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TRANSPORT CASE STUDY: UNITED STATES

Presidio Parkway

Location
San Francisco, California, USA

Owner
California Department of Transportation (Caltrans) and the San Francisco County Transportation Authority (SFCTA)

Private Partner
Golden Link Partners, LLC (GLP) (Hochtief PPP Solutions North America, Meridiam Infrastructure, Flatiron West, Inc., Kiewit Infrastructure West, Co.)

PPP Model
Design-Build-Finance-Operate-Maintain (DBFOM)

Operating Term
30 years

Contract Value
USD 856.6 million (Phase I of USD 496.3 million and Phase II of USD 360.3 million)

Asset Class
Transportation (Highways)

Awards[1]

- Geotechnical Project of the Year Award 2011, and Outstanding Structural Engineering Project of the Year Award 2015, American Society of Civil Engineers San Francisco Section
- P3 Project of the Year 2012, American Roads and Transportation Builder Association
- Structural Project of the Year 2013, 24th Annual California Transportation Foundation Transportation Awards
- Infrastructure Project Award 2016, National Council for Public-Private Partnership (NCPPP)

1 A detailed list of awards can be found at: http://www.presidioparkway.org/about/awards.aspx

The Presidio Parkway project is a replacement of Doyle Drive, a 1.6-mile segment of Route 101 in San Francisco that is the southern access to the Golden Gate Bridge. The road connects Marin County on the north with San Francisco County on the south and provides a major regional traffic link between the peninsula and North Bay Area counties.

Originally built in 1936, the asset no longer met highway standards and was seismically deficient. Thus, the replacement was not only critical for seismic and public safety, but also provided an opportunity for major design improvements. The Presidio Parkway is a six-lane facility with a southbound auxiliary lane between the Presidio Park Interchange and the new Presidio access at Girard Road.

The project was developed in two phases. California Department of Transportation (or "Caltrans") is responsible for the design, financing, and construction of Phase I, which was delivered through a traditional design-bid-build process. Through a competitive procurement process, Caltrans selected a private consortium, the Golden Link Concessionaire, to deliver Phase II as a design, build, finance, operate, and maintain availability-payment concession. This case study focuses on the Phase I project only.

Construction of Phase I began in late 2009 and was completed in 2012. In April of 2012, traffic was shifted onto a seismically-safe temporary bypass that carried traffic until the final roadway was opened on July 12, 2015. Construction activity continued through 2017 and included the removal of the temporary bypass, reconstructing Halleck Street, covering the tunnels and landscaping.

Particular features of the project:

- California's first PPP transaction under its new (2009) legislation;
- California's first availability payment contract for transportation infrastructure;
- First U.S. project with direct Federal-aid participation in availability payments;
- First Transportation Infrastructure Finance and Innovation Act (TIFIA) loan to be repaid in part with a milestone payment following substantial completion; and
- Incorporation of numerous Context Sensitive Design features to minimise traffic impacts and to protect and enhance environmental and cultural resources.

Output Specifications Development Approach Used

This case study focuses on the seismic performance requirements to compliment the content of the Central 70 project case study.

The output specification adopts industry and Owner standards, and project specific requirements, to define design requirements. The output specification defines a performance-based design approach for the seismic design of the structures. Performance is based on two levels: Safety and Functionality (referred to as the Safety Evaluation Earthquake or 'SEE' and the Functionality Evaluation Earthquake or 'FEE'), corresponding to the 'upper' and 'lower' level earthquake events.

Alignment to QI Focus Areas

Ability of the asset to withstand natural and other disasters, including climate change

The seismic requirements in the output specification refer to location-specific industry standards. By adopting a performance-based design approach, the Private Partner has the flexibility to design a solution that best mitigates the risk. The output specification requirements are informed by:

- **Industry requirements:** American Association of State Highway and Transportation Officials Load and Resistance Factor Design (AASHTO-LRFD) Standard;
- **Owner requirements:** Caltrans Seismic Design Criteria[2] (SDC); and
- **Project requirements:** Detailed below.

