California High-Speed Rail Peer Review Group

August 14, 2013

The Honorable Darrell Steinberg
Senate President Pro Tem
State Capitol Building
Room 205
Sacramento, CA 95814

The Honorable John Perez
Speaker of the Assembly
State Capitol Building
Room 219
Sacramento, CA 95814

The Honorable Bob Huff
Senate Republican Leader
State Capitol Building
Room 305
Sacramento, CA 95814

The Honorable Connie Conway
Assembly Republican Leader
State Capitol Building
Room 3104
Sacramento, CA 95813

Dear Honorable Members:

SB1029 passed by the Legislature in July of 2012 required the California High-Speed Rail Authority (Authority) to make a number of changes or additions to its existing analytical work for incorporation in the 2014 Business Plan and later plans. Specifically:

- Section 8, para. 8 required the Authority to develop a comprehensive risk management plan.
- Section 8, para. 9 required the authority to develop a proposed approach to improving demand projections, the operations and maintenance (O&M) cost model and benefit-cost analysis as applied to future project decisions. It also required that the Authority make available a study conducted by the Union Internationale des Chemins de Fer (UIC) that assessed the applicability of European Union HSR techniques and methods to potential operations and maintenance practices in California. These were to be "...based on

recommendations of the authority's peer review panel, advice from the international rail community and academic review." The Peer Review Group (Group), in our review of the Revised 2012 Business Plan, strongly urged these improvements as well.

- Section 8, para. 10 required the Authority to prepare and submit an analysis of the "net impact of the high-speed rail program on the state's greenhouse gas emissions."

The Peer Review Group met with the Authority on July 9, 2013 to discuss the Authority's progress against these requirements as outlined in a series of presentations that are listed below and available on the PRG's website at www.cahsrprg.com. We would like to thank the Authority for the effort involved in preparing these presentations and we recommend that the Legislature review them with care. Each of the topics will be discussed separately below, but we do have some summary observations.

We believe that the Authority has made manifest progress in all areas of planning and management since the Revised 2012 Business Plan. This assessment applies to risk management, demand forecasting, operating and maintenance (O&M) cost modeling and the analysis of the impact of HSR on California's greenhouse gas emissions.

We particularly compliment the inclusion in all of the upcoming financial and economic analyses of probabilistic assessments based on Monte Carlo simulation techniques so that future reports will more accurately report the range and likelihood of potential outcomes. The Authority also expects to incorporate their cost experience in real time at every stage so that future plans will more and more be based on results rather than expectations. As noted by the U.S. GAO, the Authority's steps to take uncertainty into account are appropriate for this stage in the project. With this said, we also emphasize that essentially all of the Authority's plans and budgets so far necessarily remain based on estimates rather than experience, causing all of the plans to have a wider range of uncertainty than might be the case 5 to 10 years from now.

We would also like to stress the need to evaluate the Authority's near-term plans against the actual **decisions** that will be made based on them. Most of the relevant policy and budgeting decisions through completion of the Central Valley work and the two "bookends" have now been made. The 2014 Business Plan will have little relevance to these decisions unless it should contradict the Revised 2012 Business Plan in some major way, which seems unlikely. The next major decision to be made – whether and when to proceed with the link from Bakersfield to the San Fernando Valley (IOS South) starting with closing the gap between Bakersfield and Palmdale – will happen after the 2014 Business Plan. From this perspective, the 2014 Business Plan is an interim document that should focus on improving analytical methods and input information, especially demand surveys and construction experience gained, with the objective of leading to later Business Plans that would provide much better support for the next real decisions.

To make this point a different way, the new management of the Authority, upon taking over the development of the 2012 Business Plan, simply did not have the time to deal adequately with a number of well-known criticisms (especially the lack of good demand survey data, but also the

comments of its own Peer Review Panel) that were on the table. Our positive assessment above is based on the expectation that the Authority's plans will be implemented as discussed in the July 9th meeting. Though some improvements will be incorporated in the 2014 Business Plan, the time and resources **are** available in the 2016 and subsequent Business Plans to fix the problems discussed. We are encouraged by their progress so far but want to highlight the importance of continued development.

Our comments on the presentations are below. Please let us know if you have any questions or need clarification on any of the discussion in this letter.

