CALIFORNIA
High-Speed Rail Authority

December 18, 2013

Mr. Michael Jewell
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Ms. Connell Dunning
U.S. Environmental Protection Agency
75 Hawthorne Street, CED-2
San Francisco, CA 94105

RE: Supplemental Information for the Fresno to Bakersfield Section, Checkpoint C Package; USACE File No: SPK-2009-01482

Dear Mr. Jewell and Ms. Dunning:

On November 12, 2013, the California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) submitted to your offices the Checkpoint C package of materials for the Fresno to Bakersfield Section of the California High-Speed Train System (Project). The package included the Summary Report to identify the Preliminary Least Environmentally Damaging Practicable Alternative (LEDPA) and the Draft Compensatory Mitigation Plan. On November 6, 2013, the Authority and FRA provided the Section 408 Draft Engineering Report to Ryan Larson of the U.S. Army Corps of Engineers (USACE).

Since that time, the FRA, Authority, USACE, and U.S Environmental Protection Agency (U.S. EPA) have met to provide high-level overview of the organization of the materials, and provide verbal responses to USACE and U.S. EPA comments. An informal Checkpoint C meeting was held on November 21, 2013; and a formal Checkpoint C meeting was held on November 26, 2013. A subsequent meeting to discuss U.S. EPA questions was held on December 4, 2013. USACE staff and U.S. EPA staff attended all of these meetings.

SUMMARY

As discussed during the November 5, 2013 Authority Board Meeting, this memo provides additional information about the public interest factors that support the BNSF-Hanford East Alternative (the Proposed Preferred Alternative). It also provides minor corrections (errata) to information identified in the Summary Report, and provides the requested additional information to be included in the Draft Compensatory Mitigation Plan regarding compensatory mitigation for indirect impacts on aquatic resources.

PUBLIC INTEREST FACTORS SUPPORTING THE BNSF-HANFORD EAST ALTERNTATIVE

The regulations governing USACE review of permit applications directs the USACE to consider public interest factors (33 CFR 320.4[a]). The public interest review includes a balancing of the detriments of a project with the foreseeable benefits (33 CFR 320.4[a]). The USACE is thus authorized to evaluate the effect of the Project on the general welfare

of the population and the benefit to the community from the perspective of the overall public interest (33 CFR 320.4[q]).

The BNSF-Hanford East Alternative will provide foreseeable benefits to the local community and will help to promote the general welfare of the population. During the November 7, 2013 Authority board meeting, the mayor of the City of Visalia, Amy Shuklian, stated that the City supports the BNSF-Hanford East Alternative because it places the future Kings-Tulare Regional Station-East Alternative closer to Visalia and other population centers in Tulare County. Visalia currently has approximately 130,000 residents. Tulare County has approximately 440,000 residents (Authority 2013:30). Kings County, by comparison, has a population of approximately 153,000 residents. This comparison of population densities suggests that the BNSF-Hanford East Alternative and station in the Hanford region will result in the California High-Speed Rail System serving the greatest population possible in the region, because the train would be located closer to a higher-density urban center, while still serving Kings County. The use of a western route (Hanford West alternatives) through Kings County would increase travel time for the denser population centers in Tulare County, reducing benefits to the community (City of Visalia 2012).

The Tulare Association of Governments, represented by Benjamin Kimball, also indicated a preference for the use of an eastern alignment. Mr. Kimball cited the pace of growth of Tulare County; by 2060, the County will have a population of 825,000, equivalent to the current population of San Francisco (California High Speed Rail Authority 2013:37). Collectively, these facts indicate that the use of the BNSF-Hanford East Alternative will locate the California High-Speed Rail System closest to existing and future population centers. Although the ultimate buildout of existing land use plans and policies is uncertain—and thus the degree of the future benefit is to some extent speculative—the proximity of the train to these population centers would likely reduce vehicle miles traveled therefore increasing overall environmental benefits.

ERRATA

An errata sheet for the Checkpoint C Summary Report for the Fresno to Bakersfield Section of the California High-Speed Train System is enclosed. The errata sheet provides a summary of the minor revisions to the Checkpoint C Summary Report Tables 4-2, Table 4-3, Table 4-10, and Table 4-11, as well as a revised Figure 1-2, for reference, use, and incorporation into the Checkpoint C package of materials.

Ten errors in calculations were identified in four tables presented in Chapter 4 of the Summary Report. In addition, Figure 1-2 was modified to include the revised nomenclature of the Hanford West alternatives, and incorporates the correct line color between the BNSF-Hanford East and BNSF-Though Corcoran alternatives.

None of the identified errata change the evaluations, recommendations, or conclusions; nor do they require changes in any text presented in Checkpoint C Summary Report.

INDIRECT IMPACTS AND COMPENSATORY MITIGATION

The following additional text will be incorporated into subsequent version, including the Final Comprehensive Mitigation Plan. This text will be added based on requests from the USACE and U.S. EPA to clarify the differences (or similarities) between vernal pools and swales affected by the Project, and the alkali rain pools proposed for compensatory mitigation. The Authority also provided a summary of indirect impacts on features in good condition, and the potential changes

in functions and services, and provided a summary of the indirect benefits associated with creation, restoration, enhancement, and preservation associated with the identified compensatory mitigation sites.

Vernal Pools and Alkali Rain Pools

Compensatory mitigation sites with aquatic resources identified as alkali rain pools are similar to the vernal pool and swale resources identified in the Section 404 Individual Permit that will be affected by the Project. These resources are similar in that these are both alkaline in nature, and contain salt-tolerant vegetation along the edge of unvegetated flats, and are located in the same geographic area. There is little to no topographical relief in the landscape; and in the spring (when rains are sufficient for inundation), annual vegetation lines the outer perimeter of these pools.

In accordance with California Rapid Assessment Method (CRAM), these features are best classified as vernal pools and vernal pool complexes; in fact, both the vernal pool and swales and alkali rain pools have been assessed using the vernal pool or vernal pool complexes CRAM module.

