










Top 5 Near-Term Risks	Severity*	Mitigation Actions
ROW acquisition delays or failure to acquire ROW impacts construction operations		<ul style="list-style-type: none"> Partner with the contractor(s) to potentially re-sequence or accelerate work as necessary based on parcel availability (IP) Settlement team established to focus on high priority construction parcels, team reviews ongoing (C) Continuous monitoring to identify and resolve delivery bottlenecks (IP)
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)		<ul style="list-style-type: none"> Assessed risks related to the railroad scope of work and recommended risk overlays to Railroad budgets (C) Signed Relocation & Construction, Purchase and Sales agreements with BNSF (C) Finalized templates for Grade Sep. agreement and execute final agreements with railroads at 100% design of grade separations and rail realignments (IP) Working with railroads to identify necessity of the requested modifications & mitigate the impact of HSR construction on railroad operations at the lowest possible costs (IP)
Additional costs associated with railroad intrusion protection		<ul style="list-style-type: none"> Identified engineering solutions for mitigating the adjacency issues within CP I and CP 2-3 projects (IP) Directives have been issued to all contracts for intrusion barrier design and pier protection required for Type II structures. Revised directives are in progress to incorporate the agreed engrg. solutions for Type I structures (IP) Intrusion Protection barrier - Transmitted draft Intrusion Barrier Assessment report recommending design forces to FRA, Volpe, UPRR and BNSF, received comments and issued final report for appendix to BNSF agreement (C)
Additional costs of utility relocations attributable to late transfer of utility work to DB and potential for as-yet unidentified utilities		<ul style="list-style-type: none"> Revised construction estimates based on revised utility conflict matrix and performed a risk overlay to account for relocations of unidentified utilities on the CPI contract (C) Performing value engineering to make utility relocation designs more cost-effective (IP) Thorough review of DB utility cost proposals and compare against competitive market estimates (IP)
Delays in obtaining environmental clearance for re-examinations performed as a result of design refinements or agency decision to refine supplemental EIRs/EISs		<ul style="list-style-type: none"> Conducting workshops with the Federal Railroad Administration and the Design-Build team to review re-examinations and early decision on course of action (IP) Developed and are using a 1-step or 2-step re-examination process to expedite the less complicated project changes and allow FRA to focus its attention on more complicated ones (C) Mitigating impacts to natural resources - Received agreement from agencies that ditches, canals and detention basins are mitigated in place; therefore no compensatory mitigation required (C)

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

Mitigation Actions: **IP** – In Progress; **C** – Complete

 Very High  High  Medium  Low  Very Low

Source: Adapted from Section 9 - Risk Management of the CHSRA 2016 Business Plan issued on May 1, 2016, F&A Committee March 2016 Operations Report and CHSR Program Risk Assessments

Top 5 Long-Term Risks	Current Mitigations
Environmental Approvals	<ul style="list-style-type: none"> Continue identifying & implementing federal and state environmental clearance strategies and process improvements to achieve Notices of Determination (NOD)/Records of Decision (ROD) timelines (IP) Increased the Authority's and contractors' environmental resources and worked with the FRA and resource agencies to assign sufficient resources for environmental review & approval processes; staffing agreements underway in various stages of execution (IP) Begin working with the FRA to increase its staff resources to expedite environmental impact and reviews (IP) Currently implementing project permitting strategies on parallel schedules with EIRs/EISs (IP)
Financing and Funding	<ul style="list-style-type: none"> Continue to identify all necessary sources of funding for the Valley-to-Valley segment (IP) Continue to review and adjust scope of work over multiple phases to fit within available funding (IP) Continue to actively manage construction projects and other expenditures to ensure that all federal funds are spent before their deadline (IP)
Third Party Agreements	<ul style="list-style-type: none"> Reached agreement on the General Order, pending adoption by the CPUC that resolves design and coordination with the utilities (C) 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 (IP) Managing utility design & construction requirements, & finalizing all cooperative utility agreements, in coordination with the affected utility companies utilities to develop early understanding of scope, cost and schedule of relocations (IP)
Right-of-Way	<ul style="list-style-type: none"> Secure adequate funding and staffing with appropriate skills to process the volume of acquisition in a timely manner (IP) Procuring additional ROW engineering and survey support services to develop appraisal mapping for ROW parcels for the Avenue 19 in Madera to San Jose segment (IP) ROW Division working with teams developing new segment alignments to evaluate costs and minimize complex parcels that require longer acquisition schedule (IP) Clearing additional width along corridors to reduce secondary ROW acquisitions from same owners resulting from design changes / refinements (IP)
Engineering and environmental challenges associated with tunnels in mountainous terrains - design, constructability, commercial, groundwater resources, & geotechnical investigation (GI)	<ul style="list-style-type: none"> Complete the Steering Committee's risk tree evaluations and develop recommendations on tunneling, and ventilation (IP) 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 (IP) Accelerate permissions-to-enter (PTE) and geotechnical work in Northern California section (IP) Develop design criteria for tunnels and include more performance based specifications (IP) Develop a faster method to obtain early PTEs and start the process earlier (IP) Perform additional geotechnical investigations in advance to support procurement phase (IP)

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 2016 Business Plan issued on May 1, 2016 Mitigation Actions: **IP** – In Progress; **C** – Complete

