations. These improvements would largely be located within the I-15 freeway corridor, similar to the Preferred Alternative. Accordingly, these improvements would thus present many of the same hydrological impacts described herein, with the exception of impacts associated with stations and maintenance facilities which are unique to the DesertXpress project. As a result, the No Action Alternative would avoid hydrological effects related to the Preferred Alternative Victorville and Las Vegas station and maintenance facilities. Project-specific environmental review to be undertaken by the sponsoring lead agency/agencies would more precisely determine the environmental effects associated with such improvements.

Since the Preferred Alternative includes construction and operation of DesertXpress plus all of the improvements considered under the No Action Alternative, the No Action Alternative would result in a lower overall level of development than the Preferred Alternative. Therefore, it is assumed that the No Action Alternative as a whole would result in a lower level of adverse hydrological and water quality effects than the Preferred Alternative as a whole.

3.8.2.3 Preferred Alternative

Draft EIS **Section 3.8.4.2** and Supplemental Draft EIS **Section 3.8.3** describe in detail hydrological and water quality effects by individual project component. The discussion below summarizes the aggregated effects for the components that comprise the Preferred Alternative.

Figures F-3.8-2 through **F-3.8-6** show the hydrology features and floodplains within the vicinity of the Preferred Alternative.

Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality

Direct Permanent Effects

Operation of the Preferred Alternative would result in potential effects to water quality. These would be related to pollutants (oils, solvents, etc.) associated with train operations and track maintenance activities. Following a storm event, these pollutants could be flushed into and thus contaminate adjacent drainages and washes. **Table F-3.8-1** shows the Preferred Alternative's direct permanent effects to water resources.

Table F-3.8-1 Direct Permanent Effects to Water Resources

Preferred Alternative Component	Linear feet of permanent effect
Rail Alignment	17,626.53
Victorville Station (VV3)	2,075
Victorville OMSF (OMSF 2)	825
Las Vegas Station (Southern Station or Central Station B)	0
Las Vegas MSF (Wigwam Avenue MSF)	0
Frias Substation	50
Utility Corridor (Baker MOW)	50.6
Utility Corridor (Victorville Station)	223.4
Total	20,850.53

Source: ICF, 2011.

Note: Impacts to water resources from the rail alignment include the autotransformers and tracks into/out of maintenance facilities. See Final EIS **Section 2.2.2.2,** for a description of autotransformers and **Appendix F-C** for autotransformer locations.

The Preferred Alternative rail alignment would install drainage features under the rail alignment that match existing I-15 freeway culverts and thus integrate into the existing system, as recommended in **Mitigation Measure HYD-6**. Stormwater runoff from the Preferred Alternative rail alignment would generally be directed away from the trackway or using natural and other local drainage systems in their present location and unmodified form as feasible.

Where the Preferred Alternative rail alignment would deviate from existing transportation facilities, such as within the Ivanpah Valley north of Mountain Pass, the Applicant would install culverts at natural drainage features. **Figure F-3.8-7** shows the preliminary location of ephemeral drainage crossings within the Ivanpah Valley, just north of Mountain Pass. At a minimum, all ephemeral drainages equal to or greater than four feet wide (as measured by the distance between the ordinary high water mark on each side of the drainage) would be avoided by tunnels, aerial crossing structures, and at grade overcrossing structures associated with the rail alignment. The Preferred Alternative rail

alignment would include clear span crossings at such locations so as to retain the natural, earthen bottoms to minimize changes to the natural flow, erosion, and sedimentation patterns.

Stormwater runoff around the stations and maintenance facilities would also potentially affect water quality due to pollutants and potentially hazardous materials deposited from vehicles and maintenance activities at the facility sites. The Preferred Alternative would cross Bell Mountain Wash, the Mojave River, and a number of named and unnamed ephemeral washes along the corridor. Specifically, the Preferred Alternative Victorville Station (VV3) would permanently impact a branch of Bell Mountain Wash. The Victorville OMSF (OMSF 2) would also bisect two small washes that connect to Bell Mountain Wash. As a whole, the Preferred Alternative would have direct permanent effects on approximately 20,850.53 linear feet of hydrologic resources.

Effects to Waters of the United States and Wetlands: According to the six jurisdictional delineation reports submitted to the USACE in July 2010 as part of the CWA Section 404 permitting process (see **Appendix F-I**), a subset of the water resources discussed above qualify as waters of the US.

Ephemeral drainages or desert dry washes were found within the Preferred Alternative study area (within the Death Valley area,[8] Cuddeback Lakes watershed,[9] Jean Dry Lake area,[10] Las Vegas watershed,[11] Roach Dry Lake area[12]) that meet the technical criteria that could be subject to the CWA Section 404 jurisdiction as waters of the US. This finding is based on the presence of ordinary high water marks as required by USACE regulations.

The active ephemeral drainages within the Pahrump and Ivanpah Valleys (that drain to the Ivanpah Dry lake) would be considered non-jurisdictional due to their isolated natures with no substantial connection to interstate or foreign commerce.[13]

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[8] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California. July 2010.

[9] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California. July 2010.

[10] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada. July 2010.

[11] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Las Vegas Watershed, Clark County, Nevada. July 2010.

[12] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

[13] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake San Bernardino County, California. July 2010.

Of these identified jurisdictional waters, construction of the Preferred Alternative would permanently affect an estimated 5.96 acres of waters of the US (ephemeral drainages). The affected ephemeral drainages are currently unvegetated and have limited habitat value, but do provide important hydrologic functions, such as water conveyance and water storage. Mitigation, which would require the restoring of affected ephemeral drainages through the reestablishment of former ephemeral drainages to compensate for temporary construction impacts to waters of the US (as recommended in **Mitigation Measure HYD-6**), would minimize adverse effects to waters of the US. The Applicant will be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit, as well as **Mitigation Measures HYD-1** through **HYD-11** stipulated in **Section 3.8.3** of this Final EIS.

No wetlands were found within the Preferred Alternative study area that met the USACE wetland criteria. This finding is based on the absence of hydric soil,[14] wetland hydrology, and/or wetland vegetation indicators as required by the USACE guidance documents and regulations related to wetlands.[15] Therefore, the Preferred Alternative would not permanently affect wetlands.

Refer to **Section 3.14.2.3** of this Final EIS for additional information relative to effects to waters of the US and wetlands.

Direct Temporary Effects (Construction)

Table F-3.8-2 identifies the direct temporary effects to water resources as a result of construction of the Preferred Alternative. Site grading would expose areas of bare soil to erosive forces. Bare soils are much more likely to erode than vegetated areas, as a vegetative cover disperses water thereby allowing for better infiltration and retention. Activities involving soil disturbance, excavation, cutting/filling, and stockpiling could thus result in increased erosion and sedimentation to surface waters. If precautions are not taken to control contaminants, construction could produce contaminated stormwater runoff, a major contributor to water quality degradation. Hazardous materials associated with construction equipment could also adversely affect water quality if such materials are improperly stored or accidentally spilled. **Mitigation Measures HYD-1** and **HYD-2** would require permanent water quality treatment devices and BMPs during construction to control runoff that could affect water quality. Additionally, **Mitigation Measure**

[14] Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season, as defined by the Natural Resources Conservation Service.

[15] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California; HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada; HUC 8 Las Vegas Watershed, Clark County, Nevada; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

HYD-5 would require the Applicant to prepare a spill prevention, control, and countermeasure plan to prevent accidental releases of chemicals that are stored on site and BMPs to use in case of the spill. The BMPs shall apply to construction activities and operation activities.

Table F-3.8-2 Direct Temporary Effects to Water Resources

Preferred Alternative Component	Linear feet (temporary)
Rail Alignment	49,200
Utility Corridor (Victorville)	233.8
Utility Corridor (Baker MOW)	52.5
TCAs (7 and 13)	188
Total	49,674.3

Source: ICF, 2011.

Note: Impacts to water resources from the rail alignment include the autotransformers and tracks into/out of maintenance facilities. See Final EIS **Section 2.2.2.2**, for a description of autotransformers and **Appendix F-C** for autotransformer locations.

In addition, dewatering may be necessary for construction in areas with shallow groundwater, such as within the bed of the Mojave River where a new bridge is proposed alongside I-15. In particular, dewatering may be necessary for the support columns associated with this bridge. Retained waters could be become contaminated and could be subsequently discharged to other surface waters, thereby spreading contamination.

Construction of the Preferred Alternative rail alignment would require ephemeral wash and ditch crossings. Construction within the drainages could provide a direct path for construction-related contaminants. Because of the minimal amount of rainfall within the Preferred Alternative study area, in-water work is highly unlikely to occur. Construction-related contaminants could also be transported to a drainage or wash during the storm season if a leak or spill were to occur.

Construction of the Preferred Alternative rail alignment would also entail areas of elevated track through urban areas of Las Vegas. In such areas, construction-related contaminants could be easily transported to the local stormwater runoff system following a rainfall event.

Construction of the Victorville Station atop a branch of Bell Mountain Wash could also provide a direct path for construction-related contaminants to enter surface waters. Construction of the Frias Substation could also degrade existing water quality, particularly as a result of trenching activities associated with the proposed underground 25 kilovolt feeder.

Construction activities at the TCAs could also affect water quality, as contaminants and sediments from stockpiles could produce contaminated stormwater runoff. Overall, water quality impacts from construction activities could violate water quality standards, exceed contaminant loadings, create additional sources of polluted runoff, or otherwise degrade water quality.

Effects to Waters of the United States and Wetlands: In addition to the 5.96 acres of direct permanent impact to waters of the US, construction of the Preferred Alternative would temporarily affect an estimated 0.2 acres of waters of the US (ephemeral drainages). Construction activities would not affect any wetlands.[16] The Applicant will be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit, Section 401 Certification, as well as **Mitigation Measures HYD-1** through **HYD-11** stipulated in **Section 3.8.3** of this Final EIS. **Section 3.8.1** above provides a summary of the CWA Section 404 permitting process and Section 401 Certification to date. **Section 3.14.2.3** of this Final EIS also describes the Preferred Alternative effects to waters of the US and wetlands.

Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite

Direct Permanent Effects

When complete, the Preferred Alternative would bridge over the Mojave River, and numerous ephemeral washes and ditches (including Bell Mountain Wash) that would be crossed along the approximately 200-mile corridor.

Based on preliminary design information from the Applicant, the crossings of these water resources would not permanently alter the course or flows of these water resources. Stormwater runoff from the trackway would generally be directed away from the trackway and into existing drainage facilities associated with the I-15 freeway or other local drainage systems. As recommended in **Mitigation Measure HYD-6**, the Preferred Alternative rail alignment would connect with and mirror the existing I-15 freeway culverts where the rail alignment would be located within the I-15 freeway corridor. (For implications relative to existing stormwater systems, please see **Section 3.4.2.3** of this Final EIS).

[16] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California; HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada; HUC 8 Las Vegas Watershed, Clark County, Nevada; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

Where the Preferred Alternative rail alignment would deviate from the I-15 freeway corridor, culverts would be installed at natural drainage features. Drainage facilities would be sized accordingly to accommodate adequate peak flows to reduce erosion or other downstream effects. Where the rail alignment would divert from the existing I-15 freeway, such as within the Ivanpah Valley just north of Mountain Pass, the Preferred Alternative would include clear span crossings for all ephemeral drainages equal to or greater than four feet in width (as measured by the distance between the ordinary high water mark on each side of the drainage). The crossings would retain natural, earthen bottoms to minimize changes to the natural flow, erosion, and sedimentation patterns. **Figure F-3.8-7** shows the preliminary location of ephemeral drainage crossings within the Ivanpah Valley area.

As the Preferred Alternative would use the EMU train technology, 17 autotransformers are required at points along the alignment. One of these, (Autotransformer #7) would be located adjacent to Telephone Wash and may result in a minor alteration to that drainage.

The Victorville Station would impact a portion of Bell Mountain Wash and would alter the existing drainage pattern to accommodate the station and parking areas. If drainage systems are not properly designed, the Victorville Station could experience periodic flooding. The nearby Victorville OMSF site would affect approximately 825 linear feet of water resources and bisect two small washes that connect to Bell Mountain Wash. Depending on the design of the OMSF, these washes may be altered and result in flooding on the west side of the site is drainage facilities are not properly designed.

The rail alignment would directly affect channels and ephemeral washes, including the Mojave River. The rail alignment would cross the Mojave River bed immediately adjacent to the north of the existing southbound I-15 bridge in Barstow. Due to the width of the Mojave River in this location, concrete pillars would be necessary to support the new bridge, thus creating the potential to redirect flows. At this location, the Mojave River runs primarily underground. While the placement of columns within the riverbed could affect underground flows, such an effect would be minimized due to the low number and wide spacing of columns, similar to those of the existing I-15 freeway bridges.

As for other affected channels, streams, and washes, it is assumed that culverts would be provided; no change to the bed elevation, to the ability of the waterways to convey water, or to the ability to convey flood flows would occur. The crossings of these water resources would not permanently alter the course or flows. Furthermore, runoff from the Preferred Alternative rail alignment would be directed away from the trackway.

There is a potential that tunneling in the Clark Mountains could result in the redirection of some surface water that currently permeates into the area's groundwater system. However, the amount of water that could be potentially redirected is considered minimal in comparison to the overall surface flow that would continue to recharge the current groundwater system. No riparian habitat would be impacted by the Preferred Alternative rail alignment in this location.

Direct Temporary Effects (Construction)

Construction of the Preferred Alternative would involve the use of heavy earth moving equipment. Use of such equipment could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind. Most natural erosion occurs at slow rates; however, the rate increases when the land is cleared or altered and left disturbed. In many locations, construction activities would remove the protective cover of vegetation, thereby increasing the likelihood of erosion.

Sheet erosion occurs when length and runoff velocity increase slope erosion on disturbed areas. As runoff accumulates, it concentrates into rivulets that cut grooves (rills) into the soil surface. If the flow is sufficient, these rills could develop into gullies causing sedimentation to local waterways. Similar impacts may also occur at TCAs where construction staging, equipment, and stockpiling would occur.

Place Housing or Structures within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows

Direct Permanent Effects

Portions of the Preferred Alternative would cross or be located adjacent to the 100-year floodplain of either the Mojave River, or specified washes along the Preferred Alternative area. **Table F-3.8-3** shows the direct impacts of the Preferred Alternative to the 100-year floodplain, distinguishing between the termination at the Las Vegas Southern Station or the Las Vegas Central Station B.

Table F-3.8-3 Direct Permanent Impacts to the 100-Year Floodplain

Preferred Alternative Component	Acres
Rail Alignment	45.3 (terminating at Las Vegas Southern Station) 51.1 (terminating at Las Vegas Central Station B)
Victorville Station	0
Victorville OMSF	0
Las Vegas Station (Southern Station or Central Station B)	0
Las Vegas MSF	5.1
Frias Substation	0.86
Utility Corridor (Baker MOW)	0.42
Utility Corridor (Victorville Station)	0
Total	51.68 (terminating at Las Vegas Southern Station) 57.48 (terminating at Las Vegas Central Station B)

Source: ICF, 2011.

Where the Preferred Alternative crosses the Mojave River, the bridge or structure that would cross has been designed to not impede or redirect flows within the adjacent/associated 100-year floodplain. Accordingly, minimal impact is anticipated at this location.

The Preferred Alternative rail alignment would cross the 100-year floodplain of Silver Lake and Soda Dry Lake when passing through Baker. These two lakes remain dry for most of the year, but in the event of a 100-year storm, the trackway could be submerged or impede and redirect flood flows. Portions of the Preferred Alternative rail alignment would cross or bank up against the 100-year floodplain north of Jean as well as at multiple drainages in the metropolitan Las Vegas area, including along the I-15 freeway, Duck Creek and Tropicana Wash. While the rail alignment would be elevated through most of the urban area of Clark County and Las Vegas, column placement would likely fall within the floodplain. The Preferred Alternative Las Vegas MSF (Wigwam Avenue MSF) site and a portion of the Frias Substation would also fall within the 100-year floodplain.

The Preferred Alternative rail alignment terminating at the Las Vegas Central Station B would result in additional impacts to the 100-year floodplain when compared to the Preferred Alternative rail alignment terminating at the Las Vegas Southern Station, since use of the Las Vegas Central Station B would require approximately two additional miles of trackway.

Direct Temporary Effects (Construction)

Construction would have the potential to result in temporary impacts to the 100-year floodplain and pose a risk to equipment, workers, and structures. None of the TCAs associated with construction of the Preferred Alternative would be within a 100-year floodplain. Within the limits of construction, components of the Preferred Alternative would have the potential to increase the size of the 100-year floodplain and impede or redirect flood flows depending on activity occurring within specific areas.

The Preferred Alternative rail alignment with termination at the Las Vegas Southern Station would result in fewer construction period effects associated with the 100-year floodplain than with termination at the Las Vegas Central Station B due to the shorter trackway. With termination at the Las Vegas Southern Station, construction activities north of Russell Road would not be required.

Create or Contribute Runoff Water That Would Exceed the Capacity of Existing or Planned Stormwater Drainage Systems, or Provide Substantial Additional Sources of Polluted Runoff

Direct Permanent Effects

As noted above, the Preferred Alternative would include drainage elements along the proposed trackway that would channel stormwater runoff away from the trackway. Runoff produced along the elevated rail alignment would be captured and directed to existing designated drainage features. For at-grade portions of rail alignment, the

trackway would not produce any considerable amount of runoff given the permeable nature of construction on ballast rather than paved or solid impervious surfaces. Refer to **Section 3.4.2** of this Final EIS for a discussion of stormwater conveyance systems.

Table F-3.8-4 shows the peak discharge for the 100-year 24-hour storm event for the Preferred Alternative station and maintenance facilities. The Preferred Alternative Las Vegas Southern Station site option would create additional runoff from parking and paved surfaces; the site is currently unimproved and unpaved. The Preferred Alternative Las Vegas Central Station B site option would be developed on existing paved, impervious surfaces and would not result in substantially more runoff than what currently exists at the site. The total peak discharge for the 100-year 24-hour storm event would vary, depending on whether the Preferred Alternative Las Vegas Southern Station or Central Station B site option is selected. The Preferred Alternative with the Las Vegas Southern Station would result in greater peak discharge than would the Preferred Alternative with the Las Vegas Central Station B, primarily due to the larger size of the Southern Station. The Southern Station site is about 62 acres in area; the Central Station B site is about 37 acres in area.

The rational method was used to calculate the peak discharge (100-year 24-hour storm event) for the facilities. The dimensionless runoff coefficient used was 0.72 and the rainfall intensity that was used was 2.93 inches.[17]

Table F-3.8-4 Peak Discharge for the 100-Year 24-Hour Storm Event

Preferred Alternative Component (Stations and Maintenance Facilities)	Cubic Feet Per Second (cfs)
Victorville Station	275
Victorville OMSF	48
Las Vegas Station	131 (Southern Station) 86 (Central Station B)
Las Vegas MSF	8.5
Total	462.5 (terminating at Las Vegas Southern Station) 417.5 (terminating at Las Vegas Central Station B)

Source: ICF, 2011.

Groundwater recharge in the area primarily occurs within the ephemeral drainages during the infrequent storm flows. The Preferred Alternative's impact on ephemeral drainages is relatively limited and there are numerous other locations in the watersheds for

[17] U.S. Department of Commerce, 2008.

groundwater recharge to occur that would not be affected by the Preferred Alternative. As a result, the increase in impervious surface associated with the project would not substantially affect groundwater levels.

Direct Temporary Effects (Construction)

The Preferred Alternative may result in additional sources of polluted runoff during construction which could impact water quality particularly on and around the TCA sites and within the limits of construction influence.

Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability

Direct Permanent Effects

The operation of the Preferred Alternative would not use surface or groundwater resources. The water that is required at Victorville Station and OMSF and the Las Vegas Station site options and MSF would be obtained from existing water utility service providers. Potential effects of the Preferred Alternative related to water service are discussed in **Section 3.4.2** of this Final EIS.

Direct Temporary Effects (Construction)

Construction of the Preferred Alternative would require water for concrete batching, washing vehicles and equipment, and dust control. The Applicant has not identified a source(s) of water from construction activities. It is assumed that water for construction will be obtained from existing commercially available sources such as water utility service providers in the Preferred Alternative area.

3.8.2.4 Comparison with Other Action Alternatives

Table F-3.8-5 below compares the impacts to hydrological resources of the various action alternatives evaluated, as well as the No Action Alternative. Components of the Preferred Alternative are highlighted in yellow.

The Preferred Alternative rail alignment would primarily implement the Action Alternative B options, where the rail alignment would be located immediately adjacent to the existing I-15 freeway within the I-15 freeway ROW.

The Action Alternative A rail alignment options, which would be primarily located within the median of the I-15 freeway, would have the potential for direct permanent impacts of up to 8,441 linear feet of hydrologic resources. The Preferred Alternative rail alignment would have the potential to result in direct permanent impacts to about 17,626.53 linear feet of hydrologic resources. Compared to the Preferred Alternative, Alternative A would have less potential direct permanent impact due to its location within the I-15 freeway median.

Table F-3.8-5 Alternatives Comparison – Hydrology and Water Quality

Alternative	Linear Feet of Impact to Water Resources (Permanent)[18]	Acres Within a 100-Year Floodplain	Result in Substantial Drainage Pattern Alteration	Estimated Peak Stormwater Discharge (cubic feet/second)
No Action Alternative	Assumed similar to Action Alternatives	Assumed similar to Action Alternatives	Not expected	N/A
Alignment Routings, including Temporary Construction Areas (TCAs) and Alignment Adjustment Areas				
Segment 1 Routing				
Segment 1 (connecting to Segment 2A/2B)	2,491	2.8	No	N/A
Segment 1 (connecting to Segment 2C)	2,259	5.71	No	N/A
Segment 2				
Segment 2A/2B, 2A	1,157	12	No	N/A
Segment 2A/2B, 2B	11,064	22	No	N/A
Segment 2C	2,344 (Side Running) 2,342 (Median)	11 (Side Running) 10 (Median)	No	No
Segment 3				
Segment 3A	4,059	0	No	N/A
Segment 3B (Modified)	7,608	2.7	No	N/A

[18] This information relates to the total linear feet of impact from the No Action Alternatives and the individual components of the Action Alternatives. With regard to impacts to waters of the US, refer to **Table 1** within the Project Background and Executive Summary chapter of this Final EIS.

Alternative	Linear Feet of Impact to Water Resources (Permanent)[18]	Acres Within a 100-Year Floodplain	Result in Substantial Drainage Pattern Alteration	Estimated Peak Stormwater Discharge (cubic feet/second)
Segment 4				
Segment 4A	734	0	No	N/A
Segment 4B	319	0	No	N/A
Segment 4C	1,485	0	No	N/A
Segment 5				
Segment 5A	0	0	No	N/A
Segment 5B	0	0.9	No	N/A
Segment 6				
Segment 6A (terminating at Las Vegas Southern Station)	0	0	No	N/A
Segment 6A (terminating at Las Vegas Central Station B)	0	0	No	N/A
Segment 6B (terminating at Las Vegas Southern Station)	3,930.53	28.92	No	N/A
Segment 6B (terminating at Las Vegas Central Station B)	3,930.53	34.72	No	N/A
Segment 6C	77	2.06 to 2.62	No	N/A
Segment 7				
Segment 7A	0	0	No	N/A
Segment 7B	0	0	No	N/A
Segment 7C	0	0	No	N/A

Alternative	Linear Feet of Impact to Water Resources (Permanent)[18]	Acres Within a 100-Year Floodplain	Result in Substantial Drainage Pattern Alteration	Estimated Peak Stormwater Discharge (cubic feet/second)
Victorville Station and Maintenance Facility Site Options				
Victorville Station Site 1	0	13.5	No	227
Victorville Station Site 2	0	0	No	243
Victorville Station Site 3	2,275 (VV3A) 2,075 (VV3B)	0	Yes (Mitigated)	275 (VV3A) 235 (VV3B)
Victorville OMSF 1	12	1.9	No	Mostly unpaved (not quantified)
Victorville OMSF 2	825	0	Yes (Mitigated)	Mostly unpaved (not quantified)
Las Vegas Area Station and Maintenance Facility Site Options				
Las Vegas Southern Station	0	0	No	131
Las Vegas Central Station A	0	0	No	69
Las Vegas Central Station B	0	0	No	86
Las Vegas Downtown Station	0	0	No	49
Sloan Road MSF[19]	0	0	No	Mostly unpaved (not quantified)
Relocated Sloan MSF	0	0	No	Mostly unpaved (not quantified)
Wigwam Avenue MSF	0	5.1	0	Mostly unpaved (not quantified)

[19] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was intended to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Alternative	Linear Feet of Impact to Water Resources (Permanent)[18]	Acres Within a 100-Year Floodplain	Result in Substantial Drainage Pattern Alteration	Estimated Peak Stormwater Discharge (cubic feet/second)
Robindale Avenue MSF	0	0	No	Mostly unpaved (not quantified)
Frias Substation	50	0.86	No	Mostly unpaved (not quantified)
Other Facility				
Baker Maintenance of Way Facility	0	0	No	N/A
Technology Options, Including Utility Corridors and Autotransformers (EMU Only)				
DEMU (Diesel-Electric Multiple Unit)	None	None	None	N/A
EMU (Electric Multiple Unit)	274 (VV3 and Baker MOW Utility Corridors)	0.42 (Baker MOW Utility Corridor)	Autotransformers 7 and 11 (alteration)	N/A

Source: CirclePoint, 2011.

Specifically, the Preferred Alternative Segment 4C rail alignment, which would diverge from the existing I-15 freeway corridor, would introduce greater effects to hydrologic resources than would Segment 4A, which would more closely follow the existing I-15 freeway. New culverts and drainage connections would be required for the Preferred Alternative rail alignment, where as the Segment 4A rail alignment would have the potential to connect with the existing I-15 drainage facilities.

For waters of the US, the Preferred Alternative Segment 4C rail alignment would directly impact 0.59 acres while as Segment 4A would directly impact 1.81 acres.

In terms of flooding effects, Action Alternative A rail alignments would result in up to about 15 acres of direct permanent impacts to the 100-year floodplain while the Action Alternative B rail alignments would result in up to about 63 acres of direct permanent impacts (assuming the longest length of the rail alignment with termination at the Las Vegas Central Station B). The Preferred Alternative rail alignment would result in about 45.3 to 51.1 acres of direct permanent impacts to floodplains, with termination at the Las Vegas Southern Station or Las Vegas Central Station B, respectively. Thus, the Preferred Alternative would result in great effects to floodplains than would the compiled Action Alternative A rail alignments, and slightly less than the compiled Action Alternative B rail alignments.

The Preferred Alternative Victorville Station would affect more linear feet of water resources than would VV1 and VV2. The Preferred Alternative Victorville Station would be placed within an existing wash – Bell Mountain Wash, where as VV1 and VV2 would not result in any stream or drainage crossings. The Preferred Alternative Victorville Station would introduce a greater amount of impervious surface than would VV1 since more surface parking would be incorporated at the Preferred Alternative station site. This larger amount of impervious surface would result in greater amounts of stormwater runoff as compared to VV1. As compared to VV2, the Preferred Alternative Victorville Station would introduce a slightly smaller amount of impervious surfaces and would result in lesser amount of stormwater runoff. However, the Preferred Alternative Victorville Station would eliminate potential impacts to riparian vegetation along the Mojave River and impacts to the 100-year floodplain associated with VV1.

The Preferred Alternative Las Vegas Southern Station would introduce a greater amount of impervious surface than the Preferred Alternative Las Vegas Central Station B or the other two site evaluated (Central Station A and Downtown). This larger amount of impervious surface would result in greater amounts of stormwater runoff at the Preferred Alternative Las Vegas Southern Station site option than the other Las Vegas Station site options. The Downtown Station would result in the least amount of stormwater runoff. None of the Las Vegas Stations would affect any water resources or the 100-year floodplain.

The Preferred Alternative Las Vegas MSF would have the greatest effects relative to flooding than the Robindale Avenue MSF, Sloan Road MSF, and the Relocated Sloan MSF, since the Preferred Alternative Las Vegas MSF would be the only facility located within the 100-year floodplain. None of the Las Vegas MSFs would affect any water resources.

3.8.3 MITIGATION MEASURES FOR THE PREFERRED ALTERNATIVE

Mitigation Measures HYD-1 through **HYD-11** identified in **Section 3.8.5** of the Draft EIS would be applied to the Preferred Alternative to reduce the potential adverse effects related to hydrology and water quality. The Record of Decision for the Preferred Alternative will incorporate these mitigation measures, making them conditions of approval needed to construct and operate the Preferred Alternative. These mitigation measures are included below.

As stated in **Section 3.8.1** above, the Applicant has also initiated the CWA Section 404 permitting process with the USCAE in May 2010. The CWA Section 404 established a program to regulate the discharge of dredged or fill material into waters of the US, including wetlands. As part of this CWA Section 404 permitting process, the Applicant prepared six formal jurisdictional delineation reports for the Death Valley, [20] the Cuddeback Lakes watershed,[21] the Ivanpah Valley area, [22] the Jean Dry Lake area,[23] the Las Vegas watershed,[24] and the Roach Dry Lake area.[25] These six delineation reports are included as **Appendix F-I** to this Final EIS. Issuance of a permit for the discharge of fill material into waters of the US associated with construction of the DesertXpress project will be part of the CWA Section 404 permit process administered by the USACE. In addition to the CWA Section 404 permit, the Applicant will apply for certification under

[20] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California. July 2010.

[21] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California. July 2010.

[22] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California. July 2010.

[23] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada. July 2010.

[24] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Las Vegas Watershed, Clark County, Nevada. July 2010.

[25] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

Section 401 of the CWA.[26] Section 401 Certification is administered in California through the Regional Water Quality Control Boards (in the case of the DesertXpress project the Lahontan Regional Water Quality Control Board) and in Nevada by the Nevada Division of Environmental Protection. Issuance of the CWA Section 404 permit by the USACE, and Section 401 Certification, are anticipated to follow issuance of the Records of Decision on the project by the Cooperating Agencies. The Applicant will be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit and Section 401 Certification, as well as **Mitigation Measures HYD-1** through **HYD-11** below.

Mitigation Measure HYD-1: Incorporate Site-Specific Permanent Water Quality Treatment Devices

To protect water quality, permanent water quality treatment devices shall be installed. Examples of water quality best management practices (BMPs) may include a vegetated swale, traction sand traps, or settling basin to help remove sediments and nutrients. Such BMPs shall be sized properly and designed by a registered professional engineer and shall not allow untreated stormwater runoff to reach the Mojave River or any washes along the alignment including the urbanized area of Las Vegas.

Mitigation Measure HYD-2: Implement Construction-Related Best Management Practices

Construction activities shall begin with the installation of erosion control BMPs. In the final construction plans, the Applicant shall identify specifications of BMPs for grading and erosion control that are necessary to reduce erosion and sedimentation. These BMPs shall be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. Standard erosion control measures, such as management, structural, and vegetative controls, shall be implemented for all construction activities that expose soil. BMPs to be implemented as part of this mitigation measure may include, but are not limited to, the following measures:

Temporary erosion control measures that would apply to construction of the stations, maintenance facilities and the rail (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) shall be employed to control erosion from disturbed areas. Grass or other vegetative cover shall be

[26] Under federal CWA Section 401, every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with USACE CWA section 404 permits for dredge and fill discharges.

established on the construction site as soon as possible after disturbance. Erosion in disturbed areas shall be controlled by grading so that direct routes for conveying runoff to drainage channels are eliminated.

The general contractors and subcontractors conducting the work shall construct or implement, regularly inspect, and maintain the BMPs in the construction plans. Some methods of Construction BMPs for rail installation that shall be included in the Preferred Alternative are:

- Install erosion control material consisting of silt fences along the outside limits of construction on both sides of the disturbance corridor for track construction;
- Clear the construction area of brush and vegetation;
- Strip any topsoil and transport it to stockpile;
- Excavate material as required to extend any culverts using good quality material as fill and transport poor quality material to stockpile;
- Place quality fill material to establish the subgrade;
- Install the sub-ballast on the subgrade, composed of crushed rock that has sufficient strength to withstand settling from loads;
- Place standard rail ties, made of wood or concrete, on the sub-ballast, then place the rail on the ties, and anchor the rail to the ties;
- Bring in ballast and dump ballast rock between and along the sides of the track; and
- Use a tamper to raise the track and tamp the ballast beneath the ties.

Mitigation Measure HYD-3: Comply with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit

The Applicant shall obtain coverage under the NPDES Construction General Permit. Most construction projects that disturb one acre of land or more are required to obtain coverage under the NPDES Construction General Permit, which required the property owner to file a Notice of Intent to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP).[27] Implementing the requirements in the NPDES Construction General Permit will reduce or eliminate construction-related water quality effects. The Applicant shall ensure that construction activities comply with the conditions in this permit, which will require preparation of a stormwater pollution prevention plan (SWPPP), implementation of BMPs identified in the SWPPP, and monitoring to ensure that effects on water quality are minimized.

[27] CWA Section 402 regulates discharges to surface waters through the NPDES program, administered by the US EPA. Draft EIS **Section 3.8.1.1** includes a detailed discussion of the NPDES program.

Mitigation Measure HYD-4: Implement SWPPP

The implementation of the SWPPP described above will reduce the likelihood that stormwater will carry any spilled contaminants to water channels. Implementation of the SWPPP along with the following mitigation measures will reduce construction related impacts. **Mitigation Measure HYD-5** addresses the potentiality of a spill during construction.

Mitigation Measure HYD-5: Implement Spill Prevention, Control, and Countermeasure Plan

The Applicant shall develop a spill prevention, control, and countermeasure plan (SPCCP) to prevent accidental releases of chemicals that are stored on site and measures to use in the case of a spill. The BMPs described in this plan shall apply to construction activities and operation activities.

The Applicant shall implement appropriate hazardous material management practices identified in the SPCCP to reduce the potential for chemical spills or releases of contaminants, including any non-stormwater discharge to drainage channels. If a spill occurs, cleanup, containment, and response measures in the SPCCP shall be implemented by the Applicant.

The Federal reportable spill quantity for petroleum products, as defined at 40 CFR 110 is any oil spill that (1) violates applicable water quality standards, (2) causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

If a spill is reportable, a superintendent shall notify appropriate agencies and the contractor will need to take action to contact any other appropriate safety and clean-up crews to ensure the SPCCP is followed. A written description of reportable releases shall be submitted to the appropriate agency. This submittal shall include a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The release shall be documented on a spill report form.

Mitigation Measure HYD-6: Proper Design of Drainage Systems

Most of the rail segments would not result in a large amount of impervious surface that could concentrate and redirect stormwater flow causing onsite erosion. Runoff from the rail alignment would be captured and directed to existing designated drainage features. Where necessary, the Applicant shall redesign and resize the existing drainage facilities to accommodate the potential increase in runoff along the rail alignment. The Preferred Alternative rail alignment shall

connect with and mirror the existing culverts along the I-15 freeway. Where the rail alignment deviates from the I-15 freeway, the Applicant shall install culverts at natural drainage features.

However, the stations and maintenance facilities would have parking lots that could concentrate and redirect stormwater flows. In order to determine the adequate size of drainage facilities, the total increase in impervious surface of the design of the facilities shall be included in a Rational Method (a way of calculating flow intensity) calculation to determine the increase in peak storm discharges resulting from the action alternatives. The 100-year, 24-hour storm event shall be used to determine the appropriate size of drainage facilities needed for the action alternatives. Drainage facilities shall retain flows and not contribute to additional flows in the Mojave River or other streams and washes. This could be achieved with several detention basins.

Drainage facilities for both the rail alignment and station and maintenance facilities will need to be sized accordingly to handle adequate flow. It is important to note that when a culvert is used, the footprint of the rail will need to be reinforced with rip-rap, and the culvert will need to be large enough to handle the 100-year 24-hour storm flow so on site flooding can be avoided. Other drainage features such as bridge crossings will need to be designed to not increase the size of the floodplain.

The Applicant shall create either a new ephemeral drainage or restore, where feasible, through the reestablishment of former ephemeral drainages to compensate for temporary construction impacts to waters of the US. The Applicant shall be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit and Section 401 Certification, as well as **Mitigation Measures HYD-1** through **HYD-11** stipulated in this Final EIS.

Mitigation Measure HYD-7: Reduce Encroachment into the 100-Year Floodplain

When Preferred Alternative features are located within the 100-year floodplain, the base elevation of rail and stations, including maintenance facilities, should be elevated above the 100-year floodplain or relocated within the facility footprint or APE to avoid any impact. Portions of the rail alignment may utilize track support columns that are located in the 100-year floodplain. Specific engineering plans and modeling, using Hydraulic Engineering Centers-River Analysis System (HEC-RAS), or similar, shall be completed by a registered professional during the design-build process. The design plans shall incorporate all feasible recommendations of the HEC-RAS analysis.

Mitigation Measure HYD-8: No Storage of Construction Equipment or Materials within the 100-Year Floodplain

The Applicant shall not store construction equipment or materials within the limits of influence that are located in areas of the 100-year floodplain so as to avoid redirecting 100-year flood flows that could cause structural damage or pose a safety risk to workers.

Mitigation Measure HYD-9: Minimize Impact of OMSF 2 (Preferred Alternative Victorville OMSF) on Water Resources

During the design-build process, the Preferred Alternative Victorville OMSF (OMSF 2) tracks and facilities shall be designed by the Applicant to avoid or bridge over the two small washes that feed into the Bell Mountain Wash (applies to Segment 1 only).

Mitigation Measure HYD-10: Minimize Impacts of Autotransformers 7 and 11 on Water Resources

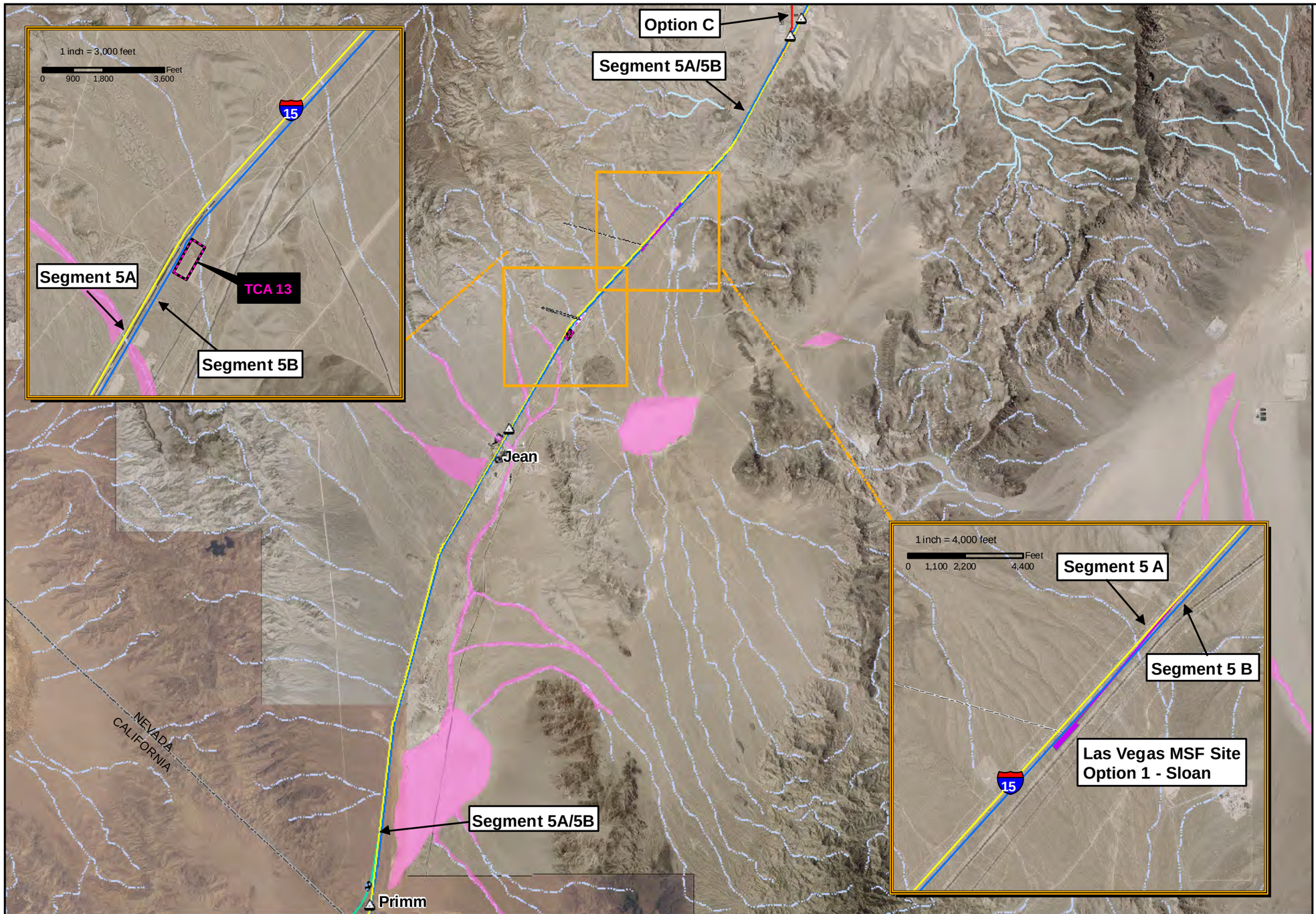
During the design-build process, the Applicant shall relocate autotransformers 7 and 11 within the limits of influence to avoid Telephone Wash and Kali Ditch, respectively, and to avoid other water resources (applies to Segment 3 only).

Mitigation Measure HYD-11: Minimize Impacts on Water Availability

During construction of the action alternatives, the Applicant shall obtain water from existing commercially available water sources. New groundwater wells or surface water impoundments would require subsequent environmental review as well as federal, state and local permits as appropriate and legally required.

3.8.4 Residual Impacts Following Mitigation

Although **Mitigation Measures HYD-1** through **HYD-11** would reduce construction and operational period effects to water resources, development of the Preferred Alternative would result in permanent impacts to existing channels, streams, drainages, and ephemeral washes whereby flows could be redirected. The Preferred Alternative would also result in an overall increase in impervious surface, which could increase the stormwater runoff in the project region.



Legend

Hydro Features
- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

DesertXpress Alignments
- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

Ancillary Facility Sites
- Text Project Modifications and Additions
- Station Options
- Maintenance Facility Options
- Temporary Construction Areas (TCAs)
- Autotransformer (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)

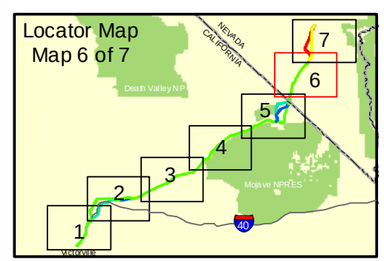
1 inch equals 2.5 miles

0 0.45 0.9 Kilometers

0 0.45 0.9 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP



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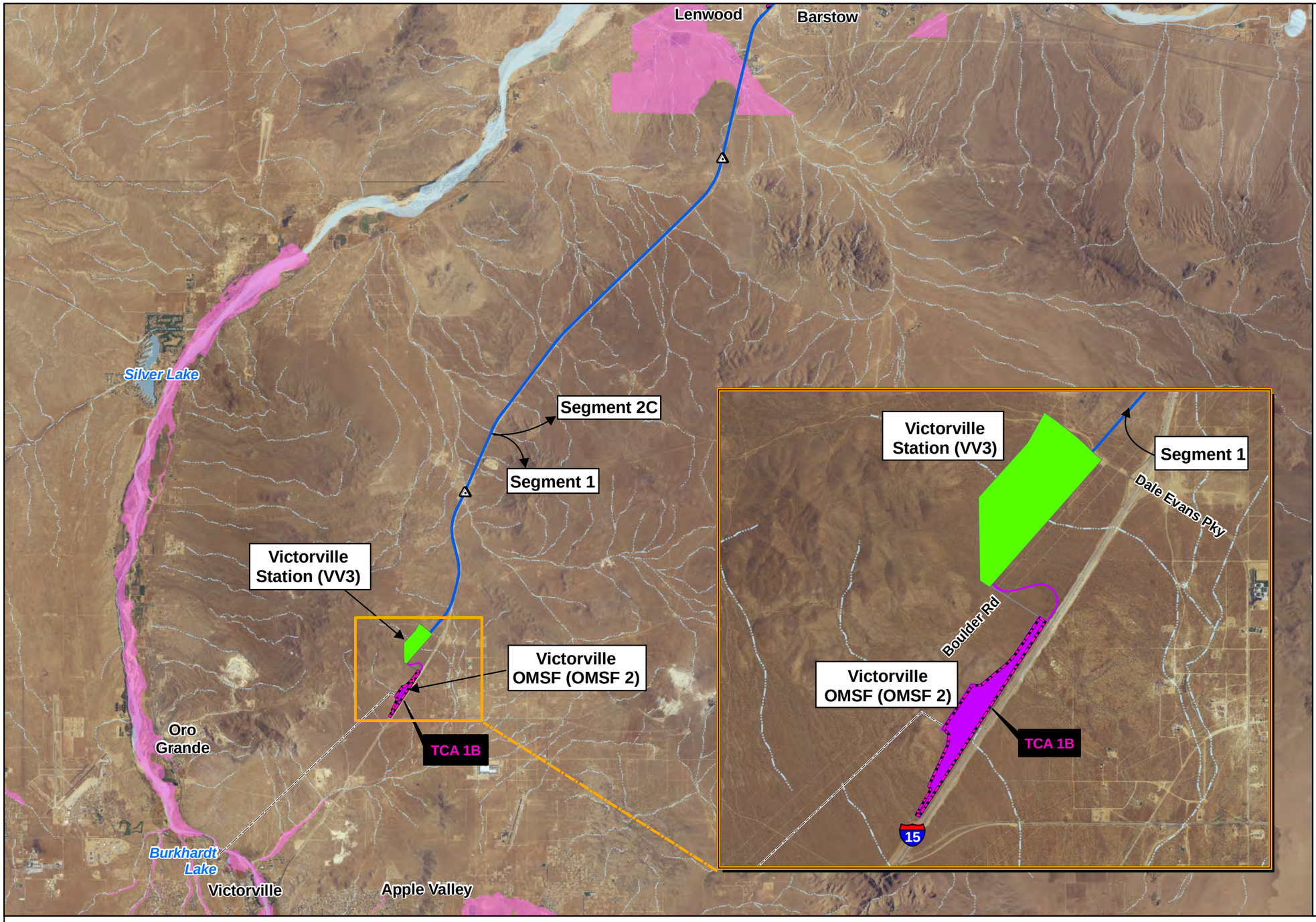
Revision of Draft EIS Figure 3.8-6: Hydrology and Floodplains (6)

FIG **F-3.8-1**

Geografika Consulting 01.27.11

* This figure, originally in the Draft EIS, has been revised to show the FEMA-designated floodplains within the vicinity of Segment 5.



Legend

Hydro Features

- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

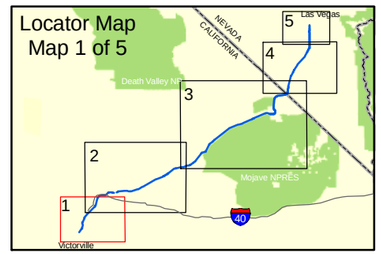
1 inch equals 3 miles

Kilometers: 0 2 4

Miles: 0 1.5 3

NORTH

Source: DesertXpress 2008, ESRI 2005, CirclePoint 2008-2011, NAIP 2003-2006,



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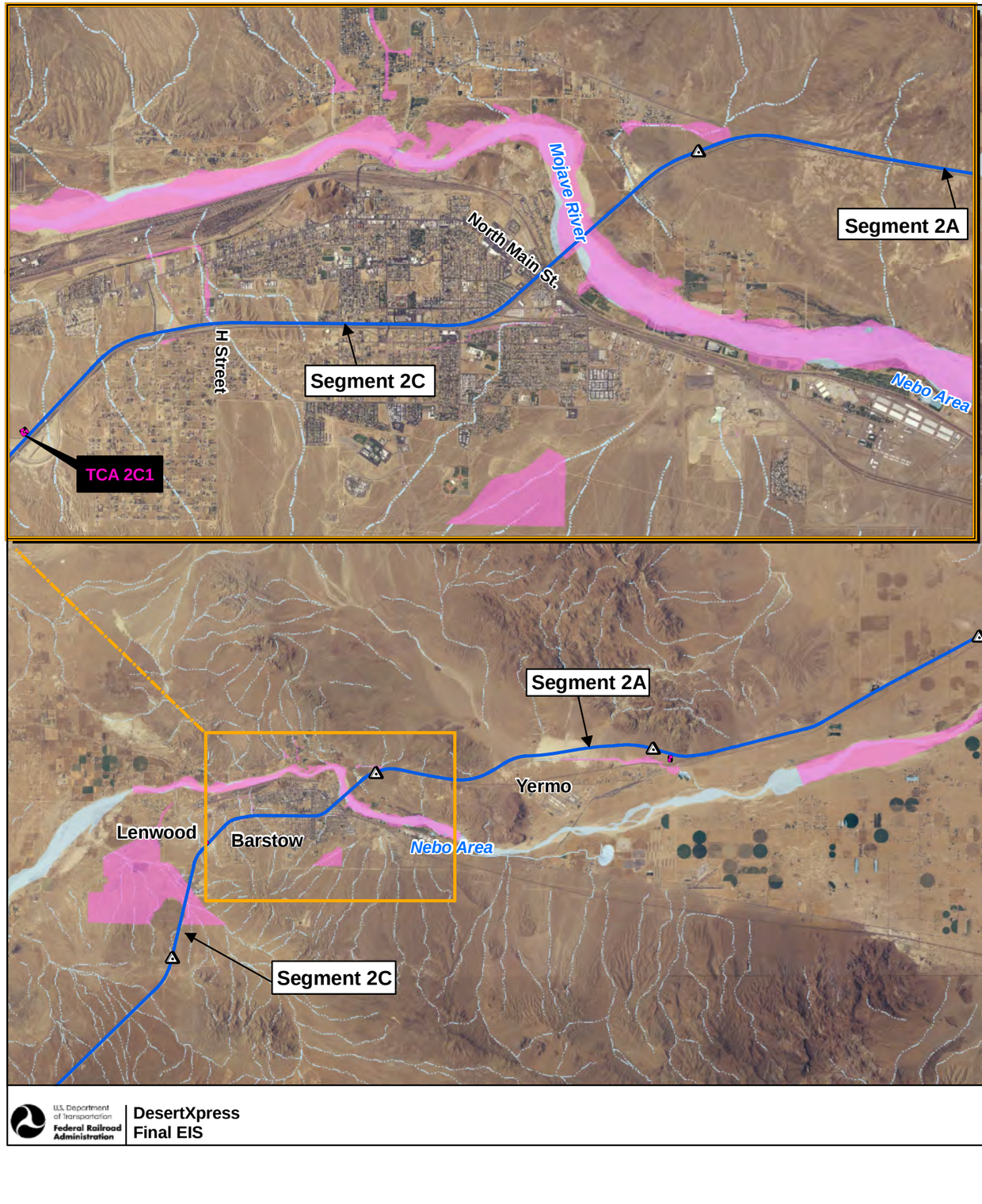
Hydrology and Floodplains (1)

FIG F-3.8-2

Geografika Consulting 01.17.11



Legend

Hydro Features

- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

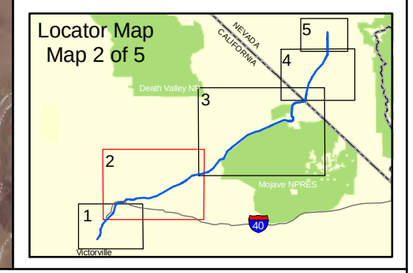
1 inch equals 4 miles

NORTH

0 5 10 Kilometers

0 4 8 Miles

Source: ICFI 2009, ESRI 2005, DesertXpress 2008, NAIP and DOQQ Imagery



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Hydrology and Floodplains (2)

FIG **F-3.8-3**

Geografika Consulting 01.17.11

TCA 4C5
Segment 4C
TCA 4C4
Ivanpah Dry Lake
Ivanpah Ditch
TCA 4C3
TCA 4C2
Wheaton Wash
TCA 4C1
Segment 5B
Segment 4C
Primm
NEVADA
CALIFORNIA
15
Segment 3B
Halloran Springs
Baker
127
Pand Ditch
Baker Inn Ditch
TCA 9
Baker Blvd.
Segment 3B
Baker MOW
Baker
1 3 B

Legend

Hydro Features
- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

DesertXpress Alignment
- Preferred Alternative

Ancillary Facilities
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals 5 miles

Kilometers
0 3 6

Miles
0 2.5 5

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

Locator Map
Map 3 of 5
NEVADA
CALIFORNIA
Death Valley NP
Mojave NPRES
Victorville
1
2
3
4
5
40

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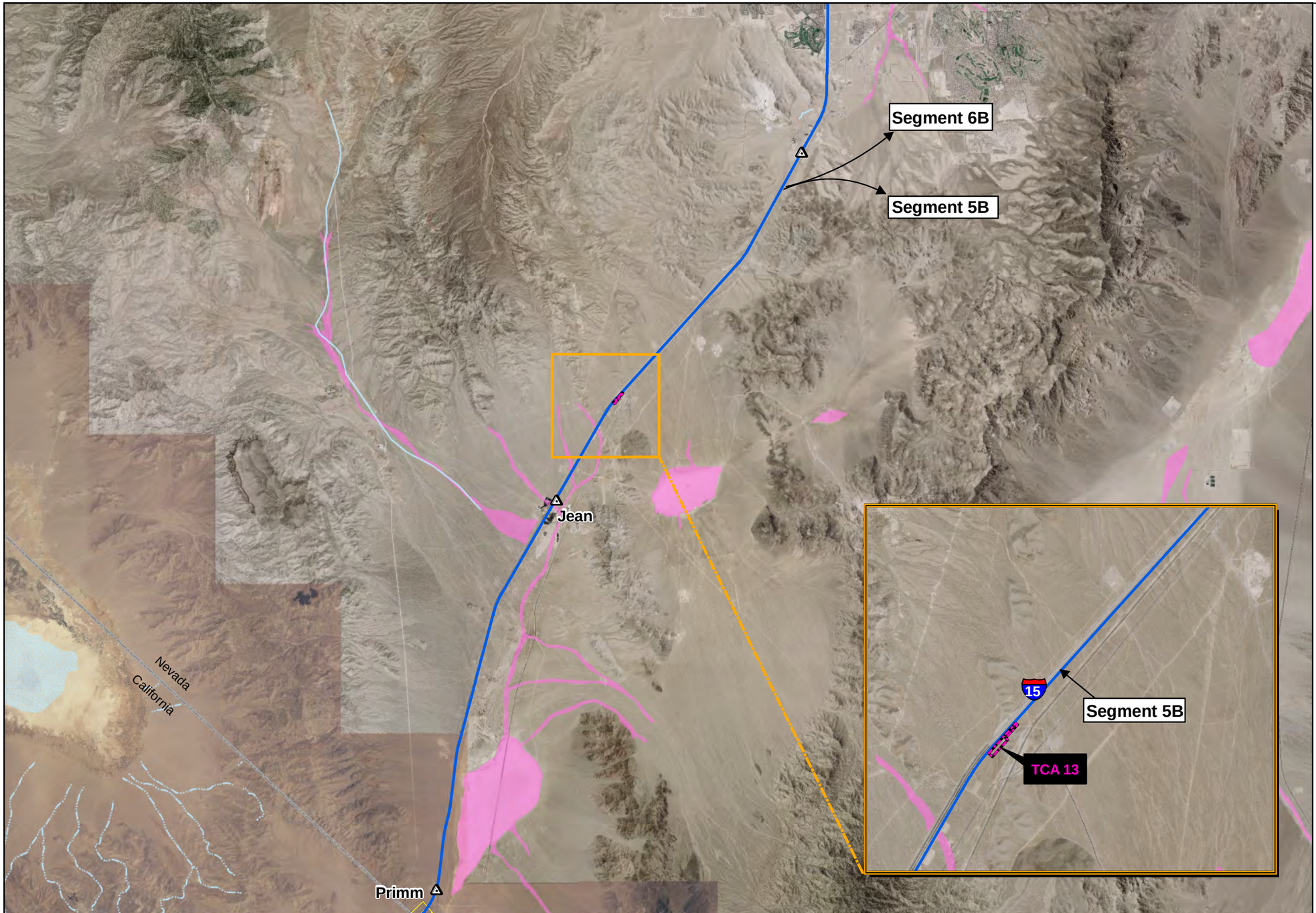
Hydrology and Floodplains (3)

FIG **F-3.8-4**

Geografika Consulting 01.17.11



Legend

Hydro Features
- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

DesertXpress Alignment
- Preferred Alternative

Ancillary Facilities
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

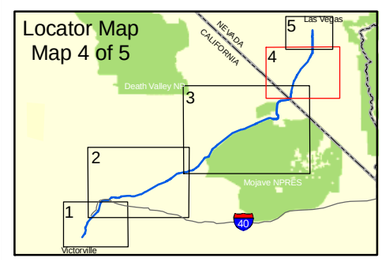
1 inch equals 3 miles

NORTH

0 2.5 5 Kilometers

0 3 6 Miles

Source: ICFI 2009, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery



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Hydrology and Floodplains (4)

FIG **F-3.8-5**

Geografika Consulting 01.17.11

TCA 22

Las Vegas Central Station B

E. Tropicana Ave

Las Vegas Blvd

Las Vegas Southern Station

TCA 16

W. Russell Rd

McCarran International Airport

Las Vegas Central Station B

Las Vegas Southern Station

Segment 6 B

15

Robindale Ave.

160 NEVADA

Wigwam Avenue MSF

Segment 6B

Segment 6 B

Frias Substation

Legend

Hydro Features

- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

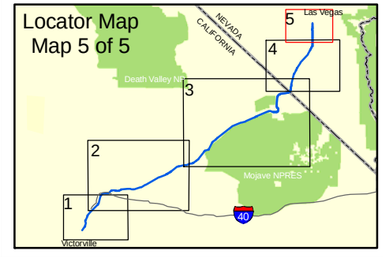
1 inch equals 2 miles

0 1.25 2.5 Kilometers

0 1 2 Miles

NORTH

Source: ICFI 2009, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery



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Hydrology and Floodplains (5)

FIG F-3.8-6

Geografika Consulting 02.28.11

U. S. Department of Transportation
Federal Railroad Administration

DesertXpress Final EIS

Location of Ephemeral Drainages, Preferred Alternative - Segment 4C

FIG **F-3.8-7**

Source: ICF International, 2010.

3.9 GEOLOGY AND SOILS

This section describes the updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential geology and soils impacts associated with the Preferred Alternative and identifies appropriate mitigation measures to reduce or avoid adverse impacts.

3.9.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, includes all comments on the Draft EIS and Supplemental Draft EIS. However, no comments were received during the public review period that required changes to the geology and soils analysis contained in the Draft EIS and Supplemental Draft EIS.

3.9.1.1 Affected Environment

Section 3.9.3 of the Draft EIS and **Section 3.9.1** of the Supplemental Draft EIS describe in detail the affected environment for geology and soils for the DesertXpress project. The general geology and soils risks associated with the 200-mile study area corridor have not changed since publication of the Draft EIS and Supplemental Draft EIS. Thus the affected environment discussions from these previous documents remain applicable to the Preferred Alternative.

3.9.1.2 Regulatory Environment

The regulatory environment for geology and soils for the DesertXpress project is described in detail in **Section 3.9.1** of the Draft EIS. There have been no changes to the Regulatory Environment regarding geology and soils since publication of the Draft EIS and Supplemental Draft EIS. Thus the regulatory environment discussions from these previous documents remain applicable to the Preferred Alternative.

3.9.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

No comments were received during the public review period that required changes to the geology and soils analysis contained in the Draft EIS and Supplemental Draft EIS.

3.9.2 ANALYSIS OF ENVIRONMENTAL CONSEQUENCES

3.9.2.1 Methods of Evaluation

The geology and soils impact methodology described in **Section 3.9.2** of the Draft EIS remains applicable to this Final EIS and the evaluation of the Preferred Alternative. This evaluation involved the review of readily available geologic and seismic literature, maps, conceptual plans of the action alternatives, and other relevant information.

Information in this section is based on a geotechnical evaluations prepared by Ninyo & Moore, as included in **Appendix F-J** of this Final EIS.[1]

3.9.2.2 No Action Alternative

The No Action Alternative would not involve the construction and operation of the high-speed train and associated facilities described above under the Preferred Alternative. The No Action Alternative consists of planned and programmed transportation improvement projects that would be in place by the year 2030, which primarily include of the expansion of existing highways and roadways in and around the I-15 freeway between Victorville and Las Vegas.

Improvements under the No Action Alternative would be located in the same vicinity as the Preferred Alternative, and would thus contend with many of the same geologic and soils impacts described herein. Project-specific environmental reviews that may be undertaken by the sponsoring lead agency would determine the environmental effects associated with such improvements. However, given that the planned improvements under the No Action Alternative would occur largely in the same area as the Preferred Alternative, impacts associated with the geologic and soil conditions would be similar.

3.9.2.3 Preferred Alternative

Section 3.9.4 of the Draft EIS and **Section 3.9.3** of the Supplemental Draft EIS describe in detail the geology and soils impacts by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative.

The Preferred Alternative would be located in a seismically active region near active faults in California. Active or potentially active faults are also located in the Nevada portion of the Preferred Alternative. However, activity on these faults is attributed to land subsidence, not tectonic activity (e.g. earthquakes).

With few exceptions, the components of the Preferred Alternative face at least some risk of the identified geologic and seismic hazards. As discussed in the **Section 3.9.3**, below, all potential effects can be controlled successfully through the application of standard engineering methods and practices.

Table F-3.9-1 below shows the likelihood of potential geologic hazards relative to the components that comprise the Preferred Alternative. The table uses a series of rating systems, ranging from 1 to 3:

- "1" signifies the known presence or greatest likelihood of the selected hazard (shaded).

[1] Ninyo and Moore (2007). *Preliminary Geotechnical Evaluation, DesertXpress Rail Line, Victorville, California to Las Vegas, Nevada.*

- "2" signifies a moderate potential effect of the selected hazard.
- "3" signifies minimal or no presence of the selected hazard.

The Preferred Alternative would be constructed in compliance with safety/seismic regulations discussed in **Section 3.9.1** of the Draft EIS, including existing building codes and regulations.

3.9.2.4 Comparison with Other Action Alternatives

Table F-3.9-2 summarizes the comparison of geologic hazards for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow.

With the exception of Segments 3B and 5B of the Preferred Alternative, all other segments of the action alternatives include some geologic or soil conditions warranting a rating of 1. The other action alternatives would therefore be located in areas with greater potential for geologic hazards when compared to the Preferred Alternative. However, Segment 4A would avoid significant landslide and excavation hazards associated with Segment 4C.

3.9.3 Mitigation Measures for the Preferred Alternative

Mitigation Measures GEO-1 through **GEO-12** identified in **Section 3.9.5** of the Draft EIS would apply to the components that comprise the Preferred Alternative. These measures have been developed to address and limit the adverse effects of the potential geologic and soils related impacts described above. Mitigation measures are classified by impact type and are further classified by their relationship to operational and construction periods.

Tables F-3.9-3 and **F-3.9-4** below identify applicable mitigation measures by component of the Preferred Alternative.

Table F-3.9-1 Likelihood of Geologic Hazards

Preferred Alternative Component	Potential Geotechnical Consequences										
	Surface FaultRupture[1]	Ground Shaking[2]	Liquefaction[3]	Dam Inundation[4]	Settlement(Natural & Fill Soils)[5]	Corrosive Soils[6]	Expansive Soils[7]	Landslides[8]	Excavation[9]	Ground Fissures[10]	Shallow Groundwater[11]
Segment 1, VV3, and OMSF 2	1	1	2	3	2	2	2	2	2	3	3
Segment 2C	1	1	1	2	2	2	1	3	2	3	1
Segment 3B (Modified) (Yermo – Baker) and Baker MOW Facility	1	1 to 2	1 to 2	2 to 3	2	2	2	2	2	3	1 to 2
Segment 3B (Modified) (Baker – east)	3	2	1 to 2	3	2	2	2	2	2	3	1 to 3
Segment 4C	3	1 to 2	3	3	2	2	2	1	1	3	3
Segment 5B	3	1 to 3	3	3	2	2	2	2	2	2	3
Segment 6B	3	3	2	3	2	2	2	3	1	1	2
Las Vegas Passenger Station (Southern Station or Central Station B), Wigwam MSF, and Frias Substation.	3	3	2	3	2	2	2	3	1	1	2

Source: Ninyo and Moore, Preliminary Geotechnical Evaluation, 2007.

Notes:
Shaded cells show areas with high likelihoods for geotechnical hazards.

[1] Rating 1 = Route crosses active fault or very close to an active fault; Rating 2 = Route crosses potentially active fault; Rating 3 = Route crosses inactive fault or does not cross any known fault.

Table F-3.9-1 Notes Continued

[2] Rating 1 = Estimated peak horizontal ground acceleration (PGA) of 0.4g to 0.6g; Rating 2 = Estimated PGA of 0.2g to 0.4g; Rating 3 = Estimated PGA of 0.1g to 0.2g.

[3] Rating 1 = Areas of known, reported shallow groundwater and potentially liquefiable soils; Rating 2 = Areas of potentially shallow groundwater and potentially liquefiable soils; Rating 3 = Areas with no reported shallow groundwater and with potentially liquefiable soils.

[4] Rating 1 = Areas of reported dam inundation; Rating 2 = Areas near reported potential dam inundation; Rating 3 = Areas with no reported potential for dam inundation.

[5] Rating 1 = Areas of reported compressible/collapsible soils; Rating 2 = Areas with potential for compressible/collapsible soils; Rating 3 = Areas with no potential for compressible/collapsible soils.

[6] Rating 1 = Areas of reported corrosive soils; Rating 2 = Areas with potential for corrosive soils; Rating 3 = Areas with no potential for corrosive soils.

[7] Rating 1 = Areas of mapped clay units or known expansive soils; Rating 2 = Areas with potential for expansive soils; Rating 3 = Areas with no potential for expansive soils.

[8] Rating 1 = Areas of known steep terrain with relatively higher potential landslide hazard; Rating 2 = Areas of potential landslide hazard; Rating 3 = Areas of little potential landslide hazard.

[9] Rating 1 = Areas of reported hard rock or caliche with anticipated difficult excavation; Rating 2 = Areas of potentially difficult excavation; Rating 3 = Areas of no potential difficult excavations.

[10] Rating 1 = Areas of known, reported ground fissures in site vicinity; Rating 2 = Areas with potential for ground fissures; Rating 3 = Areas with no reported ground fissures.

[11] Rating 1 = Areas of known, reported shallow groundwater; Rating 2 = Areas of potentially shallow groundwater; Rating 3 = Areas with no reported shallow groundwater.

Table F-3.9-2 Alternatives Comparison – Geologic Hazards

Alternative	Expected likelihood of Surface Fault Rupture	Expected likelihood of ground shaking	Expected difficulty of excavation	Expected likelihood of landslides
No Action Alternative	Similar to the Preferred Alternative	Similar to the Preferred Alternative	Similar to the Preferred Alternative	Similar to the Preferred Alternative
Alignment Routings, including Temporary Construction Areas (TCAs), Alignment Adjustment Areas, and Autotransformer Sites (EMU Only)				
Segment 1 Routing				
Segment 1	High	High	Moderate	Moderate
Segment 2				
Segment 2A/2B, 2A	High near Barstow, Low near Yermo	High	Moderate	Moderate near Barstow, Low near Yermo
Segment 2A/2B, 2B	High near Barstow, Low near Yermo	High	Moderate	Moderate near Barstow, Low near Yermo
Segment 2C	High	High	Moderate	Low
Segment 3				
Segment 3A	High from Yermo to Baker, Low from the east of Baker	Low/Moderate from Yermo to Baker, Moderate from the east of Baker	Moderate	Moderate
Segment 3B	High from Yermo to Baker, Low from the east of Baker	Low/Moderate from Yermo to Baker, moderate from the east of Baker	Moderate	Moderate

Alternative	Expected likelihood of Surface Fault Rupture	Expected likelihood of ground shaking	Expected difficulty of excavation	Expected likelihood of landslides
Segment 4				
Segment 4A	High	Low/Moderate	Moderate	Moderate
Segment 4B	High	Low/Moderate	High	High
Segment 4C	Low	Moderate/High	High	High
Segment 5				
Segment 5A	Low to None	Low to High	Moderate	Moderate
Segment 5B	Low to None	Low to High	Moderate	Moderate
Segment 6				
Segment 6A	Low to None	Low/Moderate	High	Moderate
Segment 6B	Low to None	Low	High	Low
Segment 6C	Low to None	Low/Moderate	High	Low/Moderate
Segment 7				
Segment 7A	Low to None	Low/Moderate	High	Moderate
Segment 7B	Low to None	Low/Moderate	High	Moderate
Segment 7C	Low to None	Low/Moderate	High	Moderate
Victorville Station and Maintenance Facility Site Options				
Victorville Station Site 1	High	High	Moderate	Moderate
Victorville Station Site 2	High	High	Moderate	Moderate
Victorville Station Site 3	High	High	Moderate	Moderate
Victorville OMSF 1	High	High	Moderate	Moderate
Victorville OMSF 2	High	High	Moderate	Moderate

Alternative	Expected likelihood of Surface Fault Rupture	Expected likelihood of ground shaking	Expected difficulty of excavation	Expected likelihood of landslides
Las Vegas Area Station and Maintenance Facility Site Options				
Las Vegas Southern Station	Low to None	Low	High	Low to None
Las Vegas Central Station A	Low to None	Low	High	Low to None
Las Vegas Central Station B	Low to None	Low	High	Low to None
Las Vegas Downtown Station	Low to None	Low	High	Low to None
Sloan Road MSF[2]	Low to None	Low to High	Moderate	Low
Relocated Sloan MSF	Low to None	Low to High	Moderate	Low
Wigwam Avenue MSF	Low to None	Low/Moderate	High	Low to None
Robindale Avenue MSF	Low to None	Low/Moderate	High	Low to None
Frias Substation	Low to None	Low	High	Low
Other Facility				
Baker Maintenance of Way Facility	High	Low/Moderate	Moderate	Moderate
Technology Options				
DEMU (Diesel-Electric Multiple Unit)	n/a	n/a	n/a	n/a
EMU (Electric Multiple Unit)	n/a	n/a	n/a	n/a

Source: CirclePoint, 2011.

