

California High-Speed Rail Authority

Bakersfield to Palmdale

Project Section

**Draft Project Environmental Impact
Report/Environmental Impact
Statement**

**Appendix 8-A: Bakersfield to Palmdale
Alignment Alternatives Analysis**

January 2020



The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

This page intentionally left blank

Table 8-A-1 Bakersfield to Palmdale Alignment Alternatives Analysis

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Constructability						
Total alignment miles, Bakersfield to Palmdale	79.8–81.3 miles	79.8–81.3 miles	79.7–81.2 miles	79.8–81.3 miles	+ 124 linear feet	+ 844 linear feet
Tunnel length	Total length: 5.4 miles	Total length: 5.4 miles	Total length: 6.3 miles	Total length: 5.4 miles	+ 0.1 miles	+ 1.46 miles
Capital costs	\$13.7 billion	\$13.9 billion	\$14.1 billion	\$13.4 billion	+ 102 million	+307 million
Constructability	SR 58 realignment in Edison	SR 58 will not be realigned, but HSR alignment will require two elevated structures over SR 58: at SR 58/ Edison Road interchange and SR 58/ Towerline Road	SR 58 realignment in Edison	SR 58 realignment in Edison	No change	SR 58 realignment just north of Tehachapi
	Requires realignment of Sierra Highway south of Avenue K, in Lancaster	Requires realignment of Sierra Highway south of Avenue K, in Lancaster	Requires realignment of Sierra Highway south of Avenue K, in Lancaster	Sierra Highway realignment in Lancaster to avoid UPRR and Metrolink facilities	No change	No change
	Requires viaduct over Los Angeles Aqueduct	Requires viaduct over Los Angeles Aqueduct	Requires viaduct over Los Angeles Aqueduct	Requires viaduct over Los Angeles Aqueduct	No change	No change
	<ul style="list-style-type: none"> Construction around Kern#1 Transmission Line Sierra Highway Bike Path realignment in Lancaster Avenue K-8 Bike Path realignment in Lancaster 	<ul style="list-style-type: none"> Construction around Kern#1 Transmission Line Sierra Highway Bike Path realignment in Lancaster Avenue K-8 Bike Path realignment in Lancaster 	<ul style="list-style-type: none"> Construction around Kern#1 Transmission Line Sierra Highway Bike Path realignment in Lancaster Avenue K-8 Bike Path realignment in Lancaster 	<ul style="list-style-type: none"> Construction around Kern#1 Transmission Line Sierra Highway Bike Path realignment in Lancaster Avenue K-8 Bike Path realignment in Lancaster 	–	–
	59 grade separations	52 grade separations	58 grade separations	59 grade separations	–	–

