



**CALIFORNIA
HIGH-SPEED RAIL
AUTHORITY**

BRIEFING: FEBRUARY 2, 2012, BOARD MEETING AGENDA ITEM # 5

TO: Thomas Umberg and Authority Board Members

FROM: C. Michael Gillam, Deputy Program Director – Southern California

DATE: January 26, 2012

RE: Bakersfield to Palmdale Section Supplemental Alternatives Analysis

Discussion

The purpose of this agenda item is to brief the California High-Speed Rail Authority (Authority) Board on the Supplemental Alternatives Analysis (SAA) for the Bakersfield to Palmdale Section. The SAA presents refinements made to the Preliminary Alternatives Analysis Report previously approved at the September 2, 2010, Board Meeting.

The proposed changes are refinements to the conceptual engineering conducted from September 2010 through December 2011 that address concerns from stakeholders, minimize impacts to existing and planned developments, and contain costs.

Background and Purpose of this Supplemental Alternatives Analysis

This Supplemental AA has been prepared to document additional evaluation, development, and refinement of the alignment alternatives, and to present the recommended modifications to the original Preliminary AA alternatives to be studied further in the next phase of environmental review. Most of this Supplemental AA focuses on responding to the Authority's concerns about potential environmental impacts and overall project costs. Specifically, potential land-use conflicts, environmental issues, and stakeholder input were considered in modifying the alternatives. In addition, costs associated with elevated profiles and tunneling were reduced by lowering HST profiles and bringing them closer to grade; increasing track grade; and reducing tunnel length where feasible.

Recommendations

A comparison of the Preliminary AA alternatives and the new alternatives are presented in Tables ES-1, ES-2, and ES-3. The staff recommendations for Board approval follow each table.

