California High-Speed Rail System

TECHNICAL MEMORANDUM

Preliminary Engineering for Project Definition Guidelines
TM 0.1

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Revision	Date	Description
0	17 Dec 07	Initial Release
1	12 May 08	Update per FRA Review and Comments
2	5 Apr 13	Added Design Baseline Report
3	24 Dec 13	Added new Utility Scope
4	18 Feb 15	Renamed as Preliminary Engineering for Project Definition, added new Bridges and Elevated Structures Scope and Design Acceptance Procedure

Note: Signatures apply for the latest technical memorandum revision as noted above.

Prepared by PARSONS BRINCKERHOFF

for the California High-Speed Rail Authority

System Level Technical and Integration Reviews

The purpose of the review is to ensure:

- Technical consistency and appropriateness
- Check for integration issues and conflicts

System level reviews are required for all technical memoranda. Technical Leads for each subsystem are responsible for completing the reviews in a timely manner and identifying appropriate senior staff to perform the review. Exemption to the system level technical and integration review by any subsystem must be approved by the Engineering Manager.

System Level Technical Reviews by Subsystem:

Systems:	*Signed document on file* Bradley Banks, PE	Date
Infrastructure:	*Signed document on file* Gene Lusherovich, PE	Date
Operations and Maintenance:	Not required Joseph Metzler	Date
Rolling Stock:	Not required Frank Banko	Date
Regulatory Approvals:	Not required John Cockle	Date

Note: Signatures apply for the technical memorandum revision corresponding to revision number in header and as noted on cover.

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ABSTRACT

The California High-Speed Rail System (CHSRS) is proposed as a high-speed steel wheel on steel rail train system that provides service throughout the state of California. In order to facilitate project-level environmental assessment, the CHSRS is organized into geographic sections where specific engineering and environmental technical studies are being prepared by separate Regional Consultant teams.

This technical memorandum presents design guidance for a minimum level of engineering, referred to as Preliminary Engineering for Project Definition (PEPD), required to support the project-specific EIR/EIS process. It defines design elements, development level, and engineering outputs with the objective of providing a consistent approach in developing preliminary engineering documents to a level that supports the identification of an inclusive environmental envelope - horizontal, vertical and temporal, adequate environmental consequence analyses, permitting, coordination of utility relocation and extension, right-of-way acquisition, and promotes and supports compliance with applicable state and federal regulations. Additional engineering may be required to address risks related to utilities, right-of-way, railroad, water crossings, and concerns of local agencies, property owners and other stakeholders.

1.0 INTRODUCTION

1.1 PURPOSE OF TECHNICAL MEMORANDUM

The California High-Speed Rail (HSR) program is proceeding through the project-level environmental review phase. The HSR system is divided into project sections for environmental clearance and implementation. The purpose of this technical memorandum is to ensure consistency of the California High-Speed Train Rail System (CHSRS) engineering studies by defining a minimum level of engineering design needed to support the project-level environmental process and to support more detailed construction cost estimates.

1.2 DEFINITION OF TERMS

Acronyms

CHSRS	California High-Speed Rail System
CPUC	California Public Utility Commission
EIR/EIS	Environmental Impact Report (CEQA)/Environmental Impact Statement (NEPA)
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HSR	High-Speed Rail
MOI	Maintenance of Infrastructure
PEPD	Preliminary Engineering for Project Definition
PE4P	Preliminary Engineering for Procurement
PMT	Program Management Team
RC	Regional Consultant
ROW	Right-of-Way
TM	Technical Memorandum

2.0 DEFINITION OF TECHNICAL TOPIC

This Technical Memorandum (TM) defines the scope for the minimum level of engineering effort, referred to as Preliminary Engineering for Project Definition (PEPD), required to support the project-specific EIR/EIS process. The PEPD defines design elements, development level, and engineering outputs with the objective of providing a consistent approach in developing preliminary engineering documents to a level that supports the identification of an inclusive environmental envelope - horizontal, vertical and temporal, adequate environmental consequence analyses, permitting, coordination of utility relocation and extension, right-of-way acquisition, and promotes and supports compliance with applicable state and federal regulations. This TM identifies the design elements to be addressed, the level of design effort, and the engineering outputs as part of the project's conceptual design in support of the project-level environmental review. The following parameters were used to develop the PEPD scope guidelines:

- Engineering Subsystems – Design will define requirements for the five subsystems (Infrastructure, Systems, Rolling Stock, Operations, and Maintenance) necessary to design a safe and reliable operating high-speed railway that meets applicable regulatory requirements and achieves CHSRS performance requirements. Additional information regarding the CHSRS objectives can be found in TM 0.3 Basis of Design.
- Design Consistency -- Design will conform to the Basis of Design, applicable codes of practice, design guidelines, design practices adopted as part of the program environmental review, and criteria prepared for the CHSRS operational and performance requirements.
- Regulatory and Performance -- Design will comply with Federal Railroad Administration (FRA) railroad safety and California Public Utility Commission (CPUC) regulations except where requirements are otherwise defined specifically for CHSRS operations. Exceptions

to regulatory and performance requirements will be identified, documented, and submitted for FRA consideration.

- Construction Cost -- Design is expected to result in sufficient information consisting of unit costs, quantities, construction staging, and implementation information to allow for preparation of construction cost estimates accurate enough to support a maximum 25% cost contingency.
- Review and Acceptance -- Design will comply with the criteria prepared for the CHSRS and the applicable AREMA design standards and with FRA regulations and guidelines. PEPD deliverables and supporting data will be transmitted to FRA for review, comment, and acceptance as to the applicable environmental, design, operational, and safety requirements. Concurrent review will be performed by state agencies and affected railroad owners and operators.

This design scope guidance is intended to define a minimum level of engineering and planning for construction, operation and maintenance required to support the project-specific EIR/EIS process, inclusive of an accurate horizontal and vertical environmental envelope that contains probable impacts, adequate environmental consequence analyses, permitting, impacted areas for utility relocation and extension, HSR and adjacent property access, collaboration with agencies and other stakeholders over HSR and consequential actions, right-of-way acquisition, and compliance with applicable state and federal regulations. Additional engineering may be required to address risks related to impact areas for utility relocation and extension, right-of-way acquisition and relocation, railroad coordination and collocation, water crossings, location agency collaboration and other stakeholder concerns. As each section of the HSR system has unique characteristics, RCs, through close coordination with their environmental planners, are responsible for confirming whether additional engineering beyond the minimum requirements defined in this document is needed to address specific project issues, to support the Project EIR/EIS and/or applicable laws and regulations, to prepare and submit complete applications for regulatory permits, and to generate the construction cost estimates and schedules.

RCs shall work closely with the PMT Systems Group who will lead the preliminary engineering Systems design and will establish an appropriate system site definition for inclusion in the program's environmental assessment and regulatory permitting, and preliminary design for use in preparation of procurement documents. The RCs shall develop site-specific civil/infrastructure designs for Systems facilities sites based on locations determined in coordination with the PMT. The coordination and integration of systems design with the RCs is described in Appendix B.

3.0 ASSESSMENT / ANALYSIS

3.1 ASSESSMENT

3.1.1 Analysis / Approach

The engineering requirements for the PEPD were initially established in collaboration with the Regional Consultant (RC) engineering managers at a June 2007 Engineering Managers Meeting held in Los Angeles[1]. The requirements were reviewed and revised to incorporate the design requirements for engineering of transit projects prepared under the guidance provided by the Federal Transit Agency (FTA).