Based on condition assessment of these features, there are few vernal pool endemic plant species; however, this appears to be the natural condition of both the vernal pools in the Project and the alkali rain pools described in the Compensatory Mitigation Plan. The alkali rain pools (or vernal pools) south of the City of Corcoran are not the same as the vernal pools that are typical of the grassland areas found north of Corcoran (i.e., vernal pools of the Sacramento Valley, and those associated with the Fagundes Mitigation Site).

Both vernal pool and swales and alkali rain pools aquatic resource types are associated with the alkali desert scrub plant community. Alkali desert scrub vegetation is typically dominated by shrublands with understory cover of herbs and forbs, and by vernally inundated or saturated areas lacking a shrub layer (vernal pools). These latter areas are characterized by herbs and forbs interspersed with barren, vernally inundated, or saturated alkali patches. Primary plant species observed during the various surveys included spinescale saltbush (*Atriplex spinifera*), cattle saltbush (*Atriplex polycarp*a), iodine bush (*Allenrolfea occidentalis*), goldenbush (*Isocoma acradenia*), and bush seepweed (*Suaeda moquinii*).

Alkali desert scrub and the vernal pool and swales and alkali rain pools therein also support the same variety of wildlife species, including special-status species such as the blunt-nosed leopard lizard (*Gambelia sila*), the San Joaquin kit fox (*Vulpes macrotis mutica*), the Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), vernal pool fairy shrimp (*Branchinecta lynchi*), and coast horned lizards (*Phrynosoma blainvillii*). Many wildlife species found in this habitat type are burrowers or burrow-dependent species, such as the western burrowing owl (*Athene cunicularia*), western spadefoot toad (*Spea hammondii*), American badger (*Taxidea taxus*), foxes *(Vulpe*s sp.), coyote (*Canis latrans*), California ground squirrel (*Spermophilus beecheyi*), and a variety of kangaroo rats (*Dipodomys* spp.) species.

The vernal pools and swales associated with the Fagundes Mitigation site are grassland-based, and provide habitat for fauna affected by the Project. Both the alkali rain pools in

the Project and the pools and swales at the Fagundes compensatory mitigation site support vernal pool fauna such as vernal pool fairy shrimp (*Branchinecta lynchi*), and California tiger salamander (*Ambystoma californiense*); adjacent uplands also support San Joaquin kit fox. Accordingly, the Fagundes compensatory mitigation site is appropriate for the compensation of effects on federally listed fauna.

Because the difference is largely one of nomenclature, the value of the alkali rain pools (as described in the Compensatory Mitigation Plan) should be considered to be the same as the vernal pool and swale features affected by the Project (as described in the Section 404 Individual Permit). As described above, the exception is the Fagundes mitigation site, which is of the annual grassland vernal pool variety. The Fagundes site offers additional benefits, and provides habitats for flora and fauna, including special-status wildlife species, many of which are the same as the alkali desert scrub community.

Compensatory Mitigation for Indirect Impacts

Compensatory mitigation will be provided for direct permanent adverse impacts that require the placement of fill in waters of the U.S, as required in Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (USACE 33 Code of Federal Regulations [CFR] Parts 325 and 332; and U.S. EPA 40 CFR Part 230). Compensatory mitigation in the form of on-site restoration of impacted resources to pre-project conditions will also be provided for direct temporary adverse impacts related to placement of fill in waters of the U.S. While direct and indirect adverse effects will result from project related discharge of fill material, and resulting loss of the aquatic resources, the compensatory mitigation will offset these adverse effects.

For fill placed in vernal pools and swales within the Project footprint, compensatory mitigation will also take into account the adverse effects on, and potential loss of these sensitive resources outside of the Project footprint. Compensatory mitigation for such impacts, categorized as indirect-bisected, would be provided in the same manner and at the same ratio as mitigation for direct-permanent impacts to the entire pool or swale. As described in the *Fresno to Bakersfield Section: Watershed Evaluation Report* (Section 3.4.1.2, Authority and FRA 2013), indirect-bisect impacts are considered high risk for the entire feature, which means that this category of indirect impact may result in significant degradation; conversion to another resource type (seasonal wetland); or complete loss of the resource. Consequently, these impacts are mitigated differently than other impacts outside of the Project footprint, because indirect-bisect impacts could result in significant changes in the hydrology, with associated potential for loss of surface area. These indirect-bisected impacts are classified as a separate category in order to assure mitigation of both fill-related and loss-related aquatic resource impacts.

With the exception of indirect-bisected, indirect impacts on aquatic resources would not require compensatory mitigation in this Project setting, because indirect impacts are not expected to be sufficiently adverse to result in a loss of waters, or significantly reduce the resource's condition, which reflects functions and services. Also, assessed indirect impacts in this situation will likely be offset by the offsite environmental benefits attributed to the compensatory mitigation project site as discussed in the following section.

Because the condition of man-made aquatic features is already poor, due to a number of existing stressors, additional changes in the nearby setting are not expected to result in a change in the quality of these features (low risk of having adverse impacts).

Indirect impacts on natural aquatic resources, including seasonal riverine, seasonal wetland, emergent wetlands, and vernal pools and swales that are entirely outside the Project footprint, and therefore are not included in the indirect-bisected category, are generally projected to have moderate risk. Moderate risk means that the indirect impact would not result in loss of the aquatic resource area; would not convert the aquatic resource to another type; and would not likely adversely affect the hydrology of the resource—but may result in a slight decrease in condition, based on CRAM score. These changes would result from changes in the landscape setting and buffer, but are not expected to result in an adverse change in the functions and services provided. In some instances, the existing setting (BNSF railway, State Route 43, existing berms) will completely buffer or protect aquatic resources from indirect impacts.

