September 28, 2015

Expression of Interest
for the Delivery of an Initial Operating Segment
California High-Speed Rail System

FLUOR®

Balfour Beatty

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for the

Delivery of an Initial Operating Segment

California High-Speed Rail System

September 28, 2015

Submitted by

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September 28, 2015

Ms. Rebecca Harnagel
California High-Speed Rail Authority
770 L Street, Suite 620 MS 2
Sacramento, California 95814

Expression of Interest for the Delivery of an Initial Operating Segment

Dear Ms. Harnagel:

Fluor Enterprises, Inc. (Fluor) and Balfour Beatty Infrastructure Inc. (Balfour Beatty) are pleased to submit our joint response to your Request for Expressions of Interest, RFEI HSR#15-02, dated June 22, 2015. Fluor and Balfour Beatty have teamed to pursue the role of Developer for the delivery of an Initial Operating Segment (IOS). We intend to form a special purpose company for developing the IOS projects.

The Fluor-Balfour Beatty contact person is:

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We appreciate your considering the feedback provided in this document, and we look forward to discussing the project with you in the future.

Sincerely,

[redacted]

David Parker
Vice President, Sales
Fluor Enterprises, Inc.

[redacted]

Joseph Reed
Vice President, Alternative Delivery
Balfour Beatty Infrastructure, Inc.

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Firm Experience and Team Structure

The EOI should include a brief statement describing the Respondent's experience with similar projects and similar services. To the extent that the Respondent is submitting an EOI as part of a joint venture or consortium, then the EOI shall include a description of the proposed team structure, including what strengths and experience each entity brings to the overall team.

Firm Experience

Continuing perhaps the most successful infrastructure delivery partnership in the United States (U.S.) over the past 10 years, Fluor and Balfour Beatty have teamed to pursue the role of Developer for the Project. Since 2002, Fluor and Balfour Beatty have jointly executed more than $5 billion of complex U.S. transportation projects, including the $3 billion Eagle P3 Project in Colorado, the nation's only transit design-build-finance-operate-maintain (DBFOM) project. Both Fluor and Balfour Beatty have a depth of global expertise and experience accrued from the successful completion of high-profile, complex infrastructure projects that include high-speed rail systems.

FLUOR

Fluor is the largest publicly traded engineering and construction company in the U.S. and a global leader in the development of transportation infrastructure using the public-private partnership (P3) approach. Established in Southern California in 1912, Fluor is a Fortune 500 company (#136) with more than 40,000 employees in 81 countries across 6 continents. Over the past century, Fluor has become a trusted global business leader whose primary objective is to develop, execute, and maintain capital projects on schedule, within budget, and with operational excellence. With 2014 revenues of more than $21.5 billion and a strong balance sheet, Fluor possesses the resources and financial capacity to develop one or both Initial Operating Segment (IOS) Projects.

Fluor's experience with similar projects includes the delivery of significant light rail, commuter rail, high-speed rail, and major transit stations such as the new $1 billion World Trade Center PATH Terminal. Fluor is the only U.S. company to develop and maintain a high-speed rail system, the Netherland's $2.6 billion HSL-Zuid Line. Locally, Fluor has been involved in the implementation of California public transportation infrastructure for more than 30 years. Fluor was part of the initial consortium acting as developer of SR-125 toll highway, one of California's first transportation P3s; and, in 2013, a Fluor team completed the main span of the new San Francisco-Oakland Bay Bridge, the largest public-works contract in California history.

Balfour Beatty

Balfour Beatty plc. is an international infrastructure group with a proud successful history extending back 100 years that delivers world-class services essential to the development, creation, and care of infrastructure assets; from finance and development, through design and project management, to construction and maintenance. With operations in the U.S., United Kingdom (U.K.), Canada, and Australia, Balfour Beatty Investments (BBI) is responsible for raising and structuring finance to help customers achieve goals that might otherwise be unattainable. The company also invests directly in infrastructure assets, particularly where there are opportunities to manage the project upon completion and enhance operational efficiency.

BBI has reached financial close on more than 60 P3 projects internationally. BBI is one of the leading providers of P3 projects in North America with more than 1,200 employees.