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
	Realign approximately 845 linear feet of the Pacific Crest Trail. The HSR alignment would be immediately adjacent to and in an aerial alignment (1,500-foot-long viaduct) above the trail. The proposed viaduct would span the trail with a 19.1-foot clearance.	Realign approximately 845 linear feet of the Pacific Crest Trail. The HSR alignment would be immediately adjacent to and in an aerial alignment (1,500-foot-long viaduct) above the trail. The proposed viaduct would span the trail with a 19.1-foot clearance.	The HSR track would be on an embankment with an approximately 500-foot, short viaduct over the Pacific Crest Trail and Oak Creek Road. The proposed viaduct under Alternative 3 would span the trail with a 12-foot clearance.	Realign approximately 845 linear feet of the Pacific Crest Trail. The HSR alignment would be immediately adjacent to and in an aerial alignment (1,500-foot-long viaduct) above the trail. The proposed viaduct would span the trail with a 19.1-foot clearance.	No change	No change
Land Use						
Compatibility with other planning efforts	The alternative is incompatible with portions of the following Land Use Plans: <ul style="list-style-type: none"> • Kern County General Plan and appendices • Keene Rural Community Plan • Kern County Golden Hills Specific Plan • Rosamond Specific Plan • Tehachapi General Plan • Keene Ranch Specific Plan • Metropolitan Bakersfield General Plan 	The alternative is incompatible with portions of the following Land Use Plans: <ul style="list-style-type: none"> • Kern County General Plan and appendices • Keene Rural Community Plan • Kern County Golden Hills Specific Plan • Rosamond Specific Plan • Tehachapi General Plan • Keene Ranch Specific Plan • Metropolitan Bakersfield General Plan 	The alternative is incompatible with portions of the following Land Use Plans: <ul style="list-style-type: none"> • Kern County General Plan and appendices • Keene Rural Community Plan • Kern County Golden Hills Specific Plan • Rosamond Specific Plan • Tehachapi General Plan • Keene Ranch Specific Plan • Metropolitan Bakersfield General Plan 	The alternative is incompatible with existing land uses in Lancaster, as realignment of Sierra Highway may displace existing residences and businesses along Sierra Highway. The alternative is inconsistent with portions of the same plans as Alternative 1.	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
	<ul style="list-style-type: none"> Lancaster Specific Plan Palmdale General Plan Los Angeles County General Plan Los Angeles County Bicycle Master Plan 	<ul style="list-style-type: none"> Lancaster Specific Plan Palmdale General Plan Los Angeles County General Plan Los Angeles County Bicycle Master Plan 	<ul style="list-style-type: none"> Lancaster Specific Plan Palmdale General Plan Los Angeles County General Plan Los Angeles County Bicycle Master Plan 			
Disruption to Communities						
Acres temporarily impacted outside of the permanent right-of-way	1,672	1,637	1,644	1,694	+15 acres	-66 acres
Acres permanently converted to transportation use	6,111	6,056	6,164	6,098	-12 acres	+767 acres
Residential displacements	253 units	253 units	255 units	368 units	No change	-1 unit
Business displacements	311	311	311	329	No change	No change
Community facility displacements	3	3	3	6	No change	No change
Disruption to existing intermodal connections for transportation	Alignment requires relocation of: <ul style="list-style-type: none"> Sierra Highway Bike Path Avenue K-8 Bike Path Proposed Avenue K-8 Bike Path Bridge 	Alignment requires relocation of: <ul style="list-style-type: none"> Sierra Highway Bike Path Avenue K-8 Bike Path Proposed Avenue K-8 Bike Path Bridge 	Alignment requires relocation of: <ul style="list-style-type: none"> Sierra Highway Bike Path Avenue K-8 Bike Path Proposed Avenue K-8 Bike Path Bridge 	Alignment requires relocation of: <ul style="list-style-type: none"> Sierra Highway Bike Path Avenue K-8 Bike Path Proposed Avenue K-8 Bike Path Bridge 	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Disruption to and relocation of utilities	High-risk utilities crossings: • Natural gas: 7 • Petroleum/fuel: 5	High-risk utilities crossings: • Natural gas: 9 • Petroleum/fuel: 5	High-risk utilities crossings: • Natural gas: 7 • Petroleum/fuel: 5	High-risk utilities crossings: • Natural gas: 7 • Petroleum/fuel: 5	No change	No change
Utilities crossings (Divided into high-risk and low-risk facilities based on HSR standards) (The numbers shown are the total number of utility crossings within 100 feet on each side of the HSR centerline alignment.)	Low-risk utilities crossings: • Electrical substation: 46 • Telecom: 646 • Fiber-optic: 21 • Water: 364 • Sewer: 75 • Stormwater: 94	Low-risk utilities crossings: • Electrical substation: 46 • Telecom: 562 • Fiber-optic: 21 • Water: 361 • Sewer: 72 • Stormwater: 94	Low-risk utilities crossings: • Electrical substation: 46 • Telecom: 646 • Fiber-optic: 21 • Water: 364 • Sewer: 75 • Stormwater: 94	Low-risk utilities crossings: • Electrical substation: 46 • Telecom: 646 • Fiber-optic: 21 • Water: 364 • Sewer: 75 • Stormwater: 94	Low-risk utilities crossings: 1 fewer for stormwater	Low-risk utilities crossings: 1 fewer for stormwater
Disruption to and relocation of wind turbines (within 100 feet of each side of HSR alignment)	Existing: 11 potential wind turbine impacts Proposed: 0	Existing: 11 potential wind turbine impacts Proposed: 0	Existing: 11 potential wind turbine impacts Proposed: 0	Existing: 11 potential wind turbine impacts Proposed: 0	No change	No change
Proximity to schools (in project footprint)	Existing: 6	Existing: 5	Existing: 6	Existing: 6	No change	No change
Proximity to hazardous materials and waste (high ranked PEC sites)	73 sites	73 sites	73 sites	71 sites	No change	No change