Specifically, indirect impacts (as defined in the Checkpoint C Summary Report) on vernal pools and swales in good condition are only present in the area between Tule River (south of Corcoran) and Poso Creek (north of Wasco), mostly along the Allensworth Bypass Alternative. These indirect impacts (which amount to approximately 4.35 acres) would be offset through indirect benefits associated with the compensatory mitigation sites (described in more detail below).

Similarly, indirect impacts (as defined in the Checkpoint C Summary Report) on seasonal riverine features in good condition (Kings River complex, and Kern River) totaling approximately 24.68 acres would be mitigated through indirect benefits associated with the proposed compensatory mitigation sites.

Additional details regarding the post-Project projections of direct and indirect impacts on aquatic resources are provided in Section 3.4.1.2 of the *Fresno to Bakersfield Watershed Evaluation Report* (Section 3.4.1.2, Authority and FRA 2013).

Indirect Benefits associated with Compensatory Mitigation

Through creation, enhancement, restoration, and preservation of aquatic resources on those sites ultimately selected as compensatory mitigation sites from the 12 potential mitigation sites that have been identified, the aquatic resources on the adjacent properties would receive secondary or indirect benefits from restoration projects conducted as part of the compensatory mitigation program.

In the case of preservation sites (e.g., Buena Vista Dairy, Yang, Staffel, Davis, Valadez, and Fagundes) these indirect benefits include the removal of development pressure that would otherwise result in significant indirect impacts on adjacent sites (which in some instances are part the existing Allensworth Ecological Reserve). These indirect benefits would likely include an increase in landscape and buffer; and in some instances, removal of stressors.

For enhancement, creation, and restoration sites, the indirect benefits include increased connectivity to features in good condition, and may also include recruitment of native

species, water quality and quantity betterments, increased groundwater recharge, potential addition of physical structure, and increased presence (density) of aquatic resources in the landscape with additional buffer. In some instances, compensatory mitigation sites will remove stressors, resulting in indirect benefits to adjacent aquatic resources.

Enhancement, creation, and restoration opportunities at such sites as Peck Island, Old River Dairy, and River Ranch, where the retirement of the existing agricultural land use and conversion to native riparian and oak woodland habitat will result in habitat creation for native species and increased groundwater recharge in the floodplain, and will contribute to the betterment of the existing aquatic resources on adjacent parcels. Similarly, for enhancement, creation, and restoration opportunities at such sites as the Fagundes property—where the degraded riparian corridor is proposed for riverine preservation and enhancement, benefits to the aquatic resources on adjacent parcels include improved riverine and riparian habitat for native species, increased groundwater recharge, and increased connectivity within federally designated Critical Habitat for California tiger salamander and listed branchiopod species.

In most cases, the landscape setting associated with the compensatory mitigation sites is better than the landscape setting of the aquatic resources affected by the Project; thus, the location where indirect benefits would accrue leverages the setting to enhance the functional lift.

For all aquatic resource types, the compensatory mitigation sites have the same type of aquatic resources that will be directly and indirectly affected by the Project.

In the case of preservation of vernal pools and swales (or alkali rain pools), the condition of the resource associated with the mitigation sites is generally better than the quality of the vernal pools and swales affected by the Project. Creation, enhancement, and restoration activities largely associated with seasonal riverine and potentially vernal pools and swales features are expected to result in similar or better-quality aquatic resources when compared against the condition of the aquatic resource affected by the Project.

Should you have questions, require clarification, or need any additional information, please do not hesitate to contact me at (916) 403-6934; or Mike Aviña, of the Project Management Team, at (916) 761-2768.

Sincerely,

Mark McLoughlin
Director of Environmental Services
California High-Speed Rail Authority

Enclosures:

Errata, including Figure 1-2 Fresno to Bakersfield Alternative Alignments, Common Components and Stations

Copies furnished:
Zachary Simmons, USACE (hard copy, with enclosures)
Kate Dadey, USACE
Jennifer Blonn, U.S. EPA (hard copy, with enclosures)
Sarvy Mahdavi, U.S. EPA (hard copy, with enclosures)
Stephanie Perez, FRA
Diana Gomez, CAHSRA
Veronica Chan, USACE
Gary Kennerley, PMT

Reference Cited:

California High Speed Rail Authority (Authority). 2013. Transcript of Proceedings: Monthly Meeting. Available: <http://www.hsr.ca.gov/Board/monthly_brdmtg.html>, Accessed December 6, 2013.

California High Speed Rail Authority and Federal Railroad Administration (Authority and FRA). 2013. *Fresno to Bakersfield Section: Watershed Evaluation Report.* Prepared by URS/HMM/Arup Joint Venture. Sacramento, California, and Washington, DC: Authority and FRA. May 2013.

City of Visalia. Letter from Amy Shuklian to the California High Speed Rail Authority commenting on the Revised DEIR/Supplemental DEIS. October 17, 2012.

The following errata are presented in the Checkpoint C Summary Report for the Fresno to Bakersfield Section of the California High-Speed Train System.

Quantification of impacts on aquatic resources as presented in Table 4-2, Table 4-3, Table 4-10, and Table 4-11 should be updated to reflect the correct acreages, as follows:

In Table 4-2, The *Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)*, *Total Impacts on Other Waters of the U.S., Indirect Impacts*, should be **96.49 acres** (was 96.82 acres).

In Table 4-2, the *BNSF-Hanford East with Corcoran Elevated*, *Total Impacts on Other Waters of the U.S., Indirect Impacts*, should be **90.55** acres (was 91.47 acres).

In Table 4-3, the *Preferred Alternative (BNSF-Hanford East with Corcoran Bypass) Total Direct Impacts on aquatic resource features in Good condition* is **0.88 acre** (was 1.93 acres). This sum includes 0.72 acre of direct permanent impacts, and 0.16 acre of direct temporary impacts, as indicated in the rows above. The numbers presented in Table 4-11 are correct, and do not require revisions or updates.

