CALIFORNIA
High-Speed Rail Authority

September 13, 2018

Susan.Macadams@gmail.com

Dear Madam:

Thank you for your correspondence of August 27, 2018.

It appears that due to a scanning error you did not receive a complete version of my July 25, 2018 letter (page 2 was omitted). I apologize for this error and have attached a complete copy.

As I stated during our previous telephone call, our Rail Group is comprised of high-speed rail experts that bring proven international high-speed expertise from Europe and Asia to the California High-Speed Rail Program.

Thank you again for your comments. As you can see from our responses to your concerns, CHSRA design requirements for track curves are more stringent that those successfully used in proven high-speed rail systems internationally. CHSRA is designing and building a safe and reliable high-speed rail system.

Sincerely,

Frank Vacca

Frank Vacca
Chief Program Manager
Rail Operations Branch

Attachment

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CALIFORNIA
High-Speed Rail Authority

July 24, 2018

Susan.Macadams@gmail.com

Dear Madam:

Thank you for your correspondence of April 11, 2018 to Brian Kelly, CEO, regarding track design for the high-speed rail system. Mr. Kelly has asked me to respond on his behalf.

We have reviewed your comments and concerns and we understand that they broadly fall into the following categories:

1. The alignment is not straight;
2. The trains will operate at speeds up to 220 mph on curves built on alluvial soils
3. Concerns that the curve design includes curves and transitions on structures that are 60 – 100 feet tall, imposing unacceptable loads upon the structures;
4. There are overlapping horizontal and vertical curves;
5. The combination of items 1-4 create a dangerous condition where the track design cannot be easily built, or safely maintained, thereby creating a significant risk of derailment;
6. An excessive amount of superelevation (track cant) is allowed in curves and the rate that the superelevation was applied is too high;
7. In addition, a concern was raised regarding the effect of the extreme hot and cold temperatures in Fresno on the interaction of the rail and the structures.

We have considered your above concerns and offer the following assessment:

1. Ideally any alignment would be straight with no elevation change. This would result in the shortest alignment and would impose minimal vertical or horizontal acceleration forces upon the infrastructure, the train equipment or the passengers. Unfortunately, in the real world, this is seldom the case and alignments must be engineered to accommodate physical features (rivers, built up areas, schools, environmental concerns such as parks, protected species) etc. Throughout the extensive NEPA and CEQA environmental process, multiple alignment alternatives are evaluated and the Least Environmentally Damaging Practical Alternative (LEDPA) was selected. This public process was followed by the Authority in evaluating and selecting the current alignment in the Central Valley.

2. The Authority, through its contractors, has conducted extensive geotechnical studies to ensure that the infrastructure designs are suitable for the ground conditions. This includes the assessment of ground conditions regarding Rayleigh Waves which are known to potentially be present in high-speed applications on alluvial soils.

3. The structures supporting the high-speed rail tracks have been designed for the expected loads that will be present during normal and extreme operating conditions, including during earthquakes. This includes the taller structures currently under construction in the Central Valley.

4. It is generally desirable to avoid the overlap of horizontal spirals and vertical curves where practical. International practice for high-speed rail applications recognize that avoiding the overlap of horizontal and vertical curves is not always practical due to physical site constraints. In these cases, the International standards state that the track design should incorporate large vertical radii with commensurate low values for vertical acceleration. It must be noted that both vertical and horizontal acceleration limits are set for passenger comfort and are much more stringent than those that would present a risk of derailment. The CHSRA vertical acceleration design limit is 0.028g (0.9 ft/sec^2). The corresponding vertical acceleration design limit for SNCF (France's high-speed rail) for example is 0.06g (1.93 ft/sec^2). The CHSRA maximum allowable vertical acceleration limit is less than half of that allowed on comparable international high-speed rail systems. Similarly, the maximum allowable CHSRA lateral acceleration is 0.05g (1.61 ft/sec^2) while the international Union of Railways (UIC) standard sets a maximum lateral acceleration of 0.068g (2.19 ft/sec^2). The CHSRA maximum lateral acceleration is 26% lower than allowed in international standards for dedicated high-speed systems.

5. The CHSRA track specifications calls for ballastless track form (slab track) to be installed in tunnels, on structures and on the approach to structures. Ballastless track form allows greater fixity and strength and can be constructed to tighter tolerances than would be possible with ballasted track, commensurate with high-speed rail requirements in this application. Ballastless track holds alignment much better than ballasted track and requires significantly less maintenance under such applications.

6. CHSRA maximum superelevation (track cant) and the rate that the superelevation is applied is directly controlled by the maximum lateral acceleration. As noted above, the maximum lateral acceleration allowed by CHSRA is 26% lower than the maximum allowed under international standards.

7. It is very well recognized that concrete structures and the steel tracks installed upon them have different thermal expansions and that the design of the track form design must take this into account to ensure that the forces within the rail are controlled to acceptable levels. Many of the countries in which high-speed systems are operated experience as great or greater temperature differentials than the Fresno area (e.g., China, Japan, France, Germany, Russia).

In addition, a reference was made to the 2013 rail accident near Santiago de Compostela in Spain. It must be noted that the Spanish accident was totally unrelated to any of the items (1-7) above. The accident was caused when a train, under manual control, attempted to go through a curve designed for operation at 50 miles per hour at 111 mph and subsequently derailed. The train was an express train enroute from Madrid Chamartin Station to Ferrol. This route is comprised of high-speed rail tracks and conventional tracks. The high-speed tracks employ an automatic train control system that continuously monitors the train speed and compares it to the maximum allowed speed. If the train speed exceeds that allowed speed, the system will override the driver and will automatically apply the brakes. This type of automatic train control system is used on all existing high-speed rail systems in Europe and Asia. Some of the conventional tracks do not employ an automatic train control system and speed control is solely dependent on the driver. In the Spanish accident, the train had just left the high-speed track area and was operating on conventional track – this section of conventional track did not have automatic train control and was totally dependent upon the driver to obey the speed limit. The driver failed to do so and attempted to go through the curve at more than double the maximum allowed speed. It should be noted that because of the investigation into the accident, an automatic speed control system was installed at this location to prevent recurrence. It must be stressed that this accident was not a track design failure but a failure of the driver to obey speed limits – it must further be stressed that the CHSRA will employ an automatic train control system that will continuously monitor the train speed and, if the train speed exceeds the maximum allowed speed, will override any driver input and will automatically apply the brakes.

Thank you again for your comments. As you can see from our responses to your concerns, CHSRA design requirements for track curves are more stringent that those successfully used in proven high-speed rail systems internationally. CHSRA is designing and building a safe and reliable high-speed rail system.

Sincerely,

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