Eagle P3 Project – The award-winning Eagle P3 Project involves the design, construction, operations, and maintenance of a new commuter rail system for the Denver metropolitan area. The network comprises three rail lines totaling 36 miles. Under the terms of the 34-year concession agreement, Fluor and Balfour Beatty are responsible for the design and construction of all civil infrastructure, fixed facilities, and rail systems as well as the procurement and delivery of 66 electric multiple unit (EMU) commuter rail vehicles. Fluor and Balfour are also part of a consortium responsible for the long-term maintenance and operations of the system. Project is currently undergoing performance testing with passenger rail services set to begin in 2016.

A sister company of BBI and a wholly owned company within Balfour Beatty plc., Balfour Beatty Infrastructure, Inc. (BBII) is a heavy civil contractor with annual revenues in excess of $800 million. The Atlanta-based company excels at large, complex projects in its key rail, highway, and water markets, including rail transit systems, new highways and highway expansion, bridges over land and water, tunnels, wastewater and potable water treatment plants, and rail civils. BBII operates in four regional geographies and two national rail markets. Balfour Beatty Rail (BB Rail), a division of BBII, is a rail infrastructure contractor specializing in construction and maintenance services for public and private railroad markets. Its industry-leading services include design, construction, operations, and maintenance. BB Rail also designs and manufactures the necessary overhead electrification hardware and traction

HSL-Zuid Line P3 Project – The Netherland's landmark HSL-Zuid Line, part of the Trans-European rail network, provides high-speed rail services between Amsterdam and the Belgium border, a distance of approximately 60 miles. Designed for 185-mile-per-hour train speeds, passenger rail services began in 2009. Implementation of the project was subdivided into three major components: Substructure, Infrastructure, and Operations.

Infraspeed, a Fluor-led consortium, was awarded a $2.6 billion contract for the design, construction, financing and maintenance of the Infrastructure component of the project. At the time, this was the largest P3 high-speed rail project in Europe. Under the 25-year concession agreement, Infraspeed is responsible for maintaining the rail track, traction power systems, train control, signaling, communications as well as all of the underlying civil works.

power equipment for the systems it constructs and maintains.

Balfour Beatty's global high-speed rail experience includes projects in Turkey, Germany, Italy, and the U.K. In summer 2007, the Chinese Ministry of Railways commissioned Balfour Beatty as the foreign partner for the overhead contact line for China's first big high-speed line connecting the cities of Wuhan in Hubei province and Guangzhou in Canton province. With a length of 165 km and a design speed of 350 km/hr, this section is part of the Beijing to Shenzhen (Hong Kong) line of almost 1,000 km.

Team Structure

Fluor and Balfour Beatty intend to form a special purpose company (SPC) for the purposes of developing the IOS Project(s). The SPC will function as the prime contractor and will have overall responsibility for contract performance. Project financing will be arranged by Fluor and Balfour Beatty through the SPC, potentially in conjunction with other equity investors. The actual capital construction work will be subcontracted to one or more design-build consortiums. The maintenance of the IOS Project(s) will be subcontracted to a project-specific maintenance company composed of both Fluor and Balfour Beatty. This integrated approach is similar to how Fluor and Balfour Beatty have organized the Eagle P3 Project.

World's Fastest Rail Link from Wuhan to Guangzhou – The Wuhan to Guangzhou section of the Beijing to Hong Kong high-speed rail line opened for service December 2009. With a top speed of around 200 mph, it is currently the world's fastest rail connection, cutting the journey time from 10 to 3 hours.

In 2007, the Chinese Ministry of Railways awarded the overhead contact line design, installation, and commissioning contract to Balfour Beatty Rail. As part of the project, Balfour Beatty Rail trained Chinese construction units to install the system through staff on site who also carried out inspection works. Part of this training package included maintenance regimes and practices.

The new overhead contact line system developed by Balfour Beatty Rail raised the international standard for high-speed overhead contact line systems. With a design speed of almost 220 mph, this system built on Balfour Beatty Rail's previous extensive experience with high-speed lines, including the Nuremberg to Ingolstadt line in Germany and the Madrid to Lerida line in Spain.