As part of the development of the PEPD scope, these engineering requirements were also reviewed with the following persons:

[1] The engineering requirements were contained in TM 0.1 15% Design Guidelines R0

- Don Emerson, Former FTA Deputy Administrator and author of the white paper "What is PE?" that was prepared for the FTA and describes what occurs during preliminary engineering for FTA New Starts projects.
- Internal reviews and assessments were performed by the Infrastructure Manager and by the Environmental Manager for the CHSRS Program Management Team in November 2007.

The guidelines in this technical memorandum have been refined in response to practical experience of preparing and advancing project-level EIR/EIS documents, state and federal regulatory permits and associated technical studies, initiation of the right-of-way acquisition process, assessment of utility relocation and extension, local agency and other stakeholder collaboration, and litigation.

3.1.2 Applicability

The guidelines in this technical memorandum are applicable to all Regional Consultants preparing PEPD for CHSRS.

3.1.3 Codes, Regulations, Design Standards and Guidelines

Reference is made to TM 1.1.1 Codes, Regulations, Design Standards and Guidelines. The technical memorandum identifies system-wide regulations, codes, and design standards to be incorporated, as applicable, into the design by the RC designers to ensure that the Preliminary Design addresses applicable design requirements. Regional and local regulations, codes and standards are to be identified and incorporated, as applicable, by the designers using the latest codes in effect at the time of the procurement.

3.2 TECHNICAL MEMORANDA

PMT has prepared Technical Memoranda (TM) that define the design requirements and design criteria that guide and direct the RCs during the Preliminary Engineering phase. The TMs document the development of the design criteria and are used to assess design compliance during the preliminary engineering phase. The TMs will not be in effect for final design and will be superseded by the CHSRS Design Criteria Manual, unless otherwise directed. Additional project specific technical guidance to the RCs is provided in Notice to Designers (NTD).

3.3 COORDINATION WITH THE ENVIRONMENTAL TEAM

Implementation of the preliminary engineering design will be verified and validated through two design acceptance decisions:

1. Draft EIR/EIS Alternatives Design
2. Final EIR/EIS Preferred Alternative Design

The purpose of this process is to establish the preliminary engineering design, project footprint and project alternatives description needed to conclude all EIR/EIS impact analyses and documents, and prepare applications and acquire regulatory permits on the basis of:

- Complete preliminary engineering design as described in this technical memorandum
- Natural resource, habitat, or community resource characteristics or conditions within (or relevant to) the HSR section and associated information necessary for complete analyses of potential project impacts
- Project design feature complexity, heightened potential for adverse impact upon sensitive resources, regulatory oversight, or feasibility

The procedure for these decisions is described in in Appendix C.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 GENERAL

This technical memorandum defines a minimum level of preliminary engineering design required to develop a complete project definition for environmental impact assessment and design of impact mitigation measures, support for federal and state regulatory processes coordinated under CEQA and NEPA, assessment of utility relocation and extension, collaboration with agencies and other stakeholders over HSR and consequential actions, initiation of right-of-way acquisition, and generate a new construction cost estimate.

4.2 SCOPE AND DELIVERABLE

Recommendations for the PEPD scope and engineering output are included in Table 1.

RCs shall develop a Design Baseline Report which documents the deliverable(s) for each item listed under Engineering Output in Table 1. Each deliverable should provide the document title, document type, and location of the document on SharePoint with hyperlink. The outline for preparation of Design Baseline Report is included in Appendix A.

RCs shall coordinate with PMT Systems group for the Systems facilities sites based on locations determined in coordination with the PMT and integrate the site-specific civil/infrastructure into their design. The coordination and integration of systems design with the RCs is described in Appendix B.

RCs shall coordinate their preliminary engineering design with their Environmental group to verify and validate a complete project definition for environmental impact assessment and design of impact mitigation measures. The procedure for complying with environmental requirements is included in Appendix C.

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5.0 SOURCE INFORMATION AND REFERENCES

5.1 GENERAL

- "What is PE?", A white paper describing what occurs during Preliminary Engineering for New Starts, February 2003, Donald J. Emerson
- 13 June 2007, Engineering Managers Meeting, Los Angeles, CA
- 11 July 2007, Meeting and review with Donald J. Emerson, Former FTA Deputy Administrator

6.0 DESIGN MANUAL CRITERIA

6.1 INFORMATION FOR INCLUSION IN DESIGN MANUAL

The guidance in this technical memorandum is not intended to be a part of the CHSRS Design Manual. The purpose of this technical memorandum is to define a minimum level of engineering design required to develop a complete project definition for environmental impact assessment and design of impact mitigation measures, support for federal and state regulatory processes coordinated under CEQA and NEPA, assessment of utility relocation and extension, collaboration with agencies and other stakeholders over HSR and consequential actions, initiation of right-of-way acquisition, and generate a new construction cost estimate.

TABLE 1 – PRELIMINARY ENGINEERING FOR PROJECT DEFINITION SCOPE GUIDELINES

	PEPD Scope	Engineering Output
General	Engineering design to support a project-level EIR/EIS, design of impact mitigation measures, support for federal and state regulatory processes coordinated under CEQA and NEPA, assessment of utility relocation and extension, collaboration with agencies and other stakeholders over HSR and consequential actions, initiation of right-of-way acquisition, and provide a more detailed construction cost estimate, and conform to all requirements and commitments included in decision documents (FRA ROD, Authority resolution, CEQA findings and MMRP, the Final Statewide Programmatic EIR/EIS for the California High-Speed Train System and the Bay Area to Central Valley Program EIR/EIS). These are minimum requirements. Additional detailed studies are to be completed where necessary. Prepare a Design Baseline Report to provide a narrative description of the engineering issues, constraint, and key features of the section Preferred Alternative. The Design Baseline Report shall be prepared after the selection of the preferred alternative. During Preliminary Engineering for Procurement (PE4P) this report will be updated as noted in the outline contained in Appendix A	Design and technical assessment defined a level of engineering to support adequate environmental consequence analyses, permitting, right-of-way acquisition, and compliance with applicable state and federal regulations, inclusive of: - Horizontal and vertical limits of disturbance for each project alternative, HSR appurtenant features and consequential actions - Design and technical documentation prepared to support regulatory agency approvals - Required agreements identified - Major cost elements Identified - Risk assessment completed and reflected in construction costs for each alternative - Design Baseline Report per outline provided in Appendix A

Infrastructure	PEPD Scope	Engineering Output
Alignment (Plan and Profile)	– Update alignment with available off-the-shelf (i.e., Intermap) planimetric and terrain mapping (3-foot vertical accuracy) – Alignment drawings at a scale appropriate to the context. Drawing scale is to be ▪ 1"=200' scale for undeveloped areas ▪ 1"=200' in developed areas ▪ 1"=100' in constrained urban areas ▪ 1"=50' for stations and special study areas on rectified aerial photo base These are recommended scales and are to be confirmed with the Environmental Manager and Regional Manager. – Develop typical sections that identify clearances to water bodies, roadways, structures, access points, wayside equipment, etc. – Define right-of-way limits	- Base mapping and photo aerials - Horizontal Alignment showing key existing features (e.g., roadways and driveways, utilities, water bodies, existing structures, sensitive or otherwise regulated environmental resources, etc.) - Vertical Alignment showing key existing features (ground and existing structures, water bodies, over and under crossings) - Typical cross sections - Station location alternatives - Limits of at-grade, elevated, and underground structures - Right-of-Way limits for each alternative including easements - Roadways and railroad in proximity to the proposed alignments
Roadway Work (Grade Separations)	– Design of roadways shall be in accordance with the local jurisdiction requirements - Develop typical sections that identify clearances to tracks, structures, access points, etc. - Identify right of way limits - Identify limits of roadway structure along the alignment See "Bridges and Elevated Structures" for Structural Plans for grade separations (for local roadways over HSR trackway)	- Horizontal Alignment. Superelevation designed only for State Highways, not local roadways. - Vertical Alignment showing key existing features (ground, water bodies, over and under crossings - Clearances shall be confirmed and noted on drawings - Design to provide and maintain access (pedestrian and vehicular). - **Alignment Data Files** (including horizontal and vertical InRoads/InRail data files) in electronic format - Typical cross sections. - Right-of-Way limits including temporary easements and maintenance access for