	Construction Package 1	Construction Package 2-3	Construction Package 4
Award Value (Original Contract)	\$1,022,988,000	\$1,394,567,890	\$444,247,000
Cost (Remaining Contingency / Remaining Contract Value)	January Report 8.6% February Report ¹ 8.4%	January Report 23.0% February Report ¹ 23.3%	January Report 15.0% February Report ¹ 14.9%
Schedule Performance Index (Earned Value / Planned Value)	January Report .51 February Report ¹ .52	January Report 1.0 February Report ¹ .94	January Report .82 February Report ¹ .83
ROW Acquisition (Actual ROW Spend / ROW Budget)	January Report 86.2% February Report ¹ 92.1%	January Report 69.5% February Report ¹ 79.7%	January Report 17.8% February Report ¹ 20.4%

	ARRA Status	
	Performance to Forecast	Total Grant Performance
ARRA Burn Rate Indicator (ARRA Paid to Date + Pending FRA Approvals + Accruals / ARRA Grant Forecast)	February Report As of December 31, 2016, HSR has attained 102.2% of the ARRA forecast.	February Report ² Overall, 87.3% of the Total ARRA Grant has been spent as of December 31, 2016, with 89.4% of the grant term completed.

1 Metrics are from the Jan-17 and Feb-17 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 grant funds.

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 Phase.
- CP1: The Remaining Contingency = [Current Allocated Contingency Amount] – [Executed Change Orders Affecting Contingency] = \$71,811,519
 The Remaining Contract Value = [Revised DB Contract Amount] – [Authority Approved Invoices to Date] = \$853,735,846
- Right-of-way delay impacts through 12/31/2015 have been resolved with the Contractor in Change Order 00099, with the delay costs coming out of project contingency. The Remaining Contract Value has also increased due to added scope for the Northern Extension and previously excluded Third Party Utility relocations that are now delegated to the Contractor. Project contingency is being evaluated based on events to date and the work remaining. The Authority is preparing to transfer funds for the added scope into the CP1 budget and to reevaluate the appropriate level of contingency in light of the added scope and other factors. The Authority is also taking steps to improve right-of-way delivery to mitigate future delay impacts.
- CP2-3: The Remaining Contingency = [Current Allocated Contingency Amount] – [Executed Change Orders Affecting Contingency] = \$254,428,943
 The Remaining Contract Value = [Revised DB Contract Amount] – [Authority Approved Invoices to Date] = \$1,092,620,353
- CP4: The Remaining Contingency = [Current Allocated Contingency Amount] – [Executed Change Orders Affecting Contingency] = \$60,305,972
 The Remaining Contract Value = [Revised DB Contract Amount] – [Authority Approved Invoices to Date] = \$405,846,546
- Right-of-way delay impacts through 12/31/2015 have been resolved with the Contractor in Change Order 00099, with the delay costs coming out of project contingency. The Remaining Contract Value has also increased due to added scope for the Northern Extension and previously excluded Third Party Utility relocations that are now delegated to the Contractor. Project contingency is being evaluated based on events to date and the work remaining. The Authority is preparing to transfer funds for the added scope into the CP1 budget and to reevaluate the appropriate level of contingency in light of the added scope and other factors. The Authority is also taking steps to improve right-of-way delivery to mitigate future delay impacts.

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.

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 (CP1ABC+CP1D) parcels needed for delivery has changed (542 to 876) over time due to design-builder design refinements, estimates based on 15% designs, and public parcels transfer agreements. (Actual ROW Spend \$452.8M + Actual Preliminary ROW \$8.8M / ROW Acquisition \$482.3M + Merced-Fresno Preliminary ROW Budget \$8.8M) = \$461.6M / \$501.1M = 92.1%
- CP2-3: The total number of CP2-3 parcels needed for delivery has changed over time (543 in March-16 to 572 in December-16) due to estimates based on 15% designs, and public parcel transfer agreements. (Actual ROW Spend \$199.7M + Actual Preliminary ROW \$15.5M / ROW Acquisition \$254.9M + Fresno-Bakersfield Preliminary ROW Budget \$15.5M) = \$215.3M / \$270.4M = 79.7%
- CP4: (Actual ROW Spend \$25.6M / ROW Acquisition \$125.5M) = 20.4%

ARRA Burn Rate Indicator: Performance to Forecast and Total Grant Performance

- The ARRA Performance to Forecast as of December 31, 2017 is from the December-2012 FCP. The Total ARRA Grant Performance is from July-2010 to September-2017. The Authority is 89.4% through the grant period as of 12/31/2016.
- ARRA spending is increasing due to the ongoing acquisition of Right of Way and as construction continues to increase.
- The Performance to Forecast (2010- December 31, 2016) ARRA Burn Rate calculation is as follows:
 (ARRA FRA Paid Invoices to Date from 2010 thru 12/31/2016 \$1,939.5M + FRA approved invoices not yet paid as of 12/31/2016 \$33.6M + Drawdowns Pending FRA Approvals as of 12/31/2016 \$9.9MM + Accruals as of 12/31/2016 \$246M / ARRA forecast \$2,180.0) = \$2,229.0M/\$2,180.0M = 102.2%
- The Total Grant Performance (2010-2017) ARRA Burn Rate calculation is as follows:
 (ARRA FRA Paid Invoices to Date from 2010 thru 12/31/2016 \$1,939.5M + FRA approved invoices not yet paid as of 12/31/2016 \$33.6M + Drawdowns Pending FRA Approvals as of 12/31/2016 \$9.9MM + Accruals as of 12/31/2016 \$246M / ARRA Grant Total \$2,553M) = \$2,229.0M/\$2,553M = 87.3%