

surrounding urban development and utilitarian visual features. Since the existing landscape is not unified or intact, AAA 8 would do little to detract from the intactness or unity of the viewshed. The elevated structure and passing trains would disrupt views to the west. The overall visual quality would remain low with AAA 8.

**Portions of AAA 8 Outside of I-15 Freeway Corridor:** Similar to Segment 6B evaluated in **Section 3.6.4.2** of the Draft EIS, the alignment adjustment would traverse through an area of low visual quality. **Figure S-3.6-9** shows that while the alignment adjustment would traverse through the median of Dean Martin Drive/Industrial Road, the elevated rail alignment and associated concrete pillars would not detract from the limited intactness and unity of the existing view. The alignment adjustment would result in a reduction in vividness, as views to the north of the distant mountains for motorists traveling on northbound I-15 and Dean Martin Drive/Industrial Road would be disrupted by the elevated structure. The visual quality with the alignment adjustment would remain low with implementation of AAA 8.

### **Wigwam MSF Modification**

The visual effects associated with the Wigwam MSF modification would be similar to the effects of the Wigwam MSF evaluated in **Section 3.6.4.2** of the Draft EIS. **Figure S-3.6-10** illustrates that the Wigwam MSF would be located behind a concrete wall when viewed from the I-15 freeway. The Wigwam MSF modification would not substantially change this condition but would reorient the trackway to enter the MSF from the south rather than the north as shown in the figure. The modification to the Wigwam MSF would not be out of character with the existing landscape due to the presence of the existing I-15 transportation corridor and existing overhead electric transmission lines. With the modification, the Wigwam MSF would not decrease the already low visual quality of the existing environment.

### **Profile Modification**

#### *Evaluation under BLM Criteria*

The Segment 3B profile modification would depress the rail alignment approximately 6 to 8 feet below grade within a retained cut for a distance of about 1.3 miles. Implementation of this profile modification would reduce the visibility of the train from the I-15 freeway when compared to the Segment 3B evaluated in **Section 3.6.4.2** of the Draft EIS. Additionally, a wall would be constructed between the I-15 freeway and rail alignment, which would preclude views of the profile modification for motorists on the I-15 freeway corridor. **Figure S-3.6-11** provides a visual simulation of the Segment 3B profile modification, as seen from the southbound I-15 freeway corridor. The wall and upper portions of the overhead catenary features would be visible to the north from motorists traveling on I-15. The wall would become the primary visual feature and would block views of the mountains to the north. Views of the mountains to the south and west would remain undisturbed. Similar to Segment 3B evaluated in **Section 3.6.4.2** of the Draft EIS, the profile modification would remain contrast with the existing environment.

### *Evaluation under FHWA Criteria*

The Segment 3B profile modification would be seen by motorists traveling on I-15 when looking north. The wall and upper portions of the overhead catenary features would be visible, resulting in a decrease in the overall vividness of the undeveloped desert landscape. Views of undeveloped lands and mountains to the north would be replaced with less vivid views of a wall in the foreground of the landscape. Refer to **Figure S-3.6-11** for a visual simulation of the Segment 3B profile modification for motorists travelling southbound on the I-15 freeway corridor. The profile modification would result in a reduction in intactness and unity as well. Nonetheless, the profile modification would result in a decrease in the existing visual quality, similar to Segment 3B as evaluated in **Section 3.6.4.2** of the Draft EIS.

## 3.6.4 MITIGATION MEASURES

**Mitigation Measures VIS-1** through **VIS-6** identified in **Section 3.6.5.1** of the Draft EIS would be applied to the new rail alignments, station site option, operations and maintenance facilities, alignment adjustments, and profile modifications to reduce potentially adverse effects related to operational visual effects. In regards to potential visual compatibility issues associated with the Frias Substation, **Mitigation Measure VIS-3** would be applied.

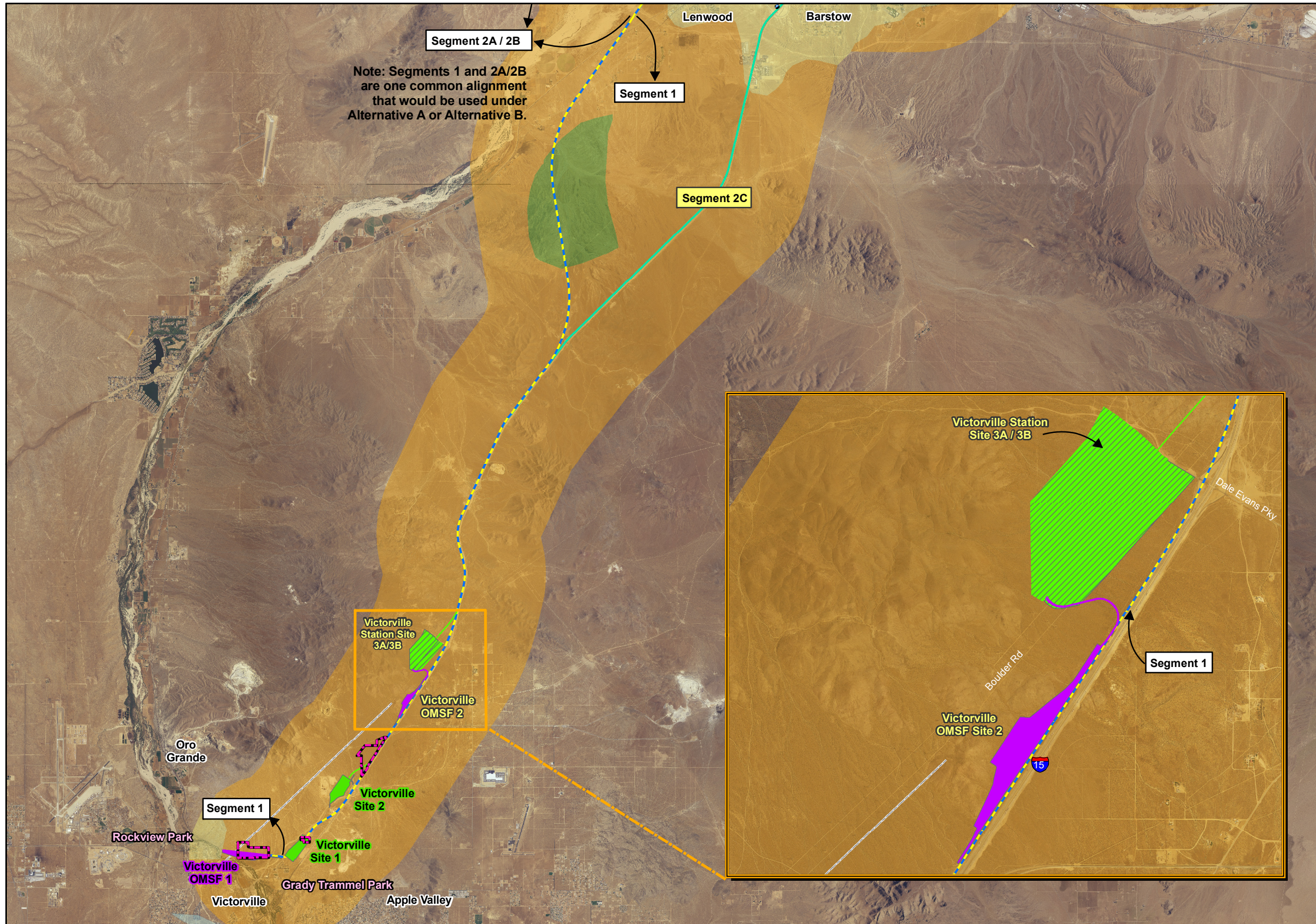
**Mitigation Measures VIS-7** through **VIS-10** identified in **Section 3.6.5.2** of the Draft EIS would also be applied to the additional alternatives to reduce potentially significant effects associated with construction of the project modifications and additions. No new mitigation would be required. The relevant mitigation measures from **Sections 3.6.5.1** and **3.6.5.2** of the Draft EIS are summarized below:

- **Mitigation Measure VIS-1** – Requires rail features, including pillars, raised tracks, catenary structures, embankments, and crash barriers, to be designed to blend with or represent the surrounding desert environment. Final design of the rail features within the I-15 right-of-way shall be reviewed by the California Department of Transportation (Caltrans) or the Nevada Department of Transportation (NDOT) as appropriate.
- **Mitigation Measure VIS-2** – Requires the Victorville Station and associated elements to be developed with architecture, muted colors, and landscaping that reflect the surrounding desert aesthetic.
- **Mitigation Measure VIS-3** – Requires maintenance facilities to be aesthetically appropriate for the surrounding desert landscape through the use of muted colors and desert landscaping.
- **Mitigation Measure VIS-4** – Requires contour grading techniques to be applied where feasible to reduce the visual appearance of cut and fill slopes. **Mitigation Measure VIS-5** – Requires lighting at station and maintenance facilities outside of the Las Vegas metropolitan area to be designed to minimize disruption of the natural dark at night in the desert landscape.

- **Mitigation Measure VIS-6** – Requires stations to provide interpretive displays and artwork in pedestrian areas in order to create a coherent pedestrian landscape and sense of place.
- **Mitigation Measure VIS-7** – Requires construction to 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** – Requires construction crews working at night to direct any artificial lighting into the work area to minimize the spillover of light or glare onto adjacent areas.
- **Mitigation Measure VIS-9** – Requires visual screening to be erected along construction and staging areas as appropriate.
- **Mitigation Measure VIS-10** – Requires the replacement of landscaping that will be removed during construction, as directed by Caltrans or NDOT as appropriate. Replacement landscaping shall occur within 6 months of construction.

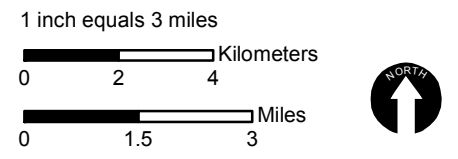
### 3.6.5 RESIDUAL IMPACTS FOLLOWING MITIGATION

Despite the incorporation of the aforementioned mitigation measures, the modifications and additions to the project would result in the permanent introduction of new elements to the project area, ultimately resulting in a permanent visual change within the viewshed. This residual impact is consistent with that of the action alternatives evaluated in **Section 3.6.5.3** of the Draft EIS.

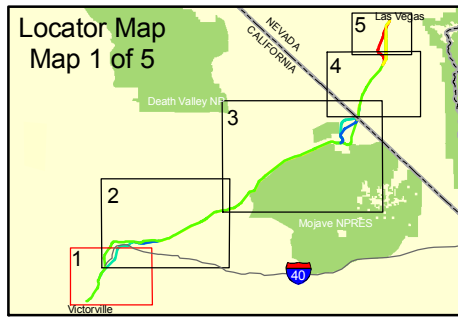


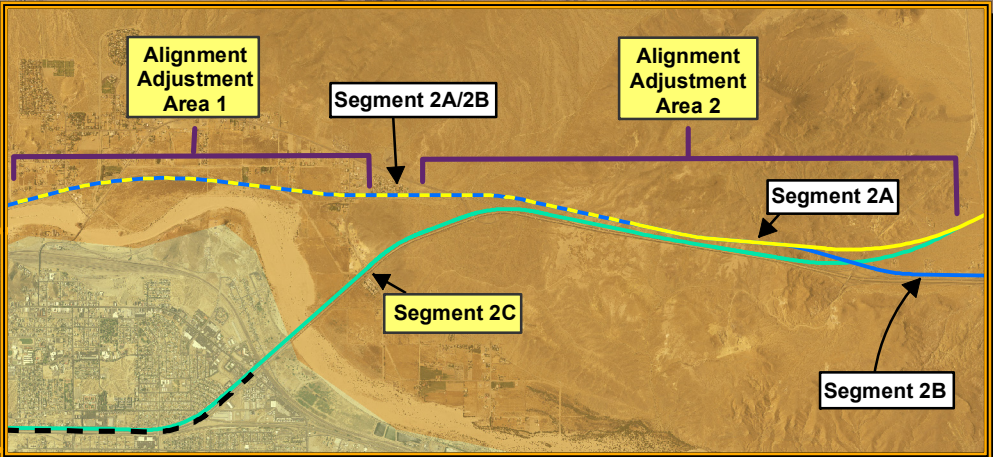
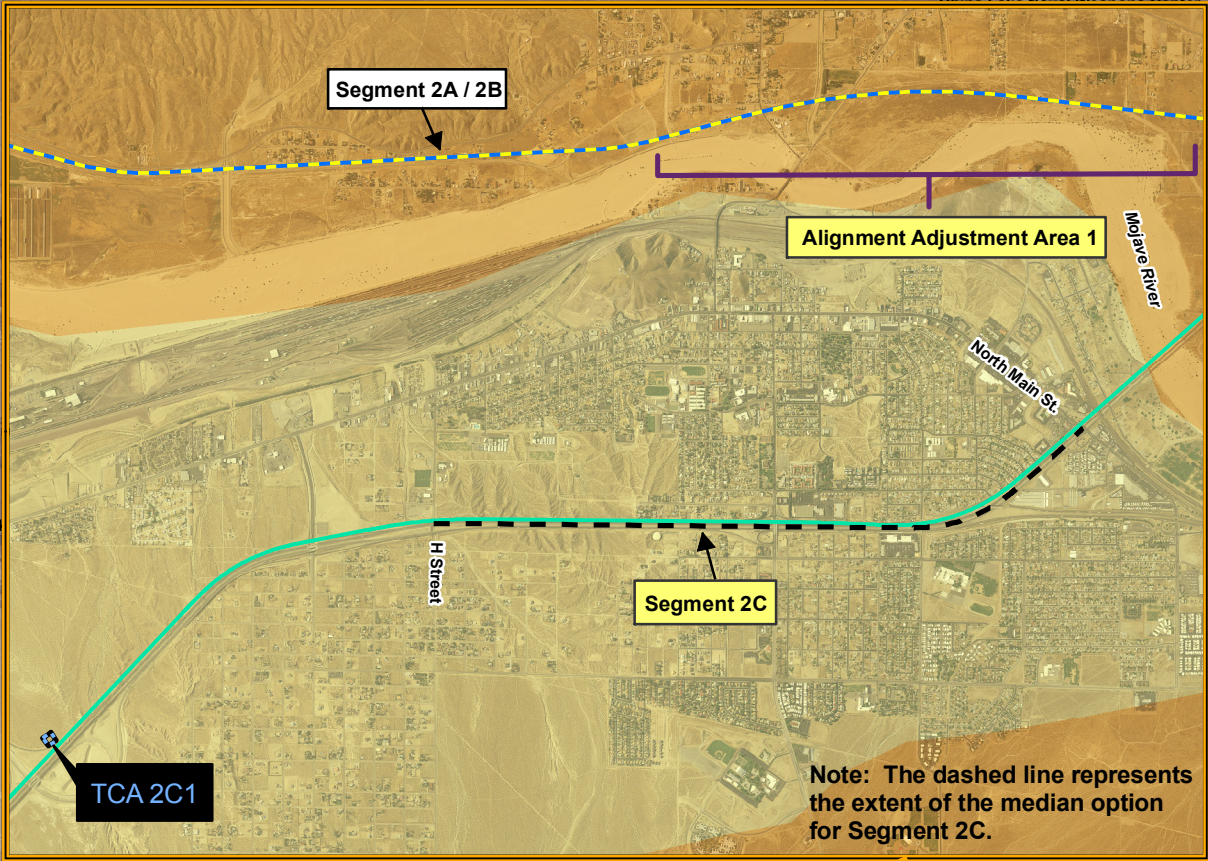
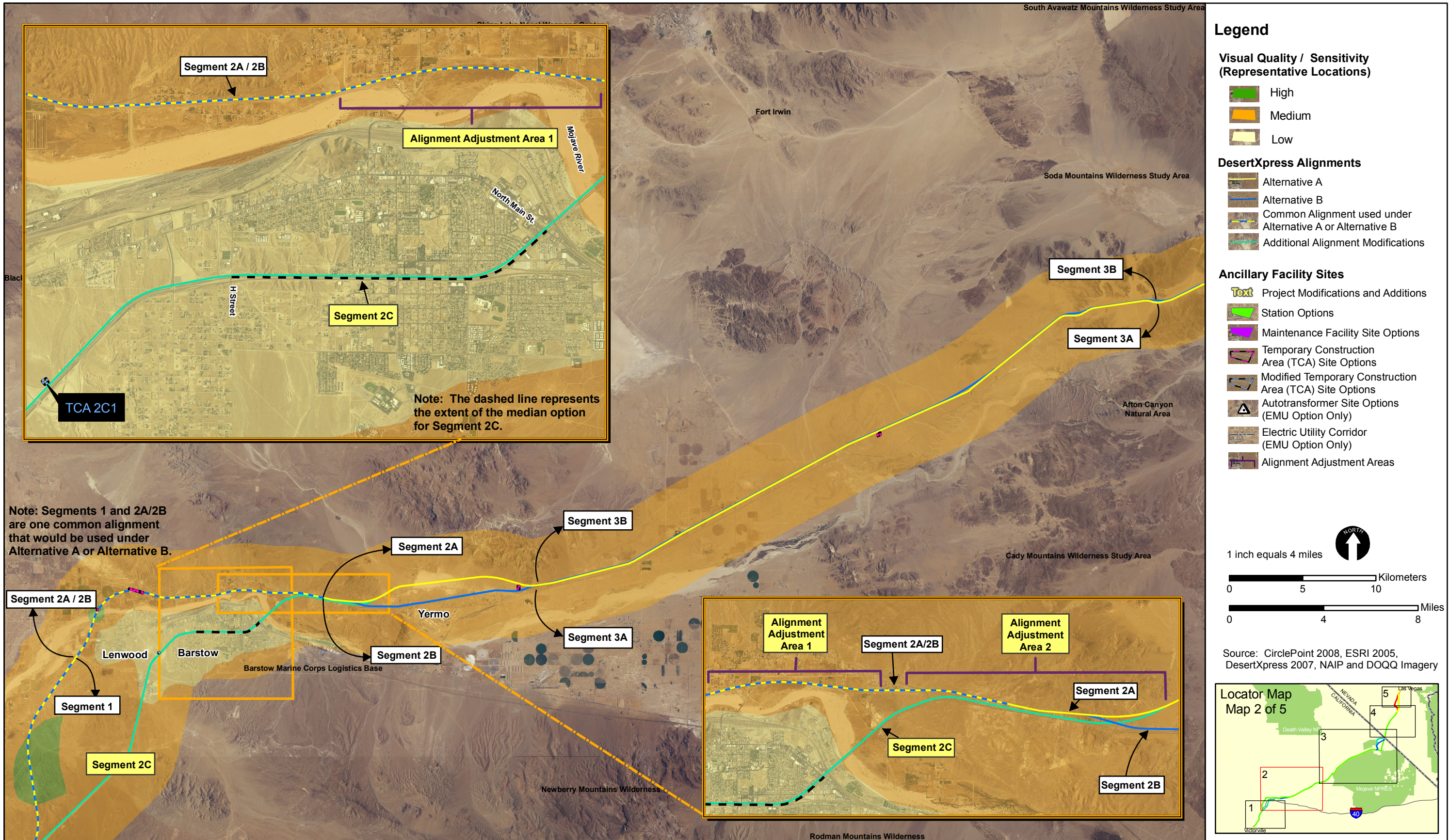
Note: Segments 1 and 2A/2B are one common alignment that would be used under Alternative A or Alternative B.

- ### Legend
- Visual Quality / Sensitivity (Representative Locations)**
- High
  - Medium
  - Low
- 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
  - 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

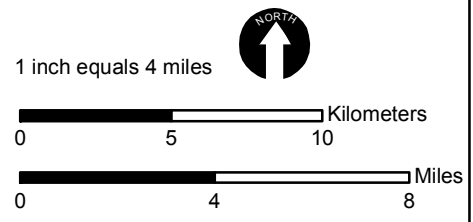


Source: CirclePoint 2008, ESRI 2005, BLM, DesertXpress 2007, NAIP and DOQQ Imagery

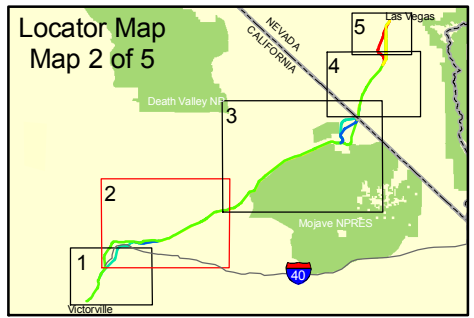


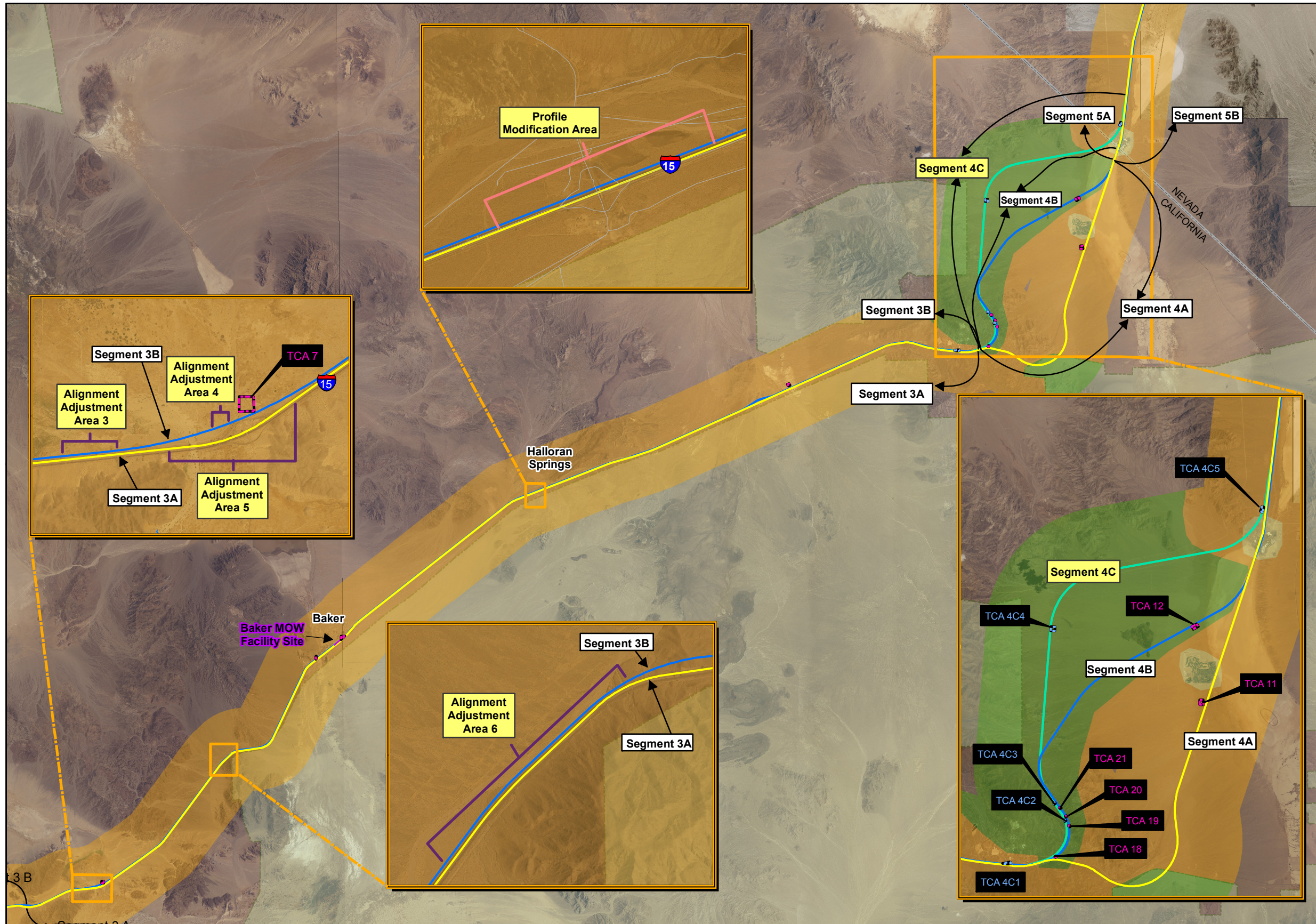


- ### Legend
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  - Medium
  - Low
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  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications
- Ancillary Facility Sites**
- Text** Project 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



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





**Legend**

**Visual Quality / Sensitivity (Representative Locations)**

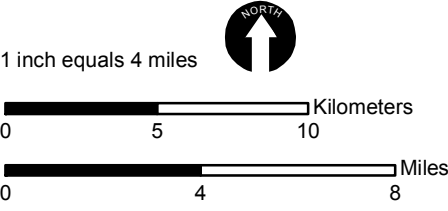
- High
- Medium
- Low

**DesertXpress Alignments**

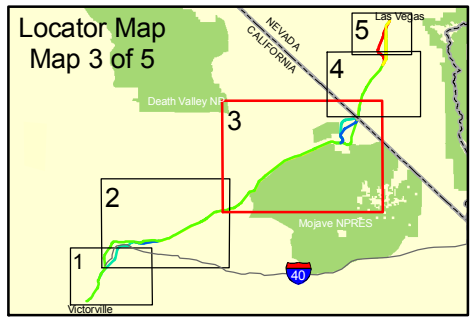
- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

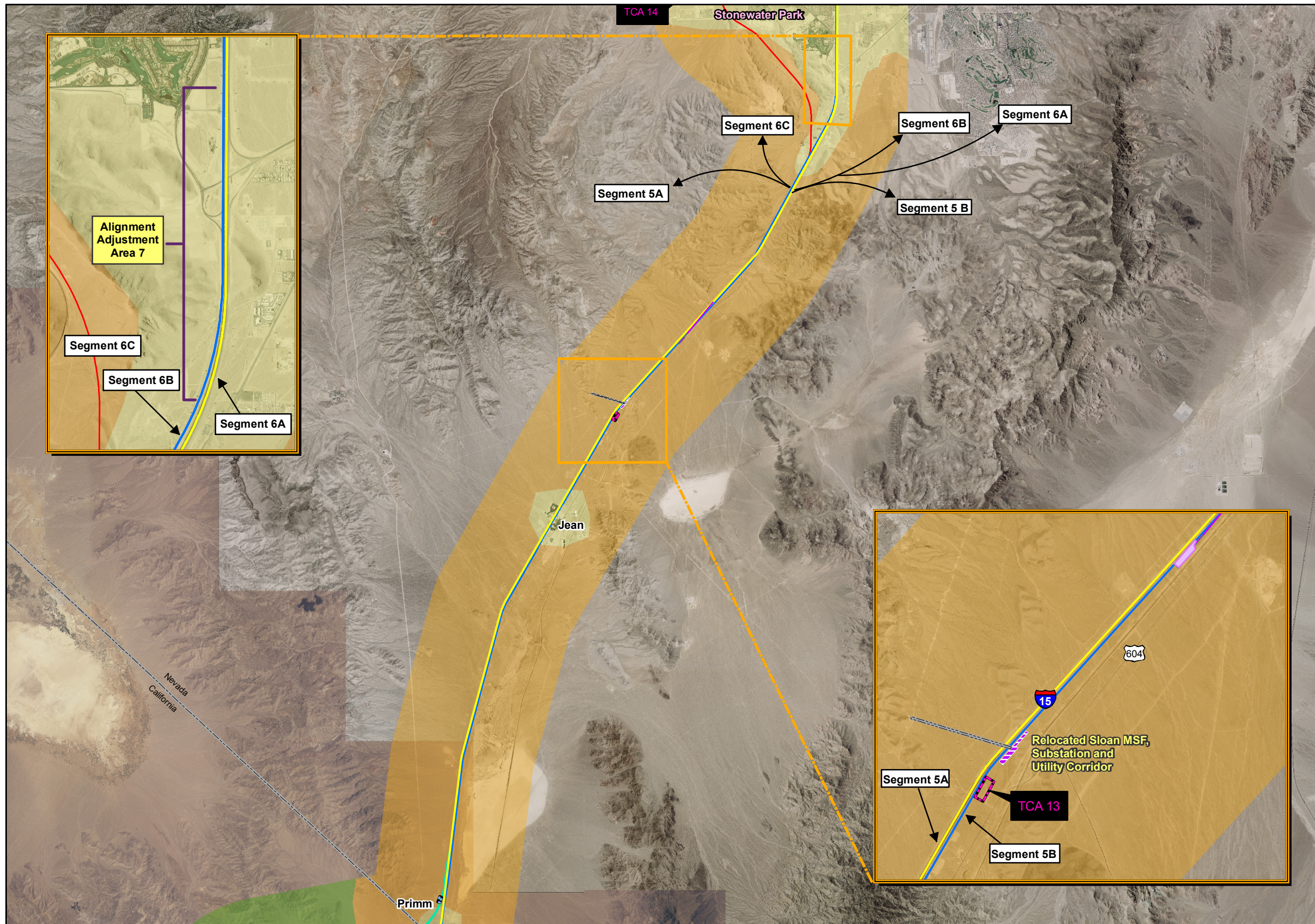
**Ancillary Facility Sites**

- 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



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





**Legend**

**Visual Quality / Sensitivity (Representative Locations)**

- High
- Medium
- Low

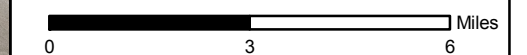
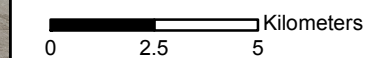
**DesertXpress Alignments**