Infrastructure	PEPD Scope	Engineering Output
		HSR and appurtenant features, and consequential features/uses. - Indicate required driveway relocations - Indicate existing and proposed speed
Temporary Construction Facilities	– Develop design to a level where the feasibility of construction can be confirmed (i.e., plan and profile level studies) – Identify construction methods/staging/laydown/tunnel mucking/shaft and access requirements, and assess and identify suitable mobilization, staging, and material disposal sites for each alternative consistent with the requirements of the project decision documents and the two Final Program EIR/EISs (Statewide and Bay Area to Central Valley) – Identify roadway/highway traffic control requirements – Identify other railroad operator requirements – Determine temporary construction easements	- Constructability assessment memorandum - Construction staging concepts as needed to determine limits and to characterize temporary impacts during construction - Temporary construction/staging measures, sites and facilities - Construction phasing/sequence and duration - Develop assumptions and quantities for level of construction activities to support air quality analysis
Stations	– Develop general station programs and identify and design potential sites including at a minimum: o Station Platforms o Preliminary Station layout o Station facilities (ticketing, waiting areas, etc.) o Vertical and horizontal passenger circulation o Vehicle and bicycle parking facility footprints, height, access and egress o Vehicular, pedestrian and bicycle traffic circulation and intermodal connections o Pick up, drop off, access and egress roadways and facilities	- Station Site alternatives - Station footprints - Vehicular and bicycle parking and site configuration - Station Platforms: number, configuration, location - Vertical and horizontal circulation elements - Off-site parking locations and station access routing - Identify intermodal and public transit connections
Bridges and Elevated Structures	– Develop approximate length, width, height, and depth of structures based on alignment design, including pier/bent type, size and location – Identify appropriate types of bridges and structures for consideration – Identify transition structures i.e., at-grade to bridge, at-grade to tunnel, bridge to tunnel, retaining walls, etc. – Prepare Advanced Planning Study (APS) level of analysis and documentation. – Identify need for scour protection and preliminary requirements – Identify site constraints including, hydrology, salt spray and water, problematic soils, geologic problems, etc. – Coordinate with Caltrans and Third Parties to prepare Evaluation of Existing Structures Report for existing structures classified as Primary Type 2 structures and obtain concurrence from Caltrans and Third Party regarding the disposition (rehabilitation/replacement) of these structures.	- Structure design (plan, elevation, cross section) to APS level including: o Bridge length, width, depth, max. height o Column / footing locations o Foundation type o Number of spans o Transitions structures o Retaining walls o Changes to affected adjacent facilities (pedestrian, roadway, highway, railroad) o Grade Separation Structures for crossroads o Major utility relocations - Advanced Planning Study Tech Memo/Report including: o Structure importance classification (i.e., lifeline, etc.) o Key design and site constraints o Seismic, soils, hydrologic, hydraulic and geomorphic design considerations o Construction costs - Evaluation of Existing Structures Report including: o Caltrans' recommended Rehabilitation Strategy Plan o Expected remaining life o Seismic retrofit assessment of existing structures to meet the no-collapse performance for Maximum Considered Earthquake (MCE)

Infrastructure	PEPD Scope	Engineering Output
		○ Seismic retrofit assessment of existing structures to remain elastic for one-third of MCE spectra ○ Recommendation whether each structure shall be: (1) accepted as-is, (2) repaired to meet the Rehabilitation Strategy Plan and/or retrofitted to meet the above seismic performance, or (3) replaced with a new structure based on expected remaining life and cost for rehabilitation/retrofit vs. replacement
Tunnels	– Determine basic tunnel configuration, tunnel location alternatives and lengths – Confirm number of tracks and approximate tunnel diameter – Identify major seismic considerations – Locate faults and avoid fault crossings in tunnels – Assess need for pilot tunnels – Determine portal location options and length – Determine ventilation requirements as required to define tunnel size and any major ventilation facilities – Assess fire and life safety requirements and develop project footprint needs for as required (i.e., structures, equipment/ operation rooms, access, shafts, egress, etc.) – Identify local requirements for first responders – Assess constructability including methods, access, temporary construction areas, muck disposal, etc.	- Tunnel drawings and report including: ○ Tunnel horizontal and vertical alignments ○ Tunnel cross sections including consideration for fire and life safety requirements, OCS, and other required equipment ○ Mitigation and design requirements for seismic ○ Tunnel lining requirements ○ Portal and ventilation structure locations ○ Cross passage spacing and locations ○ Construction methods assessment ○ Temporary construction easements ○ Assess operations, emergency and maintenance access identification, locations and right-of-way
Buildings	– Develop footprint based on general program of functions for the following: ○ Operations Control Center and redundant line facilities ○ Maintenance facilities (Heavy and Light Maintenance) ○ Lineside facilities for maintenance-of-way ○ Access, vehicle and bicycle parking, utility services for the above facilities as required to define right-of-way requirements ○ Employee considerations as appropriate	- Site Selection - Building footprint limits and size - Parking and Site Configuration - Access requirements - Utility services requirements
Grading	– Determine cut and fill slope limits based on 2:1 side slopes (typical) – Identify retaining structures as required to reduce ROW requirements and/or mitigate impacts – Determine retaining wall type, locations, lengths and heights – Identify temporary construction requirements	- Cut and fill slope catch points included on alignment plans - Retaining wall locations, lengths and heights - Retaining wall type (standard, MSE, tie-back, etc.) - Construction easement requirements - Assess operations, emergency and maintenance access identification, locations and right-of-way
Hydrology / Hydraulics / Drainage	– Prepare Hydrology and Hydraulic studies required for environmental impact studies including: ○ Type, location and cost of major drainage facilities or modifications as well as their footprint and costs ○ Assess and incorporate rise in tidal waters (and expansion of tidal waters) due to climate change (global warming) ○ Environmental methodologies for hydrology and design practices to reduce impacts or improve	- Hydrology and Hydraulics Report - Floodplain Impacts Assessment Report - Storm Water Management Report - Additional information as needed to support Section 408, Section 404, Section 401/402 determinations (e.g., hydraulic basis of design in service of regulatory permitting)