[2] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Table F-3.9-3 Operational Period Mitigation Measure Applicability

Preferred Alternative Component	Mitigation GEO-1: Surface Fault Rupture	Mitigation GEO-2: Ground Shaking	Mitigation GEO 3: Liquefaction	Mitigation GEO-4: Dam Inundation	Mitigation GEO-5: Settlement	Mitigation GEO-6: Corrosive Soils	Mitigation GEO-7: Expansive Soils	Mitigation GEO-8: Landslides
Segment 1, VV3, and OMSF 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Segment 2C Side Running	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Segment 3B	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Segment 4C	N/A	Yes	Yes	N/A	Yes	Yes	Yes	Yes
Segment 5B	N/A	Yes	Yes	N/A	Yes	Yes	Yes	Yes
Segment 6B	N/A	Yes	Yes	N/A	Yes	Yes	Yes	N/A
Las Vegas Passenger Station (Southern Station or Central Station B), Wigwam MSF, and Frias Substation.	N/A	Yes	Yes	N/A	Yes	Yes	Yes	N/A

Source: CirclePoint, 2011.

Table F-3.9-4 Construction Period Mitigation Measure Applicability

Preferred Alternative Component	Mitigation GEO-9: Caliche/Hard Rock Excavation	Mitigation GEO-10: Shallow Groundwater	Mitigation GEO-11: Tunneling	Mitigation GEO-12: Ground Fissures
Segment 1, VV3, and OMSF 2	Yes; hard rock	Yes	N/A	N/A
Segment 2C Side Running	Yes; hard rock	Yes	N/A	N/A
Segment 3B	Yes; hard rock	Yes	N/A	N/A
Segment 4C	Yes; hard rock	Yes	Yes	N/A
Segment 5B	Yes, caliche	Yes	N/A	Yes
Segment 6B	Yes, caliche and hard rock	Yes	N/A	Yes
Las Vegas Passenger Station (Southern Station or Central Station B), Wigwam MSF, and Frias Substation.	Yes, caliche and hard rock	Yes	N/A	Yes

Source: CirclePoint, 2011.

Mitigation Measure GEO-1: Surface Fault Rupture

A site-specific, detailed evaluation, which includes surface reconnaissance and subsurface assessment, shall be performed by a qualified geologist. Recommendations of this evaluation shall be incorporated in final design documents. This evaluation shall be performed prior to construction so that, in the event a fault-rupture hazard exists, the recommendations of the geologist can be implemented in the final project design. (Applies to all facilities located within Segment 1, Segment 2C Side Running, and Segment 3B).

Mitigation Measure GEO-2: Ground Shaking

A site-specific evaluation of the potential ground shaking hazard shall be performed by a qualified geologist. The evaluation shall be performed during design development and prior to construction so that appropriate structural design and mitigation techniques can be incorporated into the design of the project. Evaluation techniques shall include drilling of exploratory borings, laboratory testing of soils, computer software analysis to develop seismic design parameters for use by the project structural engineer. Recommendations of this evaluation that avoid or minimize impacts related to seismic ground shaking shall be incorporated into final design documents. Structural elements of the rail system shall be designed to resist or accommodate appropriate site-specific ground motions and to conform to the current seismic design standards. Implementation of an earthquake early warning system shall also be included as part of the project. (Applies to all segments, all facilities).

Mitigation Measure GEO-3: Liquefaction

A site-specific evaluation of the potential liquefaction hazard shall be performed by a qualified geotechnical engineer during design development and prior to construction. This evaluation shall assess the liquefaction and dynamic settlement characteristics of the on-site soils and shall include drilling of exploratory borings, evaluation of groundwater depths, and laboratory testing of soils. Recommendations of this evaluation that avoid or minimize impacts related to liquefaction shall be incorporated into final design documents. (Applies to all segments, all facilities).

Mitigation Measure GEO-4: Dam-Inundation

A detailed hydrologic evaluation shall be performed during design development and prior to construction by a qualified hydrologist to assess the risks and potential effects of inundation on project improvements to the alignment. The hydrologic evaluation shall identify potential dam inundation hazards at site-specific locations and identify corresponding design recommendations to be incorporated into the final design documents. (Applies to all facilities located within Segment 1, Segment 2C Side Running, and Segment 3B).

Mitigation Measure GEO-5: Settlement

During the design phase of the project, site-specific geotechnical evaluations shall be performed by a qualified geologist to assess the settlement potential of the on-site natural soils and undocumented fill. Surface reconnaissance and subsurface evaluation shall be performed which addresses the potential settlement hazards. The evaluations shall include drilling of exploratory borings and laboratory testing of soils, in addition to surface reconnaissance to evaluate site conditions. Recommendations of the geotechnical evaluation shall be implemented prior to design and construction. (Applies to all segments, all facilities).

Mitigation Measure GEO-6: Corrosive Soils

A subsurface evaluation shall be performed prior to design and construction. Evaluation of corrosive soil potential shall be accomplished by testing and analysis of soils at design depths. Laboratory tests shall be conducted on the soils prior to construction and the results shall be reviewed by a qualified corrosion engineer. The qualified corrosion engineer shall prepare an improvement plan which shall include corrosion protection measures suitable to the project elements. The improvement plan shall include corrosivity tests to evaluate the corrosivity of the subsurface soils. Recommendations of the improvement plan shall be implemented prior to design and construction. (Applies to all segments, all facilities).

Mitigation Measure GEO-7: Expansive Soils

During the project design, a site-specific subsurface evaluation, including laboratory testing, shall be performed by a qualified geologist to evaluate the extent of which expansive soils are present along the alignment. Where expansive soil conditions are found and would be detrimental to proposed improvements, measures recommended by the geologist shall be implemented in project design. (Applies to all segments, all facilities).

Mitigation Measure GEO-8: Landslides

To further evaluate the potential for landslides and surficial slope failures along the proposed segments, surface reconnaissance and subsurface evaluation shall be performed by a qualified geotechnical engineer during project design. Surface reconnaissance shall include visual observation of the earth units and geomorphology and review of geologic maps to evaluate the condition of slopes relative to the alignment. Subsurface exploration shall be performed as recommended by the qualified geotechnical engineer to evaluate the potential for landslides and surficial slope failures. If necessary, subsurface evaluation shall include the excavation and detailed logging of exploratory trenches, test pits and/or borings as recommended by the qualified geotechnical engineer. Slope stability computer analyses shall be performed to address the stability of slopes

where recommended by the qualified geotechnical engineer. Measures recommended in the evaluation shall be implemented prior to project design and construction. (Applies to all facilities located within Segment 1, Segment 2C Side Running, and Segment 3B, Segment 4C, and Segment 5B).

Mitigation Measure GEO-9: Caliche/Hard Rock Excavation

A surface reconnaissance and subsurface evaluation shall be performed by a qualified geotechnical engineer during project design to assess soil excavatibility. This evaluation shall include drilling of exploratory borings and/or test pits to evaluate ground conditions for excavation capability where recommended by the qualified geotechnical engineer. Measures recommended in the evaluation shall be incorporated into final design and construction plans. (Applies to all segments, all facilities).

Mitigation Measure GEO-10: Shallow Groundwater

Prior to project design and construction, a qualified geotechnical engineer shall assess groundwater conditions in the project area. In the event shallow groundwater is detected or suspected, mitigation techniques shall be incorporated into final design documents. (Applies to all segments, all facilities).

Mitigation Measure GEO-11: Tunneling

Excavations for underground structures shall be performed with care to reduce the potential for lateral deflection of excavation sidewalls and/or shoring, which could also cause differential movement of structures located near the excavation. To reduce the potential for damage to improvements and structures resulting from dewatering operations, the ground surface and/or structures around the excavation shall be monitored for movement with a variety of instrumentation. If during the course of construction, the instrumentation detects ground movement that exceeds a pre-specified value, work shall stop and the contractor's methods shall be reviewed by a qualified geotechnical engineer and appropriate changes shall be made, if recommended by the geotechnical engineer. Typical monitoring methods include installation of ground survey points around the outside of the excavation to monitor settlement, placing monitoring points on nearby structures to monitor performance of the structures, and installation of inclinometers along the sides of the excavation to monitor lateral deflection of sidewalls. (Applies to tunnel construction in Segment 4C).

Mitigation Measure GEO-12: Ground Fissures

To further evaluate the potential for ground fissures, a qualified geologist shall conduct surface reconnaissance and prepare an evaluation during the design phase of the project. This evaluation shall include visual observation of the earth units, manmade features and geomorphology, and review of geologic maps to evaluate

the surface conditions relative to project features. Recommendations of the evaluation shall be incorporated into final design and construction plans. (Applies to all facilities located within Segment 5B and Segment 6B).

3.9.4 Residual Impacts Following Mitigation

All potential geologic and seismic hazards can be controlled successfully through the application of standard engineering methods and practices identified in the mitigation measures above. Following implementation of these mitigation measures, the Preferred Alternative would not result in any residual impacts.

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3.10 HAZARDOUS MATERIALS

This section describes the updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential hazardous material impacts associated with the Preferred Alternative in comparison with the No Action Alternative and other Action Alternative and identifies and appropriate mitigation measures.

3.10.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, includes all comments on the Draft EIS and Supplemental Draft EIS. However, no comments were received during the public review period that required changes to the hazardous materials analysis contained in the Draft EIS and Supplemental Draft EIS.

3.10.1.1 Affected Environment

Section 3.10.2 of the Draft EIS and **Section 3.10.1** of the Supplemental Draft EIS describe in detail the affected environment for hazardous materials for the DesertXpress project. The general hazardous risks associated with the 200-mile study area corridor have not changed since publication of the Draft EIS and Supplemental Draft EIS. Thus the affected environment discussions from these previous documents remain applicable to the Preferred Alternative.

3.10.1.2 Regulatory Environment

The regulatory environment for hazardous materials for the DesertXpress project is described in detail in **Section 3.10.1** of the Draft EIS. Since publication of the Draft EIS and Supplemental Draft EIS, there have been no changes to the Regulatory Environment regarding hazardous materials. Thus the regulatory environment discussions from these previous documents remain applicable to the Preferred Alternative.

3.10.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

No comments were received during the public review period that required changes to the hazardous materials analysis contained in the Draft EIS and Supplemental Draft EIS.

3.10.2 ANALYSIS OF ENVIRONMENTAL CONSEQUENCES

3.10.2.1 Methods of Evaluation

The hazardous materials impact methodology described in **Section 3.10.2.4** of the Draft EIS remains applicable to this Final EIS and the evaluation of the Preferred Alternative.

Ranking of Potential Effects

Section 3.10.2 of the Draft EIS and **Section 3.10.1** of the Supplemental Draft EIS evaluated the likelihood that hazardous materials may be present in soil or groundwater beneath the study area as a result of on-site or off-site activities. The likelihood of contamination in specific portions of the study area was ranked as high, moderate, or low based on the following descriptions:

- **High:** This rank was given to property in the study area with known or probable contamination. An example of a property in this category would be a leaking underground storage tank (LUST) property where remediation had not been started or was not yet finished.
- **Moderate:** This rank was given to property with potential or suspected contamination. Examples of properties in this category would be LUST properties in the vicinity of the study area that are in final stages of remediation or in post-remediation monitoring. Any LUST properties adjacent to the site would be included in this category, regardless of case status (deed restrictions may exist for closed LUST cases).

  Other examples of a "moderate" ranking would be a property within or adjoining the study area with known use or storage of hazardous materials which had received violation notices from an inspecting agency, or a property where visual evidence of inadequate chemical and storage practices (such as significant staining) were observed but where no environmental assessments had occurred.

  Also included in the "moderate" category are facilities within or adjoining the study area where underground storage tanks (UST) are likely present but appeared to be abandoned by their former operators.
- **Low:** This rank was given to properties where use or storage of hazardous materials occurs but with no significant violations, known releases, or evidence of inadequate chemical-handling practices. Example properties would be active UST or dry cleaning facilities with no documented releases. Also included would be properties outside the immediate study area where remediation of previous releases had been completed.

Information in this section is based on the Hazardous Material Assessments (HMAs) prepared by Ninyo & Moore, included as **Appendix F-K.1.**

The classification of each property was based on the type of operation (current or historical), proximity to the project alignments, hydrogeologic conditions, field observations, and regulatory information. If a property was given a High or Moderate ranking, it is considered to have potential effects related to hazardous materials.

If a property was given a Low ranking, or the use or storage of hazardous materials is not identified in a particular area, no potential effect is assumed.

In addition, **Section 3.10.2.1**, below, includes a discussion of the potential for operational effects related to the use of hazardous materials at proposed maintenance facilities and elsewhere within the area of the Preferred Alternative. Mitigation measures are identified for each adverse effect identified.

3.10.2.2 No Action Alternative

The No Action Alternative would not involve the construction and operation of the high-speed train and associated facilities described above under the Preferred Alternative. The No Action Alternative consists of planned and programmed transportation improvement projects that would be in place by the year 2030, which primarily include of the expansion of existing highways and roadways in and around the I-15 freeway between Victorville and Las Vegas. Given that the planned improvements under the No Action Alternative would occur largely in the same area as the Preferred Alternative, impacts associated with contaminated soils/groundwater, construction period hazards, and operational period hazards would be similar.

Although some improvements could be located in areas with more hazardous material risks, the relative risk related to the identified sites cannot be determined without detailed subsurface investigations. As such, planned improvements located in an area with severe contamination from one site could potentially have a greater environmental risk than the components of the Preferred Alternative located in an area with minor contamination from several sites. However, detailed subsurface environmental assessment and development of remediation plans (if necessary) would not occur until the final design phase of the improvements is complete.

3.10.2.3 Preferred Alternative

Section 3.10.4 of the Draft EIS and **Section 3.10.3** of the Supplemental Draft EIS describe in detail the hazardous materials impacts by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative.

Contaminated Soil/Groundwater

Construction activities associated with the project facilities and rail alignments may encounter contaminated soils and/or groundwater or other previously identified hazardous materials that must be removed, disposed of, and/or remediated. Contaminated soils and groundwater are anticipated to be found in the following locations in the project area:

1. On and/or near Segment 2C Side Running/Segment 2A, Segment 3B, Segment 6B, and Las Vegas Central Station B

2. Within and/or near existing or abandoned railroad corridors, where herbicides, petroleum hydrocarbons, and metals may be found in soils and/or groundwater (Segment 2A, Segment 6B)
3. Within or near existing freeway corridors, where petroleum hydrocarbons and aerially deposited lead may be found in soils and/or groundwater (All rail alignments and station/maintenance facilities are in proximity to existing freeway corridors; this risk is common to all project elements).

Appendix F-K identifies these sites of concern and the location in relation to the Preferred Alternative. **Figures F-3.10-1** and **F-3.10-2** illustrate the locations of these sites of concern.

Unidentified Hazardous Materials – Construction Period Risk

In addition to the potential adverse effects associated with known or suspected areas of contaminated soil and/or groundwater, additional adverse effects may result if previously unidentified hazardous materials are encountered during construction of any of the facilities and rail alignments of the Preferred Alternative. While this analysis has followed standard protocols in terms of investigating known contamination, there is a risk that earth-moving activities, including track construction, building construction, and the like could be conducted within areas of undocumented hazardous materials releases, thus potentially putting construction workers and others in the vicinity at risk.

Use/Storage/Transport of Hazardous Materials – Operational Period Risk

The DesertXpress project proposes a passenger-only railroad that would not include the transport of hazardous materials for outside commercial or industrial purposes. Once constructed, the Preferred Alternative will include such activities as train operations, track maintenance, and equipment maintenance. These activities are anticipated to involve the routine use, storage, and transport of potentially hazardous materials, including fuels, lubricants, solvents, paints, compressed gases, and waste products. These materials would be stored and/or staged in buildings and storage tanks, particularly at maintenance and storage facilities [the Victorville OMSF (OMSF 2) and the Las Vegas MSF (Wigwam MSF)]. Project operations will require the safe handling, use, storage, and disposal of these materials to avoid a potentially adverse effect.

3.10.2.4 Comparison with Other Action Alternatives

The action alternatives would involve the construction and operation of rail alignments and associated facilities similar to those described above under the Preferred Alternative. Although some of the components of the action alternatives could be located in areas with more hazardous material risks, the relative risk related to the identified sites cannot be determined without detailed subsurface investigations. As such, the components of the action alternatives located in an area with severe contamination from one site could potentially have a greater environmental risk than the components of the Preferred

Alternative located in an area with minor contamination from several sites. However, detailed subsurface environmental assessment and development of remediation plans (if necessary) would not occur until the final design phase of the improvements is complete.

Given that the components of the action alternatives would occur largely in the same area as the Preferred Alternative, impacts associated with contaminated soils/groundwater, construction period hazards, and operational period hazards would be similar.

Table F-3.10-1 summarizes the comparison of hazardous material risks for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow.

Table F-3.10-1 Alternatives Comparison – Hazardous Materials

Alternative	Number of properties of environmental concern
No Action Alternative	Assumed to be same as Preferred Alternative with Southern Station – 20.
Alignment Routings, including Temporary Construction Areas (TCAs), Alignment Adjustment Areas, and Autotransformer Sites (EMU Only)	
Segment 1 Routing	
Segment 1	0
Segment 2	
Segment 2A/2B, 2A	4
Segment 2A/2B, 2B	6
Segment 2C	7
Segment 3	
Segment 3A	2
Segment 3B	2
Segment 4	
Segment 4A	1
Segment 4B	0
Segment 4C	0
Segment 5	
Segment 5A	0
Segment 5B	0
Segment 6	
Segment 6A	6
Segment 6B	11
Segment 6C	3

Alternative	Number of properties of environmental concern
Segment 7	
Segment 7A	2
Segment 7B	2
Segment 7C	3
Victorville Station and Maintenance Facility Site Options	
Victorville Station Site 1	0
Victorville Station Site 2	0
Victorville Station Site 3	0
Victorville OMSF 1	0
Victorville OMSF 2	0
Las Vegas Area Station and Maintenance Facility Site Options	
Las Vegas Southern Station	0
Las Vegas Central Station A	0
Las Vegas Central Station B	1
Las Vegas Downtown Station	0
Sloan Road MSF[1]	0
Relocated Sloan MSF	0
Wigwam Avenue MSF	0
Robindale Avenue MSF	0
Frias Substation	0
Other Facility	
Baker Maintenance of Way Facility	0
Technology Options	
DEMU (Diesel-Electric Multiple Unit)	The choice of technology option does not in itself result in the addition of any properties of concern. For the Preferred Alternative as a whole under either technology option, the total number of properties would be 20 if terminating at the Southern Station, 21 if terminating at Central Station B.
EMU (Electric Multiple Unit)	

Source: CirclePoint, 2011

[1] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

3.10.3 Mitigation Measures for the Preferred Alternative

Mitigation Measures HAZ-1 through **HAZ-5** identified in Draft EIS **Section 3.10.5** would be applied to all facilities and rail alignments of the Preferred Alternative to address and limit the adverse effects of the potential hazardous material impacts described above. Mitigation measures are classified by impact type and are further classified by their relationship to operational and construction periods. These include:

3.10.3.1 Construction Period Mitigation Measures

Mitigation Measure HAZ-1: Structures Built Prior to 1980

Prior to the start of construction activities, the applicant shall conduct an evaluation of all buildings to be demolished to determine the presence of asbestos containing materials and lead based paint. Remediation should be implemented in accordance with the recommendations of these evaluations.

Mitigation Measure HAZ-2: Contaminated Soil and/or Groundwater

The applicant shall prepare a soil monitoring plan prior to the issuance of permits for demolition, grading, or construction and shall implement the plan during all phases of construction. Disturbed soils shall be monitored for visual evidence of contamination (e.g., staining or discoloration). Soil shall be monitored for the presence of volatile organic compounds (VOC) using appropriate field instruments such as organic vapor measurement with photoionization detectors (PIDs) or flame ionization detectors. If the monitoring procedures indicate the possible presence of contaminated soil, a contaminated soil contingency plan shall be implemented that shall include procedures for segregation, sampling, and chemical analysis of soil. Contaminated soil shall be profiled for disposal and shall be transported with appropriate hazardous or non-hazardous waste manifests by a state-certified hazardous material hauler to a state-certified disposal or recycling facility licensed to accept and treat the type of waste indicated by the profiling process. The contaminated soil contingency plan shall be developed and in place during all construction activities. In the unlikely event that these processes generate any contaminated groundwater that must be disposed of outside of the dewatering/ NPDES process, the groundwater shall be profiled, manifested, hauled, and disposed of in the same manner.

Where conditions warrant a Phase II Environmental Site Assessment (ESA), such ESAs shall include the following:

- A work plan that includes the numbers and locations of proposed soil borings/monitoring wells, sampling intervals, drilling and sampling methods, analytical methods, sampling rationale, site geohydrology, field screening methods, quality control/quality assurance, and reporting methods.

- A site-specific Health and Safety Plan (HSP) signed by a Certified Industrial Hygienist.
- Necessary permits for encroachment, boring completion, and well installation.
- A traffic safety plan.
- Sampling program (fieldwork) in accordance with the work plan and HSP. Fieldwork shall be completed under the supervision of a geologist registered in the State of California and/or Nevada, as appropriate.
- Hazardous materials testing through a laboratory certified by California and/or Nevada.
- Documentation to include field procedures, boring logs/well diagrams, tables of analytical results, cross-sections, an evaluation of the levels and extent of contaminants found, and conclusions and recommendations regarding the environmental condition of the site and the need for further assessment. Recommendations may include additional assessment or handling of the contaminants found though the contaminated soil contingency plan. If the contaminated soil contingency plan is inadequate for the contamination found, a remedial action plan shall be developed. Contaminated groundwater shall generally be handled though the NPDES/dewatering process**.**
- Disposal process including transport by a state-certified hazardous material hauler to a state-certified disposal /recycling facility licensed to accept/treat the identified waste.

Where contaminated groundwater is encountered, the Applicant shall obtain a NPDES permit prior to the issuance of a permit to construct. The NPDES permit shall specify site-specific testing and monitoring requirements and discharge limitations.

Additionally, available agency files for moderate and high risk properties as discussed in this section and identified in **Appendix F-K.1** of this Final EIS, shall be reviewed prior to demolition, grading, or construction. If the file review indicates a low likelihood of contaminants being present beneath or adjacent to a project feature (rail alignment, station, maintenance facility, etc.), additional assessment/mitigation may not be recommended and the property could be reclassified as low risk.

Mitigation Measure HAZ-3: Previously Unidentified Hazardous Materials

Prior to the start of construction activities, the applicant shall prepare a hazardous materials contingency plan addressing the potential for discovery of unidentified underground storage tanks, hazardous materials, petroleum hydrocarbons, or

hazardous or solid wastes during construction. This contingency plan shall address underground storage tank decommissioning, field screening, and materials testing methods, mitigation and contaminant management requirements, and health and safety requirements.

Mitigation Measure HAZ-4: Hazardous Material Disposal

Construction contractors shall dispose of all hazardous or solid wastes and debris encountered or generated during construction and demolition activities in accordance with all applicable Federal regulations.

3.10.3.2 Operational Period Mitigation Measures

Mitigation Measure HAZ-5: Operational Generated Hazardous Materials

Desert Xpress shall prepare a Hazardous Materials Management Plan for all facilities that use, store, or dispose of hazardous materials. Facilities emitting toxic air emissions shall submit inventories and plans to the appropriate air quality management district and be subject to permitting and monitoring regulations of the district. Desert Xpress shall obtain all necessary local, state and Federal permits for the installation and operation of any above or below ground chemical or fuel storage tanks prior to installing such tanks.

Table F-3.10-2 identifies the applicable mitigation measures by facility or rail alignment of the Preferred Alternative. These measures are also intended to apply to any project features (stations, maintenance facilities, etc.) located within each segment. For example, any mitigation measures applicable to Segment 1 are also applicable to the VV3 and OMSF 2 sites.

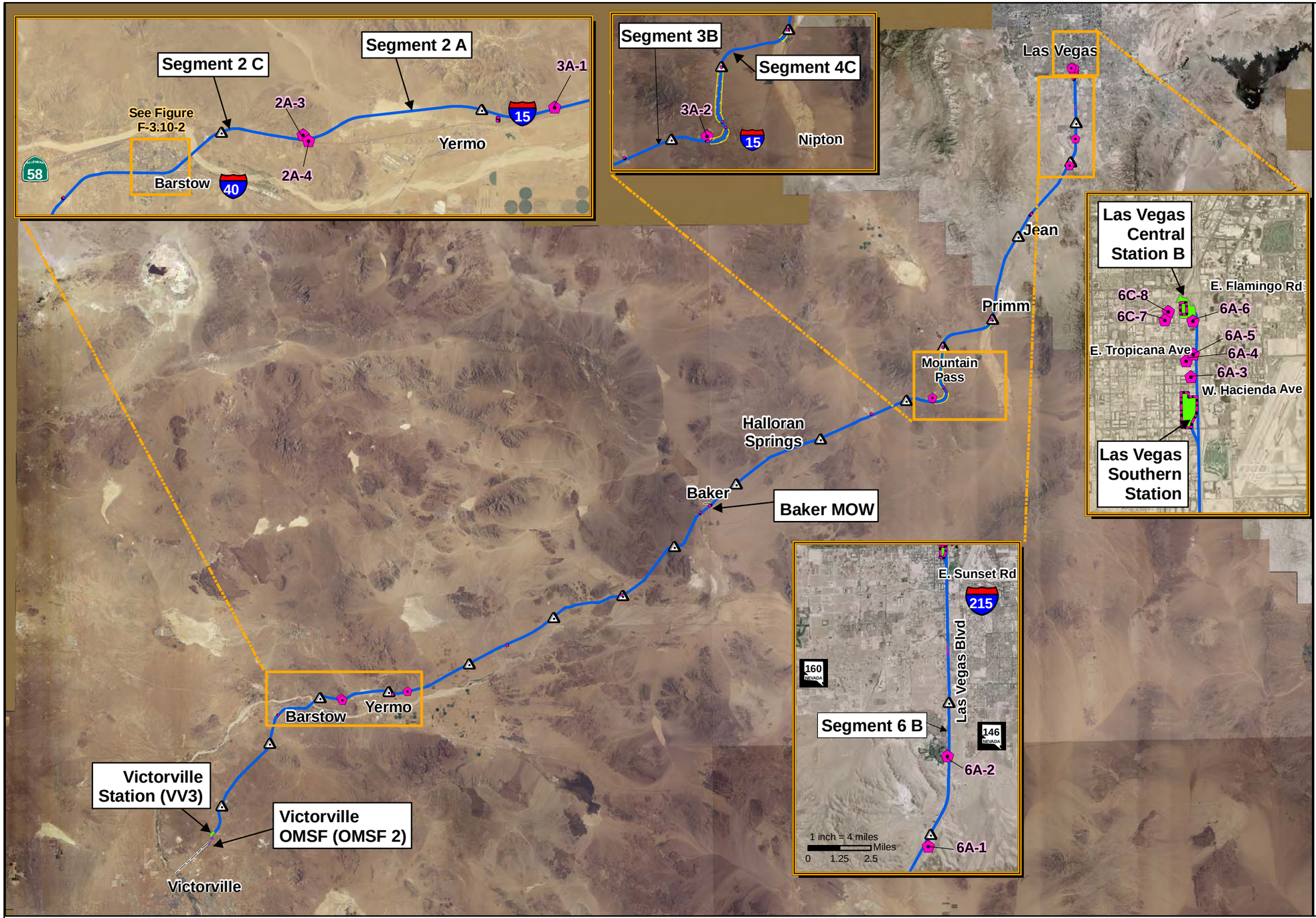
Table F-3.10-2 Mitigation Measure Applicability

Preferred Alternative Component	Mitigation HAZ-1: Structures Built Prior to 1980	Mitigation HAZ-2: Contaminated Soil/ Groundwater	Mitigation HAZ-3: Previously Unidentified Hazardous Material	Mitigation HAZ-4: Hazardous Material Disposal	Mitigation HAZ-5: Operationally Generated Hazardous Materials
VV3	No	No	Yes	Yes	Yes
OMSF 2	No	No	Yes	Yes	Yes
Segment 1	No	No	Yes	Yes	N/A
Segment 2C Side Running/ Segment 2A	No	Yes	Yes	Yes	N/A
Segment 3B	No	Yes	Yes	Yes	N/A
Segment 4C	No	No	Yes	Yes	N/A
Segment 5B	No	No	Yes	Yes	N/A
Segment 6B	No	Yes	Yes	Yes	N/A
Las Vegas Southern Station	No	No	Yes	Yes	Yes
Las Vegas Central Station B	No	No	Yes	Yes	Yes
Wigwam MSF	No	No	Yes	Yes	Yes
Frias Substation	No	No	Yes	Yes	Yes

Source: CirclePoint, 2011.

3.10.4 Residual Impacts Following Mitigation

All potential effects related to hazardous materials can be controlled successfully through the application of standard safety planning methods and practices identified in the mitigation measures above. No additional mitigation would be required.



Legend

Properties of Environmental Concern

- Property Location

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

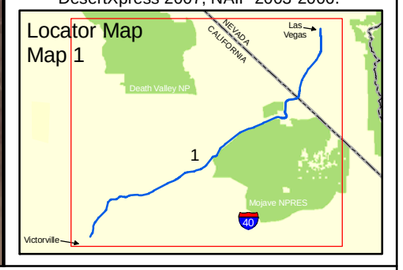
Note: Please refer to Appendix F-A, which includes Plan and Profile drawings at 1"=200'.

1 inch equals 13.5 miles

Kilometers
0 10 20

Miles
0 10 20

Source: Ninyo & Moore, 2007 & 2009, ESRI 2005, DesertXpress 2007, NAIP 2003-2006.



U.S. Department of Transportation
Federal Railroad Administration

DesertXpress Final EIS

Properties of Environmental Concern

FIG F-3.10-1

Geografika Consulting 02.27.11

Legend

Source: Ninyo & Moore, 2007 & 2009

DesertXpress Alignments

- Preferred Alternative

Ancillary Facility Sites

- Temporary Construction Area (TCA)

U.S. Department of Transportation
Federal Railroad Administration

DesertXpress Final EIS

Hazardous Sites of Environmental Concern - Segment 2C

FIG **F-3.10-2**

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3.11 AIR QUALITY AND GLOBAL CLIMATE CHANGE

This section describes the updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS, analyzes the potential effects the Preferred Alternative would have on regional and localized air quality, and presents appropriate mitigation measures.

3.11.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to air quality and global climate change impacts, and provides responses to those comments. Several comments resulted in changes to the air quality analysis in the EIS and are discussed below. Substantive updates and changes in response to comments on the Draft and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

3.11.1.1 Affected Environment

Draft EIS **Section 3.11.3** and Supplemental Draft EIS **Section 3.11.1** describe in detail the affected environment for air quality for the DesertXpress project. Supplemental Draft EIS **Section 3.11.3** updated baseline conditions, including baseline greenhouse gas (GHG) emissions. These baseline conditions have not changed since the publication of the Supplemental Draft EIS.

Comment S-6 on the Supplemental Draft EIS indicated that the reference for Draft EIS **Table 3.11-4** was incorrect in that regional criteria pollutant emissions calculations were not provided in Draft EIS **Appendix J**. Upon further review of the data, it was determined that the information reflected in Draft EIS **Table 3.11-4** was not correct. **Table F-3.11-1** below shows corrected regional criteria pollutant emissions which replace the information presented in Draft EIS **Table 3.11-4**. Year 2007 greenhouse gas emissions originally reported in Draft EIS **Table 3.11-4** were corrected within the Supplemental Draft EIS (see **Table S-3.11-3**), and remain applicable to this Final EIS. Regional emission calculations reflected in **Table F-3.11-1** were calculated using project-specific vehicle miles traveled (VMT) data and air quality modeling emissions factors (Mobile6a/EMFAC2007). Updated calculation worksheets are included as part of **Appendix F-L**.

Table F-3.11-1 Year 2007 Regional Criteria Pollutant Emissions (tons per year)

	Criteria Pollutant Emissions						
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2e
Mojave Desert Air Basin	1,722	11,395	20,644	19	493	453	2,310,285
Clark County Nevada	563	3,723	6,745	6	161	148	963,797
Total Annual Emissions	2,285	15,118	27,389	25	654	601	3,274,082

Source: ICF/Jones & Stokes, 2011.

Notes: CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

The corrected 2007 emissions data do not affect the overall evaluation of the affected environment for the project. Thus the affected environment discussions from these previous documents remain applicable to the Preferred Alternative.

Comment S-3 on the Supplemental Draft EIS requested that the phrasing of the attainment status for Clark County be revised. To address this comment, this Final EIS amends the Supplemental Draft EIS text on page 3.11-1 as follows:

> Air basins are found to be in or out of "attainment" status based on compliance with Federal standards for regulated air pollutants. The Mojave Desert Air Basin is still in moderate nonattainment of ozone (O_3) and inhalable particulate matter (PM_{10}). ~~The Clark County Air Basin is still in nonattainment of O_3 and serious non-attainment of carbon monoxide (CO) and PM_{10}.~~ **Parts of Clark County are currently designated by EPA as nonattainment areas for O_3 and PM_{10}. With respect to carbon monoxide (CO), EPA re-designated Clark County from nonattainment to attainment on September 27, 2010 and adopted a CO maintenance plan for the area on that same date.**

In addition, this Final EIS amends Draft EIS **Table 3.11-3** to reflect the above changes in attainment status. **Table F-3.11-2** below shows attainment status as of December 17, 2010; this table replaces Draft EIS **Table 3.11-3**.

Table F-3.11-2 Federal Attainment Status for Mojave Desert Air Basin and Clark County

Pollutants	Mojave Desert Air Basin Federal Classification	Clark County Federal Classification
Ozone (O_3) – 8-hour standard	Nonattainment, Moderate	Nonattainment (Sub Part 1)
Inhalable Particulates (PM_{10})	Nonattainment, Moderate	Nonattainment, Serious
Fine Particulates ($PM_{2.5}$)	Attainment/Unclassified	Attainment
Carbon Monoxide (CO)	Attainment	~~Nonattainment, Serious~~ **Attainment, Maintenance**
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment

Source: U.S. Environmental Protection Agency. The Green Book Nonattainment Areas for Criteria Pollutants. <http://www.epa.gov/oar/oaqps001/greenbk/>. Accessed March 4, 2011.

Comment S-4 on the Supplemental Draft EIS identified that the annual average nitrogen dioxide (NO_2) concentrations for years 2005, 2006 and 2007 provided in **Table S-3.11-2** were incorrect. To address this comment, this Final EIS amends Supplemental Draft EIS **Table S-3.11-2**. The revised table is provided as **Table F-3.11-3** below:

Table F-3.11-3 Summary of 2008 and 2009 Air Quality Data, Clark County Monitoring Stations

Pollutant Standards	2005	2006	2007
Nitrogen Dioxide (NO_2) [JD Smith Monitoring Station]			
National standard (annual average 0.053 ppm)			
Maximum 1-hr concentration	**0.075**	**0.072**	**0.224**
Annual average concentration	~~0.075~~ **0.020**	~~0.072~~ **0.021**	~~0.224~~ **0.021**
Days national standard exceeded	0	0	0

Source: ICF/Jones & Stokes, 2011.

3.11.1.2 Regulatory Environment

The regulatory environment for air quality and global climate change for the DesertXpress project is described in detail in Draft EIS **Section 3.11.1.** Since publication of the Draft EIS and Supplemental Draft EIS, there is no change to the Regulatory Environment that addresses air quality issues. Thus the regulatory environment discussions from these previous documents remain applicable to the Preferred Alternative.

Air quality is regulated at the federal level under the Clean Air Act (CAA) of 1970 and the Final Conformity Rule.[1] The CAA Amendments of 1990[2] direct the U.S. Environmental Protection Agency (EPA) to implement strong environmental policies and regulations that will ensure better air quality: "No federal agency may approve, accept, or fund any transportation plan, program, or project unless such plan, program or project has been found to conform to any applicable state implementation plan (SIP) in effect under this act."[4] Title 1, Section 101, Paragraph F of the amendments, amends Section 176(c) of the CAA to define *conformity* as follows: conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; such activities will not cause any of the following occurrences:

- Cause or contribute to any new violation of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or
- Delay timely attainment of any NAAQS or any required interim emissions reductions or other milestones in any area.[5]

As required by the CAA Amendments of 1970 and the CAA Amendment of 1977,[6] EPA has established NAAQS for the following air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulates (PM_{10} and $PM_{2.5}$), oxides of sulfur (SO_X), and lead. The federal and state governments have both adopted health-based standards for pollutants. For some pollutants, the national and state (California and Nevada) standards are very similar; for other pollutants, the California state standards are more health protective. The differences in the standards are generally the result of the different health effect studies considered during the standard-setting process and how these studies were interpreted.

Table F-3.11-4 lists the federal and state standards. The federal primary standards are intended to protect the public health with an adequate margin of safety. The federal secondary standards are intended to protect the nation's welfare and account for air-pollutant impacts on soil, water, visibility, vegetation, and other aspects of the general welfare. Areas that violate these standards are designated nonattainment areas. Areas that once violated the standards but now meet the standards are classified as maintenance areas. Classification of each area under the federal standards is done by EPA based on state recommendations and after an extensive review of monitored data.

---

[1] 40 CFR Parts 51 and 93

[2] Public Law (PL) 101–549, November 15, 1990

[4] 42 USC § 7506(c)(2)

[5] 42 USC § 7506(c)(1).

[6] PL 91-064, December 31, 1970, PL 95-95, August 7, 1977

Table F-3.11-4 National and State (California and Nevada) Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[a]		CAAQS[b]	NeAAQS[c]
		Primary	Secondary		
Ozone (O_3)	1-hour	0.12 ppm	0.12 ppm	0.09 ppm[d]	0.12ppm
	8-hour	0.075 ppm		0.07 ppm	--
Carbon Monoxide (CO)	1-hour	35 ppm	--	20 ppm	35 ppm
	8-hour	9 ppm	--	9 ppm	9 ppm
Nitrogen Dioxide (NO_2)	1-hour	--	--	0.18 ppm	--
	Annual	0.05 ppm	0.05 ppm	0.03 ppm	0.053 ppm
Sulfur Dioxide (SO_2)	1-hour	--	--	0.25 ppm	--
	3-hour	--	0.5 ppm	--	0.5 ppm
	24-hour	0.14 ppm	--	0.04 ppm	0.14 ppm
	Annual	0.03 ppm	--	--	0.03 ppm
Inhalable Particulate Matter (PM_{10})	24-hour	150 µg/m^3	150 µg/m^3	50 µg/m^3 [c]	150 µg/m^3
	Annual	50 µg/m^3	50 µg/m^3	20 µg/m^3	50 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	24-hour	35 µg/m^3	35 µg/m^3		--
	Annual	15 µg/m^3	15 µg/m^3	12 µg/m^3	--
Sulfates	24-hour	--	--	25 µg/m^3	
Lead (Pb)	30-day	--	--	1.5 µg/m^3	--
	Calendar quarter	1.5 µg/m^3	1.5 µg/m^3	--	1.5 µg/m^3
Hydrogen Sulfide	1-hour	--	--	0.03 ppm	0.08 ppm
Vinyl Chloride	24-hour	--	--	0.01 ppm	--

Source: CARB 2008b; NDEP 2008b.

Notes:

[a] The National Ambient Air Quality Standards, other than O_3 and those based on annual averages, are not to be exceeded more than once a year. The O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

[b] The California Ambient Air Quality Standards (CAAQS) for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ are values not to be exceeded. All other California standards shown are values not to be equaled or exceeded.

[c] The Nevada Ambient Air Quality Standards (NeAAQS) must not be exceeded in areas where the general public has access.

[d] ppm = parts per million by volume, µg/m^3 = micrograms per cubic meter

3.11.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

Mitigation Measures AQ-2 and **AQ-4** were unique to the DEMU locomotive technology. As the EMU locomotive technology was selected for the Preferred Alternative, these DEMU-related mitigation measures are no longer applicable or necessary and have thus been deleted.

Project construction emissions were provided in **Table 3.11-24** of the Draft EIS, based on preliminary information provided by the Applicant. These estimates assumed a rail alignment from Victorville to Las Vegas utilizing Segment 4A, the shortest and most direct route. The Preferred Alternative rail alignment includes the longer Segment 4C, which also features three tunnels through the Clark Mountains. Accordingly, the construction emissions information presented herein has been revised to reflect the Preferred Alternative, including Segment 4C. See **Tables F-3.11-17** and **Table F-3.11-18** below.

As a result of the revision of construction emissions estimates, additional mitigation was included. **Mitigation Measure AQ-5** below was added to reduce the amount of construction period emissions of air pollutants.

> **Mitigation Measure AQ-5: Utilize additional means to reduce construction period emissions of air pollutants.**
>
> **The Applicant shall integrate the following control measures into approved design-build plans:**
>
> - **All off-road internal-combustion engine construction equipment shall be EPA Tier-4 certified.**
> - **All signal boards shall be solar-powered.**
> - **All architectural coatings products shall contain no more than 250 grams of VOC per liter of coating (2.08 pounds per gallon).**
> - **For all work conducted within Clark County, only the following fuels shall be used to power off-road equipment:**
>   - **A composite fuel blend consisting of at least 20 percent biodiesel.**

3.11.2 Analysis of Environmental Consequences

3.11.2.1 Methods of Evaluation

The same methodology as described in Draft EIS **Section 3.11.2** was used to evaluate potential effects of the Preferred Alternative. The analysis focuses on potential regional and localized impacts on air quality associated with the EMU technology option and its related level of passenger/automobile activity. Pollutant burdens generated by on-road (vehicles), off-road (trains), and stationary (electric power generation) sources for the Preferred Alternative were compared to the No Action Alternative.

Pollutants that can be traced principally to transportation sources and are thus relevant to the evaluation of the project alternatives are carbon monoxide, ozone precursors (nitrous oxide (NO_x) and reactive organic compounds [ROC]), particulate matter (PM_{10} and $PM_{2.5}$), and carbon dioxide (CO_2). Because high carbon monoxide levels are mostly the result of congested traffic conditions combined with adverse meteorological conditions, high CO concentrations generally occur within 300 ft to 600 ft of heavily traveled roadways. Concentrations of carbon monoxide on a regional and localized or microscale basis can consequently be predicted appropriately.

As discussed below in the affected environment section, ROC and NO_x emissions from mobile sources are of concern primarily because of their role as precursors in the formation of ozone and particulate matter. Ozone is formed through a series of reactions that occur in the atmosphere in the presence of sunlight over a period of hours. Because the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The impacts of ROC and NO_x emissions are, therefore, generally examined on a regional level. Carbon dioxide emission burdens, because of their global impact, are currently expressed only on the statewide level by CARB (California), NDEP (Nevada) and EPA. In this analysis, therefore, carbon dioxide impacts are discussed on a statewide level. It is appropriate to predict concentrations of PM_{10} and $PM_{2.5}$ on a regional and localized basis.

The air quality analysis for the proposed project focuses on the potential regional and localized impacts on air quality. The regional pollutant burdens were estimated based on changes that would occur, including the following, under each of the alternatives:

- Highway VMT;
- Diesel fuel requirement under the proposed DEMU technology alternative; and
- Power requirement under the proposed EMU technology alternative.

Localized air quality impacts were estimated based on level of service information and intersection geometry for arterial roadways near proposed stations.

Localized air quality impacts were estimated based on level of service information and intersection geometry for arterial roadways near proposed stations.

Localized impacts for California were calculated and evaluated using CALINE4 and Emfac 2007 emissions factors; while such impacts for Nevada were calculated and evaluated using CAL3QHC and Mobile 6 emissions factors. GHG emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) were calculated using the formulas provided in the *California Climate Action Registry, General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, version 2.2*.

Although the project would be constructed through a design-build process, adequate information is available to estimate construction-period emissions. For purposes of calculating emissions, the overall construction project was apportioned into three

components, at grade, on structure, and via tunnels. Emissions were calculated for each component using the CalEEMod (version 2011.1) software model, which uses OFFROAD2007 emissions factors, and apportioned into activity occurring in California and Nevada for each year. Detailed assumptions about construction phase durations, equipment type and quantity, equipment use assumptions, and work fraction occurring in California and Nevada per year for each construction component are provided in **Appendix F-L**.

GHG emissions are reported in terms of carbon dioxide equivalents (CO_2e). Changes in the amounts of CO_2e emissions as a result of the project alternatives were estimated on a statewide basis for both California and Nevada. Emission burdens were projected for the expected opening and horizon years of the project, 2013 and 2030.

Under the impact methodology described in **Section 3.5.2** of the Draft EIS, two horizon years were selected for the traffic analysis: 2013 and 2030. The year 2013 was selected because it was the year the DesertXpress high speed passenger train was expected to begin operations at the time when the Draft EIS was being prepared. The year 2030 was selected to evaluate cumulative conditions because it was the farthest year in the future for which regional travel forecasts were available for the metropolitan Las Vegas area.

In order to maintain consistency in the evaluation of project modifications and additions, the two horizon years were retained in the Supplemental Draft EIS. However, due to a longer than expected environmental review process, 2013 may no longer be the opening year for the project. However, this Final EIS assumes this shift of one to two years in the opening year to be less than significant and continues to use the existing 2013 traffic analysis in the evaluation of project impacts. It is not anticipated that substantially different findings would result under an opening year of 2014 or 2015. Similarly, regional travel forecasts for the year 2030 remain applicable to this Final EIS and also provide consistency between the previous Draft and Supplemental Draft EIS documents.

Criteria Pollutant Emissions: This assessment is based on the total pollutant burden of emissions to occur in California and Nevada under the No Action Alternative and the change in emissions estimated under the proposed action alternatives with the DEMU and EMU technology options. The following factors were used to rate the potential effects of each proposed project alternative:

- The threshold values provided in EPA's Conformity Rule (**Table F-3.11-5**, below) that determine when a detailed conformity analysis is required for a proposed federal project located in a nonattainment or maintenance area; and
- The Conformity Rule's definition (40 CFR Part 55.852) of a regionally significant project, which is one that would increase emissions of an applicable pollutant in a nonattainment or maintenance area by 10% or more.

Pursuant to the General Conformity Rule, the lead federal agency must make a General Conformity Determination for all federal actions in non-attainment or maintenance areas where the total of direct and indirect emissions of a non-attainment pollutant or its precursors exceeds levels established by the regulations.

Table F-3.11-5 Threshold Values Used to Determine Impact Significance

Pollutant	Area's Attainment Status	Conformity Rule's Significant Impact Thresholds in Tons (Metric Tons)/Year
O_3 (VOCs or NO_x)	Nonattainment—serious	50 (45)
	Nonattainment—severe	25 (23)
	Nonattainment—extreme	10 (9)
	Nonattainment—outside an O_3 transport region	100 (91)
	Nonattainment—moderate/marginal inside an O_3 transport region	50/100 (45/91) (VOC/NO_x)
	NO_x maintenance	100 (91)
	VOC maintenance—outside O_3 transport region	100 (91)
	VOC maintenance—inside O_3 transport region	50 (45)
CO	Nonattainment—all	100 (91)
	Maintenance	100 (91)
$PM_{10}/PM_{2.5}$	Nonattainment—moderate	100 (91) / 100 (91)
	Nonattainment—serious	70 (64) / 100 (91)
	Maintenance	100 (91) / 100 (91)

Source: USEPA 40 CFR 51.853.

Greenhouse Gas Emissions: Changes in the amounts of CO_2 emissions as a result of the project alternatives were estimated on a statewide basis for both California and Nevada. These results are provided to indicate how changes in CO_2e emissions, as a result of the proposed action alternatives with the DEMU and EMU technology options, may affect global warming. These estimates were based on the estimated changes in fuel use and electrical energy production associated with each technology option.

3.11.2.2 No Action Alternative

The No Action Alternative is used to compare the relative impacts and benefits of the proposed project improvements. The No Action Alternative assumes that no new passenger rail system to divert vehicular travel between the southern California region and Las Vegas would be built. Under the No Action Alternative, public agencies in California and/or Nevada are anticipated to move forward with physical and/or operational roadway

improvements to increase the capacity of the I-15 corridor. These improvements would be located in the same vicinity as the Preferred Alternative and would be subject to their own environmental review processes.

Permanent Effects

Regional Operations Effects

Under the No Action Alternative there would be no construction of the proposed project and a continued intensification of automobile travel between southern California and Las Vegas. None of the beneficial operational effects of the Preferred Alternative (reduction in several criteria pollutants) would occur under the No Action Alternative. Vehicle trips along the I-15 project corridor between Victorville and Las Vegas resulted in more than 10 million average daily VMT during year 2007. Emissions occurring under existing conditions are provided in **Table F-3.11-1** above. Under the No Action Alternative, VMT along this corridor is expected to grow to approximately 12.75 million average daily VMT by the opening year and reach 20.38 million average daily VMT by the horizon year. The regional criteria pollutant and GHG emissions that would result from vehicular travel along the I-15 project corridor under the No Action Alternative at the opening and horizon years are provided in **Table F-3.11-6** below.

Table F-3.11-6 Regional Criteria Pollutant and Greenhouse Gas Emissions, No Action Alternative, Opening Year and Horizon Year

	Criteria Pollutant Emissions						CO_2e Emissions, tons per year[a]
	ROC[7]	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Opening Year							
Mojave Desert Air Basin	342	2,408	7,372	15	170	156	1,464,461
Clark County Nevada	930	1,348	18,990	18	61	31	970,312
Total Annual Emissions	1,272	3,756	26,362	33	231	187	2,434,773
Horizon Year							
Mojave Desert Air Basin	197	941	3,895	20	176	162	1,977,278
Clark County Nevada	882	769	29,504	35	105	48	1,807,732
Total Annual Emissions	1,079	1,710	33,399	55	281	210	3,785,010

Source: ICF/Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

[7] As noted in Draft EIS **Section 3.11.2.1**, reactive organic compounds (or ROC) are considered a precursor of ozone (O3). Ozone is not a direct mobile-source emission but is instead formed in the atmosphere from the interaction of sunlight and precursors such as ROC. While ROC is not specifically listed as a criteria pollutant, ROC is emitted by vehicles and can eventually convert to ozone and is standard practice to evaluate in determining whether a project will result in the production of ozone.

Localized Operations Effects

The No Action Alternative would not result in any project-related changes to conditions (i.e., local roadway circulation patterns) that affect local air quality. As such, there would be little effect on local air quality.

Temporary Effects

The No Action Alternative would not result in any of the construction identified for the project, but would include effects associated with the construction of future roadway improvement projects as described in **Section 2.3.1** of this Final EIS. The construction of these improvements would entail short-term, localized effects. Similar to the Preferred Alternative, it is assumed that mitigation measures would be implemented for each construction effort to avoid or minimize adverse construction-period effects. Effects and associated mitigation measures would be calculated in individual environmental review processes. Construction emissions related to the tunnel boring under the Preferred Alternative would not occur under the No Action Alternative. As such, overall emissions related to construction activity would be less under the No Action Alternative when compared to the Preferred Alternative, as tunneling requires a substantial construction effort. In addition, the Preferred Alternative would result in a shorter duration construction schedule (approximately three years) when compared to construction of No Action Alternative improvements, which would result in higher annual emissions under the Preferred Alternative when compared to the No Action Alternative.

3.11.2.3 Preferred Alternative

The Preferred Alternative (including the EMU technology and the rail alignment) was evaluated against the criteria identified in **Section 3.11.2.2** of the Draft EIS to determine whether any adverse effects to air quality would occur during operations of the high-speed rail service as well as during the construction period of about 4 years.

Temporary, short-term adverse air quality effects can result from project construction activities, specifically with exhaust emissions (including GHGs) from construction equipment and truck haul trips, and with fugitive dust from soil disturbance activity. The Draft EIS had characterized construction-related impacts to air quality and GHG emissions as "indirect." This error was corrected in the Supplemental Draft EIS. Such impacts are properly noted as "temporary" construction effects in this section.

All calculations related to operational and construction period air quality effects are provided in Final EIS **Appendix F-L**.

Regional Operations Effects

The Preferred Alternative would have complex effects on regional air quality. Criteria pollutant and GHG emissions would result from the preferred locomotive technology (EMU) and station/maintenance facility activities. However, criteria pollutants and GHG emissions would decrease in association with the diversion of passenger vehicles that would otherwise have traversed the entire distance between southern California and Las Vegas.

It is important to note that the Preferred Alternative would traverse two air basins: the Mojave Desert Air Basin and the Clark County area. The distribution between resource areas is approximately 80.5 percent in the Mojave Desert Air Basin and 19.5 percent in Clark County, accounting for the proportionate amount of rail alignment within each state.

Mojave Desert Air Basin Emissions – California

Table F-3.11-7 and **Table F-3.11-8** show the regional criteria pollutant and GHG emissions that would result from operation of the Preferred Alternative at the opening and horizon years. All criteria pollutant emissions would remain below general conformity *de minimis* thresholds during the opening and horizon years. Notably, the shift from passenger vehicles to high-speed trains associated with the Preferred Alternative will result in reductions of some criteria pollutants, some to a substantial degree.

Table F-3.11-7 Preferred Alternative Regional Criteria Pollutant and Greenhouse Gas Emissions, Mojave Desert Air Basin, Opening Year Operations

	Criteria Pollutant Emissions						CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Railway Emissions	1	75	13	8	3	2	47,463
Mobile-source Emissions	(76)	(530)	(1,621)	(3)	(37)	(34)	(322,115)
Net Emissions	(75)	(455)	(1,608)	5	(34)	(32)	(274,652)
General Conformity Threshold	50	100	--	--	100	--	--
Exceed Threshold?	No	No	N/A	N/A	No	N/A	N/A

Source: ICF/Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Table F-3.11-8 Preferred Alternative Regional Criteria Pollutant and Greenhouse Gas Emissions, Mojave Desert Air Basin, Horizon Year Operations

	Criteria Pollutant Emissions						CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Railway Emissions	1	118	21	12	4	4	75,122
Mobile-source Emissions	(77)	(366)	(1,516)	(8)	(69)	(63)	(769,715)
Net Emissions	(76)	(248)	(1,495)	4	(65)	(59)	(694,593)
General Conformity Threshold	50	100	--	--	100	--	--
Exceed Threshold?	No	No	N/A	N/A	No	N/A	N/A

Source: ICF/ Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Clark County Emissions – Nevada

Table F-3.11-9 and **Table F-3.11-10** show regional criteria pollutant and GHG emissions that would result from operation of the Preferred Alternative at the opening and horizon years. All criteria pollutant emissions would remain below general conformity *de minimis* thresholds during the opening year and at the horizon year. Notably, the shift from passenger vehicles to high-speed trains associated with the Preferred Alternative will result in reductions of some criteria pollutants, some to a substantial degree.

Table F-3.11-9 Preferred Alternative Regional Criteria Pollutant and Greenhouse Gas Emissions, Clark County Air Basin, Opening Year Operations

	Criteria Pollutant Emissions						CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Railway Emissions	<1	18	3	2	1	1	11,497
Mobile-source Emissions	(104)	(151)	(2,130)	(2)	(7)	(4)	(108,808)
Net Emissions	(104)	(133)	(2,127)	<1	(6)	(3)	(97,311)
General Conformity Threshold	50	100	100	--	70	--	--
Exceed Threshold?	No	No	No	N/A	No	N/A	N/A

Source: ICF/Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Table F-3.11-10 Preferred Alternative Regional Criteria Pollutant and Greenhouse Gas Emissions Clark County Air Basin, Horizon Year Operations

	Criteria Pollutant Emissions						CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Railway Emissions	<1	29	5	3	1	1	18,197
Mobile-source Emissions	(85)	(74)	(2,830)	(3)	(10)	(5)	(173,422)
Net Emissions	(85)	(45)	(2,825)	<1	(9)	(4)	(155,225)
General Conformity Threshold	50	100	100	--	70	--	--
Exceed Threshold?	No	No	No	N/A	No	N/A	N/A

Source: ICF/Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Operational Effects on Climate Change and Greenhouse Gas Emissions

Global climate change is a problem caused by combined worldwide greenhouse gas emissions. Mitigating global climate change will require worldwide solutions. GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which could have otherwise escaped to space. Prominent GHGs contributing to this process include water vapor, carbon dioxide, nitrous oxide, methane, ozone, and certain hydro- and fluorocarbons. This "greenhouse effect" keeps the Earth's atmosphere near the surface warmer than it would be otherwise. Increases in these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface. Emissions of GHGs in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and to contribute to what is termed "global warming," a trend of unnatural warming of the Earth's natural climate. Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors) and toxic air contaminants (TACs), which are pollutants of regional and local concern.

Tables F-3.11-7 through **F-3.11-10** show GHG emissions associated with operations of the Preferred Alternative. As shown therein, GHG emissions are predicted to decrease under the Preferred Alternative when compared to no project, at both the opening year and horizon year.

As no quantitative GHG guidelines or thresholds have been developed by the EPA, Mojave Desert Air Quality Management District (MDAQMD), or the Clark County Department of Air Quality & Environmental Management (DAQEM), these emissions are provided for informational purposes only.

Localized Operational Effects

With respect to the Preferred Alternative, localized effects of primary concern are TAC emissions related to railway activity, and CO hotspot formation at congested intersection locations. An evaluation of each is provided below.

Evaluation of TAC Emissions

With the Preferred Alternative utilizing the EMU technology, there would be no new TAC emissions sources. Electric power demands would be met using existing sources.

Evaluation of CO Hotspots

Within an urban setting, vehicle exhaust is the primary source of CO. Consequently, the highest CO concentrations are generally found close to congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as the distance from the emissions source (i.e., congested intersection) increases. For purposes of providing a conservative worst-case impact analysis, CO concentrations are typically analyzed at congested intersection locations. If impacts were less than significant close to congested intersections, impacts would also be less than significant at more distant sensitive-receptor locations.

Project-related traffic volumes associated with ingress/egress to the passenger stations in Victorville and Las Vegas would have the potential to create local area CO concentrations that exceed National Ambient Air Quality Standards (NAAQS) (i.e., CO hotspots).

For California intersection locations, local area CO concentrations were projected using the CALINE4 line source dispersion model developed by Caltrans, with Emfac 2007 emissions factors. Nevada intersection locations were evaluated using the CAL3QHC line source dispersion model developed by EPA and Mobile 6 emissions factors. The evaluation of congested intersection locations to ascertain the potential for localized CO hotspots is provided below.

Victorville Intersection Locations – California

The potential for CO hotspots was evaluated for the Victorville Station (VV3). **Table F-3.11-11** shows projected CO concentrations during the opening year**, Table F-3.11-12** shows projected horizon year concentrations. As shown in **Tables F-3.11-11** and **F-3.11-12**, concentrations at the most congested intersection locations would not violate NAAQS (i.e., result in a CO hot spot) at any intersection at the opening year or horizon year.

Las Vegas Intersection Locations – Nevada

The potential for CO hotspots was evaluated for the Las Vegas passenger station options (Southern Station or Central Station B). **Table F-3.11-13** and **Table F-3.11-14** show projected CO concentrations during the opening year for each station; **Table F-3.11-15** and **Table F-3.11-16** show projected horizon year CO concentrations. As shown in

Table F-3.11-11 CO Hotspot Analysis, Opening Year, Victorville Station

Intersection[a]	Max. 1-Hour Base (ppm)[b]	Max. 1-Hour With Project (ppm)[b]	Significant 1-Hour Impact?[c]	Max. 8-Hour Base (ppm)[d]	Max. 8-Hour With Project (ppm)[d]	Significant 8-Hour Impact?[e]
I-15 NB Ramps and Dale Evans Parkway	3.0	4.3	No	1.9	2.8	No
I-15 SB Ramps and Dale Evans Parkway	3.0	4.2	No	1.9	2.7	No
Station Access #1 and Dale Evans Parkway	2.9	4.2	No	1.8	2.7	No
Future Street and Dale Evans Parkway	3.0	3.5	No	1.9	2.2	No
Future Street and Station Access #5	3.1	3.4	No	2.0	2.2	No

Source: ICF/Jones & Stokes, 2009.

Notes: ppm = parts per million
[a] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the project by DMJM Harris/AECOM, October 2009.
[b] Includes 1-hour background concentration of 2.6 ppm.
[c] The state standard for the 1-hour average CO concentration is 20 ppm.
[d] Includes 8-hour ambient background concentration of 1.6 ppm.
[e] The state standard for the 8-hour average CO concentration is 9 ppm.

Table F-3.11-12 CO Hotspot Analysis, Horizon Year, Victorville Station

Intersection[a]	Max. 1-Hour Base (ppm)[b]	Max. 1-Hour With Project (ppm)[b]	Significant 1-Hour Impact?[c]	Max. 8-Hour Base (ppm)[d]	Max. 8-Hour With Project (ppm)[d]	Significant 8-Hour Impact?[e]
I-15 NB Ramps and Dale Evans Parkway	2.9	3.1	No	1.8	2.0	No
I-15 SB Ramps and Dale Evans Parkway	3.1	3.4	No	2.0	2.2	No
Future Street and Dale Evans Parkway	3.2	3.2	No	2.0	2.0	No

Source: ICF/Jones & Stokes, 2009.

Notes: ppm = parts per million
[a] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the project by DMJM Harris/AECOM, October 2009.
[b] Includes 1-hour background concentration of 2.6 ppm.
[c] The state standard for the 1-hour average CO concentration is 20 ppm.
[d] Includes 8-hour ambient background concentration of 1.6 ppm.
[e] The state standard for the 8-hour average CO concentration is 9 ppm.

Table F-3.11-13 CO Hotspot Analysis, Opening Year, Las Vegas Southern Station

Intersection[a]	Max. 1-Hour Base (ppm)[b]	Max. 1-Hour With Project (ppm)[b]	Significant 1-Hour Impact?[c]	Max. 8-Hour Base (ppm)[d]	Max. 8-Hour With Project (ppm)[d]	Significant 8-Hour Impact?[e]
Valley View Blvd and Tropicana Ave	8.6	8.6	No	5.3	5.3	No
Dean Martin Dr and Tropicana Ave	8.5	8.6	No	5.2	5.4	No
Aldebaran Dr and Hacienda Ave	7.9	8.2	No	4.9	5.1	No
Polaris Ave and Hacienda Ave	7.9	8.4	No	4.8	5.4	No
Polaris Ave and Russell Rd	8.4	9.0	No	5.0	5.8	No
I-15 SB Ramps and Russell Rd	9.4	9.5	No	6.0	6.1	No

Source: ICF/Jones & Stokes, 2008.

Notes: ppm = parts per million

[a] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the project by DMJM Harris/AECOM, August 2008.

[b] Includes 1-hour background concentration of 7.0 ppm.

[c] The NAAQS for the 1-hour average CO concentration is 35 ppm.

[d] Includes 8-hour ambient background concentration of 4.2 ppm.

[e] The NAAQS for the 8-hour average CO concentration is 9 ppm.

Table F-3.11-14 CO Hotspot Analysis, Opening Year, Las Vegas Central Station B

Intersection[a]	Max. 1-Hour Base (ppm)[b]	Max. 1-Hour With Project (ppm)[b]	Significant 1-Hour Impact?[c]	Max. 8-Hour Base (ppm)[d]	Max. 8-Hour With Project (ppm)[d]	Significant 8-Hour Impact?[e]
Flamingo Rd and Hotel Rio Dr	8.1	11.1	No	5.0	7.0	No
Dean Martin Dr and Hotel Dr	7.6	8.5	No	4.7	5.4	No
Dean Martin Dr and Tropicana Ave	8.4	8.8	No	5.2	5.4	No

Source: ICF/Jones & Stokes, 2008.

Notes: ppm = parts per million

[a] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the project by DMJM Harris/AECOM, August 2008.

[b] Includes 1-hour background concentration of 7.0 ppm.

[c] The NAAQS for the 1-hour average CO concentration is 35 ppm.

[d] Includes 8-hour ambient background concentration of 4.2 ppm.

[e] The NAAQS for the 8-hour average CO concentration is 9 ppm.

Table F-3.11-15 CO Hotspot Analysis, Horizon Year, Las Vegas Southern Station

Intersection[a]	Max. 1-Hour Base (ppm)[b]	Max. 1-Hour With Project (ppm)[b]	Significant 1-Hour Impact?[c]	Max. 8-Hour Base (ppm)[d]	Max. 8-Hour With Project (ppm)[d]	Significant 8-Hour Impact?[e]
Valley View Blvd and Tropicana Ave	9.0	9.0	No	5.7	5.7	No
Dean Martin Dr and Tropicana Ave	8.3	8.3	No	5.1	5.2	No
I-15 NB Ramps and Tropicana Ave	10.1	10.2	No	6.7	6.7	No
Aldebaran Dr and Hacienda Ave	8.0	8.1	No	5.0	5.1	No
Polaris Ave and Hacienda Ave	7.9	8.3	No	4.9	5.1	No
Valley View Blvd and Hacienda Ave	10.8	10.8	No	6.9	6.9	No
Polaris Ave and Russell Rd	8.8	8.7	No	5.5	5.6	No
I-15 SB Ramps and Russell Rd	9.1	9.4	No	5.9	6.0	No
I-15 NB Ramps and Russell Rd	9.6	9.2	No	5.9	6.4	No

Source: ICF/Jones & Stokes, 2008.

Notes: ppm = parts per million

[a] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the project by DMJM Harris/AECOM, August 2008.

[b] Includes 1-hour background concentration of 7.0 ppm.

[c] The NAAQS for the 1-hour average CO concentration is 35 ppm.

[d] Includes 8-hour ambient background concentration of 4.2 ppm.

[e] The NAAQS for the 8-hour average CO concentration is 9 ppm.

Table F-3.11-16 CO Hotspot Analysis, Horizon Year, Las Vegas Central Station B

Intersection[a]	Max. 1-Hour Base (ppm)[b]	Max. 1-Hour With Project (ppm)[b]	Significant 1-Hour Impact?[c]	Max. 8-Hour Base (ppm)[d]	Max. 8-Hour With Project (ppm)[d]	Significant 8-Hour Impact?[e]
Flamingo Rd and Hotel Rio Dr	5.3	7.4	No	2.6	8.6	No
Flamingo Rd and I-15 NB On/Off Ramps	5.7	6.0	No	2.7	8.6	No
Dean Martin Dr and Hotel Dr	4.8	5.5	No	2.0	8.6	No
Dean Martin Dr and Tropicana Ave	5.5	5.8	No	2.5	8.6	No
Tropicana Ave and I-15 NB Ramps	6.9	6.2	No	3.7	8.6	No

Source: ICF/Jones & Stokes, 2008.

Notes: ppm = parts per million
[a] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the project by DMJM Harris/AECOM, August 2008.
[b] Includes 1-hour background concentration of 7.0 ppm.
[c] The NAAQS for the 1-hour average CO concentration is 35 ppm.
[d] Includes 8-hour ambient background concentration of 4.2 ppm.
[e] The NAAQS for the 8-hour average CO concentration is 9 ppm.

Temporary Effects

Construction of the Preferred Alternative would temporarily generate emissions of fugitive dust (PM_{10} and $PM_{2.5}$), construction equipment tailpipe emissions (ROC, NO_x and CO), and evaporative VOC emissions from paving and painting. Construction-period emissions would be temporary and localized to the areas adjacent to the construction activity.

Construction of the Preferred Alternative is anticipated to last approximately 38 months. The total amount of construction (i.e., magnitude), the duration of construction, and the intensity of construction activity would have a substantial effect upon the amount of construction emissions occurring at any one time. The emission forecasts provided in the Draft EIS (see Draft EIS **Table 3.11-24**) reflected a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. However, following publication of the Draft EIS, additional detail about project construction was developed and air quality effects were recalculated for the Preferred Alternative. Accordingly, estimates of construction-period emission have been recalculated (see **Appendix F-L**); pre-mitigation results are shown in **Tables F-3.11-17** and **Table F-3.11-18**. As shown in these tables, certain pollutant levels would exceed general conformity *de minimis*

thresholds during construction. Accordingly, **Mitigation Measures AQ-1**, **AQ-3**, and **AQ-5** described in **Section 3.11.3** will be required to reduce construction period emissions to below general conformity *de minimis* thresholds. These measures were selected as standard practice control measures as included in require adherence to regional fugitive dust (PM_{10}) control measures, but also set forth several additional measures to reduce the emissions of criteria pollutants during construction, including requirements that all off-road construction vehicles meet "Tier 4" standards set forth by the EPA. These standards were enacted by EPA in 2004. Construction vehicles meeting these standards would reduce exhaust emissions from off-road construction vehicles by 90 percent relative to older engines meeting less stringent standards. The measures also require the use of paints and solvents that produce low levels of volatile organic compounds, thus reducing ROC. The measures also include the use of compressed natural gas and/or biodiesel fuel. The construction-period emissions were recalculated utilizing these mitigation measures and the resultant analysis (see **Appendix F-L**) shows that construction period pollutant emissions would be below general conformity *de minimis* thresholds (see **Tables F-3.11-20** and **F-3.11-21**). Therefore, no general conformity determination is required.

The Frias Substation had not yet been developed when the Draft EIS was published, but has been included in the recalculated emissions for the Preferred Alternative. The Frias Substation would require site grading, trenching, foundation construction, and utility structure/power line installations. Construction duration is anticipated to be two months or less. Facility construction would occur concurrent with adjacent track installation and require similar construction equipment.

The criteria air pollutant, TAC, and GHG emissions that would occur as a result of construction of the Frias Substation would represent a small fraction of the total regional emissions that would result from overall project construction. With respect to localized impacts, sensitive receptors closest to the proposed facility include areas of single-family residential development approximately 250 feet to the north and to the south of the proposed substation site. During the approximately two months of facility construction, these sensitive uses would experience a marginal exposure increase to localized criteria pollutant and TAC emissions. **Mitigation Measure AQ-3** would be applied to the Frias Substation. Once operational, there would be no long-term direct emissions associated with this proposed facility.