Project Approach

The Authority would like to know whether each Respondent is interested in the IOS-South scope, IOS-North scope, or both, as well as any recommendations for improvement to its delivery strategy. The EOI shall include a description of how the Respondent will approach each project scope and how each approach will meet the goals and objectives of the Authority and the hurdles to overcome to deliver the project(s) on time and on budget. This section of the EOI shall also include any innovative ideas for delivering both projects.

With the design-build construction of the Central Valley backbone under way, the California High Speed Rail Authority (the Authority) is exploring the use of innovative delivery models to leverage Cap-and-Trade (C&T) funding and accelerate completion of the California High-Speed Rail System. Fluor-Balfour Beatty are keenly interested in working with the Authority to explore how different packaging and procurement strategies can deliver major components of the system in the most efficient and effective way. Fluor-Balfour Beatty's experience on the Eagle P3 project, which at over $3 billion is the only rail design-build-operate-maintain (DBFOM) project in the United States, and on P3 rail projects around the world is that an integrated delivery model will meet the Authority's objective of accelerated delivery, risk transfer, and value for money.

We have reviewed the Authority's Business Plan and understand the timeline for implementation of IOS-North and IOS-South that would get trains running to either one of California's major population centers, San Francisco or Los Angeles. Packaging civil works and infrastructure components across major geographical segments, like IOS-North and IOS-South, using a design-build-finance-maintain (DBFM) model will allow the Authority to manage integration and interface risks and achieve the Authority's objectives, including:

- Accelerate delivery
- Draw large, capable proposers consortia
- Integrate maintenance into design and construction
- Minimize integration and interface risks
- Whole-life benefits

At $10 billion to $14 billion, IOS-North or -South would be the largest P3 procurements in the world, larger than the $8.3 billion Tours-Bordeaux project, which was backstopped by the French government. While our analysis shows that there is significant capacity to finance large P3 projects, several smaller projects may be more cost effective to finance. A $10-billion-plus procurement will significantly reduce the number of competitors willing and able to compete for the contracts. In addition, a project of this size would require a consortium of many industry partners adding organizational complexity to technical complexity.

As an alternative to a delivery strategy by segment, we recommend the Authority consider packaging the work by major components within or across segments, for instance, a combination of rail infrastructure for IOS-North and/or -South, rolling stock, and maintenance facility. Other packages that might be split out could be tunnels or stations. A $5 billion rail infrastructure package could be procured as a DBFM resulting in the benefits of innovative delivery listed above but would also:

- Be more easily financed
- Attract more competition
- Integrate rolling stock and rail infrastructure systems

A smaller project could be procured and closed more quickly. In the case of an integrated rail infrastructure and rolling stock procurement, this would allow the Authority to start construction of rail infrastructure on the Central Valley backbone as soon as the civil work is completed to test and certify the first high-speed rail equipment in the United States.

Were the Authority to decide to combine IOS-South and IOS-North into one procurement, a developer approach may an alternative for a procurement of that size. Under a developer approach, a private-sector team would provide services at a program level. While this could facilitate phased implementation and financing, it might duplicate the role of the Authority's Rail Delivery Partner.

Regardless of the packaging, Fluor-Balfour Beatty will use an integrated project approach to match the size and scope of the project and deliver the most efficient project using whole-life considerations, managing the interfaces among design, construction, maintenance, and rolling stock. To optimize delivery, we would bring together a team of the best local, national, and international firms. Fluor-Balfour Beatty has the experience and resources to self-perform construction and maintenance of the civil and rail infrastructure.

Fluor-Balfour Beatty is keen to be a prime service provider for the California High-Speed Rail System. We are experienced in delivery of complex rail projects both in the U.S. and around the world. Our international experience includes designing, building, and integrating high-speed rail systems in Europe and Asia. We bring the necessary civil, rail infrastructure, systems integration and strong management capabilities to any project the Authority chooses to advance. Our experience, financial capability and drive will help the Authority successfully deliver the High-Speed Rail System in the shortest time.