Infrastructure	PEPD Scope	Engineering Output
	water quality – Prepare a floodplain impacts assessment (i.e., Location Hydraulic Study) – Review stormwater runoff water quality issues and identify best management practices – Determine hydraulic and geomorpholocal effects upon floodwater conveyance and flood risk management facilities	
Utilities	– Contact utility companies to obtain data for existing and planned high risk and major utilities within the project limits. – Prepare utility composite map for major utilities by transferring the collected data to project plans for each alignment. – Furnish utility owners with composite utility (verification) mapping for alignment(s) under study to confirm utilities in conflict. – Identify location and extent of critical areas and document basis for selection. Critical areas are the areas within the project limits where the presence of utilities could significantly impact the project environmental footprint, construction cost, or overall project schedule – Identify utilities and potential impacts in critical areas where the proposed utility disposition could affect the environmental footprint. – Prepare letters to utility owners to communicate property/franchise rights for the utilities in conflict with the project. – Transmit the list of major utilities in critical areas with the extent of work and estimated cost to the Authority. – Perform additional, detailed utility investigations to more clearly identify the location of existing utilities (i.e., field survey, potholing) in critical project areas, as appropriate. – Coordinate disposition of potential utility impacts and mitigations (relocation/protection) with utility owner/operator for major utilities, and identified utilities in critical areas, to assess that sufficient project footprint is identified in the Environmental Document. This effort includes preparing profiles for gravity flow utilities. – Prepare a matrix of existing high risk and major utilities that require protection or relocation. Include utility owners property/franchise rights for each of the relocated utilities. – Identify relocation options for major utilities and utility relocation in critical areas. Include the areas for these relocation options in the environmental footprint.	- Assess existing and relocation of utilities within project limit per TM 2.7.4 Utility Requirements for 15% Design level[2]. - High Risk and Major Utilities Conflict memo - Utility composite map for disposition of major utilities in critical areas - Define footprint for utility accommodations and disposition
Geotechnical	– Research available literature and geotechnical studies within the project limits for use to identify and resolve geotechnical related design and cost issues – Prepare preliminary Geotechnical design recommendations based on available geotechnical data – Geotechnical investigation plan recommendations to	- Updated Geotechnical Database - Preliminary Geotechnical Design Report - Geotechnical investigation plan recommendations - Additional information as needed to support Section 408 determinations (e.g., geotechnical basis of design in service of

[2] In TM 2.7.4, 15% Design shall be read as PEPD

Infrastructure	PEPD Scope	Engineering Output
	support PEPD – Subsurface investigations for special circumstances where additional geotechnical information is required to establish the project footprint or to establish a reasonable construction cost estimate	regulatory permitting)
Right-of-Way	– Identify adjacent parcels and ownership for alternatives – Identify adjacent parcels and estimated costs for: o Full and partial takes o Permanent easements o Construction areas o Temporary staging areas and easements o Assess operations, emergency, maintenance access, locations and routes for HSR and appurtenant facilities, and consequential features o Assess access requirements, locations and routes for utilities	- Preliminary Right-of-Way Requirements Report
Construction Cost Estimate	– Develop quantities per CHSRS 15% Design Construction Cost Guidelines[3] – Prepare construction cost estimates per CHSRS Construction Cost Guidelines (cost categories consistent with FRA and FTA guidelines)	- PEPD level quantities - Cost adjustments to reflect regional conditions

Systems	PEPD Scope	Engineering Output
General	– Refer to Appendix B – PMT Systems Coordination and Integration of Systems Design with Regional Consultants	
Traction Power	– Identify site locations and alternatives, access, and parking for traction power sites. *(PMT LEAD, RC SITE DESIGN AND ENVIRONMENTALLY CLEARED)* – Determine facilities for power between substation to the railway (*PMT LEAD, RC SITE DESIGNED AND ENVIRONMENTALLY CLEARED).* Coordinate preliminary CHSRS load requirements with utilities *(PMT LEAD)*	- Traction Power System Computer Model Analysis - Traction Power site locations, alternatives, access and footprint requirements
Utility / Electric Power Connections	– Identify power supply points in coordination with the Utility Companies – Identify needed facilities and site options, including high voltage transmission or tie lines, to connect substations to commercial power lines *(PMT LEAD, RC SITE DESIGN INPUT REQUIRED AND ENVIRONMENTALLY CLEARED)*	- Possible power supply points - Engineering requirements for Grid connections - Site footprint and easement locations, access and footprint requirements
Overhead Contact System (OCS)	– Develop conceptual design for OCS for design speeds *(PMT LEAD)* – Check electrical clearances to fixed structures *(RC)*	- Conceptual OCS Design (PMT) - Electrical Clearance Diagrams (RC) for specific location requested by PMT and other locations needed to support design variance requests
Communications	– Determine communications technology *(PMT)* – Identify site locations, alternatives, access and parking requirements for communication facilities *(PMT LEAD, RC SITE DESIGNED AND ENVIRONMENTALLY CLEARED)*	- Communications site locations, alternatives, access and footprint requirements to support CHSRS communications technology

[3] In TM 1.1.19, 15% Design shall be read as PEPD

Systems	PEPD Scope	Engineering Output
Trackside Services/ Train Control System	– Identify requirements for equipment houses, cabinets, troughs, manholes, ductbanks, gantries and other wayside equipment, etc. *(PMT LEAD, RC SITE DESIGNED AND ENVIRONMENTALLY CLEARED)*	- Footprint for trackside equipment including cabinets, troughs, manholes, ductbanks, gantries and other wayside equipment, etc. identified within the corridor - Traction Power Gantries and Radio Towers identified on the plans - Train control site locations, access and footprint requirements to support CHSRS train control technology

Rolling Stock	PEPD Scope	Engineering Output
Technology	– Identify Rolling Stock performance requirements to meet CHSRS requirements including operating speed, capacity *(PMT)* – Review available technology from HSR systems in the U.S., Europe and Asia *(PMT)*	- Rolling Stock performance characteristics for use in Train Simulation Model and Traction Power Model
Clearances	– Develop vehicle clearance requirements that is inclusive of potential vehicle technologies for the CHSRS *(PMT)*	- Vehicle Clearance Diagrams (Structure Gauge)

Operations	PEPD Scope	Engineering Output
Facilities	– Identify activities and functional requirements for an operations center *(PMT)* – Review requirements for redundancy of the operations facilities *(PMT)* – Identify potential locations and develop size of operations facilities *(PMT)*	- List of activities and functionality of the operations facilities - Types and size of operations facilities including a Central Control Center and redundant line facilities as required
Operations Concept	– Identify train performance characteristics that meet CHSRS performance requirements including operating speed and capacity *(PMT)* – Identify operational parameters to provide a train service that supports the projected ridership *(PMT)* – Develop a train dispatch schedule using computer based train simulation models to confirm operational feasibility and number of trainsets *(PMT)*	- Concept of Operations Report

Maintenance	PEPD Scope	Engineering Output
Rolling Stock	– Develop list of activities and functions for a Heavy Maintenance/Repair facility *(PMT)* – Develop list of activities and functionality for the Light/Medium maintenance facilities located near terminal stations *(PMT)* – Determine facility requirements for rolling stock maintenance facilities *(PMT)* – Develop track layout and access requirements for central maintenance and repair facility (Heavy Maintenance /Repair) and terminal maintenance facilities (Light/Medium Maintenance) *(PMT LEAD, RC DESIGNED)* – Identify potential hazardous waste generators, special requirements for storage, and current best practices for disposal *(PMT LEAD, RC DESIGNED)*	- Alternative sites and approximate size of Heavy Maintenance/Repair facility - Alternative sites and sizes of Light/Medium maintenance facilities near terminal stations

Maintenance Of Infrastructure	– Determine maintenance of infrastructure (MOI) activities and access requirements based on expected CHSRS infrastructure *(PMT)* – Identify and develop siding locations for MOI maintenance facilities *(PMT LEAD, RC DESIGNED)* – Identify and develop CHSRS railway access points from local roads including easement requirements *(PMT LEAD, RC DESIGNED)* – Identify requirements for continuous longitudinal access for inspection and maintenance. *(PMT LEAD, RC DESIGNED)* – Identify effects on maintenance of adjacent railroads. *(PMT LEAD, RC DESIGNED)* – Identify requirements for emergency access and incident response. *(PMT LEAD, RC DESIGNED)*	- Sites for MOI facility locations and functional requirements - Determination if MOI facilities require additional footprint - Confirmation of accessibility of CHSRS alignment for maintenance

APPENDIX A - DESIGN BASELINE REPORT OUTLINE

Table of Contents

List of Figures and Tables

Abbreviations and Acronyms

1.0 Executive Summary *(1 Page)*

2.0 Introduction *(1 - 2 Pages)*

2.1 Purpose

2.2 Project Description

Include Project Description in close coordination with language included in Final EIR/EIS, environmental and regulatory permits, NEPA/404/408 integration process, and Section 106 process. Identify and describe preferred alignment for which Design Baseline Report is being prepared (per Locally Preferred Alternative (LPA) and LEDPA), including local sub-sections into which the selected alignment may be divided for design purposes.[4]

Include brief description of other alignment and design options studied in EIR/EIS but that were not selected.