Table F-3.11-17 Revised Construction Period Regional Criteria Pollutant and Greenhouse Gas Emissions, Mojave Desert Air Basin, Before Mitigation

	Criteria Pollutant Emissions (tons per year)					CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	PM_{10}	$PM_{2.5}$	
Evaluation Year						
Year 1	27	200	109	183	93	18,103
Year 2	112	832	457	273	129	80,594
Year 3	100	739	425	267	123	75,166
Year 4	44	320	188	177	97	34,024
General Conformity Threshold (per year)	50	100	--	100	--	--
Exceed Threshold?	Yes	Yes	N/A	Yes	N/A	N/A

Source: ICF/Jones & Stokes, 2011.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Table F-3.11-18 Revised Construction Period Regional Criteria Pollutant and Greenhouse Gas Emissions, Clark County, Before Mitigation

	Criteria Pollutant Emissions (tons per year)					CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	PM_{10}	$PM_{2.5}$	
Evaluation Year						
Year 1	7	48	26	40	20	4,371
Year 2	27	200	108	62	28	19,561
Year 3	23	173	99	61	27	17,661
Year 4	10	75	44	37	20	7,898
General Conformity Threshold	50	100	100	70	--	--
Exceed Threshold?	No	Yes	Yes	No	N/A	N/A

Source: ICF/Jones & Stokes, 2011.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

3.11.2.4 Comparison with Other Action Alternatives

Table F-3.11-19 summarizes the comparison of air quality and global climate change effects for the No Action Alternative and the Action Alternatives.

Permanent Effects

The action alternatives were analyzed for air quality effects under two potential technology options: DEMU and EMU. As with the analysis of the EMU technology option under the Preferred Alternative, the No Action Alternative is used to compare the relative impacts and benefits of the proposed improvements under the DEMU technology option under the other action alternatives.

Under either technology option, the diversion of passenger vehicles from I-15 would decrease VMT and thus result in a decrease in criteria pollutant and GHG emissions.

Emissions related to passenger rail propulsion (either the DEMU or EMU technology options) would represent an increase in both criteria pollutant and GHG emissions. Ozone precursor emissions of NO_X under the DEMU technology option would exceed general conformity thresholds at the opening and horizon years. However, all criteria pollutant emissions under the Preferred Alternative EMU technology option would remain below general conformity thresholds at the opening and horizon years.

The Action Alternatives included in the Draft EIS and Supplemental Draft EIS include various rail alignment options which would influence emissions related to passenger rail propulsion by modifying the total length of the proposed rail alignment. The longer the distance between the Victorville and Las Vegas Station options (VV1, VV2, Central Station A, and Downtown Station), the more emissions would be generated. Selecting VV3B as the preferred Victorville Passenger Site and eliminating Segment 7 under the Preferred Alternative has reduced the total distance of the project rail alignment when compared to other action alternatives, thereby resulting in lower emissions related to passenger rail propulsion. If the Southern Station is ultimately selected as the Las Vegas Station, the rail alignment would be 1.8 miles shorter, thereby resulting in the shortest possible alignment of all the action alternatives, resulting in even lower emissions related to passenger rail propulsion.

Temporary Effects

The Victorville Passenger Stations evaluated under the other action alternatives would have a slightly smaller surface parking area than the VV3 option selected under the Preferred Alternative. The decrease in parking area size would result in the Victorville Station having a marginal decrease in criteria pollutant emissions and GHG emissions associated with site grading, asphalt paving activity, and truck haul trips relative to Preferred Alternative.

Construction emissions related to the tunnel boring in Segment 4C of the Preferred Alternative would not occur with the Segment 4A option. If Segment 4A were to become viable subsequent to publication of the Final EIS, construction-period emissions would be recalculated, and would be expected to show substantially lower levels of criteria pollutants, given the shorter alignment length and lack of tunneling required to construct Segment 4A.

Table F-3.11-19 Alternatives Comparison – Air Quality

Alternative	Exceed a state or federal standard?	Result in CO Hotspot?	Expected adverse construction period impact?
No Action Alternative	Not expected	Not expected	Not expected
Technology Options, including Autotransformer Sites (EMU Only)			
DEMU (Diesel-Electric Multiple Unit)	Yes – O_3 precursor emissions of NO_x	No	Construction emissions would not exceed *de minimis thresholds*;
EMU (Electric Multiple Unit)	No	No	Construction emissions would not exceed *de minimis thresholds*;

Source: CirclePoint, 2011.

3.11.3 Mitigation Measures for the Preferred Alternative

Mitigation Measures AQ-1 and **AQ-3** identified in **Section 3.11.5** of the Draft EIS and **AQ-5**, added to this Final EIS, would be applied during the construction of the Preferred Alternative.

Mitigation Measures AQ-2 and **AQ-4** of the Draft EIS were unique to the DEMU locomotive technology. As the EMU locomotive technology was selected for the Preferred Alternative, these mitigation measures are no longer applicable or necessary.

Mitigation Measures AQ-1 and **AQ-3** would reduce fugitive dust (PM_{10}) emissions by requiring a fugitive dust control plan for each of the two air basins. Control measures required by the dust control plans would include watering for stabilization of disturbed surface area, covering loaded haul vehicles, and reducing non-essential earth-moving activities during high wind conditions.

Mitigation Measure AQ-1: Fugitive Dust Control Plan during Construction to Meet MDAQMD Rule 403.2 Requirements

Consistent with the MDAQMD Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area), the following control measures shall be implemented by the Applicant:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;
- Take actions sufficient to prevent project-related trackout onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Clean up project-related trackout or spills on publicly maintained paved surfaces within 24 hours; and
- Reduce nonessential earth-moving activity under high wind conditions. A reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.

Mitigation Measure AQ-3: Fugitive Dust Control Plan during Construction to Meet Clark County DAQEM Requirements

Consistent with Section 94 of Clark County Air Quality Guidelines, the Applicant shall compile a Dust Mitigation Plan that is consistent with measures identified in the DAQEM Construction Activities Dust Control Handbook (included by reference in Section 94 of the Clark County Air Quality Regulations) and Desert Tortoise protective measures, and a Dust Control Permit shall be secured from the DAEQM. The Dust Control Plan may include the following measures, among other measures:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions;
- Take actions sufficient to prevent project-related trackout onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Clean up project-related trackout or spills on publicly maintained paved surfaces within 24 hours; and
- Reduce nonessential earth-moving activity under high wind conditions.

Mitigation Measure AQ-5: **Utilize additional means to reduce construction period emissions of air pollutants.**

The Applicant shall integrate the following control measures into approved design-build plans:

- All off-road internal-combustion engine construction equipment shall be EPA Tier-4 certified.
- All signal boards shall be solar-powered.
- All architectural coatings products shall contain no more than 250 grams of VOC per liter of coating (2.08 pounds per gallon).
- For all work conducted within Clark County, only the following fuels shall be used to power off-road equipment:
    - A composite fuel blend consisting of at least 20 percent biodiesel.

3.11.4 Residual Impacts Following Mitigation

Tables F-3.11-20 and **F-3.11-21** show calculations of construction-period emissions incorporating **Mitigation Measures AQ-1, AQ-3,** and **AQ-5**. With the implementation of these measures, construction period emissions of all criteria pollutants would be reduced and would not exceed *de minimis* thresholds. As a result, with mitigation the project's impact on air quality would be less than significant and there would be no residual impact.

Mitigation Measures AQ-1 and **AQ-3** would reduce fugitive dust emissions from off-road, disturbed surfaces by 61 percent; and from paved roads by 50 percent

Mitigation Measure AQ-5 would substantially reduce NOx and PM exhaust emissions from off-road construction equipment. On May 11, 2004, the EPA signed the final rule introducing Tier 4 emission standards; the phasing process for these standards began in 2008 and is expected to continue through 2015 [69 FR 38957-39273, 29 Jun 2004]. The Tier 4 standards require that emissions of PM and NOx be further reduced by about 90 percent from Tier 3 levels. Use of modern equipment manufactured during 2008 or later, or older equipment that has been retrofit to meet Tier 4 standards, will be sufficient to meet required emissions reductions.

The fuel requirements within **Mitigation Measure AQ-5** would reduce ROC and CO emissions by approximately 20 percent and 13 percent, respectively for all off-road construction equipment operating within Clark County. At the same time, the use of these fuels would increase NOx emissions by approximately 2 percent These estimates are taken from the publication A *Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions* (EPA, October 2002) for the most common biodiesel blend that contain 20 percent biodiesel 80 percent conventional diesel by volume.

Implementation of **Mitigation Measures AQ-1, AQ-3** and **AQ-5** would substantially reduce criteria pollutant emissions during construction so that emission levels would be below General Conformity *de minimis* thresholds for all criteria pollutants in both air resource areas. Criteria pollutant emissions after implementation of the mitigation measures, for each year of construction, are shown below in **Tables F-3.11-17** and **F-3.11-18**.

Table F-3.11-20 Construction Period Regional Criteria Pollutant and Greenhouse Gas Emissions, Mojave Desert Air Basin, Post Mitigation

	Criteria Pollutant Emissions (tons per year)					CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	PM_{10}	$PM_{2.5}$	
Evaluation Year						
Year 1	7	17	103	70	32	18,103
Year 2	28	80	452	99	35	80,594
Year 3	26	75	427	99	34	75,166
Year 4	12	38	197	64	32	34,024
General Conformity Threshold	50	100	--	100	--	--
Exceed Threshold?	No	No	N/A	No	N/A	N/A

Source: ICF/Jones & Stokes, 2011.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Table F-3.11-21 Revised Construction Period Regional Criteria Pollutant and Greenhouse Gas Emissions, Clark County, Post Mitigation

	Criteria Pollutant Emissions (tons per year)					CO_2e Emissions, tons per year[a]
	ROC	NO_X	CO	PM_{10}	$PM_{2.5}$	
Evaluation Year						
Year 1	1	4	22	15	7	4,371
Year 2	6	20	96	23	7	19,561
Year 3	5	19	88	23	7	17,661
Year 4	2	10	40	13	7	7,898
General Conformity Threshold	50	100	100	70	--	--
Exceed Threshold?	No	No	No	No	N/A	N/A

Source: ICF/Jones & Stokes, 2011.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

3.12 NOISE AND VIBRATION

This section describes the updates/changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the noise and vibration impacts related to the Preferred Alternative in comparison to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.12.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to noise and vibration and provides responses to those comments. Several comments resulted in changes to the noise and vibration analysis in the EIS and are discussed below. Substantive updates and changes in response to comments on the Draft EIS and Supplemental Draft EIS are shown in **bold underline** and ~~strikeout~~ text.

3.12.1.1 Affected Environment

Draft EIS **Section 3.12.5** and Supplemental Draft EIS **Section 3.12.1** describe in detail the affected environment for noise and vibration for the DesertXpress project. Since publication of the Draft EIS and Supplemental Draft EIS, there have been no changes to the affected environment regarding noise and vibration because no major changes to the transportation or land use patterns have occurred in the project region. In addition, no comments were received during the public review period that required changes to the affected environment discussion in the Draft EIS. The affected environment discussions in Draft EIS **Section 3.12.5** and Supplemental Draft EIS **Section 3.1-2.1** remain applicable to this Final EIS and the evaluation of the Preferred Alternative.

It is important to note that Supplemental Draft EIS **Section 3.12.1** updated the discussion in Draft EIS **Section 3.12.5.2** related to the affected environment in the metropolitan Las Vegas area (Segment 6). Supplemental Draft EIS **Section 3.12.1** included a discussion of new noise sensitive developments that were constructed after the original noise measurements were taken for the Draft EIS. The new noise sensitive development included a mobile home park immediately east of the I-15 freeway at Blue Mountain Road.

Based on additional consultation following publication of the Supplemental Draft EIS, an approximately 10 mile portion of Segment 3B in the vicinity of the Halloran Springs and Halloran Summit interchanges would be further modified to reduce or avoid impacts to sensitive resources in the area. This modification would shift the rail alignment from the north to the south side of the I-15 freeway, remaining within the I-15 ROW. At Halloran

Summit, the rail alignment would cross back to the north side of the I-15 ROW. This modification results in a slight change to geographic area potentially affected by project noise and vibration.

3.12.1.2 Regulatory Environment

The regulatory environment for noise and vibration for the DesertXpress project is described in detail in Draft EIS **Section 3.12.3**. In addition, no comments were received during the public review period that require changes to the regulatory environment discussion in the Draft EIS. This regulatory environment discussion remains applicable to this Final EIS and the evaluation of the Preferred Alternative.

3.12.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

The Noise and Vibration mitigation measures in Draft EIS **Section 3.12, Noise and Vibration**, and Supplemental Draft EIS **Section 3.12, Noise and Vibration**, were not numbered. For consistency with other technical sections, this Final EIS includes a revision assigning numbers to each mitigation measure, as shown below.

Mitigation Measures NV-1 through **NV-4** addresses noise impacts.

Mitigation Measure NV-1: Noise Barriers

Mitigation Measure NV-2: Relocation of Crossovers or Special Trackwork at Crossovers

Mitigation Measure NV-3: Building Sound Insulation

Mitigation Measure NV-4: Property Acquisitions or Easements

Mitigation Measure NV-5 through **NV-9** addresses vibration impacts.

Mitigation Measure NV-5: Ballast Mats

Mitigation Measure NV-6: Resilient Rail Fasteners

Mitigation Measure NV-7: Relocation of Crossovers or Special Trackwork

Mitigation Measure NV-8: Floating Slabs

Mitigation Measure NV-9: Property Acquisitions or Easements

Mitigation Measure NV-10 addresses noise and vibration impacts resulting from construction.

Mitigation Measure NV-10: Construction Noise and Vibration Measures

Draft EIS **Section 3.12.6.2,** which evaluated the noise and vibration effects in the metropolitan Las Vegas area (Segment 6), was updated in Supplemental Draft EIS **Section 3.12.3** to more accurately reflect the plan and profile of the rail alignment and anticipated train speeds between Blue Diamond Road and Flamingo Road. The rail alignment in this portion would be on an elevated structure at a height of up to 63 feet. Supplemental Draft EIS **Section 3.12.3** also included updates to noise sensitive land uses in metropolitan Las Vegas, specifically a mobile home park immediately east of the I-15 freeway at Blue Mountain Road.

Several comments on the Draft EIS resulted in changes to the noise and vibration analysis in the EIS, which are discussed below.

Comment 345 on the Draft EIS requested that the statement that the traffic noise near the Las Vegas Station sites would only represent a "small percentage" of the projected traffic increase be substantiated. To address this comment, this Final EIS amends Draft EIS **Section 3.12.6.1**, under the heading "Traffic Noise," paragraph 3, as follows:

> In Las Vegas, there are only four intersections for all four station alternatives combined that **would experience an overall doubling of traffic volumes by year 2030**. **A two-fold increase in traffic volumes typically results in an audible increase in traffic noise, as perceived by the human ear.** ~~have a growth factor above 2.~~ However, at all four intersections, the increase in traffic ~~due to the Action Alternatives~~ **is primarily related to future growth in the metropolitan Las Vegas area by year 2030. The traffic generated by the DesertXpress project at the Las Vegas Station sites would not individually result in the two-fold increase of traffic volumes at the four intersections, but would rather combine with the anticipated future traffic volume increases associated with regional growth in the area. The traffic generated by the DesertXpress project at the Las Vegas Station site options would represent less than half of the anticipated future increase in traffic volumes at these intersections.** ~~is only a small percentage of the projected increase and t~~ **T**herefore, there is no noise impact associated with increases in traffic volume in Las Vegas due to the project.

Comment 346 on the Draft EIS requested clarification related to sensitive receptors in the Mojave National Preserve and that the context of the existing traffic noise on the I-15 freeway corridor near the Mojave National Preserve (i.e., Segment 3) be provided. To address this comment, this Final EIS amends Draft EIS **Section 3.12.6.2,** under the heading "Segment 3", paragraph 1, as follows:

> The noise generated by both technology options would be comparable to that of a semi truck traveling at full speed on the highway. The additional audible noise in the Preserve to the south of the I-15 **freeway would be limited to approximately ½-mile and** would be comparable to adding approximately 60 total daily trucks to existing highway traffic (comparable to just over two

additional trucks per hour). The noise generated by the high speed rail would affect approximately the same area of the Preserve as the highway along this section. **Further, there are no hiking trails or other attractions within 10 or more miles from the I-15 freeway corridor, and therefore, no likely sensitive receptors would be affected by train noise.**

Comment 347 on the Draft EIS requested that the timing of the implementation of the noise barrier mitigation to reduce adverse noise effects be identified. To address this comment, this Final EIS amends Draft EIS **Section 3.12.7.1**, bullet point 1, as presented below. In addition, based on additional noise evaluations conducted as part of the Supplemental Draft EIS, it was concluded that noise barriers at a height of at least four feet would be sufficient to reduce severe noise impacts to a non-adverse level. This information is also reflected in the change to Draft EIS **Section 3.12.7.1**, bullet point 1.

The noise analysis used standard noise barrier calculations to determine the effectiveness of the barriers at mitigating impacts. The barrier calculations depend primarily on the geometry of the situation, including the heights of the source and receiver, the height of the barrier, and the distances between the source and barrier and the barrier and the receiver. The primary purpose of the barrier is to block the line of sight between the source and receiver. Blocking the line of sight between the noise source and the receiver with a standard noise barrier is a "rule of thumb" used by acoustical engineers to determine if a barrier if effective in reducing the impact. One of the most important aspects of the barrier calculation is the distance from the source of the noise (in this case, the proposed high-speed train) and the barrier. On elevated structures, the noise barriers are located very close to the source of the noise, which is primarily generated at the wheel/rail interface. Because of this and height of the elevated structures, the barriers provide a substantial reduction in noise.

~~Depending on the proximity of the barrier to the tracks and on the track elevation, noise barriers typically range in height from between four and ten feet.~~

Noise barriers would be required to be at least four feet in height and would be constructed along the at grade portions of the rail alignment and on the elevated structures to reduce severe impacts and noise impacts. The noise barriers shall be installed prior to the commencement of train operations along the rail alignment to reduce adverse noise effects.

3.12.2 Analysis of Environmental Consequences

3.12.2.1 Methods of Evaluation

The noise and vibration impact methodology described in Draft EIS **Section 3.12.4** remains applicable to this Final EIS and the evaluation of the Preferred Alternative.

The area for noise and vibration analysis generally includes a ½-mile radius from the Preferred Alternative. As noise and vibration attenuate with distance, substantial noise and vibration effects are not anticipated beyond the ½-mile radius from the Preferred Alternative rail alignment, stations, and maintenance facilities.

This evaluation considers potential operational and construction noise and vibration effects. Operational noise and vibration effects are considered permanent, while construction noise and vibration effects are considered temporary.

Noise Methodology

Future noise levels were modeled and compared to the existing noise measurements to determine the change in noise levels and specific noise impacts. The existing noise measurement locations were selected in noise sensitive areas and were intended to represent a range of existing noise conditions along the proposed rail alignment.

There are two levels of noise impact considered – "severe" and "impact." These two classifications are consistent with FRA noise impact criteria.

- *Severe:* Severe noise impacts identify locations where a significant percentage of people would be highly annoyed by noise from the high-speed rail alignment. FRA particularly encourages noise abatement on high-speed train projects where such severe noise impacts are identified.
- *Impact*: A noise impact identifies an area where the change in the cumulative noise level is noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels and the types and numbers of noise-sensitive land uses affected.

Noise is typically defined as unwanted or undesirable sound. The basic parameters of environmental noise that affect human response are (1) intensity or level, (2) frequency content, and (3) variation with time. The intensity of level of noise is expressed on a compressed scale in units of decibels (dB). By using this scale, the range of normally encountered sound can be expressed by values between 0 and 120 dB. On a relative scale, a 3 dB change in sound is usually the smallest unit of change in noise levels perceptible to the human ear, whereas a 10 dB change in sound level would typically be perceived as a doubling (or halving) in the loudness of a sound. Noise levels and intensity also involve

varying frequencies. As the sensitivity of human hearing varies with frequency, the A-weighting system is commonly used when measuring environmental noise to provide a single number descriptor that correlates with the human subjective response. Sound levels measured using this weighting system are called "A-weighted" sound level, and are expressed in dB notation a dBA. At a distance of 50 feet, a noise level of 60 dBA is equivalent to a commercial air conditioner, 70 dBA is equivalent to a lawn mower, 80 dBA is equivalent to a bus travelling at 55 mph, and 90 dBA is equivalent to a jack hammer.

Sensitivity to noise also increases at night, as the background noise levels are typically limited and the overall ambient noise levels are usually lower than noise levels during the day. The Day-Night Sound Level (L_{dn}) is used to calculate a 24-hour period of cumulative noise exposure, with an added 10 dB 'penalty' imposed on noise that occurs during the nighttime hours (between 10:00 PM and 7:00 AM). In other words, if an activity results in a noise level of 55 dB, the L_{dn} would calculate this noise as 65 dB if the activity took place between the hours of 10:00 PM and 7:00 AM.

The noise impact assessment for high-speed rail operations is based on a comparison of existing and projected future noise exposure for different land use categories. The following steps were performed to assess train noise impact:

- A detailed land-use survey was conducted along the project corridor to identify and classify all noise-sensitive receptors within the vicinity of the Preferred Alternative. The majority of these receptors are single- and multi-family residences, falling under FRA Category 2.[1] The remaining receptors are generally institutional sites falling under FRA Category 3.[2]
- The receptors were clustered based on distance to the tracks, acoustical shielding between the receptors and the tracks, and other operational parameters.
- The existing noise exposure at each cluster of receptors was estimated based on the ambient noise measurements discussed above, and was used to determine the thresholds for impact and severe impact using the FRA criteria.
- Projections of future high-speed rail noise at each cluster of receptors were developed based on distance from the tracks; train schedule and train speed using the methods described above.

[1] FRA Category 2 refers to residences and building where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.

[2] FRA Category 3 refers to institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medial offices, conference rooms, recording studios and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

- In areas where the projections showed either degree of impact, mitigation options were evaluated and new projections were developed assuming implementation of mitigation measures.

Vibration Methodology

The Preferred Alternative vibration effects were assessed using the FRA vibration criteria. The FRA vibration criteria consider the land use types and the frequency of train passbys. FRA defines a frequent train passby event as one where more than 70 train passbys occur within a 24-hour period. Infrequent train passby events entail fewer than 70 train passby events within a 24-hour period.

Table F-3.12.1 summarizes the vibration impact criteria. The vibration propagation tests described in Draft EIS **Section 3.12.6.2** remain applicable to this Final EIS and the evaluation of the Preferred Alternative. The train vibration characteristics were combined with the ground vibration propagation test results to project vibration levels as a function of distance for the Preferred Alternative.

The vibration effects for the Preferred Alternative are identified using the infrequent event criteria since there would be fewer than 70 train passbys per day. Depending on the type of land uses potentially affected by operation of the Preferred Alternative, the threshold for identifying adverse vibration effects would range from 65 to 83 vibration decibels (VdB).

Table F-3.12-1 Vibration Impact Criteria

Land Use Category	Ground-Borne Vibration Impact (VdB re: 1 micro-inch/sec)	
	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[3]	65 VdB[3]
Category 2: Residences are buildings where people normally sleep	72 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	83VdB

Source: Federal Railroad Administration, 2005.

Notes:

1 – Frequent Events is defined as more than 70 vibration events per day.

2 – Infrequent events is defined as fewer than 70 vibration events per day.

3 – This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often require special design of the HVAC systems and stiffened floors.

Construction Noise Criteria

Construction noise criteria are based on the land use types and the time of day, as defined in the FRA Guidance Manual. **Table F-3.12-2** presents the construction noise criteria in terms of equivalent continuous noise level (L_{eq}) for an eight-hour work shift. For every doubling of distance from the construction site, it is assumed that construction noise levels would decrease by approximately 6 dB. In other words, if construction noise is measured as 65 dBA at a distance of 50 feet from a construction site, noise levels would be approximately 59 dBA at a distance of 100 feet.

Table F-3.12-2 FRA Construction Noise Criteria

Land Use	Noise Limit, 8-Hour L_{eq} (dBA)	
	Daytime	Nighttime
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: FRA, 2005.

3.12.2.2 No Action Alternative

Existing noise levels associated with the I-15 freeway, UPRR operations, and other local roadways would continue to generate noise and vibration under the No Action Alternative.

Under the No Action Alternative, the traffic volumes on the I-15 freeway are expected to increase as a result of future travel demand and regional growth. This likely increase in traffic volumes along the I-15 freeway between Victorville and Las Vegas would have the potential to generate higher traffic noise levels, contributing to an increase in ambient noise levels within the vicinity of the I-15 freeway. Construction of these improvements could also introduce vibration impacts to sensitive receptors. Refer to Draft EIS **Section 3.5.4.2** for a detailed discussion related to the anticipated traffic increase on the I-15 freeway mainline under the No Action Alternative.

The No Action Alternative planned and programmed transportation improvements would be required to undergo separate environmental review to determine the specific noise effects and to determine the type and extent of mitigation necessary to reduce potential adverse noise and vibration effects.

These planned and programmed transportation improvement projects would occur as part of the Preferred Alternative as well. The addition of the high-speed train noise and vibration as a result of the Preferred Alternative, in combination with these transportation improvement projects under the No Action Alternative would result in somewhat greater noise and vibration effects than the No Action Alternative, notwithstanding the

anticipated diversion of automobile traffic (up to 1,400 vehicles per hour in peak hours by the year 2030) associated with the introduction of high-speed passenger rail service in this corridor.

3.12.2.3 Preferred Alternative

Draft EIS **Section 3.12.6** and Supplemental Draft EIS **Section 3.12.3** describe in detail the noise and vibration effects by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative. This evaluation considers the noise and vibration effects during operation and construction of the Preferred Alternative.

Operational Period Noise

Table F-3.12-3 presents the detailed comparison of the existing and future noise levels within the vicinity of the Preferred Alternative. As set forth in Final EIS **Section 2.4.1,** the Preferred Alternative includes two options for the Las Vegas Station site – the Las Vegas Southern Station and Central Station B. Depending on the final Las Vegas Station site selection, the Preferred Alternative rail alignment would affect different sensitive noise receptors. The Southern Station would result in the rail alignment being shorter by about 1.8 miles through metropolitan Las Vegas. **Table F-3.12-3** identifies the noise impacts of the Preferred Alternative terminating at the Las Vegas Southern Station and terminating at the Las Vegas Central Station B.[3]

Table F-3.12-3 notes the location and distance to the near track and includes the existing noise level, the projected noise level from operation of the Preferred Alternative with either the Las Vegas Southern Station or the Las Vegas Central Station B, and the impact criteria for each receptor or receptor group. Based on a comparison of the predicted Preferred Alternative noise level with the impact criteria, the impact category is listed, along with the predicted total noise level and projected noise increase due to the implementation of the Preferred Alternative. **Table F-3.12-3** also includes an inventory of the number of impacts and severe impacts at each sensitive receptor location. **Table F-3.12-3** identifies the noise impacts prior to implementation of the mitigation measures identified in **Section 3.12.3** of this Final EIS.

[3] **Tables F-3.12-3** shows the noise impacts of Preferred Alternative Segment 2C and Segment 6B, as these are the only portions of the Preferred Alternative rail alignment that would result in noise impacts. The tables combine the information from Supplemental Draft EIS **Tables S-3.12-4** and **S-3.12-12**, which identify the noise impacts for Segment 2C (Side Running) and Segment 6B (as modified by the alignment adjustment), respectively. Page 3.12-23 of the Supplemental Draft EIS **Section 3.12.3** states that the maximum train speed for Segment 6B with the alignment adjustment was refined as part of the Supplemental Draft EIS, with resultant reductions in train passby noise levels. Noise impacts were recalculated based on the refined maximum train speeds. There are fewer anticipated noise impacts identified for Segment 6B as modified by the alignment adjustment than Segment 6B without the alignment adjustment.

Table F-3.12-3 Preferred Alternative Noise Impacts (Prior to Mitigation)

Location	Side of Track	Dist to Near Track (feet)	Exist. Noise Level[1]	Project Noise Level (dBA)			Total Noise Level	Increase in Noise Level[1]	Number of Impacts	
				Pred.[2]	Impact Criteria					
					Imp	Sev			Imp	Sev
Preferred Alternative Terminating at Las Vegas Southern Station or Las Vegas Central Station B										
Lenwood Rd, Days Inn	SB	215	62	63	58	64	65	3.6	1	0
Lenwood Rd, Country Inn and Suites	NB	365	62	60	58	64	64	2.3	1	0
L St to H St	SB	130-350	62	58-63	58	64	63-65	1.7-3.7	4	0
Grace St	SB	45-150	66	61-69	61	66	67-71	1.3-5.0	7	15
Mount Vernon Ave, Church of the Nazarene	SB	45	60	71	62	68	71	11.0	0	1
Coolwater Ln, Days Inn	SB	110	66	64	61	66	68	2.3	1	0
Western Whip Ct to Muriel Dr	SB	60-190	66	61-68	61	66	67-70	1.2-4.0	7	8
Muriel Dr to Kelly Dr	SB	50-200	66	61-69	61	66	67-70	1.2-4.7	35	9
Elephant Mountain Rd	SB	170	63	60	60	65	65	1.6	3	0
Ghost Town Rd, Oak Tree Inn	NB	160	63	60	60	65	65	1.8	1	0
Saffredi Ln	SB	50-70	66	64-66	61	66	68-69	2.2-3.2	11	0
Deluna St	SB	40-60	66	65-67	61	66	68-70	2.6-4	11	12
Industrial Rd, Silverton Casino Lodge	SB	80	66	66	61	66	69	3.0	1	0
Preferred Alternative Terminating at Las Vegas Central Station B Only (In Addition to Impacts Above)										
Dean Martin Dr, Americana 5 Inn	SB	55	66	67	61	66	70	4.0	0	1
Total Noise Impacts										
Total (terminating at Las Vegas Southern Station)									83	45
Total (terminating at Las Vegas Central Station B)									83	46

Source: HMMH, 2010.

Notes: Pred – Predicted Noise Levels, Imp – Impact, Sev – Severe Impact.

1 – Noise levels are based on Ldn and are measured in dBA. Noise levels are rounded to the nearest decibel except for the increase in noise level, which is given to the nearest one-tenth decibel to provide a better resolution for assessing noise impact.

2 – The reported noise levels represent the range of projected noise levels for each location.

The comparison in **Table F-3.12-3** is limited to urban, populated areas along the Preferred Alternative rail alignment because these are areas with nearby sensitive receptors that would be affected by high-speed train noise. Noise impacts to sensitive receptors, such as residential, commercial, and hotel uses, would be limited to areas within Barstow, Yermo, and the metropolitan Las Vegas areas, along Segments 2C and Segment 6B of the Preferred Alternative rail alignment. While operation of the Preferred Alternative would result in increased noise levels associated with train passbys along the entire rail alignment, there are no sensitive receptors outside of these urban areas that are in close enough proximity of the Preferred Alternative rail alignment to be affected by the train noise.

The Preferred Alternative, with either the Las Vegas Southern Station or the Las Vegas Central Station B, would result in a total of 83 noise impacts. The Preferred Alternative terminating at the Las Vegas Southern Station would result in 45 severe noise impacts; or 46 severe noise impacts if terminating at Central Station B. Inclusion of the Las Vegas Southern Station would terminate the Preferred Alternative rail alignment just south of Hacienda Avenue and the sensitive noise receptors along Dean Martin Drive (i.e., existing hotels and motels) would not be affected by the high-speed train noise. The specific noise impacts are summarized below.

- *Lenwood Road, Days Inn/Country Inn and Suites, Barstow* – There are several motels, including the Days Inn and County Inn and Suites, on the east side of I-15 freeway. The Preferred Alternative rail alignment would be located across the I-15 freeway to the west. The noise impact is due to the relatively low existing noise levels at this location.
- *L Street to H Street, Barstow* – There are a number of single-family residences to the north and south of the I-15 freeway within western Barstow. The noise impacts in this location are due to the low existing noise levels and the proximity of the residences to the Preferred Alternative rail alignment.
- *Grace Street, Barstow* – There are a number of single-family and multi-family residences to the north of the I-15 freeway in this area. The noise and severe noise impacts at this location are due to the close proximity of the residences to the Preferred Alternative rail alignment.
- *Mount Vernon Avenue, Church of the Nazarene, Barstow* – There is a church adjacent to the residential area on Grace Street to the north of the I-15 freeway. The severe noise impact at this location is due to the close proximity of the church to the Preferred Alternative rail alignment.
- *Coolwater Lane, Days Inn, Barstow* – There is a motel adjacent to a single-family residential area to the north of the I-15 freeway in central Barstow. The noise impact at this location is due to the close proximity of the motel to the Preferred Alternative rail alignment.

- *Western Whip Court to Kelly Drive, Barstow* – There are a number of single-family residences to the north of the I-15 freeway and a mobile home park and several residences to the south of the I-15 freeway in this portion of Barstow. The noise and severe noise impacts are due to the proximity of the residences and mobile home park to the Preferred Alternative rail alignment.
- *Elephant Mountain Road, Yermo* – There are a number of single-family residences to the north of the I-15 freeway at this location. The noise impacts are due to the low existing noise levels and the close proximity of the residences to the Preferred Alternative rail alignment.
- *Ghost Town Road, Oak Tree Inn, Yermo* – There is a motel to the south of the I-15 freeway at this location. The noise impact is due to the low existing noise levels and the close proximity of the motel to the Preferred Alternative rail alignment.
- *Saffredi Lane* – There is a single-family residential development to the west of the I-15 freeway in this area. The noise impacts at this location are due to the close proximity of the residences to the Preferred Alternative rail alignment.
- *Deluna Street* – There is a single-family residential development to the west of the I-15 freeway in this area. The severe noise impacts at this location are due to the close proximity of the residences to the Preferred Alternative alignment.
- *Industrial Road, Silverton Casino Lodge, Las Vegas* – There is a motel on the west side of the I-15 freeway. The noise impact at this location is due to the proximity of the hotel to the Preferred Alternative rail alignment and the elevated structure.
- *Dean Martin Drive, Americana 5 Inn, Las Vegas* – There is a motel on the west side of the I-15 freeway that would be passed by high-speed trains if Las Vegas Central Station B is selected as the terminus. This would result in a severe noise impact at this location, due to the proximity of the hotel to the Preferred Alternative rail alignment and the elevated structure. No impact at this location would occur if the Las Vegas Southern Station is selected as the terminus.

With regard to the Preserve, FRA's guidance on measuring noise and vibration associated with high-speed trains requires noise impact assessment at locations where there would be human activity such as trails, picnic areas, campgrounds, or other places where human activity would occur.

Portions of the Preserve near the I-15 freeway are currently subject to noise from ongoing freeway operations, including existing interchanges and roadways providing access to the Preserve (including but not limited to Zzyzx Road, Halloran Summit Road, Cima Road, and others). To this end, portions of the Preserve closest to the freeway cannot reasonably be considered areas where serenity and quiet are key attributes.

Notably, there are no established public use areas such as hiking trails and few attractions within the Preserve within 3 to 5 miles of the I-15 freeway. The Zzyzx Desert Studies Center, for example, is about 5 miles south of the I-15 freeway. Key Preserve elements in

close proximity to the I-15 freeway are primarily unpaved dirt roads, primarily for the use of off-road/4-wheel drive vehicles. Consultation with NPS confirmed that there are no sensitive receptors or extremely noise sensitive uses in the areas of the Preserve closest to the I-15 freeway.

However, even if one were to consider the northern boundary of the Preserve as a location to assess noise impact, at 175 feet away from the south edge of the I-15 freeway ROW, there would be no impact under FRA guidance from anticipated train operations. The project noise levels would be less than the existing highway noise levels at that distance. While FRA's noise guidance relates to noise impacts to humans, the proximity of the Preferred Alternative rail alignment to the Preserve could result in potential noise impacts to sensitive wildlife species.

Considering FRA's noise guidance of the potential distance affected by high-speed train passbys, potential noise effects to wildlife within the Preserve would be minimal. Areas within approximately 50 feet of the I-15 freeway ROW would have some potential for wildlife effects, but these areas are not located within the Preserve and are already exposed to high noise levels. Therefore, there would be no additional noise effects on wildlife within the Preserve as a result of the Preferred Alternative rail alignment.

As the Preferred Alternative rail alignment would be located primarily within the existing I-15 freeway corridor, the high-speed train passbys along the rail alignment would introduce additional noise sources within the existing I-15 freeway corridor (in addition to the existing vehicle traffic noise). The I-15 freeway corridor currently has a defined noise contour. A noise contour refers to an area experiencing equal levels of noise exposure.

The I-15 freeway noise contour extends outwards from the freeway center line; the areas closest to the freeway would experience higher noise levels, while areas farther from the freeway centerline would experience lower noise levels. The existing topography of the area also affects the defined noise contours. The I-15 freeway 65 dBA noise contour extends approximately 100 to 150 feet from the centerline of the I-15 freeway. In other words, individuals within 100 to 150 feet of the I-15 freeway centerline would experience noise levels of about 65 dBA. Where the Preferred Alternative rail alignment would be located within the I-15 freeway ROW, the train passbys on the rail alignment would alter the existing I-15 freeway 65 dBA noise contour by expanding the area affected by the transportation noise. The 65 dBA noise contour would increase the most in distance in areas that are currently undeveloped and unpopulated. With high-speed rail operations, the I-15 freeway 65 dBA noise contour in these undeveloped areas would be extended an additional 30 feet. Thus, the I-15 freeway 65 dBA noise contour with operation of the Preferred Alternative would extend approximately 130 to 180 feet from the centerline of the I-15 freeway in these undeveloped areas.

In Barstow, the current I-15 freeway 65 dBA contour extends approximately 200 to 250 feet from the centerline of the I-15 freeway in either direction. Implementation of the Preferred Alternative would extend the I-15 freeway 65 dBA noise contour an additional

500 feet to the north of the I-15 freeway during train passby, resulting in a 65 dBA noise contour of approximately 750 feet to the north from the I-15 freeway centerline. The Preferred Alternative would extend the I-15 freeway 65 dBA noise contour by about 350 feet to the south of the I-15 freeway, resulting in a 65 dBA noise contour of approximately 600 feet to the south from the I-15 freeway centerline. This extension of the I-15 freeway 65 dBA noise contour would only occur during train passby (less than 70 passbys per day), as the rail alignment itself would not generate noise.

In the metropolitan Las Vegas area, implementation of the Preferred Alternative, with either Las Vegas Station site option, would extend the 65 dBA contour an additional 20 feet, establishing a total distance of 270 feet from the centerline of the I-15 freeway for the 65 dBA noise contour with operation of the Preferred Alternative.

The Preferred Alternative traffic noise was also assessed. The majority of the roadways in the vicinity of the Preferred Alternative, including the I-15 freeway and major arterials in Las Vegas, have significant volumes of traffic that produce existing traffic noise. **Section 3.5, Traffic and Transportation**, of this Final EIS states that the Preferred Alternative would result in a reduction in vehicle traffic on the I-15 freeway between Victorville and Las Vegas. Based on the existing ambient noise levels along the I-15 freeway, the associated reduction in traffic noise in areas outside of existing metropolitan areas would be less than 1 dB, representing a minor reduction in traffic noise that would not be perceptible to the human ear.

While the implementation of high-speed passenger rail service would reduce traffic volumes along I-15 freeway segments, the Preferred Alternative would increase station area traffic near the Victorville and Las Vegas station locations.

There are a number of intersections that are expected to experience a doubling of traffic volumes near the Preferred Alternative Victorville Station Site 3 (VV3) by year 2030, with the majority of the increase in traffic due to the traffic generated by the Preferred Alternative. A doubling of traffic volumes typically results in an audible increase in traffic noise, as perceived by the human ear. There are no noise sensitive receptors within 1,000 feet of any of the roadways near the Victorville Station. Thus, the Preferred Alternative would not result in any adverse traffic noise effects near the Victorville Station.

The intersections near the Las Vegas Station site options (Southern Station and Central Station B) would also experience a doubling of traffic volumes by year 2030. The increase in traffic is primarily related to future growth in the metropolitan Las Vegas area; the Preferred Alternative would not individually result in the doubling of traffic volumes near either of the Las Vegas Station site option intersections. The traffic generated by the Preferred Alternative at either the Las Vegas Southern Station or Las Vegas Central Station B would represent less than half of the anticipated future increase in traffic volumes at these intersections. Thus, the Preferred Alternative would not result in any adverse traffic noise effects near either the Las Vegas Station site option.

Operational Period Vibration

The Preferred Alternative would not result in adverse vibration effects. As stated in **Section 3.12.2** above, the vibration evaluation utilizes the thresholds for infrequent train passby events, where fewer than 70 train passbys would occur within a 24-hour period. The sensitive vibration uses within the vicinity of the Preferred Alternative rail alignment are identified as Category 2 receptors (residential). Under these criteria, a threshold of 80 VdB was utilized for evaluating vibration impacts associated with the Preferred Alternative.

The Preferred Alternative rail alignment would be constructed on an elevated structure in areas within close proximity to vibration sensitive uses. The elevated structures would result in a 10 VdB reduction in vibration levels as a result of the attenuation (reduction) of vibration levels as the vibration travels through the elevated structure to the ground surface. Through Barstow, the resulting vibration levels with the train passbys on the Preferred Alternative rail alignment would range from 50 VdB to 74 VdB at adjacent residences. These vibration levels would not exceed the 80 VdB criterion and would not be adverse. Through Yermo and the metropolitan Las Vegas area, the Preferred Alternative would not result in any vibration effects due to the distance of the nearest vibration-sensitive uses.

Construction Effects

Based on the construction noise criteria described in **Section 3.12.2** above, the construction noise impact associated with the Preferred Alternative would be minimal.

Industrial and commercial uses within 40 to 70 feet of the Preferred Alternative construction activity would be exposed to temporary construction noise impacts. Residential land uses within 125 feet of the Preferred Alternative construction activity would be exposed to temporary construction noise impacts. The potential for noise impacts from nighttime construction could extend to residences as far as 400 feet. Potential construction noise impacts will be further evaluated and mitigated during the design-build process of the Preferred Alternative.

Construction activities would be carried out in compliance with all applicable local noise regulations. Specific residential property line noise limits will be developed during the design-build process and included in the construction specifications for the Preferred Alternative. Noise monitoring will be performed during construction to verify compliance with the limits.

3.12.2.4 Comparison with Other Action Alternatives

Table F-3.12-4 summarizes the comparison of noise and vibration effects for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow. The table identifies the number of impacts prior to the

application of mitigation. As stated in **Section 3.12.4** below**,** following implementation of mitigation measures, all noise and vibration impacts of the Preferred Alternative can be successfully mitigated with no residual effects.

Train Technology Option

The Preferred Alternative would implement the EMU train technology, which would result in fewer noise effects than would the DEMU train technology. The DEMU technology option has a higher reference noise level than the EMU option. The "reference noise level" refers to a noise level associated with a specific speed and distance from the noise source. Draft EIS **Section 3.12.4.1** noted that the DEMU technology results in a higher reference noise level than the EMU. While the EMU technology option has a maximum speed of 150 mph and the DEMU technology option has a maximum speed of 125 mph, the speed difference is not large enough to overcome the higher reference level for the DEMU technology option at the maximum speed conditions.

Through Barstow and Yermo, the Preferred Alternative Segment 2C Side Running rail alignment (EMU technology option) would result in a total of 60 noise impacts and 33 severe noise impacts to nearby sensitive receptors. Under the DEMU technology option, the DesertXpress project would result in 139 noise impacts and 48 severe noise impacts through Barstow and Yermo, representing substantially greater noise effects than the EMU technology option.

Through Las Vegas, the Preferred Alternative Segment 6B rail alignment (EMU technology option) terminating at either the Las Vegas Southern Station or the Las Vegas Central Station B would result in 23 noise impacts to nearby sensitive receptors. The Preferred Alternative Segment 6B rail alignment would result in 12 severe noise impacts when terminating at the Las Vegas Southern Station and 13 severe noise impacts when terminating at the Las Vegas Central Station B. Under the DEMU technology option, the train activity on the Segment 6B rail alignment would result in 215 noise impacts and 34 severe noise impacts with termination at the Las Vegas Southern Station and 222 noise impacts and 37 severe noise impacts with termination at Las Vegas Central Station B. The EMU technology option would have substantially fewer noise effects than the DEMU technology option.

Overall, the Preferred Alternative EMU train technology would result in 83 noise impacts to nearby sensitive receptors and 45 severe noise impacts when terminating at the Las Vegas Southern Station and 46 severe noise impacts when terminating at the Las Vegas Central Station B. Under the DEMU technology option (using the same rail alignment components as the Preferred Alternative), the DesertXpress project would result in 354 to 361 noise impacts and 82 to 85 severe noise impacts to sensitive receptors when terminating at the Las Vegas Southern Station and Las Vegas Central Station B, respectively. Overall, the DEMU technology option would result in substantially greater noise effects than the EMU technology option for the Preferred Alternative rail alignment. As previously stated, the DEMU has a higher reference noise level than the EMU due to

the use of diesel-powered engines rather than pure electric engines. The combustion of diesel fuel results in louder engine noise levels. While the EMU technology option has a maximum speed of 150 mph and the DEMU technology option has a maximum speed of 125 mph, the speed difference is not large enough to overcome the higher reference level for the DEMU technology option at the maximum speed conditions.

Rail Alignment Options

The Preferred Alternative would primarily implement the Action Alternative B options, where the rail alignment would be located immediately adjacent to the existing I-15 freeway within the I-15 freeway ROW. The Action Alternative B rail alignments, which are primarily located alongside the I-15 freeway, would result in fewer noise impacts than would the Action Alternative A rail alignment options through Barstow, Yermo, and Las Vegas. The Action Alternative B rail alignments would primarily result in noise impacts to sensitive receptors that are adjacent to the side of the I-15 freeway where the rail alignment would be located. The Action Alternative A rail alignment options would result in noise impacts to sensitive receptors on both sides of the I-15 freeway, as the rail alignment would be located in the median of the I-15 freeway.

Through Barstow and Yermo, the Preferred Alternative Segment 2C Side Running rail alignment would result in 60 noise impacts, as compared to 80 noise impacts associated with Segment 2C Median. As compared to the Segment 2A/2B rail alignments that would deviate from the I-15 freeway alignment and traverse through the western and northern portions of Barstow, the Preferred Alternative Segment 2C Side Running rail alignment would result in three more noise impacts than Segment 2A and the same number of noise impacts as Segment 2B. Both Segment 2A and Segment 2B would also affect sensitive receptors not already exposed to noises from a major transportation corridor, since the rail alignment would deviate from the I-15 freeway.

However, the Preferred Alternative Segment 2C Side Running rail alignment would result in 33 severe noise impacts (before mitigation), where as the Segment 2C Median rail alignment would not result in any severe noise impacts. The Preferred Alternative Segment 2C Side Running rail alignment would also result in two more severe noise impacts than Segment 2A, but two less severe noise impacts than Segment 2B.

Both the Preferred Alternative 2C Side Running and Segment 2C Median rail alignments would avoid noise impacts and severe noise impacts near Route 58, Waterman Road, Radio Road, Poplar Street, Soapmine Road, and Balsa Avenue associated with the Segment 2A/2B rail alignment, since the Preferred Alternative rail alignment would remain within the I-15 freeway corridor through Barstow. However, both the Preferred Alternative Segment 2C Side Running and Segment 2C Median rail alignments would introduce noise impacts and severe noise impacts (Preferred Alternative Segment 2C Side Running only) to areas through central Barstow immediately adjacent to the I-15 freeway

Table F-3.12-4 Alternatives Comparison Table – Noise and Vibration

Alternatives	Expected number of impacts under FRA criteria, before mitigation	Expected number of severe impacts under FRA criteria, before mitigation	Expected number of vibration impacts, before mitigation
No Action Alternative	Anticipated Noise Increase, Impacts Not Quantified	Anticipated Noise Increase, Impacts Not Quantified	Anticipated Construction Vibration, Impacts Not Quantified
Alignment Routings, including Temporary Construction Areas (TCAs) and Alignment Adjustment Areas,			
Segment 1 Routing			
Segment 1 (connecting to Segment 2A/2B)	3 for EMU 4 for DEMU	0 for EMU 1 for DEMU	None
Segment 1 (connecting to Segment 2C)	None	None	None
Segment 2			
Segment 2A/2B, 2A	57 for EMU 77 for DEMU	31 for EMU 41 for DEMU	19
Segment 2A/2B, 2B	60 for EMU 83 for DEMU	35 for EMU 46 for DEMU	23
Segment 2C (Side Running)	60 for EMU 139 for DEMU	33 for EMU 48 for DEMU	None
Segment 2C (Median)	80 for EMU 127 for DEMU	0 for EMU 22 for DEMU	None
Segment 3			
Segment 3A	None	None	None
Segment 3B (Modified)	None	None	None
Segment 4			
Segment 4A	None	None	None
Segment 4B	None	None	None

Alternatives	Expected number of impacts under FRA criteria, before mitigation	Expected number of severe impacts under FRA criteria, before mitigation	Expected number of vibration impacts, before mitigation
Segment 4C	None	None	None
Segment 5			
Segment 5A	None	None	None
Segment 5B	None	None	None
Segment 6			
Segment 6A (terminating at Las Vegas Southern Station)	353 for EMU 260 for DEMU	55 for EMU 165 for DEMU	None
Segment 6A (terminating at Las Vegas Central Station B)	358 for EMU 268 for DEMU	55 for EMU 165 for DEMU	
Segment 6B (terminating at Las Vegas Southern Station)	23 for EMU 215 for DEMU	12 for EMU 34 for DEMU	None
Segment 6B (terminating at Las Vegas Central Station B)	23 for EMU 222 for DEMU	13 for EMU 37 for DEMU	None
Segment 6C	None	None	None
Segment 7			
Segment 7A	None	None	None
Segment 7B	2 for EMU 1 for DEMU	19 for EMU 21 for DEMU	None
Segment 7C	None	None	19
Victorville Station and Maintenance Facility Site Options			
Victorville Station Site 1	n/a	n/a	None
Victorville Station Site 2	n/a	n/a	None
Victorville Station Site 3	n/a	n/a	None
Victorville OMSF 1	n/a	n/a	None
Victorville OMSF 2	n/a	n/a	None

Alternatives	Expected number of impacts under FRA criteria, before mitigation	Expected number of severe impacts under FRA criteria, before mitigation	Expected number of vibration impacts, before mitigation
Las Vegas Area Station and Maintenance Facility Site Options			
Las Vegas Southern Station	None	None	None
Las Vegas Central Station A	None	None	None
Las Vegas Central Station B	None	None	None
Las Vegas Downtown Station	None	None	None
Sloan Road MSF[4]	None	None	None
Relocated Sloan Road MSF	None	None	None
Wigwam Avenue MSF	None	None	None
Robindale Avenue MSF	None	None	None
Frias Substation	None	None	None
Other Facility			
Baker Maintenance of Way Facility	None	None	None
Technology Options, including Autotransformers and Electric Utility Corridors (EMU Only)			
DEMU (Diesel-Electric Multiple Unit)	Noted Above for Each Component		
EMU (Electric Multiple Unit)			

Source: CirclePoint, 2011.

[4] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was intended to completely replace the Sloan Road MSF evaluated in the Draft EIS.

that would have not otherwise been affected by the Segment 2A/2B rail alignment. These sensitive receptors in central Barstow do, however, already experience transportation noise from the I-15 freeway traffic.

Through Las Vegas, the Preferred Alternative Segment 6B rail alignment through metropolitan Las Vegas would result in 23 noise impacts when terminating at either the Las Vegas Southern Station or the Las Vegas Central Station B. The Segment 6B rail alignment would also result in 12 severe noise impacts when terminating at the Las Vegas Southern Station and 13 severe noise impacts when terminating at the Las Vegas Central Station B.

Segment 6A through this same area would result in 353 noise impacts when terminating at the Las Vegas Southern Station and 358 noise impacts when terminating at the Las Vegas Central Station B and 55 severe noise impacts with either Las Vegas Station site option. The Segment 6A rail alignment would result in substantially greater noise impacts than the Preferred Alternative Segment 6B rail alignment because the Segment 6A rail alignment would be located within the I-15 freeway median and therefore closer to sensitive receptors, including residences and a mobile home park, on the eastern side of the I-15 freeway corridor. The Preferred Alternative Segment 6B rail alignment would be located on the western side of the I-15 freeway corridor and would be located at a distance where the train passby noise would not impact the sensitive receptors to the east. Segment 6C would not result in any noise impacts or severe noise impacts.

3.12.3 Mitigation Measures for the Preferred Alternative

Draft EIS **Sections 3.12.7.1** and **3.12.7.3** included mitigation measures for reducing noise effects from high-speed rail operation and construction. FRA requires that severe noise and vibration impacts be mitigated unless there are no practical means to do so. While mitigation is encouraged at the impact level, the implementation of such mitigation will depend on other project-specific factors. These other factors can include the projected increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-to-indoor sound insulation and the cost-effectiveness of mitigating noise to more acceptable levels. FRA and the Cooperating Agencies shall ensure that the appropriate mitigation measures are developed during project design and implemented during construction.

The following mitigation measures have been updated to focus specifically on the components selected as part of the Preferred Alternative.

Noise Mitigation

Mitigation Measure NV-1: Noise Barriers

The Applicant shall install noise barriers at least four feet in height along the at grade portions of the Preferred Alternative rail alignment and on the elevated structures to reduce severe noise impacts. The noise barriers shall be installed

prior to the commencement of train operations along the rail alignment to reduce adverse noise effects.

This is a common approach to reducing noise impacts from surface transportation sources. The primary requirements for an effective noise barrier are that (1) the barrier must be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) the barrier must be of an impervious material with a minimum surface density of four pounds per square foot and (3) the barrier must not have any gaps or holes between the panels or at the bottom. Because numerous materials meet these requirements, the selection of materials for noise barriers is usually dictated by aesthetics, durability, cost and maintenance considerations.

Table F-3.12-5 lists the locations where noise barriers would be effective at mitigating noise from high-speed rail operations for the Preferred Alternative terminating at the Las Vegas Southern Station and the Las Vegas Central Station B, respectively. **Figures F-3.12-1** through **F-3.12-3** show the approximate locations of the noise mitigation measures identified in **Table F-3.12-5**.

The noise analysis used standard noise barrier calculations to determine the effectiveness of the barriers at mitigating impacts. The barrier calculations depend primarily on the geometry of the situation, including the heights of the source and receiver, the height of the barrier, and the distances between the source and barrier and the barrier and the receiver. The primary purpose of the barrier is to block the line of sight between the source and receiver. Blocking the line of sight between the noise source and the receiver with a standard noise barrier is a "rule of thumb" used by acoustical engineers to determine if a barrier if effective in reducing the impact. One of the most important aspects of the barrier calculation is the distance from the source of the noise (in this case, the proposed high-speed train) and the barrier. On elevated structures, the noise barriers are located very close to the source of the noise, which is primarily generated at the wheel/rail interface. Because of this and height of the elevated structures, the barriers provide a substantial reduction in noise.

Noise barriers would be required to be at least four feet in height and would be constructed along the at grade portions of the rail alignment and on the elevated structures to reduce severe impacts and noise impacts. The noise barriers shall be installed prior to the commencement of train operations along the rail alignment to reduce adverse noise effects.

Table F-3.12-5 Noise Mitigation Locations

Location	Side of Track	Civil Station	Length (ft)	Relevant Figure
Preferred Alternative Terminating at Las Vegas Southern Station or Las Vegas Central Station B				
Lenwood Road	NB	1557 – 1563	600	F-3.12-1
Lenwood Road	SB	1580 – 1587	700	F-3.12-1
L Street to H Street	SB	1735 – 1743	800	F-3.12-1
Grace Street	SB	1791 – 1821	3,000	F-3.12-1
Coolwater Lane	SB	1882 – 1892	1,000	F-3.12-1
Western Whip Court to Kelly Drive	SB	1842 – 1886	4,400	F-3.12-1
Elephant Mountain Road	SB	2225 – 2235	1,000	F-3.12-1
Ghost Town Road	NB	2245 – 2255	1,000	F-3.12-1
Saffredi Ln/Deluna St	SB	9469 – 9531	6,200	F-3.12-3
South of Blue Diamond Rd	SB	9715 – 9732	1,700	F-3.12-3
Preferred Alternative Terminating at Las Vegas Central Station B Only (In Addition to Mitigation Above)				
South of W Tropicana Ave	SB	9926 – 9934	800	F-3.12-3
Total Noise Mitigation Length				
Total (terminating at Las Vegas Southern Station)			*20,400*	
Total (terminating at Las Vegas Central Station B)			*21,200*	

Source: HMMH, 2010.

Mitigation Measure NV-2: Relocation of Crossovers or Special Trackwork at Crossovers

To reduce severe noise impacts, the Applicant shall locate crossovers away from residential area where feasible, or use spring-rail or moveable point frogs in place of standard rigid frogs at turnouts where relocation is not feasible. Because the impacts of wheels over rail gaps at track crossover locations, or turn-outs for passing tracks, increases vibration by about 6 dBA, crossovers are a major source of vibration noise impact when they are located in sensitive areas. If crossovers cannot be relocated away from residential areas, another approach is to use spring-rail or moveable point frogs in place of standard rigid frogs at turnouts. These devices allow the flangeway gap to remain closed in the main traffic direction for revenue service trains.

Mitigation Measure NV-3: Building Sound Insulation

Where sensitive receptors would be dispersed or limited in nature , the Applicant may choose install building sound insulation rather than implementing noise barriers defined under **Mitigation Measure NV-1** to mitigate severe noise

impacts. Sound insulation to improve the outdoor-to-indoor noise reduction has been widely applied around airports and has seen limited application for rail projects. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where noise barriers are not feasible or desirable, and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to the windows, by sealing any holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air-conditioning so that windows do not need to be opened.

Mitigation Measure NV-4: Property Acquisitions or Easements

Where sensitive receptors would be dispersed or limited in nature , the Applicant may choose to implement **Mitigation Measure NV-4** rather than **Mitigation Measure NV-1** to mitigate severe noise impacts. The Applicant may purchase residences likely to be impacted by train operations or to acquire easements for such residences by paying the homeowners to accept the future train noise conditions. These approaches are usually taken only in isolated cases where other mitigation options are infeasible, impractical, or too costly.

Vibration Mitigation

The Preferred Alternative would not result in adverse vibration effects and no mitigation would be required. **Mitigation Measures NV-5** through **NV-9** identified in Draft EIS **Section 3.12.7.2** would not be required for the Preferred Alternative.

Construction Noise Mitigation

Temporary noise during construction of the Preferred may be intrusive to residents near the construction sites. Most of the construction would consist of site preparation and laying new track, and would only occur during daytime hours.

Mitigation Measure NV-10: Construction Noise and Vibration Measures

The Applicant shall conduct construction activities in compliance with all applicable local noise regulations. In addition, the Applicant shall develop specific residential property line noise limits would be developed during the design-build process, include these noise limits in the construction specifications for the Preferred Alternative, and perform noise monitoring during construction to verify compliance with the limits. This approach allows the contractor flexibility to meet the noise limits in the most efficient and cost-effective manner. Noise control measures that would be applied as needed to meet the noise limits include the following:

- Avoiding nighttime construction in residential neighborhoods.

- Using specially quieted equipment with enclosed engines and/or high-performance mufflers.
- Locating stationary construction equipment as far as possible from noise-sensitive sites.
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
- Re-routing construction-related truck traffic along roadways that will cause the least disturbance to residents.
- Avoiding impact pile driving near noise-sensitive areas, where possible. Drilled piles or the use of a sonic or vibratory pile driver are quieter alternatives where the geological conditions permit their use. If impact pile drivers must be used, their use will be limited to the periods between 8:00 AM and 5:00 PM on weekdays.

With the incorporation of the appropriate noise mitigation measures, impacts from construction-generated noise should not be adverse. To provide added assurance, a complaint resolution procedure shall also be put in place to rapidly address any noise problems that may develop during construction.

In regards to vibration during construction, construction activities that could cause intrusive vibration include vibratory compaction, jackhammers, and use of tracked vehicles such as bulldozers. The most serious sources of construction vibration are blasting and pile driving. Avoiding vibration impacts during construction will be achieved through numeric limits in the construction specifications.

3.12.4 Residual Impacts Following Mitigation

The severe noise impacts associated with the Preferred Alternative will be fully mitigated with implementation of the four foot noise barriers along the Preferred Alternative rail alignment at the specified locations and lengths in **Table F-3.12-5**. With implementation of the noise barriers, no residual adverse noise effects would occur.

Where sensitive receptors would be dispersed or limited in nature (i.e., one residence in a generally undeveloped area), sound insulation or property acquisitions/easements could be considered in lieu of construction of a noise barrier.

Overall, implementation of the noise mitigation measures will fully mitigate noise impacts and severe noise impacts associated with operation of the Preferred Alternative and no residual effects would remain.

As no adverse vibration effects would occur with the Preferred Alternative, no residual vibration effects would remain.

Legend

Noise Mitigation Locations

DesertXpress Alignment

Preferred Alternative

Ancillary Facility Sites

Stations

Maintenance Facility Sites

Temporary Construction Area (TCA)

Autotransformer

Electric Utility Corridor

1 inch equals 2.5 miles

Kilometers
0 1.25 2.5

Miles
0 1 2

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

Locator Map

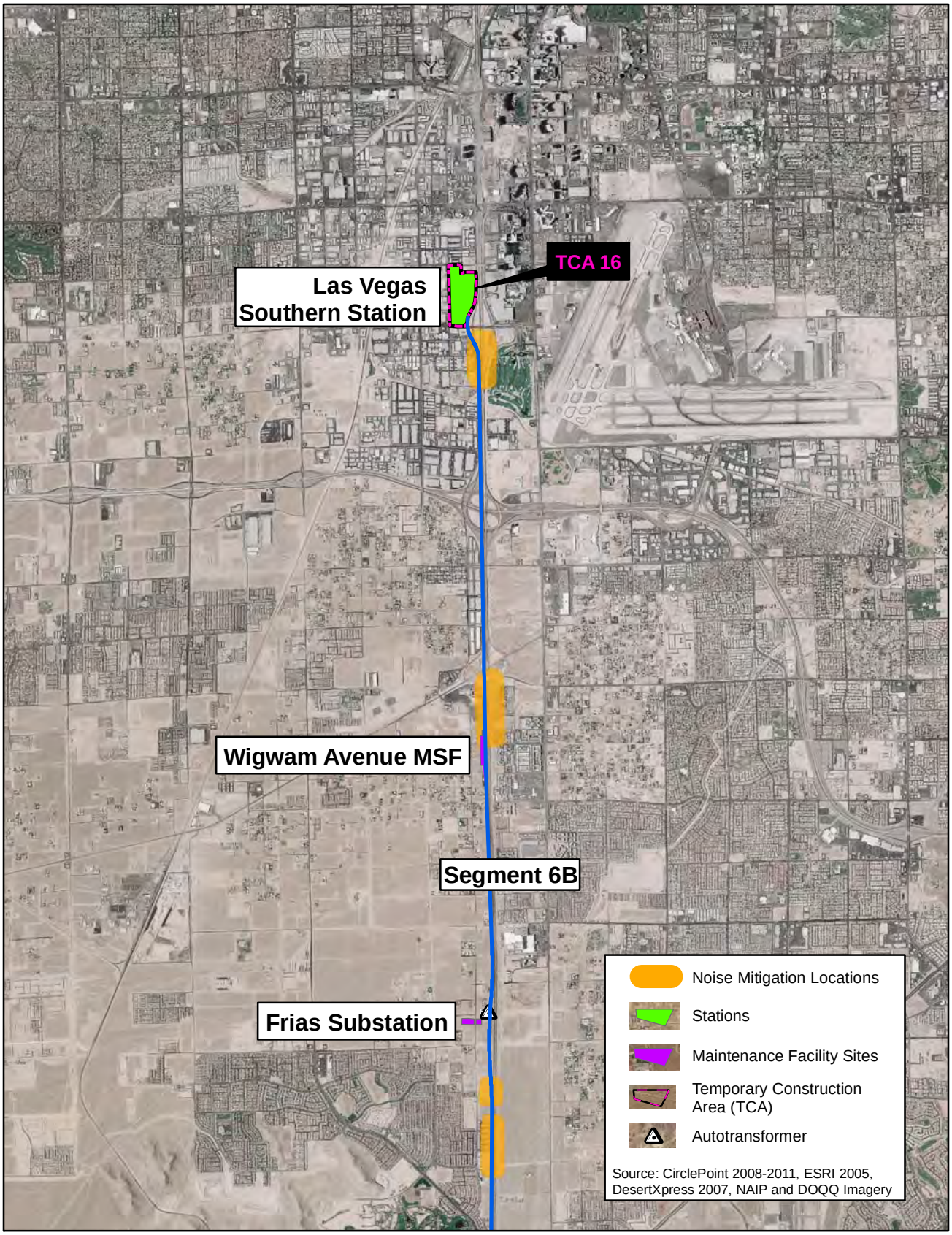
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Noise Mitigtion Locations, Barstow

FIG **F-3.12-1**

Geografika Consulting 01.17.11



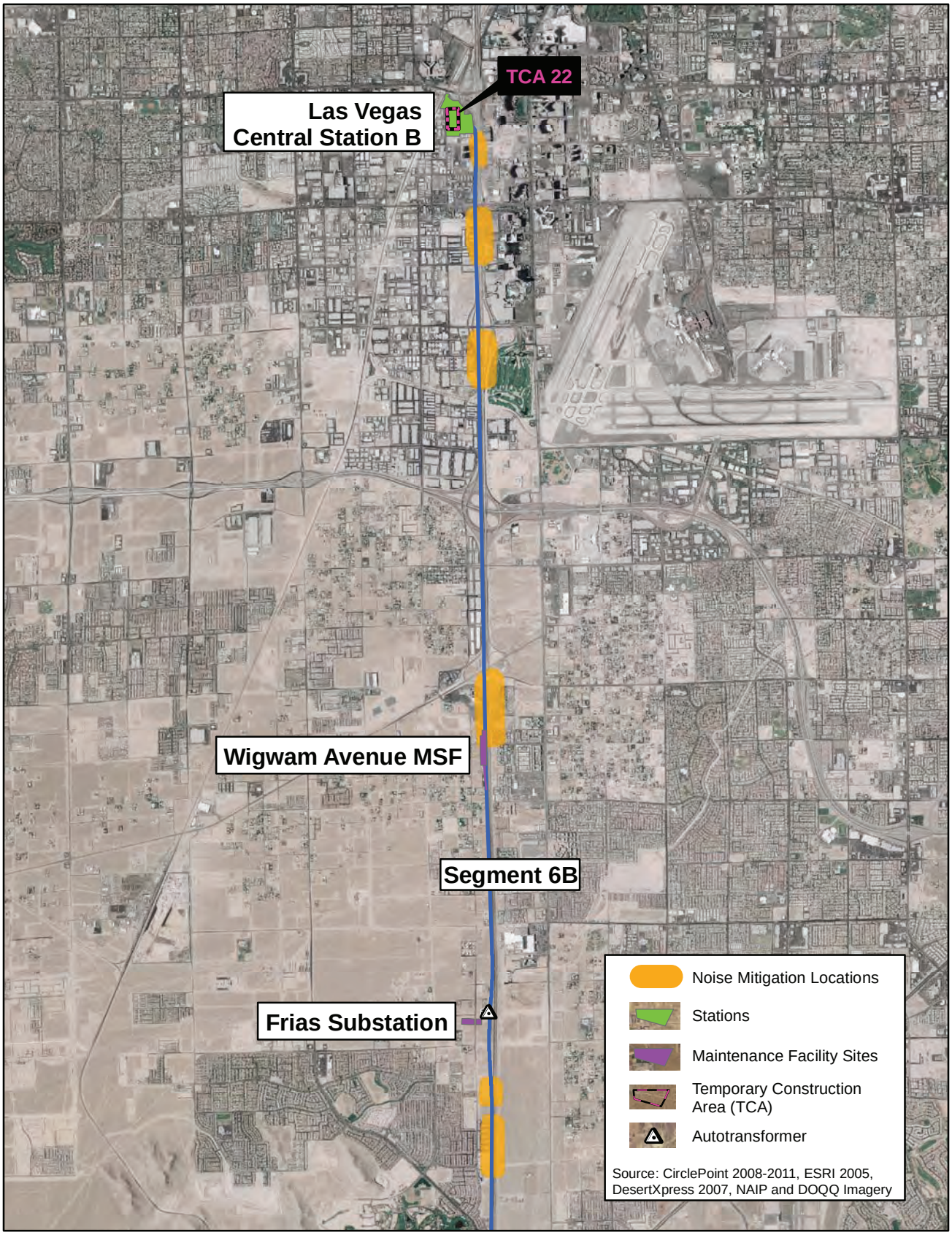
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress Final EIS

Noise Mitigation Locations, Las Vegas (Terminating at Southern Station)

FIG F-3.12-2

Geografika Consulting 02.27.11



U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Noise Mitigation Locations, Las Vegas (Terminating at Central Station B)

FIG F-3.12-3

Geografika Consulting 02.27.11

3.13 ENERGY

This section describes the changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential energy impacts related to the Preferred Alternative compared to the No Action and Other Action Alternatives and identifies appropriate mitigation measures.

3.13.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to energy impacts and provides responses to those comments. However, no comments were received during the public review period that required changes to the energy analysis contained in the Draft EIS and Supplemental Draft EIS.

3.13.1.1 Affected Environment

Draft EIS **Section 3.13.3** and Supplemental Draft EIS **Section 3.13.1** describe in detail the affected environment relative to energy for the DesertXpress project. Since publication of the Draft EIS and Supplemental Draft EIS, there has been no change to the affected environment. In addition, no comments were received during the public review period that required changes to the energy analysis contained in the Draft EIS and Supplemental Draft EIS. Thus the affected environment discussions from these previous documents remain applicable to the Preferred Alternative.

It should also be noted that several renewable energy projects have been approved since the publication of the Draft EIS and Supplemental Draft EIS. One project that will greatly affect the supply of renewable energy to the region is the Ivanpah Solar Energy Generating System (ISEGS), part of what is also referred to as the Ivanpah Solar Energy Complex. ISEGS is located in California at the Ivanpah Dry Lake, about 5 miles west of Primm, Nevada. ISEGS is about 3,500 acres in area (5.5 square miles) and is expected to generate approximately 400 megawatts (MW) of power when complete.