Section 4(f)/6(f)						
Park, recreation, and school play area properties evaluated under Section 4(f) (preliminary)	• Pacific Crest Trail (<i>De minimis</i> ~ 845 linear feet of trail realignment, permanent maintenance	• Pacific Crest Trail (<i>De minimis</i> ~ 845 linear feet of trail realignment, permanent maintenance	• Pacific Crest Trail (<i>De minimis</i> permanent maintenance easement,	• Pacific Crest Trail (<i>De minimis</i> ~ 845 linear feet of trail realignment, permanent maintenance	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
determinations are noted in parentheses)	<p>easement, temporary occupancy)</p> <ul style="list-style-type: none"> Avenue K-8 Bike Path (<i>de minimis</i> ~ 0.3 mile) Rex Parris High School (permanent use ~ 4.58 acres) Dr. Robert C. St. Clair Parkway (<i>de minimis</i>—Footings for pedestrian overcrossings in parkway) 	<p>easement, temporary occupancy)</p> <ul style="list-style-type: none"> Avenue K-8 Bike Path (<i>de minimis</i> ~ 0.3 mile) Rex Parris High School (permanent use ~ 4.58 acres) Dr. Robert C. St. Clair Parkway (<i>de minimis</i>—Footings for pedestrian overcrossings in parkway) 	<p>temporary occupancy)</p> <ul style="list-style-type: none"> Avenue K-8 Bike Path (<i>de minimis</i> ~ 0.3 mile) Rex Parris High School (permanent use ~ 4.58 acres) Dr. Robert C. St. Clair Parkway (<i>de minimis</i>—Footings for pedestrian overcrossings in parkway) 	<p>easement, temporary occupancy)</p> <ul style="list-style-type: none"> Whit Carter Park (permanent use ~ 6.86 acres, temporary occupancy) Avenue K-8 Bike Path (<i>de minimis</i> ~ 0.3 mile) Rex Parris High School (permanent use ~ 4.58 acres) Dr. Robert C. St. Clair Parkway (<i>de minimis</i>—Footings for pedestrian overcrossings in parkway) 		
Properties listed in, or determined or recommended eligible for, the NRHP evaluated under Section 4(f)	<ul style="list-style-type: none"> Big Creek Hydroelectric System – Historic District (permanent use) 	<ul style="list-style-type: none"> Big Creek Hydroelectric System – Historic District (permanent use) 	<ul style="list-style-type: none"> Big Creek Hydroelectric System – Historic District (permanent use) 	<ul style="list-style-type: none"> Big Creek Hydroelectric System – Historic District (permanent use) Denny's Restaurant #30 (Village Grille) (diner) (permanent use) 	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Environmental Justice						
Low-income or minority communities affected	<ul style="list-style-type: none"> • Northeast Bakersfield • Edison • Lancaster 	<ul style="list-style-type: none"> • Northeast Bakersfield • Edison • Lancaster 	<ul style="list-style-type: none"> • Northeast Bakersfield • Edison • Lancaster 	<ul style="list-style-type: none"> • Northeast Bakersfield • Edison • Lancaster 	No change	No change
Disproportionate effects on low-income or minority communities	Displacements: <ul style="list-style-type: none"> • 96 residential units reserved for low-income/55 and older • Majority of displaced residential units are in census block groups with substantial EJ populations • Grace Resource Center • Lancaster Community Shelter • 155 motel rooms/<i>de-facto</i> affordable housing units 	Displacements: <ul style="list-style-type: none"> • 96 residential units reserved for low-income/55 and older • Majority of displaced residential units are in census block groups with substantial EJ populations • Grace Resource Center • Lancaster Community Shelter • 155 motel rooms/<i>de-facto</i> affordable housing units 	Displacements: <ul style="list-style-type: none"> • 96 residential units reserved for low-income/55 and older • Majority of displaced residential units are in census block groups with substantial EJ populations • Grace Resource Center • Lancaster Community Shelter • 155 motel rooms/<i>de-facto</i> affordable housing units 	Displacements: <ul style="list-style-type: none"> • 96 residential units reserved for low-income/55 and older • 36 residential units reserved for low-income housing • Majority of displaced residential units are in census block groups with substantial EJ populations • Grace Resource Center • 527 motel rooms/<i>de-facto</i> affordable housing units 	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Demographics, socioeconomic composition, and communities of environmental justice concern	<ul style="list-style-type: none"> Low-income populations: 23.4% of population within the EJ RSA is considered low-income Minority populations: 61.7% of population within the EJ RSA is considered minority Limited English Proficiency (LEP) households: 7.2% of households within the EJ RSA are considered LEP Elderly populations: 11.6% of population within the EJ RSA is 65 and older 	<ul style="list-style-type: none"> Low-income populations: 23.4% of population within the EJ RSA is considered low-income Minority populations: 61.7% of population within the EJ RSA is considered minority Limited English Proficiency (LEP) households: 7.2% of households within the EJ RSA are considered LEP Elderly populations: 11.6% of population within the EJ RSA is 65 and older 	<ul style="list-style-type: none"> Low-income populations: 23.4% of population within the EJ RSA is considered low-income Minority populations: 61.7% of population within the EJ RSA is considered minority Limited English Proficiency (LEP) households: 7.2% of households within the EJ RSA are considered LEP Elderly populations: 11.6% of population within the EJ RSA is 65 and older 	<ul style="list-style-type: none"> Low-income populations: 23.4% of population within the EJ RSA is considered low-income Minority populations: 61.7% of population within the EJ RSA is considered minority Limited English Proficiency (LEP) households: 7.2% of households within the EJ RSA are considered LEP Elderly populations: 11.6% of population within the EJ RSA is 65 and older 	No change	No change