In Table 4-3, the *BNSF-Hanford East with Corcoran Elevated*, *Total Direct Impacts on aquatic resources on features in Poor condition* is **54.92 acres** (was 54.93 acres).

In Table 4-10, the *BNSF-Hanford East with BNSF-Through Corcoran*, *Wetlands Total*, *Indirect impacts* should be **8.15 acres** (was 5.94 acres).

In Table 4-10, the *BNSF-Hanford East with Corcoran Elevated*, *Wetlands Total*, *Indirect impacts* should be **5.94 acres** (was 7.71 acres).

In Table 4-10, the *BNSF-Through Hanford East with Corcoran Bypass*, *Man-Made Lacustrine* , *Indirect impacts*, should be **39.29 acres** (was 39.65 acres).

In Table 4-10, the *BNSF-Hanford East with Corcoran Elevated*, *Man-Made Lacustrine*, *Indirect impacts*, should be **36.97 acres** (was 37.92 acres).

In Table 4-10, the *BNSF-Hanford East with Corcoran Elevated*, *Total Impacts on Waters of the U.S.*, *Direct-Temporary impacts*, should be **12.74 acres** (was 12.76 acres).

In Table 4-11, the *BNSF-Hanford East with Corcoran Elevated*, *Total Direct Impacts on aquatic resources in Poor condition* should be **54.92 acres** (was 54.93 acres).

None of these changes require changes in text, nor do they change the evaluation, recommendations, conclusions, or other statements made in the Summary Report.

Table 4-2 (revised)

Comparison of Quantity of Impacts on Waters of the U.S. in the Hanford and Corcoran Area Alternative Combinations (acres)

Wetlands and Other Waters (TYPE/ HST water type)	Impact Type[a]	Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)	BNSF – Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass
TOTAL IMPACTS ON WETLANDS[b]	*Direct permanent*	*1.33*	*1.99*	*1.23*	*1.62*	*1.88*	*1.21*	*1.31*	*1.48*	*1.58*
	Direct temporary	*0.09*	*0.69*	*1.91*	*0.73*	*0.68*	*1.95*	*0.12*	*1.91*	*0.09*
	Indirect bisected	—	*0.01*	—	*0.01*	*0.01*	—	—	—	—
	Indirect	*1.38*	*8.15*	*5.94*	*10.37*	*8.75*	*6.04*	*1.48*	*6.14*	*1.58*
Emergent wetlands	Direct permanent	0.01	0.38	0.01	—	—	—	—	—	—
	Direct temporary	—	—	—	—	—	—	—	—	—
	Indirect	0.60	0.23	0.60	1.75	—	—	—	—	—
Seasonal wetlands	Direct permanent	1.31	1.61	1.20	1.62	1.88	1.20	1.31	1.47	1.58
	Direct temporary	0.09	0.69	1.91	0.73	0.68	1.95	0.12	1.91	0.09
	Indirect	0.77	7.92	5.34	8.62	8.75	6.04	1.47	6.14	1.57

Table 4-2 (revised)

Comparison of Quantity of Impacts on Waters of the U.S. in the Hanford and Corcoran Area Alternative Combinations (acres)

Wetlands and Other Waters (TYPE/ HST water type)	Impact Type[a]	Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)	BNSF – Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass
Vernal Pools and Swales	Direct permanent	—	0.0007	0.01	0.0007	0.0007	0.01	—	0.01	—
	Direct temporary	—	—	—	—	—	—	—	—	—
	Indirect bisected	—	0.01	—	0.01	0.01	—	—	—	—
	Indirect	0.01	—	—	—	—	—	0.01	—	0.01
TOTAL IMPACTS ON OTHER WATERS OF THE U.S.[b]	*Direct permanent*	*33.38*	*39.08*	*47.26*	*41.20*	*42.08*	*48.32*	*34.43*	*66.38*	*52.50*
	Direct temporary	*11.61*	*4.95*	*10.83*	*7.06*	*7.50*	*21.24*	*22.02*	*7.74*	*8.52*
	Indirect	*~~96.82~~ 96.42*	*84.67*	*~~91.47~~ 90.55*	*62.09*	*63.09*	*65.40*	*71.34*	*64.94*	*70.87*
Canals/ ditches	Direct permanent	20.48	25.10	30.63	30.35	31.62	32.51	22.36	35.47	25.32
	Direct temporary	4.49	4.24	3.79	6.09	6.52	4.97	5.67	5.48	6.17
	Indirect	32.27	25.32	27.65	35.39	34.24	37.84	42.47	37.07	41.70

Table 4-2 (revised)

Comparison of Quantity of Impacts on Waters of the U.S. in the Hanford and Corcoran Area Alternative Combinations (acres)

Wetlands and Other Waters (TYPE/ HST water type)	Impact Type[a]	Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)	BNSF – Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass
Man-made lacustrine	Direct permanent	9.73	11.73	13.41	10.03	9.53	13.69	10.02	28.76	25.08
	Direct temporary	6.90	0.45	6.83	0.45	0.48	15.79	15.85	1.78	1.85
	Indirect	39.29	34.83	36.97	17.16	19.19	17.39	19.71	17.52	19.84
Seasonal riverine	Direct permanent	3.17	2.25	3.23	0.82	0.93	2.12	2.06	2.16	2.10
	Direct temporary	0.23	0.26	0.21	0.52	0.50	0.48	0.50	0.48	0.50
	Indirect	24.92	24.52	25.93	9.55	9.66	10.18	9.17	10.35	9.34
TOTAL IMPACTS ON WATERS OF THE U.S.[b]	Direct permanent	34.70	41.07	48.49	42.83	43.95	49.54	35.75	67.86	54.08
	Direct temporary	11.70	5.64	12.74	7.79	8.18	23.19	22.15	9.65	8.61
	TOTAL DIRECT	46.40	46.72	61.23	50.62	52.13	72.73	57.89	77.52	62.68
	Indirect bisected	—	0.01	—	0.01	0.01	—	—	—	—
	Indirect	99.87	92.82	96.49	72.47	71.84	71.44	72.82	71.07	72.45

Table 4-2 (revised)

Comparison of Quantity of Impacts on Waters of the U.S. in the Hanford and Corcoran Area Alternative Combinations (acres)

Wetlands and Other Waters (TYPE/ HST water type)	Impact Type[a]	Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)	BNSF – Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass

Notes:

= least-impact alternative

— = no impact or not applicable

[a] Indirect impacts are calculated within a 250-foot buffer of the Project Footprint (including areas of permanent and temporary impacts) and areas outside of vernal pools and swales intersected by the Project Footprint.