Edison Subsection

Figure ES-1. Edison Subsection

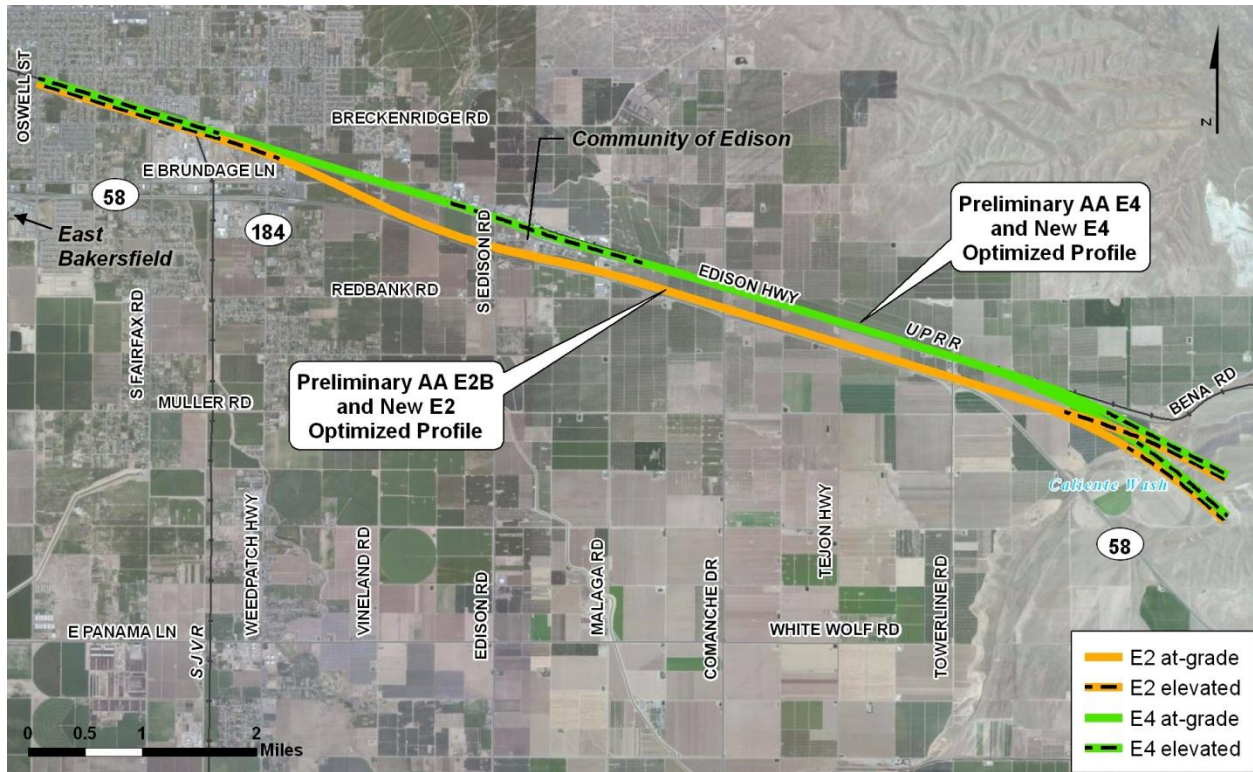


Table ES-1: Comparison of Preliminary AA and New Alternatives in the Edison Subsection

Preliminary AA E2A (Partially At-Grade)	Preliminary AA E2B (All Elevated)	New E2 (At-Grade) Proposed Modification to E2 Profile	Preliminary AA E4 (All Elevated)	New E4 (At-Grade) Proposed Modification to E4 Profile
<ul style="list-style-type: none"> Alignment Length: 11.2 	<ul style="list-style-type: none"> Alignment Length: 11.2 	<ul style="list-style-type: none"> Alignment Length: 11.2 	<ul style="list-style-type: none"> Alignment Length: 11.2 	<ul style="list-style-type: none"> Alignment Length: 11.2
<ul style="list-style-type: none"> Elevated structures: 5.0 At-grade: 6.2 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 11.2 At-grade: 0 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 3.3 At-grade: 7.9 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 11.2 At-grade: 0 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 4.8 At-grade: 6.4 Tunnel: 0

- Carry forward Preliminary AA E2B (all elevated) and New E2 (close to grade), working with Caltrans, the County, and other key stakeholders to develop the optimal profile for E2.

A primarily at-grade alignment of New E2 could offer substantial capital cost savings and avoid visual impacts relative to the Preliminary AA E2B all-elevated alignment. This alignment would be further refined in cooperation with Caltrans to allow future capacity and design improvements to the SR 58 interchanges in the Edison area. As a result, staff recommends carrying forward Preliminary AA E2B and New E2 to determine the optimal profile.

- Withdraw Preliminary AA E2A from further consideration. (E2A is the same horizontal alignment as E2B, but only partially elevated.) E2A displaces similar acreages of agricultural land and other uses, and causes more-extensive reconstruction of multiple SR 58 interchanges than New E2.
- Carry forward Preliminary AA E4 (all elevated) and New E4 (primarily at-grade) to determine the optimal profile, and to minimize impacts to the community of Edison and agricultural businesses along Edison Highway.

The lowered profile of New E4 offers substantial reduction in capital costs, while displacing similar acreages of agricultural land and other uses, as compared to Preliminary AA E4. New E4 (at grade) would require construction of multiple overpasses of the at-grade HST alignment, while maintaining access from north-south arterials to Edison Highway. Both alternatives could affect truck circulation and access for Edison agricultural businesses, and access to public uses along Edison Highway. As a result, staff recommends carrying forward Preliminary AA E4 and New E4 to determine the optimal profile.

Tehachapi Subsection

Figure ES-2. Tehachapi Subsection (Incline Area)