Environmental Resources						
Biological Resources						
Special-status plant communities	994.4 acres	994.4 acres	1,026.5 acres	994.4 acres	No change	+503 acres
Blue Oak Woodland						
Desert Riparian	18.9 acres	18.9 acres	19.9 acres	18.1 acres	No change	+1 acre
Desert Scrub	89.1 acres	89.1 acres	89.1 acres	89.1 acres	No change	+1 acre
Desert Wash	32.2 acres	37.3 acres	32.2 acres	32.2 acres	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Joshua Tree	325.0 acres	325.0 acres	284.0 acres	328.5 acres	No change	No change
Mixed Chaparral	0.0 acres	0.0 acres	0.0 acres	0.0 acres	No change	+1 acre
Perennial Grassland	0.2 acres	0.2 acres	0.2 acres	0.2 acres	No change	+2 acres
Valley Foothill Riparian	2.2 acres	2.2 acres	2.2 acres	2.2 acres	No change	-1 acre
Valley Oak Woodland	0.5 acres	0.5 acres	0.5 acres	0.5 acres	No change	+1 acre
BLM West Mojave Planning Area (within the California Desert Conservation Area boundary)	959 acres	959 acres	958 acres	959 acres	No change	No change
Western Mojave Desert Tortoise Recovery Plan area	957 acres	957 acres	955 acres	956 acres	No change	No change
Upland species of the San Joaquin Valley Recovery Plan area	<ul style="list-style-type: none"> • Linkage: 377 acres • Satellite: 122 acres 	<ul style="list-style-type: none"> • Linkage: 377 acres • Satellite: 122 acres 	<ul style="list-style-type: none"> • Linkage: 377 acres • Satellite: 122 acres 	<ul style="list-style-type: none"> • Linkage: 377 acres • Satellite: 122 acres 	Linkage: +15.91 acres	Linkage: +15.47 acres
Biological resources PG&E San Joaquin Valley Operations and Maintenance HCP	716 acres	716 acres	716 acres	716 acres	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Kern County Valley Floor HCP	<ul style="list-style-type: none"> Green Zone: 254 acres Metropolitan Bakersfield HCP: 274 acres 	<ul style="list-style-type: none"> Green Zone: 254 acres Metropolitan Bakersfield HCP: 274 acres 	<ul style="list-style-type: none"> Green Zone: 254 acres Metropolitan Bakersfield HCP: 274 acres 	<ul style="list-style-type: none"> Green Zone: 254 acres Metropolitan Bakersfield HCP: 274 acres 	Green Zone: +96.10 acres	Green Zone: +76.36 acres
	<p>A memorandum of understanding was prepared in 1989 among the USFWS, the BLM, the California Department of Fish and Wildlife (formerly the California Department of Fish and Game), the California Energy Commission, and the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, to establish the Kern County VFHCP. The proposed VFHCP uses a conservation strategy that would provide for preservation of the best remaining natural lands while still allowing economic growth to occur in the area. The VFHCP area consists of 3,110 square miles within Kern County. The boundaries are Kings and Tulare Counties to the north, up to an approximately 2,000-foot elevation contour to the south and east, and San Luis Obispo County to the west. The VFHCP area would be divided into three habitat zone categories of red, green, and white based on habitat value. Red Zones contain the highest-valued conservation habitat and represent the best contiguous blocks of undisturbed or lightly disturbed habitat. Green Zones are second highest in priority classification, contain some disturbance, and are important for movement of species among the Red Zones. The White Zones contain the least amount of valuable habitat and have the lowest priority for conservation.</p>					No change
Desert Renewable Energy Conservation Plan area	1,181 acres	1,181 acres	1,181 acres	1,180 acres	No change	No change
Tejon Ranch Conservation Lands (within 100 feet)	Tejon Ranch White Wolf acquisition Area + conservation easement (Ranchwide Management Plan): 171 acres	Tejon Ranch White Wolf acquisition Area + conservation easement (Ranchwide Management Plan): 171 acres	Tejon Ranch White Wolf acquisition Area + conservation easement (Ranchwide Management Plan): 171 acres	Tejon Ranch White Wolf acquisition Area + conservation easement (Ranchwide Management Plan): 171 acres	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Aquatic Resources—OHWM or Edge of Wetland						
Seasonal Wetland	2.3 acres	2.3 acres	1.2 acres	2.3 acres	No Change	-0.07 acres
Forested Wetland	0.9 acre	0.9 acre	1.0 acre	0.9 acre	No Change	No Change
Claypans	8.9 acres	8.9 acres	8.9 acres	8.8 acres	No Change	No Change
Streams and Washes	22.4 acres	22.4 acres	23.2 acres	22.4 acres	+0.19 acres	+2.53 acres
In-Stream Impoundments	0.5 acre	0.4 acre	0.5 acre	0.5 acre	No Change	No Change
Artificial Watercourses	31.2 acres	28.8 acres	31.3 acres	27.4 acres	No Change	+0.04
Aquatic Resources—Top of Bank or Edge of Riparian						
Streams and Washes	48.3 acres	48.1 acres	50 acres	48.5 acres	+0.41 acres	+4.09 acres
In-Stream Impoundments	0.5 acre	0.4 acre	0.5 acre	0.5 acre	No Change	No Change
Riparian	15.1 acres	15.1 acres	15.8 acres	15.1 acres	No Change	+2.02 acres
Artificial Watercourse	39.1 acres	36.8 acres	39.1 acres	35.5 acres	No Change	No Change
Cultural Resources						
Cultural resources (within 100 feet)	10	10	11	11	No change	Two fewer archaeological properties (-2)
Paleontological resources (linear miles crossed by alignment)	8.9 miles of geologic units with High sensitivity for paleontological resources	8.9 miles of geologic units with High sensitivity for paleontological resources	8.35 miles of geologic units with High sensitivity for paleontological resources	8.9 miles of geologic units with High sensitivity for paleontological resources	-0.02 mile	+ 0.15 mile
	48.32 miles of geologic units with "high at-depth" paleontological sensitivity	48.32 miles of geologic units with "high at-depth" paleontological sensitivity	47.4 miles of geologic units with "high at-depth" paleontological sensitivity	48.32 miles of geologic units with "high at-depth" paleontological sensitivity	+0.01 mile	+ 0.15 mile