3.13.1.2 Regulatory Environment

The regulatory environment for energy for the DesertXpress project is described in detail in Draft EIS **Section 3.13.1**. Since publication of the Draft EIS and Supplemental Draft EIS, there have been no changes to the regulatory environment regarding energy. In addition, no comments were received during the public review period that required changes to the energy regulatory discussion contained in the Draft EIS and Supplemental Draft EIS. Thus the previous regulatory environment discussions remain applicable to the Preferred Alternative.

3.13.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

There has been no change to the energy section as a result of comments received on the Draft EIS or Supplemental Draft EIS.

3.13.2 Analysis of Environmental Consequences

3.13.2.1 Methods of Evaluation

The methodology described in Draft EIS **Section 3.13.2** used to evaluate the potential effects of the project on energy resources remains applicable to this Final EIS and the analysis of the Preferred Alternative. Analysis of the environmental consequences includes three topics of discussion: 1) overall energy consumption, 2) peak-period electricity demand, and 3) construction-related energy consumption.

In the Draft EIS, the impact analysis was divided into "direct" effects (overall energy consumption and electricity demand) and "indirect" effects (construction-related energy consumption). In the Supplemental Draft EIS, this terminology was revised, and the discussion was divided into "permanent" and "temporary" effects, respectively. The Final EIS carries forward the "permanent" and "temporary" terminology.

Table F-3.13-1 reflects the energy consumption factor for passenger vehicles consistent with the most current U.S. Department of Energy (USDOE) Transportation Energy Data Book. These rates were used in the calculations of operational energy consumption for the Preferred Alternative.

Table F-3.13-1 Operational Energy Consumption Factors

Mode	Factor[c]
Passenger vehicles[a]	5,517 BTUs/VMT
EMU[b]	569,163 BTUs/TMT

Source: ICF/Jones & Stokes, 2010.

BTUs = British thermal units.
TMT = Train-mile traveled.

[a] USDOE, Energy Information Administration. 2009. Office of Energy Efficiency and Renewable Energy. Transportation Energy Data Book: Edition 28. Prepared by Oak Ridge National Laboratory, Oak Ridge, TN.

[b] The values in this table are on a per-train-mile basis, converted from the annual energy consumption values that this source provided using the planned mileage in the planned operating schedule. The values were also adjusted to reflect the planned 2030 operating schedule from the planned 2027 operating schedule, as provided by the source (DesertXpress 2007).

[c] The conversion from diesel fuel consumption to heat content (BTUs) is 130,500 BTUs/gallon. The conversion from electricity consumption (kWh) to heat content (BTU) for EMU is 10,812 BTUs/ kWh, accounts for generation, transmission and distribution losses. Calculated from generation loss factor of 9,919 BTUs/kWh for petroleum generation and a T&D loss factor of 1.07 (USDOE).

3.13.2.2 No Action Alternative

Permanent Effects

Overall Operation Energy Consumption

As shown in **Table F-3.13-2**, passenger trips taken in the I-15 corridor between Victorville and Las Vegas in year 2007 resulted in approximately 3.67 billion automobile VMT. These trips used about 20,260,000 million British thermal units (MMBTUs), or about 3.7 million barrels of oil. By 2030, under No Action Alternative conditions, passenger trips in the study corridor would consume about 41,030,000 MMBTUs, or the equivalent of about 7.5 million barrels of oil. This is an increase of about 20,770,000 MMBTUs, or 3.8 million barrels of oil, over 2007 conditions. This is a conservative estimate that does not take into account the fact that automobile fuel efficiency decreases considerably as travel speed decreases below 30 mph and stop-and-go traffic increases. Projections of increased travel on the I-15 corridor suggest more congested conditions and thus lower fuel efficiency. Therefore, the increase in energy used in 2030 could be even higher than the estimated 3.8 million-barrel increase, which assumes higher travel speeds.

Table F-3.13-2 Annual Overall Operational Energy Consumption

	2007	2030	
	Existing	**No Action Alternative**	**Preferred Alternative**
Annual Auto VMT in Study Area (billions of miles)[a]	3.67	7.44	6.53
Estimated Project VMT (millions of miles)[b]	NA	NA	4.93
Annual Auto Energy Consumption[c] (MMBTUs)	20,260,000	41,030,000	36,020,000
With Project Energy Consumption[c] (MMBTUs)	0	0	2,588,000
TOTAL ENERGY CONSUMPTION (MMBTUs)	**20,260,000**	**41,030,000**	**38,611,000**
Change in Total Energy from Existing (MMBTUs)	NA	20,775,000	18,354,000
Change in Total Energy from No Action (MMBTUs)	NA	NA	-2,420,000
TOTAL ENERGY CONSUMPTION (Barrels of Oil[d])	**3,729,200**	**7,553,700**	**7,108,800**
Change in Total Energy from Existing (Barrels of Oil[d])	NA	3,824,500	3,378,900
Change in Total Energy from No Action (Barrels of Oil[d])	NA	NA	-445,600

Source: ICF/Jones & Stokes, 2010.

[a] DMJM 2008.

[b] Train VMT and operations were provided by the Applicant in 2007 and supplemented in 2008. See *Review of Operations Plan* (included as **Appendix C** of the Draft EIS).

[c] Calculated using the operational energy consumption factors from **Table S-3.13-2** of the Supplemental Draft EIS.

[d] One barrel of crude oil is equal to 5.8 million British thermal units (MMBTUs).

Peak-Period Electricity Demand

The No Action Alternative would have a negligible effect on electricity demand resources insofar as the various roadway improvement projects generally do not increase peak-period energy demands. Certain roadway improvements will involve incremental increases in electricity demand, including implementation of the intelligent transportation system in the Las Vegas area.

Temporary Effects

Construction-Related Energy Consumption

The No Action Alternative would not involve the construction and operation of the high-speed train and associated facilities described above under the Preferred Alternative. The No Action Alternative consists of planned and programmed transportation improvement projects that would be in place by the year 2030, which primarily include the expansion of existing highways and roadways in and around the I-15 freeway between Victorville and Las Vegas. As shown in **Table F-3.13-3**, energy consumption factors for constructing one mile of one lane of freeway is considerably higher than for non-elevated railways. In addition, the No Action Alternative would not result in an operational energy savings, as constructing new traffic lanes would not result in energy payback over time (i.e., fewer barrels of oil consumed by automobile travel).[1] The construction of new traffic lanes would thus result in an irretrievable commitment of energy resources.

Table F-3.13-3 Construction-Related Energy Consumption Factors

Type of Facility	Rural Compared to Urban[g]	Factor (billions of BTUs)
Highway - At grade	Rural[a]	17.07/one-way lane mi
	Urban[b]	26.28/one-way lane mi
Highway - Elevated	Rural[a]	130.38/one-way lane mi
	Urban[b]	327.31/one-way lane mi
Railway - At grade	Rural[c]	12.29/one-way trackway mile
	Urban[d]	19.11/one-way trackway mile
Railway - Elevated	Rural[c]	55.46/one-way trackway mile
	Urban[d]	55.63/one-way trackway mile
Railway - Tunnel	NA[d]	99.51/one-way trackway mile
Railway - Station	NA[e]	78[f]/station

Source: U.S. Congress, Budget Office 1977; U.S. Congress, Budget Office 1982; and California State Department of Transportation 1983.

[1] Energy "payback" means the number of years required to "pay back" the energy used in construction via operational energy consumption savings. The payback period is calculated by dividing the estimate of construction energy by the amount of energy that would later be saved by the action.

Table F-3.13-3, continued.

Notes:

[a] Estimates reflect average roadway construction energy consumption.

[b] Estimates reflect range maximum for roadway construction energy consumption.

[c] Estimates reflect typical rail system construction energy consumption.

[d] Estimates reflect energy consumption for BART system construction as surrogate for DesertXpress construction through urban area.

[e] Discreet (i.e., non-alignment-related facilities) are not differentiated between rural or urban because the data used to develop the respective values were not differentiated as such. Some difference between the actual values might be expected.

[f] Value for construction of freight terminal. Used as proxy for DesertXpress station consumption factors.

[g] Differences between the construction-related energy consumption factors for urban and rural settings reflect differences in construction methods, demolition requirements, utility accommodation, etc.

3.13.2.3 Preferred Alternative

This section analyzes the potential effects of the Preferred Alternative on energy resources.

Permanent Effects

Overall Operation Energy Consumption

Implementation of the Preferred Alternative would result in lower operational energy consumption relative to future conditions without the railway (the No Action Alternative). This change is associated with an expected shift from automobile usage to train usage. The shift is expected to result in a reduction in annual automobile travel on I-15 of approximately 910 million VMT (0.91 billion VMT). Although the train would require energy to operate, the reduction in automobile VMT would reduce gasoline use, and thus result in a net decrease in energy usage (expressed in barrels of oil) relative to the No Action Alternative. As shown in **Table F-3.13-2**, in 2030, the Preferred Alternative would result in an annual energy savings of about 445,000 barrels of oil.

Peak-Period Electricity Demand

Table F-3.13-4 presents estimated electricity demand associated with the Preferred Alternative's peak headway rate (i.e., departures approximately every 20 minutes). It is reasonable to assume that peak operation levels would cause peak electricity demand.

Table F-3.13-4 EMU Peak-Period Electricity Demand (MW)

Jurisdiction	Friday	Saturday	Sunday	Monday-Thursday
California	53 MW	49 MW	65 MW	32 MW
Nevada	14 MW	13 MW	17 MW	8 MW
Project Corridor	67 MW	62 MW	82 MW	40 MW

Source: ICF/Jones & Stokes, 2008.

Note: Peak demand calculated per [average demand per trainset] X [number of trainsets on track coincidentally during peak-period], where [average demand per trainset] = [18,314 kWh per train roundtrip X 60 minutes per hour / 203 minutes per train roundtrip / 1,000 kW per MW] = 5.41 MW per train. Trainset consumption (i.e., 18,314 kWh per train roundtrip was obtained from DesertXpress 10/21/08 (EMU at 150 mph).

According to the National Energy Modeling System description, included in Draft EIS **Section 3.13.3.1**, the USDOE expects Electricity Market Modular (EMM) Region 12 (which includes southern Nevada) and EMM Region 13 (coterminous with the State of California) to have production capacity values on the order of 77.8 gigawatts (GW) and 85.9 GW, respectively. The electricity demand stemming from the Nevada and California portions of the Preferred Alternative would be 0.02 percent and 0.08 percent of these projections, respectively. The load from the Preferred Alternative on regional electricity resources is therefore minimal and would not result in any adverse effect.

Temporary Effects

Construction-Related Energy Consumption

The Preferred Alternative would require a temporary commitment of energy resources for construction. **Table F-3.13-5** shows construction-related energy factors associated with the project. This Final EIS section uses these factors to calculate construction-related energy, based on the number of track miles at- grade, above-grade (elevated), and in a tunnel. Energy related to the construction of the project facilities (stations, maintenance facilities) is included in these calculations.

Table F-3.13-5 shows the construction energy consumption of the project as a whole. The data show that construction-related energy would be offset by energy saved during operations (from reduced automobile travel) in approximately two years (the "payback period").

Table F-3.13-5 Construction Energy Consumption

Alternative	Facility Quantity (trackway miles & number of stations)	Energy Consumption (MMBTUS; rounded)	Payback Period (years)
At-Grade Rural	119	1,457,063	**2.2**
Above Grade Rural	46	2,557,147	
Above Grade Urban	11	630,579	
Tunnel	2.3	228,873	
Stations	2	156,000	
TOTAL		**5,029,662**	

Source: ICF/Jones & Stokes, 2010.

The total anticipated energy consumption for the construction of the Preferred Alternative would be approximately 5 MMBTUs. However, this is not an unrecoverable commitment of energy resources because the Preferred Alternative would be a net reducer of the overall operational energy requirement. Energy spent on construction would be made up by

energy saved during operations in approximately two years. The Preferred Alternative's construction-related energy consumption would therefore not be anticipated to result in an adverse effect.

It is reasonable to assume that secondary facilities, such as those used in the production of cement, steel, and so on, would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business. Therefore, it can reasonably be assumed that construction-related energy consumption by secondary facilities would not consume nonrenewable energy resources in a wasteful, inefficient, or unnecessary manner.

3.13.2.4 Comparison with Other Action Alternatives

Table F-3.13-6 summarizes the comparison of energy resource effects for the No Action Alternative and the Technology Alternatives. The detailed energy analysis examined project as a whole, comparing DEMU, EMU, and No Action Alternatives for energy consumption impacts. As a result, the table illustrates these alternatives, rather than the detailed component listing by segment or facility for the Action Alternatives. The Preferred Alternative is highlighted in yellow.

Both the DEMU and EMU technology options would result in lower operational energy consumption compared to the No Action Alternative in 2030. The shift from automobiles in the No Action Alternative to trains under the Preferred Alternative and Action Alternatives would result in a reduction in annual automobile travel on I-15 by 733 million VMT with DEMU and 931 million VMT with EMU technology. The difference between the two propulsion technologies is related to expected higher top speed and higher ridership levels for the EMU.

Regardless of the net direct energy benefit that would occur with the adoption of either propulsive technology, adoption of the EMU technology under the Preferred Alternative would further reduce consumption of non-renewable resources that the DEMU would not. This is because the DEMU alternative would (by definition) be powered by petroleum and would offer no change to shift at least some petroleum-powered transportation to renewable-powered transportation.

Differing combinations of the Action Alternatives would influence energy usage by modifying the total length of the proposed rail alignment, thus influencing the total amount of energy required to power the system. The longer the distance between the Victorville and Las Vegas Station options (VV1, VV2, Central Station A, and Downtown Station), the more energy required to power the system. Selecting VV3 as the preferred Victorville Passenger Site and eliminating Segment 7 under the Preferred Alternative has reduced the total distance of the project rail alignment when compared to the action alternatives, thereby resulting in lower operational energy consumption. If the Southern Station is ultimately selected as the Las Vegas station, the combination of VV3 and the Southern Station would yield the shortest possible alignment of all site options considered, the lowest energy consumption, and the greatest potential for energy payback.

Table F-3.13-6 Alternatives Comparison – Energy Resources

Alternative	Result in Significant Change in Energy Consumption?
No Action Alternative	Increase in energy consumption from existing conditions: + 3.8 million barrels of oil
Technology Options	
DEMU (Diesel-Electric Multiple Unit)	Decrease in annual energy consumption from No Action: -193,400 barrels of oil
EMU (Electric Multiple Unit)	Decrease in annual energy consumption from No Action: -444,900 barrels of oil

Source: CirclePoint, 2011.

3.13.3 Mitigation Measures for the Preferred Alternative

Implementation of the Preferred Alternative would result in an overall reduction in total energy consumption (electric power demand and petroleum-based consumption). The project would continue to result in a reduction in automobile traffic that would be greater than the new energy required by the railway. As a result, operational effects of the Preferred Alternative would not require mitigation.

The Preferred Alternative would result in one-time temporary energy consumption effects related to construction. The following measures should be applied to further conserve energy resources during construction:

- Develop and implement a construction energy conservation plan.
- Use energy efficient construction equipment and vehicles.
- Develop and implement a program encouraging construction workers to carpool for travel to and from construction sites.

3.13.4 Residual Impacts Following Mitigation

The energy analysis presented in this section identifies a net energy benefit (over the No Action Alternative) as a result of implementing the Preferred Alternative. Therefore, no mitigation measures are necessary to offset any adverse effect.

The measures noted in **Section 3.13.3** above would further reduce energy consumption during the construction period, thereby potentially reducing the time required for the "energy payback." As no adverse effect was identified, no residual impacts would exist.

3.14 BIOLOGICAL RESOURCES

This section describes the changes made in response to comments on the Draft EIS and Supplemental Draft EIS. This section also describes the potential the biological resource impacts to the Preferred Alternative compared to the No Action and other Action Alternatives and identifies appropriate mitigation measures.

3.14.1 CHANGES TO THE DRAFT EIS AND SUPPLEMENTAL DRAFT EIS

Section 4.3, Response to Public and Agency Comments on the Draft EIS and Supplemental Draft EIS, of this Final EIS includes all comments on the Draft EIS and Supplemental Draft EIS related to biological resource impacts and provides responses to those comments. Several comments resulted in updates and changes to the biological resources analysis in the EIS and are discussed below. Substantive updates and changes are shown in **bold underline** and ~~strikeout~~ text.

3.14.1.1 Affected Environment

Draft EIS **Section 3.14.3** and Supplemental Draft EIS **Section 3.14.1** describe in detail the affected environment for biological resources for the DesertXpress project.

Since publication of the Draft EIS and the Supplemental Draft EIS, the biological resources affected environment has changed, specifically related to desert tortoises. Draft EIS **Section 3.16, Cumulative Impacts**, and Supplemental Draft EIS each discussed the proposed Ivanpah Solar Electric Generating System (ISEGS) project as part of the respective cumulative analyses. The status of the ISEGS project has changed since publication of the Supplemental Draft EIS, resulting in a change to the affected environment. Accordingly, this Final EIS amends Supplemental Draft EIS, **Section 3.14.1**, under the heading "Segment 4C", to incorporate the following text:

> **The California Energy Commission approved the Ivanpah Solar Electric Generating System (ISEGS) project in August 2010. The ISEGS project site consists of approximately 3,300 acres of permanent ground disturbance within suitable desert tortoise habitat. This suitable habitat is within an isolated portion of the Northeastern Recovery Unit near the Clark Mountains and the I-15 freeway corridor. The Northeastern Recovery Unit has undergone considerable development resulting in the permanent loss of suitable desert tortoise habitat. Due to the presence of desert tortoise in this area, the project incorporated desert tortoise relocation and short-distance translocation measures to minimize harm to individual tortoises that may occur within that project's action area. As of October 2010,**

California state biologists and contract workers began the relocation and translocation process of desert tortoise.[1] The ISEGS project identified specific relocation and short-distance translocation areas to the west and south of Segment 4 rail alignments. Figure F-3.14-4 shows the approximate locations of the desert tortoise relocation and translocation areas for the ISEGS project.

Comment S-64 on the Supplemental Draft EIS stated that **Figure S-3.14-4** incorrectly omitted the Large Scale Tortoise Translocation Site from the legend. To correct this error and address this comment, this Final EIS amends Supplemental Draft EIS **Figure S-3.14-4** to include this information on the legend. The revised figure is shown as **Figure F-3.14-1** at the end of this section.

Based on additional consultation following publication of the Supplemental Draft EIS, an approximately 10 mile portion of Segment 3B in the vicinity of the Halloran Springs and Halloran Summit interchanges would be further modified to reduce or avoid impacts to sensitive resources in the area. This modification would shift the rail alignment from the north to the south side of the I-15 freeway, remaining within the I-15 ROW. At Halloran Summit, the rail alignment would cross back to the north side of the I-15 ROW. This modification does not alter the affected environment to include any new or different areas of habitat or other biological resources.

No other changes to the affected environment regarding biological resources have occurred since publication of the Draft EIS and Supplemental Draft EIS. Thus, the affected environment discussions in Draft EIS **Section 3.14.3** Supplemental Draft EIS **Section 3.14.1** remain applicable to this Final EIS and the evaluation of the Preferred Alternative.

3.14.1.2 Regulatory Environment

The regulatory environment for biological resources for the DesertXpress project is described in detail in Draft EIS **Section 3.14.1.**

Concurrently with the NEPA process, FRA initiated the Endangered Species Act Section 7 consultation process, pursuant to 50 CFR 402.14. The Endangered Species Act Section 7 process requires all federal agencies to consult with the USFWS if they are proposing an action that my affect listed species or their designated habitat. FRA's informal and formal consultation with the USFWS has been ongoing, as detailed in Final EIS **Section 3.14.2.1** and **Chapter 4.0, Comments and Coordination**. With regard to species identification, **Appendix F-Q** of this Final EIS contains the Listed, Proposed, and Candidate Species in southern California and Nevada provided by the USFWS.

[1] San Francisco Chronicle, Relocation of Tortoises to Pave Way for Solar Plant, October 25, 2010.

As part of the Section 7 consultation process, FRA developed and submitted a draft Biological Assessment (BA) to the USFWS in August 2010. Per the requirements of the USFWS, the BA evaluates the federal agency Preferred Alternative. The USFWS provided specific comments on the August 2010 BA and FRA developed a revised BA in response to those comments and as a result of additional coordination between the USFWS and FRA. FRA submitted the revised BA on the Agency Preferred Alternative to the USFWS in December 2010. The purpose of the BA is to address the effect of the federal agency Preferred Alternative on federally listed, threatened, endangered, or proposed listed species and their designated habitat. The BA evaluates direct, indirect, and cumulative effects to such biological resources, including desert tortoise, in the project study area. The December 2010 BA is included as **Appendix F-M** to this Final EIS. The USFWS will review the BA and will prepare a Biological Opinion (BO) as part of the Section 7 consultation process. Within the BO, the USFWS will determine if the DesertXpress project is likely to adversely affect listed species or designated critical habitat, jeopardize the continued existence of species that are proposed for listing, or adversely modify proposed critical habitat. The BO from the USFWS will be required prior to the issuance of a ROD on the DesertXpress project. This Final EIS incorporates that analysis from the BA into the substantive updates and changes in response to comments on the Draft EIS and Supplemental Draft EIS as appropriate. **Section 3.14.2.3** below also incorporates this information as it relates to the Preferred Alternative.

FRA also received comments on the Draft EIS and Supplemental Draft EIS related to the regulatory environment for biological resources, discussed below.

For clarification purposes, this Final EIS amends Draft EIS **Section 3.14.1.1** as follows to include a discussion of the Bald and Golden Eagle Protection Act:

> **Bald and Golden Eagle Protection Act**
>
> **The Bald and Golden Eagle Protection Act of 1940 (and as amended) protects both the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce in such birds. Pursuant to the ESA, permits were formerly available to "take" bald eagles as part of otherwise lawful activities. When the bald eagle was removed from the ESA (i.e., "delisted") in June 2007, the provision for issuing permits for activities that could "disturb" or otherwise incidentally take eagles was eliminated. This left significant constraints on a broad range of otherwise legal activities as no permitting process remained which would protect project proponents against liability for unintended take that may occur associated with otherwise lawful activities.**
>
> **To address this problem, the USFWS proposed regulations to create a permit provision to continue to provide protection for eagles while also authorizing limited take of eagles, for situations where take occurs**

pursuant to otherwise lawful activities. On September 11, 2009, these regulations were formalized in a final ruling issued in the Federal Register (74 Federal Register 175). The ruling took effect on November 10, 2009. The regulations comprise a USFWS program that will allow the issuance of two new types of permits, one addressing take in the form of disturbance or actual physical take of eagles (50 CFR 22.26), and a second permit, which would provide for removal of nests (50 CFR 22.27). Most permits issued under the new regulations are expected to be those that would authorize disturbance, as opposed to physical take (e.g., take resulting in mortality). Permits for a physical take will be issued in very limited cases only, where every precaution has been implemented to avoid physical take and where other restrictions and requirements will apply.

Comment 81 on the Draft EIS requested that when referring to the loss or damage to native vegetation communities, the DesertXpress project should conform to the California Desert Native Desert Plant Act, consistent with BLM policy. To address this comment, this Final EIS amends Draft EIS, **Section 3.14.1.2**, to include the following text:

California Desert Native Desert Plants Act

The California Desert Native Plants Act was passed in 1981 to protect non-listed California desert native plants from unlawful harvesting on both public and privately owned lands within the State of California. Harvest, transport, sale, or possession of specific native desert plants is prohibited by the California Desert Plants Act unless a person has a valid permit, or wood receipt, and the required tags and seals. The provisions of this Desert Plants Act are applicable within the counties of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego, California.

Comment 85 on the Draft EIS requested that the DesertXpress project conform to the minimum standards contained in the BLM Manual 6840-1. To address this comment, this Final EIS amends Draft EIS **Section 3.14.1.1**, to include the following text:

Bureau of Land Management Manual, 6840-1

The Bureau of Land Management Manual Handbook 6840-1 provides direction on the management of special status plants on BLM administered public lands. Special status plants are those plant species that are federally listed as endangered or threatened, officially proposed for federal listing as endangered or threatened, candidates for federal listing as endangered or threatened, state listed as endangered, threatened, or rare, or listed as sensitive by the BLM California State Director. It is BLM policy to conduct inventories to

determine the occurrence and status of all special status plant species on lands managed by BLM or affected by BLM actions. This includes pro-active inventories conducted to determine the impacts of BLM planned or authorized actions on any special status plants that might be within the area of a proposed project. These inventories are to be conducted at the time of year when such plant species can be found and positively identified. The inventories are also used to ensure compliance with the National Environmental Policy Act and the Endangered Species Act, as amended, by having sufficient information available to adequately assess the effects of proposed actions on special status plants.

Comment 106 on the Draft EIS requested that the Draft EIS include a discussion of the goals and objectives of the California Missing Linkages Report and California Essential Habitat Connectivity Project in regards to wildlife movement. To address this comment, this Final EIS amends Draft EIS **Section 3.14.1.2**, to include the following text:

California Missing Linkages Report

The objective of the California Missing Linkages Report is to identify the location of, and threats to the most important movement corridors for California's wildlife. This report is in response to habitat fragmentation reducing, often irreversibly, the permeability of the landscape to its native flora and fauna. The importance of habitat linkages and wildlife corridors is they can significantly contribute to both the viability of individual species but also to the integrity of the natural community. The DesertXpress project occurs within the Mojave and Sonoran Desert Ecoregion as defined by the report and key species used to identify the linkages include bighorn sheep (*Ovis Canadensis*), Mohave ground squirrel (*Spermophilus mohavensis*), desert tortoise (*Gopherus agassizii*), southwestern willow flycatcher (*Empidonax traillii extimus*), least Bell's vireo (*Vireo bellii pusillus*), and other migratory birds.

California Essential Habitat Connectivity Project

The California Essential Habitat Connectivity Project was commissioned by the Caltrans and CDFG recognizing the need for a functional network of connected wildlands to the continued support of California's natural communities. This Essential Habitat Connectivity Report includes: (1) a statewide Essential Habitat Connectivity Map, (2) data characterizing areas delineated on the map, and (3) guidance for mitigating the fragmenting effects of roads and for developing and implementing local and regional connectivity plans. The DesertXpress project occurs within the Mojave Desert Ecoregion as defined by the

California Essential Habitat Connectivity project and identifies transportation facilities as having a significant threat to such species as the federally listed threatened Mojave desert tortoise (*Gopherus agassizi*). It also identifies sustaining and enhancing habitat connectivity in the face of energy development, urban sprawl, transportation improvements, off-road vehicle use, and other environmental stressors as a major conservation concern in the Mojave Desert Ecoregion. In addition, the California Essential Habitat Connectivity Project notes populations of many of the region's rare and endemic species, such as the desert tortoise, Mohave ground squirrel (*Spermophilus mohavensis*), and desert bighorn sheep (*Ovis canadensis*), are becoming increasingly isolated from one another, leading to decreased genetic diversity and risk of extirpations.

Comment 107 on the Draft EIS requested a discussion of the California Wildlife Action Plan and the Nevada Wildlife Action Plan. To address this comment, this Final EIS amends Draft EIS **Section 3.14.1.2** to include the following text:

California Wildlife Action Plan

The California Wildlife Action Plan focuses on species and habitats of greatest concern, major stressors affecting native wildlife and habitats, and identifying actions to restore and conserve California wildlife. The Mojave Desert Region is one of nine regional divisions within the State of California. Two of this regions contain three identified species at risk include the Mojave Desert tortoise and Mohave ground squirrel. The major stressors affecting wildlife in the region include, but are not limited to, multiple use conflicts, growth and development, and invasive species.

To further address Comment 107 on the Draft EIS, this Final EIS also amends Draft EIS **Section 3.14.1.3** to include the following text:

Nevada Wildlife Action Plan

The Nevada Wildlife Action Plan provides a framework and information resource to help conserve terrestrial and aquatic wildlife and associated land and water habitats in Nevada. The DesertXpress project occurs in the Mojave/Sonoran Warm Desert Scrub, identified as one of 27 key wildlife habitats within Nevada. The action plan identifies urban and suburban growth, off-highway vehicle (OHV) recreation, invasive species spread and corresponding changes to plant community diversity and fire intervals, and overharvesting of reptile species as the greatest challenges facing wildlife in the habitat.

Comment 114 on the Draft EIS requested that additional information be added to Draft EIS **Section 3.14.1.3** related to Nevada Regulations to provide additional context for the associated regulations for biological resources. To address this comment, this Final EIS amends Draft EIS **Section 3.14.1.3** to include the following text:

> **Conservation management and special protections for flora and fauna are provided mainly by State and federal laws, regulations and policies, with management carried out by authorized agencies. Under the Nevada Department of Conservation and Natural resources, the Nevada Natural Heritage Program maintains a list of unique and rare species, those experiencing population declines in all or portions of their range within the state, and species having been provided some level of State and/or federal management protection through laws and policies. By nature, authorities to manage plant and animals overlap between the State and federal natural resource management agencies.**

Comments 115, 116, 118, and 119 on the Draft EIS requested additional information related to the Nevada Revised Statutes (NRS) and Nevada Administrative Code (NAC) in relation to biological resources and the classification of State protected wildlife. To address this comment, this Final EIS amends Draft EIS **Section 3.14.1.3** to include the text below. It should be noted that **Section 1.4.1.2** of this Final EIS includes a discussion of the STB preemptive authority, whereby STB issued a decision in DesertXpress Enterprises, LLC-Petition for Declaratory Order, STB Finance Docket No. 34914 (STB served June 27, 2007) (June 2007 Dec. Order) stating that the project would not be subject to state and local environmental review, land use, or to other permitting requirements.

> **Nevada Revised Statute, Section 501.110**
>
> **Nevada Revised Statute 501.110 creates the wildlife classification system for wildlife including mammals, birds, fish, reptiles, amphibians, mollusks, crustaceans. In addition, the Nevada Revised Statute, Section 501.110 creates the classification of protected or unprotected, game, sensitive, threatened or endangered. The statute also directs Wildlife Commission to place each species of wildlife into one of these classification categories.**
>
> **Nevada Administrative Code**
>
> **Nevada Administrative Code 503.035 classifies all species of mammals which are not classified as game, fur-bearing, protected, sensitive, threatened or endangered animals as unprotected.**
>
> **Nevada Administrative Code 503.004 defines "Sensitive" as a species or subspecies is classified as sensitive by the Commission pursuant to NAC 503.104.**

Nevada Administrative Code 503.103 provides the criteria for classification of wildlife as protected.

Nevada Administrative Code 503.104 provides the criteria for classification of wildlife as sensitive.

For clarification purposes, this Final EIS amends Draft EIS **Sections 3.14.1.2** and **3.14.1.3** to include the following text:

This section identified the state regulations related to biological resources. While these regulations establish specific standards and requirements related to sensitive biological resources, the federal regulations identified in Section 3.14.1.1 of this Final EIS are given priority in regards to implementation of the specific standards and policies.

3.14.1.3 Other Changes to the Draft EIS and Supplemental Draft EIS

Several comments on the Draft EIS and Supplemental Draft EIS resulted in changes to the biological resource impact analysis in the EIS and are discussed below.

Based on the updated discussion of the biological resources affected environment in **Section 3.14.1.1** of this Final EIS, mitigation measures presented in the Draft EIS **Section 3.14.5** and Supplemental Draft EIS **Section 3.14.4** have been refined and/or expanded as appropriate. **Section 3.14.3** of this Final EIS amends the mitigation measures to incorporate these refinements and expansions. Changes to the text are shown in **bold underline** and ~~strikeout~~ text.

Comments 77 and 80 on the Draft EIS requested that the term "noxious weed species" be replaced with "invasive, non-native weed species." To address this comment, this Final EIS amends Draft EIS **Section 3.14.3.1** as follows:

Invasive Plant Species

A project area comprehensive survey was not completed for invasive plant species. A review of the existing literature in addition to observations made by resource specialist during general project site visits have identified a number of ~~noxious~~ **invasive, non-native** weed species known to occur in the study area. These include saltcedar (*Tamarix ramosissima*), halogeton (*Halogeton glomeratus*), white horsenettle (*Solanum elaeagnifolium*), yellow starthistle (*Centaurea solstitialis*), Dalmatian toadflax (*Linaria dalmatica*), Russian thistle (*Salsola tragus*), puncture vine (*Tribulus terrestris*), camelthorn (*Alhagi camelorum*),

giant reed (*Arundo donax*), Sahara mustard (*Brassica tournefortii*), red brome (*Bromus madritensis*), fountain grass (*Pennisetum setaceum*), and tree-of-heaven (*Ailanthus altissima*).[2]

To further address Comments 77 and 80 on the Draft EIS, the Final EIS also amends the following Draft EIS sections by replacing the term "noxious weed species" with "invasive, non-native weed species" where appropriate:

- **Section 3.14.4.2**, paragraph 6
- **Section 3.14.4.5**, under the heading "Potential Introduction or Spread of Noxious Weeds into Natural Vegetation Communities"
- **Section 3.14.4.5**, under the heading "Potential Introduction or Spread of Noxious Weeds into Natural Vegetation Communities", paragraph 1
- **Section 3.14.5**, **Mitigation Measure BIO-2**, paragraph 13
- **Section 3.14.5**, **Mitigation Measure BIO-4** heading "Avoid the dispersal of noxious weeds into uninfested areas"
- **Section 3.14.5**, **Mitigation Measure BIO-4**, paragraph 1 and bullet points 3, 5, and 6

Comment 79 on the Draft EIS requested that the term "permanent loss of natural vegetation" be revised to "permanent loss of native vegetation." To address this comment, Draft EIS **Section 3.14.4.1**, bullet point 6, has been revised as follows:

- Substantial permanent loss of ~~natural~~ **native** vegetation;

To further address Comment 79 on the Draft EIS, the Final EIS also amends the following Draft EIS sections by replacing the term "permanent loss of natural vegetation" with "permanent loss of native vegetation" where appropriate:

- **Section 3.14.1.2**, under the heading "California Fish and Game Code Section 1602", paragraph 2
- **Section 3.14.4.5**, heading "Potential Introduction or Spread of Noxious Weeds into Natural Vegetation Communities"
- **Section 3.14.4.5**, under the heading "Potential Introduction or Spread of Noxious Weeds into Natural Vegetation Communities", paragraph 1

Comment 82 on the Draft EIS requested information related to the timing of the required Invasive Weed Species Monitoring and Treatment Plan. To address this comment, this Final EIS amends Draft EIS **Section 3.14.5** as follows:[3]

[2] Mojave Weed Management Area, 2007.

[3] The text changes to **Mitigation Measure BIO-4** also incorporate the changes made to address Comments 77 and 80 on the Draft EIS.

Mitigation Measure BIO-4: Avoid the Dispersal of ~~noxious~~ Invasive, Non-Native Weed~~s~~ Species into Uninfested Areas

To avoid the introduction or spread of ~~noxious~~ **invasive, non-native** weed~~s~~ **species** into uninfested areas, the Applicant will incorporate the following measures into the project plans and specifications:

- Use only certified, weed-free, imported erosion-control materials (or rice straw in upland areas).
- Coordinate with BLM field offices and National Park Service (NPS) to ensure that the appropriate best BMPs are implemented.
- Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of ~~noxious~~ **invasive, non-native** weed~~s~~ **species**.
- Clean equipment at designated wash stations before and after entering the project construction area.
- A**n** ~~noxious~~ **invasive, non-native** weed **species** survey of the proposed project ROW, including temporary work areas, will be completed prior to initiating project construction. All areas disturbed by the project will be surveyed using approximately 30-foot meandering transects. Populations of ~~noxious~~ **invasive, non-native** weed~~s~~ **species** will be identified and mapped using global positioning systems (GPS).
- Develop an approved ~~Noxious~~ **Invasive** Weed~~s~~ **Species** Monitoring and Treatment Plan to detect and treat any ~~noxious~~ **invasive, non-native** weed~~s~~ **species** in the construction area. The plan will include methods for monitoring, treating and reporting ~~noxious~~ **invasive, non-native** weed **species** infestations within the construction area. **The Invasive Weed Species Monitoring and Treatment Plan shall be drafted and submitted to BLM prior to initiating construction as part of the BLM ROW grant requirements.**

Comment 83 on the Draft EIS requested that the erosion control plan, as discussed under **Mitigation Measure BIO-9**, be submitted as part of the EIS review process. To address this comment, this Final EIS amends Draft EIS **Section 3.14.5** as follows:

Mitigation Measure BIO-9: Implement Erosion Control Measures as Appropriate

An erosion control and restoration plan shall be prepared and implemented to control short-term and long-term erosion and sedimentation effects and to restore soils and native vegetation in areas affected by construction activities. The plan shall include all requirements of applicable erosion control ordinances and grading permits and shall implement BMPs for erosion and sediment control as necessary.

The erosion control plan shall be submitted to the BLM prior to the commencement of construction activities. The erosion control plan shall be submitted as part of the BLM ROW grant process.

Comment 84 on the Draft EIS requested that the project conform to the California Desert Native Desert Plants Act. To address this comment, this Final EIS amends Draft EIS **Section 3.14.5** as follows:

Mitigation Measure BIO-10: Obtain a Tree or Plant Removal Permit from San Bernardino County and the Nevada Division of Forestry

This permit is issued in compliance with San Bernardino County Development Code Subsection 88.01.050 for removal of regulated plants. The Applicant shall comply with all provisions of the Permit. A permit shall be required from the Nevada Division of Forestry and/or the BLM in order to relocate succulents within the project alignment. **The Applicant shall also comply with the permit requirements of the California Desert Native Desert Plants Act, consistent with BLM regulations.**

Comment 85 on the Draft EIS requested that the DesertXpress project conform to the minimum survey and mitigation standards contained in the BLM Manual 6840-1. To address this comment, this Final EIS amends Draft EIS **Section 3.14.5** as follows:

Mitigation Measure BIO-~~14~~13:[4] Avoid Known Special-Status Plant Populations During Project Design

To the extent possible, the Applicant shall design the project to avoid special-status plant populations. **The Applicant shall comply with the minimum survey and mitigation standards as required by the BLM Manual 6840-1.** Where avoidance is infeasible, the Applicant shall focus on minimizing the width of construction work areas in and around special-status plant populations. Before construction, special-status plant populations shall be demarcated with temporary orange construction fencing and posted as a restricted area. Depending on the proximity of the populations to the construction work area, populations shall be monitored to ensure adverse effects on special-status plant populations are avoided. If effects on special-status plant populations are unavoidable, the Applicant shall implement **Mitigation Measure BIO-15** described below.

[4] The Draft EIS did not include a **Mitigation Measure BIO-12**. As such, the mitigation numbering for the biological resources mitigation measures has been revised to correct this error. Mitigation Measure BIO-14 from the Draft EIS is now **Mitigation Measure BIO-13**. This error was also corrected in **Section 3.14.4** of the Supplemental Draft EIS.

Comment 90 on the Draft EIS stated that impacts to the Superior-Cronese Desert Tortoise Critical Habitat would occur as a result of the project, particularly since the Superior-Cronese unit has already sustained huge losses from previous large-scale projects. To address this comment, this Final EIS amends Draft EIS **Section 3.14.4.5** as follows:

> **In addition to the adverse impacts of the DesertXpress project to the Superior-Cronese Desert Tortoise Critical Habitat, this area has also sustained substantial losses of acreage from previous large-scale projects, such as the Fort Irwin expansion. The portion of the critical habitat unit impacted by the DesertXpress project has undergone substantial impacts from historical and ongoing raven predation and modification to the vegetation community resulting from proximity impacts associated with the I-15 corridor. The habitat within the project limits cannot be adversely modified further as it currently does not support desert tortoise.**

Comments 105, 108, 109, and 111 on the Draft EIS and Comments S-57, S-69. S-72, S-73 and S-77 on the Supplemental Draft EIS requested additional information related to wildlife movement corridors and proposed wildlife crossings near the existing I-15 freeway. The comments state that wildlife currently cross the I-15 freeway corridor, not only at overpasses, but also at various points along the freeway corridor, and that the Draft EIS and Supplemental Draft EIS should consider impacts to these crossings. To address these comments, this Final EIS amends Draft EIS **Section 3.14.5** as follows:

> **Mitigation Measure BIO-~~20~~19:**[5] **Construct Exclusion Fencing, ~~and~~ Culverts to Sustain Hydrologic Function and Provide Wildlife Crossings**
>
> The Applicant shall install culverts under the proposed railroad line that match existing I-15 or UPRR culverts. Where the project deviates from existing transportation facilities, the Applicant shall install culverts **adequately designed to serve as wildlife crossings** at natural drainage features and at appropriate intervals to allow for wildlife passage, including**, but not limited to,** desert tortoises **and other wildlife** to pass under the proposed rail **alignment** ~~grade~~. **The project design shall ensure flow for natural drainages equal to or greater than four feet in width (as measured by the distance between the ordinary high water mark on each side of the drainage) during project construction or operation in order to reduce potential effects to wildlife movement, including, but not limited to, desert tortoise and**

[5] The Draft EIS did not include a **Mitigation Measure BIO-12**. As such, the mitigation numbering for the biological resources mitigation measures has been revised to correct this error. **Mitigation Measure BIO-20** from the Draft EIS is now **Mitigation Measure BIO-19**. This error was also corrected as part of the Supplemental Draft EIS.

desert bighorn sheep. ~~In order to reduce potential effects to desert bighorn sheep, no natural drainages would be obstructed or block by the construction or operation of the proposed project.~~ The culverts **and fencing** would be designed and spacing determined through coordination with USFWS, NPS, BLM, CDFG, ~~and~~ the Nevada Department of Wildlife (NDOW)**, and EPA** to ensure they meet agency wildlife standards. Exclusion fencing would be constructed parallel to the rail line and would direct tortoises **and other wildlife species** to the culverts.

3.14.2 Analysis of Environmental Consequences

3.14.2.1 Methods of Evaluation

The methodology described in Draft EIS **Section 3.14.2.2** and Supplemental Draft EIS **Section 3.14.2** used to evaluate impacts to biological resources remains applicable to this Final EIS and the evaluation of the Preferred Alternative. This same methodology was used in Supplemental Draft EIS **Section 3.14, Biological Resources**, as described below.

Section 3.14.1.2 details the formal and informal consultation conducted by FRA with the USFWS regarding potential effects of the project on federally-listed species or their designated habitat. As part of this process, FRA developed and submitted a BA to the USFWS. The BA evaluates direct, indirect, and cumulative effects to sensitive biological resources, including desert tortoise, in the project study area. The December 2010 BA is included as **Appendix F-M** to this Final EIS. This Final EIS incorporates that analysis from the BA as it relates to the Preferred Alternative.

The evaluation of biological resources considers direct and indirect effects.

Direct effects would include, but are not limited to, grubbing, grading, and other construction and operation activities that disturb vegetation and soil resources and disrupt the biological or hydrologic function of surface water features. Direct effects are considered permanent or temporary.

- *Permanent direct effects* would result from the placement of fill material for the railway bed and associated stations, operation, and maintenance facilities thus converting the area from its current condition to a transportation facility. The area considered for permanent direct effects to biological resources includes a 75-foot wide permanent rail alignment, station and maintenance facilities, autotransformers and substations, and utility corridors. In some cases, the Preferred Alternative rail alignment would have a width of approximately 60 feet, specifically near the Mojave River crossing in Barstow. The 75-foot wide area of analysis for permanent direct effects would cover the varied widths of the permanent rail alignment, since the rail alignment would not exceed a width of 75 feet.

- *Temporary direct effects* would result from soil compaction, construction dust, water and contaminant runoff from the construction area, and construction-related noise and vibrations from construction equipment. The area considered for temporary direct effects to biological resources includes an additional 162.5 foot wide area on either side of the 75 foot wide Preferred Alternative rail alignment (area of permanent direct effects). As previously stated, the 75-foot wide area of analysis for permanent direct effects would cover the varied widths of the permanent rail alignment (i.e., 60 feet near the Mojave River), since the rail alignment would not exceed a width of 75 feet. The TCAs are also included within the temporary impact area. The TCAs that are within permanent disturbance areas, such as the station sites, have been incorporated into the analysis of permanent impacts.

Indirect effects include, but are not limited to, the modification of habitat functions resulting from wind-blown dust, erosion of sediments, invasive, non-native weed species invasion, or hydrologic modifications.

Consistent with the thresholds established in Draft EIS **Section 3.14.4.2,** any effects to vegetation and wildlife would be considered adverse if any of the following were to occur:

- Loss of individual or populations of a Federal or state-listed threatened or endangered species or their habitat
- Loss of critical habitat for Federally listed threatened or endangered species
- Loss of habitat that is sensitive or rare in the region, such as Mesquite Shrubland, Joshua Tree Wooded Shrubland, wetlands, cliff face formations, and surface water sources
- Substantial loss of populations or habitat of a species that is a Federal candidate, is federally proposed for listing, is a BLM sensitive species, is a California species of special concern, is on the California Native Plant Society (CNPS) Inventory 1B or 2, is identified as a covered species in the Clark County Multiple Species Habitat Conservation Plan (MSHCP), is regionally rare, or is otherwise so sensitive as to jeopardize the continued existence of the species in the region
- Loss of long-term disruption of wildlife movement corridor
- Substantial permanent loss of native vegetation
- Substantial loss of diversity of species or natural communities and wildlife habitat
- Incompatibility with local, state, or Federal land management plans

Information Sources

Multiple informational sources were consulted to identify special-status plans and wildlife species and sensitive natural communities that have potential occur in the project region. The following sources were utilized:

- USFWS Ventura Ecological Services Office list of Listed, Proposed, and Candidate Species Which May Occur in San Bernardino County, California
- USFWS Nevada Ecological Services Office list of Listed, Proposed, and Candidate Species Which May Occur in Clark County, Nevada
- CDFG California Natural Diversity Data Base
- CDFG Special Animals and Special Plant lists
- CNPS (2007) Inventory of Rare and Endangered Vascular Plants of California
- Nevada Natural Heritage Program sensitive species list for Clark County
- BLM list of Sensitive Plant Species that occur in California
- BLM list of Sensitive Wildlife Species that occur in California
- Supplemental Final EIS for the Proposed Addition of Maneuver Training Land at Fort Irwin, California
- Tortoise Recovery Plan
- West Mojave Habitat Conservation Plan
- Northern and Eastern Mojave Desert Management Plan Amendment to the California Desert Conservation Area Plan and Final Environmental Impact Statement
- Clark County Multi Species Habitat Conservation Plan (MSHCP)
- Results of 2007 desert tortoise field surveys in California
- Results of habitat assessment for Mohave ground squirrel (included as **Appendix F-O** to this Final EIS)
- Results of 2007 protocol-level field surveys for southwestern willow flycatcher and least Bell's vireo, and a habitat assessment for western yellow-billed cuckoo
- Results of 2006 vegetation mapping for sensitive botanicals in Nevada
- Results of 2010 botanical survey in California near Mountain Pass (included as **Appendix F-N** to this Final EIS)
- Biological Assessment for the DesertXpress Project (December 2010) (included as **Appendix F-M** to this Final EIS)
- Results of formal jurisdictional delineation reports as part of the CWA Section 404 permitting process (included as **Appendix F-I** to this Final EIS)

Agency Coordination

FRA convened several agency coordination meetings during the biological resources analysis. Draft EIS **Section 3.14.2.2** and **Chapter 4.0, Comments and Coordination**, of this Final EIS include the complete list of agency coordination meetings. Multiple interagency meetings have been held with the USFWS, BLM, CDFG,

NPS, and the USACE. Since publication of the Draft EIS, there has been ongoing coordination with the BLM, USFWS, NPS, and the USACE as part of the analysis for the Supplemental Draft EIS and for this Final EIS.

Field Surveys

Field surveys were also conducted, including vegetation mapping, wetland surveys, special-status plant surveys, and special-status wildlife surveys. Draft EIS **Section 3.14.2.3** provides a summary of these surveys conducted for the Draft EIS. Similar types of surveys were conducted as part of the Supplemental Draft EIS. A comprehensive description of the surveys to date is provided below.

Vegetation Mapping

Reconnaissance-level pedestrian and windshield surveys were conducted in December 2006 to assess and map the vegetation types in a 600-foot wide corridor (400-foot-wide limit of disturbance plus a 200-foot buffer) of the rail alignment and ancillary facilities.

Vegetation was identified and classified following the scheme used in the Mojave Desert Ecosystem Program,[6] which is based on the U.S. National Vegetation Classification (NVC).[7]

ArcGIS 9.0 software was used to create a GIS dataset of vegetation communities and other land-cover types, based on true color digital ortho-rectified aerial photography. The aerial photographs were taken in 2005 (California) and 2006 (Nevada) with one meter resolution (i.e., each cell represents an area on the ground of approximately one square meter). Vegetation was mapped using a combination of field mapping onto the aerial photography and digitizing polygons on a computer screen (a process known as heads-up digitizing). Lines were drawn to delineate land-cover polygons following visible differences in color tone and texture on the photographs. Minimum mapping units (the smallest area that was distinguished and mapped) range from ¼-acre for wetland, riparian, and sensitive vegetation types.

Wetlands

Reconnaissance-level pedestrian and windshield surveys were conducted in April through May 2007 and March through May 2008 to assess and map the surface water and wetlands in the 400-foot wide corridor of the DesertXpress project rail alignments. The project alignments were projected onto USGS 7.5 minute quadrangle maps using ArcGIS 9.0 software to create a GIS dataset of surface water features. In addition, the rail alignments were also projected onto true color digital ortho-rectified aerial photography to help identify potential surface water features not identified as a blue line on the USGS quadrangle maps. The aerial photographs were taken in 2005 (California) and 2006

[6] USGS, 2004.

[7] Grossman et al. 1998.

(Nevada) with one meter resolution. The surface water features were mapped using a combination of field mapping onto the aerial photography and digitizing polygons on a computer screen.

Section 3.8.1 of this Final EIS describes the CWA Section 404 permitting process in detail, which involved additional field surveys related to wetlands and waters of the US. Field surveys designed to identify the presence or absence of field indicators of wetland vegetation, soils, and hydrology conditions, were conducted within low-lying landscape features where wetlands could potentially occur. These field surveys were conducted during the month of April, May, and June 2010.

Special-Status Plants

Floristic surveys were conducted in the Nevada portion of the alignment in Spring 2006. **Appendix F-P** of this Final EIS includes the report documenting the survey results.

A survey targeting potentially occurring special-status plants was not conducted in the California portion of the alignment in 2007 because the recorded precipitation measurement was below the annual average and the lack of adequate rainfall inhibits plant growth. Reference populations of Mojave monkeyflower (*Mimulus mojavensis*) were surveyed in April 2007. Four known populations tracked in CNDDB (2008) were visited during the typical flowering season; no Mojave monkeyflower plants were found, and few annual plants were present. **Appendix F-P** of this Final EIS provides the survey result maps.

A botanical survey was conducted in the area north of Mountain Pass within the Ivanpah Valley in April and May 2010. This botanical survey is included as **Appendix F-N** to this Final EIS.

Special-Status Wildlife

The agencies reviewed preliminary maps of the proposed alignment and provided guidance and recommendations on special-status species surveys and habitat assessments during the agency coordination meetings. Following agency guidance, biologists conducted a reconnaissance-level survey of the project area to field verify the areas that USFWS had identified as needing surveys or habitat assessments for the Mojave population of desert tortoise (December 2007), southwestern willow flycatcher, least Bell's vireo, western yellow-billed cuckoo (April 2007), and Mohave ground squirrel (May 2007). Based on the results of the reconnaissance surveys, biologists conducted focused field surveys for desert tortoise, southwestern willow flycatcher, and least Bell's vireo in areas of suitable habitat. For purposes of this analysis, the term suitable habitat refers to those areas where the rail alignment traverses relatively undeveloped lands away from the I- 15 freeway ROW and undeveloped areas in the vicinity of the Mojave River. A habitat assessment for Mohave ground squirrel was also conducted and is included as **Appendix F-O** to this Final EIS.

Desert Tortoise Survey Methods: Biologists initially identified approximately 50 miles of suitable habitat for desert tortoise in the project study area in California and Nevada. Based on coordination with USFWS Ventura Office and CDFG, it was determined that select areas within California would be surveyed for desert tortoise. These areas were selected in order to estimate desert tortoise density and surveys were conducted in from May 1 through 3, 2007 in areas of suitable habitat and where property access was granted. Based on coordination with the USFWS Nevada Ecological Services Office, it was determined that desert tortoise surveys were not necessary in Nevada. It was determined through coordination with the USFWS that all areas outside the existing I-15 ROW and outside urbanized development in Primm, Jean and the Las Vegas Metropolitan Area were occupied desert tortoise habitat. No desert tortoise surveys would be required in Nevada as part of the EIS and ESA Section 7 process.

Desert tortoise surveys were conducted by two biologists walking meandering transects within a 300-foot wide corridor, as measured from the centerline of the rail alignment. The USFWS did not recommend conducting desert tortoise surveys along the portions of the DesertXpress project that are within the I-15 freeway ROW because the I-15 freeway is assumed to have a substantial negative impact on desert tortoise population numbers. However, they requested that desert tortoise surveys be conducted in a representative number of drainage crossings along the I-15 freeway that may allow desert tortoise movement between habitat on either side of the I-15 freeway. Tortoise surveys were conducted at 29 drainage crossings in the project study area. The drainage bed and banks at these crossings were surveyed using 30-foot wide pedestrian transects at distances of 500 feet upstream and downstream on either side of I-15 (a total of 1,000 feet per drainage) for a total of 21,000 feet (approximately 4 miles).

All observed tortoises and tortoise sign (e.g., suitable burrows, pallets, scat, tracks, eggshells, and carcasses) were recorded on survey forms and location coordinates were collected using a Global Positioning System (GPS) unit.

Southwestern Willow Flycatcher, Least Bell's Vireo, and Western Yellow-Billed Cuckoo Survey Methods: Biologists conducted a habitat assessment in April 2007 to evaluate habitat characteristics and suitability for special-status bird species in the project study area. Based on the habitat assessment, it was determined that suitable habitat for western yellow-billed cuckoo does not exist in the project study area and no further survey effort was necessary. Suitable habitat was present for southwestern willow flycatcher and marginally suitable habitat was present for least Bell's vireo and protocol-level surveys were conducted for both species during the 2007 breeding season. The goals of the surveys were to document the breeding status of southwestern willow flycatcher and least Bell's vireo in the project study area and identify the extent of suitable habitat.

Following USFWS survey protocol, biologists conducted five surveys during the 2007 southwestern willow flycatcher breeding season on May 15, June 4, June 15, June 26, and July 10, 2007. The first survey of the season was timed to occur about two weeks after the

arrival of the first nesting southwestern willow flycatchers in mid-May 2007. Surveys for least Bell's vireos were conducted in appropriate habitats concurrently with southwestern willow flycatcher surveys from May 15 through July 10, 2007 when the two survey protocol periods overlap. The eight surveys for least Bell's vireos were conducted during the 2007 breeding season on April 10, April 20, May 1, May 15, June 4, June 15, June 26, and July 10, 2007.

Biologists recorded field notes of all species detected by sight or vocalization during the surveys and, in particular, listened for the characteristic calls and songs of least Bell's vireos and willow flycatchers.

Mohave Ground Squirrel Survey Methods: Habitat suitability for the Mohave ground squirrel in the project study area was evaluated by a qualified biologist. The assessment was performed from May 25 to May 30, 2007 within a 300-foot corridor, 150 feet on either side of the rail alignment centerline, between Victorville and Yermo. The habitat assessment was conducted by walking and driving the survey area, observing and recording habitat characteristics such as land use, topography, soil type, and vegetation, as well as connectivity of adjacent areas. The survey report is provided as **Appendix F-O** to this Final EIS. The report also includes the results of trapping surveys previously conducted in the region and prepared a database of all records of Mohave ground squirrel occurrence within 10 miles of the eastern edge of the species known geographic range between Victorville and Yermo. On November 19, 2008, the qualified biologist also assessed the corridor for the proposed utility corridor near Victorville using aerial photographs, but did not believe that a field assessment was necessary because of the close proximity of the utility corridor to a previously assessed rail alignment. The findings for the utility corridor are also included in **Appendix F-O** to this Final EIS.

3.14.2.2 No Action Alternative

Under the No Action Alternative, no high-speed passenger rail system would be constructed or operated. However, under the No Action Alternative, public agencies in California and/or Nevada are anticipated to implement the planned and programmed transportation improvements along the I-15 freeway corridor and adjoining roadways and interchanges. These planned and programmed improvements would be located in the same vicinity as the Preferred Alternative and would therefore cross similar biological resources and sensitive areas. The planned and programmed transportation improvements under the No Action Alternative would therefore have the potential to affect similar biological resources as would the Preferred Alternative. Project-specific environmental review to be undertaken by the sponsoring lead agency/agencies would more precisely determine the environmental effects to biological resources associated with such planned and programmed improvements.

3.14.2.3 Preferred Alternative

Draft EIS **Section 3.14.4** and Supplemental Draft EIS **Section 3.14.3** describe in detail the biological resources effects by individual project component. The discussion below summarizes the aggregated impact for the components that comprise the Preferred Alternative. **Figures F-3.14-2** through **F-3.14-6** show the biological resources within the vicinity of the Preferred Alternative.

Potential Effects to Vegetative Communities

Introduction or Spread of Invasive, Non-Native Weed Species

Construction activities associated with the Preferred Alternative could introduce or spread invasive, non-native weed species to areas with native vegetative communities. Ground disturbing activities and operation of construction equipment could result in invasive, non-native weed seed dispersal as a result of the soil movement. Construction activities would also loosen soils in the construction areas, which could result in seed dispersal via wind-blown deposits which could introduce and/or spread invasive, non-native weed species. Many invasive, non-native weed species are adapted to and promoted by soil disturbance and seeds are commonly transported on vehicles (including high-speed passenger trains) and by wind and water. Invasive, non-native weed species often out-compete the native vegetation species because of the high germination potential and high seed production, and they can become locally dominant. Invasive, non-native weed species typically displace native plant populations, degrade sensitive native communities, and reduce habitat quality for special-status wildlife. This could result in permanent and temporary direct effects to native vegetation communities and could increase the frequency of wildland fires within the Preferred Alternative area due to an increase in the fuel load within the non-fire adapted Mojave Desert.[8]

The Preferred Alternative would not result in substantial indirect effects related to wildland fire. The Preferred Alternative would be constructed within a permanent ROW that would be cleared of vegetation and maintained in this state to accommodate high-speed train activities.[9]

Loss of or Damage to Native Vegetation Communities

Construction-related activities would result in the temporary direct loss of native vegetation in areas that are cleared for TCAs, staging areas, and equipment access routes. Desert vegetation communities are slow to recover after disturbance and disturbed communities are vulnerable to the introduction of non-native invasive species. Construction-related activities could result in temporary direct effects and loss of natural

[8] ICF, 2011.

[9] ICF, 2011.

communities, including sensitive vegetation communities and habitat for special-status species, within the Preferred Alternative area and within the immediate vicinity the construction area.

The operation and maintenance infrastructure of the Preferred Alternative would convert native vegetation communities to transportation use and permanently remove these communities. The Preferred Alternative would result in permanent direct effects to 1,509.8 acres and temporary direct effects to approximately 4,135.2 acres of native vegetation communities.[10] Damage to or loss of these native vegetation communities would be considered an adverse permanent direct effect.

Loss of Sensitive Vegetation Communities

Construction and operation of the Preferred Alternative could result in permanent and temporary direct effects to sensitive vegetation communities.

Construction activities associated with the Preferred Alternative would result in temporary direct effects to sensitive vegetation communities through ground disturbing activities, movement of soils, and clearing of areas for TCAs and equipment access routes. These temporary construction activities could result in the loss of sensitive vegetation communities during the construction period and could result in long-term degradation of a sensitive plant community.

The operation and maintenance of the Preferred Alternative would permanently convert sensitive vegetation communities to transportation use and permanently remove these communities. Permanent direct effects would occur within the Preferred Alternative permanent ROW, which includes the rail alignment, the designated footprints for the passenger stations and maintenance facilities, and utility corridors. Sensitive vegetation communities in these areas would be permanently displaced and replaced with transportation facilities.

The Preferred Alternative rail alignment would result in permanent direct effects to about 3.9 acres of Mesquite Shrubland and about 84 acres of Joshua Tree Wooded Shrubland. The Preferred Alternative rail alignment would also result in temporary direct effects to about 16.1 acres of Mesquite Shrubland and about 194 acres of Joshua Tree Wooded Shrubland.[11] The Preferred Alternative would also permanently convert 4.6 acres of Mojave Creosote to transportation use.[12]

Mesquite Shrubland and Joshua Tree Wooded Shrubland are considered sensitive by state (CDFG) and local (San Bernardino County) authorities. Under the San Bernardino County Development Code (April 2007), regulated desert native plants and regulated riparian

[10] ICF. Biological Assessment for the DesertXpress Project. December 2010.

[11] ICF, 2011.

[12] ICF, 2011.

plants shall not be removed except under a Tree or Plant Removal Permit in compliance with Section 88.01.050 (Tree or Plant Removal Permits). Regulated desert native plants are defined as:

- The following desert native plants with stems two inches or greater in diameter or six feet or greater in height:
  - *Dalea spinosa* (smoketree)
  - All species of the genus *Prosopis* (mesquites)
- All species of the family *Agavaceae* (century plants, nolinas, yuccas)
- Creosote Rings, 10 feet or greater in diameter
- All Joshua trees
- Any part of any of the following species, whether living or dead:
  - *Olneya tesota* (desert ironwood)
  - All species of the genus *Prosopis* (mesquites)
  - All species of the genus *Cercidium* (palos verdes)

Regulated riparian plants are defined as vegetation within 200 feet of the bank of a stream, or in an area indicated as a protected riparian area on an overlay map or Specific Plan; streams include those shown on USGS topographic maps as perennial or intermittent, blue or brown lines (solid or dashed), and river wash areas.

Potential Effects to Special-Status Plant Populations

Construction activities associated with the Preferred Alternative would result in the loss of special-status plant populations through ground disturbing activities, movement of soils, and clearing of the ROW. The ROW needed for operation and maintenance of the Preferred Alternative would permanently convert areas where special-status plant populations and their habitat exist to transportation use, representing a permanent direct effect.

Focused presence/absence surveys were not conducted for the entire Preferred Alternative rail alignment due to prolonged drought in the region and because sensitive botanical resources can change over time in any given area. In response, FRA has required that additional surveys along the Preferred Alternative rail alignment (as set forth in **Mitigation Measure BIO-2)**, be conducted prior to initiating construction. If sensitive botanical resources are present, appropriate avoidance, minimization, and mitigation requirements would be implemented to reduce or mitigate adverse effects to special-status plant populations. The focused presence/absence surveys would be conducted just prior to the construction of the Preferred Alternative to provide more precise data and account for the most current resource conditions in the area.

The California and Nevada Natural Heritage Program databases were reviewed for existing information regarding the location of previously observed sensitive botanical resources. In addition, the BLM resource specialist in the Barstow, Needles and Las Vegas field offices reviewed the Preferred Alternative rail alignment for potential sensitive botanical resource habitat. This information determined *penstemon bicolor* ssp. *bicolor*, a BLM sensitive species and a USFWS species of concern occurs within the I-15 ROW and would be adversely affected by the Preferred Alternative rail alignment.

A botanical survey was conducted in the area north of Mountain Pass within the Ivanpah Valley in April and May 2010. This botanical survey is included as **Appendix F-N**. This botanical survey was conducted because the rail alignment in this location would traverse through undisturbed lands with assumed high resource value; the vast majority of the remainder of the rail alignment is within the I-15 freeway corridor, where resource values are generally lower.

Potential Effects to Wildlife Species

Desert Tortoise and Desert Tortoise Habitat

The Mojave population of the desert tortoise is federally and California state listed as a threatened species. In Nevada, desert tortoises are classified as a state protected and threatened species.

Operation and construction of the Preferred Alternative would remove or degrade desert tortoise habitat. Permanent direct effects would occur within the Preferred Alternative permanent ROW, which includes the rail alignment, the designated footprints for the passenger stations and maintenance facilities, and utility corridors. Desert tortoises in these areas would be permanently displaced and their natural movement corridors would be disrupted and replaced with transportation facilities.

Temporary direct effects would occur within the Preferred Alternative construction areas as a result of topsoil removal and stockpile, grading and blading, and construction activity including vehicular and equipment use in the area. Temporary direct effects would also result from soil compaction, construction dust, water and surface water runoff from construction areas, and noise and vibrations from construction equipment. Such temporary activities could cause desert tortoise to avoid the area during construction, thereby temporarily reducing available forage habitat and access to burrows. The temporary direct effects resulting from desert tortoise being relocated from the Preferred Alternative construction areas could further affect other desert tortoise already residing in the area by temporarily modifying behavior and competing for burrows and forage. This could result in reduced habitat productivity adjacent to the Preferred Alternative rail alignment during construction. Furthermore, construction activity and the presence of construction crews could attract ravens and coyotes to the area, thereby increasing

predation of desert tortoise. Ravens and coyotes are known to prey on the juvenile desert tortoises and increased predator densities in the construction areas may result in direct mortality of the juvenile desert tortoise.

The Preferred Alternative would permanently convert 1,509.8 acres and temporarily affect approximately 4,135.2 acres of desert tortoise habitat.[13]

Desert tortoise habitat exists in the vicinity of the Preferred Alternative from the Victorville area to about Sloan, Nevada.[14] The aforementioned impacts would occur in this region. There is no desert tortoise habitat located within the metropolitan Las Vegas area due to the intensity of the urban development and no adverse effects would occur in this area. The Preferred Alternative would result in permanent direct effects to 1,269.2 acres of desert tortoise habitat in California and 240.6 acres in Nevada. The Preferred Alternative would result in temporary direct effects to 3,322.59 acres of desert tortoise habitat in California and 812.6 acres in Nevada.[15]

A portion of the Preferred Alternative rail alignment is in proximity to the ISEGS project in the Ivanpah Valley (approved in August 2010). The ISEGS project site consists of approximately 3,300 acres of permanent ground disturbance within suitable desert tortoise habitat. This suitable habitat is within a portion of the Northeastern Recovery Unit near the Clark Mountains and the I-15 freeway corridor. The Northeastern Recovery Unit has undergone considerable development resulting in the permanent loss of suitable desert tortoise habitat. Due to the presence of desert tortoise in this area, the ISEGS project incorporated desert tortoise relocation and short-distance translocation measures to compensate for the loss of desert tortoise habitat associated with development of the solar energy facility. In October 2010, California state biologists and contract workers began the relocation and translocation process of desert tortoise.[16] The ISEGS project identified specific relocation and short-distance translocation areas to the west and south of the proposed project site. **Figure F-3.14-4** shows the approximate locations of the desert tortoise relocation and translocation areas for the ISEGS project in relation to the Preferred Alternative rail alignment. The Preferred Alternative rail alignment would be approximately 0.25 miles east of the ISEGS designated relocation area.

As shown in **Figure F-3.14-4**, a portion of the Preferred Alternative rail alignment would traverse through the northern portion of the designated relocation area for desert tortoise. The Preferred Alternative rail alignment would, however, avoid intrusion into the planned translocation areas for desert tortoise. Regardless, the intrusion into the relocation areas for desert tortoise would impact the quality and suitability of this area as tortoise habitat.

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[13] ICF, Biological Assessment for the DesertXpress Project, December 2010.

[14] California Department of Fish and Game. California Wildlife habitat Relationships. <http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx>. Accessed on February 15, 2011.

[15] ICF, Biological Assessment for the DesertXpress Project, December 2010.

[16] San Francisco Chronicle, Relocation of Tortoises to Pave Way for Solar Plant, October 25, 2010.

The affect of the Preferred Alternative on desert tortoise and its habitat, including the impact on the relocation area identified for the ISEGS project, is addressed in the BA; and appropriate mitigation will be included in the Biological Opinion to be issued by the USFWS in concluding the Section 7 consultation process for the project.

In regards to indirect effects, construction and operation of the Preferred Alternative could increase predation and mortality of desert tortoise from perching and nesting ravens, as the new rail alignment features, passenger stations, and maintenance facilities would provide perching and nesting opportunities for such predators. This could increase raven predation on juvenile desert tortoise along the alignment.

Additionally, disturbance of soils within the construction areas could result in increased wind erosion of the soil and could indirectly affect desert tortoise. Transport of soil and sand could result in the degradation of soil and vegetation over a wider area than the area of permanent effect. Large amounts of dust can have negative effects on the physiology of plants and may affect their productivity, result in diminishing foraging potential for desert tortoises. Degradation of the soil would also have adverse effects on the ability of desert tortoises to create burrows, representing an adverse indirect effect on desert tortoise foraging and burrowing potential.

The introduction of non-native grasses and forbs as a result of construction and operation of the Preferred Alternative could further indirectly affect desert tortoise. Refer to the discussion under the heading "Effects to Vegetative Communities" and subheading "Introduction or Spread of Invasive, Non-Native Weed Species" above for further discussion of the introduction of non-native grasses and forbs. The introduction of non-native grasses and forbs could reduce the native vegetation species, which could cause short- and long-term effects to desert tortoise through the decline in forage species diversity.

The Preferred Alternative would also result in modifications to the natural drainages, particularly in areas where the Preferred Alternative rail alignment diverges from the I-15 freeway corridor north of the Clark Mountains in the Ivanpah Valley. The natural drainage modifications in this area could result in downstream effects to the natural hydrology and Mojave wash scrub of the alluvial fan. The Preferred Alternative would incorporate measures to reduce downstream effects on the natural hydrology through the use of culverts and bridges as described in more detail in the BA and in **Mitigation Measure BIO-19**. The Applicant has also initiated the CWA Section 404 permitting process with the USACE and issuance of a permit for the discharge of fill material into waters of the US associated with construction of the Preferred Alternative will be part of the CWA Section 404 permit process administered by the USACE. The Applicant will also

apply for certification under Section 401 of the CWA.[17] The Applicant will be required to comply with all conditions and mitigation requirements that result from the Section 404 permit and Section 401 Certification. Refer to **Section 3.8.3** of this Final EIS for further discussion of these mitigation measures and permitting processes. However, there is still the potential that hydrological modifications could indirectly modify and reduce the desert tortoise forage base within the ephemeral drainages downstream from the Preferred Alternative rail alignment. Maintenance and clean-out of the culverts, bridges, and aerial structure columns associated with the Preferred Alternative rail alignment could result in additional modification of restored tortoise habitat associated with the ISEGS project immediately adjacent to the rail alignment and downstream through sediment transport and erosion.