The output specification describes the required level of performance, depending on the defined seismic event. The general seismic performance parameters are:

- **Serviceable Performance** after a seismic event requires immediate full traffic access after a short period of inspection or minor repairs. A maximum delay of 72 hours is permitted. See Functionality Evaluation Earthquake (FEE) performance level below;
- **Repairable Performance** after a seismic event requires limited immediate access for emergency vehicles, with only repairable damage. The asset shall be repaired within seven days to full capacity. "Repairable Damage" can be defined as allowing moderate inelastic response to occur. Concrete cracking, reinforcement yield, and spalling of cover concrete is expected at this level of inelastic response. The extent of damage should be sufficiently limited to permit restoration of the structure to essentially the pre-earthquake condition without replacement of any portion of the structures. See FEE performance level below; and
- **No-Collapse Performance** three days after the seismic event, the structure shall be stable for public safety in accordance with ductility demand and capacity values documented in the SDC. See Safety Evaluation Earthquake (SEE) performance level below.

There are two levels of seismic event:

- **Functionality Evaluation Earthquake (FEE):** Damage is repairable and the asset is returned to service, with or without traffic restrictions. Immediate access to emergency vehicles following inspection.
- **Safety Evaluation Earthquake (SEE):** Although there may be significant damage, there is no-collapse and life safety assured. Limited service post event.

Per the guidelines adopted by the Owner and the return period risk determined for the project, site-specific hazard analyses shall be performed to establish the design response spectra and ground motions for the FEE and SEE as follows:

- **Functionality Evaluation Earthquake (FEE):** The lower level event to be used for the design shall be based on a probabilistic hazard acceleration response spectrum (ARS) for an event, with a mean return period of 108 years (i.e., 50% probability of exceedance in 75 years); and
- **Safety Evaluation Earthquake (SEE):** The upper level event to be used for the design shall be based on the ARS derived from the envelope of the median (50th percentile) deterministic Maximum Credible Earthquake (MCE) ARS and a probabilistic hazard ARS for an event, with a mean return period of one thousand years (i.e., 7.5% probability of exceedance in 75years).

The output specification also considered the required level of performance during construction. Seismic performance requirements of structures under construction shall meet the SDC requirements for temporary bridges or bridges under temporary conditions carrying public vehicular traffic. The Owner also has existing requirements for temporary structures ('Division of Engineering Services (DES) Memo to Designer 20-12 Site Seismicity for Existing and Temporary Bridges carrying Public Vehicular Traffic').

Mechanisms used to achieve QI alignment

Management plans

The Private Partner is required to design and construct the project in accordance with their Project Management Plan. The Project Management Plan includes a Quality Management Plan, which is required to be approved by the Owner, which documents the systems and processes to manage the quality of the project scope. The plan details the process for the Private Partner to submit design packages to the Owner for review and approval. In addition, the Owner shall have the right to perform oversight and auditing of the work to determine that it is performed in accordance with the contract documents. The intent of these measures is to monitor and manage the risk throughout design development, when changes are easy to make, rather than waiting until completion inspections to identify non-compliances.

Seismic event deductible

The Private Partner is responsible for the first USD10,000,000 of extra work and delay costs (in aggregate during the project term) incurred to repair or replace tangible property damage caused by seismic events. All un-insured costs above this will be borne by the Owner. By sharing the risk, the Private Partner is incentivised to develop a design that mitigates repairs for a minor (and more likely) event.

A seismic event would be considered a Force Majeure Event and thereby a Permitted Closure which would not be subject to an Unavailability Deduction. Typically, it would be a combination of the Owner, third parties (police) and the Private Partner working together to close the road. It would then depend on the reason for the closure as to whether the Private Partner would be eligible for relief.

Market Comparison Analysis

Performance-based design is a common approach across sectors (for example, refer to the John Hart Generating Station case study in the Energy Case Study section).

The 'seismic event deductible' (or similar) is also a common way of sharing the seismic risk. The value of the threshold depends on the project value.

2 The Owner's Seismic Design Criteria: https://dot.ca.gov/programs/engineering-services/caltrans-engineering-manuals