Sincerely,

Louis S. Thompson
Chairman
California High-Speed Rail Peer Review Group

cc: Hon. Mark DeSaulnier, Chair, Senate Transportation and Housing Committee
Hon. Ted Gaines, Vice Chair, Senate Transportation and Housing Committee
Hon. Bonnie Lowenthal, Chair, Assembly Transportation Committee
Hon. Eric Linder, Vice Chair, Assembly Transportation Committee
Brian Kelly, Acting Secretary, Department of Business, Transportation and Housing
Mac Taylor, State Legislative Analyst
Ken Alex, Director, Governor's Office of Planning and Research
Dan Richard, Chair, California High-Speed Rail Authority
Jeff Morales, Chief Executive Officer, California High-Speed Rail Authority
Members, California High-Speed Rail Peer Review Group

Comments on the presentations

Risk Management. Documents: "Program Risk Management Plan, June 5, 2013" prepared under the Authority's direction by Parsons Brinckerhoff in June 2013 and the "Update to Peer Review Group of work in progress on Risk Management" presentation.

The Program Risk Management Plan appears to be a thorough and well developed summary of the current state of the art in identifying risk issues and methods for dealing with them. The Risk Management presentation, given by Jon Tapping, the Authority's new risk manager, is a professional summary of the principles of the risk management planning, including use of probabilistic methods to assess degrees of risk and calculation of the most cost effective methods of managing risk.

The Authority's risk management plan is being implemented, building upon and refining work that has been ongoing for a number of years. The Group's primary comments were that it will be a major continuing task to **implement** the approach described in the manual and presentation, especially because the organization will be under increasing day-to-day stress as work gets underway and long-terms plans are confronted with immediate problems. In addition, risk management requires a disciplined effort to update the information in the system so that future plans benefit from actual experience: this will again require attention from management. Risk management also requires focused leadership within the organization to ensure proper attention and a common approach. Finally, risk management is an issue of corporate culture more than simply data collection and reporting. The entire organization will need to be encouraged to identify risks and develop solutions; senior management cannot do this by itself.

Ridership and Revenue Modeling and Forecasts. Document: "Update to Peer Review Group of work in progress on Ridership and Revenue Modeling and Forecasts," presented by Thierry Prate of Parsons Brinckerhoff.

Ridership and revenue forecasting has undergone significant development in preparation for the 2014 Business Plan. In accord with a range of comments received, with particular emphasis on comments received from the Authority's demand forecasting Peer Review Panel, The Authority now plans to approach demand forecasting in three "Versions." Version 1 was used to develop the forecasts used up through the Revised 2012 Business Plan. Version 2 will be used for the 2014 Business Plan, and Version 3 will be the basis for Business Plans beyond 2014 and specifically for use in making the IOS South decision.

Version 2 will incorporate as many of the changes recommended by the Peer Review Panel as can be included within the time available. It will also make the transition to presenting the outcome in probabilistic terms rather than the "Low, Medium, High" approach in previous plans. We note that Version 1 produced lower forecasts than prior work. With the changes planned, Version 2's probabilistic approach will give a clearer picture of the range of potential outcomes. Given that the 2014 Business Plan will not be used to support major new investment decisions, the changes planned for Version 2 appear adequate for current needs.

Good demand and revenue forecasts are the central issue of planning and justifying any project. This means that getting Version 3 right by continuing to refine the forecasts will be critical. Version 3 may incorporate some additional changes in analytical approach, but the major change will be the collection and use of much better survey data defining the California travel market. The need for better input data has long been recognized as a weakness in the demand forecasting. The Group understands that the Authority has initiated a large data gathering effort to support Version 2 and Version 3 modeling, an effort that we support. This effort includes incorporation of the new California Household Survey, which is a large new set of data and survey results from Caltrans. We urge the Authority to ensure that the data gathering effort receives the highest priority.

Train Performance Calculation and Trip Time Analysis. Documents: "Phase I Blended Travel Time," a memo from Frank Vacca to Jeff Morales dated February 2, 2013, and presentation entitled "Update to Peer Review Group of work in progress on Train Performance Calculation (TPC) Trip Time Analysis," presented by Frank Vacca.

Section 2704.09 of AB 3034 (Prop. 1A) requires, in pertinent part, that "The high-speed train system ... shall be designed to achieve ... [m]aximum nonstop service travel times for each corridor that... shall not exceed ... (1) San Francisco-Los Angeles Union Station: two hours, 40 minutes ... (3) San Francisco-San Jose: 30 minutes. The authority has employed the Berkeley Simulation train performance calculator (TPC) model to establish the ability of the system to meet these mandatory goals.