Include project and section maps to support Project Description.

3.0 Documentation of Preliminary Engineering for Project Definition Output

Document the deliverable(s) for each item listed under Engineering Output in Table 1 of the PEPD Guidelines. As a minimum for each deliverable provide the document title, document type, and location of document on SharePoint with hyperlink.

Itemize alignment type, as follows:

DISCIPLINE	ENGINEERING OUTPUT	Document Title	Document Type	Location on SharePoint	Hyperlink
Alignment (Plan and Profile)					
Temporary Construction Facilities					
Etc.					

4.0 Survey and Mapping *(0.5 - 1 Page)*

Document basis of survey used for preliminary design, such as source type (i.e., Intermap, LIDAR, field, etc.), date of inception, map scale, survey zone, combining factor, and vertical datum, as applicable based on type. Document and reference ground control as included in survey plan sheets.

[4] It is assumed that this Design Baseline Report will be initially prepared by the Regional Consultant upon completion of Record Set PEPD and LPA/LEDPA Determination. A final version of this report should be updated and completed upon completion of Preliminary Engineering for Procurement.

5.0 Right-of-Way *(1 Page)*

Include brief summary from ROW Requirements Report, with special consideration on critical and most notable ROW locations inclusive of utility and third party facilities relocation needs.

6.0 Track Alignment *(4 - 5 Pages)*

Include description of track alignment, by geography from N-S or W-E as applicable, including most salient technical, non-technical, and geographical features that informed its design basis. Address horizontal layout and vertical profile features (include horizontal and vertical alignment data as attachment, with specific reference to CHSRS Design Standards used in establishment of alignment).

Itemize design speed(s) along track alignment, with special consideration on design speed limitations, if any.

Include listing of ballasted and non-ballasted sections, if specifically determined, to include locations, distances (feet or mileage), and justification.

Itemize and address all special/unique design and construction considerations acquired by the RC through its technical coordination efforts (refer to TM 0.1.1).

Itemize alignment type, as follows:

ALIGNMENT TYPE	GEOPHYSICAL LIMITS (i.e., STREET NAMES)		STATIONING		Miles
	Start	End	Start	End	
At Grade	North of Stanislaus St.	East American Ave.	S 10806+00	S 10970+00	3.1
Embankment					
Cut					
Aerial					
Bridges					
Tunnel					
Trench					
TOTAL	-	-	-	-	100

Itemize special trackwork, as follows:

TRACKWORK TYPE	PURPOSE	LOCATION (STATION)	LENGTH	DIRECTION	DESIGN SPEED
Turnout	Serves station			NB	
Turnout	Serves MOE			SB	
Crossover	Serves Station			SB	
Crossover	Universal			NB and SB	
Storage Tracks					
Other					

7.0 Roadway Work (Grade Separations) and Other Third Party Improvements *(4 - 5 Pages)*

Provide general approach for locations, frequency, types, and design of all roadway work.

Itemize and address all special/unique design and construction considerations acquired by the RC through its technical coordination efforts with impacted Third Parties. These may include special design, access, and construction requirements that may not otherwise be included and/or readily available in published design standards by the Third Party (refer to TM 0.1.1).

Cite all Codes, Standards, and Criteria employed in design of Third Party facilities itemized below (may be part of table).

Itemize grade separations, as follows:

No.	**TYPE** (OVERPASS, UNDERPASS, MODIFICATION, CLOSURE)	**LOCATION** (MID. STATION ALONG HST)	**THIRD PARTY** (OWNER)	**DESIGN SPEED**	**% GRADE**	**CLEARANCE TO HST**	**LENGTH** (EXTENT OF ROADWAY WORK)
1							
2							

8.0 Earthwork *(1 - 2 Pages)*

Include general approach to earthwork design, including summary of earthwork calculations for excavation and fill.

9.0 Temporary Construction Facilities *(1 - 2 Pages)*

Provide brief summary from Constructability Report, with special attention to design requirements for itemized temporary construction facilities.

Itemize and address all special/unique design and construction considerations acquired by the RC through its technical coordination efforts. These may include special design, access, and construction requirements that may not otherwise be included and/or readily available in published design standards by the CHSRS and/or Third Party (refer to TM 0.1.1).

10.0 Stations *(2 - 3 Pages)*

Include description of proposed HSR stations, by geography from N-S or W-E as applicable, including most salient technical, non-technical, and geographical features that informed their design basis.

Itemize HSR stations, as follows:

NAME	**LOCATION** (CITY/COUNTY AND BEG. STATION)	**CONFIGURATION** (AT GRADE, AERIAL, BELOW GROUND)	**# OF PLATFORMS**	**LENGTH/ WIDTH**	**SQ. FOOTAGE OF PLATFORM AREA**

Indicate any special considerations in the location, layout, design, configuration, and relationship(s) to adjacent Third Party facilities for the HSR stations.

11.0 Bridges and Elevated Structures *(4 - 5 Pages)*

Provide brief summary from Structures Report that includes general approach for locations, types, and design of all bridges and aerial structures.

Itemize bridges and aerial structures, including complexity classification, as follows:

No.	PURPOSE (i.e., span over river, local roads, etc.)	LOCATION (BEG. STATION)	STRUCTURAL TYPE (i.e., balanced cantilever)	LENGTH	MAX. HEIGHT	No. OF BENTS	No. OF SPANS	CLEARANCES TO LOCAL FACILITIES
1								
2								

Itemize assessment of Existing Structures, including disposition for rehabilitation or replacement of Primary Type 2 Structures, as follows:

No.	Bridge Name	Bridge Owner	Bridge Number	Inventory Route or Feature	Sufficiency Rating	Recommendation
1						
2						

12.0 Tunnels *(3 - 4 Pages)*

Provide brief summary from Tunnels Report that includes general approach for locations, types, and design of all tunnels.

Itemize tunnels, as follows:

No.	LOCATION (BEG. STATION)	LENGTH	CROSS-SECTIONAL AREA (ID)	TYPE (i.e., TBM, NATM, MINED, CUT-AND-COVER, ETC.)	LOCATION AND CONSIDERATION OF SUPPORT FACILITIES (i.e., ACCESS, EGRESS, VENTILATIONS SHAFTS, CROSS PASSAGES, ETC.)
1					
2					

13.0 Floodplain Impacts, Hydrology/Hydraulics, and Stormwater Management *(2 - 3 Pages)*

Include brief summaries from Floodplain Impacts, Hydrology/Hydraulics, and Stormwater Management reports, including most salient technical, non-technical, and geographical features that informed the design. Address summary of drainage concept area design per TM 0.1.1.

13.1 Floodplain Impacts

13.2 Hydrology/Hydraulics

13.3 Stormwater Management

14.0 Utilities *(2 - 3 Pages)*

Include summary from Utilities Report with special attention to most salient technical, non-technical, and construction requirements as identified through coordination efforts with Utility Owners. Include matrix of existing utilities and listing of major utility conflicts, locations, owner, and proposed disposition, summarized from Utilities Report, including table of high risk and major utility conflicts and proposed disposition.

15.0 Maintenance and Support Facilities *(2 - 3 Pages)*

Include description of maintenance facilities, by geography from N-S or W-E as applicable, including salient technical, non-technical, and geographical features that informed the design basis.