[b] Calculations are based on raw, unrounded Geographic Information System (GIS) source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impact calculations in this table include Project alternatives and station alternatives, but do not include heavy maintenance facility site alternatives.

All impacts were calculated based on the Final EIR/EIS 15% engineering design Project Footprint.

Table 4-3 (revised)

Comparison of Quality (Relative Condition) of Impacts on Waters of the U.S. in the Hanford and Corcoran Area Alternative Combinations (acres)[a]

Impact Type[b]	Relative Condition	Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)	BNSF – Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass
Waters of the U.S.										
Direct permanent	Poor	30.47	37.07	44.30	40.54	41.38	47.70	33.88	65.73	51.90
	Fair	3.51	3.28	3.47	2.01	2.30	1.55	1.60	1.85	1.90
	Good	0.72	0.72	0.73	0.27	0.27	0.28	0.27	0.28	0.27
Direct temporary	Poor	11.38	4.76	10.64	6.57	7.00	20.73	21.49	7.23	7.99
	Fair	0.16	0.72	1.97	1.15	1.11	2.39	0.59	2.35	0.55
	Good	0.16	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL DIRECT[b]	*Poor*	41.85	41.83	~~54.93~~ 54.92	47.11	48.38	68.44	*55.37*	*72.96*	*59.90*
	Fair	3.67	4.00	5.43	3.16	3.41	3.94	*2.18*	*4.21*	*2.45*
	Good	~~1.93~~ 0.88	0.88	0.89	0.34	0.34	0.35	*0.34*	*0.35*	*0.34*
Indirect - Bisected	Good	—	0.01	—	0.01	0.01	—	—	—	—
Indirect[a]	Poor	75.69	64.22	69.74	54.57	55.42	57.95	64.90	57.32	64.27
	Fair	10.81	17.24	16.39	11.38	11.66	8.73	3.14	8.99	3.41
	Good	11.37	11.36	11.36	6.52	4.76	4.76	4.77	4.76	4.77

Table 4-3 (revised)

Comparison of Quality (Relative Condition) of Impacts on Waters of the U.S. in the Hanford and Corcoran Area Alternative Combinations (acres)[a]

Impact Type[b]	Relative Condition	Preferred Alternative (BNSF-Hanford East with Corcoran Bypass)	BNSF – Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass
Total[b]	Poor	117.54	106.05	123.66	101.69	103.80	126.39	120.28	130.28	124.16
	Fair	14.49	21.24	21.83	14.54	15.07	12.67	5.33	13.20	5.86
	Good	12.25	12.25	12.25	6.87	5.12	5.12	5.12	5.12	5.12

Notes:

— = no impact or not applicable

[a] Calculations are based on raw, unrounded Geographic Information System (GIS) source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

[b] Indirect impacts are calculated within a 250-foot buffer of the Project Footprint (including areas of permanent and temporary impacts) and areas outside of vernal pools and swales intersected by the Project Footprint. Impact calculations in this table include Project alternatives and station alternatives, but do not include the heavy maintenance facility site alternatives.

All impacts were calculated based on the Final EIR/EIS 15% engineering design Project Footprint.

Impact types and/or existing condition types that do not appear in the table are not present in these alternatives.

Table 4-10 (revised)