Refer to the section under the heading "Loss of Special Management Lands" below for further discussion of the effects to designated critical habitat for desert tortoise. Also refer to the section under the heading "Effects to Wildlife Movement" below for a discussion of effects to desert tortoise movement through the Preferred Alternative area.

Mohave Ground Squirrels

The Mohave ground squirrel is listed as a threatened species under the California Endangered Species Act and is covered under the West Mojave Habitat Conservation Plan.

Construction-related activities could result in injury or mortality to Mohave ground squirrels if construction equipment crushed squirrels, trapped squirrels in their burrows, and/or removed foraging habitat during the temporary construction period. Operation of the Preferred Alternative would replace existing Mohave ground squirrel habitat with transportation use, including rail alignments, passenger stations, maintenance facilities, and utility corridors, thereby resulting in the permanent loss of such habitat.

The Preferred Alternative would permanently convert approximately 447.38 acres and temporarily affect approximately 562.45 acres of Mohave ground squirrel habitat.[18] [19]

The effects on Mojave ground squirrel habitat would be limited to areas of the Preferred Alternative in San Bernardino County. There is no Mohave ground squirrel habitat located within the metropolitan Las Vegas area due to the intensity of the urban development and no adverse effects would occur in this area.[20] Refer to the Mohave Ground Squirrel Habitat Assessment in **Appendix F-O** of this Final EIS for additional information related to Mohave ground squirrel habitat.

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[17] Under federal CWA Section 401 every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with USACE CWA Section 404 permits for dredge and fill discharges.

[18] Jones & Stokes, Mohave Ground Squirrel Habitat Assessment, DesertXpress Rail Project, November 2007.

[19] ICF, 2011.

[20] Jones & Stokes, Mohave Ground Squirrel Habitat Assessment, DesertXpress Rail Project, November 2007.

Refer to the section under the heading "Effects to Wildlife Movement" below for a discussion of effects to Mohave ground squirrel movement through the Preferred Alternative area.

Mojave Fringe-toed Lizard

The Mojave fringe-toed lizard is a California species of special concern and is a BLM sensitive species. There are no known occurrences of Mojave fringe-toed lizard in the vicinity of the Preferred Alternative.[21] However, suitable habitat for Mojave fringe-toed lizards is present in the vicinity of where the rail alignment would cross the Mojave River. Construction activities associated with the Preferred Alternative, especially the use of heavy machinery, could crush Mojave fringe-toed lizards. Within the proposed ROW at the Mojave River crossing, the Preferred Alternative would permanently convert Mojave fringe-toed lizard habitat to transportation use.[22]

The Preferred Alternative would permanently convert 3.6 acres and temporarily affect approximately 8.3 acres of Mojave fringe-toed lizard habitat.[23]

Also refer to the section under the heading "Effects to Wildlife Movement" below for a discussion of effects to Mojave fringe-toed lizard movement through the Preferred Alternative area.

Nesting Raptors and Migratory Birds

The Preferred Alternative would be located within suitable nesting habitat for special-status and migratory birds and raptors. Regulations under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, would apply to the Preferred Alternative effects to nesting raptors and migratory birds. Draft EIS **Section 3.14.1.1** includes a detailed description of the Migratory Bird Treaty Act as it relates to special-status and migratory birds and raptors. The Migratory Bird Treaty Act (Title 16, U.S.C., Part 703) authorizes the US Secretary of the Interior to protect and regulate the taking of migratory birds and established hunting seasons and capture limits for game species and protects migratory birds, their occupied nests, and their eggs.[24] **Section 3.14.1.2** above includes a description of the Bald and Golden Eagle Protection Act, which protects both the bald eagle and golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce in such birds.

Construction and operation of the Preferred Alternative could disturb the nesting of special-status and migratory birds and raptors. Construction activities (e.g., grubbing, grading, excavation, tunneling through the Clark Mountains, and driving off existing

[21] CNDDB, 2008.

[22] ICF, 2011.

[23] ICF, 2011.

[24] Title 16 USC 703, 50 CFR 21, 50 CFR 10

roads) could result in the removal or disturbance of shrubs and trees that provide potential nesting habitat for migratory birds and raptors. In addition, construction activities near the cliff areas, such as tunneling through the Clark Mountains, could result in disturbance to cliff-nesting raptors as a result of construction dust and construction-related noise and vibration from construction equipment. If construction occurs during the breeding season (generally between March 1 and August 15), nesting raptors or migratory birds could be disturbed. This disturbance could cause nest abandonment and subsequent loss of eggs or developing young at active nests in or near the project area.[25]

Trees, shrubs, and cactus between Victorville and Barstow provide suitable nesting habitat for migratory birds and raptors. The dry lakebed crossed by the Preferred Alternative rail alignment north of Yermo provides potential nesting habitat for the western snowy plover. However, the dry lake bed has been historically used for OHV recreation resulting in frequent periods of air-borne dust and loose blowing sands. These conditions have reduced the quality of the western snowy plover potential nesting habitat.

Joshua trees, other tree species, shrubs, and cactus between Yermo and Mountain Pass provide suitable nesting habitat for migratory birds and raptors. This portion of the Preferred Alternative rail alignment crosses the Soda Dry Lake bed, which provides potential nesting habitat for western snowy plover. Shrubs located in the TCAs and the Baker MOW provide suitable nesting habitat for migratory birds and raptors.

The cliff areas through the Clark Mountains also provide potential nesting habitat for American peregrine falcons, prairie falcons, and golden eagles.

Joshua trees, other tree species, shrubs, and cactus also provide suitable nesting habitat for migratory birds and raptors between the California/Nevada state line and the Las Vegas metropolitan area. Cliff areas provide potential nesting habitat for American peregrine falcons, prairie falcons, and golden eagles.

The loss or abandonment of the eggs or young of migratory birds or raptors would be an adverse effect. Mitigation recommended in **Mitigation Measure BIO-2** would include measures, such as preconstruction surveys, to avoid disturbance of tree-, shrub-, or ground-nesting special-status migratory birds and raptors.

Banded Gila Monster

The banded gila monster is a California species of special concern and is a BLM sensitive species. There are no known occurrences of banded gila monsters in the vicinity of the Preferred Alternative.[26]

Construction activities in the Mountain Pass area of the Preferred Alternative rail alignment could affect suitable habitat for banded gila monster. While no occurrences of

[25] ICF, 2011.

[26] CNDDB, 2008.

this species were recorded during surveys of the Preferred Alternative area, construction activities in this habitat, especially the use of heavy machinery, could crush banded gila monsters.[27]

Also refer to the section under the heading "Effects to Wildlife Movement" below for a discussion of effects to banded gila monster movement through the Preferred Alternative area.

Clark County Habitat Conservation Plan Covered Reptile Species

Construction of the Preferred Alternative within Clark County, Nevada would affect suitable habitat for banded gecko, Great Basin collard lizard, desert iguana, large-spotted leopard lizard, desert tortoise, chuckwalla, sidewinder, speckled rattlesnake, Mojave green rattlesnake, glossy snake, common king snake, western leaf-nosed snake, western long-nosed snake, and Sonoran lyre snake. Construction activities, such as grading and excavation and the use of heavy machinery, could injure or kill reptile species covered under the Clark County HCP.

The Preferred Alternative would permanently convert 248.4 acres and temporarily affect 821.4 acres of habitat for reptiles covered under the Clark County HCP.[28]

Also refer to the section below with the heading "Effects to Wildlife Movement" for a discussion of effects to the Clark County HCP covered reptile species' movement through the Preferred Alternative area.

Burrowing Owls

Burrowing owls are a California species of special concern and a BLM sensitive species. The shoulders of roads, dirt mounds and berms, and other open areas located in the vicinity of the Preferred Alternative rail alignment provide suitable habitat for burrowing owls, especially where open culverts, ground squirrel burrows, desert tortoise burrows, and badger burrows occur. Construction activities (e.g., grubbing, grading, excavation, and driving off-road) could result in the removal of active nests, if construction occurs during the nesting season (February 1 through August 31) and/or foraging habitat.

Since burrowing owls utilize similar habitat as the desert tortoise for nesting and foraging, the amount of burrowing owl habitat affected by the Preferred Alternative is the same as described for the desert tortoise. The Preferred Alternative would permanently convert 1,509.8 acres and temporarily affect approximately 4,135.2 acres of burrowing owl habitat.[29]

[27] ICF, 2011.

[28] ICF, 2011.

[29] ICF, 2011.

Also refer to the section below under the heading "Effects to Wildlife Movement" for a discussion of effects to burrowing owl movement through the Preferred Alternative area.

Roosting Bats

Bridges throughout the Preferred Alternative rail alignment provide potential roosting and nursery sites for bats. Caves and mines located in or near the rail alignment, specifically within the Clark Mountains, provide potential roosting and nursery sites. Disturbance of these roosting and/or nursery sites during construction activities, such as grading, excavation, or tunneling, as well as operation of the high-speed passenger trains could result in the injury or mortality of roosting bats, representing an adverse effect.[30]

American Badger

American badger is a California species of special concern. Suitable habitat for American badger occurs in desert scrub habitats located throughout the project area. Construction activities such as grubbing, grading, excavation, and off-road travel through American badger habitat could result in the injury or mortality of badgers.

Since American badgers utilize similar habitat as the desert tortoise, the amount of affected acreage is the same as described for desert tortoise habitat for the Preferred Alternative. The Preferred Alternative would permanently convert 1,509.8 acres and temporarily affect approximately 4,135.2 acres of American badger habitat.

Refer to the discussion below under the heading "Effects to Wildlife Movement" for a discussion of effects to American badger movement through the Preferred Alternative area.

Desert Bighorn Sheep

Desert bighorn sheep are a fully protected species under CDFG code and a BLM sensitive species. Suitable habitat for desert bighorn sheep occurs in the Cronese Basin (Cave Mountain) and Mountain Pass areas near the Preferred Alternative rail alignment. In addition, the rail alignment may act as an additional barrier to desert bighorn sheep movement.[31] Construction-related activities in these areas, such as grading, excavation, or tunneling, could directly affect desert bighorn sheep by disrupting lambing areas. The construction activities could also alter the flow of natural springs, which provide critical supply of water. Additionally, desert bighorn sheep could use the rail alignment for movement and utilize the tunnels through the Clark Mountains as shelter. If desert bighorn sheep are located on the rail alignment, the operation of a high-speed passenger train could result in sheep mortality.[32]

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[30] ICF, 2011.

[31] California Department of Fish and Game. California Wildlife habitat Relationships. <http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx>. Accessed on February 15, 2011.

[32] ICF, 2011.

The Preferred Alternative would permanently convert 57.3 acres and temporarily affect approximately 239.1 acres of desert bighorn sheep habitat.[33]

Also refer to the section below under the heading "Effects to Wildlife Movement" for a discussion of effects to desert bighorn sheep movement through the Preferred Alternative area.

Potential Effects to Wildlife Movement

Rail Alignment

The I-15 freeway is an existing linear barrier to wildlife within the vicinity of the Preferred Alternative. The Preferred Alternative rail alignment would primarily be located within the existing I-15 freeway corridor and would incorporate fencing, walls, and crash barriers which would further limit wildlife crossings across the I-15 freeway. As discussed below, the Preferred Alternative would also incorporate culverts that connect to the existing I-15 freeway culverts, which would allow for existing wildlife crossing patterns under these transportation features.

Where the Preferred Alternative rail alignment would divert from the existing I-15 freeway corridor, such as in areas north of Yermo and the Mountain Pass/Ivanpah area, the rail alignment would introduce a new barrier to wildlife movement and create additional habitat fragmentation.

While recreational off-highway vehicle (OHV) use in the Yermo area has reduced habitat quality within and immediately adjacent to the dry lake bed near Yermo, this portion of the rail alignment would increase habitat fragmentation and create an additional barrier to wildlife movement and may reduce the distribution of genetic material between populations. Individual wildlife occurring in this area would be further isolated from surrounding populations by the construction and operation of the Preferred Alternative in this area.

North of Mountain Pass to the California/Nevada state line (in the Ivanpah Valley), the Preferred Alternative rail alignment would travel away from the I-15 freeway corridor and would cause habitat fragmentation by creating a new linear feature through currently undeveloped lands. The rail alignment would create a barrier to wildlife movement for species including, but not limited to, larger wildlife species like the desert bighorn sheep and American badger and smaller wildlife species like the desert tortoise, banded gila monster, or burrowing owls. This portion of the rail alignment could isolate or block existing habitat areas between it and the I-15 freeway. This could reduce the distribution of genetic material between species populations, as individual wildlife occurring in this area would be further isolated from surrounding populations.

[33] ICF, 2011.

The installation of appropriately constructed culverts along the proposed route (as recommended by **Mitigation Measure BIO-19**) would mitigate some of these effects for smaller wildlife species, such as desert tortoise. However, desert tortoise access to and utilization of the isolated block of habitat is expected to be reduced which would limit the availability of foraging and population interaction. In regards to larger wildlife species in the area, such as desert bighorn sheep, this isolation and blocking of existing habitat could also cut off access to available water resources, which would limit habitat viability in the area. Mitigation is provided to reduce this adverse effect (the project design shall ensure flow for natural drainages equal to or greater than four feet in width, as measured by distance between the ordinary high water mark on each side of the drainage, during construction and operation as included in **Mitigation Measure BIO-19**). Additionally, the use of tunnels through the Clark Mountains and elevated sections through the Ivanpah Valley area would also allow for ongoing wildlife access in the area.

The Preferred Alternative would also divert from the I-15 freeway corridor for approximately seven miles through northern Yermo, which could also cause habitat fragmentation by creating a new linear feature through undeveloped lands. Similar to the area north of Mountain Pass in the Ivanpah Valley, this portion of the Preferred Alternative rail alignment would create a barrier to wildlife movement and could isolate habitat on either side of the I-15 freeway corridor. This could reduce the distribution of genetic material between species populations, including desert tortoise, Mohave ground squirrel, Mojave fringe-toed lizards, burrowing owls, and American badger. The individual wildlife occurring in this area would be further isolated from surrounding populations. The installation of appropriate construction culverts, as noted above, would mitigate some of these effects for smaller wildlife species.

The Preferred Alternative rail alignment would divert from the I-15 freeway corridor for approximately five miles in the metropolitan Las Vegas area. The rail alignment would shift into the Clark County ROW within the median of an existing transportation facility (Dean Martin Drive/Industrial Road), which is surrounded by urban development. If the Southern Station site option is ultimately developed as the Las Vegas Station (the Preferred Alternative encompasses either the Southern Station or Central Station B), approximately 1.8 miles of the rail alignment through the metropolitan Las Vegas area between Russell Road and Aldebaran Avenue (including an approximately one-mile portion of the rail alignment that would divert from the I-15 freeway north of Hacienda Avenue) would not be constructed. No wildlife movement occurs in this area. No new linear barriers to wildlife, such as the Clark County HCP covered reptile species, would occur in this area due to the presence of the existing I-15 freeway corridor and other transportation and urban facilities.

Passenger Stations and Maintenance Facilities

The Preferred Alternative Victorville Station (VV3) and OMSF (OMSF 2) and the Baker MOW would not introduce a new linear barrier to wildlife movement, since movement around the station and maintenance buildings would be maintained. Their proximity to the I-15 freeway corridor blunts the potential for the Victorville Station and OMSF to serve as a barrier to wildlife movement.

The Preferred Alternative Las Vegas Station site options (Southern Station or Central Station B) and the Las Vegas MSF (Wigwam Avenue MSF) would also not introduce a new linear barrier to wildlife movement, as these facilities would be located in areas surrounded by existing urban development that already precludes wildlife movement.

Potential Effects to Special Management Lands

The Preferred Alternative rail alignment would result in the loss of special management lands between Yermo and Mountain Pass. These special management lands provide critical habitat for desert tortoise. During operation, the Preferred Alternative would result in the permanent conversion of these special management lands to transportation use, thereby resulting in a permanent loss of critical habitat for desert tortoise. Construction activities, such as grading and excavation, would require specific special management lands to be cleared for temporary construction areas. Refer to the discussions above under the heading "Effects to Wildlife Species" and subheading "Desert Tortoise and Desert Tortoise Habitat" for a further description of potential impact to desert tortoise habitat.

The Preferred Alternative would permanently convert 249.97 acres and temporarily affect 868.81 acres of Superior-Cronese Desert Tortoise Critical Habitat. The Preferred Alternative would also permanently convert 202.98 acres and temporarily affect 531.48 acres of Ivanpah Desert Tortoise Critical Habitat. In total, the Preferred Alternative would permanently convert 452.95 acres and temporarily affect 1,400.29 acres of special management lands providing critical desert tortoise habitat. The permanent effect to the Superior-Cronese Desert Tortoise Critical Habitat and Ivanpah Desert Tortoise Critical Habitat is about 0.032 percent of each unit's total acreage. The majority of these effects are to designated critical habitat immediately adjacent to the existing I-15 freeway corridor.[34]

The impacted critical habitat provides limited functionality due to its proximity to the I-15 freeway. The proximity also results in increased raven and coyote predation on juvenile desert tortoise, a modified vegetation structure due to the presence of non-native weed species, and habitat that is not protected from disturbance or human caused mortality.

[34] ICF, 2011.

The Preferred Alternative is not expected to change the critical habitat function to serve the intended conversion purpose or inhibit the ability of the primary constituent's elements to be functionally established within the critical habitat.

In addition, areas of the Superior-Cronese Desert Tortoise Critical Habitat have also sustained substantial losses of acreage from previous large-scale projects, such as the Fort Irwin expansion.

The Preferred Alternative would also permanently and temporarily affect DWMAs. The Preferred Alternative would permanently convert 208.32 acres and temporarily affect 726.36 acres of the Superior-Cronese DWMA. The Preferred Alternative would permanently convert 103.02 acres and temporarily affect 290.64 acres of the Shadow Valley DWMA. All of the impacts to DWMAs would occur in California.[35]

The Preferred Alternative would also permanently convert 3.6 acres of Cronese ACEC.

Potential Effects to Wetlands/Waters of the United States

The Preferred Alternative would result in direct and indirect effects to wetlands and waters of the US.

Concurrently with the NEPA process, the Applicant initiated the CWA Section 404 permitting process with the USCAE in May 2010. The Applicant submitted six formal jurisdictional delineation reports to the USACE in July 2010, which considered the Death Valley area, [36] the Cuddeback Lakes watershed,[37] the Ivanpah Valley area, [38] the Jean Dry Lake area,[39] the Las Vegas watershed,[40] and the Roach Dry Lake area.[41] The formal jurisdictional delineation reports for the Preferred Alternative area are included as

[35] ICF, 2011.

[36] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California. July 2010.

[37] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California. July 2010.

[38] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California. July 2010.

[39] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada. July 2010.

[40] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Las Vegas Watershed, Clark County, Nevada. July 2010.

[41] Huffman-Broadway Group. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

Appendix F-I to this Final EIS. The delineation reports investigate the presence of wetlands and other waters potentially subject to USACE regulation under CWA Section 404. The delineation reports were conducted in accordance with the CFR definitions of jurisdictional waters, USACE regulations, and supporting guidance documents. The delineation reports make recommendations to the USACE relative to the presence of waters of the US for a final jurisdictional determination. Issuance of a permit for the discharge of fill material into waters of the US associated with construction of the Preferred Alternative will be part of the CWA Section 404 permit process administered by the USACE.

In addition to the CWA Section 404 permit, the Applicant will apply for certification under Section 401 of the CWA.[42] Section 401 certification is administered in California through the Regional Water Quality Control Boards (in the case of the DesertXpress project the Lahontan Regional Water Quality Control Board) and in Nevada by the Nevada Division of Environmental Protection. Issuance of the CWA Section 404 permit by the USACE, and Section 401 Certification, are anticipated to follow issuance of the Records of Decision on the project by the Cooperating Agencies. The Applicant will be required to comply with all conditions and mitigation requirements that result from the Section 404 permit and Section 401 Certification. Refer to **Section 3.8.3** of this Final EIS for further discussion of these mitigation measures and permitting processes.

Direct effects are effects that would occur as a result of ground disturbance, including earthwork (clearing, grading, excavation, and fill) to create the rail bed, construction vehicle traffic, and staging and storage areas. For this analysis, it was assumed that direct effects associated with the Preferred Alternative would be limited to the area within the limits of disturbance, and that the area within the proposed ROW would be directly affected by conversion to use by the Preferred Alternative. This analysis was carried out by overlaying the Preferred Alternative design on the U.S. Geological Survey (USGS) 7.5 minute quadrangle and assuming that all drainages within the Preferred Alternative footprint would be filled, with subsequent loss of all natural functions.

Indirect effects are effects that would occur later in time and could affect the natural function of the drainage located outside the Preferred Alternative footprint. This analysis determined the area of indirect effects by assuming that all drainages within the study area might be indirectly affected by the Preferred Alternative. In general, indirect effects occur with the greatest intensity adjacent to the Preferred Alternative rail alignment and become less severe with distance. Some effects, such as the effects of dissolved substances

[42] Under federal CWA Section 401 every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with USACE CWA section 404 permits for dredge and fill discharges.

and suspended particles, may be manifested within 50 feet of the tracks but may extend up to 500 feet. Other indirect effects, such as introduction of invasive, non-native weed species or effects on wildlife use of and movement through the drainage feature, may extend for 1,000 feet. Potential direct and indirect effects that the Preferred Alternative could have on wetlands are listed below:

- Construction of the Preferred Alternative would cause soil and vegetation disturbance within the channel and banks of project area drainages. This includes permanent disturbance from placement of culverts within the drainages and temporary effects resulting from construction activity.
- During construction, ground disturbance may cause sediment deposition and potential for erosion of sediments into the drainages within the study area. In addition, construction activity (i.e. driving in and across washes) in or near ephemeral washes can cause drainage bed and bank modifications due to the erodible nature of the study area soils. These modifications could adversely affect hydrology and vegetation within the construction area and immediately downstream.
- Soil disturbance and removal of existing vegetation during construction would increase the potential for the spread of invasive, non-native exotic plant species into washes within the study area.
- Construction materials, such as fuel, oil, lubricants, and concrete that may be spilled into associated drainages within the study area, could have adverse affects on vegetation and wildlife habitat.

Some of these effects would be short-term, such as construction effects. Other effects, such as placement of culverts and the runoff of contaminants, would be ongoing, continual effects.

The Preferred Alternative rail alignment would cross about 300 ephemeral drainages and the Ivanpah Dry Lake. Refer to **Section 3.8.2.3** of this Final EIS for further surface water and drainage information relative to the Preferred Alternative. Of these approximately 300 drainages, the Mojave River, Duck Creek, Tropicana Wash and Flamingo Wash are the largest drainages crossed by the Preferred Alternative. Construction of the Preferred Alternative would permanently remove vegetation from these principal drainages and upland vegetation within the other ephemeral drainages.

Based on the formal jurisdictional delineation reports submitted to the USACE by the Applicant, a subset of these ephemeral drainages qualify as waters of the US or wetlands regulated by the USACE. Of these jurisdictional waters, construction of the Preferred Alternative would permanently affect an estimated 5.96 acres of waters of the US (ephemeral drainages).[43]

The Preferred Alternative would not permanently affect any wetlands, either permanently or temporarily.[44]

In addition to the 5.96 acres of direct permanent effects to waters of the US, construction of the Preferred Alternative would temporarily affect an estimated 0.2 acres of waters of the US (ephemeral drainages).[45]

Refer to **Section 3.8.2.3** for further discussion of the Preferred Alternative's effects to waters of the US and wetlands in regards to water quality.

3.14.2.4 Comparison with Other Action Alternatives

Tables F-3.14-1 through **F-3.14-3** summarize the comparison of biological resources effects for the No Action Alternative and the Action Alternatives. Components of the Preferred Alternative are highlighted in yellow.

Rail Alignment Options

The Preferred Alternative rail alignment is largely similar to the Action Alternative B rail alignment option articulated in the Draft EIS. Alternative B largely places the rail alignments immediately adjacent to the existing I-15 freeway within the freeway ROW.

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[43] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California; HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada; HUC 8 Las Vegas Watershed, Clark County, Nevada; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

[44] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California; HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada; HUC 8 Las Vegas Watershed, Clark County, Nevada; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

[45] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California; HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada; HUC 8 Las Vegas Watershed, Clark County, Nevada; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

Table F-3.14-1 Alternatives Comparison – Biological Resources (1 of 3)

Alternative	Impose Barrier to Wildlife Movement	Number of Stream Crossings	Sensitive Plant Community Acreage Affected		Desert Tortoise Habitat Acreage Affected	
			Permanent	Temporary	Permanent	Temporary
No Action Alternative	Assumed to be similar to Preferred Alternative rail segments within the I-15 corridor					
Alignment Routings, Including Temporary Construction Areas (TCAs), and Alignment Adjustment Areas						
Segment 1 Routing						
Segment 1 (connecting to Segment 2A/2B)	Yes, outside I-15 corridor	24	0	0	159	832.1
Segment 1 (connecting to Segment 2C)	No	34	0	0	33.45	321.05
Segment 2						
Segment 2A/2B, 2A	Yes, outside I-15 corridor	16	0	4.6 (Mesquite)	171	700
Segment 2A/2B, 2B	Yes, outside I-15 corridor	12	0	0	151	548
Segment 2C	No	12	0	0	108.26 (Side Running) 37.4 (Median)	455.17 (Side Running) 97.1 (Median)
Segment 3						
Segment 3A	No	105	0	0	7.6	40.9
Segment 3B (Modified)	No	117	84 (Joshua Tree) 2 (Mesquite)	194 (Joshua Tree) 13 (Mesquite)	640.45	1,882.5

Alternative	Impose Barrier to Wildlife Movement	Number of Stream Crossings	Sensitive Plant Community Acreage Affected		Desert Tortoise Habitat Acreage Affected	
			Permanent	Temporary	Permanent	Temporary
Segment 4						
Segment 4A	Yes, outside I-15 corridor	29	0.5 (Mesquite)	0	42.2	371.7
Segment 4B	Yes	42	0	0	111.8	500.3
Segment 4C	Yes	48	1.9 (Mesquite)	3.1 (Mesquite)	167.7	722.23
Segment 5						
Segment 5A	No	49	0	0	0.2	8.7
Segment 5B	No	49	0	0	175.5	564.6
Segment 6						
Segment 6A (terminating at Las Vegas Southern Station or Las Vegas Central Station B)	No	16 to 18	0	0	40.2	116.6
Segment 6B (terminating at Las Vegas Southern Station or Las Vegas Central Station B)	No	16 to 18	0	0	32.75	119.99
Segment 6C	Yes	26 to 27	0	0	78.2	329.2
Segment 7						
Segment 7A	No	0	0	0	0	0
Segment 7B	No	0	0	0	0	0
Segment 7C	No	0	0	0	0	0
Victorville Station and Maintenance Facility Site Options						
Victorville Station Site 1	No	0	0	0	93	0

Alternative	Impose Barrier to Wildlife Movement	Number of Stream Crossings	Sensitive Plant Community Acreage Affected		Desert Tortoise Habitat Acreage Affected	
			Permanent	Temporary	Permanent	Temporary
Victorville Station Site 2	No	2	0	0	114.5	0
Victorville Station Site 3	No	1	0	0	205.5 (VV3A)	0
					209.78 (VV3B)	0
Victorville OMSF 1	No	0	0	0	92.4	0
Victorville OMSF 2	No	2	0	0	98.31	27.23
Las Vegas Area Station and Maintenance Facility Site Options						
Las Vegas Southern Station	No	2	0	0	0	0
Las Vegas Central Station A	No	0	0	0	0	0
Las Vegas Central Station B	No	0	0	0	0	0
Las Vegas Downtown Station	No	0	0	0	0	0
Sloan Road MSF[46]	No	1	0	0	9.7 to 13.9	0
Relocated Sloan MSF	No	0	0	0	9.1	11.4
Wigwam Avenue MSF	No	1	0	0	0	0
Robindale Avenue MSF	No	1	0	0	8.8	0
Frias Substation	No	0	4.6 (Mojave Creosote)	0	0	0
Other Facility						
Baker Maintenance of Way Facility	No	1	0	0	3.96	3.45

[46] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Alternative	Impose Barrier to Wildlife Movement	Number of Stream Crossings	Sensitive Plant Community Acreage Affected		Desert Tortoise Habitat Acreage Affected	
			Permanent	Temporary	Permanent	Temporary
Technology Options, Including Autotransformers and Electric Utility Corridors (EMU Only)						
DEMU (Diesel-Electric Multiple Unit)	None	None	None	None	None	None
EMU (Electric Multiple Unit)	None	None	None	None	39.67	38.95

Source: CirclePoint, 2011.

Table F-3.14-2 Alternatives Comparison – Biological Resources (2 of 3)

Alternative	Mohave Ground Squirrel Habitat Acreage Affected		Effects to:			
	Permanent	Temporary	Mojave Fringe-toed Lizard	Nesting Raptors/ Migratory Birds	Banded Gila Monster	Burrowing Owls
No Action Alternative	Assumed to be similar to Preferred Alternative rail segments within the I-15 corridor					
Alignment Routings, Including Temporary Construction Areas (TCAs) and Alignment Adjustment Areas						
Segment 1 Routing						
Segment 1 (connecting to Segment 2A/2B)	198.5	803.3	Yes	Yes	No	Yes
Segment 1 (connecting to Segment 2C)	85.11	350.77	Yes	Yes	No	Yes
Segment 2						
Segment 2A/2B, 2A	23	863	Yes	Yes	No	Yes
Segment 2A/2B, 2B	40	319	No	Yes	No	Yes
Segment 2C	36	89.1	Yes (Side Running) No (Median)	Yes	No	Yes
Segment 3						
Segment 3A	0	70.1	No	No	No	No
Segment 3B	0	61.5	No	Yes	Yes	Yes
Segment 4						
Segment 4A	0	0	No	Yes	Yes	Yes
Segment 4B	0	0	No	Yes	Yes	Yes

Alternative	Mohave Ground Squirrel Habitat Acreage Affected		Effects to:			
	Permanent	Temporary	Mojave Fringe-toed Lizard	Nesting Raptors/ Migratory Birds	Banded Gila Monster	Burrowing Owls
Segment 4C	0	0	No	Yes	Yes	Yes
Segment 5						
Segment 5A	0	0	No	Yes	No	No
Segment 5B	0	0	No	Yes	No	Yes
Segment 6						
Segment 6A (terminating at Las Vegas Southern Station or Las Vegas Central Station B)	0	0	No	No	No	No
Segment 6B (terminating at Las Vegas Southern Station or Las Vegas Central Station B)	0	0	No	Yes	No	Yes
Segment 6C	0	0	No	Yes	No	Yes
Segment 7						
Segment 7A	0	0	No	No	No	No
Segment 7B	0	0	No	No	No	No
Segment 7C	0	0	No	No	No	No
Victorville Station and Maintenance Facility Site Options						
Victorville Station Site 1	85.1	0	No	No	No	Yes
Victorville Station Site 2	105.2	0	No	No	No	Yes

Alternative	Mohave Ground Squirrel Habitat Acreage Affected		Effects to:			
	Permanent	Temporary	Mojave Fringe-toed Lizard	Nesting Raptors/ Migratory Birds	Banded Gila Monster	Burrowing Owls
Victorville Station Site 3	205.5 (VV3A) 224 (VV3B)	38.5 (VV3A) 41 (VV3B)	No	No	No	Yes
Victorville OMSF 1	22.6	0	No	No	No	Yes
Victorville OMSF 2	95.61	20.08	No	No	No	Yes
Las Vegas Area Station and Maintenance Facility Site Options						
Las Vegas Southern Station	0	0	No	No	No	No
Las Vegas Central Station A	0	0	No	No	No	No
Las Vegas Central Station B	0	0	No	No	No	No
Las Vegas Downtown Station	0	0	No	No	No	No
Sloan Road MSF[47]	0	0	No	Yes	No	No
Relocated Sloan MSF	0	0	No	Yes	Yes	Yes
Wigwam Avenue MSF	0	0	No	No	No	No
Robindale Avenue MSF	0	0	No	No	No	No
Frias Substation	0	0	No	No	No	Yes
Other Facility						
Baker Maintenance of Way Facility	0	0	No	Yes	No	Yes

[47] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

Alternative	Mohave Ground Squirrel Habitat Acreage Affected		Effects to:			
	Permanent	Temporary	Mojave Fringe-toed Lizard	Nesting Raptors/ Migratory Birds	Banded Gila Monster	Burrowing Owls
Technology Options, Including Autotransformer and Electric Utility Corridors (EMU Only)						
DEMU (Diesel-Electric Multiple Unit)	None	None	None	None	None	None
EMU (Electric Multiple Unit)	6.66	None	None	None	None	None

Source: CirclePoint, 2011.

Table F-3.14-3 Alternatives Comparison – Biological Resources (3 of 3)

Alternative	Effects to:				Acres of Special Management Lands Converted
	Roosting Bats	American Badger	Desert Bighorn Sheep	Clark County MSHCP Covered Reptiles	
No Action Alternative	Assumed to be similar to Preferred Alternative rail segments within the I-15 corridor				
Alignment Routings, Including Temporary Construction Areas (TCAs) and Alignment Adjustment Areas					
Segment 1 Routing					
Segment 1 (connecting to Segment 2A/2B)	Yes	Yes	No	No	0
Segment 1 (connecting to Segment 2C)	Yes	Yes	No	No	0
Segment 2					
Segment 2A/2B, 2A	Yes	Yes	No	No	60.9 (Superior-Cronese)
Segment 2A/2B, 2B	Yes	Yes	No	No	60.7 (Superior-Cronese)
Segment 2C	No	Yes	No	No	0
Segment 3					
Segment 3A	No	Yes	No	No	0
Segment 3B	Yes	Yes	Yes	No	249.97 (Superior-Cronese) 202.98 (Ivanpah) 208.32 (Superior-Cronese DWMA) 103.02 (Shadow Valley DWMA) 3.6 (Cronese ACEC)
Segment 4					
Segment 4A	Yes	Yes	Yes	No	20.4 (Ivanpah) 13.8 (Mojave National Preserve)
Segment 4B	Yes	Yes	Yes	No	0

Alternative	Effects to:				Acres of Special Management Lands Converted
	Roosting Bats	American Badger	Desert Bighorn Sheep	Clark County MSHCP Covered Reptiles	
Segment 4C	Yes	Yes	Yes	Yes	0
Segment 5					
Segment 5A	No	No	No	Yes	0
Segment 5B	Yes	Yes	No	Yes	0
Segment 6					
Segment 6A (terminating at Las Vegas Southern Station or Las Vegas Central Station B)	No	Yes	No	Yes	0
Segment 6B (terminating at Las Vegas Southern Station or Las Vegas Central Station B)	Yes	Yes	No	Yes	0
Segment 6C	Yes	Yes	No	Yes	0
Segment 7					
Segment 7A	No	No	No	No	0
Segment 7B	No	No	No	No	0
Segment 7C	No	No	No	No	0
Victorville Station and Maintenance Facility Site Options					
Victorville Station Site 1	Yes	Yes	No	No	0
Victorville Station Site 2	No	Yes	No	No	0
Victorville Station Site 3	No	Yes	No	No	0
Victorville OMSF 1	Yes	Yes	No	No	0
Victorville OMSF 2	No	Yes	No	No	0

Alternative	Effects to:				Acres of Special Management Lands Converted
	Roosting Bats	American Badger	Desert Bighorn Sheep	Clark County MSHCP Covered Reptiles	
Las Vegas Area Station and Maintenance Facility Site Options					
Las Vegas Southern Station	No	No	No	No	0
Las Vegas Central Station A	No	No	No	No	0
Las Vegas Central Station B	No	No	No	No	0
Las Vegas Downtown Station	No	No	No	No	0
Sloan Road MSF[48]	No	Yes	No	Yes	0
Relocated Sloan MSF	No	Yes	No	Yes	0
Wigwam Avenue MSF	No	Yes	No	Yes	0
Robindale Avenue MSF	No	Yes	No	Yes	0
Frias Substation	No	No	No	No	0
Other Facility					
Baker Maintenance of Way Facility	No	Yes	No	No	0
Technology Options, Including Autotransformers and Electric Utility Corridors (EMU Only)					
DEMU (Diesel-Electric Multiple Unit)	None	None	None	None	None
EMU (Electric Multiple Unit)	None	None	None	None	None

Source: CirclePoint, 2011.

[48] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was proposed to completely replace the Sloan Road MSF evaluated in the Draft EIS.

The Action Alternative B, I-15 side running rail alignment would generally result in greater impacts to biological resources than would the Alternative A (largely median) rail alignment options. Sensitive biological resources are not as likely to existing within the median of the I-15 freeway due to its confined nature between existing travel lanes.

The Preferred Alternative Segment 2C rail alignment would result in lesser effects to sensitive plant communities than would Segment 2A/2B, 2A. The Segment 2A/2B, 2B rail alignment would impact about 4.6 acres of Mesquite Shrubland just north of Yermo, while the Preferred Alternative Segment 2C rail alignment would avoid such impacts since the rail alignment would be within the existing I-15 freeway corridor at this location.

The Preferred Alternative Segment 4C rail alignment would also result in greater effects to sensitive plant communities than would Segment 4A and Segment 4B. Segment 4C would result in permanent impacts to 1.9 acres and temporary impacts to 3.1 acres of Mesquite Shrubland, while Segment 4A would only permanently impact 0.5 acres of such plant habitat. Segment 4B would not result in any impacts to sensitive plant communities.

The Preferred Alternative Segment 2C would result in substantially fewer impacts to desert tortoise and Mohave ground squirrel habitat as compared to Segment 2A/2B, which would traverse through western and northern Barstow outside of an existing transportation corridor.

The Preferred Alternative Segment 2C would also avoid impacts to roosting bats associated with Segment 2A/2B, as the rail alignment would be within an existing transportation corridor with no adjacent rock outcroppings.

The Preferred Alternative Segment 3B rail alignment would also result in greater effects to special management lands than would Segment 3A. Segment 3B would result in impacts to Superior-Cronese Desert Tortoise Critical Habitat, Ivanpah Desert Tortoise Critical Habitat, and Cronese ACEC, where as Segment 3A would not result in any impacts to these special management lands.

The Preferred Alternative Segment 4C rail alignment would impact a desert tortoise relocation area for the ISEGS project further degrading tortoise habitat in this area. However, Segment 4C would avoid effects to special management lands that would be affected by Segment 4A. Segment 4A would impact the Ivanpah Tortoise Critical Habitat and Mojave National Preserve.

In regards to desert bighorn sheep, the Preferred Alternative Segment 4C rail alignment could result in greater effects than Segment 4A. The Preferred Alternative Segment 4C rail alignment would deviate from the existing I-15 freeway corridor within an area of suitable habitat for this species and would create a new linear barrier. This portion of the rail alignment could isolate or block existing habitat east of the rail alignment and west of the existing I-15 corridor. The Segment 4A rail alignment would follow the existing I-15 freeway corridor and would not introduce a new linear barrier through previously undisturbed lands. Since the Segment 4B alignment would also deviate from the I-15

freeway corridor in this same area north of Mountain Pass, the Preferred Alternative Segment 4C and Segment 4B rail alignments would have similar effects to desert bighorn sheep.

The Preferred Alternative Segment 4C would result in greater potential effects to wetlands and waters of the US than would Segment 4A and Segment 4B. Segment 4C would cross approximately 48 streams, where as Segment 4A would only cross 29 streams and Segment 4B would cross 42 streams. Segment 4C would, however, avoid traversing through the dry Ivanpah Lake bed as would Segment 4B.

Passenger Stations and Maintenance Facilities

The Preferred Alternative Victorville Station would result in greater effects to desert tortoise habitat than would VV1 and VV2. The Victorville Station would permanently convert about 224 acres of desert tortoise habitat, as compared to 93 acres and 114.5 acres for VV1 and VV2, respectively. The Victorville Station would result in temporary impacts to 41 acres of desert tortoise habitat, while VV1 and VV2 would not result in any temporary impacts to such habitat.

The Preferred Alternative Victorville OMSF would also result in greater effects to desert tortoise habitat than OMSF 1. The Victorville OMSF would permanently convert 195.2 acres of desert tortoise habitat, as compared to 92.4 acres impacted by OMSF 1.

The Preferred Alternative Victorville Station would also result in greater effects to Mohave ground squirrel habitat than would VV1 and VV2. The Victorville Station would permanently convert up to 224 acres of Mohave ground squirrel habitat, as compared to 85.1 acres and 105.2 acres for VV1 and VV2, respectively. The Victorville Station would result in temporary impacts to 41 acres of Mohave ground squirrel habitat, while VV1 and VV2 would not result in any temporary impacts to such habitat.

The Preferred Alternative Victorville OMSF would also result in greater effects to Mohave ground squirrel habitat than OMSF 1. The Victorville OMSF would permanently convert about 339.7 acres of Mohave ground squirrel habitat, as compared to 22.6 acres impacted by OMSF 1.

The Preferred Alternative Victorville Station would also avoid potential impacts to roosting bats associated with VV1. There are no rock outcroppings within the vicinity of Victorville Station as there are with VV1.

The Preferred Alternative Victorville Station would result in greater effects to streams than would VV1, as the Victorville Station would cross one stream. However, the Victorville Station would have lesser wetland effects than would VV2, which would cross two streams. The Preferred Alternative Victorville OMSF would also have greater effects to wetlands, as OMSF 2 would cross two streams where as OMSF 1 would not cross any.

The Preferred Alternative Las Vegas Southern Station site option would result in greater effects to streams than the other Las Vegas Station site options. The Southern Station site option would cross two streams, while the Preferred Alternative Las Vegas Central Station B site option, Las Vegas Central Station A, and Las Vegas Downtown Station would not result in any stream crossings.

The Preferred Alternative Las Vegas MSF would result in fewer effects to biological resources than the Sloan Road MSF and Relocated Sloan MSF[49] but similar effects as the Robindale Avenue MSF. Both the Wigwam Avenue and Robindale MSFs would be located within an existing urban, developed (and thus, disturbed) environment, whereas the Sloan Road MSF and Relocated Sloan MSF would be on currently undeveloped lands.

3.14.3 Mitigation Measures for the Preferred Alternative

Mitigation Measures BIO-1 through **BIO-21**[50] identified in **Section 3.14.5** of the Draft EIS would be applied to the Preferred Alternative to reduce and avoid adverse effects to biological resources. The mitigation measures from **Section 3.14.5** of the Draft EIS are included below, with revisions incorporated in response to addressing public comment on the Draft EIS and Supplemental Draft EIS.

Mitigation Measure BIO-1: Conduct Mandatory Environmental Awareness Training Program

All personnel working within the project area shall attend an environmental awareness training program. The program shall be presented by qualified biologists and include information on the life history of special-status species that may be encountered during construction activities, the legal protection for each species, the definition of "take" for listed species, measures to protect special-status species, reporting requirements, specific measures that each worker shall need to employ to avoid adverse effects to individual sensitive species, a detailed description of environmental project commitments as described in the decision records (i.e. Record of Decision), ROW grants, and Biological Opinion, and penalties for violation of Federal and state environmental laws.

[49] The Supplemental Draft EIS evaluated the "Relocated Sloan MSF," located approximately two miles south of the Sloan Road MSF considered in the Draft EIS. The Relocated Sloan MSF site location was intended to completely replace the Sloan Road MSF evaluated in the Draft EIS.

[50] The Draft EIS did not include a Mitigation Measure BIO-12. To correct this error from the Draft EIS, the mitigation numbering for the biological resources mitigation measures has been revised. (This error was also corrected in the Supplemental Draft EIS).

Mitigation Measure BIO-2: Conduct Preconstruction Surveys and Install Environmental Fencing

Preconstruction surveys for special-status species shall be conducted by qualified biologists (third party contractor approved by BLM, NPS, and USFWS) prior to the start of construction. Preconstruction surveys shall be tailored for specific species based on the species biology, natural history, and regulatory requirements. The locations for any individual or population of sensitive species within the limit of disturbance shall be documented with a GPS unit and reported to the state and Federal regulatory agencies.

Mohave ground squirrel surveys are only valid for 12 months. Therefore, they shall be done no more than 12 months prior to the start of construction in a particular area. If no Mohave ground squirrels are found during the surveys, no additional mitigation would be required.

Mojave fringe-toed lizard surveys shall occur no more than 24 hours prior to the start of construction. Surveys shall be conducted within the work area and a 100-foot buffer. Any Mojave fringe-toed lizards observed in the work area shall be allowed to move out of the work area. Those that become trapped in the work area shall be captured and moved to nearby suitable habitat outside of the work area.

Qualified biologists shall conduct preconstruction surveys for banded gila monsters no more than 24 hours prior to the start of construction within all suitable habitat in Segments 3 and 4. Surveys shall be conducted within the work area and a 100-foot buffer. Any gila monsters observed within the work areas shall be allowed to move out of the work area and those that become trapped within the work area shall be carefully moved to nearby suitable habitat. The handler shall have the necessary CDFG permit to handle and move lizards.

Qualified biologists shall conduct preconstruction surveys for BLM sensitive and Clark County MSHCP covered reptile species no more than 48 hours prior to the start of construction. Surveys shall be conducted within the work area and include a 100-foot buffer. Any sensitive reptile species observed within the work areas shall be allowed to move out of the work area and those that become trapped within the work area shall be very carefully moved to nearby suitable habitat.

The Applicant shall implement the following measures, to avoid disturbance of tree, shrub- or ground-nesting special-status and migratory birds and raptors:

- If construction activities are scheduled to occur during the breeding season (generally between March 1 and August 15), a qualified wildlife biologist shall conduct focused nesting surveys within the appropriate habitat and an appropriate buffer distance up to 0.25 mile from the limit of project disturbance for nesting raptors.

- The focused surveys shall include tree- and shrub-nesting birds, ground-nesting birds, and cliff-nesting birds. The surveys shall be conducted within the two-week period before initiation of construction activities in a particular area between March 1 and August 15. If no active nests are detected, then no additional mitigation would be required.
- Follow-up surveys shall be required on a monthly basis during the breeding season. If surveys indicate that active nests are present in any areas that would be directly affected by construction activities, a no-disturbance buffer would be established around the site to avoid disturbance or destruction of the nest site until after a wildlife biologist determines that the young have fledged (usually late June to mid-July). The extent of these buffers shall be determined by a wildlife biologist in consultation with CDFG in California and NDOW in Nevada and will depend on the level of noise or construction disturbance, line of sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. These factors shall be analyzed to make an appropriate decision on buffer distances.

A qualified biologist shall conduct preconstruction surveys for active burrows according to CDFG guidelines for burrowing owl (1993 and 1995). The preconstruction surveys shall be conducted by a qualified biologist within the work area and include a 250-foot buffer and within the 2-week period before initiation of construction activities to locate active burrowing owl burrows. The preconstruction surveys shall include a nesting season survey and a wintering season survey the season immediately preceding construction. If no burrowing owls are detected, no further mitigation would be required.

Focused surveys for the presence of sensitive bat species shall be conducted in areas that provide suitable roosting or nursery habitat. If a roosting site is active and cannot be avoided, the Applicant shall consult with a bat expert in conjunction with CDFG in California and NDOW in Nevada to develop appropriate exclusion methods. If it is determined that a nursery sites is active and cannot be avoided, construction activities that would disturb the nursing bats shall be delayed until the breeding cycles for the bats are completed. The Applicant shall consult with a bat specialist in order to determine when the breeding cycle for bats. The Applicant shall document the results of any exclusion or avoidance of roosting/nursery sites for bats.

Qualified biologists shall conduct preconstruction surveys for American badger no more than 48 hours prior to the start of construction. Surveys shall be conducted within the work area and a 100-foot buffer. Any American badgers observed in the work area shall be allowed to leave the work area.

Construction activities conducted within suitable desert bighorn sheep habitat in the Mountain Pass area of the Preferred Alternative shall not occur during the period of the year when desert bighorn sheep are lambing (from January 1 to April 30). If construction activities must occur during the desert bighorn sheep lambing period, pre-construction surveys for lambing desert bighorn sheep shall be conducted prior to construction. If lambing desert bighorn sheep are found, then the Applicant shall consult with the BLM and CDFG to identify appropriate avoidance measures.

Qualified botanists shall conduct preconstruction surveys for sensitive botanical species and invasive, non-native weed species prior to initiating construction of the project. If sensitive botanical species are observed within the temporary construction area of effect, avoidance and minimization measures shall be applied by the Applicant.

Temporary environmental fencing shall be installed around sensitive biological resources prior to the commencement of on-site project construction in order to avoid unnecessary adverse effects to the resource. USFWS and BLM approved desert tortoise exclusionary fencing shall be erected by a qualified biologist within portions of the Preferred Alternative that occur in desert tortoise habitat. Temporary desert tortoise fencing shall be installed in areas of construction that are beyond the perimeter of the ROW or in areas where construction staging would occur. This includes fencing all work areas, temporary equipment and vehicle yards, and material staging and storage areas. Desert tortoise exclusionary fencing and clearance surveys shall be undertaken no more than 10 days prior to initiating construction activities. After installation of the temporary fencing, the entire Preferred Alternative shall be surveyed for desert tortoises by a qualified biologist. Following the procedures and precautions outlined in the Desert Tortoise Council's guidelines, all desert tortoise pallets and burrows within the survey areas shall be examined and excavated by hand, either by or under the direct supervision of an authorized biologist, and unoccupied features collapsed to prevent re-entry. After installation, the fence shall be regularly inspected to ensure its integrity. Desert tortoise encountered during preconstruction surveys shall be relocated off the Preferred Alternative ROW based on a USFWS, BLM, and CDFG approved project-specific Desert Tortoise Relocation Plan. At a minimum the Desert Tortoise Relocation Plan shall require the desert tortoises found within the Preferred Alternative area be removed to undisturbed areas beyond the construction site and relocated within their own territory where they may be familiar with alternate burrows. If no natural burrows are available, artificial burrows shall be created following the Desert Tortoise Council's guidelines. Only biologists authorized by the USFWS shall handle desert tortoises and shall follow the guidelines established by the Desert Tortoise Council.

The Applicant shall install and maintain permanent exclusionary fencing along the open portion of the Preferred Alternative rail alignment in areas of suitable bighorn sheep habitat. The fencing shall be constructed to ensure that bighorn sheep cannot access the rails or any culverts/tunnels. In addition, prior to initiating construction, temporary exclusionary fencing shall be placed around all sensitive botanical species that occur within the temporary construction areas. These areas shall be signed for avoidance by construction equipment and personnel.

Mitigation Measure BIO-3: Conduct Construction Monitoring

The following measures shall be implemented during project construction:

- Qualified biologists shall be on site during any construction activity within or near special-status species habitat to ensure the implementation and compliance of environmental commitments and avoidance measures.
- The qualified biologist shall have the authority to stop work if dangers to desert tortoises or other special-status wildlife species arise and allow work to proceed after the hazard has been removed. The USFWS Las Vegas and Ventura Ecological Services Offices, BLM Field Offices and CDFG must be notified of any desert tortoise injury or death resulting from project-related activities. In addition, the USFWS Division of Law Enforcement shall also be notified in accordance with reporting requirements.
- As part of the monitoring, the biologists shall check construction areas immediately before construction activities each day to ensure that no special-status wildlife species have moved into the construction area. If tortoises are discovered within the construction area they shall be relocated by an authorized biologist based on the Desert Tortoise Relocation Plan.
- All construction activities shall be confined to the designated work areas. Grubbing of vegetation shall only be to the extent necessary for construction and shall be limited to areas designated for that. An authorized biologist(s) shall be present during all initial brushing or grading activities within the project area. Overnight parking and storage of equipment and materials would be limited to previously disturbed areas or areas identified in the BLM ROW grant.
- All vehicle traffic shall be restricted to existing roads or land management agency approved newly constructed roads. The Applicant shall ensure that cross-country travel for construction purposes outside of the areas of desert tortoise fencing is prohibited.
- Construction vehicles within sensitive species habitat shall not exceed 15 miles per hour.

- A litter-control program shall be implemented during construction. The program shall include the use of covered, raven-proof trash receptacles, daily removal of trash from work areas to the trash receptacles, and proper disposal of trash in a designated solid waste disposal facility. Precautions shall also be taken to prevent trash from blowing out of construction vehicles.
- No pets or firearms shall be permitted in the work area.
- Both pre- and post-construction photographs shall be taken to document sensitive habitat conditions within the limits of project disturbance.

Mitigation Measure BIO-4: Avoid the Dispersal of Invasive, Non-Native Weed Species into Uninfested Areas

To avoid the introduction or spread of invasive, non-native weed species into uninfested areas, the Applicant shall incorporate the following measures into the project plans and specifications:

- Use only certified, weed-free, imported erosion-control materials (or rice straw in upland areas).
- Coordinate with BLM field offices and National Park Service (NPS) to ensure that the appropriate best BMPs are implemented.
- Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of invasive, non-native weed species.
- Clean equipment at designated wash stations before and after entering the project construction area.
- An invasive, non-native weed species survey of the Preferred Alternative ROW, including temporary work areas, shall be completed prior to initiating project construction. All areas disturbed by the Preferred Alternative shall be surveyed using approximately 30-foot meandering transects. Populations of invasive, non-native weed species shall be identified and mapped using global positioning systems (GPS).
- Develop an approved Invasive Weed Species Monitoring and Treatment Plan to detect and treat any noxious invasive, non-native weed species in the construction area. The plan shall include methods for monitoring, treating and reporting invasive, non-native weed species infestations within the construction area. The Invasive Weed Species Monitoring and Treatment Plan shall be drafted and submitted to BLM prior to initiating construction as part of the BLM ROW grant requirements.

Mitigation Measures BIO-5: Confine Construction Equipment to a Designated Work Zone (Including Access Roads) at Each Project Site

Before construction begins, the work zone shall be clearly staked and flagged. During the environmental training program, construction personnel shall be informed about the importance of avoiding ground-disturbing activities outside the designated work area. During construction, the construction monitors and resource monitors shall ensure that construction equipment and associated activities avoid any disturbance of native vegetation and sensitive resources outside the designated work zones. Contaminant run-off shall be contained within the temporary construction boundaries and clean-up efforts shall be initiated immediately. Clean-up procedures shall be coordinated with the responsible agency to insure additional resource damage does not occur.

Mitigation Measure BIO-6: Reestablish Preconstruction Site Conditions to Allow Revegetation

Disturbed areas of native vegetation shall be restored to preconstruction site conditions. To ensure that effects on native plant species and communities are not long-term, native topsoil shall be stockpiled within the project ROW and immediately replaced, and natural site topography (including necessary amendments to soil structure) reestablished to allow natural colonization of plant species.

In California and Nevada, all succulents within the limits of disturbance shall be relocated either off the Preferred Alternative rail alignment onto undeveloped BLM administered public lands or maintained within a temporary nursery (located within the ROW) and replanted within the ROW as part of site restoration activities.

In areas that require immediate stabilization, non-vegetative techniques that allow native species to reestablish can be used, including use of weed- and disease-free mulch, erosion blankets, or rolled organic fiber material.

Erosion control seed mixes may be necessary on selected sites. If sites need to be stabilized through seeding, the seed mix would be composed entirely of native and locally occurring species appropriate for stabilizing local site conditions. All seed mixes shall be approved by the BLM, NPS, and CDFG prior to initiating restoration activities. Special attention shall be given to erosion control near ephemeral drainages and within playas.

Site-specific erosion control measures (nonvegetation or mechanical techniques) shall be determined on a site-specific basis by a vegetation specialist and project engineer.

Mitigation Measure BIO-7: Retain and Stockpile Topsoil

Native topsoil shall be removed from areas of permanent disturbance and stockpiled within the ROW. To avoid altering local hydrologic conditions or flood flows, spoils materials shall not be placed in sensitive habitat areas or within or adjacent to ephemeral drainages. Prior to disturbance, native topsoil shall be excavated and stockpiled for later reapplication in native vegetation areas. Separate stockpiling areas shall be identified and clearly marked for each different vegetation type as appropriate. The exact depths shall be determined for each native vegetation type and depend upon the stratigraphy and soil profiles (estimated to be 6-12 inches in depth). The excavated soil depths shall exceed the restored soil depths to allow for soil compaction during placement. The stockpiled soil shall not be covered to minimize damage to propagation material from heated soil conditions but it shall be protected from construction activity and signed to identify it as a protected resource.

Mitigation Measure BIO-8: Restore Natural Site Topography

The Applicant shall be responsible for restoring the natural site topography to pre-project contours. The restored topography shall mimic the pre-project condition to the greatest extent possible. Minor modifications may be required to conform with post-project site condition. Construction area soil compaction shall be treated using grubbing, raking, and other BLM approved soil decompaction techniques as part of the project restoration. Proper compaction of the subsurface material and plow furrows is necessary to help prevent surface and subsurface migration of water along the plow or trench furrow, and to prevent trench settlement. The reapplied topsoil in the ROW shall be left in roughened condition to facilitate the establishment of vegetation and reduce the potential for erosion. Excessive passes of finish grading equipment that would compact topsoil shall be avoided. Upon completion of the grading operations, no further vehicular traffic shall be allowed, other than necessary mitigation planting equipment.

Mitigation Measure BIO-9: Implement Erosion Control Measures as Appropriate

An erosion control and restoration plan shall be prepared and implemented to control short-term and long-term erosion and sedimentation effects and to restore soils and native vegetation in areas affected by construction activities. The plan shall include requirements of applicable erosion control ordinances and grading permits and shall implement BMPs for erosion and sediment control as necessary. The erosion control plan shall be drafted and submitted to the BLM prior to initiating construction as part of the BLM ROW grant requirements.

In areas that require immediate stabilization, non-vegetative techniques that allow native species to reestablish can be used, including use of weed- and disease-free mulch, erosion blankets, or rolled organic fiber material. The use of such measures shall be identified in the SWPPP or recommended by a soil or civil engineer based on slope, soil type, or other site factors as necessary and may be required later in the design phase.

Mitigation Measure BIO-10: Obtain a Tree or Plant Removal Permit from San Bernardino County and the Nevada Division of Forestry

This permit is issued in compliance with San Bernardino County Development Code Subsection 88.01.050 for removal of regulated plants. The Applicant shall comply with all provisions of the Permit. A permit shall be required from the Nevada Division of Forestry and/or the BLM in order to relocate succulents within the project alignment. The Applicant shall also comply with the California Desert Native Desert Plants Act, consistent with BLM regulations.

Mitigation Measure BIO-11: Compensate for the Loss of Sensitive Vegetation Communities

The Applicant shall compensate for the loss of Sensitive Vegetation Communities prior to initiating construction. Compensation ratios shall be based on site-specific information and determined through coordination with state and Federal agencies (CDFG and the U.S. Army Corp of Engineers (USACE) and BLM). This site-specific information will supplement the executed studies for the Preferred Alternative, including the 2010 botanical survey in California near Mountain Pass (included as **Appendix F-N** to this Final EIS). Compensation should be provided at a minimum 1:1 ratio (1 acre restored or created for every 1 acre removed/disturbed) and may be a combination of onsite restoration/creation, offsite restoration, or mitigation credits. The Applicant shall develop and implement a restoration and monitoring plan that describes enhancement of sensitive communities, creation, and monitoring over a select time period.

Mitigation Measure BIO-12:[51] Conduct Preconstruction Surveys and Identify Sensitive Areas

Where the Preferred Alternative rail alignment crosses the Mojave River, specific areas of important riparian vegetation shall be marked with orange fencing and the limits of disturbance narrowed to reduce effects to sensitive vegetation.

[51] The Draft EIS did not include a **Mitigation Measure BIO-12**. To correct this error from the Draft EIS, **Mitigation Measure BIO-13** from the Draft EIS is reflected as **Mitigation Measure BIO-12** in this Final EIS (This error was also corrected in the Supplemental Draft EIS). Subsequent mitigation measure numbers were revised accordingly.)

Mitigation Measure BIO-13: Avoid Known Special-Status Plant Populations During Project Design

To the extent possible, the Applicant shall design the project to avoid special-status plant populations. The Applicant shall comply with the minimum survey and mitigation standards as required by the BLM Manual 6840-1. Where avoidance is infeasible, the Applicant shall focus on minimizing the width of construction work areas in and around special-status plant populations. Before construction, special-status plant populations shall be demarcated with temporary orange construction fencing and posted as a restricted area. Depending on the proximity of the populations to the construction work area, populations shall be monitored to ensure adverse effects on special-status plant populations are avoided. If effects on special-status plant populations are unavoidable, the Applicant shall implement **Mitigation Measure BIO-15** described below.

Mitigation Measure BIO-14: Compensate for Adverse Effects on Special-Status Plant Populations

If effects on a special-status plant population are unavoidable the Applicant shall coordinate with USFWS and CDFG to determine the appropriate mitigation strategy. If affected plants are listed under the Federal Endangered Species Act (ESA), the appropriate take permits would be obtained from USFWS. Currently accepted mitigation of effects on special-status plants includes acquisition and preservation of nearby occupied habitat, or habitat creation at a ratio determined by the regulatory agency. Transplantation of affected populations is not considered a viable mitigation option. Creation of habitats with high levels of endemism, such as vernal pools, is effective only with stringent agency management guidelines. The Applicant shall coordinate with USFWS to develop an effective mitigation and monitoring plan for specific vernal pool plants in conjunction with the construction of compensatory vernal pool habitat. Alternatively, the Applicant could acquire and preserve nearby high-quality occupied habitat, with the Applicant responsible for the long-term habitat management.

Mitigation Measure BIO-15: Prepare a Desert Tortoise Relocation Plan

A Desert Tortoise Relocation Plan shall be developed in conjunction with the USFWS Las Vegas and Ventura Ecological Services Offices, BLM, NPS, and the CDFG. The relocation plan shall outline procedures and protocols to follow when tortoises need to be relocated out of the areas of disturbance. The relocation plans shall include:

- Clearance procedures for construction areas;
- Relocation procedures;
- Procedures for determining the health of tortoises;

- Relocation areas;
- Methods that shall be used to manage and protect relocation areas;
- Monitoring for short and long term success of the plan; and
- Permitted activities.

Mitigation Measure BIO-16: Prepare Final Mitigation Monitoring Report

No more than 90 days after the completion of construction, the monitoring biologists shall prepare a report for USFWS, BLM, and state agencies. The report shall include the effectiveness of mitigation measures, the results of preconstruction and construction monitoring including the number of desert tortoises excavated and moved.

Mitigation Measure BIO-17: Implement Mitigation Measures Outlined by the Nevada USFWS Ecological Services Office to Protect Desert Tortoises

In accordance with the USFWS guidance, mitigation fees (2008 fees are $753 per acre) for disturbance to Mojave Desert Tortoise habitat on BLM administered public lands in Nevada shall be paid by the Applicant.[52]

Mitigation Measure BIO-18: Compensate for the Permanent Loss of Desert Tortoise Habitat

The Applicant shall provide compensation for the permanent loss of desert tortoise habitat. Compensation for loss of habitat in California shall be provided by the Applicant according to BLM, USFWS, and CDFG requirements. Current requirements for loss of desert tortoise habitat are based on a formula of 5:1 inside DWMAs and 1:1 outside of DWMAs. For the purposes of the Preferred Alternative, changes to the compensation formula must be reviewed and approved by the USFWS, NPS, and CDFG.

For Preferred Alternative-related loss of habitat in Nevada, the Applicant shall follow the mitigation measures outlined by the Nevada USFWS Ecological Offices for the protection of desert tortoises.

Mitigation Measure BIO-19: Construct Exclusion Fencing, Culverts, and Wildlife Crossings

The Applicant shall install culverts under the proposed railroad line that match existing I-15 or UPRR culverts. Where the project deviates from existing transportation facilities, the Applicant shall install culverts adequately designed to

[52] Hastey et al., 1991.

serve as wildlife crossings at natural drainage features and at appropriate intervals to allow for wildlife passage, including, but not limited to, desert tortoises and other wildlife to pass under the proposed rail alignment. The project design shall ensure flow for natural drainages equal to or greater than four feet in width (as measured by the distance between the ordinary high water mark on each side of the drainage) during Preferred Alternative construction or operation in order to reduce potential effects to wildlife movement, including, but not limited to, desert tortoise and desert bighorn sheep. The culverts and fencing would be designed and spacing determined through coordination with USFWS, NPS, BLM, CDFG, the Nevada Department of Wildlife (NDOW), and EPA to ensure they meet agency wildlife standards. Exclusion fencing would be constructed parallel to the rail line and would direct tortoises and other wildlife species to the culverts.

Mitigation Measure BIO-20: Compensate for the Permanent Loss of Mohave Ground Squirrel Habitat

If Mohave ground squirrels are determined to be present in the project area, compensatory lands shall be purchased by the Applicant to mitigate for the permanent loss of suitable habitat. Acreage of suitable habitats that shall be permanently affected by the segments alignments, associated stations, and operation and maintenance facilities is presented in Draft EIS **Table 3.3-11.** The mitigation ratios and the location of the compensatory lands shall be determined through coordination with CDFG pursuant to Section 2081.

Mitigation Measure BIO-21: Avoid Active Burrows or Passively Relocate Owls

If burrowing owls are detected within 250 feet of proposed construction within the project area, the following measures shall be implemented:

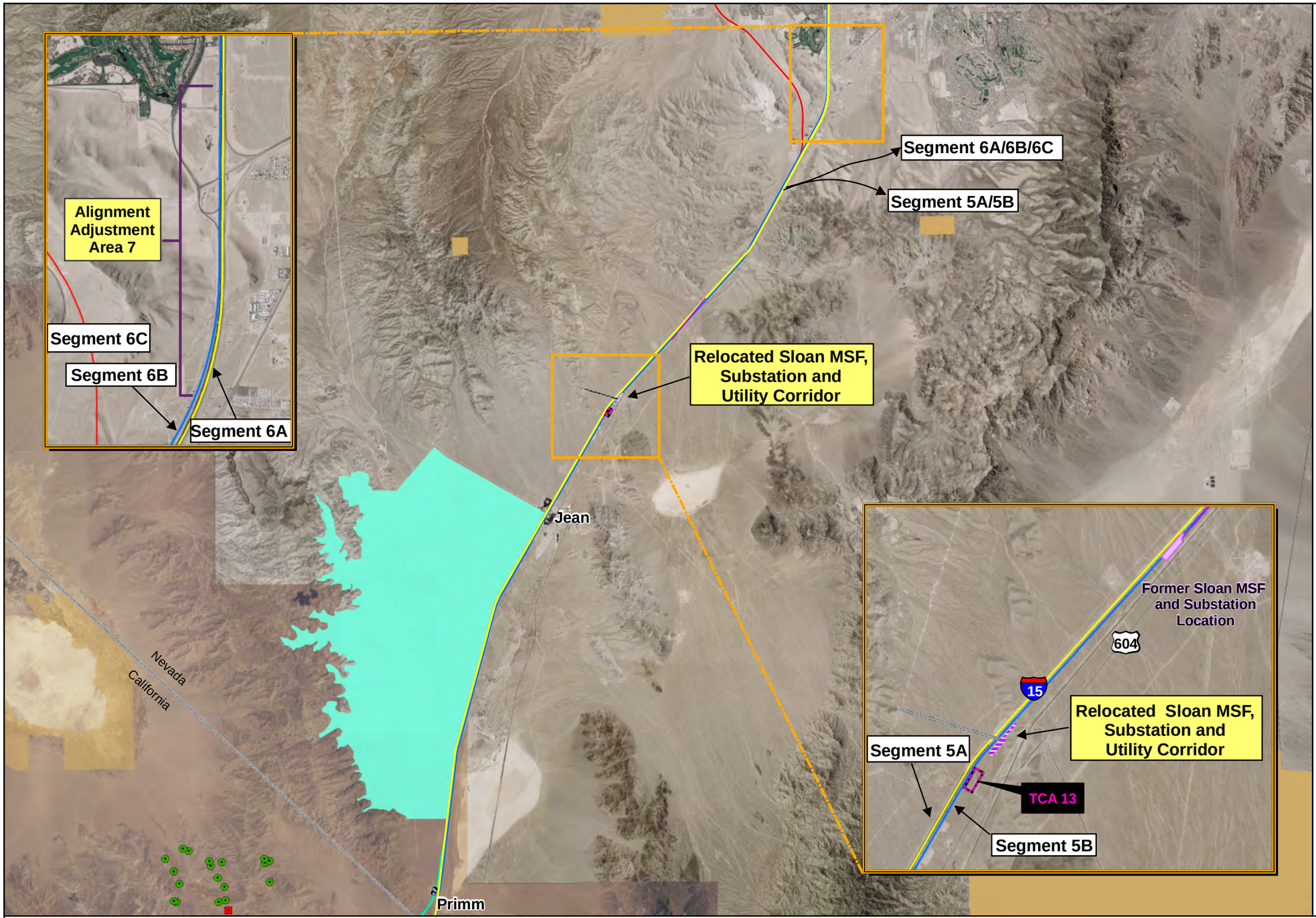
- Occupied burrows shall not be disturbed during the nesting season (February 1 through August 31).
- If avoidance is the preferred method of dealing with potential effects, no disturbance shall occur within 160 feet of occupied burrows during the non-breeding season or within 250 feet during the breeding season.

If destruction of occupied burrows is unavoidable during the non-nesting season (September 1–January 31), passive relocation techniques (e.g., installing one-way doors at burrow entrances) shall be used instead of trapping and active relocation. At least one week will be necessary to accomplish passive relocation and allow owls to acclimate to alternate burrows. Unsuitable burrows that will not be destroyed in the vicinity of the Preferred Alternative shall be enhanced (enlarged or cleared of debris).

3.14.4 Residual Impacts Following Mitigation

The incorporation of the above mitigation measures would mitigate permanent effects related to construction and operation of the Preferred Alternative. Implementation of **Mitigation Measures BIO-1** through **BIO-21** would minimize and reduce potential temporary and permanent effects to biological resources. This includes the reclamation and restoration of temporary construction impacts with the ultimate goal to restore these areas to pre-disturbance conditions (**Mitigation Measures BIO-6** and **BIO-11**). The restoration of temporary construction areas reduced permanent effects to native vegetation communities by accelerating the natural succession rate of the temporarily impacted areas as opposed to natural re-vegetation. This mitigation to restore native vegetation would also minimize permanent effect to sensitive wildlife species. In addition, implementation of the desert tortoise mitigation (**Mitigation Measures BIO-2**, **BIO-3**, and **BIO-16** through **BIO-19**) would reduce or eliminate the potential for direct desert tortoise mortality and minimize the incidental take of desert tortoise to a level acceptable to the USFWS.

