

Top 5 Near-Term Risks	Severity*	Mitigation Actions
ROW acquisition delays or failure to acquire ROW impacts construction operations	P I	<ul style="list-style-type: none"> Joint work with the contractor(s) to potentially re-sequence or accelerate work as necessary based on parcel availability Established a settlement team to focus on high priority construction parcels Executed Purchase Agreements for parcels required for CP 1 and made substantial progress for CP 2-3
Additional costs associated with railroad intrusion protection	P I	<ul style="list-style-type: none"> Working cooperatively with railroads to identify engineering solutions for mitigating the adjacency issues within Construction Package 1 and Construction Package 2-3 Intrusion Protection barrier - Transmitted draft Intrusion Barrier Assessment report recommending design forces to FRA, Volpe, UPRR and BNSF and received comments and working on issuing final report. Transmitted white paper to BNSF on strategies for use of earthen berms as intrusion protection
Additional costs of requirements needed for railroad operations and delays associated with agreements, design exceptions (clear-span of property), review and approval, or other issues during construction (lack of flaggers)	P I	<ul style="list-style-type: none"> Executed agreements with UPRR & SJVR and finalized template for grade separation agreement required with UPRR for CP 1 and working with UPRR to identify necessity of the requested betterments and mitigate the impact of HSR construction on UPRR operations at the lowest possible costs Finalized templates for Relocation and Construction, Purchase and Sales and Grade Separation agreements with BNSF Final agreements will be signed at 100% design of grade separations, rail realignment and intrusion protection structures
Additional costs of utility relocations attributable to late transfer of utility work to DB and potential for as-yet unidentified utilities.	P I	<ul style="list-style-type: none"> Value Engineering to make utility relocation designs more cost-effective Thorough review of DB utility cost proposals and compare against competitive market estimates Recommended a contingency increase of \$150M to account for relocations of unidentified utilities on the CP1 contract
Delays in obtaining environmental clearance for Central Valley Interconnections and Heavy Maintenance Facility	P I	<ul style="list-style-type: none"> Coordinating with PG&E on electrical interconnections and upgrades Field work on biological and cultural resources to assess potential environmental impacts Decide on environmental clearance approach for HMF







*Note: P – Probability of occurrence; I – Potential Impact of the risk



Source: Adapted from Section 9 - Risk Management of the CHSRA DRAFT 2016 Business Plan issued on February 18, 2016, Finance & Audit Committee March 2016 Operations Report and CHSR Program Risk Assessments

High Medium Low

Top 5 Long-Term Risks	Mitigations
Environmental Approvals	<ul style="list-style-type: none"> Implemented a number of identified federal and state environmental clearance strategies to achieve Notices of Determination (NOD)/Records of Decision (ROD) timelines Increased the Authority's and contractors' environmental resources Worked with the FRA and resource agencies to assign sufficient resources for environmental approval processes Currently implementing project permitting strategies on parallel tracks
Financing and Funding	<ul style="list-style-type: none"> Secured a long term continuous funding stream of proceeds from the Greenhouse Gas Reduction Fund Continue to identify all necessary sources for the \$6 billion cost of the first construction segment in the Central Valley Continue to review and adjust scope of work over multiple phases to fit within available funding Advancing work with lenders and investors to accelerate private sector participation and get to operations early Continue to actively manage the construction projects and other expenditures to ensure that all federal funds are spent before their deadline
Third Party Agreements	<ul style="list-style-type: none"> Executed several agreements with railroads in the Central Valley that will serve as a basis for other regions Collaborating with utilities and the FRA for early identification of any potential Buy America issues, and negotiations are continuing on agreements to resolve remaining issues Managing utility design and construction requirements, and finalizing all cooperative utility agreements, in coordination with the affected utility companies Changing utility work to be under the control of the design-build contractor to allow for better scheduling and control by the contractor to prevent delays and utilizing value engineering to make utility relocation designs more cost-effective Thoroughly reviewing contractor utility cost proposals and comparing against competitive market estimates
Right-of-Way	<ul style="list-style-type: none"> Assigned a dedicated ROW program manager charged with strategic planning, identifying & addressing procedural bottlenecks Secure adequate funding and staffing with appropriate skills to process the volume of acquisition in a timely manner
Engineering and Environmental challenges associated with tunnels in mountainous terrains - Design, constructability and commercial challenges; Groundwater resources; & Geotechnical investigation (GI)	<ul style="list-style-type: none"> Complete preliminary Hazard Analysis on tunneling, ventilation and geotechnical risks Continue to explore provisions to cross active faults on at-grade alignments where practical or crossing faults in underground structures with seismic fault chambers that accommodate shifts in track alignment Employ design solutions such as pre-excavation grouting to control of groundwater inflows and establish a groundwater resource monitoring program Established a geotechnical steering committee to review and make recommendations for work and move forward with GI in the mountainous regions to support environmental analyses and confirm feasibility.