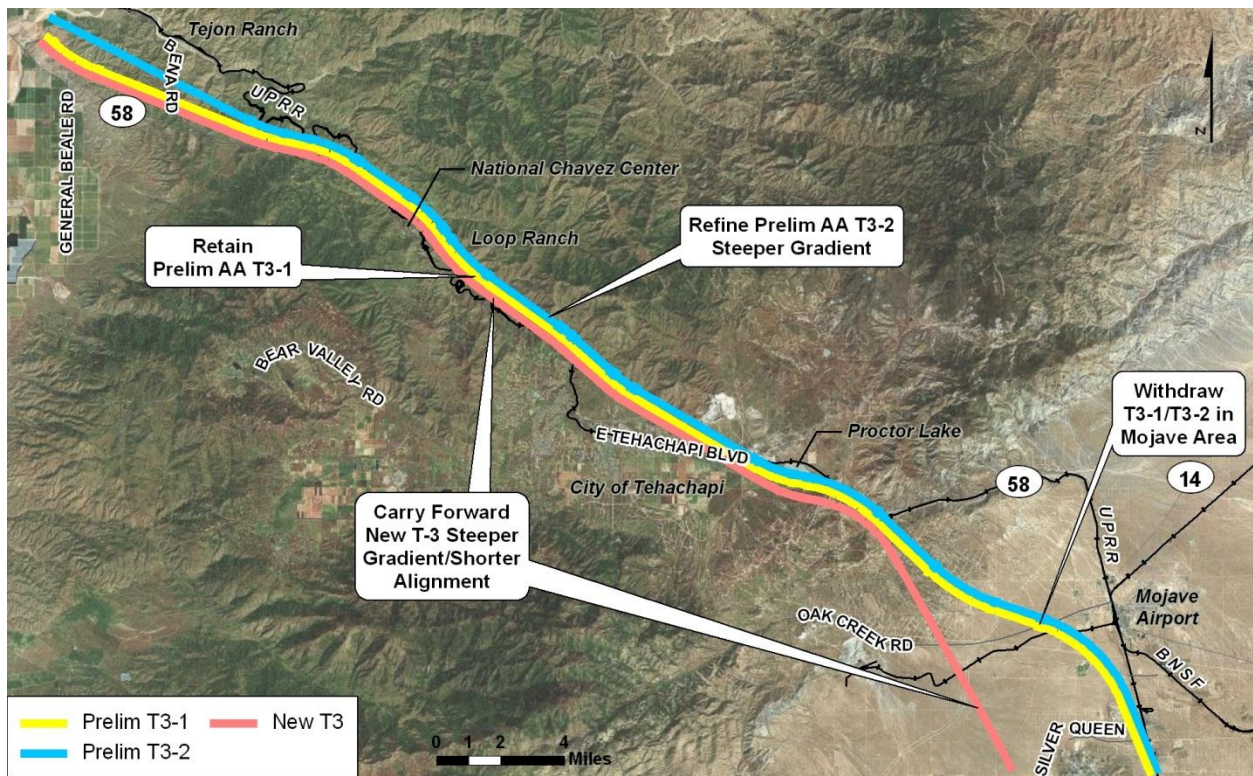


Table ES-2: Comparison of Preliminary AA and New Alternatives in the Tehachapi Incline Area

New Alternative T3	Preliminary AA T3-1	Preliminary AA T3-2
<ul style="list-style-type: none"> Alignment Length: 39.4 	<ul style="list-style-type: none"> Alignment Length: 40.4 	<ul style="list-style-type: none"> Alignment Length: 40.5
<ul style="list-style-type: none"> Cut/Fill/At-grade: 25.2 Elevated structures: 3.4 Tunnel: 10.9 	<ul style="list-style-type: none"> Cut/Fill/At-grade: 19.5 Elevated structures: 8.0 Tunnel: 12.8 	<ul style="list-style-type: none"> Cut/Fill/At-grade: 19.2 Elevated structures: 11.0 Tunnel: 10.3

Tehachapi Incline between Caliente Creek and the City of Tehachapi

- Carry forward Preliminary AA T3-1 to assess potential environmental impacts and benefits associated with viaducts and tunnels in this alternative.
- Carry forward New T3, which has a shorter route and steeper gradients. This limits the length of tunnels and viaducts relative to the Preliminary AA alternatives.

New T3 would reduce visual impacts, as well as construction costs associated with the viaducts necessary for this alternative. However, by traveling at-grade or on cuts or fills throughout the incline section, New T3 would affect more acres of habitat for threatened and endangered species, and may require the design of wildlife crossing features to maintain wildlife circulation. The New T3 alignment would also need to consider the cattle operations at Loop Ranch.