Itemize maintenance facilities, as follows:

LOCATION (CITY/COUNTY AND BEG. STATION)	**TYPE** (i.e., MOE, MOI, HMF, etc.)	**LEVEL** (1-5)	**SIZE** (SQ. FOOTAGE)	**SPECIAL DESIGN CONSIDERATIONS**

16.0 Systems Facilities *(2-3 Pages)*

Include description of all systems; traction power, communication, and train control facilities, by geography from N-S or W-E as applicable, including most salient technical, non-technical, and geographical features that informed their design basis.

Itemize systems facilities, noting site alternatives as well, as follows:

LOCATION (STATION)	**TYPE** (i.e., SSS, PS, WPC, CST, IH)	**SPACING FROM ADJACENT IN-KIND FACILITY**	**ACCESS ROAD CONFIRMATION**	**SPECIAL DESIGN CONSIDERATIONS**

17.0 Design Variances *(as required)*

Itemize all anticipated (approvable or approved, depending on design phase) design variances, for HSR and Third Party facilities, in separate tables (17.1 and 17. 2, below). Describe unique technical and construction considerations coordinated through preliminary design phase that may not otherwise be readily available in published codes/criteria.

17.1 HSR Design Variances

No.	**Location / Station**	**Design Criteria Reference**	**Minimum or Exceptional Standard Requiring Deviation**	**Variance Request**	**Constraint / Justification**	**Approval Date**
1						
2						

17.2 Third Party Design Variances

No.	**Location / Station**	**Design Criteria Reference**	**Minimum or Exceptional Standard Requiring Deviation**	**Variance Request**	**Constraint / Justification**	**Approval Date**
1						
2						

18.0 Design and Construction Permits *(1 - 2 Pages)*

Preliminary listing of anticipated design/construction permits that may be required from regulatory, resource, state, and local agencies

Permit	Agency	Permit Preparation Stage/Status

19.0 Special and Unusual Conditions *(4-5 Pages)*

Itemize special additional coordination and technical requirements. This information shall focus on unique, extraordinary coordination and/or technical knowledge that a reasonable follow-on designer and/or Contractor would not otherwise be able to discern from the standard specifications, industry-wide data, and/or more readily available specifications. It is expected that the RC's technical information will therefore be focused on local conditions and/or technical issues specifically related to the proposed preliminary design.

This section should summarize any special conditions itemized elsewhere in this Design Baseline Report.

20.0 Sustainability Checklist for Public Facilities *(<1 Page)*

Complete the PMT-supplied Project Sustainability Checklist, identifying points to achieve required sustainability goals at HSR stations and maintenance facilities, as delineated in TM 0.1.1. Provide brief summary documenting major sustainability opportunities per preliminary design for eligible facilities, and attach checklist as an appendix.

List of Attachments *(as required)*

APPENDIX B – INTEGRATION OF SYSTEMS DESIGN WITH REGIONAL CONSULTANTS

Background

The PMT Systems Group will lead the preliminary engineering Systems design in order to more efficiently establish an appropriate system site definition for inclusion in the program's environmental assessment and regulatory permitting, and preliminary design for use in preparation of procurement documents. The RC will develop the site-specific civil/infrastructure design for the Systems facilities based on locations determined in conjunction with the PMT.

General Approach

The Regional Consultants will provide existing site and design information, including base mapping, alignment alternatives, track plan and profile, property parcel data, survey, right-of-way, geotechnical, utility, environmental envelope, systems sites locations (if available) and other information to PMT in hardcopy and softcopy suitable for importing into and manipulating within a GIS software tool.

The RC shall deliver data suitable for import into ArcGIS.DGN format and Google Maps KMZ format (in correct state plane coordinate system and project datum), showing the latest versions of the elements below (as available and applicable to the route section):

- Color coded (differentiating at-grade, tunnel, trench, aerial) alignment alternatives (including horizontal and vertical alignment data)
- Systems sites, site alternatives and access roads
- Maintenance facilities, passenger stations, tunnel portals and other facilities
- Environmental Area of Potential Effect ("APE") and Environmental Envelope mapping
- Existing topography and proposed track grading
- 100-year floodplain with base flood elevation
- Utilities
- Property parcels
- Seismic Fault Lines

Updated data shall be provided on a monthly basis, as required, to reflect design revisions associated with the preliminary design.

PMT will locate systems sites and features, perform site visits, assess and develop site-specific conceptual site designs, as necessary. The Regional Consultant staff will participate in systems site visits and incorporate the conceptual site designs into the preliminary plans and environmental documents.

The Regional Consultant will retain responsibility for existing data, property research, cultural /historical and biological environmental assessments and surveys, access road routing, environmentally clearing PMT placed systems sites and features and conducting utility surveys.

The PMT will perform quantity takeoffs, unit costs and overall system costs for the capital cost estimates. The RC will develop civil/infrastructure quantity take offs.

The PMT will attend RC progress and coordination meetings during the design development period.

Specific Direction for Systems Preliminary Engineering for Project Definition

The task numbers are based on the Regional Consultant WBS

Task 4.2 Systems

Task 4.2.1 Traction Power System (TPS)

A. The RC will develop and produce the relevant alignment background mapping, property maps and plan and profile designs showing track and infrastructure details.

B. RC shall transmit the above information to the PMT Systems engineering group.

C. The PMT/will perform TPF site identification work and/or verify sites previously identified by the RC. PMT will then identify conceptual site locations for TPF, WPC and HV interconnection sites on the plans, based on the design guidelines.

D. PMT will perform PEPD for the Systems site design elements (with subsequent confirmation at PE4P). PMT will transmit conceptual site locations to RC for incorporation into the plan sets.

E. RC will perform site design preliminary engineering to incorporate the conceptual locations of systems sites into the RC's design. The RC will identify precise site locations, alternatives and access on the plan sets based on RC's local knowledge and information gathered. The RC will also coordinate with adjacent sections to quantify and report TPF site spacing on key plans.

F. RC will conduct follow-up actions with respect to the identified sites. RC responsibilities include identification of property impacts, property to be acquired, access road routing to public road connection, utility and land use relocations, impacts on natural and cultural resources, community impacts and regulatory permit requirements, etc.

G. The RC will support field visits (nominally between In-Progress and Draft Submittal) for site identification with personnel, logistical planning, conceptual plans and data on property, utilities, environmental, etc. – obtained during design development. PMT comments to be addressed and incorporated in the Draft Submittal.

H. RC will conduct environmental and community investigations on the sites identified by the PMT and incorporate the sites into the design package, EIR/EIS documents and regulatory permits.

I. RC is required to coordinate the previous activities with the PMT to so that the identified sites will comply with engineering guidelines and are constructible.

Task 4.2.2 Public Utility Company (PUC) Connections

A. The PMT has identified major electric transmission lines to determine supply points along the CHSRS corridor. The PMT will perform coordination activities with Utilities to determine the needed facilities, the routing of HV lines to the TPF, and interconnection details.

B. PMT will determine footprint size and location for the utility switching station for interconnection adjacent to the railway TPF. PMT will determine sites and options in conjunction with the Utility

C. PMT will coordinate with the Utility to manage the engineering of the site plans including orientation of major components, access roads and clearance buffer zones routing of power lines overhead or underground from Utility grid substations/transmission network to the utility switching station and onto the traction substation, and the routing of 25 kV feeders from TPF to the track alignment in case of TPF.

D. PMT/Utility will perform PEPD (with subsequent confirmation at PE4P), and PMT will transmit the site information and easements for the routing of power lines and access for utility operations and maintenance to the RC for incorporation into the plan sets.