Note: The probability and impact of these risks are dependent on decisions and policy that the Authority has not yet settled. Therefore, it is too early to include a severity column.
Source: Section 9 - Risk Management of the CHSRA DRAFT 2016 Business Plan issued on February 18, 2016

	Construction Package 1	Construction Package 2-3
Award Value (Original Contract)	\$1,022,988,000	\$1,394,567,890
Cost (Remaining Contingency / Remaining Contract Value)	 Feb. Report <u>17.7%</u> Mar. Report ¹ <u>17.5%</u>	 Feb. Report <u>20.4%</u> Mar. Report ¹ <u>21.0%</u>
Schedule Performance Index (Earned Value / Planned Value)	 Feb. Report <u>0.31</u> Mar. Report ¹ <u>0.31</u>	 Feb. Report <u>1.00</u> Mar. Report ¹ <u>1.00</u>
ROW Acquisition (Actual ROW Spend / ROW Budget)	 Feb. report was at 69% of budget. Mar. report is at 76% of budget. (Actual ROW Spend \$262M / ROW Budget \$344M = 76%)	 Feb. report was at 27% of budget. Mar. report is at 32% of budget. (Actual ROW Spend \$83M / ROW Budget \$257M = 32%)

	ARRA Status	
	FY 2015-16	2010-2017
ARRA Burn Rate Indicator (ARRA Paid to Date + Pending FRA Approvals + Accruals / ARRA Grant Forecast)	 Mar. Report <u>67%</u> of the FY 15-16 forecast has been spent with 58% of the Fiscal Year gone by	 Mar. Report ² <u>41%</u> of the Total ARRA Grant has been spent with 76% of the grant term gone by

1 Metrics are from the February-2016 and March-2016 CA High-Speed Rail Board Reports

2 The ARRA funds were awarded to first allow the program to proceed through environmental approvals, preliminary design and proceed to construction, which is what has happened. Those early stages have significantly lower expenditure rates than construction, so expenditures could never have proceeded on a straight line, but would accelerate in the later stages of the grant period. With the construction activities of CP1 currently expanding, CP2-3 design accelerating and the execution of CP4, as well as other grant eligible activities, the Authority has planned for the bulk of ARRA expenditures to be loaded toward the end of the grant term. The ARRA funds will be expended in line with the grant terms and the Authority is on track to fully expend the ARRA appropriations.

Cost (Remaining Contingency / Remaining Contract Value)

- The goal is to contain the contingency in the range of 10-20%. As per Federal Transit Administration guidelines, cost for contingency should be in the range of 10% to 20% of construction cost during the 15% - 30% Preliminary Design Report.