- Carry forward and refine Preliminary AA T3-2 using the same gradient variances as applied to the design of New T3.
- Withdraw Preliminary AA T3-B and Preliminary AA T3-2B (phase-break alternatives) from further consideration.

Early in the Supplemental AA process, the Authority determined that two Preliminary AA alternatives—Preliminary AA T3-B and Preliminary AA T3-2B—which included a 1-mile flat section for phase breaks, could be withdrawn, because the alternatives carried forward incorporate the phase break at an acceptable gradient over a longer distance. A phase break is a short, electrically unpowered segment of track required on electrified railways that draws traction power from different power grids of varying voltages and frequencies on relatively flat terrain.

Mojave Area between Proctor Lake and Rosamond

Table ES-3: Comparison of Preliminary AA and New Alternatives in the Mojave Area

New T3 + AV Tie-in (Cameron Canyon Rd – Felsite Ave)	Prelim AA T3-1/T3-2 + AV Tie-in (Cameron Canyon Rd – Felsite Ave)
<ul style="list-style-type: none"> Alignment Length: 17.4 	<ul style="list-style-type: none"> Alignment Length: 19.6
<ul style="list-style-type: none"> Cut/Fill/At-grade: 13.6 Elevated structures: 0.5 Tunnel: 3.3 	<ul style="list-style-type: none"> Cut/Fill/At-grade: 15.2 Elevated structures: 0.8 Tunnel: 3.6

- Carry forward New T3 and drop Preliminary AA T3-1 and Preliminary AA T3-2 in the Mojave area. New T3 reduces environmental effects; allows shorter trip time; and is less costly to construct, operate, and maintain because it has a shorter route than the Preliminary AA alternatives.

In the Mojave area, the Supplemental AA evaluation determined that New T3 would reduce wetland and potential traffic circulation impacts, particularly at SR 14 interchanges, and would affect fewer sensitive noise receptors than the Preliminary AA alternatives. BLM lands and potential land use, FAA-restricted area, and utility conflicts associated with Preliminary AA T3-1 and Preliminary AA T3-2 in the vicinity of Mojave Airport would be avoided by New T3 in this area. As a result, New T3 should be the only alternative carried forward in the Mojave area.