E. The RC will support field visits (nominally between In-Progress and Draft Submittal) for site identification with personnel, logistical planning, conceptual plans and data on property, utilities, environmental, etc. obtained during design development. PMT comments to be addressed and incorporated in the Draft Submittal.

F. RC will conduct follow up actions with respect to the identified sites. RC responsibilities include identification of property to be acquired, access road routing to public road connection, utility and land use relocations, impacts on natural and cultural resources, community impacts and regulatory permit requirements, etc.

G. RC will conduct environmental and community investigations on the sites identified by the PMT and incorporate the sites into the design package, EIR/EIS documents and regulatory permits.

H. RC to conduct field survey of overhead utilities located within or adjacent to the right-of-way and identify conflicts based on the OCS configuration in the area. As per current practice, the RC will coordinate with the utility owner to identify removal or relocation requirements and details and include in the design package.

Task 4.2.3 Overhead Contact System (OCS)

A. The PMT has developed clearance guidelines and standard configurations for the OCS, overhead bridge barriers, grounding and bonding of structures and other fixed elements, and horizontal and vertical dimensions of area required for OCS maintenance.

B. RC shall maintain OCS clearance requirements to existing and new structures as well as CHSRS infrastructure elements. As per current practice, the RC shall apply typical OCS configurations to bridge, tunnel, station and other cross-sections to demonstrate conformance with clearance requirements to infrastructure and other physical elements for typical OCS arrangements.

C. RC shall identify any non-conforming or atypical clearance areas and elements and provide this information to PMT. PMT will perform site specific design analysis and determine if any unique OCS configurations or arrangements are warranted and required. This type of analysis would typically be developed as part of the assessment and approval of a design variances for reduced clearances as requested by the RC.

D. PMT will provide RC with specific designs or design requirements where warranted. RC to apply the specific designs to cross-sections included in the design package. No separate specific submittal is required.

E. RC will identify the locations for typical overhead bridge protection barriers or screens into the preliminary design.

F. No specific OCS design submittal, arrangement drawings or layout plans are required from the RC.

Task 4.2.4 Trackside Services/Train Control System (TS/TCS)

A. The RC will, as per present practice, develop and produce the relevant alignment background mapping, property maps and plan and profile designs.

B. RC shall transmit the above information to the PMT Systems engineering group.

C. The PMT/ will perform TS/TCS site identification work or evaluate previously identified sites by the RC. PMT will then identify conceptual TS/TCS sites on these plans based on the design guidelines and coordination with the PMT's Operations, Maintenance and Safety groups.

D. Crossovers and Station turnouts will be based on alignment data and other information provided by the RC. Conceptual locations of train control houses, wayside cabinets, manholes, cable duct banks, towers, troughs, switches, gantries and other equipment will be determined by PMT. The RC will conduct engineering to integrate TS/TCS elements and sites into the design based on available/suitable land parcels, local knowledge and other information contained in the RC supplied alignment and mapping.

E. PMT will perform PEPD (with subsequent confirmation at PE4P). PMT will transmit site information to RC for incorporation into the plan sets.

F. The RC will support field visits (nominally between In-Progress and Draft Submittal) for site identification with personnel, logistical planning, conceptual plans and data on property, utilities, environmental, etc. – obtained during design development. PMT comments to be addressed and incorporated in the Draft Submittal.

G. RC will conduct follow-up actions with respect to the identified sites. RC responsibilities include identification of property to be acquired, access road routing to public road connection, utility and land use relocations, impacts on natural and cultural resources, community impacts and regulatory permit requirements, etc.

H. RC will conduct environmental and community investigations on the sites identified by the PMT and incorporate the sites into the design package, EIR/EIS documents and regulatory permits.

I. RC is required to coordinate the previous two activities with the PMT so that identified sites will provide compliance with engineering guidelines, and are constructible with minimal environmental and community impact and minimal cost.

J. Generally separate TS/TCS plans will not be developed. Except for unique instances, TS/TCS related layout and site work will be shown on the civil plans.

Task 4.2.5 Communications (COM)

A. The RC will, as per present practice, develop and produce the relevant alignment background mapping, property maps and plan and profile designs.

B. RC shall transmit the above information to the PMT Systems engineering group.

C. COM radio towers and shelters are to be co-located with TPF, tunnel portal and train control master interlocking facility sites and will be placed independently as stand-alone radio sites (SRSs) at midpoint locations. COM sites (both co-located and SRS) are to contain a 100ft. radio tower, communications shelter and associated equipment.

D. The RC will identify and report to PMT spacing between co-located COM sites TPF, tunnel portal and train control master interlocking sites. PMT will then identify and conceptually place the SRS COM sites on these plans based on the design guidelines.

E. PMT will perform PEPD (with subsequent confirmation at PE4P). PMT will transmit site information on GIS background maps to RC for incorporation into the plans.

F. The RC will perform site design preliminary engineering to incorporate the conceptual locations of SRS into the RC's design. The RC will identify precise SRS site locations, alternatives and access for operations and maintenance on the plan sets based on RC's local knowledge and information gathered.

G. The RC will support field visits (nominally between In-Progress and Draft Submittal) for site identification with personnel, logistical planning, conceptual plans and data on property, utilities, environmental, etc. – obtained during design development. PMT comments to be addressed and incorporated in the Draft Submittal.

H. RC will conduct follow up feasibility actions with respect to the identified sites. RC responsibilities include identification of property to be acquired, access road routing to public road connection, utility and land use relocations, flight path analysis, impacts on natural and cultural resources, community impacts and regulatory permit requirements, etc. As part of the flight path analysis the RC shall use the FCC online tool TOWAIR to identify which antenna structures require FAA approval and FCC registration.

TOWAIR can be found at the following URL:

http://wireless2.fcc.gov/UlsApp/AsrSearch/towairSearch.jsp.

The Regional Teams shall use the following input data:

Latitude:	Site specific
Longitude:	Site specific
Measurement System:	Feet
Overall Structure Height:	105
Support Structure Height:	100
Site Elevation:	Site specific
Structure Type Selection:	MTOWER – Monopole

The Regional Teams shall report to the PMT whether a tower requires registration or does not require registration. This information, along with tower nomenclature and latitude and longitude shall be tabulated and included within each Regional Team's EIR/EIS document. Additionally, the TOWAIR output is to be captured electronically and transmitted to the PMT CADD team for convenient incorporation into a GIS tool.

I. RC will conduct environmental and community investigations (including visual simulations) on the sites identified by the PMT and incorporate the sites into the design package, EIR/EIS documents and regulatory permits.

J. RC is required to coordinate the previous two activities with the PMT to ensure sites are identified that will provide compliance with engineering guidelines, and are constructible with minimal environmental and community impact, and minimal cost.

K. Generally, separate communications plans will not be developed. Except for unique instances, communications related layout and site work will be shown on the civil plans including spacing between sequential radio towers (co-located and SRS).