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

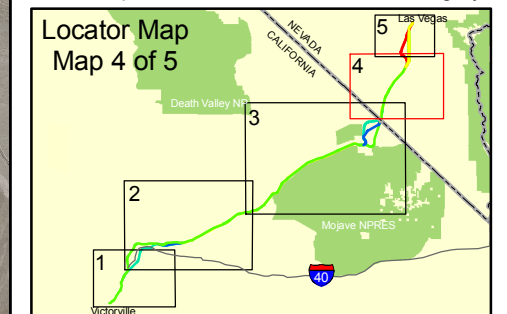
**Ancillary Facility Sites**

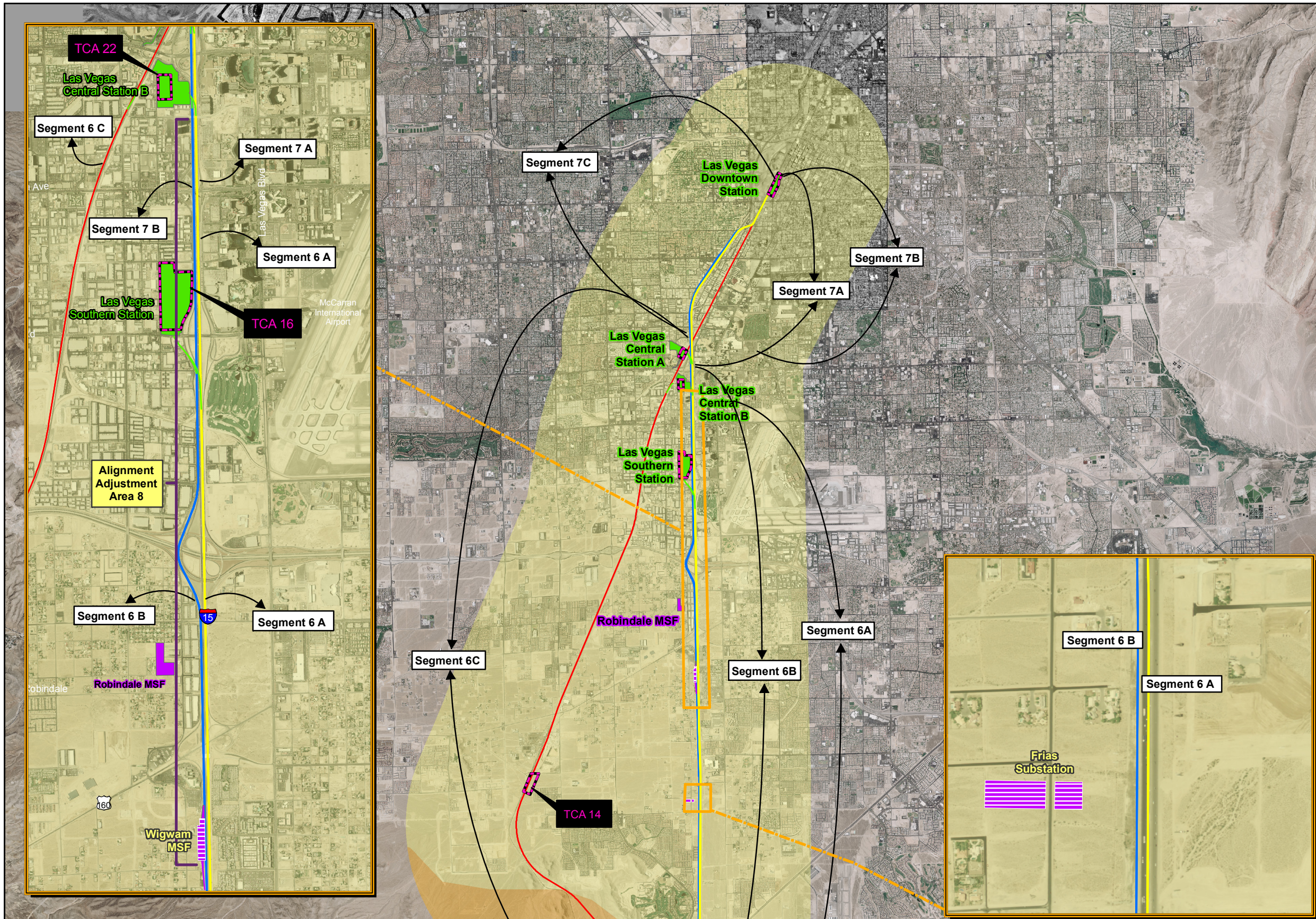
- Text** Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Relocation Sloan MSF / Substation Site Option
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)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

1 inch equals 3 miles



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





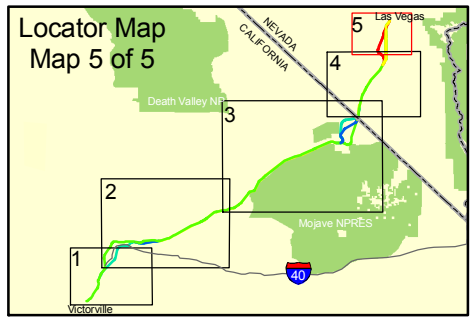
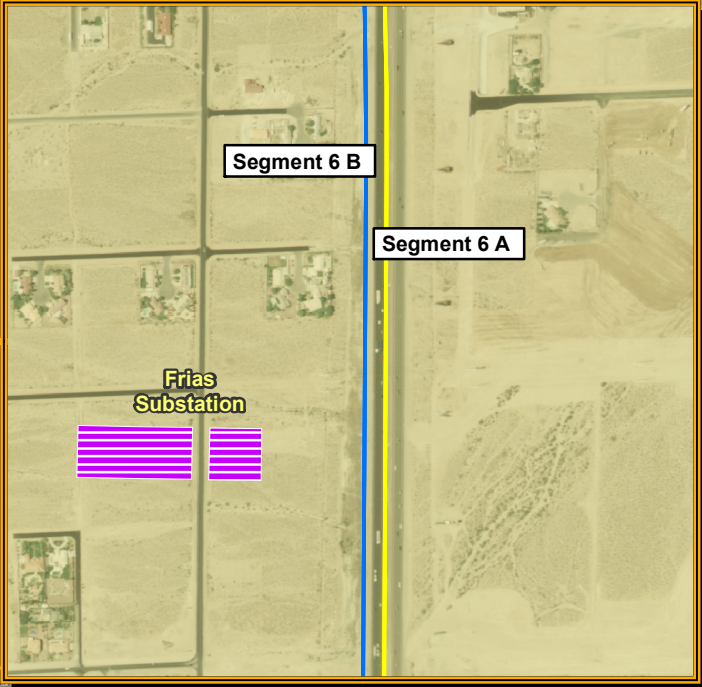
- ### Legend
- Visual Quality / Sensitivity (Representative Locations)**
- High
  - Medium
  - Low
- DesertXpress Alignments**
- Alternative A
  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications
- Ancillary Facility Sites**
- Text** Project Modifications and Additions
  - Station Options
  - Maintenance Facility Site Options
  - Frias Substation and Wigwam MSF Modifications
  - 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 2 miles

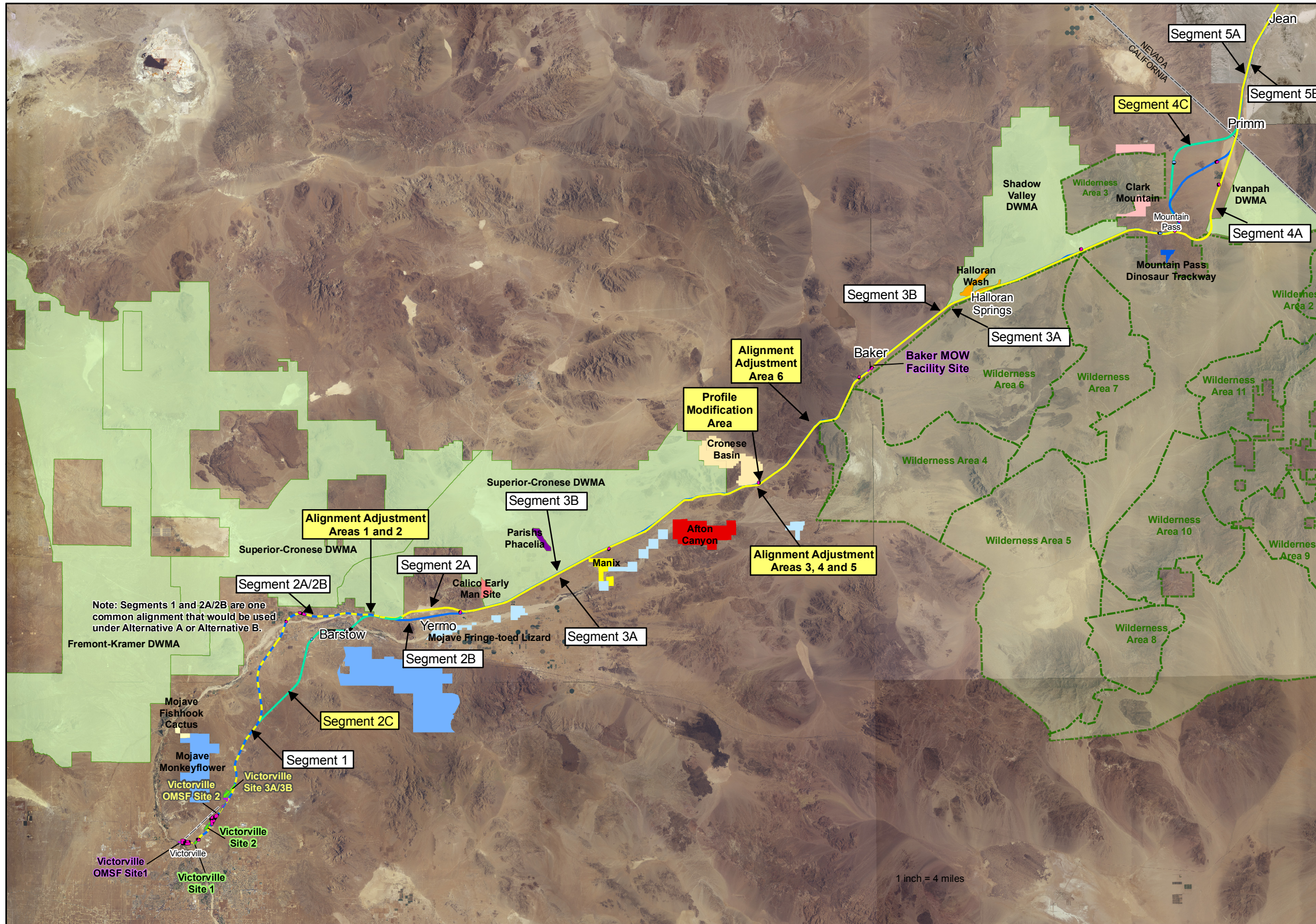
0 1.25 2.5 Kilometers

0 1 2 Miles

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







**Legend**

**Areas of Critical Environmental Concern**

- Afton Canyon
- Calico Early Man Site
- Clark Mountain
- Cronese Basin
- Halloran Wash
- Manix
- Mojave Fishhook Cactus
- Mojave Fringe-toed Lizard
- Mojave Monkeyflower
- Mountain Pass Dinosaur Trackway
- Parishs Phacelia
- BLM Designated Wilderness Mngt Area

**National Park Lands**

- Mojave National Preserve
- Wilderness Areas

**DesertXpress Alignments**

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

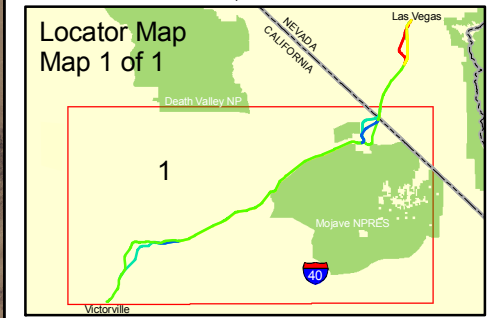
**Ancillary Facility Sites**

- Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Electric Utility Corridor (EMU Option Only)

1 inch equals 10.5 miles

0 5 10 Miles

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





Existing view from I-15 eastbound



Visual simulation of Victorville Station 3A

*Note: The visual simulation of the VV3B site option would be similar to the conditions shown here, as the railroad tracks and station building are proposed for the exact same location. However, the surface parking shown here, beneath the electrical utility lines, would be located behind the station building under option VV3B*



U.S. Department  
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**DesertXpress -  
Modifications to the Draft EIS**

**View Comparison,  
Victorville Station Site 3A**

**FIG**

**S-3.6-7**

Source: Environmental Vision, 2009



Existing view from Main Street looking southeast (Barstow, CA)





Existing view of Dean Martin Drive/Industrial Road near West Ali Baba Lane looking northeast (Las Vegas)



Visual simulation of Alignment Adjustment Area 8 on Dean Martin Drive



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**DesertXpress -  
Modifications to the Draft EIS**

*View Comparison,  
Alignment Adjustment Area 8*

**FIG**

**S-3.6-9**

Source: Environmental Vision, 2009



Existing view from westbound I-15 of Wigwam MSF site option



KOP 8, Visual simulation of Wigwam MSF Modification



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**DesertXpress -  
Modifications to the Draft EIS**

*View Comparison,  
Wigwam MSF Modification*

**FIG S-3.6-10**

Source: Environmental Vision, 2009



Existing view from I-15 westbound near Halloran Springs



Visual simulation of Profile Modification Area from westbound I-15 near Halloran Springs



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**DesertXpress -  
Modifications to the Draft EIS**

*View Comparison,  
Profile Modification Area*

**FIG**

**S-3.6-11**

Source: Environmental Vision, 2009



Existing view from Main Street looking southeast



Visual simulation of Segment 2C Side Running at Main Street overcrossing (Barstow)



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**DesertXpress -  
Modifications to the Draft EIS**

**View Comparison,  
Segment 2C  
Side Running Option**



**S-3.6-12**

Source: Environmental Vision, 2009



Existing view from Main Street looking southeast (Barstow, CA)



Visual simulation of Segment 2C Median at Main Street overcrossing (Barstow)



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**Federal Railroad  
Administration**

**DesertXpress -  
Modifications to the Draft EIS**

**View Comparison,  
Segment 2C Median  
Running Option**



**S-3.6-13**

Source: Environmental Vision, 2009



## 3.7 CULTURAL AND PALEONTOLOGICAL RESOURCES

This section describes the potential impacts on cultural resources from the project modification and additions and the mitigation measures that would reduce these impacts. Cultural resources customarily include archaeological resources, such as artifacts; 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.

### 3.7.1 AFFECTED ENVIRONMENT

The regulations and standards pertinent to archaeological, historic architecture, and paleontological resources as described in **Section 3.7.1** of the Draft EIS have not changed since publication of the Draft EIS and remain applicable to the proposed project. **Section 3.7.2.1** of the Draft EIS describes the Area of Potential Effect (APE) defined for the project consistent with Section 106 of the National Historic Preservation Act (NHPA).<sup>1</sup>

Project modifications and additions that occur within the previously recorded APE include the modification to OMSF 2, the Wigwam MSF Modification, and the Profile Modification. The affected environment for these project modifications and additions are the same as those discussed in **Section 3.7.3.1** of the Draft EIS for archaeological resources, **Section 3.7.3.2** of the Draft EIS for historic architectural resources, and **Section 3.7.3.3** of the Draft EIS for paleontological resources. These project modifications and additions relative to cultural and paleontological resources are not discussed further as part of this Supplemental Draft EIS.

The remaining project modifications and additions require an expansion of the APE. **Table S-3.7-1** lists the additional archaeological resources recorded within the expanded APE as a result of the project modifications and additions. As discussed in **Section 3.7.1.1** of the DEIS, the FRA and the cooperating agencies, with input from DesertXpress Enterprises Inc. and Native American Tribes, are developing a Programmatic Agreement (PA) for the project in compliance with Section 106. Since under the PA, a formal determination of the eligibility of cultural resources would be deferred until after the ROD is issued for the project, all potential resources have been considered and an assumption of their eligibility has been presented to inform the NEPA process. This process for deferring the PA until after the ROD has been issued has been endorsed by the signatory cooperating agencies for the PA, including the Surface Transportation Board (STB), the

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<sup>1</sup> Per 36 CFR § 800.16(d), the APE is 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. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

California and Nevada State Historic Preservation Officers (SHPOs), the California and Nevada Bureau of Land Management (BLM), the Federal Highway Administration (FHWA), and the National Park Service (NPS), and the Advisory Council on Historic Preservation (ACHP).

Table S-3.7-1 Additional Identified Archaeological Resources at Project Modifications and Additions<sup>3</sup>

Site Number	Period	Type	NRHP Eligibility <sup>a</sup>	Impact Area (Direct or Indirect) <sup>b</sup>
<b>VV3</b>				
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 NRHP 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

<sup>3</sup> For those resources identified as ineligible, neither direct nor indirect impacts would result in an adverse environmental effect. Since formal NRHP eligibility status will be determined through a PA process following conclusion of the environmental review, all potential resources, both eligible and ineligible are listed.

Site Number	Period	Type	NRHP Eligibility <sup>a</sup>	Impact Area (Direct or Indirect) <sup>b</sup>
<b>Segment 2C – Median</b>				
CA-SBR-562	Prehistoric	Prehistoric lithic quarry and reduction site; non-contributing element of Sidewinder Quarry Archaeological District	Not Eligible	Direct
CA-SBR-2283	Prehistoric	Prehistoric lithic quarry and reduction site with rock rings; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-2910H	Historic	Segment of Route 66, part of the old National Trails Highway	Eligible	Direct
CA-SBR-3486	Prehistoric	Prehistoric lithic quarry and reduction site; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-4085H	Historic	Earthen railroad berm	Assumption of Eligibility	Direct
CA-SBR-6023H	Historic	Extensive residential and commercial refuse deposit, known as the Yermo Dump	Assumption of Eligibility	Indirect
CA-SBR-6693H	Historic	Atchison, Topeka & Santa Fe railroad	Eligible	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-8323	Prehistoric	Prehistoric trail; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-8923	Multicomponent	Prehistoric lithic quarry and reduction site with historic to modern period rock cairns	Determined Not Eligible	Direct
CA-SBR-9357	Prehistoric	Prehistoric site with rock rings	Assumption of Eligibility	Direct
CA-SBR-9361H	Historic	Sidewinder Road wagon trail	Assumption of Eligibility	Direct
P-36-20375	Prehistoric	Sidewinder Quarry Archaeological District, with 45 identified contributing elements	Eligible	Direct

Site Number	Period	Type	NRHP Eligibility <sup>a</sup>	Impact Area (Direct or Indirect) <sup>b</sup>
<b>Segment 2 C – Side Running</b>				
JSA-CS-S-229H	Historic	Homestead site with treelines 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

Site Number	Period	Type	NRHP Eligibility <sup>a</sup>	Impact Area (Direct or Indirect) <sup>b</sup>
CA-SBR-3486	Prehistoric	Prehistoric lithic quarry and reduction site; contributing element of Sidewinder Quarry Archaeological District	Eligible	Direct
CA-SBR-3548	Prehistoric	Prehistoric rock rings	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
<b>Segment 4C</b>				
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

Site Number	Period	Type	NRHP Eligibility <sup>a</sup>	Impact Area (Direct or Indirect) <sup>b</sup>
JSA-CS-S-205H	Historic	Rock cairn	Not Eligible	Direct
JSA-CS-S-206H	Historic	Rock cairn	Not Eligible	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	Multicomponent	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	Multicomponent	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
<b>RSMSF</b>				
JSA-CS-S-217H	Historic	Residential refuse deposit	Not Eligible	Direct
<b>Alignment Adjustment Areas</b>				
JSA-CS-S-222H	Historic	Residential refuse deposit with cans, glass, ceramics, and faunal remains	Assumption of Eligibility	Direct
CA-SBR-4525H	Historic	Road segment	Assumption of Eligibility	Direct
JSA-CS-S-030H	Historic	Residential refuse deposit	Not Eligible	Direct
JSA-CS-S-031/H	Multicomponent	Prehistoric quarry site and historic rock cairns	Assumption of Eligibility	Direct
JSA-CS-S-032	Prehistoric	Prehistoric quarry site	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	Not Eligible	Direct
P-2044-5	Prehistoric	Habitation and food processing site	Assumption of Eligibility	Direct

Site Number	Period	Type	NRHP Eligibility <sup>a</sup>	Impact Area (Direct or Indirect) <sup>b</sup>
CA-SBR-4198	Prehistoric	Habitation site with pottery, lithics, fire affected rock, faunal remains, ground stone, and possible human remains	Assumption of Eligibility	Direct
P-2044-11	Prehistoric	Quarry and habitation site	Assumption of Eligibility	Direct
26CK3542	Historic	Railroad grade segment	Not Eligible	Direct

Source: ICF, 2010.

<sup>a</sup> Preliminary recommendations of *not eligible* for inclusion on the NRHP were based on the results of the field survey, follow-up archival research, and BLM consultation. The preliminary notations of "Not Eligible" and "Assumption of Eligibility" are based on existing data and are not a determination of eligibility. SHPO has not concurred on these findings.

<sup>b</sup> 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 (EMU option only), 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 (EMU option only).

### Victorville Station Site 3

#### *Archaeological Resources*

**Table S-3.7-1** lists the archaeological resources within the APE for VV3 under both parking options. A total of 12 sites were identified within the APE for VV3, all of which were identified as historic. Preliminary evaluations of these sites indicate that five sites would not be eligible for inclusion in the NRHP, five would be assumed eligible, and two would be eligible.

#### *Historic Architectural Resources*

Field investigation of the APE around the VV3 site did not identify any historic architectural resources.

#### *Paleontological Resources*

Paleontological resources (fossils) tend to occur within certain layers of geologic units. The majority of the VV3 station footprint for both parking options is situated on surface exposures of younger (Holocene) alluvial materials, not considered paleontologically sensitive. However, these layers are presumed to be underlain at an unknown depth by highly sensitive strata of Pleistocene age.

### Segment 2C

#### *Archaeological Resources*

**Table S-3.7-1** lists the archaeological resources within the APE around the Segment 2C alignment options.

A total of 14 sites were identified within the APE for the Segment 2C Median alignment option. Of these, five were identified as being in the historic period, eight were identified as within the prehistoric period, and one identified as multicomponent. Preliminary evaluations of these sites indicate that two sites would not be eligible for inclusion in the NRHP, four would be assumed eligible, and eight would be eligible.

A total of 29 sites were identified within the APE for the Segment 2C Side Running alignment option. Of these, 21 were identified as being in the historic period and eight were identified as within the prehistoric period. Preliminary evaluations of these sites indicate that 15 sites would not be eligible for inclusion in the NRHP, six would be assumed eligible, and eight would be eligible.

### *Historic Architectural Resources*

The Segment 2C alignment options traverse central Barstow, which includes several notable architectural features. While none of these are eligible or assumed eligible NRHP historical architectural resources, they are discussed in greater detail below.

The Segment 2C alignment options would rise roughly 35 feet over East Main Street and I-15 in Barstow. Buildings along East Main Street and its surrounding environs are predominantly commercial, with some residential and manufactured homes to the north and south. Most of these buildings date from the 1970s or later, and include strip retail, hotels, gas stations, and the like. One such building is “Barstow Station,” popularly known as the “Train McDonalds.”

Barstow Station is a novel, western-themed collection of 17 train cars, including a caboose, used as dining space and a gift shop for the adjacent two-story McDonalds fast-food restaurant. Although the train cars are older and the facility is well known by Los Angeles-to-Las Vegas travelers, the buildings are not 50 years old, they have had numerous alterations to the exterior cladding since their 1975 completion, and the McDonalds itself is a rebuild from an earlier fire that destroyed the original 1975 facility. Based on the reconnaissance survey along East Main Street, the vast majority of buildings, including Barstow Station, do not appear to be 50 years old and do not demonstrate exceptional significance to meet Criteria Consideration G of the NRHP.

One feature of note at Barstow Station is a wood water tower and tank. Although the tank itself appears to be over 50 years old, the tower/support structure is understood to have been recently built. The tank is not of a type associated with historic railroad usage. For these reasons, the tower does not appear to be eligible for the NRHP.

The Segment 2C alignment options would also be approximately 30 feet above the existing Burlington Northern Santa Fe Railroad (BNSF) bridge over I-15 at a point due northeast of East Main Street in Barstow. The BNSF bridge is a double-span deck plate girder bridge supported on concrete abutments with a central pier. I-15 was completed through Barstow in 1958. Since the piers and abutments were constructed at that time, the bridge is now greater than 50 years old. However, deck plate girder bridges are a common type, and this example does not appear to have any exceptional qualities. The I-15 abutments



and piers may have been altered for seismic safety since construction. Given lack of quality and probable alterations, the BNSF bridge is unlikely to meet NRHP criteria.

#### *Paleontological Resources*

The Segment 2C alignment options would cross extensive exposures of Pleistocene alluvial units that may be in part correlative with the richly fossiliferous vertebrate-bearing Lake Manix/Lake Mojave deposits and are accordingly considered highly sensitive for paleontological resources. Construction along this alignment would therefore have the potential for adverse effects on paleontological resources. However, both Segment 2C alignment options would be within the existing I-15 right-of-way, and thus the ground has likely been subject to prior disturbance during grading for I-15 or trenching for underground utilities adjacent to the freeway. Prior site disturbance reduces the potential of finding intact paleontological resources, but would not eliminate it entirely.

### **Segment 4C**

#### *Archaeological Resources*

**Table S-3.7-1** lists the archaeological resources within the APE around Segment 4C. A total of 24 sites were identified within the APE for the Segment 4C. Of these, 21 were identified as being in the historic period, one was identified as within the prehistoric period, and two were identified as exhibiting components from multiple periods. Preliminary evaluations of these sites indicate that 11 sites would not be eligible for inclusion in the NRHP, 11 would be assumed eligible, and two would be eligible.

#### *Historic Architectural Resources*

Field investigation of the APE around Segment 4C did not identify any historic architectural resources.

#### *Paleontological Resources*

Much of Segment 4C would be situated on alluvial deposits of the Holocene age, which are not considered paleontologically sensitive. However, older alluvial strata presumably present in the subsurface would be highly sensitive. Segment 4C would also traverse areas of metamorphic rocks, particularly in mountainous areas, where tunnels are proposed. None of these metamorphic rock areas have strong potential to harbor paleontological resources.

### **Relocated Sloan MSF**

#### *Archaeological Resources*

**Table S-3.7-1** lists the archaeological resources identified by project archaeologists within the APE around the RSMSF. One historic period site was identified, but would be assumed to not be eligible for inclusion in the NRHP.

*Historic Architectural Resources*

Field investigation of the APE around the RSMSF site did not identify any historic architectural resources.

*Paleontological Resources*

Approximately 75 percent of the RSMSF site is underlain by sedimentary rocks of Oligocene-Miocene age. A portion of this sequence may correlate with the Barstow Formation, which is famous for its vertebrate fauna; this sequence is therefore considered highly sensitive. The remaining 25 percent (south end) of the RSMSF site is underlain by alluvial deposits of Holocene age, which could include underlying sensitive strata.

**Frias Substation***Archaeological Resources*

No archaeological resources were identified within the APE for the Frias Substation.