Even with mitigation, the Preferred Alternative would result in the permanent conversion of lands identified as sensitive habitat areas. Specifically, the Preferred Alternative would result in the permanent loss of native vegetation communities, sensitive plant communities, and special-status plant populations in areas where permanent project features would be located. Following mitigation, the Preferred Alternative would still result in the permanent loss of sensitive wildlife habitat, including desert tortoise habitat, suitable habitat for the Mohave ground squirrel, Mojave fringe-toed lizard habitat, banded gila monster habitat, habitat for reptile species covered under the Clark County HCP, burrowing owl habitat, American badger habitat, desert bighorn sheep habitat, and BLM special management lands.



Legend

Biological Resources

Sensitive Vegetation Community

- Joshua Tree Woodland
- Mesquite bosque
- Large Scale Tortoise Translocation Site

Special Status Species*

- Plants
- Animals

* See Figure S-3.14-4 for list of species names
Note: Undeveloped areas below 5000 feet in elevation are potential Desert Tortoise habitat.

- Area of Critical Environmental Concern
- Desert Wildlife Management Area (DWMA)

DesertXpress Alignments

- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

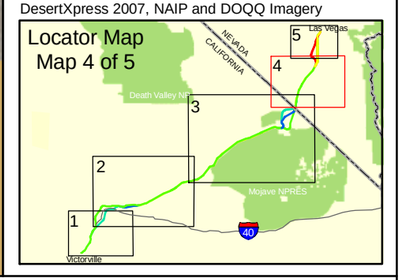
Ancillary Facility Sites

- Text Project Modifications and Additions
- Modified Station Site Option - Victorville Station Site 3A/3B
- Station Options
- Relocation Sloan MSF / Substation Site Option
- Maintenance Facility Site Options
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)
- Alignment Adjustment Areas

1 inch equals 3 miles

Miles
0 3 6

Source: CirclePoint 2008, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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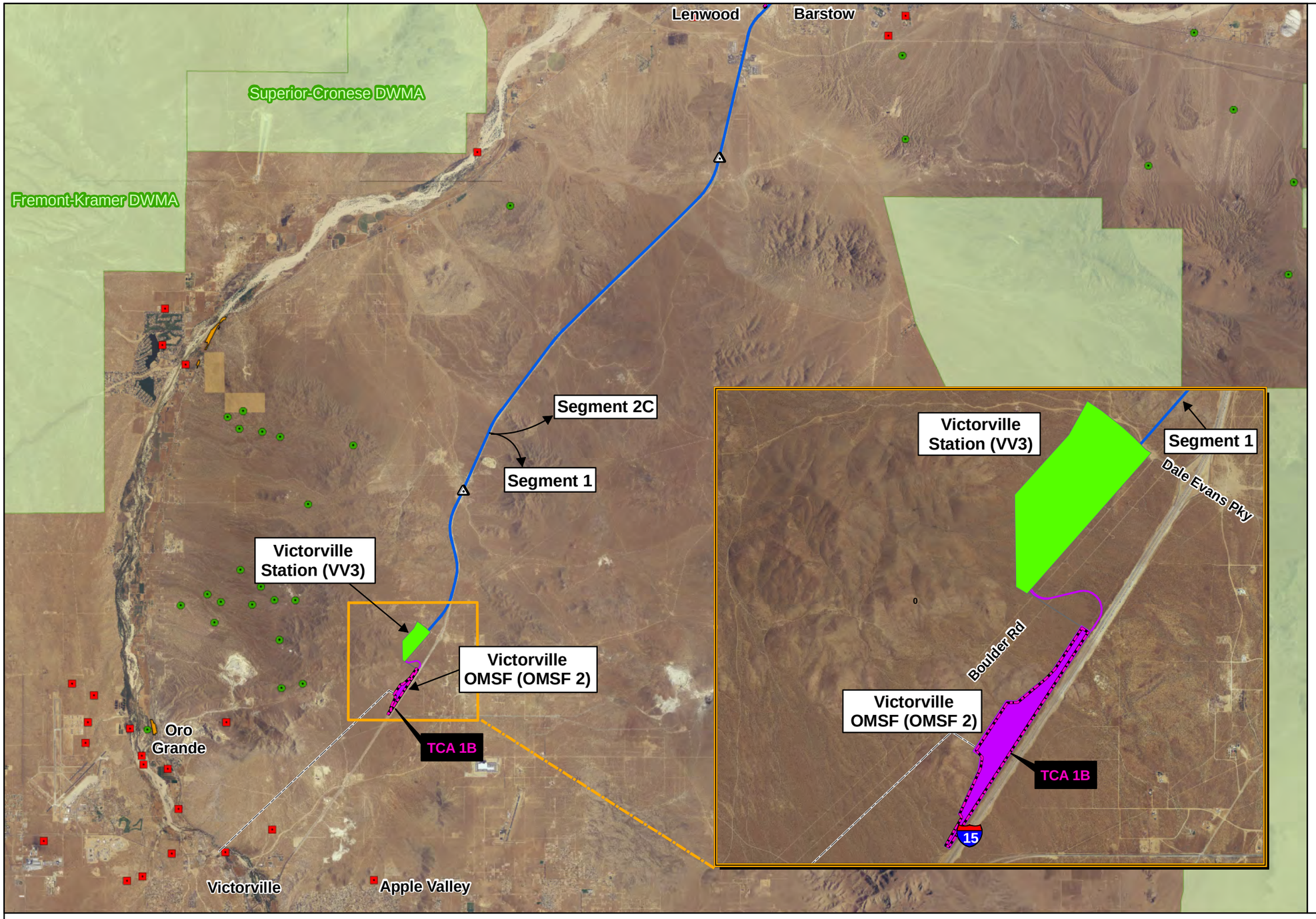
DesertXpress Final EIS

Revision of Supplemental Draft EIS Figure S-3.14.4: Biological Resources (4)

FIG **F-3.14-1**

Geografika Consulting 01.25.11

* This figure, originally in the Supplemental Draft EIS, has been revised to incorporate the Large Scale Tortoise Translocation Site in the legend.



Legend

Biological Resources

Sensitive Vegetation Community

- Joshua Tree Woodland
- Mesquite bosque

Special Status Species*

- Plants
- Animals

* See Figure S-3.14-4 for list of species names
Note: Undeveloped areas below 5000 feet in elevation are potential Desert Tortoise habitat.

- Area of Critical Environmental Concern
- Desert Wildlife Management Area (DWMA)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

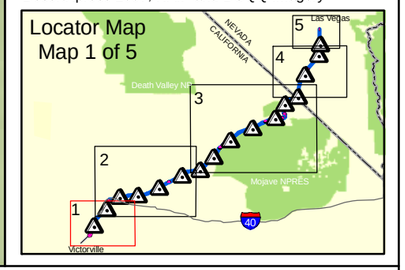
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 3 miles

Kilometers: 0 2 4

Miles: 0 1.5 3

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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DesertXpress Final EIS

Biological Resources (1)

FIG F-3.14-2

Geografika Consulting 01.25.11

Legend

Biological Resources

Sensitive Vegetation Community

- Joshua Tree Woodland
- Mesquite bosque

Special Status Species*

- Plants
- Animals

* See Figure S-3.14-4 for list of species names
Note: Undeveloped areas below 5000 feet in elevation are potential Desert Tortoise habitat.

- Area of Critical Environmental Concern
- Desert Wildlife Management Area (DWMA)

DesertXpress Alignment

- Preferred Alternative

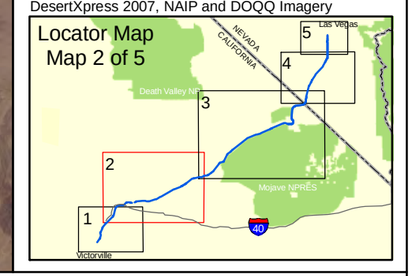
Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 4 miles

0 4 8 Miles

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



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DesertXpress
Final EIS

Biological Resources (2)

FIG **F-3.14-3**

Geografika Consulting 01.17.11

Segment 5B
Primm
Segment 4C
NEVADA
CALIFORNIA
Shadow Valley DWMA
Segment 3B
15
Ivanpah DWMA
Shadow Valley DWMA
Segment 3B
Halloran Springs
TCA 7
15
2811
Segment 3B
17 36 49 49 17 49 17 49 49 17 17 36 34 36 17 79 17 49 49 49
53 4 35 36
23 36 48 29 6 40 2 15
15
Ivanpah DWMA
Baker
Baker MOW

Legend

Biological Resources

Sensitive Vegetation Community
- Joshua Tree Woodland
- Mesquite bosque

Special Status Species*
- Plants
- Animals

* See Figure S-3.14-4 for list of species names
Note: Undeveloped areas below 5000 feet in elevation are potential Desert Tortoise habitat.

- Area of Critical Environmental Concern
- Desert Wildlife Management Area (DWMA)

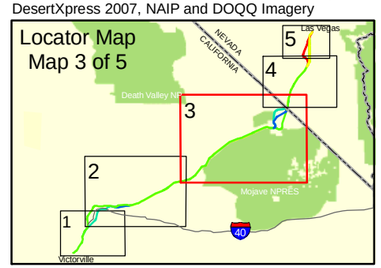
DesertXpress Alignment
- Preferred Alternative

Ancillary Facility Sites
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals 5 miles
Miles
0 2.5 5

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery

Locator Map
Map 3 of 5


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Federal Railroad Administration

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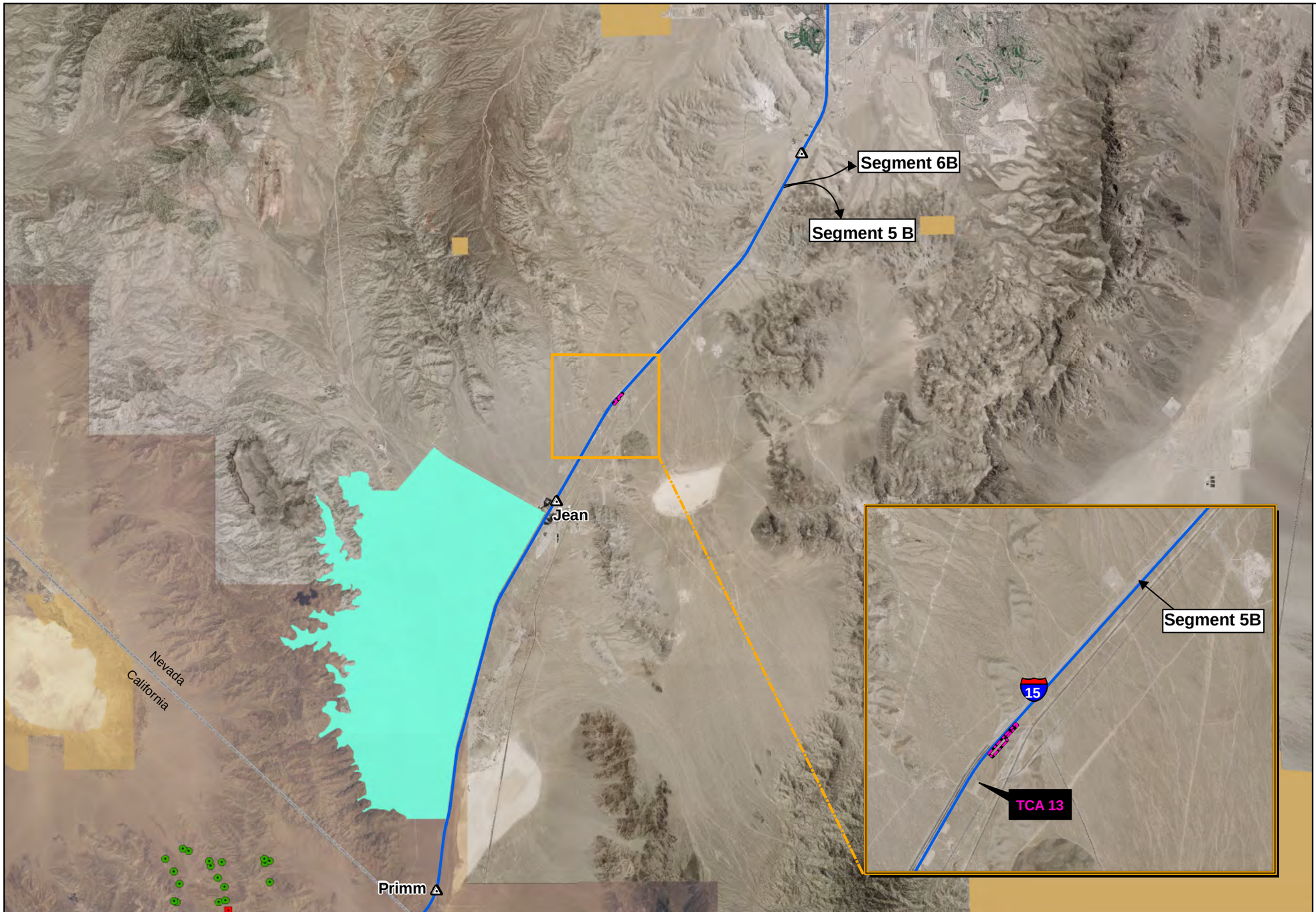
Final EIS

Biological Resources (3)

FIG F-3.14-4

Geografika Consulting 01.25.11



Legend

Biological Resources

Sensitive Vegetation Community

- Joshua Tree Woodland
- Mesquite bosque
- Large Scale Tortoise Translocation Site

Special Status Species*

- Plants
- Animals

* See Figure S-3.14-4 for list of species names

Note: Undeveloped areas below 5000 feet in elevation are potential Desert Tortoise habitat.

- Area of Critical Environmental Concern
- Desert Wildlife Management Area (DWMA)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

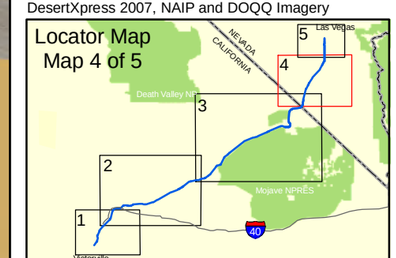
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 3 miles

NORTH

0 3 6 Miles

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



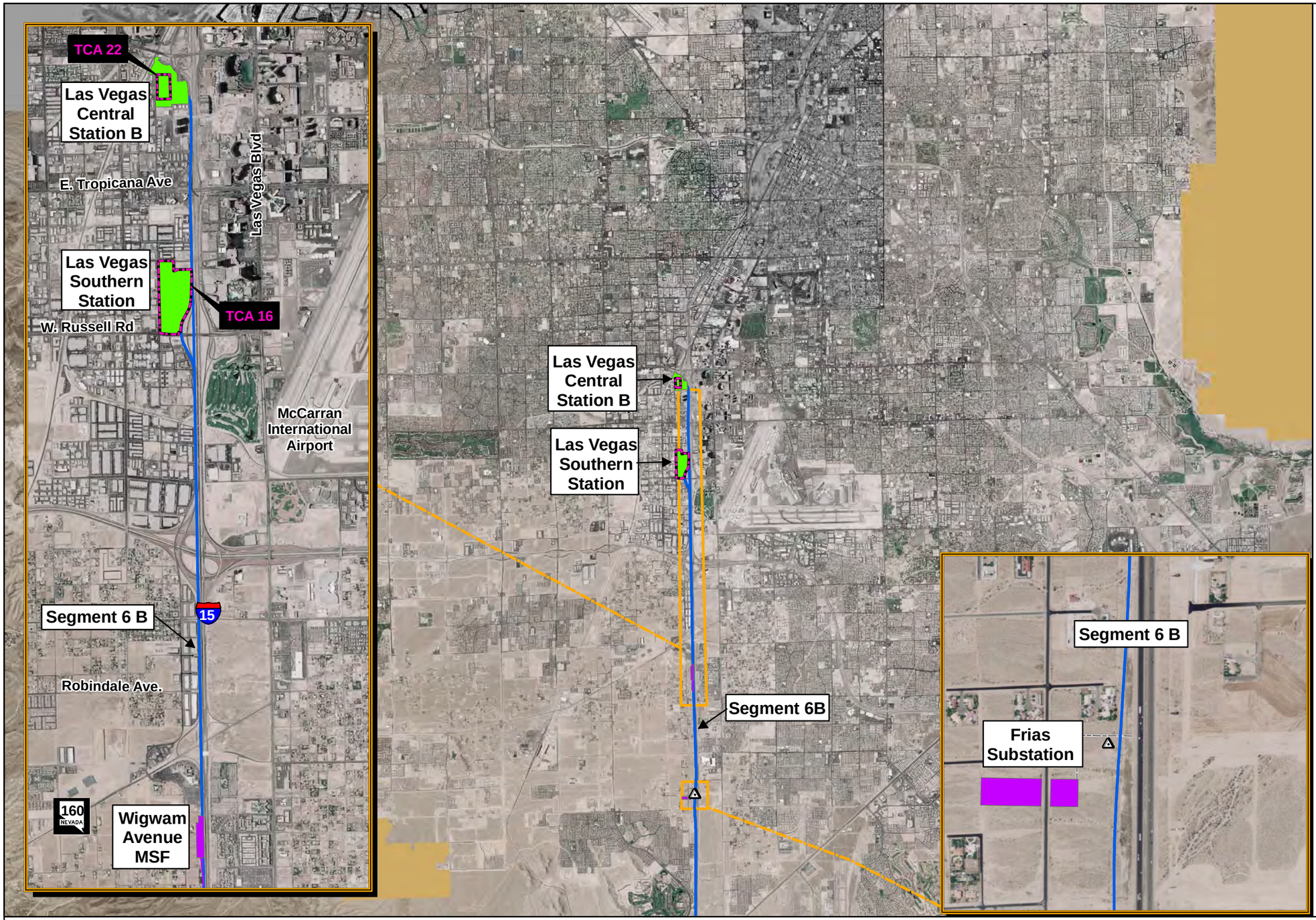
U.S. Department of Transportation Federal Railroad Administration

DesertXpress Final EIS

Biological Resources (4)

FIG F-3.14-5

Geografika Consulting 01.25.11



Legend

Biological Resources

Sensitive Vegetation Community

- Joshua Tree Woodland
- Mesquite bosque

Special Status Species*

- Plants
- Animals

* See Figure S-3.14-4 for list of species names

Note: Undeveloped areas below 5000 feet in elevation are potential Desert Tortoise habitat.

- Area of Critical Environmental Concern
- Desert Wildlife Management Area (DWMA)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

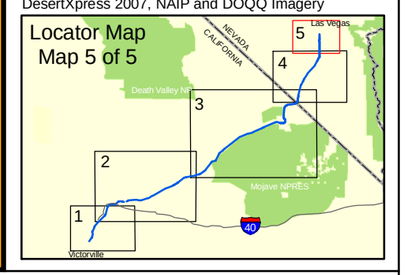
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2 miles

0 1 2 Miles

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery



U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Biological Resources (5)

FIG **F-3.14-6**

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3.15 FINAL SECTION 4(F) EVALUATION

3.15.1 SECTION 4(F)

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 23 U.S.C 138 and 49 U.S.C. 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation land, wildlife and waterfowl refuges, and historic sites."

Section 4(f) states that the Secretary of Transportation "may approve a transportation program or project . . . requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

1. there is no prudent and feasible avoidance alternative to the use of the land from the Section 4(f) property; and
2. the program or project includes all possible planning to minimize harm to the Section 4(f) property resulting from the use.[1]

There are two broad classes of Section 4(f) uses: direct and constructive.

A direct use occurs when a property protected by Section 4(f) is permanently incorporated into a transportation facility or is temporarily occupied, causing minor effects that are subsequently restored. Removal of a historic/cultural property is considered a direct use. Constructive use can occur when there is no direct use, but when the proximity impacts of the project on the property or resource protected by Section 4(f) are so severe that the activities, features, or attributes that qualify the property or resource for protection are substantially impaired. Five criteria are used to evaluate this type of use:

- **Noise:** For constructive use to occur, noise must substantially interfere with the use of the Section 4(f) property sensitive to noise, such as amphitheaters, campgrounds, and properties where significant attributes include serenity and quiet.
- **Vibration:** For constructive use to occur, vibration must be substantial enough to result in damage or substantially diminish the use of historic structures, buildings or other resources.

[1] 49 U.S.C. 303 (c)

- **Property access:** For constructive use to occur, the transportation facility must substantially restrict access to the Section 4(f) property.
- **Visual/Aesthetic character**: For constructive use to occur, the transportation facility must result in substantial impairment to the visual qualities of the Section 4(f) property, such as the obstruction of visual resources that contribute to the setting and value of the property.
- **Ecological intrusion**: For constructive use to occur, the transportation facility must substantially affect the value of wildlife habitat and/or access to a Federal, state, or local wildlife refuge or area, including waterfowl production areas and refuges.

FRA's Procedures for Considering Environmental Impacts[2] (FRA Procedures) require that a Section 4(f) determination be prepared prior to the approval of any FRA action which requires the use of any Section 4(f)-protected properties.[3] FRA Procedures Section 12(d) sets forth the minimum level of information for a Section 4(f) determination.

The implementing regulations of Section 106 of the National Historic Preservation Act permit the head of a Federal Agency to withhold from public disclosure information about the "location, character, or ownership of a historic property when disclosure may cause a significant invasion of privacy; risk harm to the historic property; or impede the use of a traditional religious site by practitioners..." 36 CFR 800.11(c). As described below, FRA underwent an extensive cultural resource identification process and has identified one archeological resource qualifying as a Section 4(f) property that would be affected by the Segment 3 alignment alternatives presented in both the Draft EIS and the Supplemental Draft EIS. As outlined below, FRA developed an avoidance alternative in cooperation with BLM and the other Cooperating Agencies. FRA has conducted a thorough analysis of the potential impacts of the alignment alternatives on this resource and identified the Preferred Alternative alignment that would avoid a 4(f) use.

After extensive tribal consultation, coordination with BLM, and a site visit to the resource with tribal members, FRA representatives determined that the resource is significant to Native American Tribes and would be in danger of irreparable harm in the form of vandalism and theft should the location and nature of the resource be disclosed to the public. For those reasons, FRA has determined that public disclosure places the resource in risk of serious harm and will withhold information that might identify the location and character of the resource. However, a detailed analysis has been provided to FRA and Cooperating Agency decision makers, which will allow them to fully understand the Section 4(f) issues presented by the various alignment alternatives.

[2] 64 FR 28546, May 26, 1999.

[3] FRA Procedures, §§ 3(g) and 12(b) (4).

As will be fully described and documented below, the Preferred Alternative would not result in the direct or constructive use of any Section 4(f) property.

FRA has prepared this Final Section 4(f) evaluation to more fully describe the process FRA followed to reach the conclusion that the Preferred Alternative does not result in a use of any Section 4(f) property.

3.15.2 Section 4(f) and the National Historic Preservation Act

The consideration of cultural resources under Section 4(f) differs from their consideration under the National Historic Preservation Act (NHPA),[4] particularly Section 106 of the NHPA.

Section 4(f) applies to programs and projects undertaken by the U.S. Department of Transportation (USDOT) that use publicly owned public parks, recreation areas, and wildlife refuges, and cultural sites (historical or archaeological), whether publicly or privately owned, that are on or eligible for the National Register of Historic Places (National Register) - the Nation's official list of properties recognized for their significance in American history, architecture, archaeology, engineering, and culture. Section 4(f) does not apply to the Surface Transportation Board (STB), the Bureau of Land Management (BLM) or the National Park Service (NPS), but does apply to FHWA and FRA. FRA and FHWA are modal administrations of USDOT and must comply with Section 4(f), generally in conjunction with the environmental review process.

In contrast, Section 106 imposes different obligations that apply to all Federal agencies. Section 106 requires Federal agencies to take into account the effect of the action on any property (site, district, building, structure, or object) that is included in or eligible for inclusion in the National Register. An adverse effect on a property would be one that endangers the eligibility for inclusion on the National Register.

Under Section 106 eligibility for the National Register is determined by the lead Federal agency in consultation with the SHPO/THPO and Native American Tribes. This eligibility determination is also significant for purposes of Section 4(f) as described in more detail below.[5]

[4] 16 U.S.C. 470f (as amended).

[5] Obligations in this region are different per a 2007 State Protocol Agreement among the California State Director of the BLM and the SHPOs of California and Nevada. The Protocol Agreement recognizes the unique requirements of managing cultural resources on public lands in California and Nevada. This Protocol allows BLM's cultural resource staff to act on the SHPO's behalf under limited circumstances. BLM assists agencies in defining areas of potential effect (APEs) and the required level of inventory efforts, recommend eligibility determinations to federal agencies and provide opinions on effects of undertakings without consulting with SHPO.

In sum, the Section 106 process evaluates whether a proposed action would result in *effects* on a cultural resource site while a Section 4(f) evaluation examines whether a proposed action would result in a *use* of a cultural resource site. While the two statutory requirements are similar, even if a proposed action results in an "adverse effect" under Section 106, there will not automatically be a Section 4(f) "use" absent a separate analysis and determination by a modal administration of the USDOT.

In order for a cultural resource to be protected by Section 4(f), it must be eligible for the National Register under specific criteria. Specifically, archaeological sites whose importance as a resource can be documented through a data recovery process alone are not protected under Section 4(f). In other words, Section 4(f) does not apply to a site if, a Federal agency, after consultation with the SHPO (or, in this region, the BLM) and the appropriate Native American Tribes and/or Tribal Historic Preservation Officer (THPO), concludes that the archaeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.[6]

The NHPA provides specific criteria to assist in making this determination.[7] An archaeological resource that is eligible only under NHPA "Criterion D" is considered valuable only in terms of the data that can be recovered from it. For such resources (such as pottery scatters and refuse deposits), it is generally assumed that there is minimal value attributed to preserving such resources in place. Conversely, resources eligible under Criteria A, B, and/or C are considered to have value intrinsic to the resource's location.

These criteria apply to resources such as prehistoric or historic habitation sites (places that were occupied by people for a sustained time period), petroglyph sites (also known as "rock art sites"), and prehistoric quarries.

3.15.3 Approach to Final Section 4(f) Evaluation

This section expands upon the Section 4(f) evaluations presented in the Draft EIS and Supplemental Draft EIS documents.

Section 4(f) broadly defines protected resources to encompass park and recreation lands, wildlife and waterfowl refuges, and historic sites. These resources and subcategories therein are discussed below.

Park and Recreation lands include Federal, state, and local parks.

Clean Air Act "Class I" Areas: A subcategory of park and recreation lands here include those parklands identified by the Clean Air Act (42 U.S.C 85) as having particular sensitivity to any visual intrusion that could result from degraded air

[6] FRA does not have separate 4(f) regulations but relies on the process described in the FRA Procedures and also looks to FHWA regulations as guidance which are codified in 23 CFR 774.

[7] 36 CFR 60.4.

quality. The Clean Air Act designates national wilderness areas and national parks meeting certain criteria as "Class I Areas."[8] These areas include all:

1. international parks, or
2. national wilderness areas which exceed 5,000 acres in size, or
3. national memorial parks which exceed 5,000 acres in size, or
4. national parks which exceed 6,000 acres in size, and
5. any or all which were in existence on August 7, 1977.

These areas are considered highly susceptible to adverse visual effects that could occur with the emission of air pollution associated with a proposed action. The Clean Air Act states that it is a national goal to prevent impairment of visibility in Class I areas.

Wildlife and Waterfowl Refuges include Federal, state, and local areas set aside for the preservation of wildlife and/or waterfowl.

Historic Sites include *historic architectural* resources (buildings, structures, landscapes, etc.) and *archaeological* resources. Historic sites qualifying for protection under Section 4(f) include only those on or eligible for listing on the National Register and warrant preservation in place as discussed above.

The Preferred Alternative rail alignment and associated facilities traverse nearly 200 miles between Victorville and Las Vegas. As required by Section 4(f), FRA has examined whether the Preferred Alternative would traverse or permanently incorporate any properties protected by Section 4(f) resulting in a direct use or pass in such proximity so as to substantially impair the features or attributes of the property resulting in a constructive use.

To determine the area within which constructive use of Section 4(f) protected properties could potentially occur, FRA employed specific distance thresholds from the Preferred Alternative. The distance thresholds employed were determined based on noise, vibration, visual, access, and ecological intrusion factors as described below.

Noise: As documented in **Section 3.12.6.1** of the Draft EIS, operating noise from the proposed high speed trains would exceed 65 dBA at a distance of about 300 feet. During construction, the distance could be increased to as much as 400 feet. Noise-sensitive land uses within this distance could be adversely affected by excessive noise levels.

Vibration: The area potentially affected by vibration is similar to that related to noise, so distances up to 400 feet were considered.

[8] 42 U.S.C. 7472.

Access: The Preferred Alternative rail alignment is proposed to be fully grade-separated. There would be no at-grade crossings of any existing roadways. Therefore, access impacts would occur only where the proposed action would otherwise severely restrict access to a protected property.

Ecological Intrusion: As documented in **Section 3.14.2.3** of the Draft EIS, a 400 foot wide corridor centered on the proposed rail centerline representing the area of potential indirect (or constructive use) was examined for the presence of ecologically important features (e.g. wetlands and endangered species). The actual width of the proposed rail corridor is typically about 65 feet, with many narrower sections. For Clean Air Act Class I areas, a much greater distance (100 miles) was utilized, given the potential for air pollutants to travel substantial distances.

To ensure all Section 4(f) properties within the project area were considered, FRA utilized the following distance criteria to develop the list of Section 4(f) properties to be evaluated for direct and constructive use.

- **Parks and Recreation Lands:** 1 mile
- **Clean Air Act "Class I" Areas:** 100 miles
- **Wildlife and Waterfowl Refuges:** 1 mile
- **Historic Sites (Historic Architecture or Archaeological Resources):** Within the Area of Potential Effect identified for the project, which is generally 400 feet. The APE is described in detail below in **Section 3.15.4.5**.

3.15.4 Description of Properties Qualifying for Section 4(f) Protection

The following descriptions of properties located within the project study area that qualify for protection under Section 4(f) is based on information previously presented in the Draft EIS (**Section 3.15.1**) and Supplemental Draft EIS (**Section 3.15.1**).

3.15.4.1 Park and Recreation Lands

Table F-3.15-1 below lists all federal, state, and local parks within 1 mile of the Preferred Alternative. By virtue of their status as park and/or recreation facilities, each is considered protected under Section 4(f). **Figures F-3.15-1** through **F-3.15-5** show the locations of these park and recreation lands in relation to the Preferred Alternative.

Table F-3.15-1 Park and Recreational Lands within One Mile of the Preferred Alternative[9]

Park	Address	Preferred Alternative Feature Within One Mile
National Park Service		
Mojave National Preserve	1.6 million acre area bounded generally by I-15 and I-40 freeways, the BNSF Railway and the California/Nevada state line	Segment 3B, Segments 4A and 4C, Baker MOW, Baker Utility Corridor, several autotransformers, several TCAs
City of Victorville		
Rockview Park	17800 National Trails Hwy	Electric Utility Corridor
Grady Trammel Park	17184 Stoddard Wells Road	
San Bernardino County		
Chet Hoffman Park	Hillview Drive and Park Avenue, Baker	Segment 3B, Electric Utility Corridor, Baker MOW
Smith Park	Yermo Road at McCormick Street,	Segment 2A
City of Barstow		
Waterman Park	417 North 3rd Avenue	Segment 2C
Barstow Heights Park	Rimrock Road and H Street	
Dana Park[10]	850 Barstow Road	
Stringham Park[11]	Rimrock Road	
Lillian Park	901 Bigger Street	
John Sturnacle Park	1434 Sage Drive	
Foglesong Park	300 Avenue G	
Mint Park	Harvard Drive	
"H" Avenue Soccer Fields	Avenue H at Vineyard Street	
Cameron Park[12]	Yucca Street and Kelly Drive	

[9] The Section 4(f) Evaluations included in the Draft EIS and Supplemental Draft EIS identified additional park and recreation lands in proximity to project alignments/features that have not been carried forward into the Preferred Alternative. **Table F-3.15-1** above and **Figures F-3.15-1** through **F-3.15-5** reflect only those park and recreation lands within 1 mile of any component of the Preferred Alternative.

[10] Due to an editing error, **Section 3.15, Section 4(f) Evaluation,** of the Supplemental Draft EIS identified a "Daha Park" in the City of Barstow. No such resource exists. However, the City of Barstow Parks and Recreation Department identifies both a "Dana Park Community Center" and adjacent "Lower Dana Park."

[11] The Supplemental Draft EIS depicted but did not describe Stringham Park. Stringham Park is an active park resource including a basketball court and lighted playing field.

[12] Cameron Park is identified as a park site on the City of Barstow's General Plan land use map. However, the City of Barstow Parks and Recreation Department does not manage this facility.

Park	Address	Preferred Alternative Feature Within One Mile
City of Barstow, continued.		
Montara Park[13]	Montara Road and Church Street	Segment 2C
Clark County		
Western Trails Park	7355 Rogers Street	Segment 6B
Stonewater Park	Southern Highlands Parkway & Valley View	
Silverado Ranch Park	East Silverado Ranch Boulevard and Gillespie Street	
Undesignated Parklands in Enterprise Land Use Plan	Various Locations in Clark County	Segment 6B, Frias Substation, and/or Wigwam Avenue MSF

Source: CirclePoint, 2010-2011.

Mojave National Preserve

The Mojave National Preserve (Preserve) is a unit of the NPS and is a public park with recreational function, and, therefore, qualifies for protection under Section 4(f). The Preserve is approximately 1.6 million acres in area, spanning a combination of Great Basin, Sonoran, and Mojave Desert ecosystems. The Preserve contains diverse mountain ranges, the Kelso dune system, dry lake beds and remains of volcanic activity (domes, lava flows, and cinder cones). According to NPS, the Preserve is visited by approximately 650,000 people per year as of 2010.

The Preserve's boundaries encompass Providence Mountain State Recreation Area (Mitchell Caverns), the University of California's Granite Mountains Natural Reserve and California State University's Desert Studies Center at Soda Springs.

The vast majority of the Preserve is located south of I-15, but a smaller, separate unit (Clark Mountain Unit) is located north of I-15 near Mountain Pass.

The Preserve fully qualifies as a Section 4(f) resource because it is a Federally-designated park. While the Preserve is well within 100 miles of the Preferred Alternative, the Preserve is not a "Class I" Area under the Clean Air Act. On either basis alone a parkland resource could qualify for protection under Section 4(f).

[13] Montara Park is associated with the adjacent Montara School. The City of Barstow General Plan map identifies Montara Park as a park but the City of Barstow Parks and Recreation Department does not manage this facility.

The Preserve was created by Congress in 1994, via the California Desert Protection Act (CDCA). Per the criteria set forth at 42 U.S.C. 7472, a Class I area must have been in existence on or before August 7, 1977.[14] Nevertheless, the CDCA states that the Preserve has notable scenic vistas; clean air contributes substantially to the ongoing protection of such vistas.

City of Victorville Parks

Draft EIS **Section 3.15.3.3** provides descriptions of the City of Victorville park lands noted in **Table F-3.15-1** above as being within 1 mile of the Preferred Alternative.

City of Barstow Parks

Supplemental Draft EIS **Section 3.15.1** provides descriptions of the City of Barstow park lands noted in **Table F-3.15-1** above as being within 1 mile of the Preferred Alternative, with the exception of Mint Park, which has been added and is described below.

> **Mint Park** is a Section 4(f) Resource because it is a City of Barstow Park. Mint Park is undeveloped but provides open space within an existing residential neighborhood in southern Barstow.

San Bernardino County Parks

Supplemental Draft EIS **Section 3.15.1** describes the San Bernardino County park lands noted in **Table F-3.15-**1 above, with the exception of Chet Hoffman Park which has been added and is described below.

> **Chet Hoffman Park** is a Section 4(f) resource as it is a County of San Bernardino Park. Chet Hoffman Park includes a playground and seating areas and primarily serves the unincorporated community of Baker.

Clark County Parks

Figure S-3.15-5 of the Supplemental Draft EIS showed the locations of two parks in Clark County within 1 mile of the modified Segment 6B alignment: Western Trails Park and Stonewater Park. The Supplemental Draft EIS did not provide descriptions of these resources. Accordingly, descriptions of these parks are provided below. In addition, other park lands identified subsequent to publication of the Supplemental Draft EIS are noted below.

> **Western Trails Park** is a Section 4(f) resource as it is a County owned park. The park includes a horse trail, playground, and picnic areas. The park is located in an urbanized area off West Warm Springs Boulevard, about 1 mile west of I-15.

[14] The California Desert Protection Act also created Death Valley National Park; for the same reason, Death Valley National Park is not a Class I Area under the Clean Air Act, although it is within 100 miles of the Preferred Alternative.

Stonewater Park is a Section 4(f) resource as it is a County owned park. The park includes a picnic area and playground. The park is located in the Southern Highlands neighborhood of Clark County, about 0.75 miles west of I-15.

Silverado Ranch Park is a Section 4(f) resource as it is a County owned park. The park includes a ball field, basketball courts, exercise stations, and a fenced dog area. **Figure F-3.15-5** shows the location of this park along Gillespie Street and East Silverado Ranch Boulevard.

Undesignated Park Lands: Clark County's Enterprise Land Use Plan identifies numerous sites for the development of future parks within 1 mile of the Preferred Alternative. **Figure F-3.15-5** depicts these locations where future parks may be located. These are noted as Section 4(f) resources because the Enterprise Land Use Plan specifically notes these sites as parks.

3.15.4.2 Clean Air Act Class I Areas

Clean Air Act 'Class 1 Areas'

The following Clean Air Act Class 1 Areas are located within 100 miles of the Preferred Alternative.

Domeland Wilderness	San Gabriel Wilderness
San Gorgonio Wilderness	San Jacinto Wilderness
Agua Tibia Wilderness	Joshua Tree National Park
Grand Canyon National Park	Cucamonga Wilderness

Figure F-3.15-6 depicts the location of these Section 4(f) resources in relation to the project area.

3.15.4.3 Wildlife and Waterfowl Refuges

Biologists under the direction of FRA consulted with state and Federal resource agencies, including the BLM, California Department of Fish and Game (CDFG), and the Nevada Department of Wildlife (NDOW) in preparation of the NEPA documents for the DesertXpress project and the related consultation required under Section 7 of the Endangered Species Act (Section 7). There are no Federal, State, or local wildlife refuges within 1 mile of the proposed action. The closest known wildlife refuge area in California is the Camp Cady Wildlife Area about 20 miles east of Barstow near the community of Harvard. This is a state wildlife refuge as designated by the CDFG. This 1,870 acre site is about 3 miles from the Segment 2 rail alignment.

In Nevada, the closest known wildlife refuge area to the proposed project is the Desert National Wildlife Refuge (also known as the Desert National Wildlife Range). This 2,200 square mile area is approximately 25 miles northwest of the City of Las Vegas and approximately the same distance from the proposed action.

3.15.4.4 Historic Architectural Resources Qualifying for Protection under Section 4(f)

Section 3.7.2.1 of the Draft EIS describes the approach that was used to identify historic architectural resources. This process was led by qualified architectural historians[15] working under the direction of FRA. The architectural historians conducted records searches at state and regional data centers, including the California Historical Resources Information System and the State of Nevada Department of Cultural Affairs. In addition, the architectural historians consulted with the SHPOs and numerous groups and individuals with knowledge of historic properties in the region (See Draft EIS, **Section 3.7.2.1**, **Table 3.7-2**).

The records search and consultation were followed by field investigations of all historic buildings, structures, and objects within the APE established for the project.

The Draft EIS and Supplemental Draft EIS each identified historic architectural resources in the APE, which encompassed all alternatives under consideration (including all rail alignments and station/maintenance facility options). **Section 3.7.3.2** of the Draft EIS and **Section 3.7.1** of the Supplemental Draft EIS identify the results of the above investigations. Specifically, **Table 3.7-12** of the Draft EIS lists the 41 historic resources identified and provides summary information about each. Eligibility of these resources had been previously established as part of surveys related to other projects. This information was furnished to the project architectural historians by the Nevada SHPO.

The 41 historic properties are concentrated in the metropolitan Clark County/City of Las Vegas within the APE for Segments 7A, 7B, and 7C, which are not included in the Preferred Alternative. The Preferred Alternative terminates at the "Central Station B" site at Dean Martin Drive and Flamingo Road in Clark County, south of all Segment 7 alignments. Please see **Table 3.7-12** within **Section 3.7.3.2** of the Draft EIS as well as **Appendix F-1** of the Draft EIS for a detailed listing of these resources.[16]

Therefore, there are no historic architectural resources within the APE for the Preferred Alternative.

[15] "Qualified" means meeting the Professional Qualifications Standards of the Secretary of the Interior – see 36 CFR 61.

[16] Section 3.7.1 of the Supplemental DEIS noted that none of the project modifications and additions analyzed therein introduced any new historic architectural resources due to associated changes to the APE. This includes Segment 2C through the City of Barstow. While Section 3.7.1 of the Supplemental DEIS discussed in some detail some notable architectural resources in or adjacent to the APE for Segment 2C, none of these resources were found to qualify for eligibility on the National Register.

3.15.4.5 Archaeological Resources Qualifying for Protection under Section 4(f)

The identification of archaeological resources qualifying for protection under Section 4(f) is closely related to the Section 106 process (see **Section 3.15.2** above). Draft EIS **Section 3.7.2.1** contains a full description of the methodology employed to evaluate for the presence of archaeological resources. That methodology is briefly summarized below.

Area of Potential Effect

The Area of Potential Effect (APE) was developed for the project in consultation with the BLM, STB, and SHPOs of California and Nevada. Both "Direct" and "Indirect" APEs were developed for the DesertXpress project.

> The **Direct APE** was assumed to be the area that would be permanently occupied by the proposed rail alignment or project facilities.
>
> The **Indirect APE** encompasses rail alignment area that would be permanently occupied plus an additional buffer area incorporating those lands likely to be disturbed during project construction.

The Indirect APE was defined as the area 200 feet on either side of the centerline of the proposed rail alignment (400 feet in total width). The Indirect APE was also defined as 50 feet from the centerline of the center of a proposed utility corridor (100 feet in total width). The Direct APE is defined as the actual width of the finished rail alignment (inclusive of tracks, maintenance/access areas, catenary structures, equipment and other infrastructure). This width is typically 60 feet, narrowing to 40 feet in several locations, where the maintenance road is omitted to ensure highway safety or avoid sensitive resources.

For the purposes of the Section 4(f) evaluation, FRA assumed that any archaeological resource in the Direct APE would be directly used; any archaeological resource in the Indirect APE was further evaluated for possible constructive use.

Records Search

For both the direct and indirect APE, a records search of both prehistoric and historic resource files was conducted. These included files/databases at the San Bernardino Archaeological Information Center of the California Historical Resources Information System (CHRIS) in Redlands, California; the Mojave River Valley Museum in Barstow, and the Harry Reid Center in Las Vegas. Numerous other resources were consulted, including historic maps, other project area cultural resource inventories, and pertinent reference documents. The records search was performed by qualified archaeologists meeting the Secretary of the Interior's Professional Qualification Standards.

Pedestrian Surveys

In order to achieve a comprehensive resource identification process, FRA engaged third-party contractor archaeologists meeting the Secretary of the Interior's Professional Qualification Standards to carry out pedestrian surveys. These archaeologists consulted with the BLM to develop pedestrian survey criteria for the project. These criteria stipulated that the pedestrian surveys of the APE be conducted for those areas outside the I-15 freeway right-of-way fence, which were determined to have the greatest potential for previously unidentified resources. The freeway right-of-way was determined to be previously disturbed and therefore unlikely to contain unidentified Section 4(f) resources with integrity.

Assessment of Eligibility

FRA's third-party archaeologists made preliminary assessments of the eligibility of the resource identified within the APE for the National Register. These preliminary assessments were made in close consultation with the appropriate BLM field office (Barstow, Needles, or Las Vegas).

All cultural resources were assigned a preliminary assessment of eligibility as follows:

> **Eligible:** Previously identified sites for which eligibility was previously and formally established were categorized as "eligible."
>
> **Not Eligible:** Previously identified sites for which non-eligibility had been previously and formally established were categorized as "not eligible."
>
> **Assumption of Eligibility:** Newly discovered resources (for which no previous, formal determination had been made) were categorized as "assumed eligible."

The assumption of eligibility relates to the use of a Programmatic Agreement (PA) to fulfill FRA's Section 106 obligations. **Section 3.7.2** of this Final EIS and **Section 3.7.1.1** of the Draft EIS explain the development of a PA for this proposed action. **Appendix F-H** includes the executed PA for the DesertXpress project.

The purpose of the PA for the project is multi-fold. Among its requirements, the PA sets forth numerous procedures to ensure the appropriate treatment of historic resources during project construction. The PA also stipulates protocols for how and when formal eligibility determinations would be made. Specifically, while extensive efforts have occurred to identify potential historic resources, the PA describes a phased implementation approach consistent with 36 C.F.R. 800.4(b)(2) permitting formal eligibility determinations to be made after the Preferred Alternative is identified and ratified by the lead and cooperating agencies via Records of Decision on the proposed

action.[17] Eligibility determinations will be made by the appropriate agency (in this region, either BLM or FRA in consultation with the respective SHPO and PA signatory parties) based on information presented in completed state-appropriate site records forms.

For the NEPA documents, information on archaeological resources was drawn from extensive field notes, literature reviews, consultations with agencies and Tribes, map and database reviews, and other sources. A complete listing of all resources identified for all alternatives evaluated can be found in **Appendix F-3** of the Draft EIS and **Tables S-3.7-1** and **S-3.7-2** of the Supplemental Draft EIS.

Notwithstanding the phased implementation process described in the PA, completion of the Section 4(f) evaluation required FRA to engage in detailed cultural resource investigations to ascertain whether the proposed action would use any archaeological resource meeting the criteria for protection under Section 4(f).

In consultation with BLM, third-party contractor project archaeologists reviewed field notes and background information on all identified resources and employed screening criteria to develop a sublist of all historic resources that could qualify for protection under Section 4(f). These screening criteria included a detailed description of the resource, a preliminary eligibility assessment, and clarification of the presence of the resource within the APE. [18] Through this effort, a total of 32 potential Section 4(f) cultural resources were initially identified. All of these are located on BLM land, meaning that formal eligibility determinations are the prerogative of the appropriate BLM field office (Barstow, Needles, or Las Vegas).

These 32 cultural resources were singled out as potential Section 4(f) resources because project archaeologists made a preliminary assessment that each of these resources might be eligible under National Register criteria that ascribe resource value to its preservation in place. Accordingly, FRA's third-party contractor archaeologists undertook additional research, field visits, and consultation to more specifically assess likely National Register eligibility.[19]

Research included online and printed materials, input from BLM personnel, and input from Native American representatives during meetings and field visits to some of the sites conducted January 6-8, 2010. Please see **Chapter 6.0, References**, of this Final EIS for a detailed listing of sources consulted in these efforts.

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[17] The Lead and Federal Cooperating Agencies are expected to adopt separate, agency-specific RODs on this proposed action.

[18] Numerous resources identified via literature and/or database search were subsequently found to be outside the APE during pedestrian surveys.

[19] The Draft Section 4(f) Evaluation in the Draft EIS was preliminary in nature. In that preliminary evaluation, any resource that had been identified as potentially eligible or eligible for the National Register **and** in the APE was assumed to be *directly* used. The subsequent work described herein updates and clarifies these earlier, preliminary conclusions.

Table F-3.15-2 lists those resources that FRA has concluded are **not** protected under Section 4(f). The table lists the site record number, the resource type, resource description, discussion of the preliminary Section 106 eligibility determination, and the reason why FRA has concluded the resource does not qualify for protection under Section 4(f).

Through this process, one resource site was determined to meet the criteria for protection under Section 4(f). This resource was found to be within the APE for both Segment 3A (which would run in the median of I-15) and Segment 3B (which would run on the north side of the I-15 corridor). As described above, FRA determined that constructing the Segment 3B alternative would constitute a Section 4(f) use of this resource thus requiring the identification of potential avoidance alternatives. However, because the resource is a significant Native American cultural site and FRA is concerned about the risk to the resource caused by the public disclosure of information possibly identifying the location and character to the resource, FRA is withholding such information and is instead providing the summary which is available below.

After extensive evaluation and consideration, FHWA and Caltrans determined that locating Segment 3A in the median on the I-15 could result in significant staging and traffic management issues, safety concerns, and long-term operational issues. These agencies thus voiced strong concerns to allowing a railroad use of the freeway median in this location.

FRA, in consultation with the Cooperating Agencies and the Tribes, determined that the range of alternatives needed to be expanded. In the Supplemental Draft EIS, FRA presented a profile modification for Segment 3B that sought to minimize potential impacts to the resource. However, after extensive consultation efforts with the Native American Tribes and BLM, this alignment was determined to adversely affect the resource.

FRA also considered a modified Segment 3A alignment that utilized the median only as necessary to avoid the resource and provide for engineering considerations to cross from the north side of the freeway to the median. However, FHWA and Caltrans expressed similar concerns about the median usage, particularly in consideration of the narrow width of the median through this area and the impact its use would have on any future highway widening efforts. Moreover, the resource was still within the APE. As a result, FRA determined it was necessary to consider alternatives that would avoid the resource.

The potential additional avoidance alternatives FRA considered were:

- **Outside freeway corridor:** Moving the rail line away from the resource area by departing from the freeway corridor and substantially looping to the north around the resource. A similar alternative looping a substantial distance to the south would directly traverse the Preserve and therefore was ruled out as a true avoidance alternative insofar as it would result in direct use of the Preserve (a Section 4(f) resource).

- **South side of freeway corridor:** Moving the rail line to the south side of the I-15 freeway but within the existing freeway right of way.

With regard to the outside freeway corridor alternative, FRA, in consultation with BLM, determined that an alignment looping north of the resource would encounter topographical constraints and would have the potential to impact substantially more sensitive biological, cultural, and other resources than the existing alignment (Segment 3B) or a south side of freeway corridor alignment. In addition, this alignment would position the resource with transportation uses on both sides of the resource since the highway would still remain to the south, which would have the potential to restrict access to the resource. Since the outside freeway corridor north loop did not appear to substantially reduce potential Section 4(f) impacts, and could actually result in substantially increased overall impacts, it was withdrawn from further study. As previously indicated, any alignment departing substantially from the freeway corridor to the south would traverse the Preserve, thus constituting a direct 4(f) use of the Preserve.

The south side of freeway corridor was developed in consultation with the BLM, NPS, and Tribes, as a feasible and prudent alternative. This alignment includes shifting a 10 mile portion of the Segment 3B alignment to the south side of the I-15 freeway corridor. While shifting to the south side of the I-15, the rail line would remain within the I-15 right-of-way area. The APE for the modified south side alignment does not include the resource. However, the south side alignment would move the rail line closer to the Preserve (a Section 4(f) park resource) to within 175 feet of its northern edge.

Detailed analysis of the south side of freeway corridor is presented in the sections below.

Table F-3.15-2 Archaeological Resources Not Qualifying for Protection under Section 4(f) Resources

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
Historic and Modern Period Resources				
26CK3542	Railroad Grade	This is a temporary grade portion of the San Pedro, Los Angeles, & Salt Lake Railroad. The railroad grade is highly disturbed.	Not Eligible	Ineligible for National Register; no intact remnants of 26CK3542 within the project APE.
26CK4958	Road	The site is a portion of the Arrowhead Trail Highway (U.S. 91).	Eligible (A)	Site not in APE; no intact remnants of 26CK4958 within the project APE.
26CK5685	Railroad Grade	The site is the existing historic Union Pacific Railroad.	Eligible (A, D)	Will not be impacted by project. While eligible for the National Register under A and D, since it is a railroad currently in use, site 26CK5685 will not be directly impacted by the proposed project.
26CK5729	Habitation Site	Railroad construction campsite with tent pads, hearths, walls, water retention basins, stone ovens, and refuse deposits.	Eligible (D)	Eligible under National Register criterion D only, and outside the APE for the Preferred Alternative; Would not be eligible under A, B, or C of the National Register in itself, and though it is associated with 26CK5685, a resource eligible under A, it is not an uncommon resource in the area.
26CK5801	Water Conveyance Canal	This resource consists of a low, linear berm that is likely the remains of a historic water line that once served the railroad construction camps in the area.	Not Eligible	Ineligible for National Register; Would not be eligible under A, B, or C of the National Register.
26CK7212	Road	The site consists of a 1.6 mile long segment of the Arrowhead Trail Highway (U.S. Route 91).	Eligible (A, D)	Site not in APE; no intact remnants of 26CK7212 within the APE.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
26CK7214	Road	Remnant of the historic Roach Road and associated refuse deposits. Historically, the road was an early access road leading to the Roach Siding.	Not Eligible	Ineligible or eligible under National Register criterion D only; Would not be eligible under A, B, C, and probably D, of the National Register. The road is visible on the available historic maps 1910 (Ivanpah; 1:192000).
26CK7217	Road	The site consists of an early frontage road to old Highway 91 and its associated refuse deposits.	Eligible (A, D)	Site not in APE. Portions of the Arrowhead Highway have been evaluated and are recommended eligible under criteria A and D. However within the project APE, there are no intact portions of the resource.
26CK7218	Road	Two remnants of early roads and associated refuse deposits.	Eligible (A, D)	Site not in APE. Portions of the Arrowhead Highway have been evaluated and are recommended eligible under criteria A and D. However, within the project APE there are no intact portions of the resource.
26CK7223	Transmission Line	The site consists of the remnant of an abandoned utility pole line.	Likely ineligible	Site appears ineligible for National Register, and there is no documentation about the resource to support a finding of eligibility.
CA-SBR-03048H Update	Road, Refuse Deposit	This is a segment of the Old Traction Road with a "newer" 1920s era refuse deposit. The site is the remnant of the 1904 Traction Road developed by Francis Marion Smith to reduce dependence on the 20 Mule Team to transport ore from the Lila C mine and the railhead at Ivanpah. The traction road was a gravel-based road upon which a steam tractor was to operate. The tractor broke down 14 miles into its first run.	Assumption of Eligibility	Per BLM, Old Traction Road is eligible under criteria (a) and (b); however, the portion of this resource within the APE lacks integrity; construction across this resource would therefore not result in any adverse effect.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
CA-SBR-03159H Update	Railroad Grade	This site consists of the original 5.5 mile alignment of the Mojave Northern Railroad built by the Southwestern Portland Cement Company between 1915 and 1916. Today, this alignment (site) consists of existing rails, removed rails, and an abandoned siding. The original alignment connected the limestone quarry at Powell to the processing plant in Leon. Currently, there is approximately 2.5 miles of the southern portion of the alignment in use by the CEMEX Corporation still processing ore at the same plant in Leon (northern Victorville). In 1925, a 1.5 mile segment of the track, as well as a midpoint siding, were abandoned and their rails removed in favor of a slightly straighter and more level parallel track (JSA-CS-S-220H). Following the 1.5 mile easterly deviation, the alignments rejoin and continue north-northeasterly for the remaining 1.25 mile trek to the Powell Quarry. A 1956 USGS map (Victorville 1:62500) depicts this northerly 1.25 mile segment as operable although a 1968 aerial photograph clearly illustrates the track as abandoned.	Assumption of Eligibility	Eligible under National Register criterion D only; Would not be eligible under A, B, or C of the National Register. Moreover, only within the APE for the electrical utility corridor extending from Victorville OMSF – outside of APE for any other project feature.
CA-SBR-07347H Update	Road	The site is a segment of the historic Ivanpah-Providence Road.	Assumption of Eligibility	Eligible under National Register criterion D only; Would not be eligible under A, B, or C of the National Register. Originally recorded as CA-SBR-7347H. May also be recorded as JSA-CS-S-108H or CA-SBR-10806H at I-15. A review of the available historic maps 1910 (Ivanpah; 1:192000) 1912 (Ivanpah; 1:250000), 1947, 1953 (Kingman; 1:250000)

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
CA-SBR-07347H Update, continued.				depict the road crossing the alluvial beds. No data available on the road through the GLO archives.
CA-SBR-10315H Update	Power Transmission Line	This is the old San Bernardino to Boulder Dam 287.5 kV Transmission Line	Eligibility under Criteria (a) and (c) determined by BLM.	The proposed project would not require directly impact or require the relocation of any part of this resource. The historic property is significant for its role in bringing electrical power from the Hoover Dam to Los Angeles, and as a civil engineering achievement. The historic property is a linear feature, traversing hundreds of miles, and is industrial in visual character. During operations, the proposed DesertXpress tracks would introduce another linear feature with industrial character into the setting at several points near Victorville, Segment 3, and Segment 4. However this affect to the setting would not diminish the qualities that contribute to the National Register eligibility of the transmission lines because there are many other linear features (e.g. I-15 freeway, pipelines and electrical transmission lines) already located within the existing setting. Therefore, no Section 4(f) use would result as no lands from the historic property would be incorporated into the project nor would any features or attributes that contribute to its National Register eligibility be impaired.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
JSA-CS-S-115H	Highway	Old Highway 58. Several original "C" monuments recorded in the vicinity of the DXE overcrossing	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. The segment is an early intact portion of historic US Route 466 which became State Route 58 in 1964. The route first appears on 1932 maps of Barstow (1:125000), but wasn't officially commissioned until 1935.
JSA-CS-S-220H	Railroad Grade	This site consists of a 1.5 mile segment of railroad grade believed to have been constructed in 1925. This alignment appears to have orphaned the original 1915-1916 segment of the Mojave Northern Railroad in favor of a straighter and more level route. A review of historic quad maps depicts the alignment as still operable in 1956 (Victorville 1:62500) although a later aerial photograph shows that the northern 0.6 mile was abandoned by 1968. The southern 0.9 mile segment is still in use and an active part of the CEMEX concrete quarry operation.	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. Moreover, only within the APE for the electrical utility corridor extending from Victorville OMSF – outside of APE for any other project feature.
JSA-CS-S-223H	Railroad Grade	Site consists of an approximately 4.5 mile segment of existing railroad track built in 1947. The track extends from the location of No. 7 Dock which served as a railroad loading dock for ore transported by truck on Black Mountain Quarry Road. Ore was driven approximately 7 miles from Black Mountain Quarry and loaded onto rail cars for the 7.5 mile trek to the processing plant in Leon (northern Victorville). This segment of the rail line is currently in use by CEMEX.	Assumption of Eligibility	Ineligible or eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. Moreover, only within the APE for the electrical utility corridor extending from Victorville OMSF – outside of APE for any other project feature.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
JSA-CS-S-081H	Refuse Deposit, Road, Rock Cairn	Site consists of a cairn marker, a prospector's pit measuring approx. 5ft in diameter, a dirt road and a historic refuse deposit containing sanitary, coffee and tobacco cans and clear glass. According to GLO records, this location is not associated with any known patentees.	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. A review of the available historic maps 1934, 1948 1957, (1:24000, 62500, 125000) and aerial photography (1968), suggests that there are no 4(f) site elements at this site.
JSA-CS-S-101H	Railroad Grade	Site consists of a 0.4 mile long section of berm associated with an approximately 5 mile long abandoned spur of the San Pedro, Los Angeles, & Salt Lake Railroad as identified in GLO plat maps. The line was never completed According to GLO records, the alignment was initially acquired by San Pedro, Los Angeles, & Salt Lake Railroad May 8 and May 13, 1903 through the General Right of Way Act (18 Stat. 482). However on November 8, 1916, the acquisition was cancelled by the GLO and the land returned to federal ownership. Cancellations of such grants were not uncommon if the patentee failed to meet all of the requirements for ownership.	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. A review of the available historic maps 1948, 1956, (1:250000 and 1:62500) did not indicate any portion of the site in existence. According to the GLO data, a 100 ft right of way was acquired by the San Pedro, Los Angeles, and Salt Lake Railroad on May 8, 1903 (LA028069). The patent was cancelled on November 8, 1916. No reason indicated.
JSA-CS-S-109H	Road	Site consists of a historic road.	Likely Not Eligible	Appears ineligible for NRHP; Would not be eligible under A, B, C, and probably D of the NRHP. The road first appears on the 1953 map (Kingman; 1:250000). No data available on the road through the GLO archives.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
JSA-CS-S-111H	Road	Site consists of a historic road measuring approx. 8 to 9 feet wide.	Likely Not Eligible*	Appears ineligible for NRHP; Would not be eligible under A, B, C, or probably D of the NRHP. The road first appears on the 1980 (Clark Mountain; 1:24000). Prior to that there is no evidence the road existed. A historic 1956 15' series did not depict the road (Clark Mountain 1:62500) No data available on the road through the GLO archives.
JSA-CS-S-113H	Road	Site consists of a historic road approx. 8ft wide with no signs of recent use.	Assumption of Eligibility	Likely ineligible or eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. The road first appears on the 1980 (Clark Mountain; 1:24000). Prior to that there is no evidence the road existed. A historic 1956 15' series did not depict the road (Clark Mountain 1:62500) No data available on the road through the GLO archives.
JSA-CS-S-148H	Refuse Deposit	The site consists of five loci of refuse along a north south trending dirt road.	Assumption of Eligibility	Likely ineligible or eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. The site cannot be linked to any historic period map feature. The dirt road identified in the site record is identified in the aerial imagery as early as 1950. A review of a 1907 and 1908 Las Vegas 60' quads (1:250000) identified a road in the vicinity but the course of direction is substantially different.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
JSA-CS-S-171M	Ethnographic Site	The site is comprised of approximately 200 locally collected cobbles mounded approximately 2 ft high. The feature measures approximately 7.5 ft north/south by 6 ft east/west and also contains modern offerings of exotic minerals. Offerings include sandstone, quartz, obsidian, rhyolite, jasper, gneiss, chert, quartzite, siltstone, hematite, geode, and basalt in the matrix.	Likely Not Eligible*	Likely ineligible for NRHP; Would not be eligible under A, B, or C of the NRHP. Possible sub-modern animal burial.
Prehistoric Resources				
CA-SBR-07098/H Update	Habitation Site	Site includes both historic and prehistoric components. Historic well feature with berms and associated refuse deposits. The berms may be associated with CA-SBR-3048H. The prehistoric element to this site consists of at least three hearth features, bifaces, groundstone and debitage.	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. The historic features (berms) associated with this site could not be definitively tied into the historic Traction Road (CA-SBR-3048). A review of the GLO Records for this location did not yield any information regarding ownership.
CA-SBR-00885 Update	Rock Alignments, Rock Shelter	This site is comprised of several circular rock alignments laid out on an east facing limestone slope. A rock shelter with groundstone and pottery was recorded at the apex of the limestone outcrop. A second rockshelter was added to the site record at the recommendation of Anthony Morales, but it does significantly alter the boundary.	Assumption of Eligibility (D)	Eligible under NRHP criterion D only, and not in APE; FRA visited this site with members of the Native American community. The preliminary conclusion is that the rock rings are part of a prehistoric food storage feature (i.e. granary), not uncommon to other environments. In the Mojave Desert, however, features like this are not commonplace.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
CA-SBR-03694 Update	Habitation Site	Extensive habitation site with cobble reduction quarry features and two prehistoric trails.	Eligible	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. Two orphaned trail segments extend northward from Interstate 15. No other features were associated with the trails.
JSA-SD-S-002	Trail	Site consists of an approximately 300 meter-long prehistoric trail (35-40cm wide).	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. The trail is an orphaned segment of a prehistoric trail between a large drainage and I-15. The trail appears to be a remnant of CA-SBR-5236 identified on the south side of Interstate 15 in 1983. The general north/south trend of JSA-SD-S-002 does indicate it may have intersected with CA-SBR-7170, an anthropomorphic rock alignment approximately 0.5 mile to the north, but there is no continuity or demonstrable association between the two.
PSBR-52	Trails	The original record for PSBR-52 consists only of the Cave Mountain 15 minute (1:62,500 Scale) USGS quadrangle illustrated with large dots and lines to depict the locations of sites and trails. The SBAIC map was the result of fieldwork conducted by advocationalist Eugene Shepard between 1981 and 1983. No other specific data has yet been produced for PSBR-52.	Assumption of Eligibility	Not present in APE; No intact portions of PSBR-52 have been identified within the project APE. Furthermore, no segments of PSBR-52 were identified in the locations depicted on SBAIC location maps.

Site Designation	Type	Description	Preliminary Assessment of Section 106 Eligibility (NHPA eligibility Criteria)	Reason for Exclusion from Section 4(f)
JSA-CS-S-186	Trail	The site consists of an approximately 100 meter-long east/west trending trail.	Assumption of Eligibility	Eligible under NRHP criterion D only; Would not be eligible under A, B, or C of the NRHP. The trail is not visible on any aerial image consulted nor do other prehistoric trails appear in the vicinity that could possibly link up to this one. The trail disappears in the rock fall near the apex of the knoll. No known significant associations.

Source: ICF International, 2010.

3.15.5 Evaluation of Potential Use of Qualifying Section 4(f) Properties

3.15.5.1 Potential Use of Park and Recreation Lands Qualifying for Protection under Section 4(f)

Mojave National Preserve: Potential Direct Use

As described in **Section 3.15.4** of the Draft EIS, if selected, Segment 4A would have resulted in a direct use of the Preserve because it would cross a portion of the Preserve in the Mountain Pass area in the vicinity of Nipton Road.

No other alignment or project feature would result in any direct use of the Preserve.

Segment 4A, however, is not included in the Preferred Alternative. As the Preferred Alternative includes Segment 4C and fully excludes Segment 4A, the Preferred Alternative would not result in a direct use of the Preserve.

However, Segment 4A has been identified by FRA and the Cooperating Agencies as part of the environmentally preferable alternative. Identification of the environmentally preferable alternative is a requirement under NEPA and may vary from the Agency Preferred Alternative. Segment 4A is identified as the environmentally preferable alternative because it would substantially reduce the biological and hydrological impacts associated with Segment 4C.

The NPS has advised FRA that the area of the Preserve that this segment would impact has already been disturbed and used for a local mine as well as used as a right-of-way for several underground utilities.

At present, no administrative mechanism exists for the NPS to grant use of a right-of-way through land on the Preserve. As set forth in more detail in **Section 2.5.4** of this Final EIS, the RODs for FRA and the Cooperating Agencies are expected to stipulate that in the event that the United States Congress takes legislative action permitting the NPS or other Federal agency to grant the right-of-way for Segment 4A, the Preferred Alternative should be updated accordingly.

While there is no certainty as to exactly what (or any) action Congress may take, the viability of Segment 4A could be established by direct legislative action.

Accordingly, if there is future Congressional action that makes Segment 4A viable and the Lead and Federal Cooperating Agencies so direct the revision of the Preferred Alternative to incorporate Segment 4A, a reevaluation of this Final EIS and a supplemental Section 4(f) evaluation would be published if necessary to reflect the specific Congressional action and ascertain whether any direct or constructive use would occur.

Mojave National Preserve: Potential for Constructive Use:

Two rail segments included in the Preferred Alternative are in proximity to the Preserve, thus presenting a potential for constructive use. Each Segment is evaluated below under the constructive use criteria (noise, vibration, visual impacts, access, and ecological intrusion).

Segment 3B: Approximately 40 miles of Segment 3B would run within the I-15 corridor. The northern boundary of the Preserve is as close as 175 feet south of the outer edge of the freeway right-of-way area.

Within Segment 3B, an avoidance alternative was developed for a 10-mile portion of Segment 3B that would locate the rail alignment on the south side of the freeway corridor to avoid impacts a Section 4(f) archaeological resource (CA-SBR 2535).

Potential for Constructive Use Resulting from Increased Noise

FRA's guidance on measuring noise and vibration associated with high-speed trains[20] requires noise impact assessment at locations where there would be human activity such as trails, picnic areas, campgrounds, or other places where human activity would occur also called "sensitive receptors."

Portions of the Preserve near the I-15 freeway are currently subject to noise from ongoing freeway operations, including existing interchanges and roadways providing access to the Preserve (including but not limited to Zzyzx Road, Halloran Summit Road, Cima Road, and others). Therefore, portions of the Preserve closest to the freeway cannot reasonably be considered areas where serenity and quiet are key attributes and there are no sensitive receptors for study purposes.

Notably, there are no established public use areas such as hiking trails and few attractions within the Preserve within 3 to 5 miles of the I-15 freeway. The Zzyzx Desert Studies Center, for example, is about 5 miles south of I-15. Key Preserve elements in close proximity to the I-15 freeway are primarily unpaved dirt roads, primarily for the use of off-road/4-wheel drive vehicles. Consultation with NPS confirmed that there are no sensitive receptors or extremely noise sensitive uses in the areas of the Preserve closest to the I-15 freeway.

However, even if one were to consider the northern boundary of the Preserve as a location to assess noise impact, at 175 feet away from the south edge of the freeway right-of-way, there would be no impact under FRA guidance from the anticipated train operations. The project noise levels would be less than the existing highway noise levels at that distance.

[20] U. S. DOT Federal Railroad Administration (FRA) High-Speed Ground Transportation Noise and Vibration Impact Assessment, October 2005.

Under FRA's noise guidance, there would be no effects on wildlife within the Preserve. Areas within approximately 50 feet of the freeway right-of-way would have some potential for wildlife effects, but these areas are not located within the Preserve and already exposed to high noise levels. Therefore there would be no additional noise effects on wildlife within the Preserve.

Potential for Constructive Use from Increased Vibration

Impact from vibration is not typically assessed for outdoor land uses, such as the Preserve. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provide the sort of impact to the resource that is considered an adverse effect. In addition, any "rumble" noise that usually accompanies the building vibration is perceptible only inside buildings.

However, based on the analysis, the vibration levels at the boundary of the Preserve would be well below the impact thresholds, and significantly below any damage criteria. As noted above, there are no established public use areas such as hiking trails and few attractions within the Preserve within 3 to 5 miles of the I-15 freeway.

Please refer this Final EIS **Section 3.12.2.1** for a full discussion of vibration criteria.

Potential for Constructive Use Resulting from Visual/Aesthetic Changes

The Preferred Alternative would be located outside the Preserve, in an area that already visually compromised by the presence of the I-15 freeway and its fences; and the intermittent presence of interchanges, rest stops, and electrical transmission lines. In certain locations, the Preferred Alternative would introduce new visual elements of retaining walls, catenary poles and wires, and passing trains. As stated above, there are few Preserve attractions in the area closest to the I-15 freeway, except some dirt roads primarily used by off-road vehicles. In sum, introducing the rail alignment and associated features would all occur within the existing transportation corridor where many similar uses are present. Therefore, the visual and aesthetic setting of the Preserve would not be substantially affected by the project and no constructive use would occur. The NPS has concurred that even the south side alignment (on the same side of the I-15 corridor as the Preserve) would not substantially affect the Preserve's visual resources.