Additional recommendations regarding delivery strategy are included in our responses to the 12 commercial, funding and financing, and technical questions.

Responses to Commercial Questions

1. Is the delivery strategy (i.e., combining civil works, track, traction power, and infrastructure) likely to yield innovation that will minimize whole-life costs and accelerate schedule? If so, please describe how. If not, please recommend changes to the delivery strategy and describe how those changes will better maximize innovation and minimize whole-life costs and schedule.

We are confident the Authority's strategy to deliver one or both Initial Operating Segments (IOSs) under a comprehensive design-build-finance-maintain (DBFM) model will yield substantial schedule savings and whole-lifecycle cost benefits. In addition, this approach will enable the transfer of important interface risks to the private sector. As noted in the RFEI, the private sector has expertise and experience in interfacing and integrating high-speed rail systems.

- The benefits of a DBFM approach can be substantial. The system can be available for public use sooner than with a conventional delivery approach – in this instance the time savings can be measured in years.
- More reliable project delivery – studies have shown public-private partnership (P3) projects are more likely to be completed on time and within budget (despite the nonrecourse nature of project financing, the financial risk shared by the debt and equity investors is a strong performance motivator). P3s accelerate the construction schedule through a significant overlap of the design and construction works rather than through a rigid sequential approach.
- Construction contractor, maintenance team and specialists working within the integrated design and construction team. The focus of the contractor will be on achieving the best whole-life cost solution and on the optimal construction schedule. Typically, consideration of construction methods, including any prefabrication opportunities, will guide the design to achieve the shortest construction period.
- Lifecycle project delivery reduces costs (the majority of traditional capital construction contracts put a premium on lowest upfront capital costs, which does not necessarily result in the lowest - cycle cost).
- Transfer of certain long-term project risks to the private sector. This risk transfer can be achieved through an effective payment mechanism that incentivizes effective maintenance and renewal work. Asset preservation can be extended by years by focusing on preventive and proactive maintenance solutions. Effective P3 brings maintenance team members into the design and construction process for whole-life considerations.

Some examples of these approaches are noted below.

Innovative Benefits and Prime Improvement Opportunities

Innovative Benefits	Whole-Life Cost Improvement	Schedule Improvement
Design		
Design based on a performance specification		
• Promotes innovative rather than prescriptive solutions	✓	✓
Implementation of a system engineering approach covering all railway components		
• Consistent systematic approach to delivering infrastructure that addresses the design, manufacturing, installation/construction and operations/maintenance phases – the full system lifecycle	✓	

Innovative Benefits	Whole-Life Cost Improvement	Schedule Improvement
• Comprehensive interface management approach of project components by a single provider		✓
• Comprehensive system integration approach by a single infrastructure provider		✓
Implementation of an integrated Reliability, Availability, Maintainability, and Safety (RAMS) process covering all railway infrastructure		
• Optimize the selection of all infrastructure components based on RAMS analysis, inclusive of lifecycle analysis	✓	
• Safety certification of all railway infrastructure by the one design-build entity	✓	
Enhanced constructability and maintainability review of the design with an integrated team of design, construction, and maintenance personnel		
• Remote maintenance diagnostics and surveillance possibilities considered and included in an integrated and optimized design	✓	
Design optimization of remaining civil works with railway infrastructure design		
• Optimize the interface between the assets to enhance coordination and reduce expensive and time wasting rework	✓	✓
Construction		
Design-build execution optimization		
• Prioritized design deliverables to support early construction works		✓
• Design package production to support construction approach		✓
• Work package integration across infrastructure elements		✓
Railway infrastructure master schedule control		
• Provides better speed to market		✓
• Provides in time delivery for integrated start up and operations by others		✓
• Improves coordination with other project components procured by the Authority		✓
Maintenance		
• Seamless pre-revenue railway start-up of revenue service		✓
• Alignment of reliability parameters and operational readiness with operations and rolling stock providers	✓	
• Reduced lifecycle costs by early participation in the design and construction decisions	✓	
• Increased focus on safety factors relating to maintenance activities during operations with operations focus during the design phase	✓	

2. Does the delivery strategy adequately transfer the integration and interface risks associated with delivering and operating a high-speed rail system?