Comparison of Quantity of Impacts on Waters of the U.S. by Alternative

Waters of the U.S.	Impact Type[a]	Proposed Preliminary LEDPA	Proposed Preferred Alternative (in acres)	Common Components	High-Speed Train Alternatives														
					BNSF-Hanford East with Corcoran Bypass	BNSF-Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass	BNSF-Through Allensworth	Allensworth Bypass	BNSF-Through Wasco-Shafter	Wasco-Shafter Bypass	BNSF-Bakersfield North	Bakersfield South	Bakersfield Hybrid
		Impact Acreage																		
WETLANDS TOTAL[c]	**Direct Permanent**	**8.48**	**8.99**	**1.13**	**1.33**	**1.99**	**1.23**	**1.62**	**1.88**	**1.21**	**1.31**	**1.48**	**1.58**	**13.12**	**6.02**	**—**	**—**	**0.63**	**0.51**	**0.51**
	Direct Temporary	**0.59**	**0.59**	**0.48**	**0.09**	**0.69**	**1.91**	**0.73**	**0.68**	**1.95**	**0.12**	**1.91**	**0.09**	**0.58**	**0.03**	**—**	**—**	**—**	**—**	**—**
	Indirect Bisected[a]	**11.54**	**11.54**	**—**	**—**	**0.01**	**—**	**0.01**	**0.01**	**—**	**—**	**—**	**—**	**14.59**	**11.54**	**—**	**—**	**—**	**—**	**—**
	Indirect[b]	**16.11**	**16.20**	**7.42**	**1.38**	**~~5.94~~ 8.15**	**~~7.71~~ 5.94**	**10.37**	**8.75**	**6.04**	**1.48**	**6.14**	**1.58**	**22.19**	**7.30**	**—**	**—**	**0.13**	**0.09**	**0.09**
Emergent wetland	Direct Permanent	0.01	0.01	—	0.01	0.38	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—
	Direct Temporary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Indirect[b]	0.60	0.60	—	0.60	0.23	0.60	1.75	—	—	—	—	—	—	—	—	—	—	—	—
Seasonal wetland	Direct Permanent	2.83	3.34	1.11	1.31	1.61	1.20	1.62	1.88	1.20	1.31	1.47	1.58	0.91	0.41	—	—	0.63	0.51	0.51
	Direct Temporary	0.59	0.59	*0.48*	0.09	0.69	1.91	0.73	0.68	1.95	0.12	1.91	0.09	*0.58*	*0.03*	—	—	—	—	—
	Indirect[b]	9.19	9.28	7.42	0.77	7.92	5.34	8.62	8.75	6.04	1.47	6.14	1.57	12.03	1.00	—	—	0.13	0.09	0.09
Vernal pools and swales	Direct Permanent	5.63	5.63	0.03	—	0.0007	0.01	0.0007	0.0007	0.01	—	0.01	—	12.21	5.61	—	—	—	—	—
	Direct Temporary	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Indirect Bisected[a]	11.54	11.54	—	—	0.01	—	0.01	0.01	—	—	—	—	14.59	11.54	—	—	—	—	—
	Indirect[b]	6.31	6.31	—	0.01	—	—	—	—	—	0.01	—	0.01	10.16	6.30	—	—	—	—	—
OTHER WATERS OF THE U.S. TOTAL[c]	**Direct Permanent**	**99.19**	**114.76**	**23.60**	**33.38**	**39.08**	**47.26**	**41.20**	**42.08**	**48.32**	**34.43**	**66.38**	**52.50**	**37.99**	**38.46**	**7.75**	**7.16**	**8.80**	**10.97**	**11.57**
	Direct Temporary	**22.92**	**25.65**	**5.34**	**11.61**	**4.95**	**10.83**	**7.06**	**7.50**	**21.24**	**22.02**	**7.74**	**8.52**	**5.85**	**2.91**	**3.15**	**2.44**	**3.34**	**2.69**	**2.64**
	Indirect[b]	**234.02**	**269.08**	**20.22**	**96.49**	**84.67**	**90.55**	**62.09**	**63.09**	**65.40**	**71.34**	**64.94**	**70.87**	**105.08**	**107.27**	**14.79**	**6.26**	**37.59**	**30.02**	**30.31**
Canals/ Ditches	Direct Permanent	55.08	63.51	22.60	20.48	25.10	30.63	30.35	31.62	32.51	22.36	35.47	25.32	11.00	11.43	2.87	2.70	3.34	5.57	6.13
	Direct Temporary	10.16	11.26	*4.30*	4.49	4.24	3.79	6.09	6.52	4.97	5.67	5.48	6.17	*0.47*	*1.28*	*0.14*	*0.12*	*0.45*	*1.05*	*1.05*
	Indirect[b]	67.87	84.58	8.10	32.27	25.32	27.65	35.39	34.24	37.84	42.47	37.07	41.70	19.66	24.50	7.37	4.78	9.07	11.72	12.33

Table 4-10 (revised)

Comparison of Quantity of Impacts on Waters of the U.S. by Alternative

Waters of the U.S.	Impact Type[a]	Proposed Preliminary LEDPA	Proposed Preferred Alternative (in acres)	Common Components	High-Speed Train Alternatives														
					BNSF-Hanford East with Corcoran Bypass	BNSF-Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass	BNSF-Through Allensworth	Allensworth Bypass	BNSF-Through Wasco-Shafter	Wasco-Shafter Bypass	BNSF-Bakersfield North	Bakersfield South	Bakersfield Hybrid
		Impact Acreage																		
Man-made lacustrine	Direct Permanent	40.72	46.06	1.00	9.73	11.73	13.41	10.03	9.53	13.69	10.02	28.76	25.08	26.70	26.79	4.88	4.46	3.23	3.60	3.65
	Direct Temporary	12.50	13.67	*1.03*	6.90	0.45	6.82	0.45	0.48	15.79	15.85	1.78	1.85	*5.27*	*1.60*	*3.01*	*2.31*	*2.22*	*1.17*	*1.13*
	Indirect[b]	139.47	143.76	12.12	~~39.65~~ 39.29	34.83	~~37.92~~ 36.97	17.16	19.19	17.39	19.71	17.52	19.84	83.81	81.01	7.42	1.48	8.31	4.24	3.92
Seasonal riverine	Direct Permanent	3.40	5.19	—	3.17	2.25	3.23	0.82	0.93	2.12	2.06	2.16	2.10	0.29	0.23	—	—	2.24	1.80	1.80
	Direct Temporary	0.26	0.73	—	0.23	0.26	0.21	0.52	0.50	0.48	0.50	0.48	0.50	*0.12*	*0.03*	—	—	*0.67*	*0.47*	*0.47*
	Indirect[b]	26.68	40.74	—	24.92	24.52	25.93	9.55	9.66	10.18	9.17	10.35	9.34	1.61	1.76	—	—	20.20	14.06	14.06
TOTAL IMPACTS[c]	**Direct Permanent**	**107.67**	**123.75**	**24.74**	**34.70**	**41.07**	**48.49**	**42.83**	**43.95**	**49.54**	**35.75**	**67.86**	**54.08**	**51.11**	**44.47**	**7.75**	**7.16**	**9.43**	**11.48**	**12.08**
	Direct Temporary	**23.51**	**26.24**	**5.81**	**11.70**	**5.64**	**~~12.76~~ 12.74**	**7.79**	**8.18**	**23.19**	**22.15**	**9.65**	**8.61**	**6.43**	**2.94**	**3.15**	**2.44**	**3.34**	**2.69**	**2.64**
	TOTAL DIRECT	**131.18**	**149.99**	**30.55**	**46.40**	**46.72**	**61.23**	**50.62**	**52.13**	**72.73**	**57.89**	**77.52**	**62.68**	**57.54**	**47.42**	**10.90**	**9.60**	**12.77**	**14.18**	**14.72**
	Indirect Bisected[a]	**11.54**	**11.54**	**—**	**—**	**0.01**	**—**	**0.01**	**0.01**	**—**	**—**	**—**	**—**	**14.59**	**11.54**	**—**	**—**	**—**	**—**	**—**
	Indirect[b]	**250.13**	**285.27**	**27.64**	**97.87**	**92.82**	**96.49**	**72.47**	**71.84**	**71.44**	**72.82**	**71.07**	**72.45**	**127.27**	**114.57**	**14.79**	**6.26**	**37.72**	**30.10**	**30.40**