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Agricultural						
Agricultural lands (within 100 feet)	<ul style="list-style-type: none"> Agricultural land: Prime, Statewide, and Unique: 1,056 acres Grazing land: 930.3 acres Williamson Act land: 416.5 acres 	<ul style="list-style-type: none"> Agricultural land: Prime, Statewide, and Unique: 1,065 acres Grazing land: 930.3 acres Williamson Act land: 416.5 acres 	<ul style="list-style-type: none"> Agricultural land: Prime, Statewide, and Unique: 1,054 acres Grazing land: 930.3 acres Williamson Act land: 416.5 acres 	<ul style="list-style-type: none"> Agricultural land: Prime, Statewide, and Unique: 1,056 acres Grazing land: 930.3 acres Williamson Act land: 416.5 acres 	<ul style="list-style-type: none"> Agricultural land: Prime, Statewide, and Unique: No change Grazing land: +9.6 acres Williamson Act land: +9.8 acres 	<ul style="list-style-type: none"> Agricultural land: Prime, Statewide, and Unique: No change Grazing land: +701.7 acres Williamson Act land: +109.8 acres
Community Resources						
Community resources potentially significant to affected communities (within 100 feet)	<p>Existing:</p> <ul style="list-style-type: none"> 2 government facilities 2 bike routes 6 low-income housing facilities (motel facilities potentially utilized for temporary housing) 1 healthcare facility 1 retirement facility White Wolf-Bodfish Road Trail –1,500 feet 	<p>Existing:</p> <ul style="list-style-type: none"> 2 government facilities 2 bike routes 6 low-income housing facilities (motel facilities potentially utilized for temporary housing) 1 healthcare facility 1 retirement facility 	<p>Existing:</p> <ul style="list-style-type: none"> 2 government facilities 2 bike routes 6 low-income housing facilities (motel facilities potentially utilized for temporary housing facilities) 1 healthcare facility 1 retirement facility 	<p>Existing:</p> <ul style="list-style-type: none"> 1 religious facilities 2 government facilities 1 school 2 bike routes 6 low-income housing facilities (motel facilities potentially utilized for temporary housing) 1 park 1 retirement facility 	No change	No change
Displacement of community resources potentially significant to affected communities	<p>Proposed:</p> <ul style="list-style-type: none"> 2 bike routes 	<p>Proposed:</p> <ul style="list-style-type: none"> 2 bike routes 	<p>Proposed:</p> <ul style="list-style-type: none"> 2 bike routes 	<p>Proposed:</p> <ul style="list-style-type: none"> 2 bike routes 1 park 	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Noise and Vibration						
Noise and Vibration (within 2,500 feet)	Residential: 1,845 Non-residential: 12	Residential: 1,803 Non-residential: 12	Residential: 1,843 Non-residential: 12	Residential: 1,943 Non-residential: 12	No change	No change
Number of severe operational impacts to sensitive receptors	Total number of sensitive noise receptors: 1,857	Total number of sensitive noise receptors: 1,815	Total number of sensitive noise receptors: 1,855	Total number of sensitive noise receptors: 1,955		
Number of operational vibration impacts to sensitive receivers.	0	0	0	0	No change	No change
Hydrology and Geomorphology						
Fire hazard at the state classification level (Total number of miles within 100 feet on either side of the HSR centerline)	Very High: 0 mile High: 19.6 miles Moderate: 25.1 miles	Very high: 0 mile High: 19.6 miles Moderate: 25.2 miles	Very high: 0.4 mile High: 20.9 miles Moderate: 23.4 miles	Very high: 0 mile High: 19.6 miles Moderate: 25.1 miles	No change	No change
Floodplains (Total number of miles of flood zones crossed)	19.50 miles	19.52 miles	19.40 miles	19.52 miles	-0.01 mile	-0.02 mile
Stormwater (Disturbed soil area during construction)	9,825	8,753	8,864	8,733	+4.0 acres	+577 acres
Stormwater (Net permanent increase in impervious surface area)	764 acres	771 acres	743 acres	760 acres	-1 acre	-5.9 acres
Groundwater (miles/area of groundwater basins crossed)	61 miles/6,833 acres	61 miles/6,764 acres	60.5 miles/6,761 acres	61 miles/6,732 acres	No change	No change