APPENDIX C - PROJECT-LEVEL EIR/EIS DESIGN ACCEPTANCE DECISIONS

Purpose

The purpose of this guidance is to outline the California High-Speed Rail Program procedures for concluding the definition of high-speed rail (HSR) project alternatives for evaluation, disclosure, and mitigation of potential environmental impacts. Under Authority direction, the HSR Regional Consultant (RC) shall prepare materials, coordinate, conduct, and record the Authority, Federal Railroad Administration (FRA), and Program Management Team (PMT) acceptance of, and concurrence with the project description, preliminary design and footprint of HSR build alternatives for use in preparing the Draft EIR/EIS, and the recommended preferred alternative for use in preparing the Final EIR/EIS. The objectives of these formal decisions are to ensure:

- Consistency with Authority-approved technical requirements, right-of-way, construction, operations, and maintenance requirements
- Consistency with Authority-approved guidance and criteria for design and construction documents
- Appropriate geographic area required to determine the significance of direct and indirect impacts, permanent and temporary impacts, beneficial and adverse impacts of HSR improvements and activities, and non-HSR physical changes that are required for HSR implementation
- Adequate area to determine potential indirect impacts of implementing mitigation measures
- Adequate area to implement, operate, or maintain mitigation measures for off-site mitigation actions and mitigation sites (including relocations)

EIR/EIS Alternatives Design Acceptance Decision

Following the receipt of U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) concurrence on National Environmental Policy Act (NEPA)/Clean Water Act Section 404/Rivers and Harbors Act Section 408 Integration (NEPA/404/408 Integration) Checkpoint B (Range of NEPA Alternatives) for the HSR section, the RC will complete draft preliminary design plans and project description for use in preparing the Draft EIR/EIS analyses. The RC will prepare the Administrative Draft EIR/EIS Chapter 2 Alternatives (including the project description) and submit with the draft preliminary design plans for Authority, FRA and PMT review. The review will be conducted by the Authority, FRA and PMT engineering, right-of-way, and environmental staff. The review will consider, in part:

- Completeness and adequacy of the proposed project footprint for completing the EIR/EIS and environmental regulatory processes that are based upon information and actions associated with the EIR/EIS
- Sufficient project footprint and range of alternatives to encompass anticipated identification of a preferred alternative and a preliminary least environmentally damaging practicable alternative (LEDPA)
- Sufficient project footprint to accommodate project refinement through final design and specification for construction documents

The RC will subsequently address Authority, FRA and PMT comments, then prepare and submit a final version of the preliminary plans, project description, and Administrative Draft Chapter 2 to the Authority for final administrative review and acceptance. Once accepted by the Authority, the RC can then proceed with environmental evaluation and documentation for the Draft EIR/EIS using the approved descriptions and footprints of project alternatives. Following final administrative acceptance of, and concurrence with, the approved project description, design, and footprint of the EIR/EIS build alternatives, **the RC shall identify and submit for approval all activities associated with preliminary project design which could alter the project footprint, accentuate environmental impacts evaluated in the Draft EIR/EIS, or lead to environmental impacts that were not evaluated in the Draft EIR/EIS**.

Final EIR/EIS Preferred Alternative Design Acceptance Decision

Following public circulation and the receipt of comments on the Draft EIR/EIS, the RC may refine the preliminary design plans and project description to prepare a recommended preferred alternative for administrative review by Authority, FRA and PMT staff. Any refinement of the preliminary design plans and project description must be accomplished within the project footprint approved for environmental evaluation and documented in the published Draft EIR/EIS. Any refinement of the preliminary design plans and project description shall not introduce a new direct, indirect, or cumulative significant impact (under CEQA and NEPA). As part of preparing a recommended preferred alternative, the RC must also:

- Refresh or re-analyze time-based data (e.g., Environmental Justice American Community Survey ridership forecasts) or characteristics of the affected environment (e.g., Section 4(f) or Section 6(f) conditions) that have changed since the Draft EIR/EIS was prepared
- Revisit previous capital and operational cost estimates to determine content for Checkpoint C and the Final EIR/EIS, and prepare an explanation of changes between the Draft EIR/EIS, the Checkpoint C, and the Final EIR/EIS cost estimates
- Consider the adequacy of preliminary project design and specifications, as required, for completing the EIR/EIS and environmental regulatory processes that are based upon information and actions associated with the EIR/EIS

Review of the recommended preferred alternative will be conducted by Authority, FRA and PMT Engineering, Right-of-Way, and Environmental staff. The RC will subsequently address Authority, FRA and PMT comments and produce a final version of the preliminary project design and project description for use in preparing the decision-support documents for identification of the preferred project alternative by the Authority Board of Directors, NEPA/404/408 Integration Checkpoint C concurrence (identification of the Preliminary LEDPA), and preparation of the Final EIR/EIS. The RC will submit the final version of the preliminary project design and project description to the Authority, FRA and PMT for final review, acceptance, and concurrence signatures (see attached signature page template). Once the signature process is completed, the RC can then proceed using the approved preliminary project design, project description, and footprint for completing the preferred alternative identification, Checkpoint C concurrence, the Final EIR/EIS, and the design baseline report. **Following final administrative acceptance of, and concurrence on, the approved preliminary project design, project description, and footprint, the RC shall document and submit for approval all activities associated with preliminary project design** which could alter the project footprint, accentuate environmental impacts evaluated in the Draft EIR/EIS, or lead to environmental impacts that were not evaluated in the Draft EIR/EIS.

ATTACHMENTS

Project Design Acceptance Decision Signature Page Template

California High-Speed Rail Program

PROJECT DESIGN ACCEPTANCE

☐ **Draft EIR/EIS Alternatives**
☐ **Final EIR/EIS Alternatives**

PMT Regional Environmental Manager	Date
PMT Regional Manager	Date
PMT Director, Program Delivery	Date
Authority Regional Project Manager	Date
Authority Director of Environmental Services	Date
Authority Regional Director	Date
Chief of FRA Environmental Division	Date

PARSONS BRINCKERHOFF

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March 12, 2015

PMT-CHSRA-04924

Mr. Jeff Morales
Chief Executive Officer
California High-Speed Rail Authority
770 L Street, Suite 800
Sacramento, CA 95814

Attn: Mr. Frank Vacca, Chief Program Manager

Re: Request for Authority review and concurrence of TM 0.1 - Preliminary Engineering for Project Definition, Revision 4

Dear Mr. Morales:

TM 0.1 Preliminary Engineering for Project Definition, Rev. 4 is enclosed for your review and concurrence. This document, formerly issued as TM 0.1 - 15 % Design Scope guidelines, has been renamed as Preliminary Engineering for Project Definition, and has added a new Bridges and Elevated Structures Scope and Design Acceptance Procedure.

This Technical Memorandum (TM) defines the scope for the minimum level of engineering effort, referred to as Preliminary Engineering for Project Definition (PEPD), required to support the project-specific EIR/EIS process.

The PEPD defines design elements, development level, and engineering outputs with the objective of providing a consistent approach in developing preliminary engineering documents to a level that supports the identification of an inclusive environmental envelope - horizontal, vertical and temporal, adequate environmental consequence analyses, permitting, coordination of utility relocation and extension, right-of-way acquisition, and promotes and supports compliance with applicable state and federal regulations.

This TM identifies the design elements to be addressed, the level of design effort, and the engineering outputs as part of the project's conceptual design in support of the project-level environmental review.

This revision of TM 0.1 includes changing the term "15% Design" to "Preliminary Engineering Design." Henceforth, when reading other technical memoranda and Authority documents, any reference to 15% design should be read as "Preliminary Engineering Design."

The change in terminology is to better communicate that the purpose of the preliminary engineering is to define a minimum level of engineering and planning for construction, operation and maintenance required to support the project-specific EIR/EIS process, inclusive of an accurate horizontal and vertical environmental envelope that contains probable impacts, adequate environmental consequence analyses, permitting, impacted areas for utility relocation and extension, HSR and adjacent property access, collaboration with agencies and other stakeholders over HSR and consequential actions, right-of-way acquisition, and compliance with applicable state and federal regulations.

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If this meets with your requirements, please sign below acknowledging your concurrence for adoption and use on the program.

Sincerely,

James R. Van Epps

James R. Van Epps
Director, Program Management Team

Attachments: TM 0.1 Preliminary Engineering for Project Definition, Revision 4

California High-Speed Rail Authority Concurrence

Frank Vacca, Chief Program Manager

Date: 3/16/2015