Notes:

— = No impact or not applicable

[a] Indirect bisected quantifies impacts on features that are bisected by the boundary of the Project Footprint (i.e., where a vernal pool or swale straddles the Project Footprint boundary). This category presents the acreage for the portion of these features that lies outside but within 250 feet of the Project Footprint

[b] Indirect impacts are calculated within a 250-foot buffer of the Project Footprint (including areas of permanent and temporary impacts) and areas outside of vernal pools and swales intersected by the Project Footprint.

[c] Calculations are based on raw, unrounded Geographic Information System (GIS) source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impact calculations in this table include Project alternatives and station alternatives but do not include heavy maintenance facility alternatives.

All impacts were calculated based on 15% engineering design Project Footprint.

Abbreviation:

LEDPA = Least Environmentally Damaging Practicable Alternative

Table 4-11 (revised)
Comparison of Quality (Relative Condition) of Impacts on Waters of the U.S. by Alternative[a]

Relative Condition	Proposed Preliminary LEDPA	Preferred Alternative (in acres)	Common Compo-nents	BNSF-Hanford East with Corcoran Bypass	BNSF-Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass	BNSF-Through Allensworth	Allensworth Bypass	BNSF-Through Wasco-Shafter	Wasco-Shafter Bypass	BNSF-Bakersfield North	Bakersfield South	Bakersfield Hybrid
	Impact Acreage																		
Direct Permanent Impacts[a,d]																			
Poor	96.08	110.36	23.63	30.47	37.07	44.30	40.54	41.38	47.70	33.88	65.73	51.90	33.96	38.23	7.75	7.16	7.19	9.69	10.28
Fair	6.16	6.16	1.11	3.51	3.28	3.47	2.01	2.30	1.55	1.60	1.85	1.90	4.52	1.54	—	—	0.01	—	—
Good	5.43	7.23	—	1.77	0.72	0.73	0.27	0.27	0.28	0.27	0.28	0.27	12.61	4.71	—	—	2.23	1.80	1.80
Excellent	—	—	—	—	—	—	—	—	—	—	—	—	0.03	—	—	—	—	—	—
Direct Temporary Impacts[a, d]																			
Poor	22.65	24.92	5.34	11.38	4.76	10.64	6.57	7.00	20.73	21.49	7.23	7.99	5.58	2.88	3.15	2.44	2.67	2.23	2.18
Fair	0.70	0.70	0.48	0.16	0.72	1.97	1.15	1.11	2.39	0.59	2.35	0.55	0.67	0.06	—	—	0.02		
Good	0.16	0.62	—	0.16	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07	0.18	—	—	—	0.65	0.47	0.47
Excellent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL DIRECT IMPACTS[a, d]																			
Poor	118.74	135.29	28.97	41.85	41.83	~~54.93~~ 54.92	47.11	48.38	68.44	55.37	72.96	59.90	39.53	41.11	10.90	9.60	9.86	11.92	12.46
Fair	6.85	6.85	1.58	3.67	4.00	5.43	3.16	3.41	3.94	2.18	4.21	2.45	5.19	1.60	—	—	0.03		
Good	5.59	7.85	—	0.88	0.88	0.89	0.34	0.34	0.35	0.34	0.35	0.34	12.79	4.71	—	—	2.88	2.26	2.26
Excellent	—	—	—	—	—	—	—	—	—	—	—	—	0.03	—	—	—	—	—	—
Indirect Bisected Impacts[a, b, d]																			
Poor	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fair	1.88	1.88	—	—	—	—	—	—	—	—	—	—	4.45	1.88	—	—	—	—	—
Good	9.66	9.66	—	—	0.01	—	0.01	0.01	—	—	—	—	9.84	9.66	—	—	—	—	—
Excellent	—	—	—	—	—	—	—	—	—	—	—	—	0.30	—	—	—	—	—	—
Indirect Impacts[a, c, d]																			
Poor	212.34	233.43	20.22	75.69	64.22	69.74	54.57	55.42	57.95	64.90	57.32	64.27	104.13	106.39	14.79	6.26	17.51	16.05	16.34
Fair	22.08	22.81	7.42	10.81	17.24	16.39	11.38	11.66	8.73	3.14	8.99	3.41	13.27	3.85	—	—	0.61	0.73	0.73
Good	15.70	29.03	—	11.37	11.36	11.36	6.52	4.76	4.76	4.77	4.76	4.77	8.58	4.34	—	—	19.59	13.33	13.33
Excellent	—	—	—	—	—	—	—	—	—	—	—	—	1.30	—	—	—	—	—	—

Table 4-11 (revised)
Comparison of Quality (Relative Condition) of Impacts on Waters of the U.S. by Alternative[a]