*Historic Architectural Resources*

Field investigation of the APE around the Frias Substation site did not identify any historic architectural resources.

*Paleontological Resources*

The Frias Substation is underlain by younger alluvial deposits of active fans and washes. These deposits have low sensitivity in regards to paleontological resources because of the Holocene age. However, these layers could be underlain by more paleontologically sensitive older units in the subsurface.

**Alignment Adjustment Areas**

**Table S-3.7-1** lists the archaeological resources identified by project archaeologists within the APE around the rail alignments as modified by the AAAs. A total of 11 sites were identified within the APE for the AAAs. Of these, six were identified as being in the historic period, four were identified as within the prehistoric period, and one was identified as exhibiting multicomponent periods. Preliminary evaluations of these sites indicate that four sites would not be eligible for inclusion in the NRHP and seven would be assumed eligible.

*Historic Architectural Resources*

Field investigation of the expanded APE around the AAAs did not identify any new historic architectural resources.

### *Paleontological Resources*

The AAAs do not shift any of their associated segments to such an extent that any different geologic units would become relevant. Therefore, conclusions regarding paleontological resources for the affected rail alignments of Segment 2A/2B, Segment 3B, and Segment 6B are as described in **Section 3.7.3.3** of the Draft EIS.

## 3.7.2 METHODS OF EVALUATION OF IMPACTS

The same methodology outlined in **Section 3.7.2** of the Draft EIS was used to evaluate potential effects of the project modifications and additions. 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 NRHP. 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, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- A. Is associated with events that have made a significant contribution to the broad patterns of history;
- B. Is associated with the lives of persons significant in the past;
- C. 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
- D. 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 NRHP. 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 NRHP 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 NRHP 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 NRHP. 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.

NRHP eligibility status of resources potentially affected in the APE has not yet been determined. The project will achieve compliance with Section 106 requirements through a PA, which defers eligibility determinations until after the execution of a ROD for the project. **Table S-3.7-2** summarizes these findings and the assumed eligibility status of all potentially affected archaeological resources.

Impacts on paleontological resources were evaluated following guidelines published by the Society of Vertebrate Paleontology (SVP).<sup>4</sup> 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.

For the purposes of this project's analysis, the APE as a whole has been divided into areas of potential direct and indirect effects.

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<sup>4</sup> Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee, 1995.

The Direct APE has been defined accordingly:

- **Rail alignments:** 115 feet on either side of rail alignment centerlines.
- **Stations/maintenance facilities:** 0 additional feet around the boundaries of these facilities.
- **Utility corridors:** 50 feet on either side of utility corridors.

The Indirect APE has been defined accordingly:

- **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.

As part of this Supplemental Draft EIS, project archaeologists conducted field surveys of the expanded APE, consistent with methods described in **Section 3.7.2** of the Draft EIS.

### 3.7.3 ENVIRONMENTAL CONSEQUENCES

**Table S-3.7-2** summarizes the known NRHP eligible or assumed eligible archaeological resources within the expanded APE for the project modifications and additions. The environmental consequences of the modifications to Wigwam MSF and the profile of Segment 3B do not differ from those presented in the Draft EIS. **Section 3.7.4.2** of the Draft EIS presents a discussion of potential impacts from the Wigwam MSF and Segment 3B on archaeological, historic architectural and paleontological resources.

Specific discussions of the environmental consequences for the modifications and additions within the modified APE are provided below and illustrated in **Table S-3.7-2**.

Table S-3.7-2 Known NRHP Eligible or Assumed Eligible Archaeological Resources in the Modified APE<sup>a</sup>

Project Modifications and Additions	Archaeological Resources Directly Affected <sup>b</sup>	Archaeological Resources Indirectly Affected <sup>b</sup>
	Number	Number
VV3 (both parking options)	7	0
OMSF 2	5	0
Segment 2C Median	11	1
Segment 2C Side Running	14	0
Segment 4C	10	3
Relocated Sloan MSF	1	0
Frias Substation	0	0
AAAs	7	0

Source: ICF, 2010.

<sup>a</sup> Preliminary recommendations of *not eligible* for inclusion on the NRHP were based on the results of the field survey, follow-up archival research, and BLM consultation. The preliminary notations of “Not Eligible” and “Assumption of Eligibility” are based on existing data and are not a determination of eligibility. SHPO has not concurred on these findings. Formal determinations of eligibility will be established as outlined in the programmatic agreement prepared for the project.

<sup>b</sup> 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 (EMU option only), 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 (EMU option only).

### Victorville Station Site 3

#### *Archaeological Resources*

Construction of either parking option for VV3 may result in direct adverse effects to cultural resources eligible or assumed eligible for the NRHP. **Tables S-3.7-1 and S-3.7-2** summarize the resources that could be affected. A total of 7 eligible or assumed eligible archaeological resources are potentially affected by VV3.

All of the eligible or assumed eligible cultural resources in the APE of VV3 are historic period resources, and include habitation sites, refuse scatters, a power transmission line, and rock cairns. The power line (CA-SBR-10315H) has been found eligible for the NRHP.

*Architectural Resources*

VV3, inclusive of both parking options, would not involve any direct or indirect effects to historic architectural resources since no such resources have been identified within the expanded APE for VV3.

*Paleontological Resources*

Depending on the thickness of Holocene materials at the VV3 site for either parking option, excavations during construction could disrupt underlying sensitive strata and damage paleontological resources.

**OMSF 2***Archaeological Resources*

The reduction of the footprint of OMSF 2 results in one fewer directly affected archaeological resource than the larger OMSF 2 evaluated in **Section 3.7.4.2** of the Draft EIS. With the reduction in size, OMSF 2 would continue to directly affect five historical period resources, including refuse deposits, homestead remnants, and mining sites, which are discussed in **Section 3.7.4.2** the Draft EIS.

*Architectural Resources*

As discussed in **Section 3.7.4.2** of the Draft EIS, OMSF 2 would not result in any direct or indirect effects to historic architectural resources since no such resources have been identified within the APE for OMSF 2.

*Paleontological Resources*

OMSF 2 is located on the same land as considered in **Section 3.7.3.3** of the Draft EIS and no new geologic units or paleontological sensitivity have been identified. Construction activities could disrupt underlying sensitive strata and damage paleontological resources, representing an adverse effect.

**Segment 2C***Archaeological Resources*

Implementation of the Segment 2C alignment options may result in direct and indirect adverse effects to cultural resources eligible or assumed eligible for the NRHP. The Segment 2C alignment options would be located within the I-15 right-of-way. While this area has likely been subject to prior disturbance during grading for I-15 or trenching for underground utilities known to run adjacent to the roadway, ground disturbing activities associated with constructing either Segment 2C option may nonetheless result in adverse effects to cultural resources.

As described below, the Segment 2C Side Running alignment option could directly affect 13 archaeological sites eligible or assumed eligible for inclusion in the NRHP, while the Segment 2C Median alignment option could directly affect 11 sites. **Tables S-3.7-1 and S-3.7-2** summarize the resources that could be affected.

**Segment 2C Median:** Eleven archaeological sites eligible or assumed eligible could be directly impacted by the Segment 2C Median option, including seven prehistoric sites and four historical period sites. The historic period resources consist of two railroad grades, one of which has been determined eligible for the NRHP (CA-SBR-6693H); the eligible National Old Trails Highway (CA-SBR-2910H); a segment of the Sidewinder Road wagon trail. CA-SBR-2910H was recommended as eligible under Criteria A and C of the NRHP. However, within the alignment for the Segment 2C Median option, CA-SBR-2910H occurs in a disturbed area within the median of I-15, and likely has lost its integrity in this area. The eligible or assumed eligible prehistoric sites include five stone quarries, and a site with rock rings.

Five of the NRHP-eligible prehistoric archaeological sites found in the Segment 2C Median option are contributing elements of the Sidewinder Quarry Archaeological District, a National Register District (P36-020365). The district is composed of a total of 45 prehistoric sites found within and on both sides of I-15. Although only five of these sites occur in the Segment 2C Median option, impacts to any of these sites must be treated as impacts to the entire district. The district was found eligible under Criterion D, for its data potential.

One assumed eligible site would be indirectly affected by the Segment 2C Median alignment option (CA-SBR-6023H), which is a residential and commercial deposit known as the Yermo Dump.

**Segment 2C Side Running:** For the side running option, 14 archaeological sites eligible or assumed eligible could be directly affected, including eight prehistoric sites and six historical period sites. Four of these eligible or assumed eligible also occur within the Segment 2C Median alignment option, since these alignment options would follow the same rail alignment south and east of Barstow. These four sites include a historic railroad grade, the National Old Trails highway, the Sidewinder Road wagon trail, and elements of the Sidewinder Quarry Archaeological District. Additional historic period resources affected by the Segment 2C Side Running option independent of the Segment 2C Median alignment option consist of a fence line and two refuse deposits. The prehistoric sites include six stone quarries and a site with rock rings. Six of the NRHP-eligible prehistoric archaeological sites found in the Segment 2C Side Running option are contributing elements of the Sidewinder Quarry Archaeological District, a National Register District (P36-020365). As with the Segment 2C Median option, impacts to any of these sites must be treated as impacts to the entire district. The district was found eligible under Criterion D, for its data potential.



### *Architectural Resources*

While there are several historic architectural resources within the APE for the Segment 2C alignment options, these resources are not eligible for inclusion in the NRHP. The Segment 2C alignment options would thus have no adverse effects to historic architectural resources.

### *Paleontological Resources*

The Segment 2C alignment options would be within the I-15 right-of-way, an area previously disturbed during freeway construction and trenching for underground utilities. However, much of the Segment 2C alignment options would be constructed on elevated trackway. This method of construction will require less ground disturbance, but deeper excavation for foundations. Therefore, the elevated structure would result in a greater potential to encounter fossil resources than at grade trackway.

Should maintenance activities along the rail alignment disturb areas not previously disturbed by construction of the Segment 2C alignment options, potentially adverse effects to paleontological resources could occur if substrate of high or undetermined sensitivity is present in that area.

## **Segment 4C**

### *Archaeological Resources*

Implementation of Segment 4C may result in direct adverse effects to ten eligible or potentially eligible resources. **Tables S-3.7-1** and **S-3.7-2** summarize the resources that could be affected. The 10 eligible or assumed eligible resources include one previously determined NRHP-eligible site, a historic power transmission line (CA-SBR-10315H) that was also identified in the APE considered in the Draft EIS. Other resources include historic period sites and a multicomponent site with both prehistoric and historic artifacts and features. Many of the historic period sites are likely associated with historic mining that occurred in the area. These historic sites include roads, survey lines, mines, and water conveyance features. The multicomponent site is a prehistoric habitation site with hearths, overlain by an historic refuse deposit.

Within the indirect APE for Segment 4C, three sites assumed eligible have been identified, including an historic period site, a prehistoric site, and a multicomponent site. The multicomponent site includes a prehistoric habitation site located in shallow dunes, which is associated with a lake shore.

### *Architectural Resources*

Segment 4C would not involve any direct or indirect effects to historic architectural resources as no such resources have been identified within the APE for Segment 4C.

*Paleontological Resources*

Construction of Segment 4C could have an adverse effect on paleontological resources, particularly in areas of high sensitivity. Should maintenance activities along the rail alignment disturb areas not previously disturbed by construction of Segment 4C, potentially adverse effects to paleontological resources could occur if substrate of high or undetermined sensitivity is present in that area.

**Relocated Sloan MSF***Archaeological Resources*

Construction of the RSMSF would result in direct adverse effects to one cultural resource eligible or assumed eligible for the NRHP. **Tables S-3.7-1** and **S-3.7-2** summarize the resource that could be affected. The site, JSA-CS-S-217H, consists of three separate locations of historic period household refuse, probably dating to the 1940s to early 1950s.

*Architectural Resources*

The RSMSF would not involve any direct or indirect effects to historic architectural resources as no such resources have been identified within the APE of the RSMSF.

*Paleontological Resources*

Excavations during construction could disrupt underlying sensitive strata and damage paleontological resources on the RSMSF site, representing a potentially adverse effect.

**Frias Substation***Archaeological Resources*

The Frias Substation would not involve any direct or indirect effects to archaeological resources as no such resources have been identified within the APE of the Frias Substation.

*Architectural Resources*

The Frias Substation would not involve any direct or indirect effects to historic architectural resources as no such resources have been identified within the APE for the Frias Substation.

*Paleontological Resources*

Construction activities could disrupt underlying sensitive strata and damage paleontological resources, representing an adverse effect.

## Alignment Adjustment Areas

### *Archaeological Resources*

**Tables S-3.7-1** and **S-3.7-2** summarize the resources that could be affected by the AAAs.

Construction of the AAAs would result in direct adverse effects to seven cultural resources assumed eligible for the NRHP. **Tables S-3.7-1** and **S-3.7-2** summarize the resources that could be affected. The resources affected include an assumed eligible road segment (Barstow-Silver Lake Road), a historic period refuse deposit, a prehistoric rock quarry, a multicomponent prehistoric rock quarry and historic cairns site, a combined prehistoric quarry and habitation site, a large prehistoric habitation and burial site, and a prehistoric habitation and food processing site.

Notably, only one of these seven affected resources, the historic period refuse deposit, was not considered in **Section 3.7.4.2** of the Draft EIS. In addition, the AAAs will result in avoidance of six archeological resources that were listed as affected in **Section 3.7.4.2** of the Draft EIS.

### *Architectural Resources*

The AAAs would not involve any new direct or indirect effects to historic architectural resources as no such resources have been identified within the APE for the AAAs.

### *Paleontological Resources*

Construction activities could disrupt underlying sensitive strata and damage paleontological resources, representing an adverse effect. Ground-disturbing maintenance activities in areas of sensitive substrate would also have some potential for adverse effects on paleontological resources, specifically in areas not previously disturbed by construction.

## 3.7.4 MITIGATION MEASURES

**Mitigation Measures CR-1** through **CR-3** in **Section 3.7.5.1** of the Draft EIS would reduce effects to archaeological resources.

**Mitigation Measure CR-1** encourages avoidance of archaeological resources where feasible. **Mitigation Measure CR-2** requires test excavations to determine the significance of archaeological resources that would be affected by construction of the action alternatives. If such resources are determined significant, they would be subject to data recovery. **Mitigation Measure CR-3** requires that archaeological monitoring be conducted for areas with a moderate to high sensitivity according to the historic property treatment plan (HPTP) that will be developed in accordance with the PA.

**Mitigation Measures CR-5 through CR-11** in **Section 3.7.5.3** of the Draft EIS address potential affects to paleontological resources. As identified in **Mitigation Measure CR-5**, the Applicant will ensure site-specific engineering geologic studies which 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, CR-11, and CR-12** 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 and CR-7** of the Draft EIS require further evaluation for paleontological resources prior to construction. **Mitigation Measure CR-8** requires paleontological resources awareness training prior to the commencement of construction activity. **Mitigation Measures CR-9** requires construction monitoring for areas with a high likelihood of paleontological materials. **Mitigation Measure CR-10** requires that if fossil materials are discovered, all construction work is stopped. **Mitigation Measure CR-11** identifies steps for fossil recovery and curation if fossils are discovered during construction.

### 3.7.5 RESIDUAL IMPACTS FOLLOWING MITIGATION

All effects to cultural resources associated with the project modifications and additions can be mitigated through avoidance, evaluation and data recovery, or other mitigation through archaeological investigation and monitoring during construction as described in **Section 3.7.4** 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.

## 3.8 HYDROLOGY AND WATER QUALITY

This section examines the potential impacts of the project modifications and additions related to hydrology and water quality. The aspects of water resources that are specifically analyzed are surface water hydrology, groundwater hydrology, surface water quality, and groundwater quality, and flooding.

### 3.8.1 AFFECTED ENVIRONMENT

**Section 3.8.1** of the Draft EIS provides a summary of regulations and standards related to hydrology and water quality. Since publication of the Draft EIS, there has been one change to the regulatory setting governing hydrology and water quality in the affected environment of the proposed project. The State of California amended the Porter-Cologne Water Quality Control Act to incorporate provisions of the California Watershed Improvement Act of 2009. The details of this amendment are discussed within this Supplemental Draft EIS in **Chapter 3.0, Regulatory Setting**.

#### **Regional Conditions**

The regional environment of the project area has remained unchanged since publication of the Draft EIS. There are no known substantial changes in existing point-source and nonpoint-source pollutant discharges contributing contaminants to surface water and groundwater within the project area.<sup>1</sup> **Figures S-3.8-1** through **S-3.8-5** show the existing hydrologic resources, including water bodies, streams, dry lakes, and the 100-year floodplain, in the vicinity of the proposed project modifications and additions.

#### **Victorville Station Site 3**

VV3, for either parking option VV3A or VV3B, would be bisected by a branch of Bell Mountain Wash. **Figure S-3.8-1** shows the location of the VV3 site in relation to existing hydrologic features.

VV3 would be located in the Upper Mojave Groundwater Basin, which is bounded by the San Bernardino Mountains on the south, follows the Mojave River through Victorville in Apple Valley, and ends near the community of Helendale.<sup>2</sup> Groundwater impairments include high nitrate concentrations in the southern portion of the basin and high iron and manganese concentrations near Oro Grande.

The VV3 site is not located within a designated Federal Emergency Management Agency (FEMA) 100-year floodplain.

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<sup>1</sup> Point source is a stationary location or fixed facility, such as the end of a pipe, from which pollutants are discharged. Nonpoint source pollution is caused by rainfall moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutant, finally depositing them into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water.

<sup>2</sup> Department of Water Resources, State of California. Groundwater Basins in California. October 2003. <[http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/maps/correct\\_statewide\\_basin\\_map\\_V3\\_subbas.pdf](http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/maps/correct_statewide_basin_map_V3_subbas.pdf)>. Accessed February 19, 2010.

## OMSF 2

The size, not the location, of OMSF 2 has been changed. Therefore, existing water resources, groundwater resources, and flooding hazards remain unaltered as presented for OMSF 2 in **Section 3.8.3.4** of the Draft EIS. **Figure S-3.8-1** shows the location of OMSF 2 in relation to existing hydrologic features. OMSF 2 is located within the vicinity of minor drainages and would bisect two small washes of Bell Mountain Wash.

OMSF 2 is not located within a designated 100-year floodplain or other flood hazard zone.

## Segment 2C

Segment 2C would traverse a number of intermittent streams, washes, and channels, as well as the Mojave River. In the immediate vicinity of Segment 2C, the Mojave River exhibits intermittent surface flows. An intermittent canal also extends along both sides of I-15 east of Calico Road. **Figure S-3.8-2** shows the location of the Segment 2C alignment options in relation to existing hydrologic features.

Segment 2C would be located within the Middle Mojave River Valley Groundwater Basin and the Lower Mojave River Valley Groundwater Basin. As discussed in **Section 3.8.3.4** of the Draft EIS, the Lower Mojave River Valley Groundwater Basin includes elevated levels of fluoride near Newberry Springs. There are also nine sites in Barstow where underground fuel storage tanks are leaking and introducing hazardous materials into the groundwater. Superfund sites are also located in the Nebo and Yermo Marine Corps depots for contaminated plumes contaminated with trichloroethane.<sup>3</sup> The Middle Mojave River Valley Groundwater Basin is affected by volatile organic compounds, salts, and nitrates that have leached into the groundwater from the Lenwood landfill in the lower portion of the basin.

Segment 2C would cross the designated 100-year floodplain of the Mojave River and would cross the designated 100-year floodplain south of Barstow, near Lenwood Road.

## Segment 4C

There are multiple small drainages, including unnamed washes, intermittent streams, and ditches, within the vicinity of Segment 4C. **Figure S-3.8-4** shows the location of Segment 4C in relation to existing hydrologic features.

Segment 4C would be located within the Ivanpah Valley Groundwater Basin.<sup>4</sup> As stated in **Section 3.8.3.4** of the Draft EIS, the Ivanpah Groundwater Basin is rated marginal for both domestic and irrigation purposes due to elevated levels of fluoride and sodium.

Segment 4C would not be located within a designated 100-year floodplain.

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<sup>3</sup> For a discussion of groundwater contamination, refer to **Section 3.10, Hazards and Hazardous Materials**, of this Supplemental Draft EIS.

<sup>4</sup> State of California, Department of Water Resources. Ivanpah Valley Groundwater Basin. 2004. <[http://www.water.ca.gov/pubs/groundwater/bulletin\\_118/basindescriptions/6-30.pdf](http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/6-30.pdf)>. Accessed March 15, 2010.

### **Relocated Sloan MSF**

Given the 2 mile proximity of the Relocated Sloan MSF (RSMSF) site to the Sloan Road MSF evaluated in the Draft EIS, the existing regional hydrology is similar to that evaluated in **Section 3.8.3.4** of the Draft EIS. There are no existing drainages, channels, or washes on the RSMSF site, nor would it be located within a designated 100-year floodplain or other flood hazard zone. The RSMSF would be located within the Jean Lake Valley Groundwater Basin.

### **Frias Substation**

**Figure S-3.8-5** shows the location of the Frias Substation in relation to existing hydrologic features. The Frias Substation site is located between two existing drainages. These drainages cross under the I-15 freeway corridor to the east and are channeled into Duck Creek. Duck Creek is a tributary to Las Vegas Wash, which drains to Lake Mead and the Colorado River. The area proposed for the underground 25 kilovolt (kV) feeders would cross beneath one of the existing drainages.

The site is located in the Las Vegas Groundwater Basin (Nevada Basin Number 212).<sup>5</sup> This is the same groundwater basin atop which all Las Vegas Valley MSF options lie, as discussed in **Section 3.8.3.4** of the Draft EIS. The quality of the shallow groundwater in the Las Vegas Valley is saline.

The Frias Substation site would not be located within a designated 100-year floodplain. However, the western limit of the 100-year floodplain for Duck Creek is immediately adjacent to the eastern boundary of the site.

### **Alignment Adjustment Areas**

The Alignment Adjustment Areas (AAAs) would result in few, relatively minor shifts to limited portions of the rail alignment (no more than 400 feet from the center line of the rail alignment evaluated in the Draft EIS). Segment 2A/2B, Segment 3B, and Segment 6B as described in **Section 3.8.3.4** of the Draft EIS would affect the same water and groundwater resources and flood hazard areas with implementation of the AAAs.

### **Wigwam MSF Modification**

The orientation, not the location of the Wigwam MSF has been changed. Therefore, existing water resources, 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.

Refer to **Section 3.4, Utilities and Service Systems**, of this Supplemental Draft EIS for a discussion of water supply effects associated with the modified Wigwam MSF.

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<sup>5</sup> State of Nevada, Department of Conservation and Natural Resources. Division of Water Resources. <[http://water.nv.gov/WaterPlanning/cty-bsn/cl\\_basin.cfm](http://water.nv.gov/WaterPlanning/cty-bsn/cl_basin.cfm)>. Accessed March 15, 2010.

### Profile Modification

The Segment 3B Profile Modification would result in placing a 1.3 mile portion of the rail alignment within a retained cut. There are no notable hydrologic features within the area of the proposed Profile Modification. An existing culverted wash is at the north/east end of the Profile Modification. Existing groundwater depths in this area are estimated to range from 45 to 76 feet below ground level.<sup>6</sup> The Profile Modification is not within a designated 100-year floodplain or other flood hazard zone.

### 3.8.2 METHODS OF EVALUATION OF IMPACTS

The same methodology discussed in **Section 3.8.2** of the Draft EIS applies in this evaluation of potential direct and indirect hydrology and water quality effects of the proposed modifications and additions. The number of linear feet of water resources has been calculated to determine the level of impact related to hydrology and water quality.

An effect on hydrology and water quality was considered adverse and would require mitigation if the project modification and addition 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.

This evaluation considers both the operational and construction period effects of the project modifications and additions relative to hydrology and water quality, consistent with the evaluation of the action alternatives in **Section 3.8.4.3** of the Draft EIS. Operational effects are considered permanent effects, while construction period effects are assumed to be temporary in nature and would only occur during the active construction period.

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<sup>6</sup> State of California, Department of Water Resources. Water Data Library. <<http://www.water.ca.gov/waterdatalibrary/>>. Accessed March 19, 2010.



### 3.8.3 ENVIRONMENTAL CONSEQUENCES

Each of the project modifications and additions were evaluated against the criteria identified above to determine whether any adverse effects would occur. The discussions below consider the project modifications and additions per these criteria.

#### **Victorville Station Site 3**

*Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

**Permanent Effects:** VV3 would impact a branch of Bell Mountain Wash. VV3A would affect approximately 2,257 linear feet of the wash, while VV3B would affect approximately 2,075 linear feet. In addition to this direct impact, VV3 could result in potential indirect effects to water quality due to pollutants deposited from vehicles at the station site and associated parking area being carried in water runoff into the local drainages. As a result, operation of VV3 would have the potential to violate water quality standards, create additional sources of polluted runoff, or otherwise degrade water quality.

**Construction Period:** Construction of VV3 under either parking option could degrade existing water quality. Construction activities, such as grading and site preparation, could result in increased erosion and sedimentation to surface waters. If precautions are not taken to contain such contaminants, construction could produce contaminated stormwater runoff with a resultant degradation of water quality. Hazardous materials associated with construction equipment could also adversely affect water quality if spilled or improperly stored. Construction of VV3 atop a branch of Bell Mountain Wash could provide a direct path for construction related contaminants. Water quality impacts from construction activities at the VV3 site could violate water quality standards, exceed contaminant loadings, create additional sources of polluted runoff, or otherwise degrade water quality.

*Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite*

**Permanent Effects:** VV3 would impact a portion of Bell Mountain Wash and require the local drainage pattern to be altered to accommodate the station and parking areas. If drainage systems are not properly designed, VV3 could experience periodic flooding.

**Construction Period:** Construction of VV3 would involve the use of earth moving machinery, which could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind. The protective vegetation cover would also be removed, which would reduce natural soil resistance to erosion. Such erosion could have an effect on the drainage patterns of the existing water resources within proximity of VV3, including Bell Mountain Wash.

*Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

VV3 would not be located within a designated 100-year floodplain and would therefore not place any structures within the 100-year floodplain that could impede or redirect flood flows.

*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*

**Permanent Effects:** VV3A would include approximately 130 acres of surface parking area, while VV3B would include approximately 111 acres of surface parking area. VV3A would introduce a greater amount of impervious surface than VV3B. Using the methodology for calculating peak discharge as in **Section 3.8.4.3** of the Draft EIS, VV3A would produce approximately 275 cubic feet per second (cfs) of runoff during the 100-year, 24-hour storm event, while VV3B would produce approximately 235 cfs under the same conditions. VV3A and VV3B would therefore produce additional stormwater runoff. Refer to **Section 3.4, Utilities/Emergency Services**, of this Supplemental Draft EIS for a discussion of stormwater conveyance systems.

Because there are numerous other locations in the watersheds for groundwater recharge, the increase of impervious surface associated with VV3 under either parking option would not result in a considerable loss of groundwater recharge and would not substantially affect groundwater levels.

**Construction Period:** Construction of VV3 under either parking option may result in additional sources of polluted runoff (i.e., soil erosion or construction machinery fuel leakage), which could adversely affect water quality.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** VV3 with either parking option would not result in a new or increased use of surface water and/or groundwater during operation beyond what was analyzed in **Section 3.8.4.3** of the Draft EIS as the size and use would be consistent with the other Victorville Station site options considered in the Draft EIS. It is assumed that water service would be obtained from existing water utility providers. Refer to **Section 3.4, Utilities**, of this Supplemental Draft EIS for a discussion of water supply.

**Construction Period:** Construction of VV3 (under either parking option) 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 project area.

**OMSF 2***Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

**Permanent Effects:** The modified OMSF 2 facility would affect approximately 825 linear feet of water resources, as compared to the 2,581 linear feet noted for OMSF 2 in **Section 3.8.4.3** of the Draft EIS. While the amount of affected linear feet would be reduced as a result of the smaller development footprint, operation of OMSF 2 would still have the potential to violate water quality standards, create additional sources of polluted runoff, or otherwise degrade water quality, consistent with the conclusion in **Section 3.8.4.3** of the Draft EIS.