The Group agrees that the "pure run time" for non-stop trains from San Francisco Trans Bay Terminal to LA Union Station has thus far been designed to be 2 hours, 32 minutes, and from San Francisco Trans Bay to San Jose has been designed to be 30 minutes. Subject to the accuracy of the input data on speeds, distances, grades, curvature, signaling and equipment characteristics, the model does produce usable results. The Authority believes that this "pure run time" is the metric that most accurately reflects the Proposition 1A requirement of the trip times that the system "shall be designed to achieve." With this said, however, the results are based on a number of assumptions that could be different from actual operating service travel times and that should be fully understood:

- The alignment of the system is still at the 15 percent design level, so the input assumptions about speed constraints may not fully reflect actual conditions. In addition, the rolling stock performance characteristics are still based on a generalized design, so actual performance may deviate (upward or downward) from the initial data. Moreover, the calculations assume that 220 mph operation through urban areas in the Central Valley and between Palmdale and Los Angeles will be acceptable to the local communities.

- "Pure run time" assumes perfect driver behavior whereas, in practice, drivers rarely accelerate or brake exactly as the model assumes. In addition, adverse weather, problems with passenger loading, minor mechanical failures, interference from other traffic and many other incidents cause systems to depart from perfection. Modern practice is to add six or seven percent to the designed, pure run time to recover from these typical deviations. The

Authority's proposed schedules on which the demand forecasts are based include such "pad" time allowances.

- Capacity simulations completed jointly by Caltrain and the Authority show that interactions between Caltrain and potential HSR schedules will produce an actual non-stop HSR run time from San Francisco to San Jose of 37 to 39 minutes during hours of normal operation (see "Caltrain/California HSR Blended Operations Analysis," March 2012, page 50). Again, we note that this is a different question than the TPC analysis of the minimum travel time that could be achieved based on the system's design parameters.

For all these reasons, it is unlikely that trains would actually be **scheduled** to run during normal hours of operation within the 30 minute or 2 hours 40 minute limits at the completion of the Phase I Blended system. The Authority's service plans, ridership forecasts and O&O cost estimates include allowance for these factors and assume longer operating travel times than the times that the system is being designed to achieve. The Authority believes this is consistent with the Proposition 1A requirements and the anticipation of various levels of services (e.g. express service, local service and other options). Of course, these system design targets could eventually be met if demand justifies the added investment in the San Francisco to San Jose area when the system is fully built out, although the Authority currently has no plans to complete dedicated tracks in the area. In the meantime, the primary requirement is that actual expected scheduled trip times be consistently employed in the demand forecasting models, which we understand to be the case. It will also be important to ensure that the TPC is kept up to date with alignment or other speed-related changes as the status of design evolves.

O&M Cost Modeling. Documents: "UIC Peer Review of Operating & Maintenance Costs of the California High-Speed Rail Project," Final Report, January 2013, untitled response of Authority to the UIC report, presentations "Update to Peer Review Group of work in progress on O&M cost modeling and projections," and "Update to Peer Review Group of work in progress on O&M Cost Risk and Monte Carlo Analysis," both presented by Frank Vacca.

The O&M cost modeling effort is much improved from the Revised 2012 Business Plan both in terms of the structure of the model and the incorporation of probabilistic analysis of the results. Since the O&M costs are as important as the demand and revenue forecasts in determining the financial and economic justification of the project, this work will greatly improve the confidence in the cost and financial projections. The PRG recommends that this effort be pursued. While the UIC analysis is quite useful, it is not fully based on methods, practices and cost levels typical of railways in the U.S. We believe the Authority should consider hiring an expert who can review the O&M cost modeling from the point of view of likely U.S. results.

HSR's Impact on Greenhouse Gas Emissions. Document: "Contribution of the High-Speed Rail Program to Reducing California's Greenhouse Gas Emission Levels," June 2013.

Though this subject was not discussed in detail at the meeting, we do want to highlight one aspect of the report. Overall, the projections of greenhouse gas emission reductions due to the planned operations of HSR are credible and within the limits projected by a number of studies.

From this starting point, however, the Authority has made two further commitments; first, the system will be operated with 100% renewable energy; and, second, the Authority assumes that the renewable energy will be generated from a mix of 20% solar, 40% wind, 35% geothermal and 5% biogas (see report, page 10).

We believe these should be understood as laudable **goals**, not fixed requirements. The current project does not include an allowance for the investment needed to construct and operate the necessary additions to generating and transmission capacity and there is no clear way that the Authority can ensure that the planned mix actually happens. We understand that the Authority's preliminary review of the responses to their Call to Industry showed that there is capacity available today from several renewable energy providers with properties in the state to meet the needs of the future system operator. Though this would not guarantee the exact mix described above, the Authority believes that the overall capacity required will be available. With this in mind, we recommend that the Authority consider sources and costs of electricity carefully in their public planning and devote specific attention to the possible variations in the cost of energy in the O&M cost calculations.