- CP1: The Remaining Contingency = [Current Allocated Contingency Amount] - [Executed Change Orders Affecting Contingency] = \$146,025,117

The Remaining Contract Value = [Revised DB Contract Amount] - [Authority Approved Invoices to Date] = \$843,373,569

- CP2-3: The Remaining Contingency = [Current Allocated Contingency Amount] - [Executed Change Orders Affecting Contingency] = \$260,445,037

The Remaining Contract Value = [Revised DB Contract Amount] - [Authority Approved Invoices to Date] = \$1,241,452,863

- The updated Construction Package 1 (CP1) cost risk analyses performed by the Authority's Risk Management Program indicates a negative trend with respect to three particular cost risks. These cost risks relate to intrusion protection and other requirements requested by the adjacent railroads and ROW acquisition. The updated cost risk analysis indicates that there is the potential of exceeding the current contingency envelope for the CP1 contract if risk mitigation actions are not undertaken. The Authority's Risk Management Program is working in concert with Program Delivery and the Rail Delivery Partner (RDP) to identify and implement risk mitigation strategies and potential savings. Mitigation involves such strategies as considering alternative design and construction approaches not only on CP1 but program-wide as well. Mitigation alternatives and cost analyses are ongoing and will be addressed in the draft 2016 Business Plan, currently under development.

Schedule Performance Index (SPI) (Earned Value / Planned Value)

- The goal is to achieve SPI ≥ 1, which is same as ≥ 100% when expressed in percent.

- Benchmark: As per guidelines by PMI (Project Management Institute, World Wide) the SPI should be ≥ 1 or 100%. At a value of 100% the Project is forecasted to complete on-time. Earned Value (EV) = Percent Complete x BAC (Budget at Completion); PV= Planned Value; SPI measures how the contractors are tracking to the cost based schedule. For example, a project has been going for 3 months, and the budget is \$100/mo, or \$300 total. If, for the 3 months the contractor has done \$150 worth of work, then the Earned Value = \$150, the Planned Value = \$300, and the SPI = \$150/\$300 = 0.50.

- CP1: Due to the delay in starting substantial construction activities, the Contractor's earned value is lagging behind the planned value. This metric will improve as the Contractor continues to increase construction and the value of their monthly invoices increases. Continued advancement of the deliverables necessary to commence substantial construction will increase the value of the Contractor's work and subsequently this metric will improve.

- CP2-3: Currently on schedule.

ROW Acquisition (Actual ROW Spend / ROW Budget)

- ROW Acquisition is calculated as follows: (Actual ROW Acquired + Actual Preliminary ROW / Regular ROW Budget + Preliminary ROW Budget)

- CP1: The total number of CP1 parcels needed for delivery has changed (542 to 728) over time due to design-builder design refinements, estimates based on 15% designs, and public parcels transfer agreements. (Actual ROW Spend + Actual Preliminary ROW/ROW Acquisition + Merced-Fresno Preliminary ROW Budget) = \$262M / \$344M = 76%

- CP2-3: The "Plan" numbers have been developed as a placeholder until acquisition plan with Design Builder is finalized. Rebaselining should occur in 1st Quarter of 2016; Actual ROW Spend + Actual Preliminary ROW / ROW Acquisition + Fresno-Bakersfield Preliminary ROW Budget) = \$83M / \$257M = 32%

ARRA Burn Rate Indicator (spending versus target to spend by deadline) for FY 2015-16, and 2010 to 2017

- The FY2015-16 ARRA burn rate calculation is as follows: (ARRA Paid from July 2015 to Jan 2016 \$347M + Pending FRA Approvals as of 1/31/2016 \$93M + Accruals as of 1/31/2016 \$68M / ARRA FY15-16 Forecast \$761M) = \$508M/\$761M = 67%

- The 2010-2017 ARRA burn rate calculation is as follows: (ARRA Paid to Date from 2010 to 1/31/2016 \$888M + Pending FRA Approvals as of 1/31/2016 \$93M + Accruals as of 1/31/2016 \$68M / ARRA Grant Total \$2,553M) = \$1,049M/\$2,553M = 41%

- The forecast is from the December-2015 Funding Contribution Plan for budget year FY 2015-16 which is July 1, 2015 - June 30, 2016.

- The ARRA grant period is from July-2010 to September-2017. As of 1/31/2016, the Authority is 76% through the grant period.

- ARRA spending is accelerating due to the ongoing acquisition of Right of Way and as construction continues to increase.