**Construction Period:** Construction of OMSF 2 could degrade existing water quality. Construction activities, such as grading and site preparation, could result in increased erosion and sedimentation to surface waters. If precautions are not taken to contain such contaminants, construction could produce contaminated stormwater runoff with a resultant degradation of water quality. Hazardous materials associated with construction equipment could also adversely affect water quality if spilled or improperly stored. Water quality impacts from construction activities at the OMSF 2 site could violate water quality standards, exceed contaminant loadings, create additional sources of polluted runoff, or otherwise degrade water quality.

*Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite*

**Permanent Effects:** The modified OMSF 2 would affect approximately 825 linear feet of water resources and bisect two small washes that connect to Bell Mountain Wash. Depending on the final design of the OMSF, these washes may be altered and result in flooding on the west side of the site if drainage facilities are not properly designed.

**Construction Period:** Consistent with the conclusion in **Section 3.8.4.3** of the Draft EIS, construction activities associated with the development of OMSF 2 could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind. The existing protective vegetation cover would be removed, which would reduce natural soil resistance to erosion and could affect the drainage patterns of the existing water resources within proximity of OMSF 2, including Bell Mountain Wash.

*Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

OMSF 2 is not located within a designated 100-year floodplain and would therefore not place housing or structures within the 100-year floodplain that could impede or redirect flood flows.

*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*

**Permanent Effects:** OMSF 2 would result in the development of impervious surfaces on previously undeveloped lands, which would result in additional runoff related to access roads and parking facilities. The modified OMSF 2 would result in a reduction in impervious surface area and associated runoff as compared to the OMSF 2 evaluated in **Section 3.8.4.3** of the Draft EIS.

**Construction Period:** Construction of OMSF 2 may result in additional sources of polluted runoff (i.e., from soil erosion or construction machinery fuel leakage), which could adversely affect water quality.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** OMSF 2 would not result in a new or increased use of surface water and/or groundwater during operation beyond what was analyzed in **Section 3.8.4.3** of the Draft EIS, as the types of uses and employment capacity would be the same as considered in **Section 3.8.4.3** of the Draft EIS. Water service would be obtained from existing water utility providers. Refer to **Section 3.4, Utilities**, of this Supplemental Draft EIS for a discussion of water supply.

**Construction Period:** Consistent with the conclusion in **Section 3.8.4.3** of the Draft EIS for OMSF 2, the modified OMSF 2 would still 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 project area.

## **Segment 2C**

*Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

**Permanent Effects:** The Segment 2C alignment options would result in potential impacts to water quality due to pollutants deposited within the proposed rail right-of-way from train operations that could contaminate adjacent drainages and washes following a storm event. Depending on the train technology option, contaminants associated with train operation would vary. For example, the DEMU technology option could result in diesel particulate deposits that would be avoided by the EMU technology option. Segment 2C would cross several intermittent stream and washes which could result in impacts to water quality during operation.

- The Segment 2C Side Running alignment option would directly affect approximately 2,344 linear feet of channels, intermittent streams, and washes, including the Mojave River.

- The Segment 2C Median alignment option would directly affect approximately 2,342 linear feet of channels, intermittent streams, and washes, including the Mojave River.

The Segment 2C alignment options would have the potential to violate water quality standards, provide additional sources of polluted runoff, or otherwise degrade water quality.

**Construction Period:** Construction of the Segment 2C alignment options would involve soil disturbance, excavation, cutting/filling, and grading, which could result in increased erosion and sedimentation to surface waters. Hazardous materials from construction machinery could also introduce additional contaminants to stormwater runoff. Construction of the Segment 2C alignment options would require intermittent stream, wash, and ditch crossings which could provide a direct path for construction related contaminants. Construction near the high groundwater table within the Mojave River could also require dewatering for bridge column construction, with subsequent discharge to surface waters, which could result in the release of sediment or other contaminants to surface waters. Construction activities at the TCA could also affect water quality, as contaminants and sediments from stockpiles could produce contaminated stormwater runoff. 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.

*Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite*

**Permanent Effects:** The Segment 2C alignment option would directly affect channels, intermittent streams, and washes, including the Mojave River. Segment 2C would cross the Mojave River immediately north of the existing I-15 freeway bridge. Due to the width of the Mojave River in this location, concrete pillars would be placed within the Mojave River and would have the potential to redirect flows. The Mojave River runs primarily underground at the proposed location of the Segment 2C crossing. While the placement of columns within the riverbed could affect underground flows, the number of columns would be limited with wide spacing between each column.

In regards to the other affected channels, streams, and washes, it is assumed that culverts could be provided within the channel and that no change to the bed elevation, to the waterway's ability to convey water, or to the ability to convey flood flows would occur. Based on this design information, the crossings of these water resources would not permanently alter the course or flows of these water resources.

Similar to the rail alignments evaluated in **Section 3.8.4.3** of the Draft EIS, stormwater runoff from the Segment 2C would be directed away from the trackway and into existing drainage facilities associated with the I-15 freeway or other local drainage system.

**Construction Period:** Construction activities associated with development of the Segment 2C alignment options could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind. The existing protective vegetation cover would be removed, which would reduce natural soil resistance to erosion and could affect the drainage

patterns of the existing water resources within proximity of Segment 2C. Similar impacts could also occur at the TCA.

*Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

**Permanent Effects:** Figure S-3.8-1 shows the Segment 2C alignment options in relation to the 100-year floodplain. The Segment 2C alignment options would cross a portion of the designated 100-year floodplains near the Mojave River and south of Barstow, near Lenwood Road.

- The Segment 2C Side Running alignment option would impact approximately 11 acres of the 100-year floodplain.
- The Segment 2C Median alignment option would impacts approximately 10 acres of the 100-year floodplain.

Impacts to the 100-year floodplain could result in impeding or redirecting flood flows.

**Construction Period:** Construction of the Segment 2C alignment options could result in temporary impacts due to construction workers, equipment, and structures located within the 100-year floodplain. The placement of construction activities within the 100-year floodplain could impede or redirect flood flows depending on the type of activity. The TCA would not be located within the 100-year floodplain.

*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*

**Permanent Effects:** Segment 2C would include drainage along the proposed trackway to channel stormwater runoff away from the trackway. As portions of the Segment 2C would be elevated, the placement of columns to support the trackway would not substantially increase the amount of impervious surface area. Runoff produced along the elevated rail alignment would be captured and directed to existing designated drainage features. For at-grade portions of Segment 2C 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, Utilities/Emergency Services**, of this Supplemental Draft EIS for a discussion of stormwater conveyance systems.

**Construction Period:** Construction of the Segment 2C alignment options may result in additional sources of polluted runoff from soil disturbances or construction equipment, which could impact water quality on and around the TCA and limits of construction.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** The Segment 2C alignment options would not use surface or groundwater resources and no effects would occur during operation.

**Construction Period:** Construction of the Segment 2C alignment options 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 project area.

#### **Segment 4C**

*Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

**Permanent Effects:** Segment 4C would result in potential impacts to water quality due to pollutants deposited within the proposed rail right-of-way from train operation that could contaminate adjacent drainages and washes following a storm event. Depending on the train technology option, contaminants associated with train operation would vary. For example, the DEMU technology option could result in diesel particulate deposits that would be avoided by the EMU technology option. Segment 4C would directly affect approximately 1,485 linear feet of intermittent streams, drainages, and washes. Segment 4C would have the potential to violate water quality standards, create additional sources of polluted runoff, or otherwise degrade water quality.

**Construction Period:** Construction of Segment 4C would involve soil disturbance, excavation, cutting/filling, and grading, which could result in increased erosion and sedimentation to surface waters. Hazardous materials from construction machinery could also introduce additional contaminants to stormwater runoff. Construction of Segment 4C would require intermittent stream, wash, and ditch crossings, which could provide a direct path for construction related contaminants. Construction activities at the TCAs could also affect water quality, as contaminants and sediments from stockpiles could produce contaminated stormwater runoff. Water quality impacts from construction activities could violate water quality standards, exceed contaminant loadings, provide additional sources of polluted runoff, or otherwise degrade water quality.

*Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite*

**Permanent Effects:** Segment 4C would directly affect approximately 1,485 linear feet of water resources. It is assumed that culverts could be provided within the affected channels and that no change to the bed elevation, to the waterway's ability to convey water, or to the ability to convey flood flows would occur. Based on this design information, the crossings would not permanently alter the course or flow of these water resources, similar to the rail alignments evaluated in **Section 3.8.4.3** of the Draft EIS. Furthermore, runoff from Segment 4C would be directed away from the trackway.

There is a potential that tunneling in Segment 4C could result in the redirection of some surface water that currently permeates into the groundwater system within the Clark Mountains. 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.

**Construction Period:** Construction activities associated with development of the Segment 4C rail alignment could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind. The existing protective vegetation cover would be removed, which would reduce natural soil resistance to erosion and could affect the drainage patterns of the existing water resources within proximity of Segment 4C. Similar impacts could also occur at the TCAs.

*Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

Segment 4C would not cross a designated 100-year floodplain and would therefore not place any structures within the 100-year floodplain that could impede or redirect flood flows.

*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*

**Permanent Effects:** Segment 4C would include drainage along the proposed trackway to channel stormwater runoff away from the trackway. For the portions of Segment 4C that are at-grade, the trackway itself would not produce any considerable amount of runoff given the permeable nature of construction on ballast rather than paved or solid impervious surfaces. In areas where Segment 4C would be elevated, the placement of columns to support the trackway would not substantially increase the amount of impervious surface area. Runoff produced along the elevated rail alignment would be captured and directed away from the trackway or into newly created drainage features since there are no existing drainage features in the undeveloped areas north of Mountain Pass. Portions of Segment 4C would also be within tunnels through the Clark Mountains. Through the tunnels, no rainfall would fall directly onto the trackway; however, runoff could enter the tunneled portions of the rail alignment at the tunnel portal areas. Runoff that enters the tunnels would be captured and directed to designated drainage features. Refer to **Section 3.4, Utilities/Emergency Services**, of this Supplemental Draft EIS for a discussion of stormwater conveyance systems.

**Construction Period:** Construction of Segment 4C may result in additional sources of polluted runoff from soil disturbances or construction equipment, which could impact water quality on and around the TCAs and limits of construction.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** The Segment 4C rail alignment would not use surface or groundwater resources and no effects would occur during operation.

**Construction Period:** Construction of Segment 4C 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 project area.



**Relocated Sloan MSF***Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

The RSMSF would not impact any intermittent washes, stream, or drainages. Operation of the RSMSF would not violate any water quality standards, waste discharge requirements, or degrade water quality during construction or operation.

*Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite*

The RSMSF would not directly affect any water resources and would therefore not alter the existing drainage patterns in the area during construction or operation.

*Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

The RSMSF would not be located within the designated 100-year floodplain and would therefore not place any structures within the 100-year floodplain that could impede or redirect flood flows.

*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*

**Permanent Effects:** Implementation of the RSMSF on previously undeveloped, vacant lands would increase the amount of impervious surface on the site. However, it is assumed that the majority of this site would not be paved over and that the increase in associated runoff would not be substantial. Because there are numerous other locations in the watersheds for groundwater recharge, the minimal increase in impervious surface associated with the RSMSF would not result in a considerable loss of groundwater recharge and would not affect groundwater levels.

**Construction Period:** Construction of the RSMSF may result in additional sources of polluted runoff (i.e., from soil erosion or construction machinery fuel leakage), which could adversely affect water quality of the nearby drainages, washes, and streams.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** The RSMSF would not result in a new or increased use of surface water and/or groundwater during operation beyond what was analyzed in **Section 3.8.4.3** of the Draft EIS as the types of uses and employment capacity would be the same as considered for the Las Vegas MSF site options. Water service would be obtained from existing water utility providers. Refer to **Section 3.4, Utilities**, of this Supplemental Draft EIS for a discussion of water supply.

**Construction Period:** Consistent with the conclusion in **Section 3.8.4.3** of the Draft EIS for the Sloan Road MSF, the RSMSF would still 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 project area.

### **Frias Substation**

#### *Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

**Permanent Effects:** The Frias Substation would not impact any intermittent washes, stream, or drainages. However, the underground 25 kV feeder that connects the Frias Substation to the autotransformer and rail alignment would cross beneath an adjacent drainage to the north, affecting approximately 50 linear feet of the drainage. It is not anticipated that operation of the 25 kV feeder would transport or emit contaminants that would violate water quality.

**Construction Period:** Construction of the Frias Substation could degrade existing water quality, particularly as a result of trenching activities associated with construction of the underground 25 kV feeder. If precautions are not taken to contain such contaminants, construction could produce contaminated stormwater runoff with a resultant degradation of water quality. Hazardous materials associated with construction equipment could also adversely affect water quality if spilled or improperly stored. Water quality impacts from construction activities at the Frias Substation site could violate water quality standards, exceed contaminant loadings, provide additional sources of polluted runoff, or otherwise degrade water quality.

#### *Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite or Offsite*

**Permanent Effects:** The underground 25 kV feeder associated with the Frias Substation would be cross beneath the existing drainage to the north. However, drainage patterns in the area have been previously modified by residential development and roadway construction and it is not anticipated that the 25 kV feeder would alter the direction or course of this drainage.

**Construction Period:** Construction activities associated with the development of the Frias Substation could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind. The existing protective vegetation cover would be removed, which would reduce natural soil resistance to erosion and could affect the drainage patterns of the existing water resources within proximity of the Frias Substation.

#### *Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

The Frias Substation would not be located within the designated 100-year floodplain 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. **Figure S-3.8-3** shows the Frias Substation in relation to the 100-year floodplain.

*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*

**Permanent Effects:** Development of the Frias Substation on previously undeveloped, vacant lands would increase the amount of impervious surface on the site. However, as the site would only encompass a 4.6 acre area, the potential to create additional stormwater runoff would be minimal.

**Construction Period:** The Frias Substation may result in additional sources of polluted runoff during construction, but such sources would be confined to the construction limits.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** The Frias Substation would not use surface or groundwater resources and no effects would occur during operation.

**Construction Period:** Construction of the Frias Substation 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 project area.

**Alignment Adjustment Areas**

*Violate Any Water Quality Standards or Waste Discharge Requirements, or Substantially Degrade Water Quality*

**Permanent Effects:** AAAs 3, 4, and 7 would not affect any channels, intermittent streams, or washes.

AAAs 1 and 2 along Segment 2A/2B would result in an increase of 17.2 linear feet of channels, intermittent streams, and washes that would be potentially affected, as compared to Segment 2A/2B evaluated in **Section 3.8.4.3** of the Draft EIS.

- AAA 1 would result in Segment 2A/2B affecting an additional 29.4 linear feet of channels, streams, and washes, an increase of 4 percent over Segment 2A/2B without the AAA 1 shift.
- AAA 2 would result in Segment 2A/2B affecting 12.2 less linear feet of channels, streams, and washes, a decrease of 2 percent over Segment 2A/2B without the AAA 2 shift.

AAAs 5 and 6 along Segment 3B would result in an overall decrease of approximately 479 linear feet of potentially affected water resources as compared to Segment 3B evaluated in **Section 3.8.4.3** of the Draft EIS. These AAAs would result in a decrease from 8,087 linear feet to 7,608 linear feet of water resources affected by Segment 3B.

- AAA 5 would result in Segment 3B affecting additional 16.9 linear feet of channels, streams, and washes, an increase of 1 percent over Segment 3B without the AAA 5 shift.

- AAA 6 would result in Segment 3B affecting 496 less linear feet of channels, streams, and washes, a decrease of 7 percent over Segment 3B without the AAA 6 shift.

AAA 8 would not result in Segment 6B affecting additional linear feet of channels, intermittent streams, or washes than Segment 6B evaluated in **Section 3.8.4.3** of the Draft EIS.

Regardless, Segment 2A/2B, Segment 3B, and Segment 6B with the AAAs would have the potential to violate water quality standards, provide additional sources of polluted runoff, or otherwise degrade water quality, similar to the conclusions for Segment 2A/2B, Segment 3B, and Segment 6B in **Section 3.8.4.3** of the Draft EIS.

**Construction Period:** Similar to the conclusions for construction of Segment 2A/2B, Segment 3B, and Segment 6B in **Section 3.8.4.3** of the Draft EIS, construction of the rail alignments with the AAAs would involve soil disturbance, excavation, cutting/filling, and grading, which could result in increased erosion and sedimentation to surface waters. Hazardous materials from construction machinery could also introduce additional contaminants to stormwater runoff. Construction of the AAAs would require intermittent stream, wash, and ditch crossings, which could provide a direct path for construction related contaminants. Water quality impacts from construction activities could violate water quality standards, exceed contaminant loadings, provide additional sources of polluted runoff, or otherwise degrade water quality.

*Substantially Alter Existing Drainage Patterns in a Manner That Would Result in Substantial Erosion, Siltation, or Flooding Onsite of Offsite*

**Permanent Effects:** There would be an overall decrease in the length (linear feet) of water resources affected by all rail alignments with implementation of the AAAs. The additional water resources crossings associated with the AAAs would not permanently alter the course of flow of the water resources based on preliminary design information from the project Applicant. The same design measures identified for the rail alignments identified in **Section 3.8.4.3** of the Draft EIS would be applied to the alignment adjustments. Furthermore, runoff would be directed away from the trackway and into existing drainage facilities associated with the I-15 freeway or other local drainage systems where possible.

**Construction Period:** Construction activities associated with the rail alignments with the AAAs could expose disturbed and loosened soils to erosion from rainfall, runoff, and wind, consistent with the construction effects related to the rail alignment evaluated in **Section 3.8.4.3** of the Draft EIS. With the exception of AAA 8, which would shift the rail alignment into areas already disturbed by the I-15 freeway corridor and into the median of already paved local roads (Dean Martin Drive), the existing protective vegetation cover would be removed by the rail alignments, which would reduce natural soil resistance to erosion and could affect the drainage patterns of the existing water resources within proximity of the AAAs.

*Place Housing or Structures Within 100-Year Floodplain or Place Structures That Would Impede or Redirect Flood Flows*

**Permanent Effects:** Segment 2A/2B, Segment 3B, and Segment 6B with the AAAs would have the potential to place structures within the 100-year floodplain which could impede or redirect flood flows.

- **AAA1:** AAA 1 would cross or run adjacent to the same 100-year floodplain of the Mojave River that would be crossed by Segment 2A/2B as evaluated in **Section 3.8.4.3** of the Draft EIS. AAA 1 would encroach upon approximately 7.6 acres of the 100-year floodplain, resulting in an increase of about 1 acre of floodplain affected, as compared to Segment 2A/2B evaluated in **Section 3.8.4.3** of the Draft EIS.
- **AAA 2:** The westernmost portion of AAA 2 would also cross the same 100-year floodplain of the Mojave River that would be crossed by Segment 2A/2B as discussed in **Section 3.8.4.3** of the Draft EIS. AAA 2 would encroach upon approximately 3.2 acres of the 100-year floodplain, representing an increase of approximately 1.7 acres of affected floodplain to Segment 2A/2B. Overall, implementation of the alignment adjustments would increase the floodplain encroachment of Segment 2A/2B by approximately 2.7 acres.
- **AAA 3 through 7:** AAAs 3 through 7 would not be located within a designated 100-year floodplain.
- **AAA8:** AAA 8 would cross or run adjacent to the same 100-year floodplain that would be crossed by Segment 6B evaluated in **Section 3.8.4.3** of the Draft EIS. AAA 8 would encroach upon approximately 23 acres of the 100-year floodplain, result in an increase of about 3 acres of affected floodplain to Segment 6B.

**Construction Period:** Consistent with the conclusion for Segment 2A/2B and Segment 6B in **Section 3.8.4.3** of the Draft EIS, construction of the rail alignments with AAAs 1, 2, and 8 would have the potential place to equipment, workers, and structures within the 100-year floodplain, which could impede or redirect flood flows during the construction period.

*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*

**Permanent Effects:** The AAAs would not result in any change to runoff beyond what was evaluated in **Section 3.8.4.3** of the Draft EIS for Segment 2A/2B, Segment 3B, and Segment 6B. Similar to all rail alignments evaluated in **Section 3.8.4.3** of the Draft EIS, the proposed trackways would be designed to channel stormwater runoff away from the trackway. Where the rail alignment would be at-grade, the trackway itself would not produce a considerable amount of runoff given the permeable nature of construction on ballast rather than paved or solid impervious surfaces. Runoff along the elevated portions of Segment 6B (AAA 8) would be captured and directed to designated drainage areas. Refer to **Section 3.4, Utilities/Emergency Services**, of this Supplemental Draft EIS for a discussion of stormwater conveyance systems.

Furthermore, where AAA 8 would shift outside of the existing I-15 freeway corridor and into the median of Dean Martin Drive/Industrial Road (between Hacienda Avenue and Tropicana Avenue), the columns and median barrier would be placed in areas of existing impervious (paved) surfaces and Segment 6B as adjusted by AAA 8 would not impede local runoff potential. **Figure S-3.6-8** in **Section 3.6, Visual Resources**, of this Supplemental Draft EIS depicts a simulation of the proposed AAA 8 in this area.

**Construction Period:** Construction of the rail alignments, including implementation of the AAAs, may result in additional sources of polluted runoff from soil disturbances or construction equipment, which could impact water quality on and around the TCAs and limits of construction.

*Use Surface or Groundwater in Wasteful or Inefficient Manner Resulting in a Reduction in Water Availability*

**Permanent Effects:** The AAAs would not use surface or groundwater resources and no effects would occur during operation.

**Construction Period:** Construction of the rail alignments with the AAAs would require water for concrete batching, washing vehicles and equipment, and dust control, similar to the rail alignments evaluated in **Section 3.8.4.3** of the Draft EIS. 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 project area.

#### **Wigwam MSF Modification**

The location and size of the Wigwam MSF has not changed and the construction and operation effects of the Wigwam MSF identified in **Section 3.8.4.3** of the Draft EIS relative to hydrology and water quality would remain unaltered. The Wigwam 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, drainage patterns, or flood flows would occur over what was assumed in **Section 3.8.4.3** of the Draft EIS. While the Wigwam 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. Water service for operation and construction of the MSF would be obtained from existing water utility providers. Refer to **Section 3.4, Utilities**, of this Supplemental Draft EIS for a discussion of water supply.

#### **Profile Modification**

The location of Segment 3B rail alignment would not change as a result of implementation of the Profile Modification and the construction and operation effects of Segment 3B identified in **Section 3.8.4.3** of the Draft EIS relative to hydrology and water quality would remain unchanged. Although the Profile Modification would result in a retained cut of about 8 feet below grade, no effects related to the groundwater table would occur due to the depth of the groundwater table (approximately 45 to 76 feet) at this location. As concluded in **Section 3.8.4.3** of the Draft EIS, Segment 3B would have the potential

to violate water quality standards, exceed contaminant loadings, provide additional sources of polluted runoff, or otherwise degrade water quality during construction and operation; would not permanently alter the course or flow of existing drainages; could increase the size of the 100-year floodplain and impede or redirect flood flows; and would not result in a considerable increase in runoff. The Profile Modification does not change these impacts of Segment 3B as presented in **Section 3.8.4.3** of the Draft EIS. While no water service would be required during operation of the rail alignment, water it is assumed that water for construction activities would be obtained from existing utility providers. Refer to **Section 3.4, Utilities**, of this Supplemental Draft EIS for a discussion of water supply.

### 3.8.4 MITIGATION MEASURES

The **Mitigation Measures HYD-1** through **HYD-9** and **Mitigation Measure HYD-11** identified in **Section 3.8.5** of the Draft EIS would apply to the proposed project modifications and additions to address potential hydrologic and water quality related impacts described above. **Mitigation Measure HYD-10** from **Section 3.8.5** of the Draft EIS would not apply as it is specifically related to mitigating impacts associated with Autotransformers #7 and #11. No additional mitigation would be required for the project modifications and additions. The relevant mitigation measures from **Section 3.8.5** of the Draft EIS are summarized below:

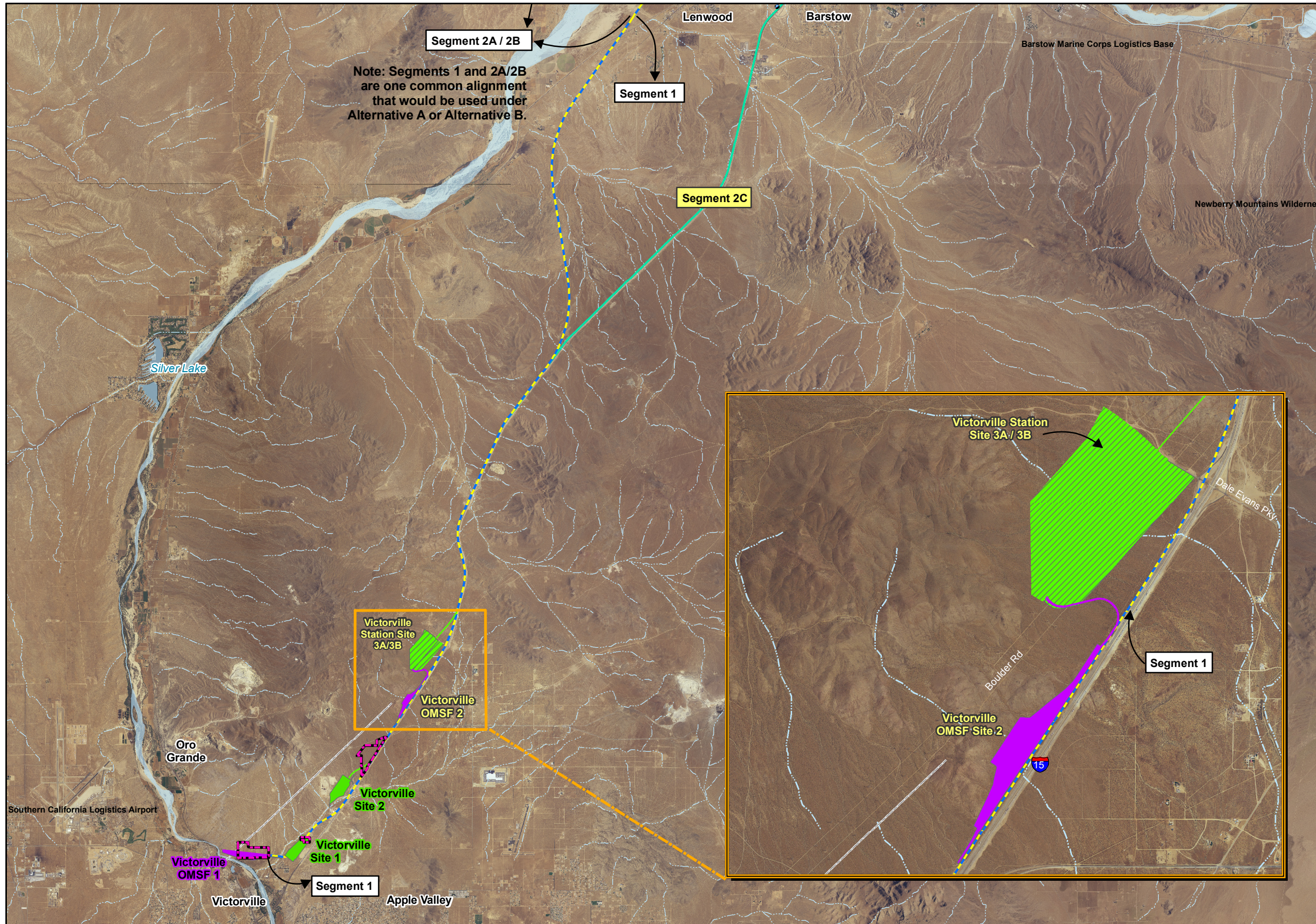
- **Mitigation Measure HYD-1** – Requires the incorporation of site-specific permanent water quality treatment devices and Best Management Practices (BMPs) to protect water quality. BMPs could include vegetated swales, traction sand traps, or settling basins and should be sized properly so that untreated stormwater does not reach the Mojave River or any washes along the rail alignment.
- **Mitigation Measure HYD-2** – Requires implementation of construction-related best management practices.
- **Mitigation Measure HYD-3** – Requires all action alternatives to comply with the NPDES Construction General Permit.
- **Mitigation Measure HYD-4** – Requires implementation of a stormwater pollution prevention program.
- **Mitigation Measure HYD-5** – Requires implementation of a spill prevention, control, and countermeasure plan to prevent accidental releases of chemicals that are stored on site and measures to use in case of a hazardous materials spill.
- **Mitigation Measure HYD-6** – Requires the proper design of station and maintenance facility drainage systems to handle adequate flow.
- **Mitigation Measure HYD-7** – Requires a reduction of encroachment into the designated 100-year floodplain by elevating the base-elevation of rail alignments, station, and maintenance facilities above the floodplain.
- **Mitigation Measure HYD-8** – Prohibits the presence of construction equipment or construction materials within the designated 100-year floodplain.