The Authority's strategy for an IOS delivered under a DBFM model would result in the transfer of certain significant integration and interface risks associated with delivering and maintaining the high-speed rail system. These include, but are not limited to, the following:

- Risks associated with the design of fixed facilities and systems (e.g., errors and omissions)
- Risks associated with the misalignment of various delivery contracts (i.e., scope gaps, physical conflicts between system elements)
- Risks associated with on-time completion
- Risks associated with construction defects
- Risks associated with system safety certification
- Risks associated with long-term maintenance of the fixed facilities and systems

Some important interface risks, however, remain in the Authority's proposed delivery strategy that are not adequately transferred and therefore must be managed through careful planning and frequent coordination between the various participants. These include, but are not limited to, the following:

- Risks associated with station design and construction (and maintenance)
- Risks associated with rolling stock design, manufacturing, testing and on-time delivery
- Risks associated with rolling stock/TPS and train control system compatibility
- Risks associated with rolling stock performance
- Risks associated with rolling stock maintenance
- Risks associated with the system testing and commissioning
- Risks associated with train dispatching and operations
- Risks associated with system security
- Institutional risks: agency conflict, labor regulations, territorial conflicts, many stakeholder expectations/interests

If risk can be transparently identified, equitably allocated, and costed appropriately, successful projects will result.

What are the key risks that will be borne by the State if such risk transfer is not affected?

If such risk transfer were not effected, the Authority would be responsible for managing and/or transferring all of the risks outlined above. The Authority would require a much larger management team to effectively provide the coordination and administration of the dozens of contracts and components that would be procured under a multi-prime design-build approach.

What are the key risks that are most appropriate to transfer to the private sector?

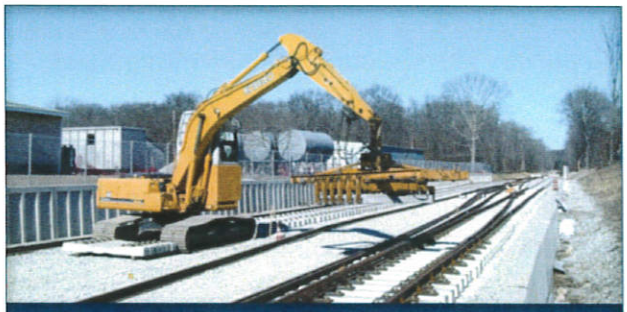
The private sector is better equipped to manage most project delivery risks (e.g., design, construction, maintenance, and operations) and the aspects of project financing that are within its control. We do not believe that ridership risk (i.e., farebox revenue risk) can be effectively and efficiently transferred to the private sector at this stage of the project.

Certain implementation risks, such as obtaining the required the NEPA/CEQA approvals and ROW acquisition, are best retained by the Authority. In addition, the Authority should be responsible for:

- Ensuring the availability of public project funding
- Managing interagency agreements
- Defending program level lawsuits and related court injunctions

- Changes in law
- Certain Force Majeure events

Example Interface Considerations



Production Control

- Geology Compatibility
- Right-of-way Availability
- Access and Staging Areas

Track Work

- Suitability of Subgrade
- Tunneling Works
- Rolling Stock Wheels and Loads
- Selection of Elements, such as Switches for Whole-Life Cost Goals

Traction Power and OCS

- Substations
- Switching Stations
- Autotransformers
- Paralleling Stations
- Overhead Contact System

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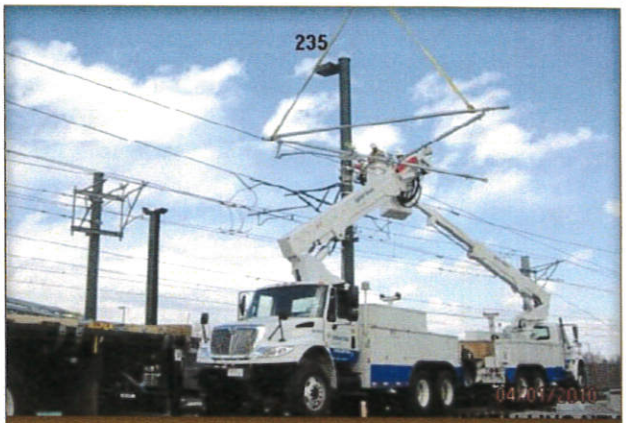