Potential for Constructive Use Resulting from Changes in Access

The Preferred Alternative would not alter existing access to the Preserve. In the vicinity of the Preserve, the rail alignment would be fully grade separated from all existing roadways, thereby avoiding the need to sever or change access to and from the Preserve. As a result, no constructive use because of change in access would occur.

Potential for Constructive Use Resulting from Ecological Intrusion

Many areas of the Preserve contain suitable desert tortoise habitat. As noted in Draft EIS **Section 3.14.3**, desert tortoise habitat was observed in proximity to Segment 3; evidence was found of tortoise use of existing washes that pass under I-15 and provide access for the

tortoise into and out of the Preserve. The Preferred Alternative rail alignment would not alter the existing location or size of culverts and bridges that cross over existing washes. As a result, tortoise would continue to be able to move north and south under the I-15 corridor (into and out of the Preserve) as at present. There would thus be no interference with the species' movement corridor or critical life cycle processes. In terms of other species, **Mitigation Measure BIO-19** requires that the railroad alignment include culverts that match existing culverts on the I-15 and/or UPRR railroad. To make such culverts more effective, the mitigation measure also requires coordination with resource protection agencies in the construction of exclusion fencing to direct species towards the culverts. Therefore, no constructive use because of ecological intrusion would occur.

Conclusion Regarding Segment 3B and Potential for Constructive Use of the Mojave National Preserve

Based on the foregoing analysis, FRA concludes that Segment 3B would not result in constructive use of any portion of the Mojave National Preserve.

Segment 4C: Approximately 5 miles of Segment 4C would run in an area approximately 1 mile to the east of the Preserve's Clark Mountain Unit, north of the I-15 corridor.

Potential for Constructive Use Resulting from Noise and Vibration

At its closest point, Segment 4C would be located approximately 1 mile east of the Clark Mountain Unit of the Preserve. Interior portions of the Clark Mountain Unit of the Preserve are accessible via unimproved roads or by foot. There are no officially designated hiking trails present in the Clark Mountain Unit, although the NPS informed FRA that the area is known to be used by rock climbers and similar recreational users.

Segment 4C would be located largely atop a plain located at a substantial elevation below the mostly rugged terrain of the northern unit of the Preserve. Because of the distance between the Clark Mountain Unit and Segment 4C, noise levels in the Preserve would be well below any impact criterion and would not interfere with the use or activities present in this portion of the Preserve.

As stated with regard to Segment 3B, impact from vibration is not typically assessed for outdoor land uses, such as the Preserve. Nonetheless, the vibration levels at the boundary of the Preserve would be well below the impact thresholds, and significantly below any damage criteria. As a result, no constructive use from noise or vibration would occur.

Potential for Constructive Use resulting from Visual/Aesthetic Changes

In consultation with the NPS, FRA developed a visual simulation of Segment 4C from a vantage point within the Preserve to assist in evaluating the potential change in the visual/aesthetic character of the area resulting from the Preferred Alternative. This visual simulation also includes the ISEGS Solar Energy Project which was recently approved and has begun construction (described more fully in **Section 3.16.1.2** of this Final EIS). Given the approval and construction status of this project, it is proper to consider it as part of the existing environment.

Figure F-3.15-7 shows that Segment 4C is visible but almost undetectable within the broader viewshed. Accordingly, FRA has concluded (and the NPS has concurred) that the potential visual intrusion effects of Segment 4C on the Preserve are minimal and thus no constructive use resulting from visual/aesthetic changes would occur.

Potential for Constructive Use Resulting from Changes in Access

Segment 4C would depart the I-15 corridor at Mountain Pass, traversing a total of about 20 miles before rejoining the I-15 freeway near Primm. Primary access to the Clark Mountain Unit is via Excelsior Mine Road, about 5 miles west of Mountain Pass. However, the NPS advised FRA that secondary, off-road vehicle access to the Clark Mountain Unit is provided by existing dirt roads that originate near Yates Well Road and I-15. To avoid interfering with this secondary access, final project design will be required to provide a suitable grade separation to facilitate ongoing access to the east side of the Clark Mountain Unit thus avoiding any constructive use due to changes in access to the Preserve.

Potential for Constructive Use Result from Ecological Intrusion

Segment 4C would be located at a substantial elevation below the Clark Mountain Unit. The use of tunnels and elevated sections in the immediate vicinity of the Clark Mountain Unit would allow for ongoing wildlife access into and out of the Preserve. As set forth in Supplemental Draft EIS **Section 3.3.3**, a portion of the Clark Mountain Unit, as well as most of the land surrounding the Clark Mountain Unit, is under a grazing allotment (jointly issued by the BLM and NPS). Grazing is not necessarily an ecological intrusion, but can degrade the quality of the lands, particularly in terms of suitability for sensitive plant species. Mitigation related to grazing at Supplemental Draft EIS **Section 3.3.4** would either allow existing grazing to continue by integrating cattle crossings into the final design of Segment 4C or would result in the termination of grazing in the Clark Mountain Unit and immediate surrounding area. Accordingly, Segment 4C would either maintain the status quo in terms of grazing or eliminate grazing all together, the latter of which would constitute a beneficial ecological impact.

Conclusion Regarding Segment 4C and Potential for Constructive Use of the Mojave National Preserve

Based on the foregoing analysis, FRA concludes that Segment 4C would not result in constructive use of any portion of the Mojave National Preserve.

Other Park and Recreational Facilities

City of Victorville Parks: Direct Use and Potential for Constructive Use – VV3 and OMSF 2, included in the Preferred Alternative, would not result in a direct use because they are located more than 5 miles from Rockview and Grady Trammel parks. Given that VV3 and OMSF 2 are further separated from these parks by many intervening land uses and topographic features, this would preclude the potential for any constructive use of these parks.

The closest component of the Preferred Alternative to Rockview Park and Grady Trammel Park is the southern end of the electrical utility corridor. **Figure F-3.15-1** depicts the location of this utility corridor relative to Rockview and Grady Trammel Parks. However, the Preferred Alternative would not result in a direct use because the electrical utility corridor would be approximately 1 mile away from each park.

In the immediate vicinity of the electric utility corridor, existing surrounding development includes several large industrial developments to the southeast and a large power transmission station to the southwest, as well as existing, more distant power line corridors to the north. Given that the electric utility corridor would be about 1 mile from either Rockview or Grady Trammel Park, noise and vibration impacts would be negligible. Moreover, the existing visual environment of the electric utility corridor is highly industrial and developed in character. The incremental addition of the electric utility corridor would not adversely degrade existing views from Rockview or Grady Trammel Park. As the electric utility corridor would consist of electric lines and towers, the electric corridor could not result in any foreseeable impact to access or ecological conditions of either Rockview or Grady Trammel Park. Accordingly, FRA concludes that no constructive use of these parks would occur.

City of Barstow Parks: Direct Use and Potential for Constructive Use – A total of 8 City of Barstow parks are located within 1 mile of the Preferred Alternative. **Table F-3.15-4** below identifies the approximate minimum distance between these parks and the Preferred Alternative rail alignment (in this area, Segment 2C Side Running). The data in the table show that the closest portion of the Preferred Alternative would be about 0.16 miles from the closest City of Barstow park (the "H" Avenue Soccer fields). Given this distance, no direct use of these parks would occur.

Table F-3.15-3 City of Barstow Parks within One Mile of Preferred Alternatives

City of Barstow Park	Distance from Preferred Alternative
"H" Avenue Soccer Fields	0.16 mile
Dana Park	0.23 mile
Cameron Park	0.24 mile
Sturnacle Park	0.30 mile
Lillian Park	0.62 mile
Barstow Heights Park	0.63 mile
Stringham Park	0.80 mile
Montara Park	0.80 mile
Mint Park	0.90 mile
Waterman Park	1.0 mile

Source: CirclePoint, 2010-2011.

Segment 2C would be located within the existing I-15 freeway corridor. All of the City of Barstow park and recreation facilities are located at distances of at least 800 feet from the Preferred Alternative and the I-15 freeway. The park and recreation facilities are separated from the Preferred Alternative and I-15 freeway by intervening urban development to such an extent that noise, vibration, and aesthetic effects of the Preferred Alternative on these resources would be minimal to none. In addition, access to these parks would not be altered in any way by the Preferred Alternative, which will be fully grade-separated from all existing roads. Finally, the parks are located in an urban/suburban environment; many include substantial areas of hardscape (basketball courts, playgrounds, etc) which are generally inhospitable to significant ecological resources. For these reasons, no constructive use of these parks would occur.

San Bernardino County Parks: Direct Use and Potential for Constructive Use – Both Smith Park and Chet Hoffman Park are located at 3/4 of a mile and 1/3 of a mile respectively from the Preferred Alternative which parallels the I-15 Freeway. There parks are also separated from the Preferred Alternative alignment by intervening urban development. Given the distance and intervening land uses, the Preferred Alternative would result in neither a direct use nor a constructive use due to noise, vibration or aesthetic effect. In addition, access to these parks would not be altered in any way by the Preferred Alternative, which would be fully grade-separated from all existing roads. Both of these parks are located within urbanized environments which do not afford opportunities for significant ecological resources.

Clark County Parks: Direct Use and Potential for Constructive Use

Figure F-3.15-5 identifies three existing, developed Clark County parks located approximately 0.75 to 1 mile away from rail alignments of the Preferred Alternative. These are Stonewater Park, Western Trails Park, and Silverado Ranch Park. Given their distance from the Preferred Alternative rail alignment, no direct use would occur.

These developed Clark County parks as well as the undesignated park lands shown on the Enterprise land use plan are located at distances from the Preferred Alternative and the I-15 Freeway and separated from the Preferred Alternative and I-15 Freeway by intervening urban development to the extent that noise, vibration and aesthetic effects would be minimal to none. Lands designated for park land use on the Enterprise Land Use Plan are a minimum 0.25 miles from the Preferred Alternative rail alignment. In addition, access to these parks and undesignated park lands would not be altered in any way by the Preferred Alternative, given that it would be fully grade-separated from all existing roads. Finally, these parks and undesignated park lands are located within an urbanized environment which does not afford opportunities for significant ecological resources. For these reasons, no constructive use of these parks or undesignated park lands would occur.

3.15.5.2 Potential Use of Clean Air Act "Class I" Areas

Section 3.15.4.2 of the Draft EIS evaluated the potential for impacts to the Class I areas from the two technology options considered: DEMU and EMU. The Preferred Alternative incorporates the EMU technology.

The Draft EIS concluded that with the EMU technology option, the project would operate in general conformity with criteria air pollutant thresholds and therefore would not contribute adversely to visibility impairment within the identified Class I areas.

The closest Class I area to any portion of the Preferred Alternative is the Cucamonga Wilderness, more than 30 miles south of Victorville. The distance of the Preferred Alternative to these resources would not substantially impair protected activities, features or attributes which qualify them for protection as a Section 4(f) Resource. Nor would the Preferred Alternative result in severe proximity impacts to aesthetics, noise, vibration, access, or ecological resources at these properties. Therefore, there would be no constructive use of these resources.

3.15.5.3 Potential Use of Wildlife and Waterfowl Refuges Qualifying for Protection under Section 4(f)

As set forth in **Section 3.15.4.3** above, there are no wildlife or waterfowl refuges within a mile of the Preferred Alternative. Accordingly, the Preferred Alternative would not result in any direct or constructive use of any such resource area.

3.15.5.4 Potential Use of Historic Architectural Resources Qualifying for Protection under Section 4(f)

As set forth in **Section 3.15.4.4** above, there are no historic architectural resources within the APE for the Preferred Alternative. Accordingly, the Preferred Alternative would not result in the direct use or constructive use of any such resources.

3.15.5.5 Potential Use of Archaeological Resources Qualifying for Protection under Section 4(f)

As described in **Section 3.15.4.5**, Segment 3B as depicted in the Draft EIS and the certain modifications described in the Supplemental Draft EIS would constitute a proximity or constructive use of a 4(f) Resource. The FRA has consulted with the BLM and Native American tribes regarding potential impacts to this site and has made its final determination regarding the impacts to this site in this Final Section 4(f) Evaluation. As a result of FRA's continuing tribal consultation efforts, FRA has determined that disclosing any information about the location, character, or ownership of the property may risk harm to the resource. Therefore, FRA is withholding additional information that may have the

potential to disclose the location or character of the resource. However, FRA and the Cooperating Agencies have prepared a detailed internal 4(f) Evaluation which provides all available information to decision makers, a summary of which is available below.

Based on FRA's analysis of Segment 3B, the north side alignment would result in constructive use of the resource due to the combination of significant potential noise and vibration impacts (during both construction and operation) and from significant changes in the visual/aesthetic setting of the site. FRA concludes that the Segment 3B north side alignment would constitute a substantial impairment of the activities, features and attributes associated with this resource.

Based on the analysis and consultation conducted to date, the Segment 3B (Modified) south side running alignment, would not result in any constructive use of the site primarily because the alignment would be located on the opposite side of the I-15 freeway. This would substantially reduce and avoid potential vibration and visual/aesthetic impacts to the site.

Summary

As discussed in sections above, the Preferred Alternative, with the incorporation of the Segment 3B (Modified) south side running alignment in the vicinity of the resource would not result in the direct or constructive use of any property qualifying for protection under Section 4(f).

3.15.6 Concluding Statement

Based on this analysis, FRA hereby finds that the Preferred Alternative is a feasible and prudent build alternative that avoids direct and constructive use of all Section 4(f) resources.

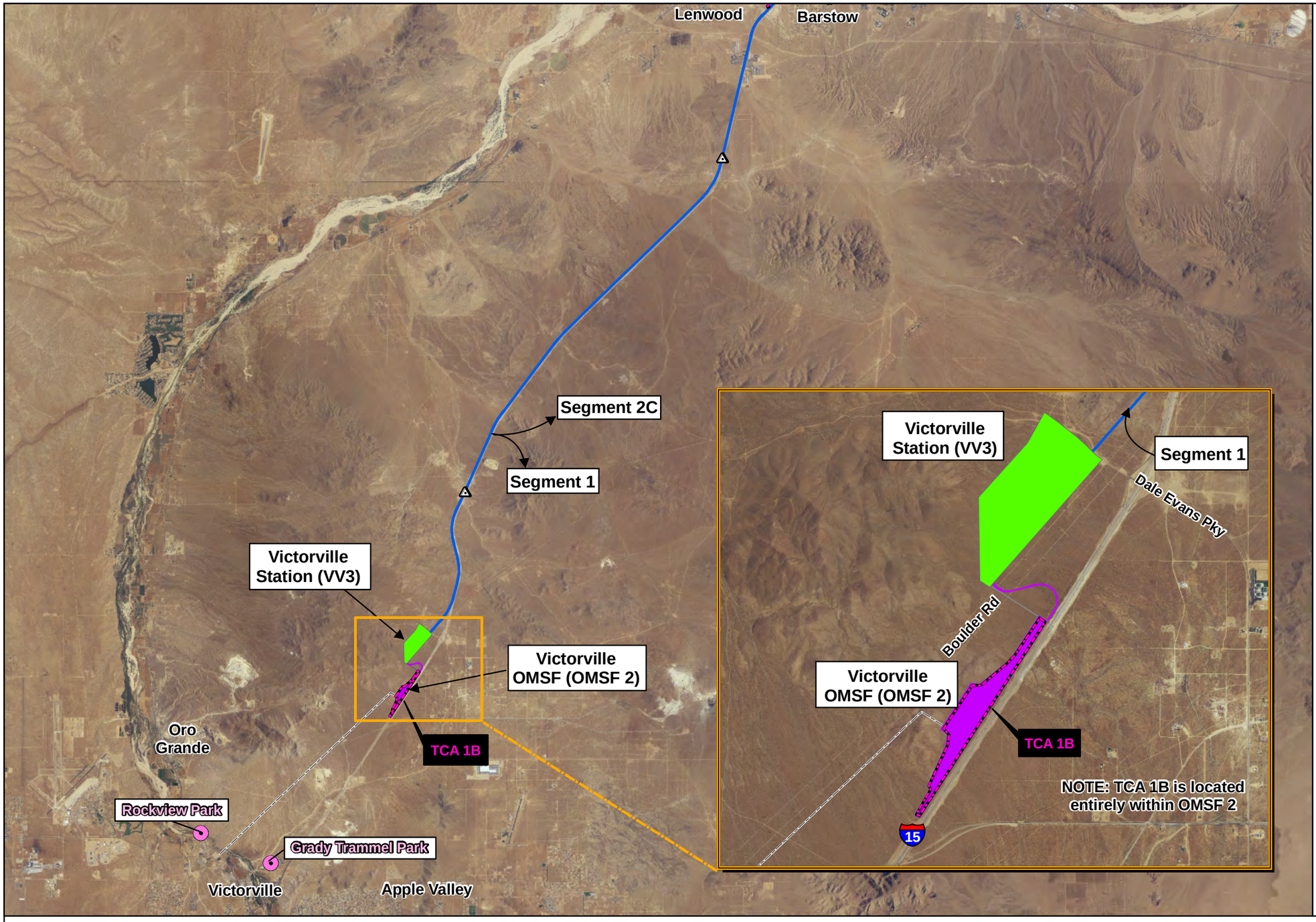
3.15.7 Letters and Other Correspondence

The following agencies and organizations provided comments on the Draft and Supplemental Draft EIS relating to this Section 4(f) Evaluation. Comments from these agencies are summarized below. Other comments from agencies, organizations, and individuals on the Draft and Supplemental Draft EIS are included in **Chapter 4.0, Comments and Coordination**, of this Final EIS.

Bureau of Land Management, Needles Field Office: In further support of FRA's determination, on January 4, 2011, the BLM Needles Field Office informed FRA of its finding of effects under Section 106 for both the north side and south side running alignments. BLM found that the north side running alignment would result in an **adverse effect**. The south side running alignment would result in **no adverse effect**. The BLM's finding of effect is thus consistent with FRA's analysis of potential Section 4(f)

use of this resource. As the result of this consultation and analysis, FRA has concluded that the south side running alignment would avoid both direct and constructive use of this resource.

National Park Service, Mojave National Preserve Superintendent's Office: In communication to FRA dated February 16, 2011, the Acting Superintendent of the Mojave National Preserve stated it concurred with FRA's conclusions that Segments 3B and 4C would not result in constructive use of the Preserve.



Legend

Public Parks and Recreation Facilities

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

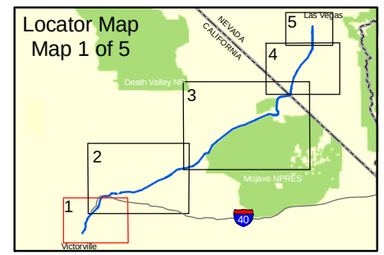
1 inch equals 3 miles

Kilometers: 0 2 4

Miles: 0 1.5 3

NORTH

Source: DesertXpress 2008, ESRI 2005, CirclePoint 2008-2011, NAIP 2003-2006,



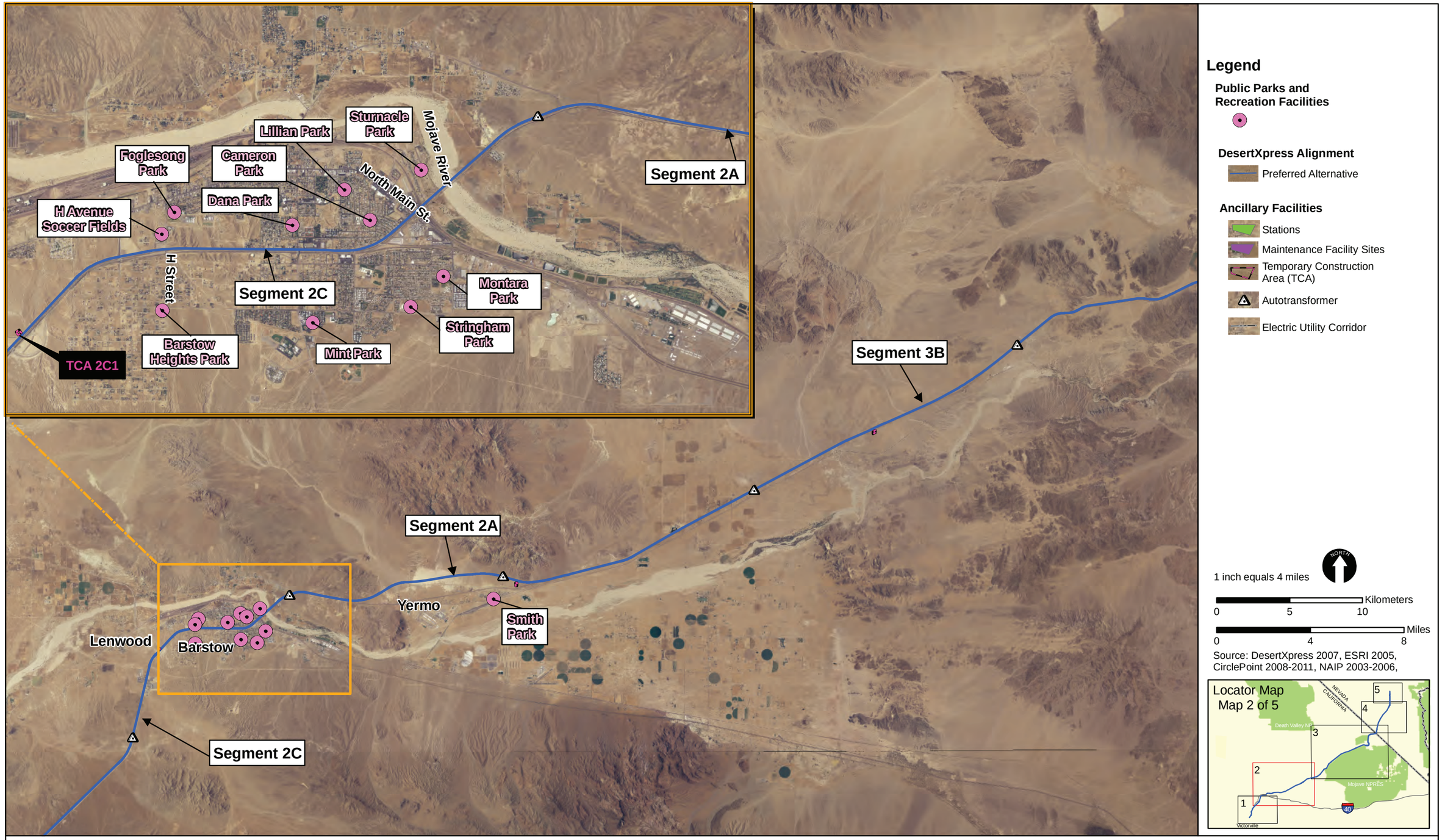
U.S. Department of Transportation Federal Railroad Administration

DesertXpress
Final EIS

Section 4(f) Resources (1)

FIG F-3.15-1

Geografika Consulting 01.13.11



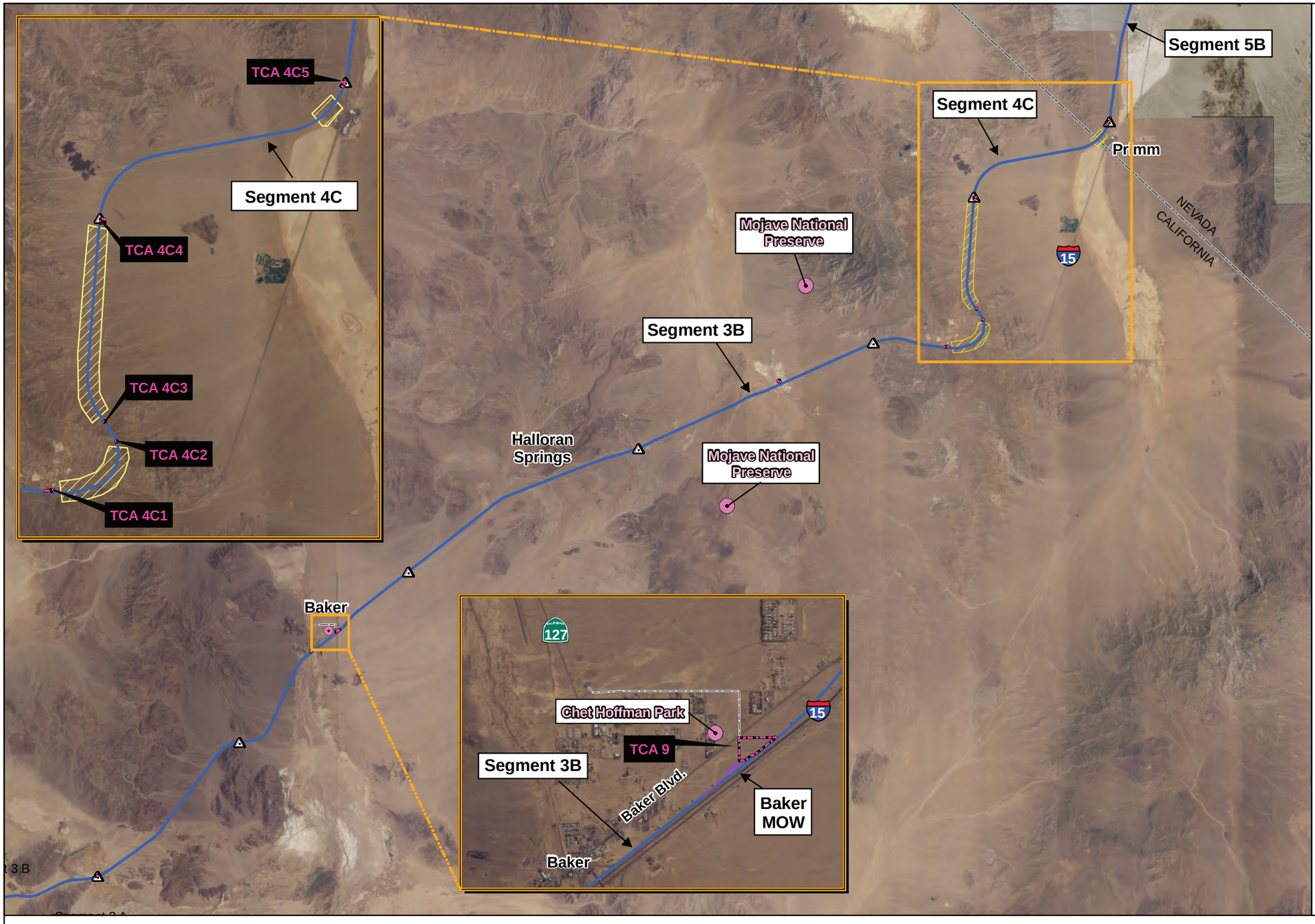
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Section 4(f) Resources (2)

FIG F-3.15-2

Geografika Consulting 01.13.11



Legend

Public Parks and Recreation Facilities

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

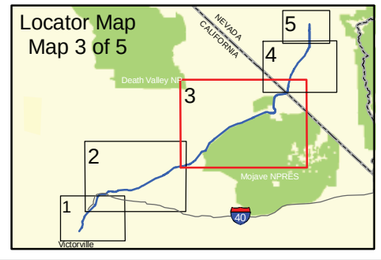
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor
- Tunnels

1 inch equals 5 miles

Kilometers
0 3 6

Miles
0 2.5 5

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery



U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Section 4(f) Resources (3)

FIG **F-3.15-3**

Geografika Consulting 01.13.11

Stonewater Park

Segment 6B

Segment 5B

Jean

Nevada

California

Primm

15

Segment 5B

TCA 13

Legend

Public Parks and Recreation Facilities

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 3 miles

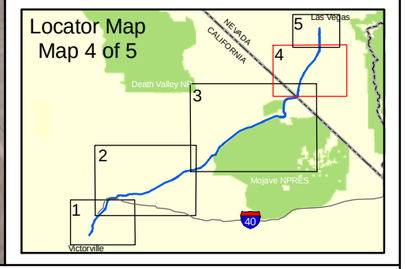
NORTH

Kilometers
0 2.5 5

Miles
0 3 6

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

Locator Map
Map 4 of 5



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DesertXpress Final EIS

Section 4(f) Resources (4)

FIG **F-3.15-4**

Geografika Consulting 01.17.11

TCA 22
Las Vegas Central Station B
E. Tropicana Ave
Las Vegas Blvd
Las Vegas Southern Station
TCA 16
W. Russell Rd
McCarran International Airport
Segment 6 B
Western Trails Park
15
Robindale Ave.
Undesignated Park Lands
160 NEVADA
Wigwam Avenue MSF
Las Vegas Central Station B
Las Vegas Southern Station
Western Trails Park
Undesignated Park Lands
Segment 6B
Undesignated Park Lands
Silverado Ranch Park
Stonewater Park
Undesignated Park Lands
Segment 6 B
Frias Substation

Legend

Public Parks and Recreation Facilities

DesertXpress Alignment

- Preferred Alternative

Ancillary Facilities

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2 miles

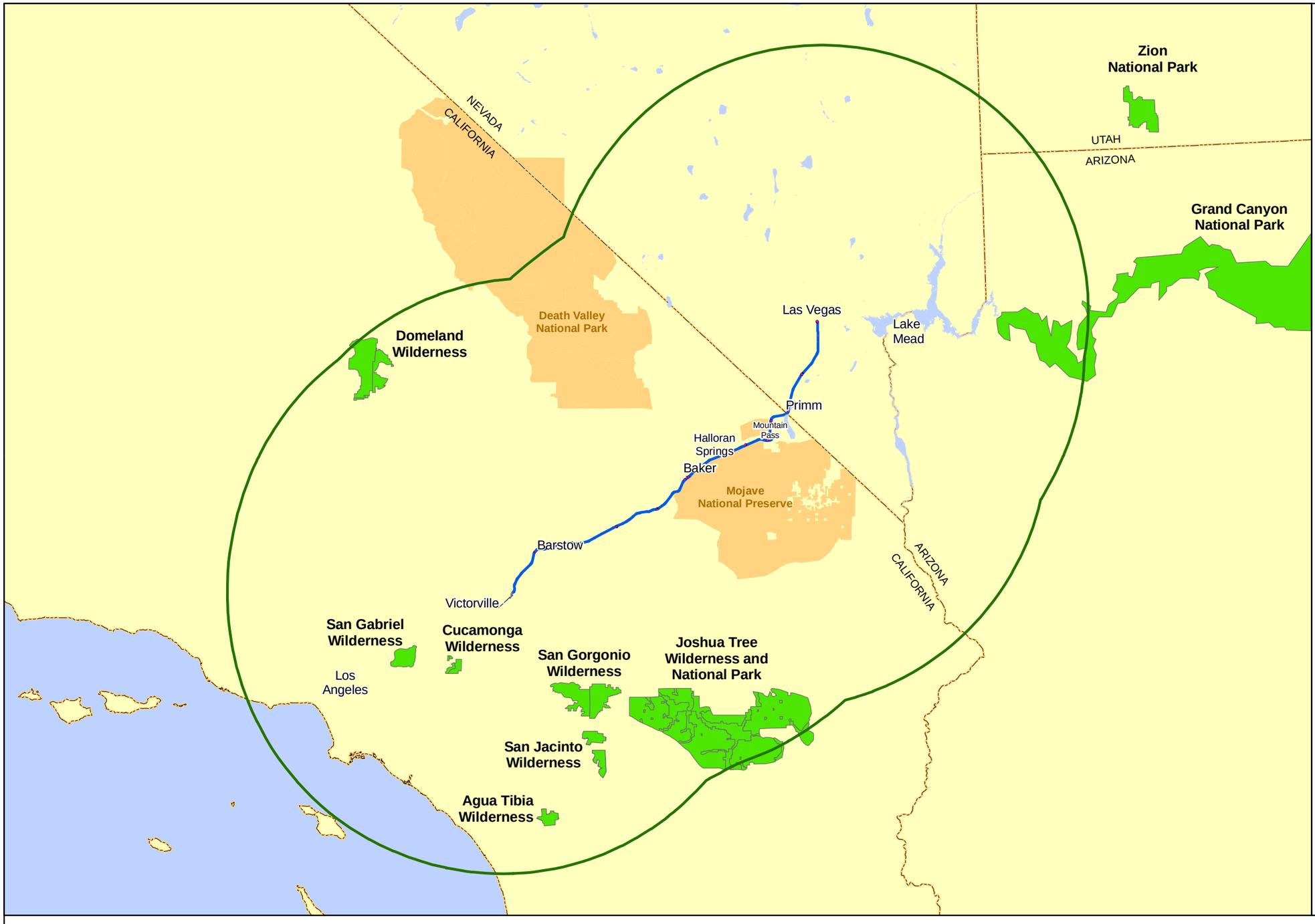
Kilometers
0 1.25 2.5

Miles
0 1 2

NORTH

Source: CirclePoint 2008-2011, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

Locator Map
Map 5 of 5
NEVADA
CALIFORNIA
Las Vegas
Death Valley N.P.
Mojave NPRES
Victorville
1
2
3
4
5
40



Legend

DesertXpress Alignments

Preferred Alternative

Clean Air Act Designated Class I Areas

Other National Park Service Lands (Not Class I Airsheds)

100-Mile Boundary

Note: Please refer to Appendix F-A, which includes plan and profile drawings at 1"200' and detailed site plans for all ancillary facilities.

1 inch equals 38 miles

NORTH

0 30 60 Kilometers

0 30 60 Miles

Source: DesertXpress 2007, ESRI 2005
CirclePoint 2008-2011

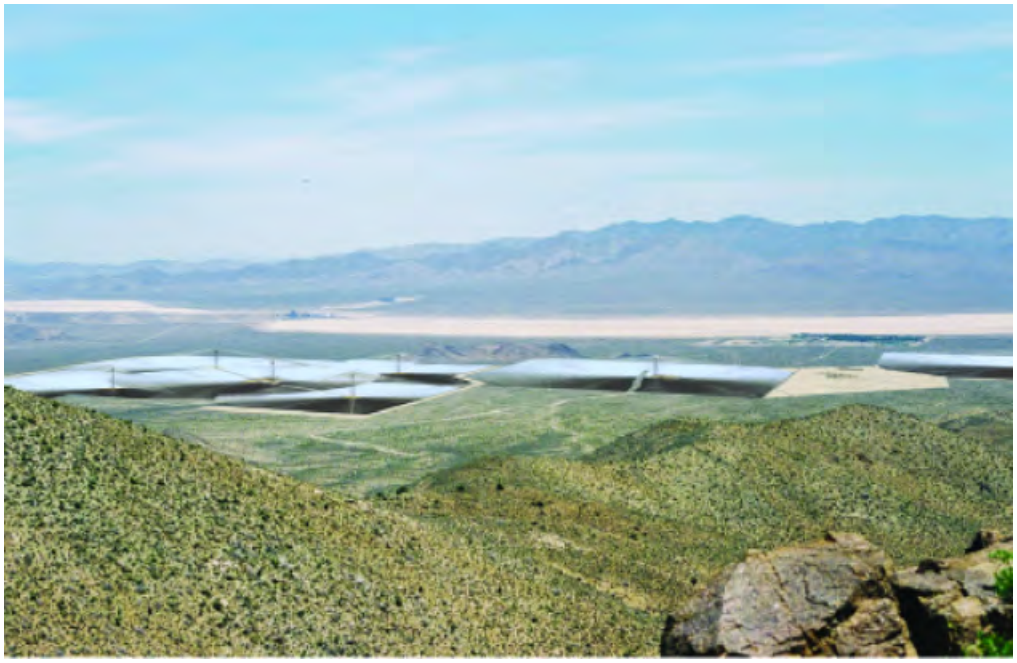
U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Clean Air Act Designated Class I Areas

FIG F-3.15-6

Geografika Consulting 01.13.11



Simulated Existing Conditions: Ivanpah Solar Electric Generation System from Mojave National Preserve

Source: CH2M Hill

Visual Simulation - DesertXpress Segment 4C and Ivanpah Solar Electric Generation System

Source: Environmental Vision, 2009

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3.16 CUMULATIVE IMPACTS

This section provides a comprehensive update of the cumulative analysis and thus replaces Draft EIS and Supplemental EIS **Sections 3.16, Cumulative Impacts**. This section summarizes the potential cumulative physical and growth-related environmental consequences of the No Action Alternative and the Preferred Alternative when combined with past, present, and reasonably foreseeable future projects.

3.16.1 REGULATIONS AND STANDARDS

Under NEPA, a cumulative impact is defined as an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts may result from individually minor actions by collectively significant actions taking place over a period of time.[1]

A cumulative impact includes the total effect on a natural resource, ecosystem, or human community that is attributable to past, present, or reasonably foreseeable future activities/actions of federal, nonfederal, public, or private entities. Cumulative impacts may also include the effects of natural processes and events, depending on the specific resource in question. Cumulative impacts include the total of all impacts on a particular resource that have occurred, are occurring, and will likely occur as a result of any action or influence, including the direct and indirect effects of a federal activity. Accordingly, there may be different levels of cumulative impacts on different environmental resources.

3.16.2 RELATED PROJECTS CONSIDERED IN THE CUMULATIVE ANALYSIS

3.16.2.1 Past Activities and Actions

Past activities and projects considered in this analysis include existing projects that are closely related in location to the Preferred Alternative, depending on the area of cumulative analysis identified for each environmental topic area.

The Preferred Alternative area consists of both rural and urban environments. The two terminals in Victorville and Las Vegas are situated in or are proximate to urban areas. Areas in between along the rail alignment are primarily undeveloped and rural, with the exception of several relatively isolated communities (Barstow, Baker, Primm, and Jean).

Over the past decades, rapid urbanization of Victorville and Las Vegas have resulted in the development and implementation of numerous past projects, such as residential, industrial, commercial, or service area projects. In the area between Victorville and Las Vegas, trends in growth and development have been much more gradual.

[1] 40 CFR §1508.7

The Preferred Alternative was selected considering the location of these past projects, so as to limit disruption or displacement where possible. The majority of the Preferred Alternative rail alignment has been located within the existing I-15 freeway corridor to avoid impacts to past projects, such as existing solar and wind energy generating facilities located in the California Desert Conservation Area, existing mining operation near Mountain Pass, and residential, commercial, agricultural, and recreational developments in Victorville, Barstow, Baker, Primm, Jean, and Las Vegas. These past projects are a part of the existing environmental conditions and establish a baseline for the potentially affected environment.

Section 3.16.3 of the Draft EIS and **Section 3.16.1** of the Supplemental Draft EIS described the reasonably present and foreseeable future actions and projects within the area of cumulative analysis for the DesertXpress project. Several present and reasonably foreseeable projects identified in the Draft EIS and the Supplemental Draft EIS have since been constructed and are identified below. These projects have been constructed and are now considered past activities and actions for inclusion in the baseline for the potentially affected environment relative to cumulative impacts for this Final EIS and the evaluation of the Preferred Alternative.

Desert Gateway Specific Plan[2]

The Desert Gateway Specific Plan, formerly referred to as the North Triangle Specific Plan, encompasses a 10,203 acre area in the northern portion of Victorville. The Desert Gateway Specific Plan was adopted by the Victorville City Council in December 2009. Multi-modal TOD principles are central to the Desert Gateway Specific Plan. The Desert Gateway Specific Plan includes plans for potential future passenger rail services to link Victorville with northern and southern California, as well as Las Vegas. The Preferred Alternative Victorville Station (VV3) and OMSF (OMSF 2) are located within the Desert Gateway Specific Plan. **Figure F-3.16-1** shows the boundaries of the Desert Gateway Specific Plan.

Fast Food Restaurant Development – Primm, Nevada

A Kentucky Fried Chicken/Taco Bell restaurant was constructed in Primm in 2009. The fast food restaurant is located just north of the California-Nevada state border and immediately east of the I-15 freeway. The fast food restaurant is at 32120 Las Vegas Boulevard South, adjacent to the existing shopping mall constructed in 1998 (Fashion Outlets of Las Vegas) and in proximity to longer-established gaming resorts. **Figure F-3.16-5** shows the location of the fast food restaurant**.**

[2] The Desert Gateway Specific Plan was referred to as the North Triangle Specific Plan in **Section 3.16.3.3** of the Draft EIS and **Section 3.16.1** of the Supplemental Draft EIS.

I-15 Mountain Pass Truck Lane

Caltrans completed the I-15 Mountain Pass Truck Lane in fall 2010. Construction of the truck lane began in May 2008.[3] This project involved the construction of a truck descending lane on the northbound side of the I-15 freeway and the repaving of the existing southbound truck lane from the Bailey Road interchange to the Yates Well Road interchange, a distance of about 12 miles. The project also included the widening and re-paving of the existing lanes and median on both the northbound and southbound sides of the I-15 freeway corridor.

Bonneville Transit Center[4]

The Regional Transportation Commission of Southern Nevada (RTC) constructed a new 21,000 square foot transit terminal at the corner of Casino Center Boulevard and Bonneville Avenue in Downtown Las Vegas, replacing the existing Downtown Transportation Center. The Bonneville Transit Center, formerly referred to as the Intermodal Transport Terminal, became operational in November 2010.[5] The Bonneville Transit Center serves as the main transit hub for the RTC's transit system, including the Strip & Downtown Express, MAX (Las Vegas Metropolitan Area Express Bus Rapid Transit), and Boulder Highway Express lines. The Bonneville Transit Center is located approximately five miles north of Las Vegas Central Station B and about 7 miles north of the Las Vegas Southern Station site. **Figure F-3.16-7** shows the location of this facility.

West Mojave Plan

The BLM developed the West Mojave Plan to define a regional strategy for conserving plant and animal species and their habitats. The West Mojave Plan also provides an efficient, equitable, and cost-effective process for complying with threatened and endangered species. The West Mojave Plan targets the desert tortoise, Mojave ground squirrel, and over 100 special status plant and wildlife species. The West Mojave Plan encompasses approximately 9.4 million acres of public land managed by BLM. The Record of Decision to adopt the West Mojave Plan was signed on March 13, 2006.[6] Due to the large expanse of land covered by the West Mojave Plan, this potential cumulative project is not shown on **Figures F-3.16-1** through **F-3.16-7**.

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[3] Caltrans. I-15 Mountain Pass Truck Lane. <http://www.dot.ca.gov/dist8/projects/san_bernardino/i15mtnpass/index.htm>. Website access January 21, 2011.

[4] The Bonneville Transit Center was referred to as the Intermodal Transport Terminal near Downtown Las Vegas in **Section 3.16.1** of the Supplemental Draft EIS

[5] Regional Transportation Commission of Southern Nevada. <http://www.rtcsouthernnevada.com/transit/servicechange/index.cfm>. Website accessed January 20, 2011.

[6] Bureau of Land Management. Record of Decision, West Mojave Plan, Amendment to the California Desert Conservation Area Plan. March 2006. <http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pdfs/cdd_pdfs/wemo_pdfs.Par.4dfb777f.File.pdf/wemo_rod_3-06.pdf>. Website accessed January 20, 2011.

3.16.2.2 Present and Reasonably Foreseeable Future Actions and Projects

Section 3.16.3 of the Draft EIS and **Section 3.16.1** of the Supplemental Draft EIS identify the present and reasonably foreseeable future actions and projects considered in the cumulative analysis. This section updates and replaces **Section 3.16.3** of the Draft EIS and **Section 3.16.1** of the Supplemental Draft EIS.

Figures F-3.16-1 through **F-3.16-7** show the location of all the present and reasonably foreseeable future projects considered in the cumulative analysis for the Preferred Alternative.

Transportation Projects[7]

I-15 Capacity Improvements

Caltrans and NDOT are planning for future highway improvements along I-15 between Victorville and Las Vegas. **Figures F-3.16-1** through **F-3.16-7** show the general location of the proposed I-15 capacity improvements.

The Caltrans improvements include widening the I-15 bridge over the Mojave River, several interchange modifications, and widening portions of the I-15 freeway to increase capacity.

NDOT is proposing several improvements and projects along the I-15 corridor, including Project NEON and the I-15 South Design-Build project, which involves the widening the I-15 freeway, reconstruction of existing interchanges, local access improvements, addition of High-Occupancy Vehicle (HOV) lanes, and the construction of new interchanges, bridges, retaining walls, and sound walls. New interchanges would be located at Bermuda Road, Starr Avenue, Cactus Road, and near the proposed SNSA.

A number of other projects are under consideration to improve capacity and/or operations of the I-15 corridor. These include:

- I-15 from California state line to Sloan Road: widen from 6 to 8 lanes
- I-15 from Sloan Road to Blue Diamond Road: widen from 6 lanes to 10 lanes

[7] Supplemental Draft EIS **Section 3.16.1** included an updated description of the California-Nevada Interstate Maglev Train System (maglev project) reflecting NDOT's progress defining a scope of work for a funding agreement to support preparation of an environmental document analyzing the potential impact of a rail system using magnetic levitation technology from Las Vegas to Primm, Nevada. This update was not intended to suggest that the Maglev system is considered a reasonably foreseeable requiring analysis in cumulative impact section of this Final EIS. The information contained in Supplemental Draft EIS **Section 3.16.1** has been integrated into the description of the maglev project in **Section 1.6.1** of this Final EIS and for the reasons described therein is not considered reasonably foreseeable thus no analysis of the potential cumulative impacts of the maglev project are presented here.

- I-15 between I-215 and Interstate 515 (I-515): widen from 10 to 14 lanes (preliminary engineering)
- I-15 between Russell Road and Sahara Avenue: widen from 8 to 10 lanes (preliminary engineering and right-of-way acquisition)
- Reversible carpool lanes between Interstate 210 (I-210) (Ontario) and U.S. Route 395 (U.S. 395) (Victorville)
- Northbound truck climbing lane between Bailey Road and Yates Road

Victorville I-15 Interchange Improvements

Caltrans and FHWA are planning a project that would add a third mixed-flow lane on southbound I-15 and construct interchange improvements at six interchanges in Victorville, including the Stoddard Wells interchanges and those at D Street and E Street/State Route 18 (SR 18).

New Roadways Intersecting I-15

The following new roadways are proposed and would intersect with the I-15 freeway corridor within the vicinity of the Preferred Alternative. These roadways improvements are located within the same area of the I-15 freeway capacity improvement projects, as shown on **Figures 3.16-6** and **3.16-7**.

- Starr Avenue: construction of a 6 lane roadway from I-15 to St. Rose Parkway (Clark County)
- I-15 at I-215: construction of new direct connector high-occupancy vehicle ramps (Clark County)

I-15 Joint Point of Entry

The I-15 Joint Point of Entry project would include a Commercial Vehicle Enforcement Facility and an Agricultural Inspection Facility between Nipton Road and Yates Road on southbound I-15, located in the Ivanpah Valley, just south of the California-Nevada state line. This project would also include construction of a truck bypass, bridges, traffic lanes through the facilities, weigh-in motion scales, and demolition of the existing California Department of Food and Agriculture Inspection Station in Yermo.

The Commercial Vehicle Enforcement Facility would be in operation 24 hours a day, seven days a week with the primary focus on inspection of vehicle equipment and loads. The Agricultural Inspection Facility would consist of six passenger vehicle and four truck lanes through the inspection facility. As of January 2011, construction is scheduled to begin in the summer of 2011 for a period of about 19 months.[8]

[8] Jason Bennecke. Project Manager. Caltrans District 8. Personal communication. January 18, 2011.

The I-15 Joint Point of Entry project would be located approximately five miles east of the Preferred Alternative rail alignment. **Figure F-3.16-5** shows the location of the I-15 Joint Point of Entry site.

California High-Speed Rail (CHSR)

The California High Speed Rail project is a proposed high-speed rail system in California. The project would include an 800-mile high-speed train system serving Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The California High-Speed Rail Authority will design, build, and operate the system. The environmental review process is being conducted in two parts due to the large scope of the project. These phases include a statewide program-level Environmental Impact Report (EIR)/EIS followed by a more specific project-level EIR/EIS of each of the nine sections. The Statewide Final Program-Level EIR/EIS was certified in 2005. The project-level EIR/EIS is underway and will determine the specific track alignments and station locations for each of the nine sections. The system is forecast to potentially carry between 88 million to 117 million passengers annually by 2030.[9] The closest potential CHSR station to the Preferred Alternative is the Ontario station, located approximately 45 miles south of the Preferred Alternative Victorville Station (VV3). Due to the distance, the CHSR is not shown in **Figures F-3.16-1** through **F-3.16-7**.

Southern Nevada Supplemental Airport (SNSA)

Pursuant to the Ivanpah Valley Airport Lands Transfer Act of 2000,[10] the CCDOA proposes to construct a new supplemental commercial airport in the Ivanpah Valley of southern Nevada. The new SNSA would provide additional capacity to serve the residents of the Las Vegas area and Clark County area. It would not replace McCarran International Airport but would supplement the existing airport and serve Las Vegas.

Specific site plans for the SNSA are not yet complete. The proposed SNSA site would be just east of I-15 and the Preferred Alternative rail alignment, between Primm and Jean. **Figure F-3.16-6** shows the location of the proposed SNSA. Congress has allowed for a transportation and utility corridor to be established between the Las Vegas Valley and the SNSA.

The Preferred Alternative could potentially serve the proposed new airport. The Preferred Alternative rail alignment would pass by the site of the proposed new airport, allowing for the potential future construction of an airport rail link.[11] Any such future link would likely

[9] California High Speed Rail. California High-Speed Rail Authority. 2011. <http://cahighspeedrail.ca.gov/other_systems.aspx>.

[10] CCDOA, Clark County Department of Aviation Comments on the Supplemental Draft EIS for the DesertXpress High-Speed Passenger Train, October 18, 2010.

[11] Construction of a link to the proposed SNSA is not part of the current DesertXpress proposal and is not evaluated in this EIS. Construction and operations of such a link would require separate environmental review.

require construction of a spur track off the mainline into the terminal area. This would allow for the possibility of dedicated service to the airport. DesertXpress Enterprises, LLC, airport officials, and Clark County may consider this possibility at some future date.[12]

Planning of the SNSA has been considerably slowed due to the economic downturn and resultant decrease in air traffic at the McCarran International Airport. Accordingly, in 2010, the FAA suspended environmental work on the SNSA without identifying a date certain at which work would resume. As of January 2011, the precise location of any roadway, utilities, or other related infrastructure within this corridor has not been established.

Southern Nevada Regional Heliport

The proposed Southern Nevada Regional Heliport site would be located in Clark County, about 15 miles south of the McCarran International Airport, just south of Sloan to the east of I-15. The CCDOA completed its initial helicopter noise assessment in December 2000, with the Needs Assessment and Site Suitability Assessment for a Southern Nevada Regional Heliport completed in late 2003.[13] A Draft Environmental Assessment was publicly released for comment in April 2008. In February 2009, the FAA signed the Finding of No Significant Impact (FONSI)/ ROD for the project. As of January 2011, there is no scheduled date for construction. The project is on hold due to insufficient funding.[14]

The proposed Heliport site location would be situated to the east of the Preferred Alternative rail alignment, south of the metropolitan Las Vegas area. **Figure F-3.16-7** shows the location of the proposed Southern Nevada Regional Heliport.

I-15/U.S. 95 Managed Lanes Demonstration Project

This project is an initiative set forth by NDOT to analyze the effectiveness, value, and functionality of managed High Occupancy Toll (HOT) lanes as a solution to traffic congestion problems in the Las Vegas Valley. The managed HOT lanes, also known as express lanes, would run approximately 19 miles within the median of the U.S. 95 and I-15 corridors. Under the current plan, the HOT lanes would begin at the I-15/I-215 intersection in the south and divert to north of Downtown Las Vegas, and beyond the proposed terminus of the Preferred Alternative. These HOT lanes would be constructed in the same area as proposed for future I-15 capacity improvements. **Figure F-3.16-7** shows the location of the HOT lanes as part of the I-15 capacity improvements.

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[12] The economic viability of the DesertXpress project does not rely upon an airport shuttle or other forms of transportation linking to the proposed SNSA. Ridership projections for DesertXpress (**Appendix F-D**) exclude any allowance for passengers that might be related to the proposed SNSA.

[13] Southern Nevada Regional Heliport, Clark County, Nevada. <http://www.ricondoprojects.com/Heliport/background.html>.

[14] Southern Nevada Regional Heliport, Clark County, Nevada. <http://www.ricondoprojects.com/Heliport/background.html>.

High Desert Corridor–New SR 138 Project

Caltrans is proposing to construct a new 63 mile freeway/expressway connecting California State Route 14 (SR 14) in City of Palmdale within Los Angeles County and California State Route 18 (SR 18) in Apple Valley within San Bernardino County. The proposed route would run primarily in an east-west direction roughly following the alignment of the Avenue P-8 near SR 14 in Los Angeles County and Air Expressway near I-15 in San Bernardino County. East of the I-15 corridor, the proposed route would turn south and terminate at SR 18. **Figure F-3.16-1** shows the approximate location of the High Desert Corridor—New California State Route 138 (SR 138) Project alignment. This crossing would be approximately 6 miles south of the Preferred Alternative Victorville Station at Dale Evans Parkway.

The High Desert corridor is expected to improve capacity and accessibility to the region due to the traffic demands projected from residential growth and increasing development in the Antelope, Victor, and Apple Valley areas. While the corridor is planned for automobiles and truck use, the alternative routings under consideration would accommodate the future addition of a rail corridor. The CHSR project has a proposed station in the City of Palmdale, about 65 miles west of Victorville. The High Desert corridor project could thus provide a basis for an interconnection between CHSR and DesertXpress.

FHWA, on behalf of Caltrans, issued a Notice of Intent to prepare an EIS for the proposed High Desert Corridor—New State Route 138 Freeway/Expressway project in September 2010. A Draft EIR/EIS is anticipated to be published in the fall of 2012.

U.S. 395 Realignment

Realignment and widening for a portion of U.S. 395 west of Victorville was under the consideration of SANBAG. In March 2008, the SANBAG terminated its work on an EIR that would have identified various route alternatives. Although SANBAG has terminated efforts on the project, Caltrans has determined that it will continue to pursue realignment activities and improvements on U.S. Route 395 (U.S. 395). Caltrans has made various improvements to the highway, including the widening of several lanes, shoulders, and medians, installation of rumble strips, and the signalization of intersections.[15] Due to the distance of this project from the Preferred Alternative, this project is not identified on **Figures F-3.16-1** through **F-3.16-7**.

[15] Referenced at http://www.dot.ca.gov/dist8/projects/san_bernardino/us395/index.htm; accessed November 5, 2010.

ACE Rapid Transit System

The Regional Transportation Commission of Southern Nevada (RTC) is developing a rapid transit system in downtown Las Vegas. The ACE Rapid Transit Downtown Connector will provide a rapid transit link between downtown Las Vegas and the southern resort corridor (the Las Vegas Strip). Project components will include dedicated transit lanes along a portion of the alignment along with passenger stations with station canopies, lighting, ticket vending machines and displays announcing vehicle arrival times. Since this project involves an entire transit system with multiple routes in the Las Vegas area, the project is not shown on **Figures F-3.16-1** through **F-3.16-7**.

The City of Las Vegas in partnership with the RTC have begun work on the project, which includes roadway and station platform improvements along Grand Central Parkway, Casino Center Boulevard, 3rd Street, and Paradise Road.[16]

The RTC has started rapid bus transit service on two of several scheduled lines. In March 2010, service began on the Gold and C Lines. The Gold Line serves Downtown Las Vegas and The Strip; the C Line provides express service from Northeast Las Vegas towards the University of Nevada Las Vegas (UNLV) campus, northwest of McCarran International Airport. Other lines in the system are expected to be operational by late 2011.

Resort Corridor Fixed Guideway Monorail Extension

The Las Vegas Monorail Company (LVMC) is proposing an extension to the Resort Corridor Fixed Guideway Monorail System (Monorail), which is an automated (driverless) and elevated rail system, running along side streets east of the Las Vegas Strip (Las Vegas Boulevard). The 4-mile long route opened in 2004 and runs roughly north-south. The system has a total of 7 stations, associated with major hotels along the Las Vegas Strip.[17]

The RTC included the extension of the monorail south to McCarran International Airport, in its Regional Transportation Plan 2009-2030, Draft for Consultation, September 2008 (Project #4200).

Parks, Recreation, or Natural Preservation Projects

Ivanpah Dry Lake Recreation Area

The Ivanpah Dry Lake is located on the I-15 corridor at the California/Nevada border and is managed by the BLM Needles Field Office. The Dry Lake is used by recreationists for non-motorized recreationalist activities such as archery, kite buggying, and land sailing. Approximately 200 Casual Use Permits are issued annually for various non-motorized recreational activities within the Ivanpah Dry Lake. Additionally, Special Recreation Permits are issued annually for commercial, competitive, vending, special area, organized

[16] Available at :http://www.rtcsouthernnevada.com/mpo/downtownconnector/

[17] Available at http://www.lvmonorail.com/.

group activity, and event uses. It is assumed that this recreational use of Ivanpah Dry Lake will continue into the foreseeable future and that permits will continue to be granted. **Figure F-3.16-5** shows the location of the Ivanpah Dry Lake Recreation Area.

Development Projects

Mixed-Use Development – Jean, Nevada

MGM Mirage and Jeanco Realty Development, LLC, propose to develop a master-planned community on 166 acres in Jean, Nevada. **Figure F-3.16-6** shows the location of the proposed Mixed-Use Development. The project would feature residential, commercial, and retail elements in addition to a new hotel casino adjacent to the I-15 corridor. Implementation of this project entails the demolition of two casinos, the Nevada Landing Hotel and Casino and the Gold Strike Hotel and Gambling Hall. Demolition of the Nevada Landing was completed in April 2008. However, as of January 2011, work on the project has halted with no date certain as to when efforts might resume.

Energy Projects

Bureau of Land Management Solar and Wind Energy Projects

The BLM has received several applications for solar energy projects within close proximity to the Preferred Alternative. The locations of these solar energy projects are shown on **Figures F-3.16-1** through **F-3.16-5** and listed below by BLM serial number[18] The following list includes the most current solar energy project applications as of January 2011.

- 350 Megawatt (MW) Baker Solar Project on 8,384 acres near Baker (CACA 48741)
- 350 MW Caithness Soda Mountain Solar Project on 7,995 acres near Baker (CACA 49584)
- 380 MW Stateline Solar Project on 5,440 acres in Ivanpah Valley (CACA 48669)
- 370 MW Ivanpah 2 Solar Project, also referred to as the Ivanpah Solar Electric Generating System (ISEGS) project, on 1,076 acres in Ivanpah Valley (CACA 048668)

The ISEGS project was approved by the California Energy Commission in September 2010.[19] The project involves the construction of a 370 megawatt solar complex using mirrors to focus the power of the sun on solar receivers atop power towers. The project includes three separate plants to be built between 2010 and 2013. Groundbreaking for the

[18] Bureau of Land Management, Solar Applications Table. December 2010. <http://www.blm.gov/ca/st/en/fo/cdd/alternative_energy/SolarEnergy.html>.

[19] BrightSource, Ivanpah Solar Electric Generating System, September 22, 2010. <http://ivanpahsolar.com/green-light-from-the-california-energy-commission-2>. Accessed November 4, 2010.

project began in October 2010.[20] As of January 2011, at least two lawsuits have been filed against the United States Department of Interior (DOI) regarding Federal approvals of this and other solar energy projects in the Mojave Desert.[21] This analysis nonetheless includes these projects as a conservative approach to addressing possible cumulative effects.

In addition to the solar energy projects, BLM has also received several applications for wind energy projects in the California Desert. The location of these wind energy projects are shown on **Figures F-3.16-1** through **Figure F-3.16-5**. These projects are listed below by BLM serial number.[22] The following list includes the most current wind energy project applications as of January 2011.

- 82.5 Megawatt (MW) Daggett Ridge Wind Energy Project on 1,691 acres near Barstow (CACA 49575)
- Wind Energy Application near Barstow (CACA 50612)
- Wind Energy Application near Barstow (CACA 50896)
- Wind Energy Application near Barstow (CACA 51605)
- Wind Energy Application near Stoddard Mountain (CACA 51772)
- Authorized Wind Energy Project near Barstow (CACA 43088)
- Authorized Wind Energy Project near Apple Valley (CACA 44975)
- Authorized Wind Energy Project near Barstow (CACA 46881)
- Authorized Wind Energy Project near Newberry-Baker (CACA 47455)
- Authorized Wind Energy Project near Newberry-Baker (CACA 48472)
- Authorized Wind Energy Project near Barstow (CACA 49053)
- Authorized Wind Energy Project near Barstow (CACA 49204)
- Authorized Wind Energy Project on 3,520 acres near Barstow (CACA 49202)
- 75 MW Iberdrola Wind Project on 2,330 acres between Mineral Mountain and the I-15 corridor (CACA 44988)
- Three wind towers near Daggett (CACA 046803)
- Two wind towers near Calico Dry Lakebed (CACA 049052)

[20] BrightSource, Ivanpah Solar Electric Generating System, October 27, 2010. <http://ivanpahsolar.com/green-light-from-the-california-energy-commission-2>. Accessed November 4, 2010.

[21] "Western Watersheds Project Sues to Stop Solar Power Towers," Environment News Service, January 18, 2011. Accessed January 24, 2011 at < http://www.ens-newswire.com/ens/jan2011/2011-01-18-091.html>

[22] Bureau of Land Management, Wind Applications Table. December 2010. < http://www.blm.gov/ca/st/en/fo/cdd/alternative_energy/WindEnergy.html>.

Nextlight Silver State South Solar Project

The proposed Nextlight Silver State Solar project would construct three photovoltaic power plants totaling 400 MW on 2,967 acres. As shown on **Figure F-3-16-5**, the Nextlight solar project would be located in the Ivanpah Valley, two miles east of Primm, Nevada**.** A Final EIS was published in September 2010 and the Record of Decision for the project was signed in October 2010.

McCullough Pass Southern Nevada Solar Project

The proposed project would construct a 1,000 MW solar thermal energy facility on approximately 19,840 acres of land east of Jean in Ivanpah Valley. The BLM received an application for the project to in January 2007. As of January 2011, the project is still pending. **Figure F-3.16-6** shows the location of the McCullough Pass Southern Nevada Solar project.

Public Utility Projects

Ivanpah Energy Center

The proposed Ivanpah Energy Center would be located near the community of Goodsprings, Nevada, about 5 miles east of I-15 and about 25 miles south of Las Vegas. The proposed Ivanpah Energy Center would include development of a 500 MW gas-turbine combined-cycle power plant. While construction was expected to begin in early 2006, no construction on the site has yet taken place as of January 2011.

Comment S-5 on the Supplemental Draft EIS stated that the Ivanpah Energy Center project site location was not accurately depicted. **Figure F-3.16-6** shows the corrected location of the Ivanpah Energy Center.

Eldorado-Ivanpah Transmission Project

The Eldorado-Ivanpah Transmission Project (EITP) would provide the electrical facilities and capacity necessary to access and deliver power from the ISEGS site, and other nearby proposed energy projects. **Figures F-3.16-5** and **F-3.16-6** show the location of the EITP.

The EITP would construct a new double-circuit 230-kilovolt (kV) transmission line, approximately 35 miles long, between the existing Eldorado Substation in Nevada and the approved ISEGS project site. This transmission line would replace a portion of the existing 115-kV transmission line that runs from Eldorado through Baker and Mountain Pass. The EITP also includes an Ivanpah Substation at the ISEGS site and a subtransmission line to connect to the existing 115-kV subtransmission system in the area. The EITP would also include distribution lines to provide light and auxiliary power to the ISEGS and Ivanpah Substation.

Southern California Edison (SCE) submitted an application to the California Public Utilities Commission (CPUC) to construct and operate the EITP and filed a right-of-way application with the BLM for a permit to construct in May 2009. CPUC and the BLM (Needles Field Office) published a Final EIR/EIS in November 2010; the California Public Utilities Commission approved the EITP project in December 2010. As of January 2011, SCE is awaiting final regulatory approvals from local jurisdictions, state and federal regulatory agencies. The project is expected to be complete and operational by 2013.

Kinder Morgan Calnev Pipeline Expansion Project

The Calnev Pipeline, operated by Kinder Morgan Energy Partners, transports gasoline, diesel, and jet fuel from refineries in Southern California to the Las Vegas area through two parallel pipelines, 8 and 14 inches in diameter. The largely underground pipeline system generally parallels the I-15 corridor, running from the North Colton terminal in Colton, California to the Bracken Junction in Las Vegas, Nevada. The Calnev Pipeline system includes laterals serving Edwards Air Force Base, Nellis Air Force Base, and McCarran International Airport.

Due to the projected increase in commercial air traffic to and from McCarran Airport which would significantly increases demand on jet fuel supplies, Kinder Morgan proposed adding a third pipeline to the existing Calnev system. The expansion project would include the construction, operation, and maintenance of a new 16-inch diameter pipeline from Colton to Las Vegas; new ancillary facilities at Colton and Baker; and new or modified connections to existing laterals. As of January 2011, a Draft EIR/EIS for the Kinder Morgan Calnev Pipeline Expansion Project is anticipated to be published in April 2011.[23] **Figures F-3.16-1** through **F-3.16-7** show the location of the proposed expansion of the Kinder Morgan Calnev Pipeline.

Kern River Gas Mountain Pass Lateral

The Kern River Gas Transmission Company has proposed to construct a distribution gas line off the Kern River mainline as means to provide natural gas supplies to Molycorp Minerals, LLC's Mountain Pass rare earth mine. The Mountain Pass lateral is conceptualized to be an 8.6-mile, 8-inch diameter pipeline routing south from the Kern River mainlines along the western edge of Ivanpah Valley, over the Clark Mountains, and terminating at the Molycorp Minerals property. The project also includes construction of new associated facilities, including a pig launcher,[24] pig receiver,[25] and meter station to be located at the Molycorp facility in San Bernardino County.

[23] Richard Rotte, BLM Barstow Field Office. Personal communication, January 10, 2011.

[24] A pig launcher is a funnel shaped section in a pipeline that can be closed, which allows pressure to build in the pipeline that can send the product in the pipeline to the pig receiver.

[25] A pig receiver is a product catching device that receives the product within the pipeline that has been sent via the pig launcher.

As of January 2011, the Kern River Gas Transmission Company has filed an application with the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act. Kern River Gas anticipates receiving FERC approval of the location and construction of the interstate pipeline by July 2011. Construction is scheduled to begin in August 2011, with facilities to be in service by January 2012. **Figures F-3.16-5** shows the location of the Kern River Gas Mountain Pass Lateral.

Other Related Projects

Molycorp Minerals, LLC, Mountain Pass Mine

Molycorp Minerals, LLC (Molycorp) is proposing to restart rare-earth mining operations at its existing Mountain Pass mine location in California. Following publication of an EIR in 2004 outlining proposed mining and reclamation plans, Molycorp proposed modifications to improve the efficiency of its mining operations. These modifications were examined in a subsequent Draft Mitigated Negative Declaration (MND) published in September 2010. The proposed modifications include equipment upgrades/replacements and construction of new major facilities (a power plant, salt recovery system, recycling facilities). In addition, Molycorp proposed relocation of its crusher plant and stockpiles; modifying existing mineral recovery facilities; constructing a new warehouse and truck shop to the central shop; and improving the extension of the access road to the new facilities/plants. Molycorp anticipates reinitiating mining activities at the existing Mountain Pass mine location within the first quarter of 2012.[26]

San Bernardino County and other relevant regulatory agencies, including the California Department of Fish and Game, issued environmental permits to Molycorp in December 2010 to allow construction of the new processing facility and plant. Groundbreaking for the project began in January 2011 and mining activities are expected to commence later in 2011. **Figure F-3.16-5** shows the location of the Molycorp Minerals Mountain Pass Mine. The Molycorp Minerals Mountain Pass Mine would be located less than a mile north of the Preferred Alternative rail alignment within the Clark Mountains.

On-Going Projects

In addition to the foregoing, the metropolitan Las Vegas area is expected to continue to generate numerous development projects. The metropolitan Las Vegas area is a dynamic urban environment. Various urban developments (hotels, casinos, other commercial development), are assumed to occur in the future, as they have occurred in the past. These types of projects would reinforce the existing urban context of the metropolitan area. While no specific development projects are identified, the continuing urban context of the metropolitan Las Vegas area is considered in the cumulative analysis.

[26] MineWeb. Molcorp approves Mountain Pass expansion, combined stock offering. January 25, 2011. <http://www.mineweb.com/mineweb/view/mineweb/en/page67?oid=119108&sn=Detail>. Access on February 15, 2011.

3.16.3 Analysis of Cumulative Impacts

3.16.3.1 Methods of Evaluation

The cumulative impact methodology described in **Section 3.16.1** of the Draft EIS and **Section 3.16.2** of the Supplemental Draft EIS remains applicable to this Final EIS and the evaluation of the Preferred Alternative. The cumulative analysis describes the potential for the Preferred Alternative, in combination with the related past, present and future project, to result in cumulatively adverse environmental effects. Each analysis considers the area of cumulative analysis and identifies the relevant past, present, and future related to the potential cumulative impact. The evaluation identified whether the cumulative impact would be substantial and whether the Preferred Alternative's contribution to a substantial cumulative impact would be considerable.

An evaluation of the cumulative impacts associated with the No Action Alternative is also included.

3.16.3.2 No Action Alternative

The No Action Alternative would not involve the construction and operation of the Preferred Alternative. However, the past, present, and future projects, as described above, would continue to be implemented. For example, land use changes, development, transportation projects, utility projects, energy projects, and redevelopment of properties would continue to occur. As such, for most environmental resource areas the No Action Alternative would not avoid or greatly reduce the cumulative effects of the Preferred Alternative described in this section. For example, improvements under the No Action Alternative would be located in the same vicinity as the Preferred Alternative, and would thus contend with many of the same utilities and emergency service impacts, cultural and paleontological resources, geological hazards, hazardous material risks.

The No Action Alternative, in combination with the present and future projects, would result in cumulative air quality and energy effects. While the Preferred Alternative would not substantially contribute to these cumulative impacts (see **Section 3.16.3** below), under the No Action Alternative, traffic along this corridor is expected to grow substantially by year 2030. The regional criteria pollutant and GHG emissions that would result from vehicular travel along the I-15 project corridor under the No Action Alternative would be considered a substantial contribution to the cumulative air quality impacts. Similarly, the capacity improvements on I-15 would substantially contribute to an increase in automobile energy consumption on this highway.