- **Mitigation Measure HYD-9** – Minimizes impact of OMSF 2 on water resources.
- **Mitigation Measure HYD-11** – Minimize impacts on water availability during construction activities.

### 3.8.5 RESIDUAL IMPACTS FOLLOWING MITIGATION

While mitigation would be incorporated to reduce construction and operational period effects to water resources, development of the project modifications and additions would result in permanent impacts to existing channels, streams, drainages, and intermittent washes whereby flows could be redirected. The project modifications and additions would also result in an overall increase in impervious surface, which could increase the stormwater runoff in the project region.





Note: Segments 1 and 2A/2B are one common alignment that would be used under Alternative A or Alternative B.

**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

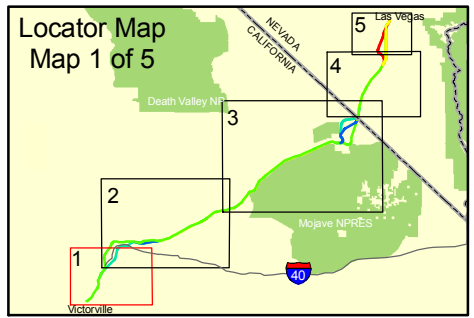
- Ancillary Facility Sites**
- Text** Project Modifications and Additions
- Modified Station Site Option - Victorville Station Site 3A/3B
  - Station Options
  - Maintenance Facility Site Options
  - Temporary Construction Area (TCA) Site Options
  - Modified Temporary Construction Area (TCA) Site Options
  - Autotransformer Site Options (EMU Option Only)
  - Electric Utility Corridor (EMU Option Only)
  - Alignment Adjustment Areas

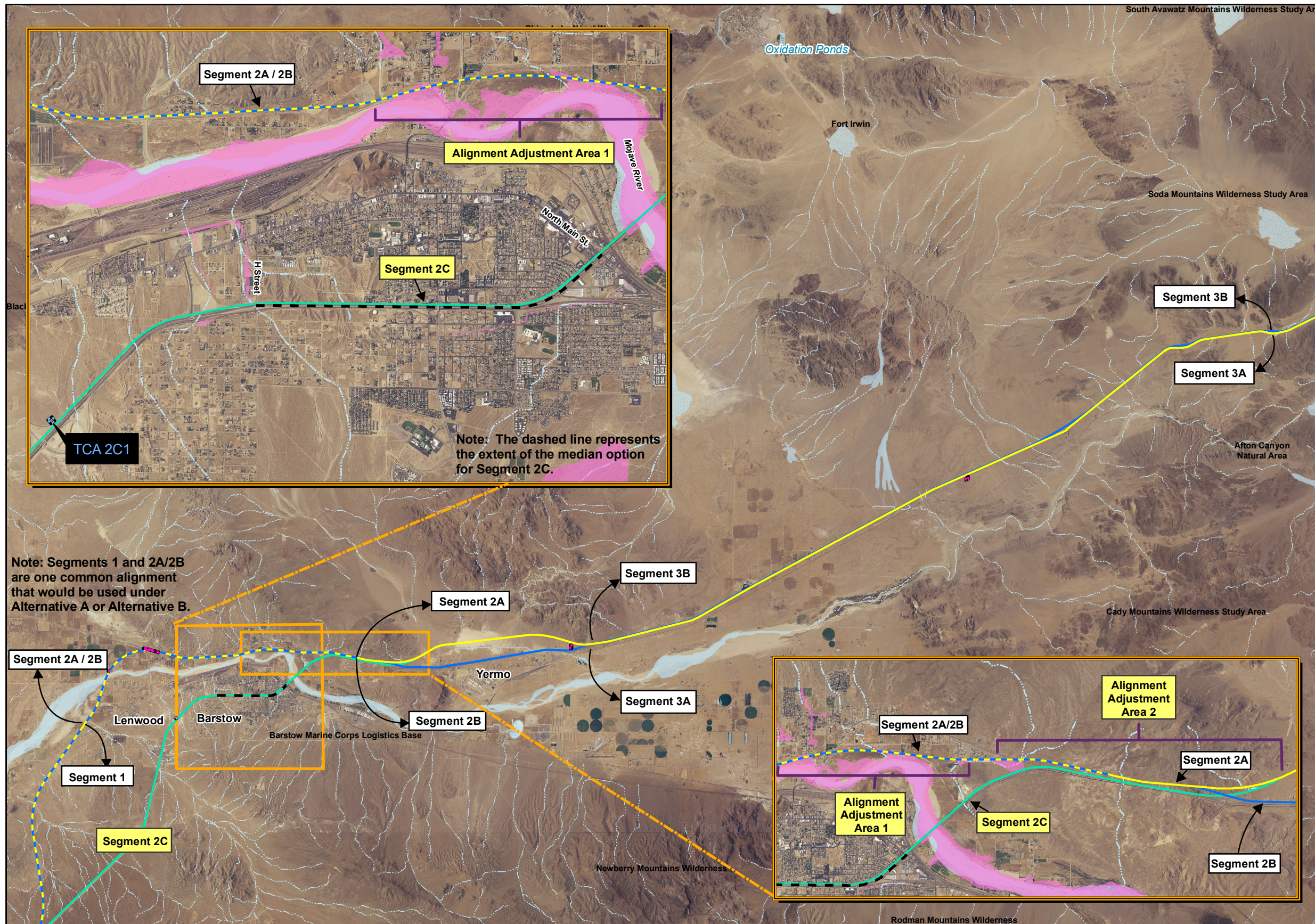
1 inch equals 3 miles

Kilometers  
0 2 4

Miles  
0 1.5 3

Source: DesertXpress 2007, ESRI 2005, NAIP 2003-2006.





### Legend

**Hydro Features**

- FEMA 100-year floodplain
- Water Bodies
- Dry Lake
- Streams

**DesertXpress Alignments**

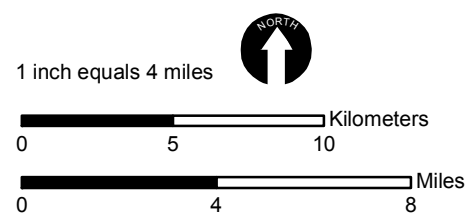
- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

**Ancillary Facility Sites**

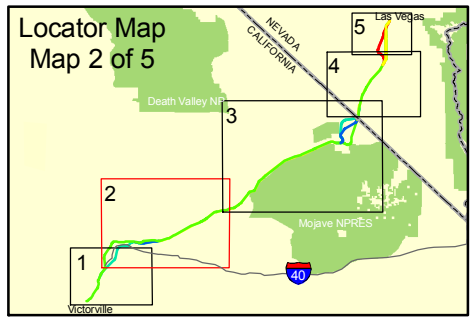
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- Station Options
- Maintenance Facility Site Options
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)
- Electric Utility Corridor (EMU Option Only)
- Alignment Adjustment Areas

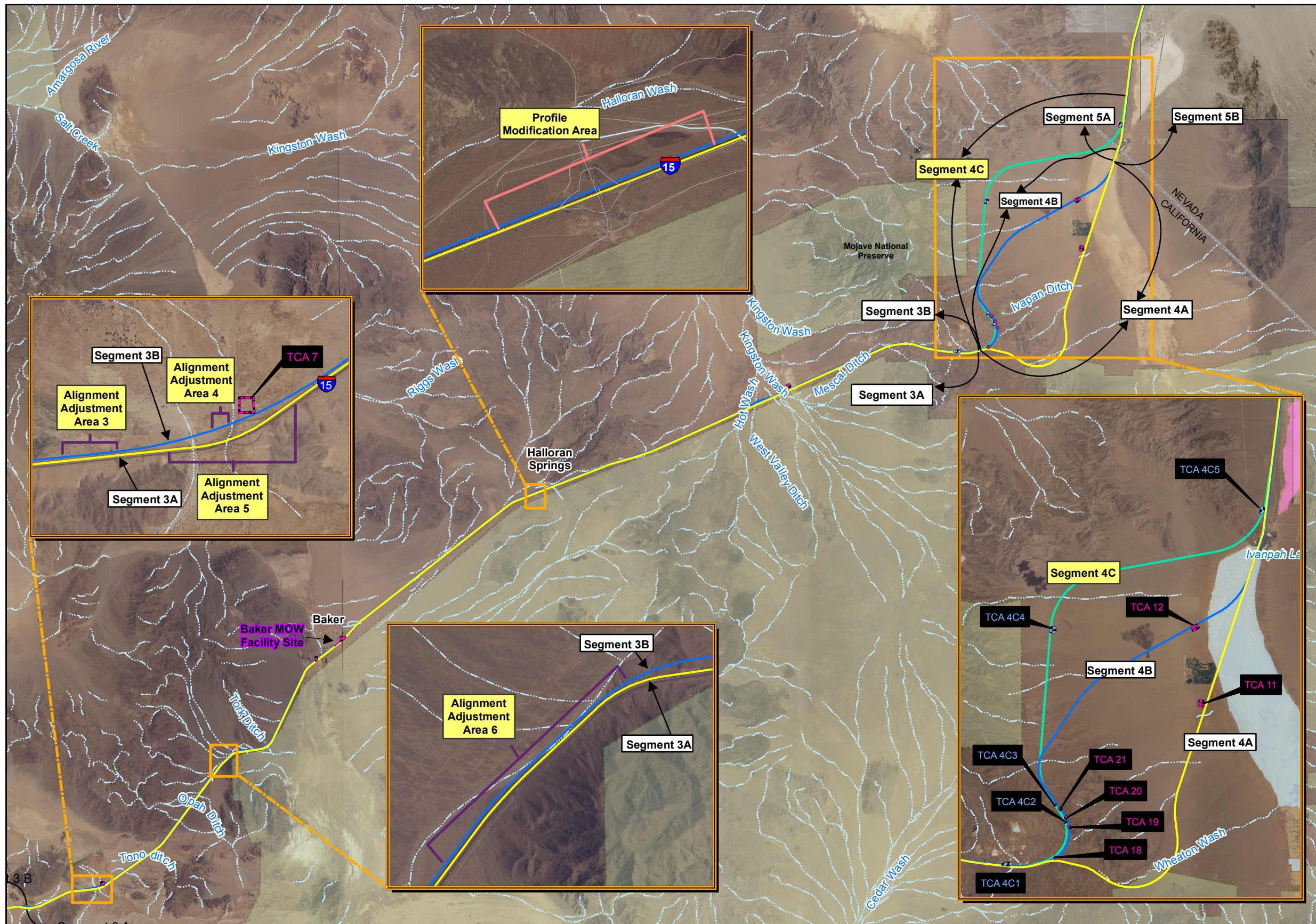
Note: Segments 1 and 2A/2B are one common alignment that would be used under Alternative A or Alternative B.

Note: The dashed line represents the extent of the median option for Segment 2C.

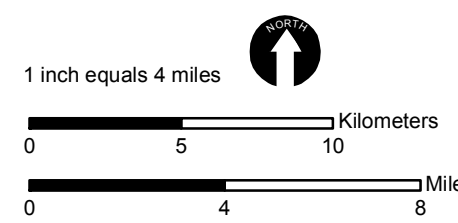


Source: ICFI 2009, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

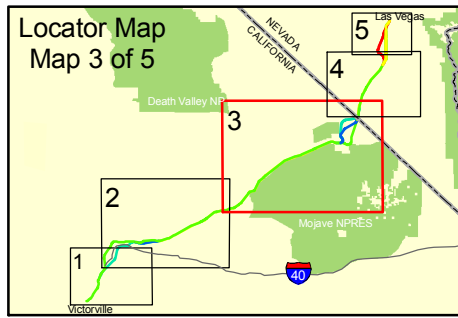


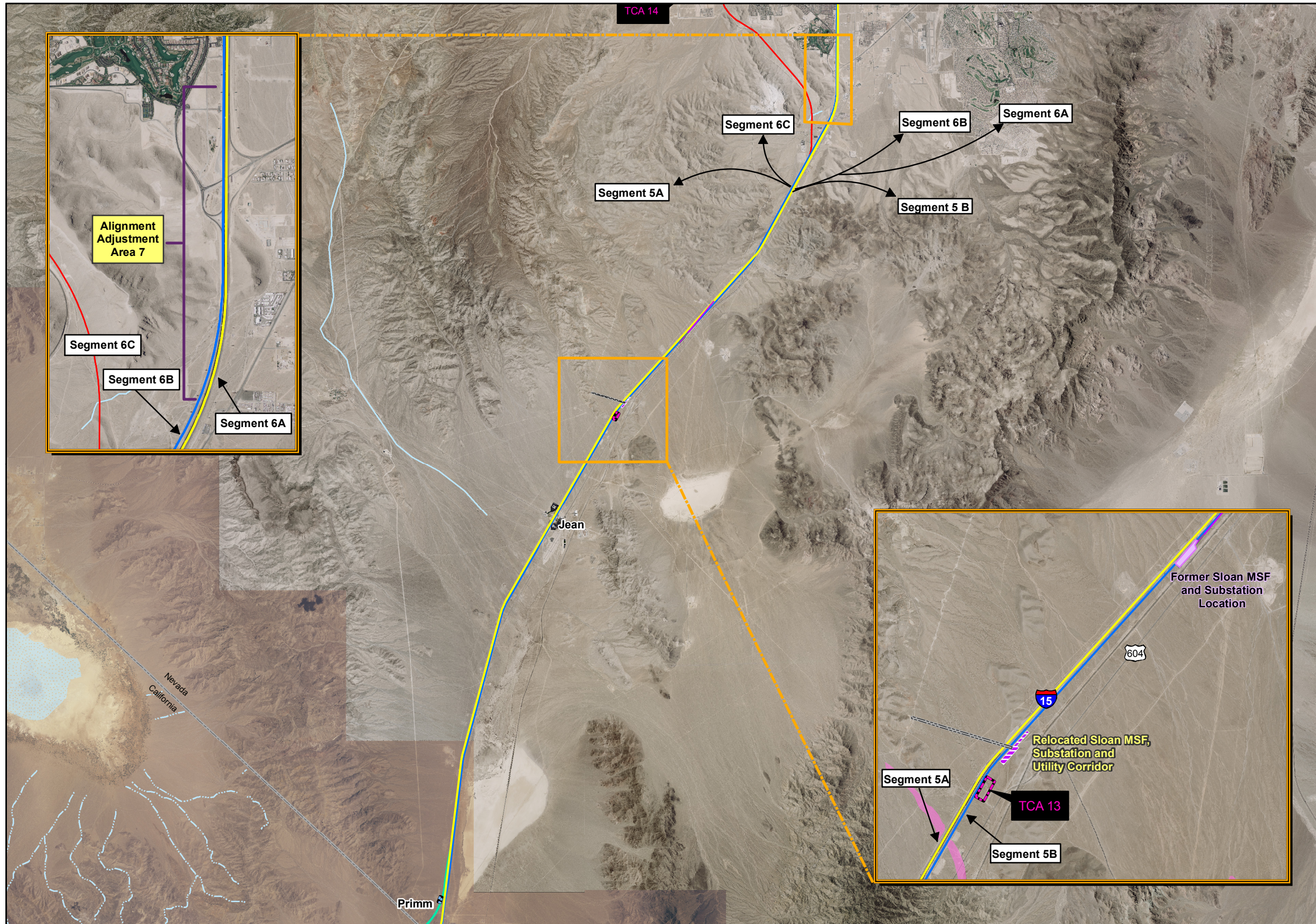


- ### Legend
- Hydro Features**
- FEMA 100-year floodplain
  - Water Bodies
  - Dry Lake
  - Streams
- DesertXpress Alignments**
- Alternative A
  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications
- Ancillary Facility Sites**
- Text** Project Modifications and Additions
  - Station Options
  - Maintenance Facility 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

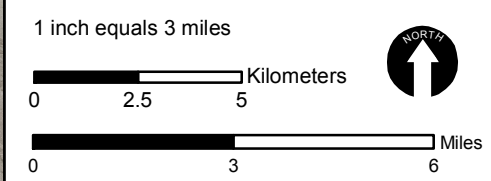


Source: ICFI 2009, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

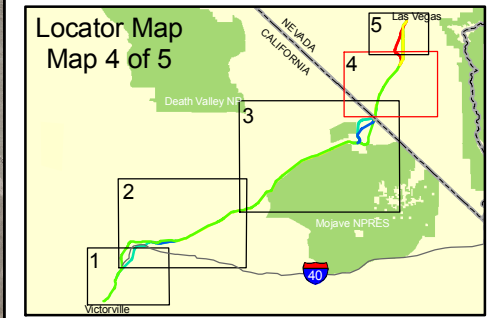


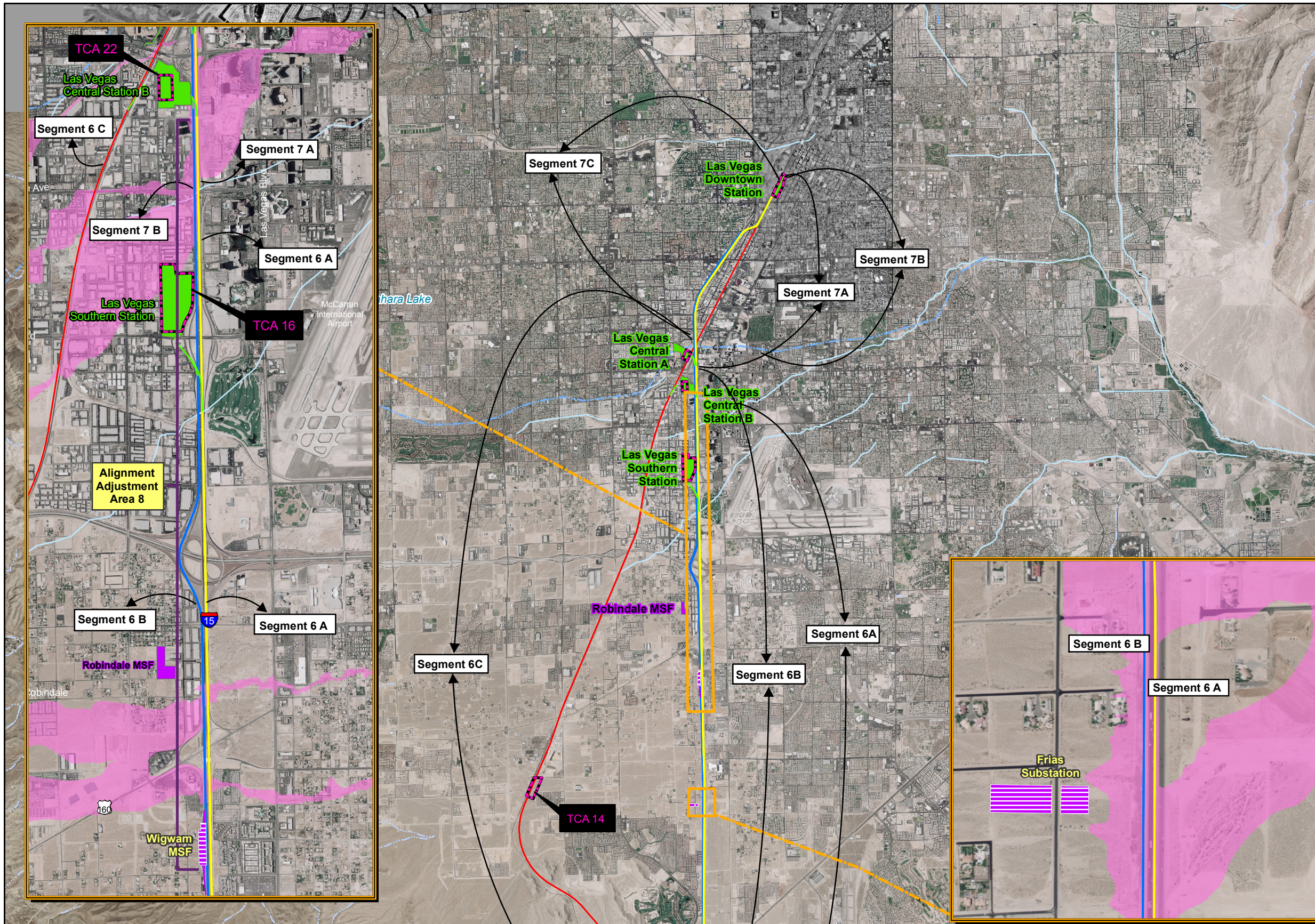


- ### Legend
- Hydro Features**
- FEMA 100-year floodplain
  - Water Bodies
  - Dry Lake
  - Streams
- DesertXpress Alignments**
- Alternative A
  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications
- Ancillary Facility Sites**
- Text** Project Modifications and Additions
- Station Options
  - Maintenance Facility 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

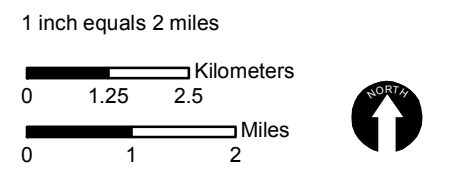


Source: ICFI 2009, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery

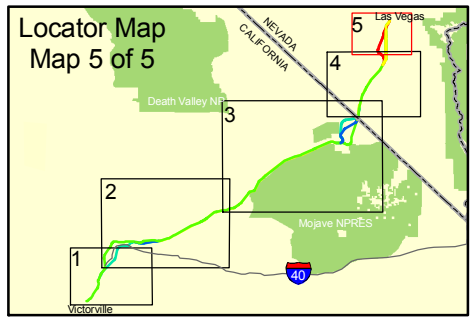




- ### Legend
- Hydro Features**
- FEMA 100-year floodplain
  - Water Bodies
  - Dry Lake
  - Streams
- DesertXpress Alignments**
- Alternative A
  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications
- Ancillary Facility Sites**
- Text** Project Modifications and Additions
  - Station Options
  - Maintenance Facility Site Options
  - Frias Substation and Wigwam MSF Modifications
  - 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



Source: ICFI 2009, ESRI 2005, DesertXpress 2007, NAIP and DOQQ Imagery



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## 3.9 GEOLOGY AND SOILS

This section summarizes the existing geological and soil conditions, describes the potential impacts as a result of the project modifications and additions, and presents appropriate mitigation measures.

### 3.9.1 AFFECTED ENVIRONMENT

Geologic and seismic related regulations and standards identified in **Section 3.9.1** of the Draft EIS have not changed and remain applicable to the proposed project.

The following text describes the geologic concerns identified within the areas of proposed modifications and additions. The affected environment relative to the proposed modifications and additions are described regionally first and then by segment.

#### **Regional Conditions**

**Figures S-3.9-1** through **S-3.9-3** show the proposed modifications and additions would be located in a seismically active region near active faults in California, similar to the features evaluated in **Section 3.9.3** of the Draft EIS.

**Figures S-3.9-4** and **S-3.9-5** shows faults in the Nevada portion of the study area. Geologic maps indicate these as active or potentially active. However, activity on these faults is attributed to land subsidence, not tectonic activity (e.g. earthquakes).<sup>1</sup>

As shown in **Figures S-3.9-6** through **S-3.9-9**, the project modifications and additions are in the same general geological areas discussed in **Section 3.9.3** of the Draft EIS and therefore the regional geologic and hydrologic conditions have not changed.

#### **Victorville Station Site 3**

Existing geological and soil conditions at VV3 would be the same as those discussed for the Victorville Stations which were presented as part of the Segment 1 discussion in **Section 3.9.3.6** of the Draft EIS.

VV3 is outside of areas identified as having the potential for landslides, dam inundation, ground fissures, or shallow groundwater. Corrosive soils may be present and the area may be subject to settlement and expansive soils. Hard soils may exist at VV3, which may be difficult to excavate.

VV3 is located in a seismically active area of California, where numerous active and potentially active faults have been mapped. VV3 would therefore be subject to seismic-related hazards.

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<sup>1</sup> Land subsidence occurs when large amounts of ground water have been withdrawn from certain types of rocks, such as fine-grained sediments. The rock compacts because the water is partly responsible for holding the ground up. When the water is withdrawn, the rocks falls in on itself.

**OMSF 2**

The location of OMSF 2 has not changed; the size of the site is about 21 acres smaller than the site reviewed in the Draft EIS. As the location is the same, the affected geological environment would not change from that presented in **Section 3.9.3.6** of the Draft EIS.

**Segment 2C**

The geologic environment of Segment 2C is the same as that discussed for Segment 2A and 2B in **Section 3.9.3.6** of the Draft EIS. Segment 2C would be closer to several fault lines than Segments 2A and 2B. **Section 3.9.3.2** of the Draft EIS describes these faults. The Lenwood – Lockhart – Old Woman Springs fault and the Gravel Hills – Harper Lake fault are considered active or potentially active. Segment 2C would cross the Lenwood - Lockhart – Old Woman Springs fault line. Due to proximate active faults, the area of Segment 2C has a moderate to high probability of experiencing ground shaking and associated seismic effects.

As Segment 2C crosses the Mojave River, it would have a high potential to encounter shallow groundwater. Due to the alluvial soils present in this area and the shallow groundwater, the potential for liquefaction is high. Expansive and corrosive soils could also be present in this area.

**Segment 4C**

Existing geological and soil conditions in the area of Segment 4C would be the same as those discussed for Segment 4B in **Section 3.9.3.6** of the Draft EIS. Conditions include a moderately steep to steep terrain near Mountain Pass where landslides are likely. This area may also contain hard rock that could be difficult to excavate. Due to proximate active faults, the area of Segment 4C has a moderate to high probability of experiencing ground shaking and associated seismic effects. Expansive and corrosive soils could be present. The potential for liquefaction, dam inundation, and shallow groundwater is low in this area.

**Relocated Sloan MSF**

Existing geological and soil conditions at the RSMSF site would be the same as those discussed for the Sloan Road MSF, since they are both located in the same region along Segment 5. Geological conditions at the Sloan Road MSF were presented as part of the Segment 5 discussion in **Section 3.9.3.6** of the Draft EIS.

The RSMSF may be located near active faults and therefore has a potential for ground shaking and other seismic related activity. Expansive and corrosive soils could be present. The RSMSF has a moderate potential for settlement and may contain hard soils, which may be difficult to excavate.

Although ground fissures have not been identified in this area, there is the potential for them to occur. Ground fissures in the area of Segment 5 are caused by differential stress resulting from regional and local subsidence associated with withdrawal of groundwater which may occur near faults in the Las Vegas Valley.



The potential for liquefaction, dam inundation, and shallow groundwater is low in this area.

### **Frias Substation**

As the Frias Substation site would be located adjacent to the Segment 6 alignment, the geologic environment is the same as Segment 6 described in **Section 3.9.3.6** of the Draft EIS. The Frias Substation site is also near several washes and could be located in an area with shallow groundwater and a moderate potential for liquefaction. Expansive and corrosive soils could be present. The Frias Substation site has a moderate potential for settlement and may contain hard soils, which may be difficult to excavate.

### **Alignment Adjustment Areas**

**AAAs 1 and 2:** AAA 1 and 2 would shift portions of Segment 2A/2B within a region with high potential for shallow groundwater and liquefaction. The soils underlying these areas would have the potential for expansion and a moderate potential for landslides and settlement. Due to proximate active faults, the soils underlying these areas have a moderate to high probability of experiencing ground shaking and associated seismic effects. Expansive and corrosive soils could also be present in this area. The alignment adjustments associated with AAA 1 and 2 may also be underlain by crystalline bedrock, and other rock types that may be difficult to excavate.

**AAAs 3 through 6:** AAA 3 through AAA 6 would shift portions of Segment 3B within a region facing a moderate potential for landslides and proximity to a projected dam inundation area. The earth underlying AAA 3 through AAA 6 may consist of hard rock. AAA 3 through 6 would shift portions of Segment 2A/2B within a region with high potential for shallow groundwater and liquefaction. There is also a moderate potential for settlement and potentially corrosive or expansive soils in these areas.

AAAs 3 through 6 would shift portions of Segment 3B within an area where ground fissures have not been identified and where there is a moderate probability of experiencing ground shaking and associated seismic effects..