Antelope Valley Subsection

Figure ES-3. Antelope Valley Subsection

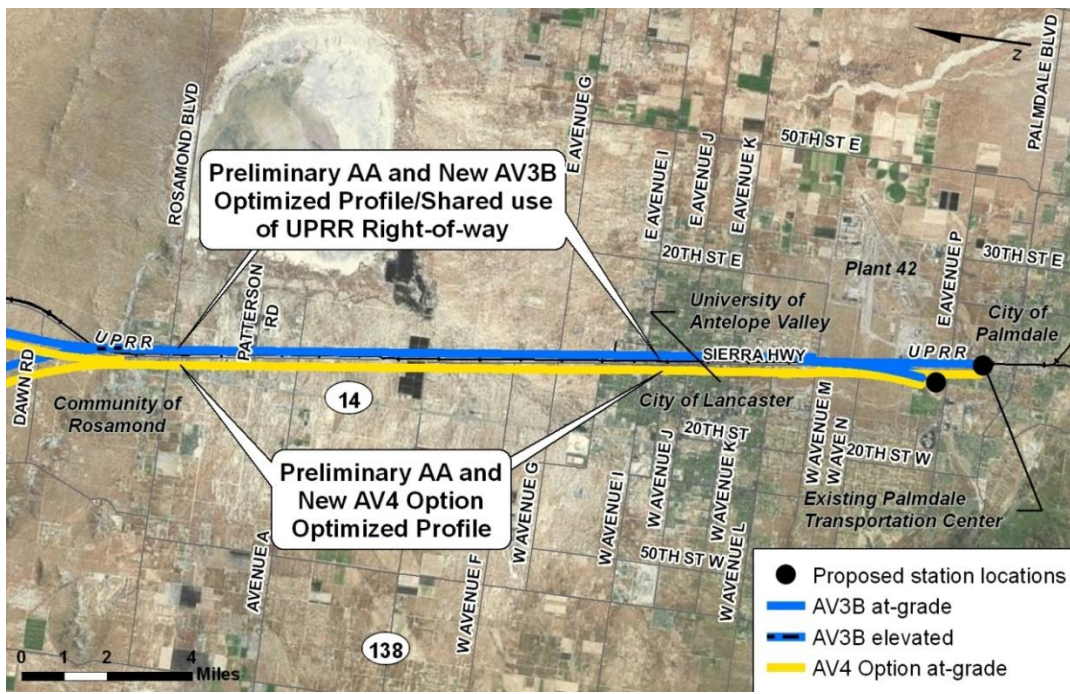


Table ES-4: Comparison of Preliminary AA and New Alternatives in the Antelope Valley Subsection

Preliminary AA AV3B (Partially Elevated)	New AV3B (Primarily At-Grade) Proposed Modification to AV3B Profile	Preliminary AA AV4 Option (Primarily Elevated)	New AV4 Option (Primarily At-Grade) Proposed Modification to AV4 Option Profile
<ul style="list-style-type: none"> Alignment Length: 25.6 	<ul style="list-style-type: none"> Alignment Length: 24.3 	<ul style="list-style-type: none"> Alignment Length: 25.5 	<ul style="list-style-type: none"> Alignment Length: 25.5
<ul style="list-style-type: none"> Elevated structures: 7.0 At-grade: 18.6 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 0.5 At-grade: 23.8 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 7.7 At-grade: 17.8 Tunnel: 0 	<ul style="list-style-type: none"> Elevated structures: 0 At-grade: 25.5 Tunnel: 0

- Carry forward Preliminary AA AV3B and New AV3B; carry forward Preliminary AA AV4 Option and New AV4 Option. Work with key stakeholders, including the UPRR, to determine the optimal profile for the AV3B and New AV4 Option alternatives.

The evaluation in the Supplemental AA report determined that bringing the profiles to grade through Rosamond and Lancaster could reduce overall construction costs, but would

require multiple grade separations, including the construction of access ramps linking the east-west arterials with Sierra Highway. In addition, New AV4 Option would generate access impacts and displace land uses on the western side of Sierra Highway. AV4 Option was developed as an alternative to avoid intruding on the UPRR right-of-way. As a result, staff recommends all AV3B and AV4 Option alternatives be carried forward, and optimal profiles determined.

Staff Recommendation

The staff recommends that the Board consider approving the following:

Edison Subsection

- ✓ Carry forward Alternative Preliminary AA E2B and New E2 to develop the optimal profile for E2.
- ✓ Carry forward Alternative Preliminary AA E4 and New E4 to develop the optimal profile for E4.
- ✗ Withdraw Alternative Preliminary AA E2A from further consideration.

Tehachapi Subsection

- ✓ Carry forward Alternative New T3.
- ✓ In the Tehachapi Incline, retain Preliminary AA Alternative T3-1, and carry forward a refined Preliminary Alternative AA T3-2 using the same gradient variances as applied to the design of Alternative New T3.
- ✗ Withdraw Preliminary AA Alternatives T3-B and T3-2B from further consideration, because the Authority has determined that the need for a phase break in the Tehachapi Mountains is not necessary.
- ✗ Withdraw Preliminary AA Alternatives T3-1 and T3-2 in the Mojave area from further consideration.

Antelope Valley Subsection

- ✓ Carry forward Preliminary AA Alternatives AV3B and New AV3B, as well as Preliminary AA AV 4 Option and New AV4 Option, to determine the optimal profile, and whether shared use of the UPRR right-of-way will be possible.

Attachments:

- ✓ Bakersfield to Palmdale Section – Supplemental Alternatives Analysis Report – Volumes 1 and 2. (Please refer to the HSR website to view both volumes of AA report; www.cahighspeedrail.ca.gov.) Thank you.