Measurement Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Oil, gas, and geothermal resources (Total number of wells within 100 feet on either side of the HSR centerline)	There are seven wells and their associated sedimentary basins with oil, gas, and geothermal production.	There are six wells and their associated sedimentary basins with oil, gas, and geothermal production.	There are seven wells and their associated sedimentary basins with oil, gas, and geothermal production.	There are seven wells and their associated sedimentary basins with oil, gas, and geothermal production.	No change	No change

BLM = Bureau of Land Management

CCNM = César E. Chávez National Monument

CRHR = California Register of Historical Resources

EJ = environmental justice

HCP = Habitat Conservation Plan

HSR = high-speed rail

LEP = Limited English Proficiency

NRHP = National Register of Historic Places

OHWM = ordinary high water mark

PG&E = Pacific Gas and Electric Company

PEC = Potential Environmental Concern

RSA = resource study area

SR = State Route

UPRR = Union Pacific Railroad

USFWS = U.S. Fish and Wildlife Service

VFHCP = Valley Floor Habitat Conservation Plan

No change = This classification is being used for the CCNM Design Option and the Refined CCNM Design Option. No change means that the related design option does not change (positive or negative) the analysis of the alternative. This is mostly due to the fact that the resource being analyzed does not exist in the area of the CCNM Design Option or the Refined CCNM Design Option. If a change in the impacts was identified, then the number is presented indicated the change.

This page intentionally left blank