**AAAs 7 and 8:** AAAs 7 and 8 would shift portions of Segment 6B within an area where there is a moderate possibility of encountering shallow groundwater, as these alignment adjustments cross a number of drainage features. The potential for liquefaction, expansive soils, settlement, and corrosive soils in the area is also moderate. The potential for ground shaking and landslides is low.

### **Wigwam MSF Modification**

The Wigwam MSF Modification does not entail any change to the existing geological and soil conditions insofar as the location is essentially the same as the Wigwam MSF as evaluated in the Draft EIS. **Section 3.9.2** of the Draft EIS presented geological conditions at the Wigwam MSF as part of the discussion of Segment 6. The Wigwam MSF site is underlain by alluvial deposits that are moderately to well consolidated to strongly cemented. The potential for liquefaction, expansive soils, settlement, and corrosive soils at the site is moderate. The potential for ground shaking and landslide is low.

### Profile Modification

The geologic setting in the area of the Profile Modification would be the same as that discussed for Segment 3 in **Section 3.9.2** of the Draft EIS. In this particular location, however, dam inundation would not be likely as the Profile Modification is not located near a dam or in an area that would be flooded if a dam would fail. Seismic hazards, including fault rupture would also be less likely in this particularly location within Segment 3.

### 3.9.2 METHODS OF EVALUATION OF IMPACTS

The methodology described in **Section 3.9.2** of the Draft EIS was used to evaluate potential effects of the project modifications and additions. This section is based upon research and analysis conducted as part of the Draft EIS.<sup>2</sup> As geologic conditions are regional in nature and are not known to have changed in any substantial way since the publication of the Draft EIS, no additional geological studies were performed.

### 3.9.3 ENVIRONMENTAL CONSEQUENCES

**Table S-3.9-1** below shows the likelihood of potential geologic hazards relative to the proposed modifications and additions. 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)

“2” signifies a moderate potential effect of the selected hazard.

“3” signifies minimal or no presence of the selected hazard.

The proposed modifications and additions 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.

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<sup>2</sup> Preliminary Geotechnical Evaluation, DesertXpress Rail Line, Victorville, California to Las Vegas, Nevada. Ninyo and Moore, 2007.

Table S-3.9-1 Likelihood of Geologic Hazards

Project Modification or Addition	Potential Geotechnical Consequences										
	Surface Fault Rupture <sup>1</sup>	Ground Shaking <sup>2</sup>	Liquefaction <sup>3</sup>	Dam Inundation <sup>4</sup>	Settlement(Natural & Fill Soils) <sup>5</sup>	Corrosive Soils <sup>6</sup>	Expansive Soils <sup>7</sup>	Landslides <sup>8</sup>	Excavation <sup>9</sup>	Ground Fissures <sup>10</sup>	Shallow Groundwater <sup>11</sup>
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 4C	3	1 to 2	3	3	2	2	2	1	1	3	3
RSMSF	3	1 to 3	3	3	2	2	2	2	2	2	3
Frias Substation	3	3	2	3	2	2	2	3	1	1	2
AAAs 1 and 2	1	1	1	2	2	2	1	3	2	3	1
AAAs 3 through 6	3	1 to 2	1 to 2	2 to 3	2	2	2	2	2	3	1 to 2
AAAs 7 and 8	3	3	2	3	2	2	2	3	1	1	2
Wigwam MSF Modification	3	3	2	3	2	2	2	3	1	1	2
Profile Modification	3	2	1 to 2	3	2	2	2	2	2	3	1 to 3

Source: Ninyo and Moore, Preliminary Geotechnical Evaluation, 2007.

Shaded cells show areas with high likelihoods for geotechnical hazards.

<sup>1</sup>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.

<sup>2</sup>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.

<sup>3</sup>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.

<sup>4</sup>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.

<sup>5</sup>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.

<sup>6</sup>Rating 1 = Areas of reported corrosive soils; Rating 2 = Areas with potential for corrosive soils; Rating 3 = Areas with no potential for corrosive soils.

<sup>7</sup>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.

<sup>8</sup>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.

<sup>9</sup>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.

<sup>10</sup>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.

<sup>11</sup>Rating 1 = Areas of known, reported shallow groundwater; Rating 2 = Areas of potentially shallow groundwater; Rating 3 = Areas with no reported shallow groundwater.

### 3.9.4 MITIGATION MEASURES

**Mitigation Measures GEO-1** through **GEO-12** identified in **Section 3.9.5** of the Draft EIS would apply to the proposed modifications and additions to address and limit the adverse effects of the potential geologic and soils related impacts described above. These include:

- **Mitigation GEO-1 – Surface Fault Rupture** – Requires site specific surface fault rupture evaluations by a qualified geologist prior to construction so that in the event a fault-rupture hazard exists, the recommendations of the geologist can be implemented into the final design.
- **Mitigation GEO-2 – Ground Shaking** – Requires site specific evaluation of the potential ground shaking hazard, which shall be performed by a qualified geologist during design development and prior to construction.
- **Mitigation GEO-3 – Liquefaction** – Requires site specific evaluations of the potential liquefaction, which shall be performed by a qualified geotechnical engineer during design development and prior to construction.
- **Mitigation GEO-4 – Dam-Inundation** – Requires the preparation of a detailed hydrologic evaluation by a qualified hydrologist during design development and prior to construction to assess the risks and potential effects of dam inundation.
- **Mitigation GEO-5 – Settlement** – Requires a site specific geotechnical evaluation to be prepared by a qualified geologist to assess the settlement potential of the on-site natural soils and undocumented fill.
- **Mitigation GEO-6 – Corrosive Soils** – Requires a subsurface evaluation to be performed by a qualified corrosion engineer prior to design and construction.
- **Mitigation GEO-7 – Expansive Soils** – Requires a site specific subsurface evaluation, including laboratory testing, to be performed by a qualified geologist to evaluate the extent of which expansive soils are present along the alignment.
- **Mitigation GEO-8 – Landslides** – Requires that surface reconnaissance and subsurface evaluations be performed by a qualified geotechnical engineer during project design to evaluate the condition of slopes relative to the alignment and the potential for landslides and superficial slope failures.
- **Mitigation GEO-9 – Caliche/Hard Rock Excavation** – Requires surface reconnaissance and subsurface evaluations to be performed by a qualified geotechnical engineer during project design to assess the potential to excavate soil.
- **Mitigation GEO-10 – Shallow Groundwater** – Requires that a qualified geotechnical engineer 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.

- **Mitigation GEO-11 - Tunneling** - Requires that excavations for underground structures 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. The ground surface and/or structures around the excavation shall be monitored for movement with a variety of instrumentation.
- **Mitigation GEO-12 – Ground Fissures** – Requires that a qualified geologist conduct surface reconnaissance and prepare an evaluation of ground fissures during the design phase of the project.

**Table S-3.9-2** identifies the applicable mitigation measures for each project modification and addition. The mitigation measures require further evaluation of specific potential effects during or prior to project design. Recommendations of technical specialists shall be implemented.

### 3.9.5 RESIDUAL IMPACTS FOLLOWING MITIGATION

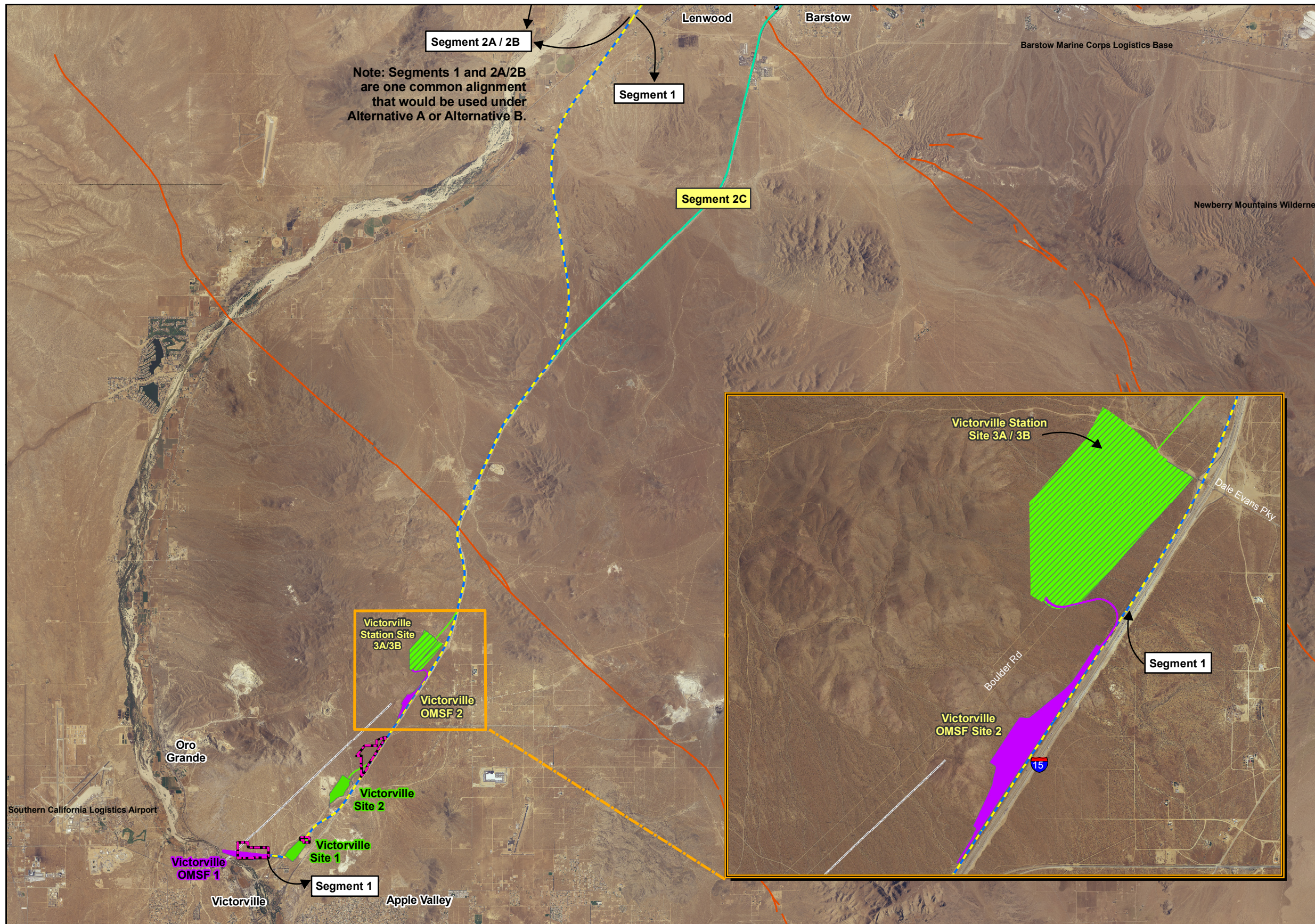
All potential geologic and seismic hazards can be controlled successfully through the application of standard engineering methods and practices identified in the mitigation measures above. Following implementation of these mitigation measures, the project modifications and additions would not result in any residual impacts.

Table S-3.9-2 Project Modifications and Additions - Mitigation Measure Applicability

Project Modification and Addition	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	Mitigation GEO-9: Caliche/Hard Rock Excavations	Mitigation GEO-10: Shallows Groundwater	Mitigation GEO-11: Tunneling	Mitigation GEO-12: Ground Fissures
VV3 (both parking options)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	NA	NA
OMSF2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	NA	NA
Segment 2C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	NA	NA
Segment 4C	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	Yes	NA
RSMSF	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes, caliche	Yes	NA	Yes
Frias Substation	NA	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes, caliche and hard rock	Yes	NA	Yes
AAAs 1 and 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	NA	NA
AAAs 3 through 6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	NA	NA
AAAs 7 and 8	NA	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes, caliche and hard rock	Yes	NA	Yes

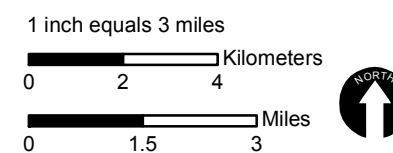
Project Modification and Addition	Mitigation GEO-1: Surface Fault Rupture	Mitigation GEO-2: Ground Shaking	Mitigation GEO-3: Liquefaction	Mitigation GEO-4: Dam-Inundation	Mitigation GEO-5: Settlement	Mitigation GEO-6: Corrosive Soils	Mitigation GEO-7: Expansive Soils	Mitigation GEO-8: Landslides	Mitigation GEO-9: Caliche/Hard Rock Excavations	Mitigation GEO-10: Shallows Groundwater	Mitigation GEO-11: Tunneling	Mitigation GEO-12: Ground Fissures
Wigwam MSF Modification	NA	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes, caliche and hard rock	Yes	NA	Yes
Profile Modification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, hard rock	Yes	NA	NA

Source: Ninyo and Moore, Preliminary Geotechnical Evaluation, 2007.

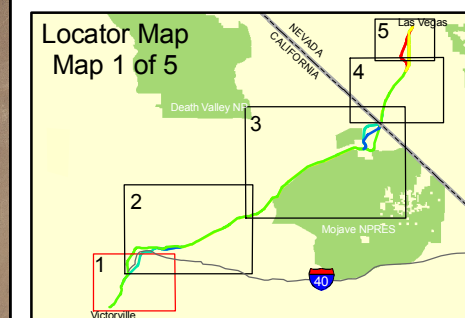


### Legend

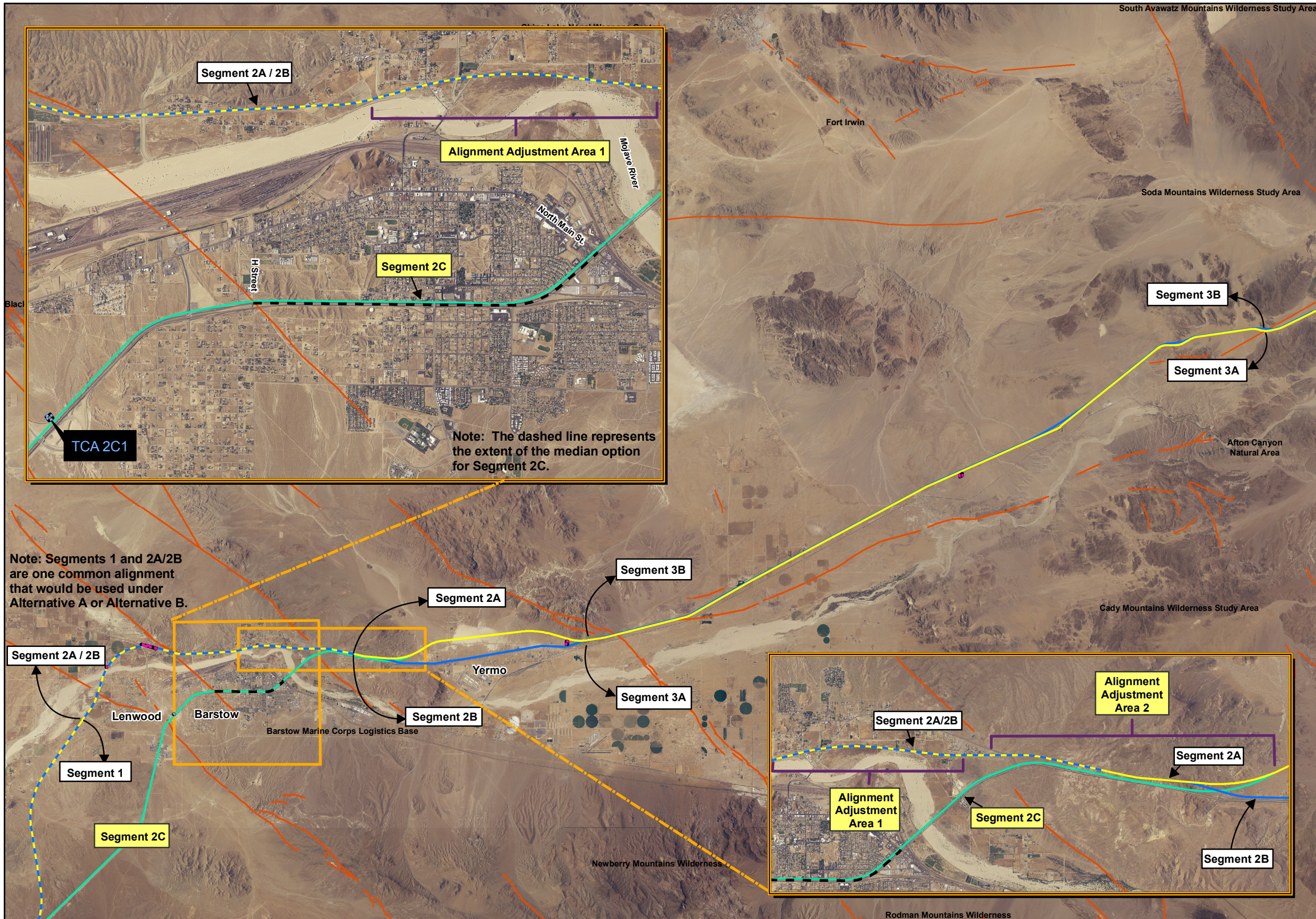
- Faults and Earth Fissures**
- Fault
  - Overall outline of fissure area
- DesertXpress Alignments**
- Alternative A
  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications
- Ancillary Facility Sites**
- Text: Project Modifications and Additions
  - Modified Station Site Option - Victorville Station Site 3A/3B
  - Station Options
  - 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



Source: Bell and Price 1992, NV Bureau of Mines & Geology 1996, CA Division of Mines & Geology 2000, DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau

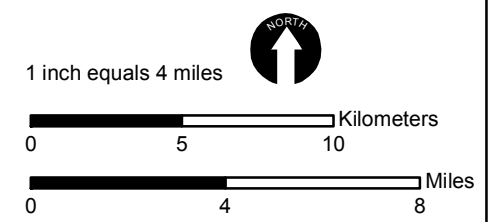




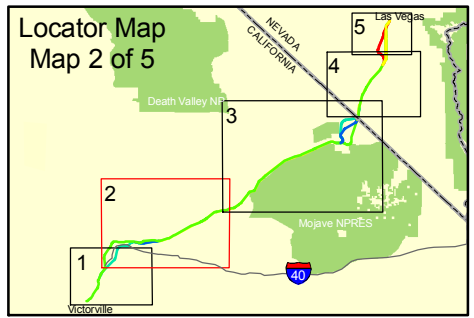


**Legend**

- Faults and Earth Fissures**
- Fault
  - Overall outline of fissure area
- 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

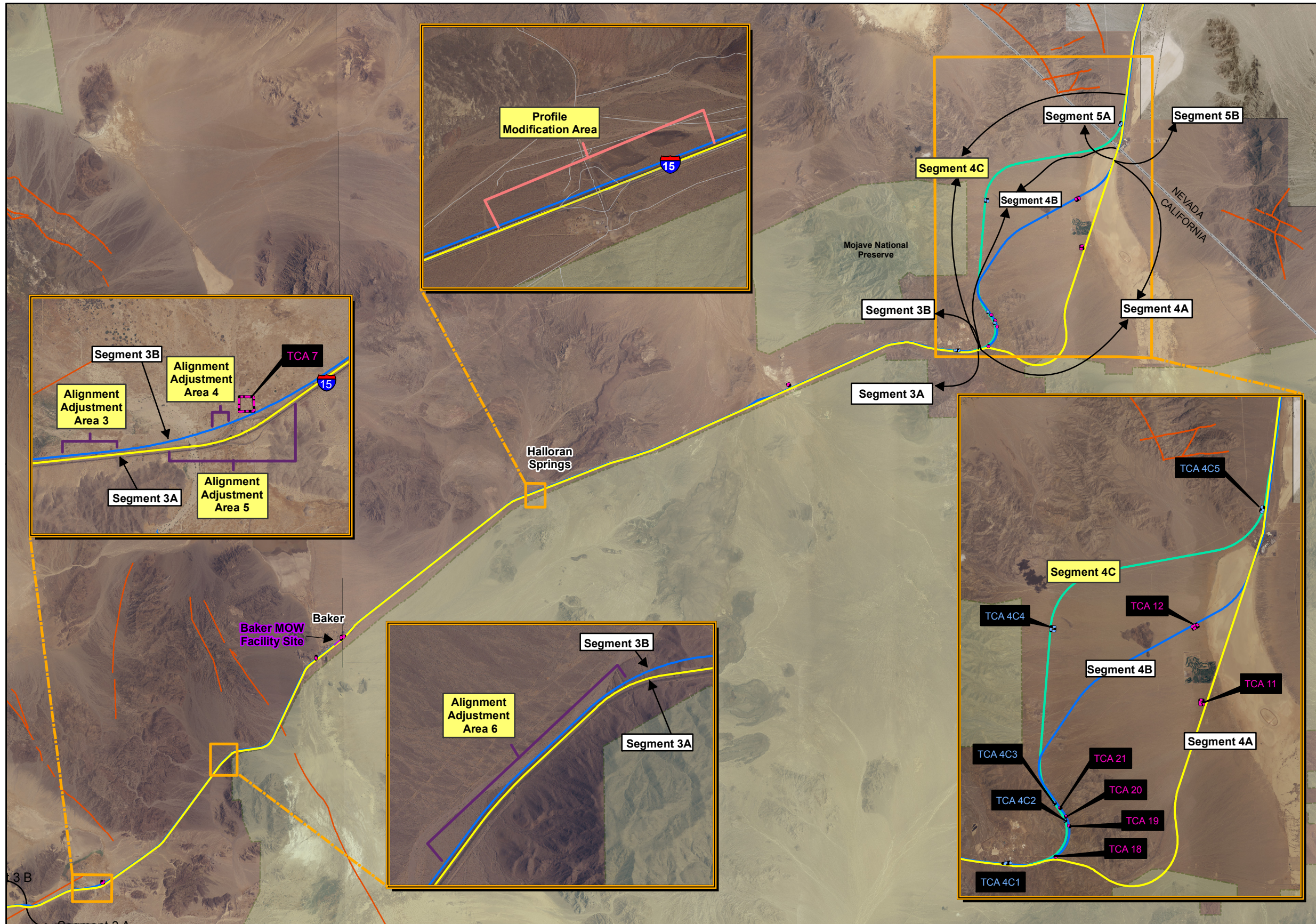


Source: Bell and Price 1992, NV Bureau of Mines & Geology 1996, CA Division of Mines & Geology 2000, DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau



Note: Segments 1 and 2A/2B are one common alignment that would be used under Alternative A or Alternative B.

Note: The dashed line represents the extent of the median option for Segment 2C.



**Legend**

**Faults and Earth Fissures**

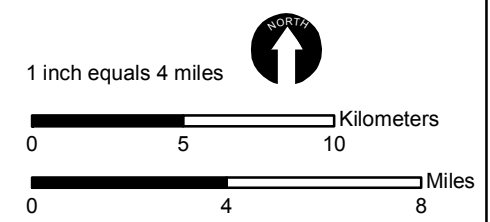
- Fault
- Overall outline of fissure area

**DesertXpress Alignments**

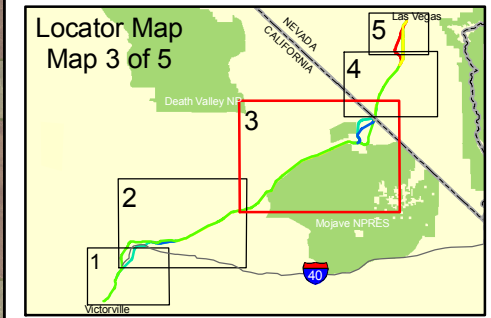
- Alternative A
- Alternative B
- Common Alignment used under Alternative A or Alternative B
- Additional Alignment Modifications

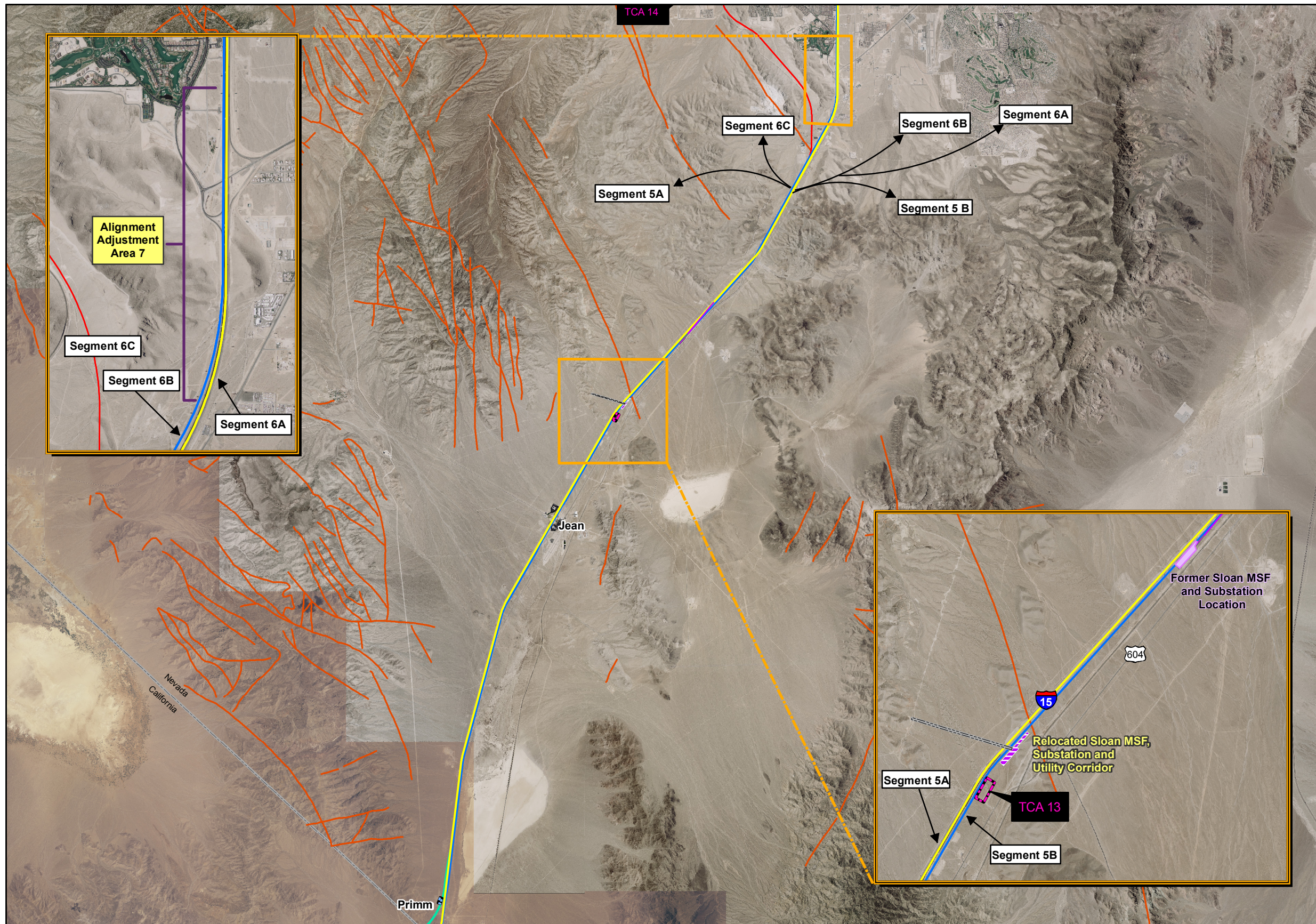
**Ancillary Facility Sites**

- 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



Source: Bell and Price 1992, NV Bureau of Mines & Geology 1996, CA Division of Mines & Geology 2000, DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau





**Legend**

**Faults and Earth Fissures**

- Fault
- Overall outline of fissure area

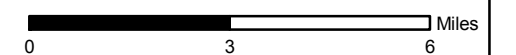
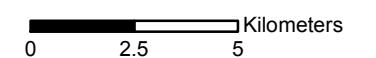
**DesertXpress Alignments**