Relative Condition	Proposed Preliminary LEDPA	Preferred Alternative (in acres)	Common Compo-nents	BNSF-Hanford East with Corcoran Bypass	BNSF-Hanford East with BNSF-Through Corcoran	BNSF-Hanford East with Corcoran Elevated	Hanford West Bypass 1 with BNSF-Through Corcoran	Hanford West Bypass 1 Modified with BNSF-Through Corcoran	Hanford West Bypass 2 with Corcoran Elevated	Hanford West Bypass 2 with Corcoran Bypass	Hanford West Bypass 2 Modified with Corcoran Elevated	Hanford West Bypass 2 Modified with Corcoran Bypass	BNSF-Through Allensworth	Allensworth Bypass	BNSF-Through Wasco-Shafter	Wasco-Shafter Bypass	BNSF-Bakersfield North	Bakersfield South	Bakersfield Hybrid
	Impact Acreage																		
Totals[a, d]																			
Total Poor[a, d]	331.08	368.71	49.19	117.54	106.05	123.66	101.69	103.80	126.39	120.28	130.28	124.16	143.67	147.49	25.69	15.86	27.37	27.96	28.80
Total Fair[a,d]	30.81	31.55	9.00	14.49	21.24	21.83	14.54	15.07	12.67	5.33	13.20	5.86	22.90	7.32	—	—	0.64	0.73	0.73
Total Good[a,d]	30.95	46.54	—	12.25	12.25	12.25	6.87	5.12	5.12	5.12	5.12	5.12	31.21	18.71	—	—	22.47	15.59	15.59
Total Excellent[a, d]	—	—	—	—	—	—	—	—	—	—	—	—	1.63	—	—	—	—	—	—

Notes:
— = No impact or not applicable
[a] Impacts include only waters of the U.S.
[b] Indirect bisected quantifies impacts on features that are bisected by the boundary of the Project Footprint (i.e., where a vernal pool or swale straddles the Project Footprint boundary). This category presents the acreage for the portion of these features that lies outside the Project Footprint but within 250 feet of the Project Footprint.
[c] Indirect impacts are calculated within a 250-foot buffer of the Project Footprint (including areas of permanent and temporary impacts) and areas outside of vernal pools and swales intersected by the Project Footprint. Impact calculations in this table include Project alternatives and station alternatives but do not include the heavy maintenance facility site alternatives.
[d] Calculations are based on raw, unrounded Geographic Information System (GIS) source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.
All impacts were calculated based on the Final EIR/EIS 15% engineering design Project Footprint.
Abbreviation:
LEDPA = Least Environmentally Damaging Practicable Alternative

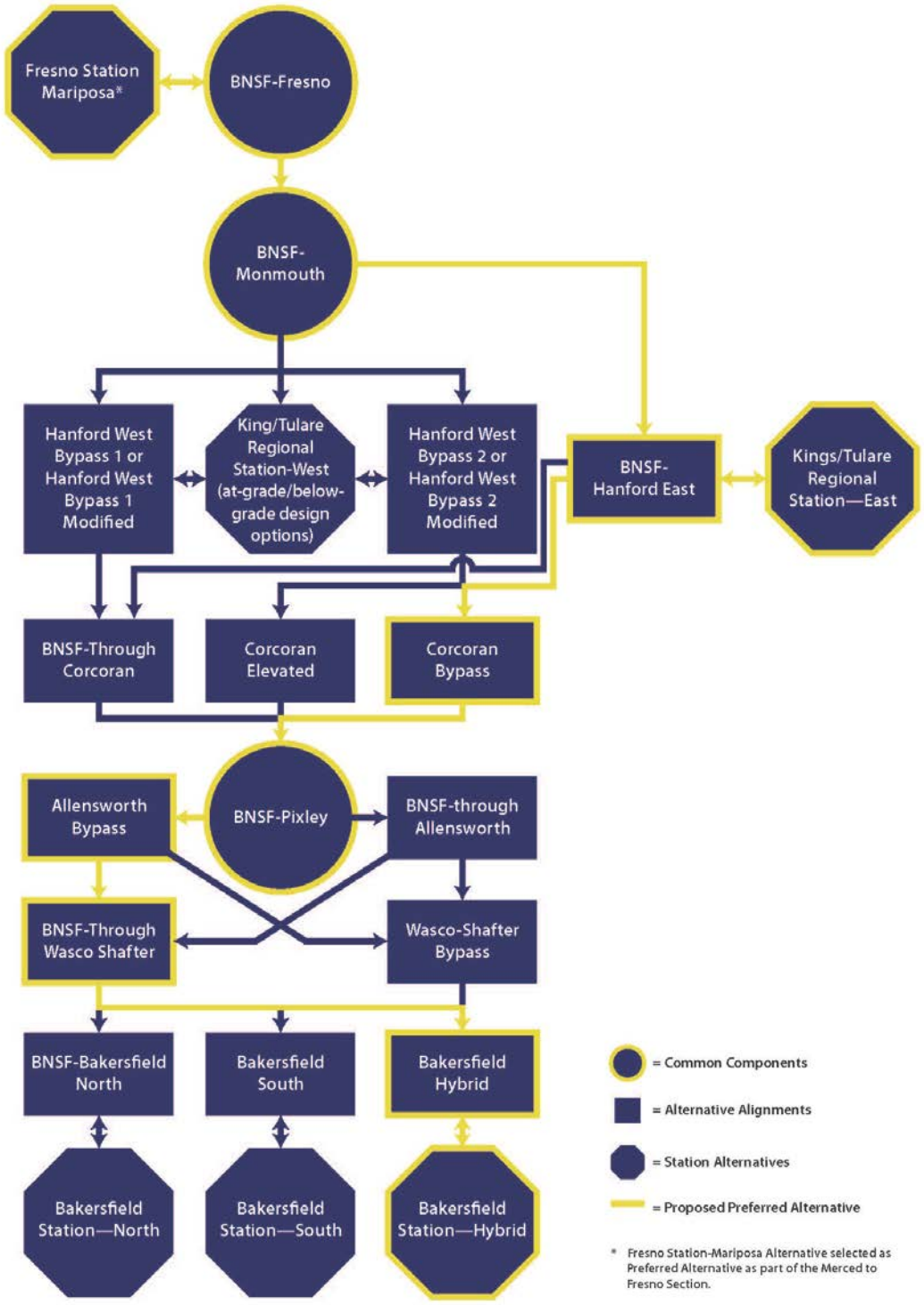

Figure 1-2
Fresno to Bakersfield Alternative Alignments, Common Components and Stations