Construction emissions related to the tunnel boring under the Preferred Alternative would not occur under the No Action Alternative. As such, cumulative emissions related to construction activity would be less under the No Action Alternative when compared to the Preferred Alternative, as tunneling requires a substantial construction effort. In addition, the Preferred Alternative would result in a shorter duration construction schedule

(approximately three years) when compared to construction of No Action Alternative improvements, which would result in higher annual emissions under the Preferred Alternative when compared to the No Action Alternative.

In addition, the No Action Alternative would not result in an operational energy savings, as constructing new traffic lanes would not result in energy payback over time (i.e., fewer barrels of oil consumed by automobile travel).[27] The construction of new traffic lanes would thus result in an irretrievable commitment of energy resources and a substantial contribution to the cumulative energy impact. Several project specific impacts associated with the Preferred Alternative would be avoided under the No Action Alternative, such as cumulative traffic effects at location intersections surrounding station and maintenance facilities in Victorville and Las Vegas. The No Action Alternative would also avoid the construction of tracks, fencing, elevated structured, station and maintenance facilities that would occur as a result of the Preferred Alternative, which would in turn reduce or avoid a portion of the cumulative visual changes that would occur with the Preferred Alternative.

The No Action Alternative would also not introduce any development to the Ivanpah Valley area north of Mountain pass, which would avoid cumulative effects related to grazing land, hydrology and water quality, cultural and paleontological resources, and biological resources that would occur with the Preferred Alternative. Under the No Action Alternative, no planned or programmed developments would combine with the proposed solar and wind energy projects, such as the ISEGS project, and public utility projects, such as the EITP and Kern River Gas Mountain Pass Lateral. The No Action Alternative would not combine with these related projects to cumulatively limit grazing land activities and limit livestock access across grazing land allotments. The No Action Alternative, in combination with the related projects, would also not cumulatively affect ephemeral drainages in the Ivanpah Valley and would not result in adverse cumulative water quality effects in this area. Similarly, no cumulative effects to sensitive plant and wildlife species would occur in this area under the No Action Alternative, since none of the planned or programmed developments considered as part of the No Action Alternative are proposed within the Ivanpah Valley.

3.16.3.3 Preferred Alternative

Draft EIS **Section 3.16.4** evaluated the cumulative impacts of DesertXpress project as a whole; Supplemental Draft EIS **Section 3.16.3** evaluated the cumulative impacts of the DesertXpress project in combination with the project additions and modifications since publication of the Draft EIS. The following analysis considers the cumulative impacts of the Preferred Alternative and thus completely replaces Draft EIS **Section 3.16.4** and Supplemental Draft EIS **Section 3.16.3**.

[27] The energy payback period measures the number of years that would be required to pay back the energy used in construction with operational energy consumption savings. The payback period is calculated by dividing the estimate of construction energy by the amount of energy that would later be saved by the action.

3.16.3.4 Land Use and Community Impacts

The area of cumulative analysis for land use and community impacts includes San Bernardino County and Clark County. Since the majority of the alignment along the I-15 freeway is undeveloped, the area considered for cumulative impacts primarily includes Victorville and Las Vegas, as well as the communities within close proximity to the Preferred Alternative rail alignment, such as Barstow, Baker, Yermo, Lenwood, Primm, Jean, and Sloan.

The Preferred Alternative, in combination with the related transportation, energy, and development projects, could contribute to cumulative impacts associated with land use. Changes in land uses over time have been relatively slow over much of the area around the DesertXpress rail alignment, with the exception of Victorville and Las Vegas. Over the past ten years, land use changes in Victorville and Las Vegas have rapidly changed through the development of urban uses, such as residential developments and industrial and commercial areas. The open space areas between Victorville and Las Vegas have experienced a slower trend in land use change, as much of this area has remained undeveloped. The Preferred Alternative, in combination with the related projects, would further this land use trend, as the proposed development and transportation projects are primarily concentrated in Victorville and Las Vegas.

Capacity improvements to I-15 are primarily located within the Victorville and Las Vegas areas. These capacity improvements would cumulatively contribute to land use effects, as the roadway improvements could encourage previously undeveloped areas near the roadway to develop residential, commercial, or service uses. The Desert Gateway Specific Plan would also allow urban developed near the Preferred Alternative Victorville Station and OMSF sites. Development within the Desert Gateway Specific Plan would allow for more pronounced commercial, residential, or transit-oriented development in the area. Ongoing urban development in Las Vegas could also combine with the Preferred Alternative Las Vegas Station (either site option) and Las Vegas MSF to establish greater transit-oriented development in the area. For a discussion of the associated cumulative growth effects, refer to the discussion under the heading "Growth," below. When considered with the Preferred Alternative, these projects could cumulatively contribute to the regional trends of rapid land use changes in Victorville and Las Vegas.

Related projects located between Victorville and Las Vegas are, however, spread out and isolated in nature and would maintain the slow trend in the change to land uses.

There are a number of solar and wind energy projects proposed within the vicinity of the Preferred Alternative between Victorville and Las Vegas. The majority of the proposed energy projects are located south of Barstow or in the Ivanpah Valley area. In the Barstow area, the proposed energy projects would be located south of the Preferred Alternative rail alignment, as shown in **Figure F-3.16-2.** These proposed energy projects could cumulatively combine to alter the existing undeveloped and rural land uses south of Barstow to industrial/institutional uses associated with the energy projects. The Preferred

Alternative rail alignment would remain within the I-15 freeway corridor in this area and thus would not cumulatively combine with the energy projects to transform the existing land use in the area.

Figure F-3.16-5 shows these proposed energy projects in Ivanpah Valley. The ISEGS project was approved in September 2010, which would alter the existing vacant and undeveloped land use within the Ivanpah Valley with the development of this solar energy project. There are also a number of other energy projects proposed within the same area, which could cumulatively combine to further transform the existing land use from undeveloped, grazing lands to industrial or institutional uses associated with the energy projects. The ISEGS project also includes a tortoise translocation area to mitigate for its impacts to desert tortoise habitat, which introduces land areas designated for habitat conservation. These future related projects would cumulatively combine to alter the normal functioning of the existing lands in the Ivanpah Valley area.

The Preferred Alternative rail alignment would be within close proximity to these energy projects within the Ivanpah Valley. The Preferred Alternative rail alignment would avoid land use conflicts with the ISEGS site. Segment 4C was designed especially to avoid the ISEGS site. However, the Preferred Alternative rail alignment would cross through a portion of a site for which BLM has received an application to develop another solar energy project (CACA 48869), as depicted on **Figure F-3.16-5,** which could result in potential cumulative land use conflicts. As of January 2011, the application for the solar energy project CACA 48869 is pending and no development permits have been approved. This solar energy project will be required to consider other projects in area, such as the DesertXpress project, during project development and planning stages. This potential cumulative conflict could be resolved through good land use planning in future coordination with the BLM. Assuming the DesertXpress project is approved prior to the formalization of the solar energy project application, potential land use conflicts at this site could be resolved through such appropriate planning efforts.

The Preferred Alternative would also cross through a proposed solar energy project west of Baker. The site designated for this project (CACA 049584; see **Figure F-3.16-4**) spans over the existing I-15 freeway corridor, but is not understood to contemplate locating any solar collection or ancillary facilities within the I-15 ROW. As the Preferred Alternative would be within the I-15 ROW through this site, it is assumed that no cumulative land use conflict would result.

The SNSA, Southern Nevada Regional Heliport, I-15 Joint Port of Entry, and the Mixed-Use Development project near Jean are also situated in isolated locations, away from urban land uses. It is anticipated that these projects would not interfere with the normal functioning of existing land uses, but that these projects would convert previously undeveloped lands to transportation and mixed-use developments. As these transportation and energy facilities would not be located within an existing community, they would not result in cumulative impacts related to the disruption or displacement of

an existing community, the displacement of a residential community, posing an adverse effect to a minority or low-income population, or interfering with adjacent land uses. As the Preferred Alternative does not propose significant land use changes along the rail alignment, these related projects in combination with the Preferred Alternative would maintain the slow trend in land use changes in this area.

The construction of the Preferred Alternative would occur primarily within existing freeway ROWs, except in Yermo, north of Mountain Pass, and in portions within metropolitan Las Vegas, and at the proposed station and maintenance facility sites. There are no proposed community interfaces (i.e., stations or maintenance facilities) located along the portions of the Preferred Alternative rail alignment that deviate from the I-15 freeway corridor. Therefore, the Preferred Alternative would not substantially alter the existing land uses in the areas, as the land use effects would be limited to the rail alignment. As such, the Preferred Alternative would not have a considerable contribution to the cumulative land use and community impacts.

3.16.3.5 Growth

Cumulative growth effects were evaluated on a county-wide basis (within San Bernardino County and Clark County). Both San Bernardino County and Clark County are expected to experience population, household, and employment growth through 2030. Present and future related projects that could impact growth in the area for cumulative analysis include transportation and development projects, such as the capacity improvements to I-15, California High Speed Rail, the SNSA, the Southern Nevada Regional Heliport, the Desert Gateway Specific Plan in Victorville, the Mixed-Use Development in Jean, and the ISEGS project just north of Mountain Pass.

San Bernardino County and Clark County are anticipated to experience rapid population growth, and associated job and housing growth, through the year 2030. The Preferred Alternative in combination with transportation improvements and development projects would contribute to growth in San Bernardino County and Clark County. While the planned I-15 capacity improvements would not directly construct new homes or jobs, these improvements would allow more individuals to travel on I-15 on a daily basis, which could indirectly promote commercial and service uses in the urbanized areas along the I-15 corridor, including Victorville, Barstow, Baker, and Las Vegas. Construction of the I-15 freeway capacity improvements would create temporary construction jobs during the respective construction periods. Construction of the ISEGS project would also introduce temporary construction jobs to the area. The temporary construction jobs associated with the Preferred Alternative could combine with these related projects to temporarily increase potential job opportunities in the project area. The increase in temporary construction jobs in the project area could have a positive cumulative impact on the local economies within Victorville, Barstow, and Las Vegas, as the construction jobs would create new salaries and thereby allow for greater spending in the local economies.

Development of the SNSA and Southern Nevada Regional Heliport could induce indirect growth effects around the facilities, similar to the Preferred Alternative stations and maintenance facilities. The potential indirect growth associated with these related projects would be less profound in comparison to the overall anticipated growth in San Bernardino County and Clark County. While these transportation projects, in combination with the Preferred Alternative, could increase the number of visitors to the Las Vegas area, no new substantial permanent population or increment of new housing stock would be established as a result of project development.

Construction period jobs may have a more substantial effect on local growth especially if the construction period for the Preferred Alternative overlaps with construction of several other large transportation and land development projects in the area. The effect of construction period employment on local growth tends primarily affects service industries (food, retail, etc.) and is generally temporary (duration of the construction period). While the project will create some permanent jobs, the number of new permanent jobs in San Bernardino County and Clark County created by the Preferred Alternative would be small in comparison to the projected employment growth in these areas. Direct and indirect growth associated with the Preferred Alternative is expected to contribute less than one percent of the total anticipated growth for San Bernardino and Clark County and would, thus, not result in a cumulative impact to growth.

With regard to economic growth and vitality, operation of the Preferred Alternative in combination with the SNSA and the Southern Nevada Regional Heliport could exacerbate the negative cumulative economic effects to San Bernardino County, specifically within Barstow. Both the Preferred Alternative and these projects would provide non-automotive travel between southern California and Las Vegas. **Section 3.2.2.3** of this Final EIS state that the diversion of freeway-related traffic to the high-speed passenger train would have a negative effect to economic growth in Barstow, since the Barstow economy relies heavily on taxable retail sales from pass-by freeway traffic traveling along the I-15 freeway corridor. These other transportation projects could similarly divert auto trips from southern California to other modes. The SNSA in particular could allow for expanded air travel between southern California and the Las Vegas region. DesertXpress plus the SNSA could cumulatively contribute to adverse economic effects in Barstow. Given the uncertainty over construction of the SNSA and uncertainty over its potential to expand air service from southern California, the extent of any such adverse economic effects is unclear.

Conversely, construction of the related projects in combination with the construction of the Preferred Alternative could result in temporary positive cumulative economic effects in both Barstow and San Bernardino County as a whole. There are a number of proposed energy projects just south of Barstow and at other points along the I-15 corridor. As Barstow would be the closest city to many of these proposed projects, construction teams for these projects are likely to be drawn from labor pools in greater Barstow. This would be a positive secondary effect for greater Barstow and other nearby communities of San

Bernardino County. Combined with the potential construction jobs from the DesertXpress project, construction employment associated with the energy projects could cumulatively combine to a substantial beneficial economic impact to the City of Barstow during the construction period.

3.16.3.6 Farmlands and Grazing Lands

The area considered for cumulative impacts to farmlands and grazing lands includes San Bernardino County, since there are no farmlands or grazing lands within Clark County within proximity to the Preferred Alternative. Present and future projects within San Bernardino County would have the potential to impact farmland and grazing lands. Projects within San Bernardino County include, but are not limited to, capacity improvements on I-15 near Victorville and Barstow, the Desert Gateway Specific Plan in Victorville, CHSR, and the solar projects, including the ISEGS project. The continued urban development within San Bernardino County would also contribute to the potential cumulative loss of farmland s and grazing lands.

Cumulative Farmland Effects

According to the San Bernardino County General Plan Environmental Impact Report, San Bernardino County ranks in the top 15 agricultural-producing counties in California. However, agricultural use within the County continues to decline with urban expansion. As urban expansion encroaches into agricultural areas, remaining agricultural lands become surrounded by urban uses, further exacerbating the conversion of farmland to non-agricultural use. The decreasing air quality, increasing water costs, and decreasing viability also contribute to the conversion of farmland to other uses. While the San Bernardino County General Plan identifies several polices relating to the preservation of agricultural land, the conversion of farmland in the County is identified as a significant and unavoidable impact.[28]

The Preferred Alternative would be located in the Desert Region of San Bernardino County, where agricultural development is limited primarily to areas bordering the Mojave River near Lenwood, Yermo, and Newberry Springs. The Preferred Alternative in combination with the future widening and capacity improvements to I-15 near Victorville and Barstow, the implementation of the Desert Gateway Specific Plan, the CHSR project, and the solar and wind energy projects, as well as other projects and development in San Bernardino County, would continue the regional trend of converting farmland to non-agricultural uses. Between 2006 and 2008, approximately 5,593 acres of the 30,919 acres of important farmland in 2006 were converted to other non-agricultural uses.

[28] San Bernardino County General Plan Draft Environmental Impact Report, 2006.

Approximately 1,200 acres of the 902,854 acres of grazing land in 2006 were converted to non-agricultural use by 2008.[29]

Transportation improvements would have the potential to sever access to active farmlands in the area, in combination with the severance of access established by the Preferred Alternative. However, the Preferred Alternative and related transportation projects would be located in the Desert Region, where farmland is confined to the irrigated areas near the Mojave River. Thus, the viability of farmland in this area is limited. Additionally, the urbanization of the Barstow and Lenwood areas, which could be furthered with I-15 improvements in these areas, may further reduce the agricultural viability of this area. Development of the CHSR would have similar limited effects to farmland as the Preferred Alternative because of the linear nature and limited station sites.

In relation to the County's annual conversion rate, the amount of important farmland affected by the Preferred Alternative would be small in scale (less than one percent). Additionally, mitigation identified in **Section 3.3.3** of this Final EIS would reduce the effects of the limited conversion of farmland. Thus, the Preferred Alternative would not result in a considerable contribution to cumulative impacts to farmland.

Cumulative Grazing Land Effects

The ISEGS project and other solar and wind energy project north of Mountain Pass would combine with the Preferred Alternative to cumulatively impact grazing land allotments. Implementation of these related projects in combination with the Preferred Alternative could sever existing grazing allotments or result in the permanent conversion of grazing land to non-agricultural use.

The Desert Gateway Specific Plan would also encourage development surrounding the Preferred Alternative Victorville Station and OMSF, which could further impact agricultural resources in the area. While there is no important farmland within this area, the cumulative development in combination with the Preferred Alternative Victorville Station and OMSF could cumulatively affect grazing land allotments in the area and permanently convert grazing land to non-agricultural use.

The Preferred Alternative would have a considerable contribution to cumulative impacts related to grazing land. The Preferred Alternative rail alignment north of Mountain Pass would introduce a linear barrier through a designated grazing allotment, which would result in adverse effects to grazing activities. While mitigation measures identified in **Section 3.3.3** of this Final EIS would reduce adverse effects to grazing land, the Preferred Alternative rail alignment would still result in the permanent conversion of grazing land to transportation use.

[29] California Department of Conservation, San Bernardino County Important Farmland Data Availability. 2008. <http://redirect.conservation.ca.gov/DLRP/fmmp/county_info_results.asp>. Accessed November 6, 2010.

3.16.3.7 Utilities/Emergency Services

The area considered for cumulative effects related to utilities and emergency services includes the utility and emergency service provider service areas, which vary greatly depending on the provider. **Table F-3.16-1** identifies the utilities and public service providers in the area of cumulative analysis.

Table F-3.16-1 Utility and Public Service Providers

Type of Service	Service Providers
Electric/Gas	Southern California Edison Southwest Gas Corporation Nevada Power Electric Service Nevada Power Company Los Angeles Department of Water and Power
Water	Victorville Water District Baker Community Services District Las Vegas Valley Water District
Sewage/Storm Water	Victor Valley Wastewater Reclamation Authority Baker Community Services District Clark County Water Reclamation District City of Las Vegas Public Works Department
Solid Waste	San Bernardino County Solid Waste Management Division Baker Community Services District Republic Services of Southern Nevada
Police	San Bernardino County Sheriff Barstow Police Department California Highway Patrol Las Vegas Metropolitan Police Department Nevada Highway Patrol
Fire/Emergency Response	San Bernardino County Fire Department Barstow Fire Protection District Baker Community Services District Mojave National Preserve: Interagency Fire Center Clark County Fire Department Las Vegas Fire and Rescue

Source: CirclePoint, 2010.

Present and future projects that could impact utilities and emergency services in the area of cumulative analysis include transportation, development, public utility, and energy projects. Such projects include capacity improvements to I-15, the California High Speed Rail, the SNSA, the Southern Nevada Regional Heliport in Sloan, the proposed Desert Gateway Specific Plan in Victorville, the expansion of the Kinder-Morgan Calnev Pipeline System, the EITP, the Kern River Gas Mountain Pass Lateral, and the solar and wind energy projects.

The Preferred Alternative in combination with the related transportation and development projects would place additional demand on the existing public utilities and emergency service providers. For example, implementation of the I-15 capacity improvements in conjunction with the Preferred Alternative would increase demand for police and emergency service in the areas where the Preferred Alternative travel within close proximity to the I-15 corridor. Development of the SNSA and Southern Nevada Regional Heliport would require the implementation of utility lines, placing demand on the public service providers in the communities of Primm, Jean, and Sloan. These additional service requirements would combine with the service needs of the Preferred Alternative in the same areas, thus cumulatively affecting the capacity of the existing public utilities and the ability of the service providers to provide adequate services.

Additionally, the proposed development associated with the Desert Gateway Specific Plan in Victorville would require the implementation of water, wastewater, stormwater, and solid waste services in the area, in addition to the services required by the Preferred Alternative Victorville Station and OMSF sites. The Preferred Alternative Victorville Station and OMSF would not, however, be adequately served by existing water facilities due to their distance from existing water mains provided by the Victorville Water District. In combination with development associated with the Desert Gateway Specific Plan, the Preferred Alternative Victorville Station and OMSF could cumulatively contribute to the need for additional water facilities to adequately serve the area. As stated in **Section 3.4.2.3** of this Final EIS, a Water Supply Assessment would be required to determine the size and extent of the new water facilities needed, which would mitigate the effects of the Preferred Alternative to water services and facilities.

However, public utility projects, such as the expansion of the Kinder-Morgan Calnev Pipeline, the Kern River Gas Mountain Pass Lateral, and the EITP, would increase the capacity of existing utilities, increasing the viability of accommodating future growth and demand associated with the Preferred Alternative and other related developments. Implementation of the related solar and wind energy projects, such as the ISEGS, would also introduce the potential for increased capacity for energy-related utilities. The expansion of the Kind-Morgan Calnev Pipeline and the EITP would also enhance energy systems in the area. Cumulative effects related to energy are discussed further below, under the heading "Energy."

Recommended avoidance, minimization, and mitigation measures identified in **Section 3.4.3** of this Final EIS would be incorporated into the Preferred Alternative to reduce adverse effects related to utilities and emergency services. Similar mitigation measures would be implemented with the future and planned projects to alleviate potential adverse effects related to public utilities and service providers. These related transportation, development, and utility projects would likely be required to abide by similar environmental review processes as the Preferred Alternative so as to evaluate project

specific impacts to public utilities and service providers. Therefore, the cumulative impact related to public utilities and the service providers in the San Bernardino County and Clark County regions would not be substantial.

3.16.3.8 Traffic and Transportation

A detailed analysis of the 2030 cumulative plus project conditions is included in **Section 3.5** of this Final EIS. The following is a summary of the potential cumulative effects on traffic and transportation.

The area of cumulative analysis includes transportation corridors between Southern California and Las Vegas. The area of cumulative analysis includes the I-15 freeway mainline and the areas around the proposed station sites in Victorville and Las Vegas, specifically the local roadway intersections in these areas.

Past, present, and future projects that could impact traffic in the area of cumulative analysis include transportation and development projects. Such projects include capacity improvements to I-15, the California High Speed Rail, the High Desert Corridor project, the US 395 realignment and widening, the Bonneville Transit Center, the SNSA, the Southern Nevada Regional Heliport in Sloan, and the Desert Gateway Specific Plan in Victorville.

The Preferred Alternative, in combination with the related transportation and development projects, would cumulatively affect traffic in the area of cumulative analysis. While the Desert Gateway Specific Plan could allow for increased development, and thus increases in traffic, the transportation projects in the cumulative area would seek to improve traffic operations on the I-15 mainline or introduce new transportation corridors, such as the High Desert Corridor. The SNSA could also reduce future traffic volumes on the I-15 corridor, as it would allow for additional flights between southern California and Las Vegas. Operation of the Preferred Alternative in conjunction with the related projects would improve traffic conditions on I-15 in year 2030. Future I-15 mainline traffic volumes would be reduced since after construction of the Preferred Alternative, as individuals who would otherwise drive to Las Vegas would instead opt to ride the train. Additionally, capacity improvements to I-15 would reduce congestion on the I-15 mainline, thus resulting in a beneficial cumulative traffic impact to the I-15 freeway between Victorville and Las Vegas.

However, the Preferred Alternative in combination with the related projects would result in a cumulatively adverse effect at study intersections near the Victorville and Las Vegas stations. Development could cumulatively combine to adversely affect intersection operations near the Preferred Alternative Victorville Station. Future development within the metropolitan Las Vegas area would also cumulatively combine with the Preferred Alternative to increase traffic volumes in the vicinity of the either site option ultimately selected for the Las Vegas Station.

Recommended mitigation measures identified in **Section 3.5.3** of this Final EIS would lessen the adverse effects related to traffic as a result of the Preferred Alternative. It is also anticipated that the agencies responsible for review, approval, and permitting of these present and future projects would require similar mitigation measures be implemented to alleviate potential adverse traffic effects created by these projects. For example, these future projects would be required to abide by similar environmental review processes as the Preferred Alternative so as to evaluate project specific impacts to traffic capacity and level of service operations. While cumulative effects would adversely affect local intersections near the Preferred Alternative Victorville station and the two Las Vegas station site options, traffic effects would be isolated to the two termini of the Preferred Alternative rail alignment. The I-15 freeway mainline would have a beneficial cumulative effect with the development of the Preferred Alternative in combination with the related transportation improvement projects. Thus, the cumulative impact of the related projects in combination with the Preferred Alternative would not be substantial.

3.16.3.9 Visual Resources

The area of cumulative analysis for effects related to visual resources and aesthetics includes the viewshed, or the visible environment, surrounding the Preferred Alternative. Present and future projects that could impact visual resources include transportation, development, energy, and natural resource projects within the area of cumulative analysis. Capacity improvements to I-15, the I-15 Joint Port of Entry, the SNSA, the Southern Nevada Regional Heliport, and the energy projects (i.e., the ISEGS project) would be visible from the Preferred Alternative and would afford views of the Preferred Alternative from their proposed locations. Additionally, the allowable development within the Desert Gateway Specific Plan would affect the visual environment in the viewshed.

The Preferred Alternative, in combination with the past, present and future projects within the area of cumulative analysis, would have the potential to create a cumulative impact to visual resources. Development of the tracks, fencing, elevated structures, station and maintenance facilities, and the DesertXpress trains themselves would introduce a linear transportation element into the landscape that could contribute to visual effects within the area of cumulative analysis.

Changes in the visual character from undeveloped, open desert land to a more urbanized, built-up visual environment have been relatively slow over in the areas between Victorville and Las Vegas. Both Victorville and Las Vegas have experienced significant visual changes in recent decades as a result of urban and suburban development. The non-urbanized lands between Victorville and Las Vegas have undergone visual changes more slowly than urban areas. With the exception of greater Barstow, most views of this area continue to be of an expansive open landscape, with low lying shrubs, desert soils, and rolling dunes. The Preferred Alternative, in combination with these related projects, would generally further this visual trend, as the proposed development, transportation, and energy projects are primarily concentrated in the Victorville and Las Vegas areas.

The visual effects of the allowable development within the Desert Gateway Specific Plan area could combine with the development of the Victorville Station and OMSF to result in a cumulative change in the visual character of this area. The Victorville Station and OMSF would have the potential to spread urban development, and thus man-made visual features, further into the undeveloped area between Victorville and Barstow. Additionally, development within the Desert Gateway Specific Plan area and the Preferred Alternative facilities would cumulatively affect the existing lighting and glare within the Victorville area. As much of this land is currently undeveloped, the Preferred Alternative, in combination with the development allowed by the Desert Gateway Specific Plan, would introduce new lighting features to the previously naturally dark area.

The capacity improvements to I-15 within the Victorville and Las Vegas areas would not substantially alter the visual character of the area of cumulative analysis or introduce a substantial amount of new lighting, as the improvements would occur alongside an existing freeway and transportation corridor within Victorville and Las Vegas.

The related projects located between Victorville and Las Vegas are isolated in nature and spread out along the Preferred Alternative rail alignment. Development of these projects, in combination with the Preferred Alternative, would maintain the slow trend of visual alterations to this area. While implementation of the SNSA, Southern Nevada Regional Heliport, and Mixed-Use Development in Jean would introduce new visual features to the desert aesthetic, including mixed-use buildings and facilities, runways and landing pads, flight towers, aircrafts, and associated structures and cumulatively contribute to changes in the open desert visual environment, the isolated nature of these projects would not result in rapid visual changes to the area.

The related energy projects within the Ivanpah Valley, north of Mountain Pass, could cumulatively alter the visual environment of this largely undeveloped area. These related energy and utility projects would introduce utilitarian visual features, such as solar panels, buildings, wind turbines, and additional overhead transmission lines into the existing visual environment. These related projects, in combination with the Preferred Alternative rail alignment, could result in cumulative changes to the existing visual character. The cumulative change to the visual environment would be visible from the I-15 freeway near the California-Nevada stateline, as well as from wilderness areas in the adjacent portions of the Mojave National Preserve. Specifically, the ISEGS project would introduce substantial areas utilitarian visual features into the existing largely undeveloped landscape, representing a new, dominant visual feature in the viewshed. **Figure F-3.6-7** shows a visual simulation of the ISEGS project in combination with and without the Preferred Alternative rail alignment. Due to the scale of the ISEGS project, the Preferred Alternative rail alignment would be a subordinate visual feature in the viewshed and would not considerably contribute to the cumulative change in the visual environment from natural to man-made features.

The related energy projects south of Barstow could also establish a more profound urbanized visual character in the greater Barstow area, as utilitarian visual features, such as solar panels and wind turbines, would be developed.

The other intermittent energy projects located within the vicinity of the Preferred Alternative (and outside the Ivanpah Valley) could cumulatively introduce an industrial visual character to the non-urbanized visual landscape, but would not result in a rapid change in visual character due to their dispersed locations throughout the desert. Therefore, while these isolated projects along the Preferred Alternative rail alignment would have cumulative effects in changing the existing desert visual environment, the visual change for the majority of the area of cumulative analysis is anticipated to be slow, generally maintaining the existing trend of visual changes. The related projects, in combination with the Preferred Alternative, would, however, cumulatively introduce new sources of nighttime lighting and daytime glare to the existing, naturally dark, open land.

The construction of the transportation, development, and energy projects would have potential short-term effects on visual resources, as construction equipment, staging areas, signage, and night lighting would be visible from the adjacent properties in urbanized areas, such as Barstow, Baker, Primm, Jean, and Sloan, during the construction period. It is important to note that these cumulative visual effects would be temporary in nature.

Recommended mitigation measures identified in **Section 3.6.3** of this Final EIS would lessen the adverse visual effects of the Preferred Alternative. It is reasonable to assume that similar mitigation measures would be implemented with the related projects to alleviate potential adverse visual effects. These projects would most likely be required to abide by similar environmental review processes as the Preferred Alternative to evaluate project specific impacts to visual resources. While cumulative effects would introduce new urban visual features into the open, expansive undeveloped desert, cumulative visual effects would be isolated to the viewshed in the related projects' sites. Thus, the cumulative impact of the Preferred Alternative with the transportation, development, and energy projects planned in the area would not likely be substantial.

3.16.3.10 Cultural and Paleontological Resources

The area of cumulative analysis for effects related to cultural resources include the identified historic and archaeological sites within the Area of Potential Effect (APE), as defined in **Section 3.7.2.1** of this Final EIS. The APE is the geographic area within which an undertaking may directly or indirectly cause alternations in the character or use of historic properties. Present and future projects that would cumulatively affect cultural and/or paleontological resources include the projects that would affect the same cultural or paleontological sites as the Preferred Alternative. Within the area of cumulative analysis, transportation projects, such as the capacity improvements to I-15 and the I-15

Joint Point of Entry project, wind and solar energy projects, and development projects, such as the Desert Gateway Specific Plan and the Mixed-Use Development, would have the potential to cumulatively affect such resources.

Cumulative impacts to historical and archeological resources can occur when development of an area results in the removal of a substantial number of historic structures (whether considered important historical features or not) or archeological sites that when taken in combination could degrade the physical historical record of an area. While impacts associated with such cultural resources tend to be limited to individual project sites and do not generally result in substantial cumulative impacts, the Preferred Alternative in combination with the related projects could result in cumulative impacts to such resources. For example, the capacity improvements to I-15 would have the potential to cumulatively impact the same historical and archaeological resources that would be impacted by the Preferred Alternative where the rail alignment is located within the I-15 freeway ROW. While the Preferred Alternative rail alignment would not traverse through the ISEGS project site north of Mountain Pass, the rail alignment would be within close proximity to proposed solar and wind energy project sites and could potentially affect the same sensitive cultural resources within the vicinity. The Mixed-Use Development in Jean could also cumulatively impact the same resources as the Preferred Alternative rail alignment in the immediate vicinity.

Near Victorville, the Preferred Alternative Victorville Station and OMSF would be located just north of the proposed development area within the Desert Gateway Specific Plan. The area surrounding the Preferred Alternative Victorville Station and OMSF contains older land uses, such as an old landing strip, landfill dump site, and off-highway vehicle roadways, but is not an area known to contain substantial cultural resources. As such, it is assumed that the cumulative development within the Desert Gateway Specific Plan area would not combine with the Preferred Alternative to cumulatively affect cultural resources within the Victorville area.

While the Preferred Alternative Las Vegas Station (either site option) and MSF would combine with the ongoing urban development within the Las Vegas metropolitan area, these developments would be located within a highly urbanized context where lands have been developed and redeveloped on multiple occasions. Given the past development trends in the area, the potential for undisturbed cultural resources near either of the Preferred Alternative Las Vegas Station site options and the MSF would not be substantial. The related projects in combination with the Preferred Alternative in the urban Las Vegas area would not combine to cumulatively affect cultural resources.

The Preferred Alternative, in combination with the related projects, could result in cumulative impacts to paleontological resources. Transportation projects, such as the capacity improvements to I-15 and the I-15 Joint Port of Entry and the solar and wind energy projects could impact the same paleontological resources as the Preferred Alternative, resulting in a cumulative impact. The development of these projects would

have the potential to unearth additional fossils or other paleontological resources at each of the respective project sites, which could contribute to a direct or indirect cumulative impact to paleontological resources within the APE.

The Preferred Alternative includes site specific mitigation measures to reduce environmental effects related to historical, archaeological, and paleontological resources, including monitoring and avoidance measures. **Section 3.7.3** of this Final EIS outlines the specific mitigation measures related to historical, archaeological, and paleontological resources. The related projects would likely be required to incorporate similar types of mitigation measures prior to development. With these mitigation measures, cumulative impacts to cultural and paleontological resources would not likely be substantial.

3.16.3.11 Hydrology and Water Quality

The area considered for cumulative effects to hydrology and water quality includes the watersheds affected by the Preferred Alternative. The Preferred Alternative would cross about 273 ephemeral drainages. The drainages include, but are not limited to, the Mojave River, Bell Mountain Wash, Kelso Wash, Duck Creek, and Tropicana Wash.

Related projects within the area of cumulative analysis include projects that are located within the watersheds potentially impacted by the Preferred Alternative. Transportation, development, energy, natural resource, and public utility projects would have the ability to cumulatively affect hydrology and water quality. These projects include the capacity improvements on I-15, the SNSA, Kinder-Morgan Calnev Pipeline expansion, the Kern River Gas Mountain Pass Lateral, the Desert Gateway Specific Plan in Victorville, and the wind and solar energy projects between Victorville and Barstow and near Mountain Pass. While the 9.4 million acre West Mojave Plan would cover the majority of the watersheds impacted by the Preferred Alternative, no development would occur as part of this project and the watersheds would be maintained; thus, no discussion of this project is included in the cumulative analysis below.

The Preferred Alternative in combination with the related transportation, development, public utility, and energy projects would cumulatively affect hydrology and water quality within the area of cumulative analysis. Capacity improvements along I-15 could affect many of the same drainages impacted by the Preferred Alternative, including the Mojave River, Bell Mountain Wash, and Tropicana Wash. As portions of I-15 would be widened, the increase in impervious surface could cumulatively contribute to stormwater runoff, primarily near the Preferred Alternative Victorville and Las Vegas station and maintenance facilities. Specifically, construction and operation of the Preferred Alternative Victorville Station would impact a branch of Bell Mountain Wash and could cumulatively combine with the related projects to adversely affect hydrologic resources and water quality.

Construction of the Kinder-Morgan Calnev Pipeline, the Kern River Gas Mountain Pass Lateral, and the EITP would also likely cross several watersheds and many of the same surface water drainages crossed by the Preferred Alternative. These projects could cumulatively affect water quality due to the potential release of contaminants during construction or changes in the existing drainage patterns as a result of grading or other soil disturbing activities.

Operation of the Molycorp Minerals Mountain Pass Mine would also be located within the same watershed area as the Preferred Alternative. While the Molycorp Mine site would be located less than one mile north of the Preferred Alternative, there are intervening mountains between the Preferred Alternative rail alignment and Molycorp Mine site that would limit cumulative hydrologic effects at this location. Given this topography, any runoff from the Molycorp Mine site would not combine with stormwater runoff associated with the Preferred Alternative rail alignment. Therefore, cumulative impacts relative to water quality and hydrology resources would not be substantial in this area.

The Preferred Alternative could combine with the related projects in the Las Vegas area (between Sloan and the Las Vegas metropolitan area) to cumulatively affect ephemeral drainages or dry washes that meet the technical criteria that could be subject to the CWA Section 404 jurisdiction as waters of the US.[30, 31] Related transportation projects, including the Southern Nevada Regional Heliport, I-15 capacity improvements (i.e., Project NEON and the I-15 South Design-Build project), and the roadways intersecting I-15 in the Las Vegas area, could affect the same of nearby ephemeral drainages that could be subject to the CWA Section 404 jurisdiction as waters of the US.

The SNSA would be located within a 100-year floodplain near the Preferred Alternative rail alignment. While the Preferred Alternative rail alignment is not located in this floodplain, implementation of the SNSA could potentially increase the floodplain or impede drainage, which could contribute to the hydrological impacts associated with the Preferred Alternative rail alignment.

The I-15 capacity improvements in the metropolitan Las Vegas area, including the Project NEON and I-15 South Design-Build project, would also cross areas of the 100-year floodplain, similar to the Preferred Alternative rail alignment. The Preferred Alternative and these transportation projects could also cumulatively combine to affect the 100-year floodplain, which could redirect or impede flood flows.

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[30] This finding is based on the presence of ordinary high water marks as required by USACE regulations.

[31] Huffman-Broadway Group, Inc. Investigation of the Presence of Wetlands and Other Waters of the United States, DesertXpress Project, HUC8 Death Valley – Lower Amargosa Watershed Draining to Badwater Basin, San Bernardino County, California; HUC8 Mojave and Coyote – Cuddeback Lakes Watersheds, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Ivanpah Lake, San Bernardino County, California; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Jean Dry lake, Clark County, Nevada; HUC 8 Las Vegas Watershed, Clark County, Nevada; HUC 8 Ivanpah - Pahrump Valleys Watershed, Draining to Roach Dry Lake, Clark County, Nevada. July 2010.

The Preferred Alternative includes site specific mitigation measures such as compliance with NPDES permit requirements, the use of BMPs, proper design of station and maintenance facility drainage systems, reducing the encroachment into the 100-year floodplain, and implementing flood control measures. Implementation of these measures would help to accommodate the increase in stormwater runoff that would be generated by the new impervious surfaces created the by the Preferred Alternative. The related projects would also be required to comply with applicable Federal, state, and local water quality regulations. The Applicant will also be required to comply with all conditions and mitigation requirements that result from the CWA Section 404 permit and Section 401 Certification as well as **Mitigation Measures HYD-1** through **HYD-11** stipulated in **Section 3.8.3** of this Final EIS. Refer to **Section 3.8.1** of this Final EIS for a full discussion of the CWA Section 404 permitting process and Section 401 Certification for the Preferred Alternative. Even with adherence to these regulations and permitting processes and implementation of the mitigation measures, the Preferred Alternative would cross about 273 ephemeral drainages, including waters of the US, between Victorville and Las Vegas and would be considered to have a considerable contribution to the overall hydrology and water quality cumulative effects.

3.16.3.12 Geology and Soils

The area considered for cumulative effects related to geology and soils includes the seismic fault zones that underlie the Preferred Alternative. The active fault zones within California include the Eastern California/Mojave Shear Zone, the San Andreas Fault Zone, and the Garlock Fault Zone. As Nevada does not have specified fault zones, the Las Vegas Valley is considered for cumulative effects relating to geology and soils in Nevada.

Geotechnical impacts related to the Preferred Alternative in combination with past, present and future projects in the area of cumulative analysis would involve hazards associated with site-specific soil conditions, erosion, and ground shaking during earthquakes which could expose individuals to risk. Other projects in the area of cumulative analysis, including transportation improvements to I-15 and the SNSA, would experience similar seismic risks to the Preferred Alternative. The impacts to each related project would be specific to that site and its users and would not be common or contribute to (or shared with, in an additive sense) the impacts on other sites. In addition, development of each site would be subject to site development and construction standards (local, state and federal) that are designed to protect public safety. Therefore, no adverse cumulative impacts would occur as a result of the Preferred Alternative in combination with the past, present, and future projects.

3.16.3.13 Hazardous Materials

The area of cumulative analysis considered for hazardous materials effects includes the properties of moderate to high environmental concern identified within a 1/8-mile radius around the Preferred Alternative.[32] Environmental effects related to hazardous materials generally occur on a site specific basis, or else are linked to a specific hazardous waste site, such as a designated superfund site.

Construction and operation of the Molycorp Mineral Mountain Pass Mine would likely involve the use of hazardous materials. While the Molycorp Mine site would be located less than one mile north of the Preferred Alternative, there are intervening mountains between the Preferred Alternative rail alignment and the Molycorp Mine site that would limit the potential for any cumulative hazardous materials effects. Additionally, operation of the Preferred Alternative rail alignment would not result in the use or transport of substantial hazardous materials. As such, cumulative impacts relative to hazardous materials would not be substantial at this location.

The planned capacity improvements on I-15 would potentially encounter hazardous materials and contaminated soils and groundwater, as construction activities would occur on and within close proximity to the existing freeway. Similarly, the proposed sites for the SNSA and Southern Nevada Regional Heliport would be within close proximity to I-15 and could potentially experience adverse effects related to contaminated soils and/or groundwater. However, as effects related to hazardous materials are site specific, the Preferred Alternative, in combination with the related projects would not result in cumulative hazardous materials impacts.

Hazardous materials are strictly regulated by state and federal laws specifically to ensure that they do not result in a gradual toxification of the environment. Recommended mitigation measures identified in **Section 3.10.3** of this Final EIS would lessen the adverse effects related to hazardous materials as a result of the Preferred Alternative. It is reasonable to assume that similar mitigation measures would be implemented as part of the related projects to alleviate potential adverse effects related to hazardous materials. Each individual project would be required to investigate and report any findings of contaminated soil or groundwater. Therefore, it is not anticipated that there would be any cumulative impact related to hazards.

[32] Releases outside of a 1/8-mile radius of the Preferred Alternative would not likely pose a significant environmental risk to the project, as typical groundwater contaminants (i.e. diesel and gasoline) do not travel long distances.

3.16.3.14 Air Quality and Global Climate Change

The area of cumulative analysis considered for air quality effects includes the Mojave Desert Air Basin in California and Clark County in Nevada. The Preferred Alternative, in combination with the related transportation, development, energy, and public utility projects, would contribute to air quality effects within the Mojave Desert Air Basin and Clark County.

Table F-3.16-2 identifies the regional criteria pollutant and GHG emissions as a result of the Preferred Alternative within the Mojave Desert Air Basin. All criteria pollutant emissions with the Preferred Alternative would remain below general conformity thresholds in 2030. The potential air quality effects for the related projects are included as part of the air quality analysis for the Mojave Desert Air Basin for year 2030 and are thus cumulatively accounted for in **Table F-3.16-2**.

Table F-3.16-2 Horizon Year 2030 Mojave Desert Air Basin Regional Criteria Pollutant and Greenhouse Gas Emissions (tons per year)

	Criteria Pollutant Emissions						CO_2e Emissions[a]
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Railway Emissions	1	118	21	12	4	4	75,122
Mobile-source Emissions	(79)	(378)	(1,565)	(8)	(71)	(65)	(32,594)
Net Emissions	(78)	(260)	(1,544)	4	(67)	(61)	42,528
General Conformity Threshold	50	50	100	100	70	70	--
Exceed Threshold?	No	No	No	No	No	No	N/A

Source: ICF/Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO_2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Table F-3.16-3 identifies the regional criteria pollutant and GHG emissions as a result of the Preferred Alternative within Clark County. All criteria pollutant emissions with the Preferred Alternative would remain below general conformity thresholds in 2030. The potential air quality effects for the related projects are included as part of the air quality analysis for Clark County for year 2030 and are thus cumulatively accounted for in **Table F-3.16-3**.

Table F-3.16-3 Horizon Year 2030 Clark County Criteria Pollutant and Greenhouse Gas Emissions (tons per year)

	Criteria Pollutant Emissions						CO_2e Emissions[a]
	ROC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	
Railway Emissions	<1	29	5	3	1	1	18,197
Mobile-source Emissions	(85)	(74)	(2,830)	(3)	(10)	(5)	(7,862)
Net Emissions	(85)	(45)	(2,825)	<1	(9)	(4)	10,335
General Conformity Threshold	50	50	100	100	70	70	--
Exceed Threshold?	No	No	No	No	No	No	N/A

Source: ICF/Jones & Stokes, 2010.

[a] Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO_2e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

For both the Mojave Desert Air Basin and Clark County, the Preferred Alternative, in combination with past, present and future projects in year 2030, is predicted to result in an increase in GHG emissions, representing a cumulative impact.

While the Preferred Alternative, in combination with the present and future projects, would result in cumulative air quality effects, the Preferred Alternative would not substantially contribute to the cumulative impact, as criteria pollutants and GHG emissions would decrease in association with the diversion of passenger vehicles that would otherwise have traversed the entire distance between southern California and Las Vegas. In addition, operation of the Preferred Alternative would not exceed criteria pollutant emission standards within the Mojave Desert Air Basin or within Clark County.

Construction of the Preferred Alternative would temporarily generate emissions of fugitive dust, construction equipment tailpipe emissions, and evaporative VOC emissions from paving and painting operations. In addition to the temporary nature of construction-period emissions, impacts would be localized to the areas adjacent to the construction activity. Construction of present and future transportation, development, energy, and public utility projects would have similar temporary construction-related air quality impacts. Thus, the Preferred Alternative in combination with the related projects would result in a substantial cumulative impacts related to construction emissions.

The Preferred Alternative in combination with the related projects would have the potential to extend the timeline of construction activities in the area of cumulative analysis. Construction of the Preferred Alternative and the related projects would, however, be subject to specific control measures to reduce construction-period emission effects. For example, I-15 capacity improvements have been and are currently under construction within the metropolitan Las Vegas area. Construction of the Preferred Alternative in this same area could extend beyond the construction timeframe of these

current and future I-15 capacity improvements, thereby extending the time period of major construction activities in the metropolitan Las Vegas area. Although mitigation measures identified in **Section 3.11.3** of this Final EIS would implement construction control measures to reduce construction period emissions, construction of the Preferred Alternative would introduce major construction activities between Victorville and Las Vegas and would be considered to have a considerable contribution to the overall cumulative impact related to construction emissions.

3.16.3.15 Noise and Vibration

The area for cumulative analysis includes a ¼-mile radius from the Preferred Alternative. As noise attenuates with distance, significant noise impacts are not anticipated beyond the ¼-mile radius from the Preferred Alternative. Vibration effects of the Preferred Alternative and the related projects would not be considered to combine with one another, since vibration rapidly attenuates with distance and would primarily remain site-specific. As such, this cumulative evaluation does not consider vibration effects of the Preferred Alternative in combination with the related projects.

Present and future projects that could have noise effects within the area of cumulative analysis include transportation, energy, and development projects. Transportation projects include the capacity improvements on I-15, the SNSA, and the Southern Nevada Regional Heliport. The ongoing urban developments within Las Vegas and the proposed Mixed-Use Development in Jean would also affect the cumulative noise environment. Energy projects, such as the BLM wind and solar projects could also result in construction period noise effects; however, the majority of these projects would not be located within ¼-mile of the Preferred Alternative and would therefore not result in a cumulative noise impact. For those energy projects within ¼-mile, a cumulative noise effect would only occur if construction of that project and the Preferred Alternative within the vicinity of that project site were to occur at the same time. Regardless, this potential cumulative noise impact would be temporary. Overall, the Preferred Alternative in combination with past, present, and future projects would result in a cumulative increase in noise within the area of cumulative analysis.

The Preferred Alternative in combination with related transportation, development, and energy projects would primarily affect noise levels in urbanized areas along the rail alignment, including Victorville, Lenwood, Barstow, Yermo, and southern Las Vegas, as these areas include single-family homes proximate to the I-15 corridor that would be sensitive to an increase in noise levels.

Since the Preferred Alternative Victorville Station and OMSF would be more than ¼-mile from the Desert Gateway Plan area in Victorville, the Preferred Alternative would not combine with the noise associated with the future allowable urban development in the Victorville area.

Development of related transportation projects, including capacity improvements to I-15, the SNSA, and the Southern Nevada Regional Heliport, could also cumulatively combine with the Preferred Alternative to increase noise levels near the Mojave National Preserve. The SNSA and the Southern Nevada Heliport would introduce overhead aircraft noise, as these facilities would allow for additional air travel in this area. **Section 3.12.2** of this Final EIS notes that the noise generated by the Preferred Alternative would affect the same area of the Mojave National Preserve as would traffic noise on I-15. The closest sensitive receptors in the Mojave National Preserve are approximately 10 to 20 miles away and the high-speed train passby would not be audible at these locations. Furthermore, increased noise levels associated with the Preferred Alternative would only occur during train passby (less than 70 train passbys per day).

Capacity improvements to I-15 would also combine with the Preferred Alternative to exceed noise level standards near the residential developments in southern Las Vegas. The Preferred Alternative rail alignment and capacity improvements to I-15 would occur immediately adjacent to one another and would have similar cumulative noise impacts during construction and operation.

Recommended mitigation measures for the Preferred Alternative would lessen the adverse effects related to noise. It is reasonable to assume that similar mitigation measures would be applied to related projects to reduce potentially adverse noise impacts. Each related project would be required to evaluate the existing noise environment and document whether the construction and operation of such a project would exceed established noise level standards. Although the Preferred Alternative would implement mitigation measures to reduce noise effects upon sensitive receptors, the Preferred Alternative would introduce new noise sources to the existing environment. The Preferred Alternative would therefore have a substantial contribution to the cumulative noise effect.

3.16.3.16 Energy

The area of analysis for cumulative effects related to energy includes California and Nevada, specifically San Bernardino County and Clark County. Present and future projects that could affect energy consumption within the area of cumulative analysis include transportation, public utility, energy, and development projects.

The Preferred Alternative in combination with the related transportation, development, public utility, and energy projects would result in cumulative impacts related to energy and electricity consumption. Capacity improvements on the I-15 freeway would increase the number of passenger trips on I-15 between Victorville and Las Vegas. By the year 2030, an increase of approximately 20,770,000 MMBTUs, or 3.8 million barrels of oil, would be used for automobile transportation on the I-15 freeway. While the Preferred Alternative would provide a mode shift from automobile travel from Victorville to Las Vegas, the capacity improvements on I-15 would contribute to an increase in automobile energy consumption on this highway. Additionally, implementation of the SNSA and

Southern Nevada Regional Heliport would also contribute to energy consumption, as these projects would promote air travel within the cumulative area. The California High Speed Rail project would have similar energy effects as the Preferred Alternative, as it is also a high speed rail project and would provide a mode shift from automobile and air travel, which would have the potential to have a net positive effect on energy consumption.

Development projects would also cumulatively contribute to energy consumption within the area of cumulative analysis. The allowable development within the Desert Gateway Specific Plan area would require the consumption of energy for development and operation of the proposed urban uses within the previously open, low-density area. While on a smaller scale than the Desert Gateway Specific Plan, the Mixed-Use Development near Jean, Nevada would also require the consumption of energy for construction and operation of such facilities.

Construction of the related projects in combination with the Preferred Alternative would also affect energy consumption, as a commitment of energy resources would be required for construction. Project-specific analyses would be required to determine the payback periods for these related projects, if applicable.[33] However, mitigation similar to that included as part of the Preferred Alternative, such as a construction energy conservation plan or the use of efficient construction equipment, would reduce the commitment of non-renewable energy resources for these related projects.

Conversely, the proposed wind and solar energy projects, such as the ISEGS project, could result in beneficial energy effects in California. These projects would use renewable energy resources to create power and electricity to serve California, reducing the need for new or expanded power plants that utilize non-renewable sources (oil, gas, nuclear, etc.). Energy produced by these wind and solar energy projects could potentially contribute to the electricity required by the Preferred Alternative, thus promoting the use of renewable resources and the reduction of petroleum dependence.

While the Preferred Alternative in combination with the related projects would constitute cumulative energy effects, the Preferred Alternative would not substantially contribute to a cumulative impact. As discussed in **Section 3.13.2.3** of this Final EIS, the electricity required for the Preferred Alternative would constitute only 0.02 and 0.08 percent of the projected statewide electricity demand in California and Nevada, respectively.

The Preferred Alternative is anticipated to reduce energy consumption overall because of the mode shift (from auto to train) that would occur with the project. Additionally, the energy consumed for construction of the Preferred Alternative would be recovered within three years (the energy payback period). Mitigation strategies to address construction energy use, including implementation of a construction energy conservation plan, would

[33] Energy "payback" means the number of years required to "pay back" the energy used in construction via operational energy consumption savings. The payback period is calculated by dividing the estimate of construction energy by the amount of energy that would later be saved by the action.

conserve energy resources. Since the Preferred Alternative would have a beneficial overall effect of reducing energy use over time, the Preferred Alternative would not have a considerable contribution to the cumulative energy effect.

3.16.3.17 Biological Resources

The area of cumulative analysis includes the areas designated for the Preferred Alternative and immediately adjacent lands and waterways containing sensitive biological resources.

Present and future projects that could contribute to cumulative impacts to the identified biological resources within the area of cumulative analysis include transportation, development, energy projects, and public utility projects. Capacity improvements to I-15, the SNSA, and the Southern Nevada Regional Heliport would all be located within close proximity to identified plant and wildlife resources. The anticipated development associated with the Mixed-Use Development project would affect biological resources near Jean. The Desert Gateway Specific Plan would also allow development in the same area as the Preferred Alternative Victorville Station and OMSF, which contains special-status plant and wildlife species and associated habitat, including desert tortoise and Mohave ground squirrel habitat. The solar and wind energy projects on BLM lands, in addition to the Ivanpah Energy Center, would also have the potential to disrupt biological resources, particularly near Barstow and Primm.

Conversely, the West Mojave Plan would have a beneficial effect on biological resources in the area of cumulative analysis, as it seeks to preserve and restore such resources.

The Preferred Alternative in combination with the related projects would result in the conversion of open space lands to developed land, contributing to the loss of ruderal habitats, wetland habitats, and other biological resources in the area of cumulative analysis. There would be an associated loss of common plant and animal species, and a cumulative loss of habitat for common special-status species. Transportation, development, energy, public utility, and natural resource projects would cumulatively affect plant and animal species, including the desert tortoise, Mojave ground squirrel, and numerous special-status plant species. Overall, the Preferred Alternative, in combination with past, present, and future projects, would result in a cumulative impact to special status plants and animals and their associated habitats.

Biological resources impacts related to the I-15 capacity improvements in combination with the Preferred Alternative would primarily affect the same biological resources as the Preferred Alternative, with the exception of areas north of Mountain Pass, where the Preferred Alternative rail alignment diverges from the I-15 freeway corridor. Capacity improvements on I-15 could directly impact additional special-status plant and animal species, particularly the Mojave ground squirrel and various special-status plants.

Present and future public utility projects, including the EITP, expansion of the Kinder-Morgan Calnev Pipeline, and the Kern River Gas Mountain Pass Lateral, would also have a cumulative adverse effect on biological resources, including special-status plant and

animal species. The expansion of the Kinder-Morgan Calnev Pipeline would, however, have similar cumulative biological impacts, as it would primarily follow the Preferred Alternative rail alignment, except just north of Mountain Pass. However, cumulative impacts would be focused on construction-related impacts, as the expansion would only construct a 16-inch pipeline adjacent to existing pipelines.

The related development and energy projects would cumulatively affect biological resources near Barstow and the California-Nevada state line. The Mixed-Use Development project near Jean would cumulatively affect the large-scale translocation site for Desert Tortoise on the west side of I-15, as the Preferred Alternative rail alignment would traverse the eastern boundary of the translocation site.

Wind energy projects between Victorville and Barstow and near the California-Nevada state line would also cumulatively impact biological resources. The ISEGS project incorporated desert tortoise relocation and translocation mitigation to reduce the adverse effects of the specific development. The Preferred Alternative rail alignment would cross through a designated desert tortoise relocation area and would cross between two translocation areas identified for the ISEGS project. Thus, the Preferred Alternative in combination with the ISEGS project would represent substantial cumulative effects to desert tortoise habitat and other sensitive species in the area north of Mountain Pass.

Construction and operation of the related projects in conjunction with the Preferred Alternative would also have the potential to cumulatively affect designated Special Management Lands. The Preferred Alternative would adversely affect the Superior-Cronese Desert Tortoise Critical Habitat. This Special Management Land has already sustained substantial losses of acreage due to past large projects, including the Fort Irwin expansion project. Therefore, development of the Preferred Alternative and the related projects would further degrade the quality of these Special Management Lands.

Conversely, the West Mojave Plan would provide a regional strategy for conserving plant and animal species in the area of cumulative analysis. Implementation of the West Mojave Plan could reduce cumulative impacts to plant and animal species, as plans and policies would be set in place for preserving and conserving biological resources that could potentially be affected by future development.

Section 3.14.3 of this Final EIS includes recommended mitigation measures to reduce the adverse biological effects of the Preferred Alternative. Similar mitigation measures would be applied to each individual related project to reduce potentially adverse impacts to biological resources. Each individual project would be required to evaluate the biological conditions of the site and document the suitability of special-status plant and animal species on the site. While mitigation would reduce impacts to biological resources, when taken collectively, the Preferred Alternative would have a considerable contribution to the cumulative effects to biological resources.

Lenwood
Barstow
CACA 049202
CACA 049204
CACA 051772
CACA 044975
Segment 2C
Segment 1
Victorville Station (VV3)
Victorville OMSF (OMSF 2)
Oro Grande
Desert Gateway Specific Plan
High Desert Corridor
Adelanto
Victorville
24

Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

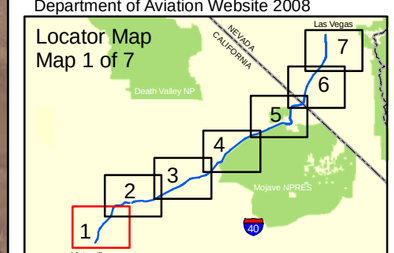
1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008

Locator Map
Map 1 of 7



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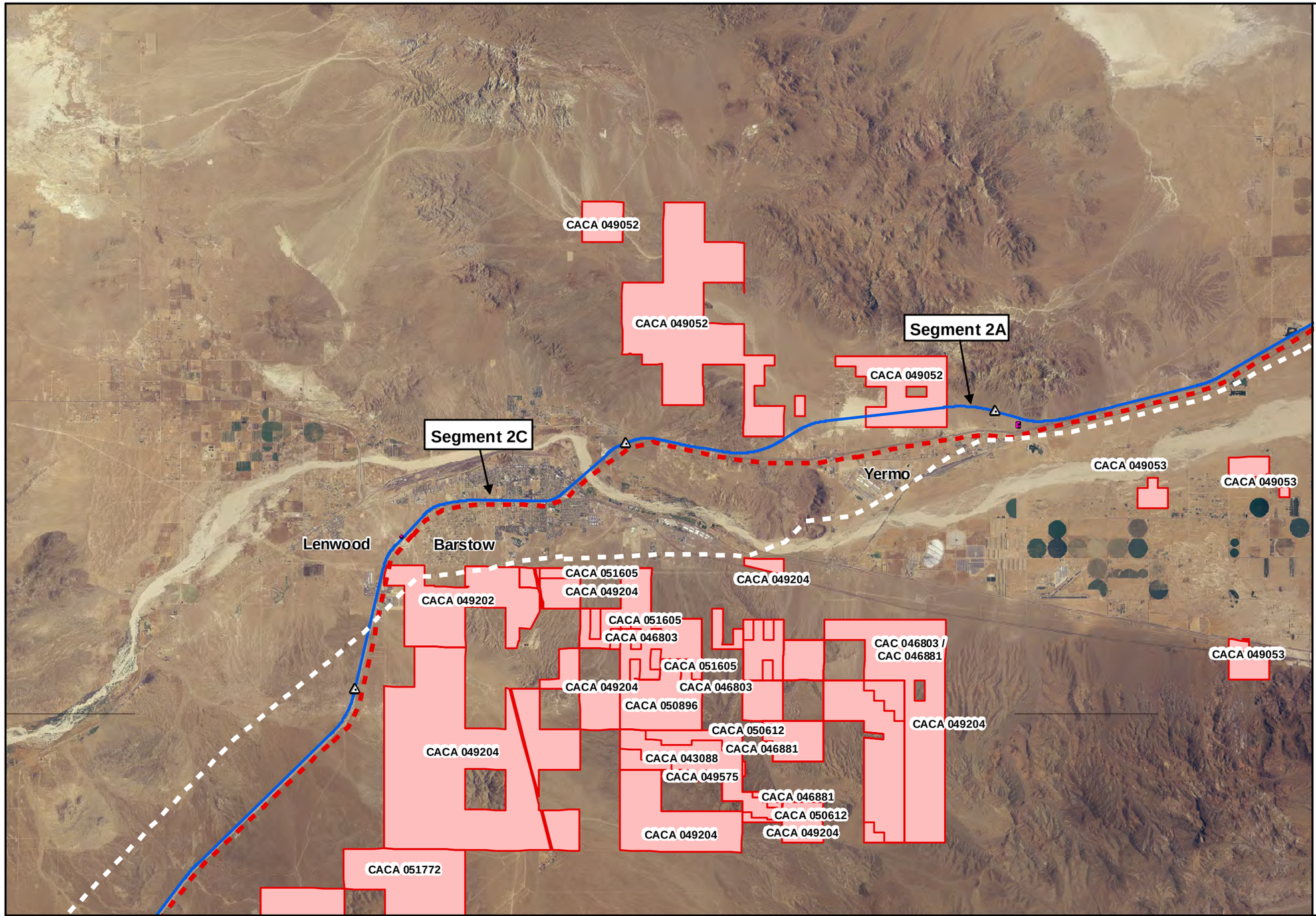
Federal Railroad Administration

DesertXpress
Final EIS

Potential Cumulative Projects (1)

FIG F-3.16-1

Source: Geografika Consulting 01.25.11



Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

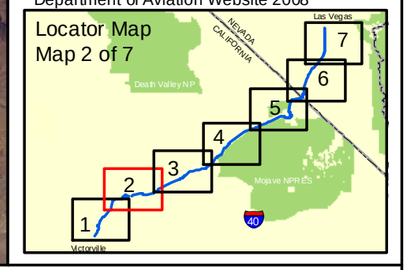
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008



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Final EIS

Potential Cumulative Projects (2)

FIG F-3.16-2

Source: Geografika Consulting 01.27.11

Segment 3B

CACA 049053

CACA 049053

CACA 048472

Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

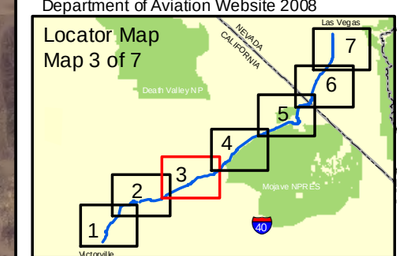
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008



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Federal Railroad Administration

DesertXpress
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Potential Cumulative Projects (3)

FIG F-3.16-3

Source: Geografika Consulting 01.27.11

CACA 047455

Halloran Springs

CACA 048741

Baker

Baker MOW

CACA 049584

Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

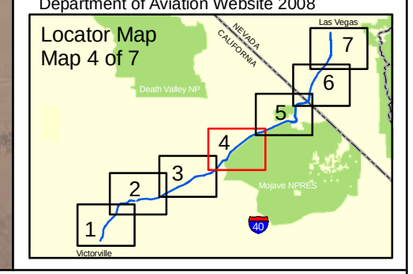
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008



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Potential Cumulative Projects (4)

FIG F-3.16-4

Source: Geografika Consulting 01.25.11

Primm

Segment 4C

Fast Food Restaurant

Ivanpah Dry Lake Recreation Area

Nextlight Silver State South Solar Project

CACA 048669

ISEGS Project Site (CACA 048668)

Ivanpah Substation (Approximate Location)

I-15 Joint Port of Entry (Approximate Location)

NEVADA

CALIFORNIA

Molycorps Minerals, LLC Mountain Pass Mine

Segment 3B

Segment 4C

CACA 044988

Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)
- Kern River Gas Mountain Pass Later (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

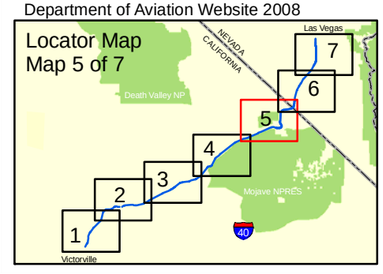
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008



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DesertXpress
Final EIS

Potential Cumulative Projects (5)

FIG F-3.16-5

Source: Geografika Consulting 02.15.11

Segment 6B

Segment 5B

Ivanpah Energy Center

Mixed Use Development

Jean

Eldorado to Ivanpah Transmission Project (Approximate Corridor)

McCullough Pass Southern Nevada Solar Project

Southern Nevada Supplemental Airport Site

NEVADA

CALIFORNIA

Primm

Fast Food Restaurant

Segment 4C

Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008

U.S. Department of Transportation Federal Railroad Administration

DesertXpress
Final EIS

Potential Cumulative Projects (6)

FIG F-3.16-6

Source: Geografika Consulting 01.26.11

Las Vegas Central Station B

Bonneville Transit Center

Las Vegas Southern Station

Segment 6B

Wigwam Avenue MSF

Frias Substation

Proposed Southern Nevada Regional Heliport (Approximate Location)

Segment 6B

Segment 5B

Legend

Potential Cumulative Projects

- Completed Project Site
- Project Site
- I-15 Capacity Improvements
- Expansion of Kinder-Morgan CalNev Pipeline System (Approximate Location)
- Eldorado to Ivanpah Transmission Project (Approximate Corridor)
- Kern River Gas Mountain Pass Later (Approximate Corridor)

DesertXpress Alignment

- Preferred Alternative

Ancillary Facility Sites

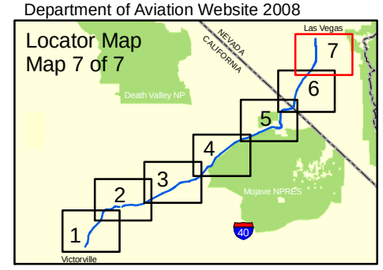
- Stations
- Maintenance Facility Sites
- Temporary Construction Area (TCA)
- Autotransformer
- Electric Utility Corridor

1 inch equals 2.5 miles

0 1.5 3 Miles

NORTH

Source: DesertXpress 2007, ESRI 2005, NAIP, CirclePoint 2008-2011, Clark County Department of Aviation Website 2008



U.S. Department of Transportation
Federal Railroad Administration

DesertXpress
Final EIS

Potential Cumulative Projects (7)

FIG F-3.16-7

Source: Geografika Consulting 02.27.11

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3.17 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENTS OF PUBLIC RESOURCES

Implementation of the Preferred Alternative would involve a commitment of a range of natural, physical, human, and fiscal resources. The public and private lands that would be used for the rail line, stations, maintenance and other ancillary facilities would be considered an irreversible commitment during the time period that the land is used for a project. However, if a greater need arises for use of the land or if the rail line and facilities are no longer needed, the land could be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and construction materials such as cement, aggregate, and bituminous material would be expended to construct the project. Additionally, large amounts of labor and natural resources are used in the making of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of funds, which are not retrievable.

The commitment of these resources is based on the concept that residents and businesses within the region would benefit from the improved quality of the transportation system. These benefits would consist of improved accessibility, increased capacity and energy savings, which are expected to outweigh the commitment of these resources.

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3.18 SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

Project implementation would potentially result in attainment of short-term and long-term transportation and economic objectives at the expense of some long-term social, aesthetic, biological, noise, and other land use impacts.

3.18.1 PREFERRED ALTERNATIVE

Potential short-term losses include: Economic losses experienced by businesses (and affiliated governments) whose revenues are highly dependent upon visitor/passby traffic on I-15. Further economic losses for businesses affected by temporary construction impacts such as noise, traffic delays, or detours. Construction-period air quality impacts and energy consumption.

Potential short-term benefits include: Increased jobs and revenue generated during construction.

Potential long-term losses include: Permanent loss of plant and wildlife resources, visual impacts, conversion of farmlands, noise increases, cultural resource site values, and use of construction materials. Indirect negative economics effect to Barstow area due to expected reduction in auto travel on I-15 and decreased business activity for visitor-serving uses.

Potential long-term gains include: Improvement of the transportation network of the region and the project vicinity, increased capacity and reduction of congestion on the I-15 freeway, construction and operation of the project by a private entity, increased jobs, increased revenue through creation of new passenger train operation, and associated beneficial growth and development near project nodes. Reduction of energy consumption associated with mode shift from automobile to train.

3.18.2 NO ACTION ALTERNATIVE

Potential short-term losses include: those similar to the construction of the Preferred Alternative in areas where freeway capacity improvements would be developed.

Potential short-term benefits include: Some increased jobs and revenue generated during construction of freeway improvements, but the benefits would be realized over a longer period of time and thus more diffuse in nature than those associated with the Preferred Alternative.

Potential long-term losses include: those similar to portions of the Preferred Alternative constructed in the freeway right of way, including permanent loss of plant and wildlife resources, visual impacts, conversion of farmlands, noise increases, cultural

resource site values lost, and use of construction materials. Increased dependence on the automobile in the corridor between Southern California and Las Vegas; associated adverse effects to regional air quality and relative increase in energy consumption.

Potential long-term gains include: Some increased capacity and reduction of congestion on the I-15 freeway where future expansions are currently planned.

3.19 UNAVOIDABLE ADVERSE EFFECTS

This section describes all potentially significant adverse effects resulting from the implementation of the Preferred Alternative. These effects cannot be fully avoided, reduced, or minimized with the mitigation measures presented in this Final EIS.

The development of a high-speed passenger rail service from Victorville, California, to Las Vegas, Nevada, would result in unavoidable adverse effects to the physical and human environment. As described below, the Preferred Alternative would cause unavoidable adverse effects in the following resource categories:

Farmlands and Grazing Lands: permanent conversion of about 442 acres of designated grazing lands. Refer to **Section 3.3.2.3** of this Final EIS for a complete discussion regarding the Preferred Alternative's impacts on grazing lands.

Visual Resources: Permanent visual change to visually sensitive areas along rail alignment. Refer to **Section 3.6.2.3** of this Final EIS for a complete discussion regarding the Preferred Alternative's impacts on visual resources.

Hydrology and Water Quality: Permanent effects to existing channels, overall increase in impervious area coverage. Refer to **Section 3.8.2.3** of this Final EIS for a complete discussion regarding the Preferred Alternative's impacts on hydrology and water quality.

Biological Resources: Permanent conversion of sensitive habitat areas, including those associated with the Desert Tortoise and Mohave ground squirrel; loss of BLM special management lands. Refer to **Section 3.14.2.3** of this Final EIS for a complete discussion regarding the Preferred Alternative's impacts on biological resources.

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