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

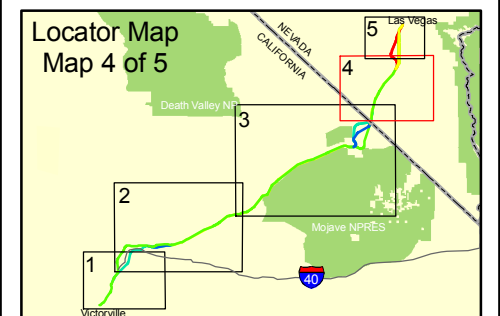
**Ancillary Facility Sites**

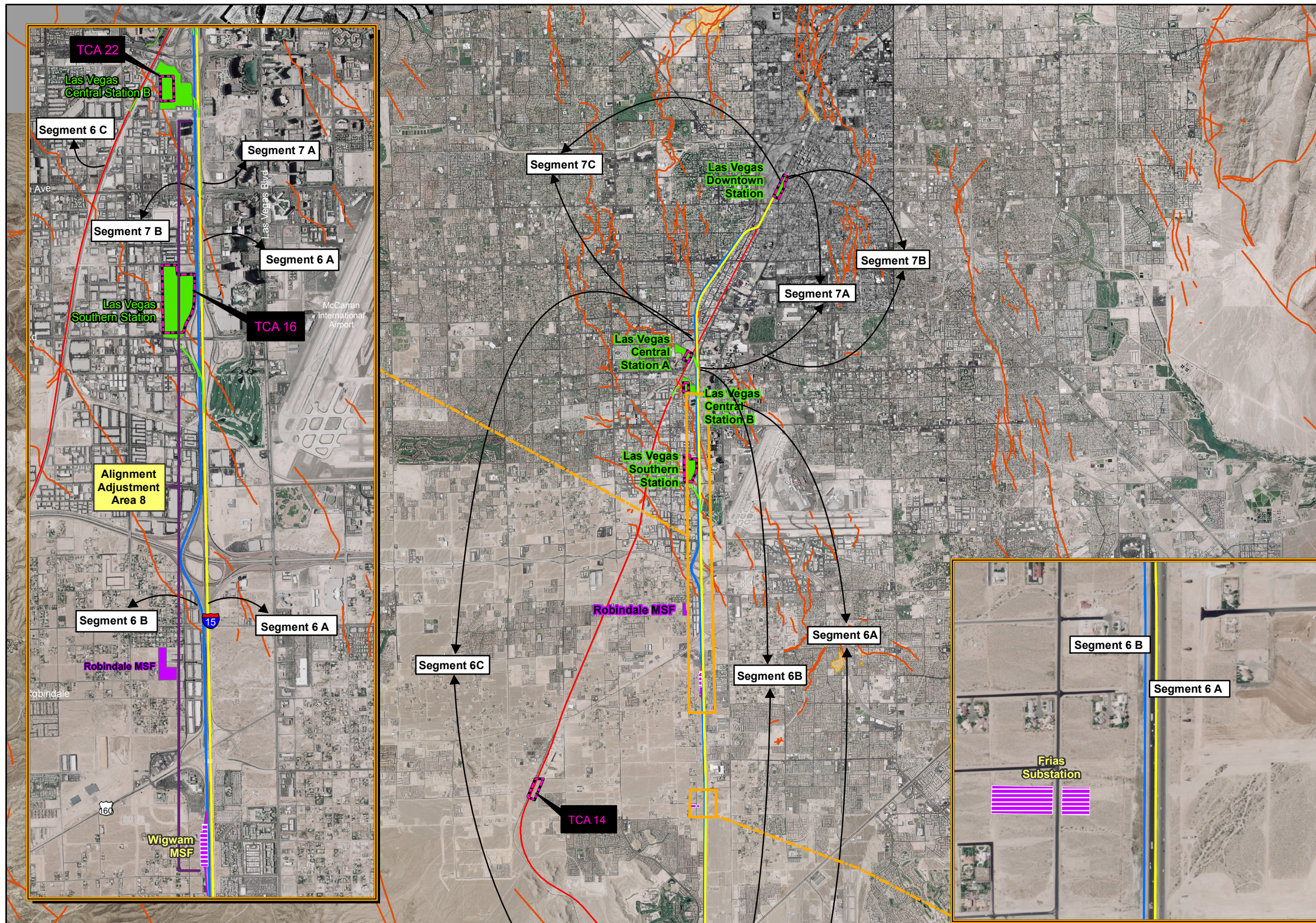
- Text Project Modifications and Additions
- Station Options
- Maintenance Facility Site Options
- Relocation Sloan MSF / Substation Site Option
- Temporary Construction Area (TCA) Site Options
- Modified Temporary Construction Area (TCA) Site Options
- Autotransformer Site Options (EMU Option Only)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

1 inch equals 3 miles



Source: Bell and Price 1992, NV Bureau of Mines & Geology 1996, CA Division of Mines & Geology 2000, DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau



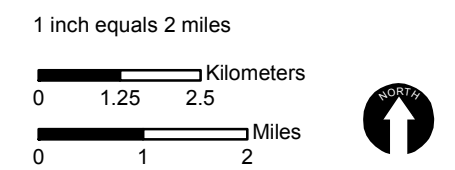


**Legend**

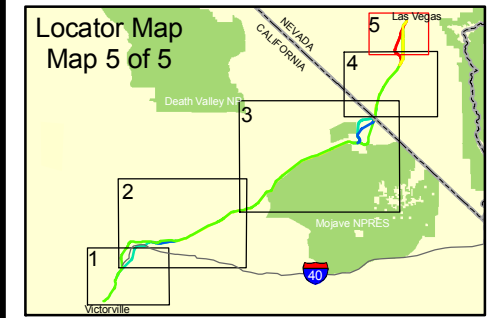
- Faults and Earth Fissures**
- Fault
  - Overall outline of fissure area

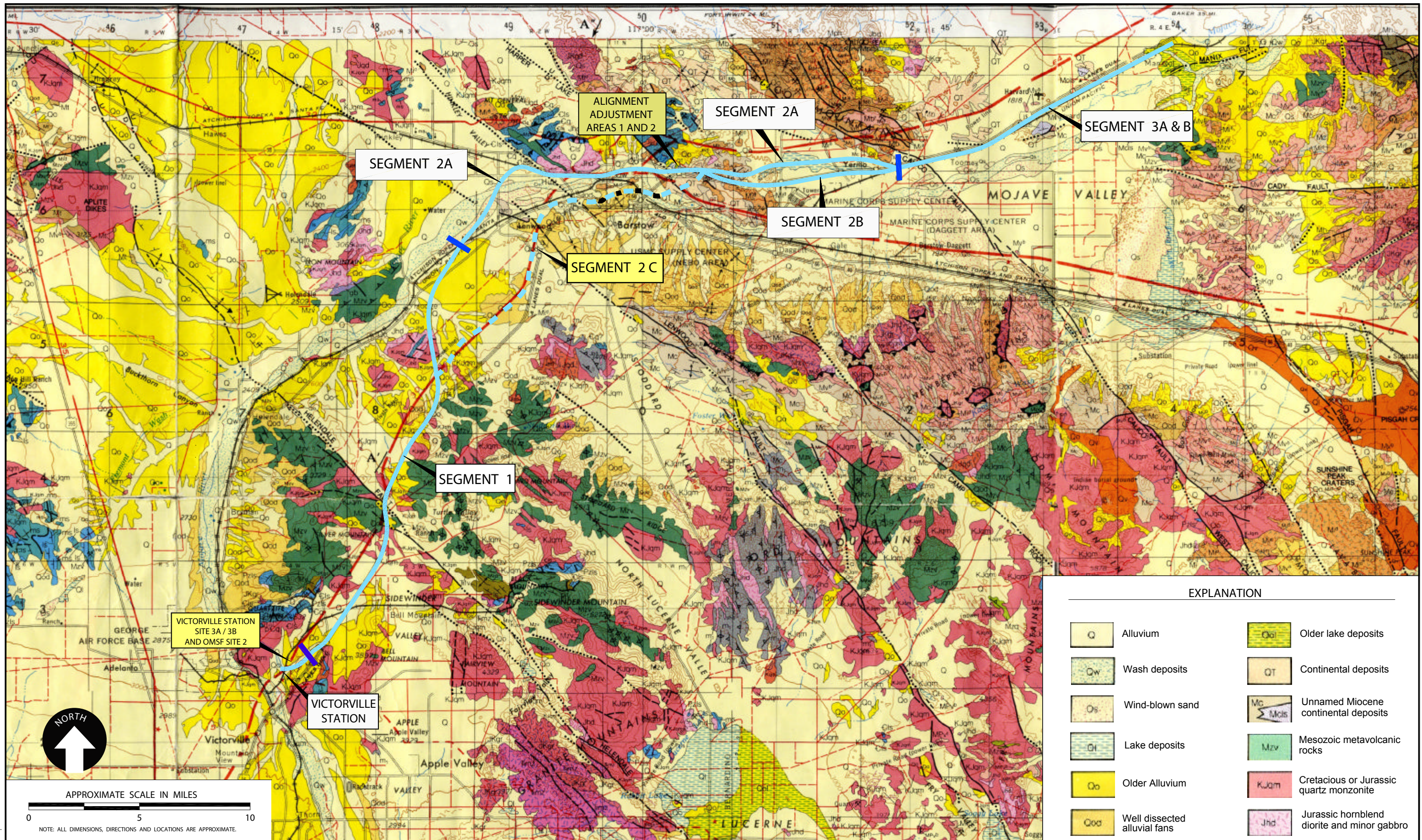
- DesertXpress Alignments**
- Alternative A
  - Alternative B
  - Common Alignment used under Alternative A or Alternative B
  - Additional Alignment Modifications

- Ancillary Facility Sites**
- Station Options
  - Maintenance Facility Site Options
  - Frias Substation and Wigwam MSF Modifications
  - 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



Source: Bell and Price 1992, NV Bureau of Mines & Geology 1996, CA Division of Mines & Geology 2000, DesertXpress 2007, ESRI 2005, NAIP 2003-2006, US Census Bureau





ALIGNMENT  
ADJUSTMENT  
AREAS 1 AND 2

SEGMENT 2A

SEGMENT 3A & B

SEGMENT 2A

SEGMENT 2B

SEGMENT 2C

SEGMENT 1

VICTORVILLE STATION  
SITE 3A / 3B  
AND OMSF SITE 2

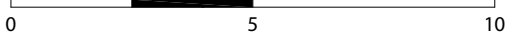
VICTORVILLE  
STATION

EXPLANATION

Q	Alluvium	Qol	Older lake deposits
Qw	Wash deposits	QT	Continental deposits
Qs	Wind-blown sand	Mc	Unnamed Miocene continental deposits
Ql	Lake deposits	Mzv	Mesozoic metavolcanic rocks
Qo	Older Alluvium	KJam	Cretaceous or Jurassic quartz monzonite
Qod	Well dissected alluvial fans	Jhd	Jurassic hornblend diorite and minor gabbro



APPROXIMATE SCALE IN MILES

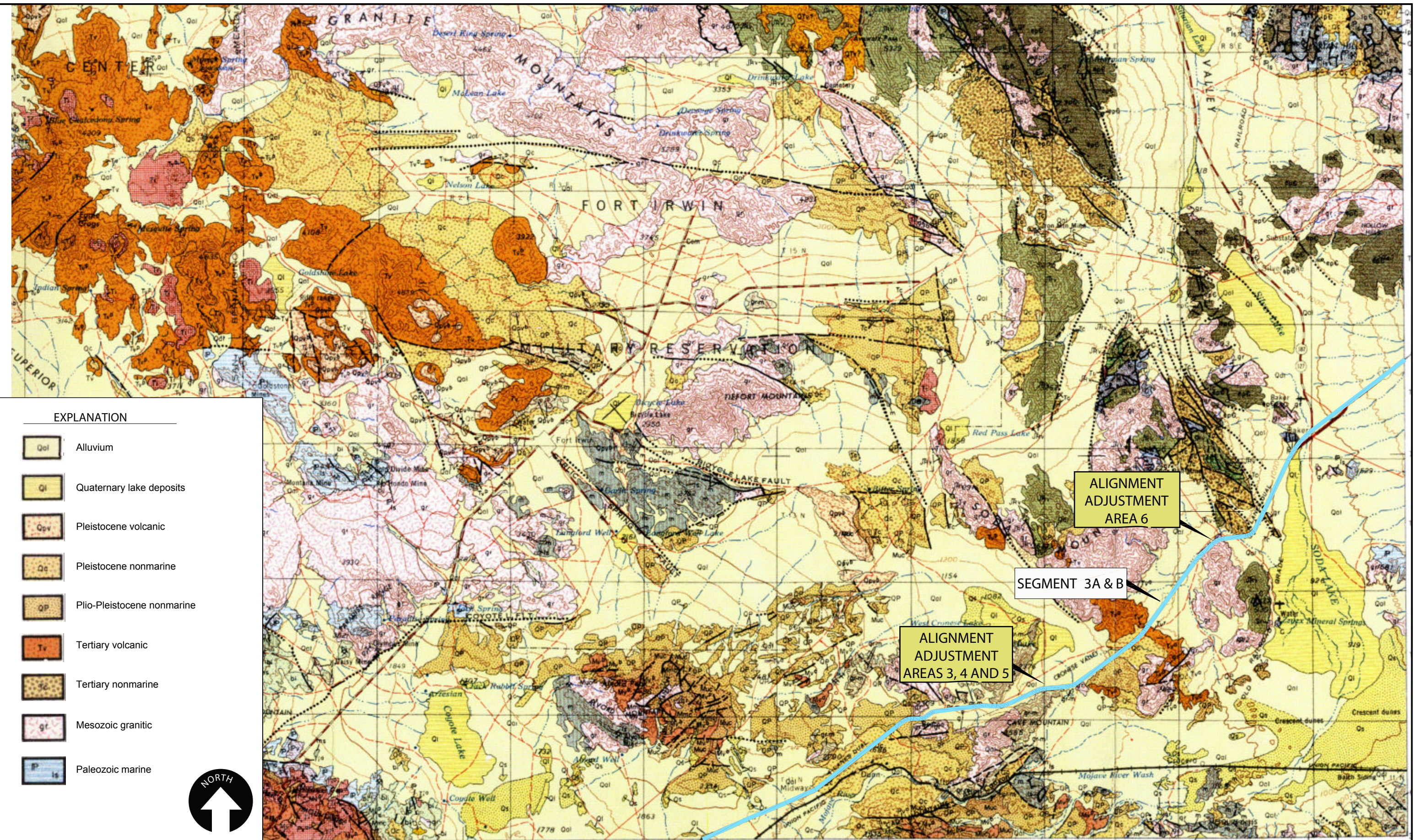


NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Source: Ninyo & Moore., 2007



**DesertXpress -  
Supplemental EIS**



**EXPLANATION**

- Qal Alluvium
- Ql Quaternary lake deposits
- Qpv Pleistocene volcanic
- Qc Pleistocene nonmarine
- QP Plio-Pleistocene nonmarine
- Tv Tertiary volcanic
- Tc Tertiary nonmarine
- gT Mesozoic granitic
- P Paleozoic marine



APPROXIMATE SCALE IN MILES



NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Source: Ninyo & Moore., 2007

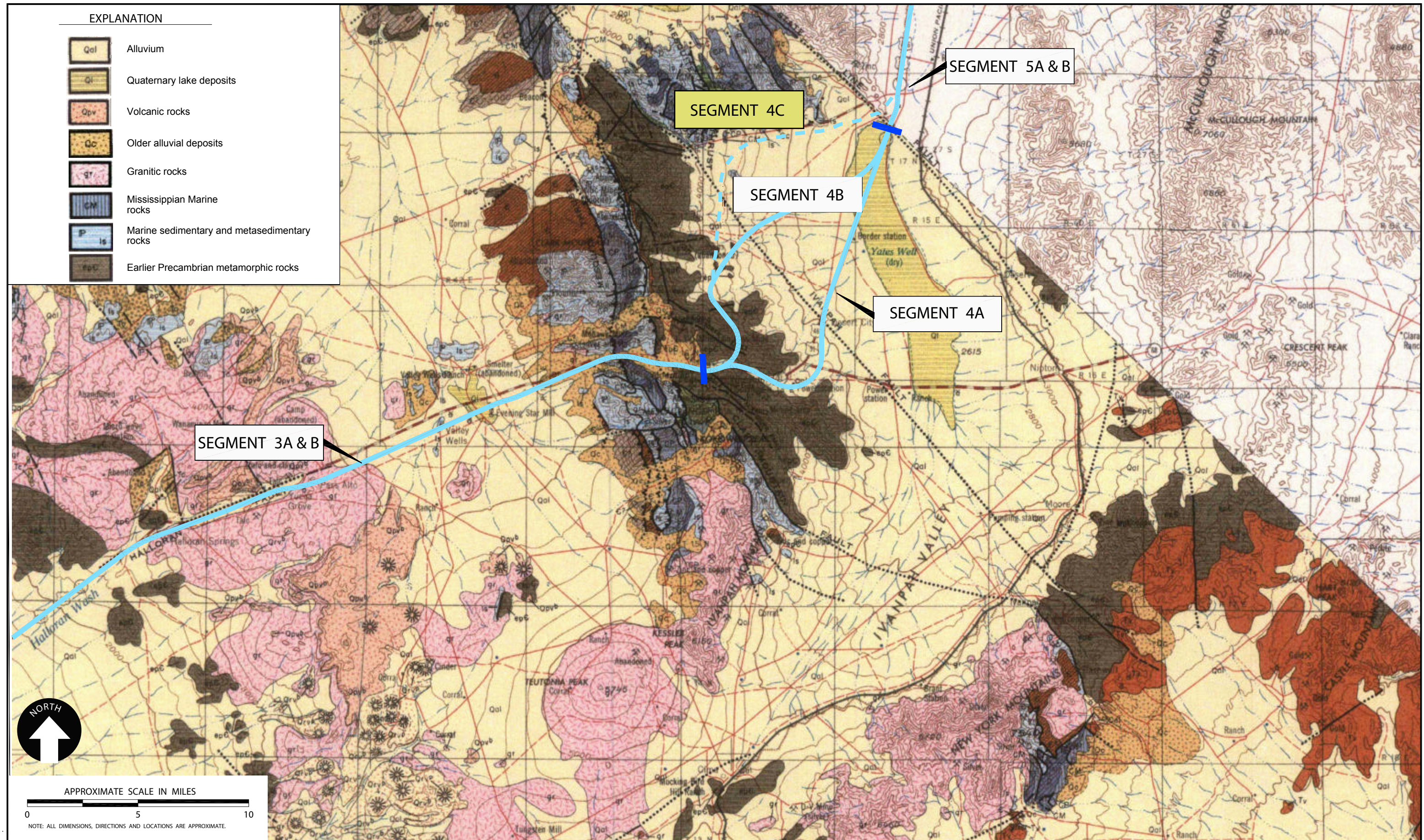


**DesertXpress -  
Supplemental EIS**

Regional Geological Map (2)

**FIG S-3.9-7**

Geografika Consulting 06.08.10



Source: Ninyo & Moore, 2007

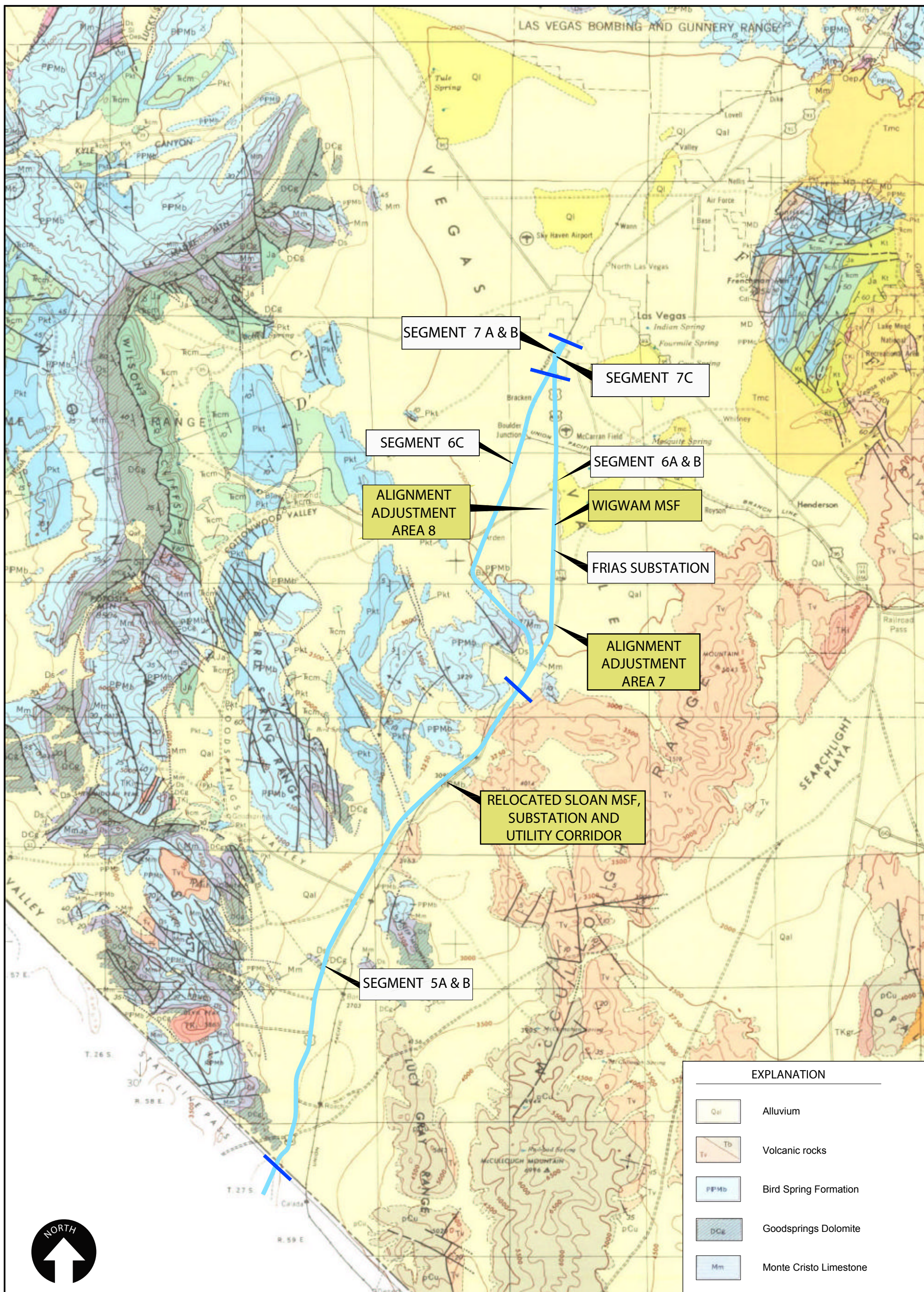


**DesertXpress -  
Supplemental EIS**

Regional Geological Map (3)

**FIG S.3.9-8**

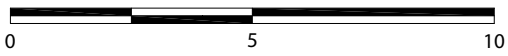
Geografika Consulting 06.08.10



EXPLANATION	
Qal	Alluvium
Tv	Volcanic rocks
PPMb	Bird Spring Formation
DCg	Goodsprings Dolomite
Mm	Monte Cristo Limestone
Ds	Sultan Limestone



APPROXIMATE SCALE IN MILES



NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.



## 3.10 HAZARDOUS MATERIALS

This section describes the hazardous materials impacts related to the project modifications and additions and presents appropriate mitigation measures.

### 3.10.1 AFFECTED ENVIRONMENT

The regulations and standards identified in **Section 3.10.1** of the Draft EIS have not changed and remain applicable to the proposed project.

#### **Regional Conditions**

The general hazardous risks associated with the 200-mile study area corridor have not changed since publication of the Draft EIS. In addition, the project modifications and additions would not introduce new operational effects related to use of hazardous materials at proposed maintenance facilities and elsewhere within the study area.

However, hazardous materials may be present in or around some of the proposed project modifications and additions not previously evaluated in the Draft EIS. 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).

Another example 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 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 USTs are likely present, but that appeared to be abandoned by their former operators.

- **Low:** This rank was given to property 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.

Where no use or storage of hazardous materials in a particular area was identified, no potential effect is assumed.

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.

### **Victorville Station Site 3**

A review of federal and state database listings for the area in which the VV3 site options (VV3A and VV3B) are proposed identified one facility listed on the State Permits Database located within 1/8 of a mile of the proposed station. This site is located at I-15 and Dale Evans Road and has an inactive County of San Bernardino hazardous waste special generator permit. Due to the status of this facility (where use or storage of hazardous materials occurs but with no known releases), this listing would be considered as having a low ranking of potential effects related to hazardous materials, and is not considered an environmental concern.

### **OMSF 2**

The footprint of OMSF 2 has been reduced to 61 acres from 83 acres, as evaluated in the Draft EIS. However, the location of the OMSF 2 is the same as was evaluated in the Draft EIS. As stated in **Section 3.10.3.1** of the Draft EIS, database and aerial photograph review, along with field reconnaissance, did not reveal evidence of significant hazardous material concerns in the area of the OMSF 2 site.

### **Segment 2C**

A review of federal and state database listings identified five facilities within 1/8 of a mile of the Segment 2C alignment options as having a moderate potential for hazardous material contamination; these are shown on **Figure S-3.10-1**.<sup>1</sup> The first three sites, 1) the Exxon Mobil Oil Corporation (Station No. 1249) at 1600 East Main Street; 2) Shell Service Station at 1601 East Main Street, and 3) Chevron Station at 2890 Lenwood Road, are listed on both Resource Conservation and Recovery Act (RCRA) and the Leaking Underground Storage Tank (LUST) databases. Due to the proximity of these sites to the project, they would be considered an environmental concern.

The fourth site, a former E-Z Serve at 1700 East Main Street, is listed on the LUST database as having a gasoline release affecting the aquifer used for the drinking water supply. According to the most recent (2009) groundwater monitoring report, this area is contaminated with chemicals associated with gasoline and would be considered an environmental concern.

The fifth site, Terrible Herbst Inc 74 at 1710 East Main Street, is listed as having at least

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<sup>1</sup> A supplemental Hazardous Materials Assessment (HMA) was prepared for Segment 2C. The analysis included a review of potential sites of concern within a 1/8-mile wide corridor based on an alignment running down the median of the I-15 freeway. This study area includes the entire I-15 freeway right of way and immediately adjacent land uses. As such the supplemental HMA covers both Segment 2C alignment options.

four LUSTs. Based on the review of the State Water Resources Control Board (SWRCB) GeoTracker website, this facility has LUSTs. According to the website, a release of gasoline and fuel oxygenates affected the local aquifer used for drinking water. The regulatory status of this facility is “open-referred.” Based on the facility’s close proximity to the alignment and regulatory status, this facility would be considered an environmental concern.

### **Segment 4C**

A review of federal and state database listings did not identify any facilities within 1/8 of a mile of Segment 4C. Two facilities between 1/2 and 1 mile from the alignment were listed in the environmental database review; however, neither facility would be of environmental concern. The first site, Primm Valley Resort and Casino at 31900 South Las Vegas Boulevard, located approximately 1/2 of a mile east the alignment, was listed on the LUST database. The report indicated that a gasoline release of approximately 25 gallons was reported in 2006 and affected soil only. The case was closed on July 20, 2007. Based on the distance from the alignment, media affected, and closure status, this facility would not be considered an environmental concern. The second site, Colosseum Mine at 1000 Colosseum Mine Road, was determined to be the unmapped source listed as a small quantity generator under the RCRA generators database. This site had no violations, has a low ranking of potential effects related to hazardous materials, and would not be considered an environmental concern.

### **Relocated Sloan MSF**

The RSMSF site would be located on the east side of the I-15 corridor, approximately nine miles south of Sloan Road, and two miles south of the Sloan Road MSF. A review of federal and state database listings for the RSMSF site did not identify any sites of concern within 1/8 of a mile of proposed modification.

### **Frias Substation**

The proposed 1.5-acre Frias Substation site would be located outside of the area previously evaluated in the HMA prepared for the Draft EIS. A review of federal and state database listings for the Frias Substation site did not identify any sites of concern within 1/8 of a mile of the proposed modification (see **Appendix S-C**).<sup>2</sup>

### **Alignment Adjustment Areas**

**AAAs 1 and 2:** AAAs 1 and 2 would shift portions of Segment 2A/ 2B within areas previously evaluated in the HMA prepared for the Draft EIS. **Table 3.10-5** of the Draft EIS identified six sites within 1/8 of a mile of Segments 2A and 2B as having a moderate to high ranking of potential effects related to hazardous materials. These same sites would pose similar potential hazardous material risks to the alignment adjustments associated with AAAs 1 and 2.

