

California High-Speed Rail Authority



RFP No.: HSR 13-57

**Request for Proposal for Design-Build
Services for Construction Package 2-3**

**Book IV, Part G.3 – Ground Assumptions for
Procurement**

CALIFORNIA HIGH-SPEED TRAIN

Engineering Report

Preliminary Engineering for Procurement

Fresno to Bakersfield

Construction Package 2-3

Ground Assumptions for Procurement

April 2014

RFP No.: HSR 13-57 - Addendum No. 1 - 06/10/2014



CALIFORNIA
High-Speed Rail Authority



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1.0 Introduction

Geotechnical Documents

The geotechnical documents include 1) the Fresno to Bakersfield Geotechnical Baseline Report for Bidding (GBR-B); 2) the Fresno to Bakersfield Geotechnical Data Report (GDR) CP2-3 (URS/HMM/Arup 2012) for Fresno and Tulare Counties; and 3) this Ground Assumptions for Procurement (GAP) document for Kings County.

The Authority was unable to acquire on-site geotechnical data for a GBR-B for Kings County, but has developed geotechnical and subsurface ground assumptions that are incorporated into the development of this document.

1.1 Purpose

The purpose of this GAP document is to provide baseline geotechnical assumptions within Kings County for the Proposers to use when preparing their bids. The information contained in the GAP may not be relied upon for developing the Contractor's final design.

The Contractor shall conduct its own sub surface investigations required to verify the actual ground conditions and prepare a Geotechnical Baseline Report for Construction (GBR-C). In accordance with the Contract, the GBR-C will serve as the basis for completing the final design.

2.0 Geotechnical Basis for Design in Kings County

2.1 Ground Conditions

The dominant surface geological formations of the Construction Package 2-3 area are alluvial deposits (consisting of granular deposits river deposits) or lacustrine deposits (consisting of predominantly cohesive lake deposits). Alluvial deposits are present in northerly portions of the alignment (Fresno County) and lacustrine deposits are present in the southerly portions of the alignment (Tulare County). Due to the lack of ground investigation data in Kings County, the boundary between the alluvial deposits and lacustrine deposits is unknown.

The geologic setting of the alignment in general is discussed in detail in the GSHR. The results of recent project-specific ground investigation in Fresno and Tulare Counties are presented in the GDR. The GDR also includes historical geotechnical information (by others, mostly Caltrans) from the Kings County area.

Based on the available information, for bidding purposes, the gradational change in the general geological sequence between predominantly lacustrine deposits associated with Tulare Lake and the alluvial deposits associated with the Central Valley's fluvial system can be taken as coincident with the intersection of the alignment with Jersey Avenue (STA 2228+60). The alignment within Kings County, and the location of Jersey Avenue, is illustrated in the vicinity map in Figure 2.1-1.