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<sup>2</sup> EDR environmental database search conducted April 2010.

**AAAs 3 through 6:** AAAs 3 through 6 would shift portions of Segment 3B within areas previously evaluated in the HMA prepared for the Draft EIS. **Table 3.10-7** of the Draft EIS identified two sites within  $\frac{1}{8}$  of a mile of Segments 3B as having a moderate ranking of potential effects related to hazardous materials. These same sites would pose potential hazardous material risks to the alignment adjustments associated with AAAs 3 through 6.

**AAAs 7 and 8:** AAAs 7 and 8 would shift portions of Segment 6B within areas previously evaluated in the Draft EIS. **Table 3.10-13** of the Draft EIS identified nine sites within  $\frac{1}{8}$  of a mile of Segment 6B as having a moderate ranking of potential effects related to hazardous materials. These same sites would pose potential hazardous material risks to the alignment adjustment areas within Segments 6B.

### **Wigwam Avenue MSF Modification**

The Wigwam Avenue MSF Modification would be located within Segment 6B. **Table 3.10-13** of the Draft EIS identified nine sites within  $\frac{1}{8}$  of a mile of Segment 6B as having a moderate ranking of potential effects related to hazardous materials. However, none of the identified sites within Segment 6B would be within  $\frac{1}{8}$  of a mile of the proposed Wigwam Avenue MSF site.

### **Profile Modification**

The Profile Modification entails locating a portion of Segment 3B within a retained cut, without a shift in the location of the alignment. The Draft EIS did not identify any sites within  $\frac{1}{8}$  of a mile of Segment 3B that would pose potential hazardous material risks to the profile modification area.

## **3.10.2 METHODS OF EVALUATION OF IMPACTS**

This Supplemental Draft EIS uses the same methodology as was used in **Sections 3.10.1** and **3.10.2** of the Draft EIS in the review of potential effects related to hazardous materials.

### **Construction Period – Structures Built Prior to 1980**

Demolition of structures built prior to 1980 could expose the public and/or the environment to hazardous materials, such as lead-based paint and asbestos-containing material.

### **Operational Period --- Storage of Hazardous Materials**

Operation of the project modifications and additions will include such activities as train operations, track maintenance, and equipment maintenance. Within maintenance facility sites, it is anticipated that some hazardous materials, including fuels, lubricants, solvents, paints, compressed gases, and associated waste products would be stored and/or staged in buildings and storage tanks (above and below ground). Equipment such as paint booths, sumps, clarifiers, and wastewater treatment units may also be used at the maintenance facilities.

### Contaminated Soil/Groundwater

Construction activities associated with the project features (including the changes and modifications examined in this Supplemental Draft EIS) may encounter contaminated soils and/or groundwater or other previously identified hazardous materials that must be removed, disposed of, and remediated. Contaminated soils and groundwater are anticipated to be found in the following locations in the project area:

- 1) On and/or near properties identified above as being of moderate to high environmental concern.
- 2) Within and/or near existing or abandoned railroad corridors, where herbicides, petroleum hydrocarbons, and metals may be found in soils and/or groundwater.
- 3) Within or near existing freeway corridors, where petroleum hydrocarbons and aerially deposited lead may be found in soils and/or groundwater.

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 were encountered during construction of any of the project modifications and additions.

In addition to the HMA that was prepared for the Draft EIS, information in this section was drawn from supplemental hazardous materials reports that examined the proposed locations of the VV3A and VV3B site options, the Segment 2C alignment options, Segment 4C, and the RSMSF (see **Appendix S-C**).<sup>3,4</sup> The HMA that was prepared for the Draft EIS covered those lands now proposed for OMSF 2, the Alignment Adjustment Areas, and the Frias substation, and thus, no supplemental information was needed for these features.<sup>5</sup>

### 3.10.3 ENVIRONMENTAL CONSEQUENCES

Each of the project modifications and additions were evaluated against the criteria identified above to determine whether any adverse effects would occur. The discussions below consider the project modifications and additions per the potential effects related to project construction, project operation, and existing soil and/or groundwater contamination within the project area.

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<sup>3</sup> Ninyo & Moore (2009a). *Hazardous Materials Assessment: Proposed Desert Xpress Rail Line Segment 4, Options C and D, Victorville 3 Station*.

<sup>4</sup> Ninyo & Moore (2009b). *Hazardous Materials Assessment: Proposed Desert Xpress Rail Line Segment 2, Alternative C, Sloan Substation*.

<sup>5</sup> Ninyo & Moore (2007). *Hazardous Materials Assessment: Proposed Desert Xpress Rail Corridor*.

### **Victorville Station Site 3**

#### *Construction Period – Structures Built Prior to 1980*

The VV3 site options are traversed by electric utility lines constructed prior to 1980, but there would be no demolition of these lines and thus no hazards related to demolition. Therefore, VV3 would not have the potential to result in impacts related to the demolition of structures built prior to 1980.

#### *Operational Period --- Storage of Hazardous Materials*

The VV3 site options would not involve the use or storage of significant quantities of hazardous materials. Any storage of hazardous materials at VV3 would be similar to what would be stored at either of the other two Victorville Station site options as identified and discussed in **Section 4.10.4** of the Draft EIS. As such, VV3 would not result in adverse effects related to hazardous materials during project operation. No new adverse effects would occur.

#### *Contaminated Soil/Groundwater*

VV3 is located in close proximity to the I-15 freeway corridor, where petroleum hydrocarbons and aerially deposited lead may be found in soils and/or groundwater. Any hazardous materials encountered during the construction process for VV3 would require safe handling and disposal to avoid a potential adverse environmental effect.

### **OMSF 2, Relocated Sloan MSF, and Wigwam MSF Modification**

#### *Construction Period – Structures Built Prior to 1980*

Project modifications propose to locate portions of the Wigwam Avenue MSF site on existing businesses between the end of West Ford Avenue and the I-15 freeway, which could result in the displacement and/or demolition of minor commercial structures. However, based on a review of the Clark County assessor's records, none of the existing improvements in this area were constructed prior to 1980.<sup>6</sup> As such, it is unlikely that these structures would have lead-based paint and/or asbestos-containing materials that would represent an environmental hazard.

None of the remaining MSF facility modifications (OMSF 2 or RSMSF) considered in this Supplemental Draft EIS would be on sites containing any such structures.

#### *Operational Period --- Storage of Hazardous Materials*

As with the other Las Vegas area MSF site options identified in the Draft EIS, it is anticipated that some hazardous materials, including fuels, lubricants, solvents, paints, compressed gases, and associated waste products would be stored and/or staged in buildings and storage tanks (above and below ground) at the OMSF 2, RSMSF, and Wigwam MSF Modification sites. Equipment such as paint booths, sumps, clarifiers, and

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<sup>6</sup> Real Property Parcel Record Search: Parcels 177-17-308-002 and -003; and 177-17-404-014. Clark County Assessor Records and Maps. Available at: <http://www.accessclarkcounty.com/depts/assessor/pages/disclaim.aspx>; Last accessed, May 21, 2010.

wastewater treatment units may also be used at the maintenance facilities. Similar to the other MSF site options, the OMSF 2, RSMSF and Wigwam MSF Modification sites will require the safe handling, use, storage, and disposal of these materials.

#### *Contaminated Soil/Groundwater*

The OMSF 2, RSMSF, and Wigwam MSF Modification sites are located in close proximity to the I-15 freeway corridor, where petroleum hydrocarbons and aerially deposited lead may be found in soils and/or groundwater. Any hazardous materials encountered during the construction process for these MSF facilities would require safe handling and disposal to avoid a potential adverse environmental effect.

### **Segment 2C, Segment 4C, and Alignment Adjustment Areas**

#### *Construction Period – Structures Built Prior to 1980*

Segment 2C, Segment 4C, and the AAAs would not require the demolition of existing structures and therefore would not have the potential to result in adverse effects related to the demolition of structures built prior to 1980.

#### *Operational Period --- Storage of Hazardous Materials*

Segment 2C, Segment 4C, and the AAAs would not involve the use or storage of significant quantities of hazardous materials and therefore would not result in adverse effects related to hazardous materials during project operation.

#### *Contaminated Soil/Groundwater*

Segment 2C and the AAAs are located near properties identified above as being of moderate to high environmental concern. Segment 4C is not located on or near any site that would pose an environmental risk.

Portions of Segment 2C and Segment 4C, as well as the AAAs are located in close proximity to the I-15 freeway corridor, where petroleum hydrocarbons and aerially deposited lead may be found in soils and/or groundwater.

Any hazardous materials encountered during the construction process for these alignments would require safe handling and disposal to avoid a potential adverse environmental effect.

### **Frias Substation and Profile Modification**

#### *Construction Period – Structures Built Prior to 1980*

Construction of the Frias Substation and Profile Modification would not require the demolition of existing structures. Therefore, neither the Frias Substation nor the Profile Modification would have the potential to result in adverse effects related to the demolition of structures built prior to 1980.

### *Operational Period --- Storage of Hazardous Materials*

The Frias Substation and the Profile Modification would not involve the use or storage of significant quantities of hazardous materials. As such, neither the Frias Substation nor the Profile Modification would result in adverse effects related to hazardous materials during project operation.

### *Contaminated Soil/Groundwater*

The Frias Substation and Profile Modification are not located on or near any site that would pose an environmental risk. As such, neither the Frias Substation nor the Profile Modification would result in adverse effects related to existing soil and/or groundwater contamination within the project area.

## **3.10.4 MITIGATION MEASURES**

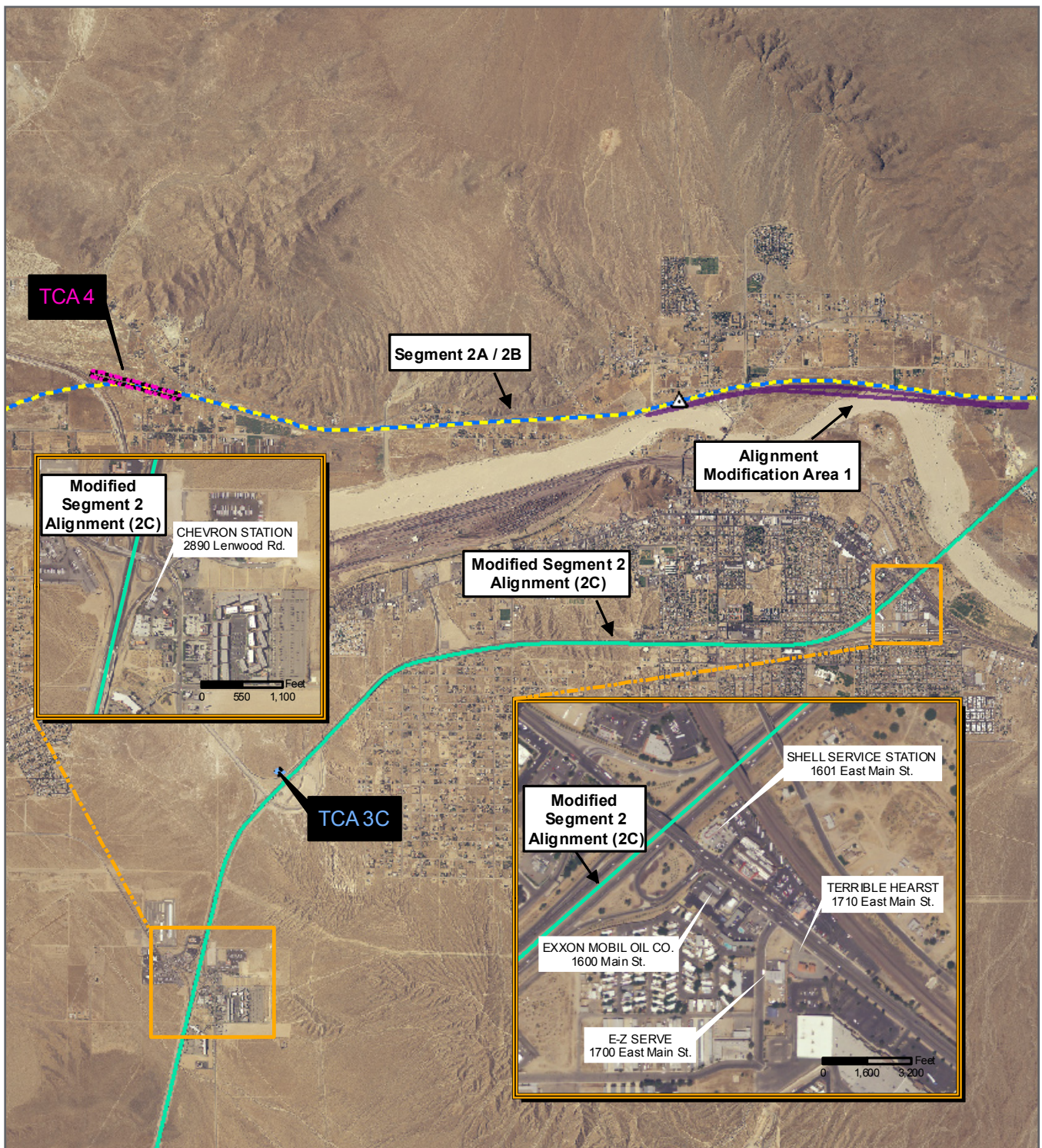
**Mitigation Measures HAZ-1** through **HAZ-5** identified in **Section 3.10.5** of the Draft EIS would be applied to all project modifications and additions to address and limit the adverse effects of the potential hazardous material impacts described above.

Table 3.10-16 of the Draft EIS identifies the applicable mitigation measures by segment. 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.

## **3.10.5 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. Following implementation of the mitigation measures identified above, the project modifications and additions would not result in any residual impacts.







**Legend**

**DesertXpress Alignments**

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

**Ancillary Facility Sites**

-  Temporary Construction Area (TCA) Site Options

-  Autotransformer Site Options (EMU Option Only)
-  Alignment Deviation Areas

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## 3.11 AIR QUALITY AND GLOBAL CLIMATE CHANGE

This section provides an update of the existing air quality conditions along the proposed rail corridor, analyzes the potential effects of the modifications and additions, and presents appropriate mitigation measures.

### 3.11.1 AFFECTED ENVIRONMENT

The proposed project would be located within two regional air quality jurisdictions: the Mojave Desert Air Quality Management District in California, and the Clark County Department of Air Quality and Environmental Management in Nevada. These jurisdictions correspond with two air basins relative to the project, the Clark County Air Basin and the Mojave Desert Air Basin.

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<sub>3</sub>) and inhalable particulate matter (PM<sub>10</sub>). The Clark County Air Basin is still in nonattainment of O<sub>3</sub> and serious non-attainment of carbon monoxide (CO) and PM<sub>10</sub>.

The affected environment relative to air quality remains as discussed in **Section 3.11.3.3** of the Draft EIS. However, as noted below, updated baseline conditions information became available in the Victorville area and in Clark County. In addition, included below is a correction of the baseline greenhouse gas (GHG) emissions.

#### **Regional Conditions**

**Table 3.11-5** of the Draft EIS presented air quality monitoring data in Victorville from 2005 until 2007. Since publication of the Draft EIS, air quality data for 2008 and 2009 has become available. **Table S-3.11-1** below provides recent data to supplement the information presented in the Draft EIS.

**Table 3.11-6** of the Draft EIS presented air quality monitoring data in Clark County from 2005 until 2007. Since publication of the Draft EIS, air quality data for 2008 and 2009 has become available. **Table S-3.11-2** below provides recent data to supplement the information in **Table 3.11-6** of the Draft EIS.

None of the updated data changes the attainment status for either air basin.

Of note, 2008 and 2009 measurements of PM<sub>10</sub> in Victorville are generally consistent with measurements taken in 2005 and 2006. In 2007, measurements of PM<sub>10</sub> spiked at this monitoring station, but 2009 measurements are the lowest of the 5 years evaluated.

Table S-3.11-1 Summary of 2008 and 2009 Air Quality Data at Victorville, Park Avenue Station

Pollutant Standards	2005	2006	2007	2008	2009
<b>Ozone (O<sub>3</sub>)</b>					
<i>State Standard (1-hr avg 0.09 ppm; 8-hr avg 0.08 ppm)</i>					
<i>National Standard (8-hr avg 0.075 ppm)</i>					
Maximum concentration 1-hr period (ppm)	0.131	0.136	0.107	0.109	0.111
Maximum concentration 8-hr period (ppm)	0.107	0.105	0.090	0.098	0.097
Days state 1-hr standard exceeded	16	9	7	16	8
Days national 8-hr standard exceeded	33	28	27	30	23
Days state/national 8-hr standard exceeded	53	47	45	59	53
<b>Carbon Monoxide (CO)</b>					
<i>State Standard (8-hr avg 9 ppm)</i>					
<i>National Standard (8-hr avg 9 ppm)</i>					
Maximum concentration 8-hr period (ppm)	1.63	1.56	1.61	1.04	1.14
Days state/national 8-hr standard exceeded	0	0	0	0	0
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>					
<i>State standard (1-hr avg 0.25 ppm; Annual arithmetic mean 0.030 ppm)</i>					
<i>National standard (Annual arithmetic mean 0.053 ppm)</i>					
Maximum 1-hr concentration	0.077	0.079	0.071	0.074	0.064
Annual average	0.019	0.020	0.018	0.016	0.015
Days state standard exceeded <sup>a</sup>	0	0	0	0	0
<b>Suspended Particulates (PM<sub>10</sub>)</b>					
<i>State standard (24-hr avg 50 µg/m<sup>3</sup>)</i>					
<i>National standard (24-hr avg 150 µg/m<sup>3</sup>)</i>					

<b>Pollutant Standards</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Maximum State 24-hr concentration	57.0	56.0	339.0	72.0	43.0
Maximum National 24-hr concentration	61.2	62.0	358.0	77.0	53.0
State annual average	26.1	30.5	36.0	n/a	n/a
National annual average	28.9	33.0	38.4	27.0	n/a
Days exceeding state standard	1	2	4	2	0
Days exceeding national standard	0	0	1	0	0
<b>Suspended Particulates (PM<sub>2.5</sub>)</b>					
<i>National standard (24-hr avg 35 µg/m<sup>3</sup>)</i>					
Maximum 24-hr concentration	27.0	22.0	28.0	17.0	20.0
State annual average	--	10.3	9.7	n/a	9.3
National annual average	9.7	10.4	9.7	n/a	8.9
Days exceeding national standard <sup>b</sup>	0	0	0	0	0

## Notes:

ppm = parts per million; µg/m<sup>3</sup> = micrograms per cubic meter

a Number of exceedances based on California ambient air quality standards applicable during period shown (0.25 ppm). Standard was changed to 0.18 ppm in February 2007, to be applied to 2007.

b Number of exceedances based on national ambient air quality standards applicable during period shown (65 µg/m<sup>3</sup>). Standard was changed to 35 µg/m<sup>3</sup> in November 2006, to be applied to 2007.

Source: California Air Resources Board (2008a), compiled by ICF Jones & Stokes, September 2008; California Air Resources Board (2010a), compiled by ICF International, May 2010. CARB Site 36306

Table S-3.11-2 Summary of 2008 and 2009 Air Quality Data Clark County Monitoring Stations

Pollutant Standards	2005	2006	2007	2008	2009
<b>Ozone (O<sub>3</sub>) [Orr, JD Smith]<sup>a</sup></b>					
<i>National standard (1-hr avg 0.125 ppm)</i>					
<i>National standard (8-hr avg 0.075 ppm)</i>					
Maximum concentration 1-hr period (ppm)	0.113	0.109	0.112	0.089	n/a
Maximum concentration 8-hr period (ppm)	0.098	0.09	0.079	0.077	n/a
Days national 1-hr standard exceeded	0	0	0	0	n/a
Days national 8-hr standard exceeded	0	9	4	3	n/a
<b>Carbon Monoxide (CO) [Orr]</b>					
<i>National standard (1-hr avg 35 ppm)</i>					
<i>National standard (8-hr avg 9 ppm)</i>					
Maximum concentration 1-hr period (ppm)	5.1	4.8	4.5	3.2	n/a
Maximum concentration 8-hr period (ppm)	4.2	3.9	3.4	2.1	n/a
Days national 1-hr standard exceeded	0	0	0	0	n/a
Days national 8-hr standard exceeded	0	0	0	0	n/a
<b>Nitrogen Dioxide (NO<sub>2</sub>) [JD Smith]</b>					
<i>National standard (annual avg 0.053 ppm)</i>					
Annual average concentration	0.075	0.072	0.224	0.016	n/a
Days national standard exceeded	0	0	0	0	n/a
<b>Suspended Particulates (PM<sub>10</sub>) [Orr]</b>					
<i>National standard (24-hr avg 150 µg/m<sup>3</sup>)</i>					
Maximum 24-hr concentration	75	94	103	72	43
Days national standard exceeded	0	0	0	0	0

Pollutant Standards	2005	2006	2007	2008	2009
<b>Suspended Particulates (PM<sub>2.5</sub>) [Sunrise Acres]</b>					
<i>National standard (annual avg 15 µg/m<sup>3</sup>)</i>					
<i>National standard (24-hr avg 35 µg/m<sup>3</sup>)</i>					
Annual average concentration	10.01	9.41	10.29	9.07	n/a
Maximum national 24-hr concentration	35	30.7	32.1	22.5	n/a
Days national standard exceeded	0	0	0	0	n/a

## Notes:

<sup>a</sup> Orr station began monitoring O<sub>3</sub> during year 2006. Year 2005 concentration from JD Smith station. Years 2006 and 2007 concentrations from Orr station. 2008 and 2009 data from Orr and JD Smith stations.

ppm = parts per million; µg/m<sup>3</sup> = micrograms per cubic meter

Source: USEPA 2008c, compiled by ICF Jones & Stokes, September 2008; USEPA 2010c, compiled by ICF International, May 2010.

### Greenhouse Gases

GHG emissions, measured in terms of carbon dioxide equivalent gases (or CO<sub>2e</sub>), represent emissions from daily vehicle traffic on the I-15 corridor within the respective air basins.

Following publication of the Draft EIS, FRA noted an error regarding baseline GHG emissions which caused existing CO<sub>2e</sub> emissions from vehicle trips to be understated. **Table S-3.11-3** below shows corrected GHG emissions which replaces the information presented in **Table 3.11-4** in the Draft EIS.

Table S-3.11-3 Year 2007 Greenhouse Gas Emissions

Air Basin	CO <sub>2e</sub> Emissions, Metric Tons Per Year
Mojave Desert Air Basin	2,310,285
Clark County Nevada	963,797
Total Annual Emissions	3,274,082

Note: CO<sub>2e</sub> emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Source: ICF International, June 2010.

### 3.11.2 METHODS OF EVALUATION OF IMPACTS

The same methodology as described in **Section 3.11.2** of the Draft EIS was used to evaluate potential effects of the project modifications and additions. The analysis focuses on potential regional and localized impacts on air quality. Pollutant burdens generated by on-road (vehicles), off-road (trains), and stationary (electric power generation) sources for the two technology options were combined and compared to the No Action Alternative. 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<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) were calculated using the formulas provided in the *California Climate Action Registry, General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, version 2.2*. GHG emissions are reported in terms of CO<sub>2e</sub>. Changes in the amounts of CO<sub>2e</sub> 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 years 2013 and 2030.

### 3.11.3 ENVIRONMENTAL CONSEQUENCES

Each of the project modifications and additions were evaluated against the criteria identified above to determine whether any adverse effects would occur. The discussions below consider the project modifications and additions and their potential to result in adverse effects to air quality. 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.<sup>1</sup>

### **Regional Operations Effects**

As in **Section 3.11.4** of the Draft EIS, the project modifications and additions were analyzed for air quality effects under two potential technology options: DEMU and EMU. 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. Trips between southern California and Las Vegas would continue to occur under current modal splits.

**Tables S-3.11-4** through **S-3.11-8** below show the criteria pollutant and CO<sub>2</sub>e emissions for the No Action Alternative and the action alternatives taking into account the proposed project modifications and additions for the years 2013 and 2030. The analysis takes into the account the differing air quality effects of the two technology options (diesel and electric) and presents findings in terms of applicable air basins.

Since publication of the Draft EIS, two factors have affected the calculations of air quality pollutant and GHG emissions used to determine the air quality impacts provided in the Draft EIS: 1) the location of VV3 relative to VV2, which was assumed for air quality calculations in the Draft EIS, and 2) the correction of a GHG calculation error for existing and future No Action Alternative Conditions.

**Tables S-3.11-4** through **S-3.11-8** below provide updated air pollutant and GHG emissions and replace the information previously presented in **Section 3.11.4** of the Draft EIS. The following tables show that inclusion of the project modifications and additions do not have a substantial effect on direct impacts to air quality.

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<sup>1</sup> The Draft EIS characterized construction related impacts to air quality and GHG emissions as “indirect.” This was an error. In this Supplemental Draft EIS, such impacts are properly noted as direct, temporary construction impacts.

**Table S-3.11-4 Regional Criteria Pollutant and Greenhouse Gas Emissions, No Action Alternative, 2013 and 2030**

	Criteria Pollutant Emissions						CO <sub>2</sub> e Emissions, tons per year <sup>a</sup>
	ROC	NO <sub>x</sub>	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	
<b>Year 2013</b>							
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
<b>Year 2030</b>							
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

<sup>a</sup> Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO<sub>2</sub>e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Source: ICF International, May 2010.

**Table S-3.11-5 Revised Regional Criteria Pollutant and Greenhouse Gas Emissions Mojave Desert Air Basin, 2013**

	Criteria Pollutant Emissions						CO <sub>2</sub> e Emissions, tons per year <sup>a</sup>
	ROC	NO <sub>x</sub>	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	
<b>DEMU Technology Option</b>							
Railway Emissions	34	621	573	43	33	31	116,449
Mobile-source Emissions	(61)	(428)	(1,311)	(3)	(30)	(28)	(260,358)
Net Emissions	(27)	193	(738)	40	3	3	(143,909)
General Conformity Threshold	50	50	100	--	100	100	--
Exceed Threshold?	No	Yes	No	N/A	No	No	N/A
<b>EMU Technology Option</b>							
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	50	100	--	100	100	--
Exceed Threshold?	No	No	No	N/A	No	No	N/A

<sup>a</sup> Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO<sub>2</sub>e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Source: ICF International, May 2010.

**Table S-3.11-6 Revised Regional Criteria Pollutant and Greenhouse Gas Emissions, Mojave Desert Air Basin, 2030**

	Criteria Pollutant Emissions						CO <sub>2</sub> e Emissions, tons per year <sup>a</sup>
	ROC	NO <sub>x</sub>	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	
<b>DEMU Technology Option</b>							
Railway Emissions	56	1,007	928	70	54	49	188,728
Mobile-source Emissions	(60)	(289)	(1,195)	(6)	(54)	(49)	(606,711)
Net Emissions	(4)	718	(267)	64	(0)	(0)	(417,983)
General Conformity Threshold	50	50	100	100	70	70	--
Exceed Threshold?	No	Yes	No	No	No	No	N/A
<b>EMU Technology Option</b>							
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	50	100	100	70	70	--
Exceed Threshold?	No	No	No	No	No	No	N/A

Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO<sub>2</sub>e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Source: ICF International, May 2010.

**Table S-3.11-7 Revised Regional Criteria Pollutant and Greenhouse Gas Emissions, Clark County Air Basin, 2013**

	Criteria Pollutant Emissions						CO <sub>2</sub> e Emissions, tons per year <sup>a</sup>
	ROC	NO <sub>x</sub>	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	
<b>DEMU Technology Option</b>							
Railway Emissions	27	482	86	11	17	16	28,195
Mobile-source Emissions	(91)	(132)	(1,853)	(2)	(6)	(3)	(94,697)
Net Emissions	(64)	350	(1,767)	9	11	13	(66,502)
General Conformity Threshold	50	50	100	--	100	100	--
Exceed Threshold?	No	Yes	No	N/A	No	No	N/A
<b>EMU Technology Option</b>							
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	50	100	--	100	100	--
Exceed Threshold?	No	No	No	N/A	No	No	N/A

<sup>a</sup> Criteria pollutant emissions expressed in short tons (1 ton = 2,000 lbs); CO<sub>2</sub>e emissions expressed in metric tons (1 ton = 2,204.62 lbs)

Source: ICF International, May 2010.