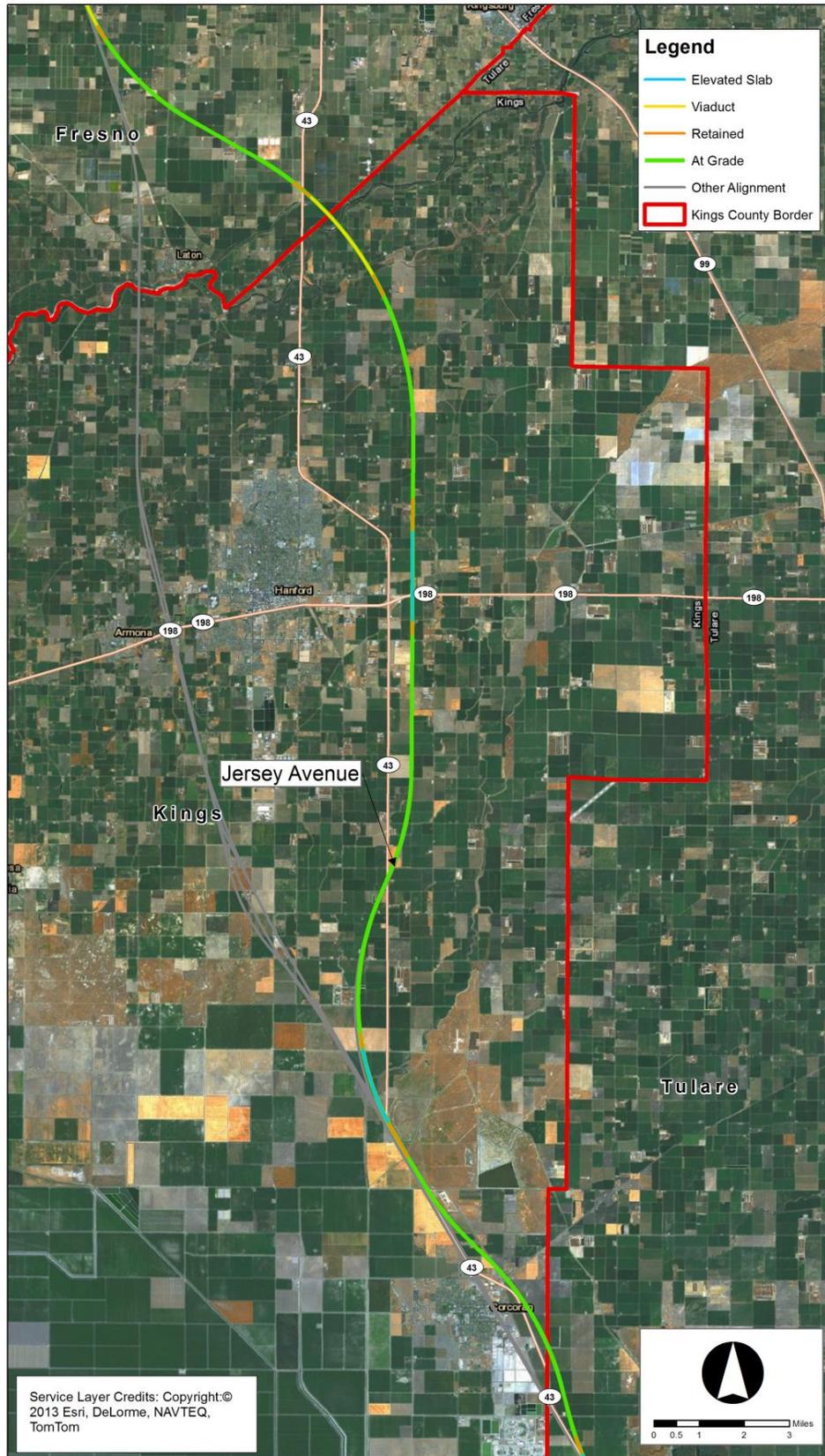


Figure 2.1-1: Overview of Alignments



2.2 Assumed Engineering Design Parameters

To assist the Proposers in the design of proposed works and associated structures within Kings County for their bids, assumed stratigraphic conditions and engineering parameters are provided. Based on the assumed geologic boundary presented in Section 2.1, general parity with the conditions investigated in Fresno County and Tulare County has been assumed north and south of Jersey Avenue in Kings County, respectively.

For bidding purposes, within Kings County, assume the stratigraphy and parameters in Table 2.2-1 for the design of elements north of Jersey Avenue.

For bidding purposes, within Kings County, assume the stratigraphy and parameters in Table 2.2-2 for the design of elements south of Jersey Avenue.

For bidding purposes, assume for design that the groundwater table is 40 feet BGL north of Jersey Avenue, and 30 feet BGL south of Jersey Avenue. Perched groundwater within 1 to 2 feet of the ground surface may be encountered during construction at locations near surface water bodies, heavily-irrigated fields, or due to seasonal variation of hydrogeological conditions during wet periods, or following isolated rainfall events. For design of foundations to be placed within stream channels, account for potential scour depth in design.



Table 2.2-1: Assumed Engineering Design Parameters for Kings County, North of Jersey Avenue

Applicable Depths BGL (ft)	Description of Material ¹	Total Unit Weight γ_t (pcf)	Soil Modulus E_s (tsf)	Corrected Blow Count SPT N_{60} (bpf)	CPT Tip Resistance q_c (tsf)	Effective Friction Angle Φ' (deg)	Effective Cohesion Intercept ² c' (psf)	Undrained Shear Strength c_u (psf)	Shear Wave Velocity V_s (ft/sec)
0 to 5	Fill / Near Surface Soils	115	150	10	40	28	0	-	500
5 to 25	Native Soil, predominantly coarse-grained	110	300	18	100	32	80	-	600
>25	Native Soil, predominantly coarse-grained, increasing fines	120	500	40	200	36	60	-	1000

¹ Native soils are likely Alluvial Fan deposits comprising predominantly sand and silty sand. Fines content may increase below 25 feet BGL, however material expected to retain a primarily coarse-grained character.

² For coarse-grained soil, effective cohesion is either representative of cementation, or is an apparent cohesion used only to adjust for the non-linearity at low stresses typical of simplified Mohr-Coulomb failure criteria. Cementation may be subject to softening when exposed to elevated groundwater or perched water. Effective cohesion should be ignored for all failure surfaces through or along undisturbed native soils confined by less than 10ft of overburden.



Table 2.2-2: Assumed Engineering Design Parameters for Kings County, South of Jersey Avenue

Applicable Depths BGL (ft)	Description of Material (distribution factor) ¹	Total Unit Weight γ_t (pcf)	Soil Modulus E_s (tsf)	Corrected Blow Count SPT N60 (bpf)	CPT Tip Resistance q_c (tsf)	Effective Friction Angle Φ' (deg)	Effective Cohesion Intercept ² c' (psf)	Undrained Shear Strength c_u (psf)	Shear Wave Velocity V_s (ft/sec)
0 to 5	Fill / Near Surface Soils	115	150	10	40	28	0	-	500
5 to 35	Native soil, coarse-grained layers (60%)	120	300	25	100	32	100	-	600
	Native soil, fine-grained layers (40%)	125	300	15	25	30	100	2,400	600
>35	Native soil, coarse-grained layers (40%)	125	500	50	200	36	150	-	1000
	Native soil, fine-grained layers (60%)	125	500	30	50	32	250	3,200	1000

¹ Native soils are likely interbedded deposits, where indicated, are likely lacustrine in origin, comprising alternating layers of predominantly coarse and predominantly fine-grained soil. The percentage indicated represents a distribution factor indicative of the average proportion of each material over the stated depth range. For design purposes, these distributions should be applied evenly over the depth range.

² For coarse-grained soil, effective cohesion is either representative of cementation, or is an apparent cohesion used only to adjust for the non-linearity at low stresses typical of simplified Mohr-Coulomb failure criteria. Cementation may be subject to softening when exposed to elevated groundwater or perched water. Effective cohesion should be ignored for all failure surfaces through or along undisturbed native soils confined by less than 10ft of overburden.



3.0 References

URS/HMM/Arup Joint Venture, 2013a FB PE4P Record Set CP2-3 Geotechnical Data Report. Fresno to Bakersfield Section. California High-Speed Train Project.

URS/HMM/Arup Joint Venture, 2013d FB Geologic and Seismic Hazards Report. Fresno to Bakersfield Section. California High-Speed Train Project.