Systems

- Communications
- Signaling
- Operational Control Center
- Local Operational Control Center
- Warning Systems
- SCADA
- CCTV
- Direct Line Telephone System
- Passenger Information System

3. ***Are there any other components of a high-speed rail system that should be included in the scope of work for each project (e.g., rolling stock, train operations, stations)? If so, how will this help meet the Authority's objectives as stated in this RFEI?***

Components of the High-Speed Rail System should be included in the Authority's proposed Initial Operating Segment (IOS) scope to help the Authority meet the following objectives:

- Minimize the whole-life cost of the system
- Secure private-sector investment

- Accelerate system completion
- Transfer key delivery and long-term maintenance risk to the private sector

Rolling Stock – Vehicles

The Authority's approach to purchase rolling stock from a single entity is workable in many ways as it provides system-wide consistency and statewide buying power. The selection of the Rolling Stock provider is in total control of the Authority.

Real risk considerations are central to who provides the vehicles.

- The interface between the manufacturer and the systems and controls work is considerable. Onboard equipment is required to provide communications, train controls, and signal coordination. Each of these components needs to be accommodated by the train manufacturer and integrated into the train systems.
- Purchasing the trains through the IOS P3 may mean that the Authority's preferred train manufacturer is not selected. The best value may be driven by the civil works as the trainset cost is relatively small compared to the cost of the civil works and train infrastructure.
- Schedule coordination is critical to project success. This is especially true in a P3 as the cost of finance is substantial. Delays in train delivery are the responsibility of the provider. If they work for the Authority, this risk flows through the Authority.
- Start-up and testing are vital to timely revenue service. There is substantial interface between the parties at this critical phase. Securing a safety certification is complicated. Having the train sets and the start-up responsibility under one contract is best for the Authority.
- Potential for minimizing system whole-life costs is increased, e.g., leverage statewide buying power. In the Denver Eagle P3, we negotiated options that are available for the Authority to exercise in the future.
- The Authority may have additional financing mechanisms available to it that may not be as readily available to a private project company (e.g., vehicle leasing, Certificates of Participation).
- Conversely, the private sector has tools that are not available to the Authority such as the Export-Import Bank support.
- P3 procurement requires access to the train manufacturer during the proposal phase. If the Authority procures the vehicles, the provider will need to interact with all bidders for each bidder to have effective pricing and schedule plans.
- Access to the train manufacturer during the pricing of the proposal is very important to the establishing of best value. Schedule, testing, onboard systems, and compatibility with the overhead contact system are all critical to the schedule and price of the project.

There are compelling reasons to procure the trainsets under the P3. Our team has relationships with all the key rolling stock providers, including Siemens, Alstom, Nippon Sharyo, Kawasaki, Hundai, and others. We have experience in managing the interface issues with the rolling stock providers including onboard interfaces for train controls and signaling, power consumption requirements, wheel and track interface, and weight considerations.

Our team procured rolling stock as part of the only U.S. P3 rail project (Denver Eagle P3) and we would be pleased to do so for this project.

Rolling Stock and Infrastructure – Maintenance Facilities

There are two important maintenance facility needs. The civil infrastructure, track, traction power, communications, and signaling work maintained under the IOS contract will require maintenance assets. These assets should share siding, track, utilities, and real estate resources to avoid duplication of physical plant. Placement of the infrastructure maintenance may require more locations than the vehicle maintenance facilities. If there is significant need for coordination between the maintenance needs of the IOS and the vehicles, the Authority may split the maintenance facilities responsibility so the lowest lifetime maintenance costs and quickest response times are considered in the IOS design.

The Authority's current Request for Proposals for Tier III Trainsets allows Proposers to submit an exemption from the requirement to build maintenance facilities on the Authority-provided property.

Allowing the trainset manufacturer to concentrate solely on the timely and compliant delivery of vehicles without the added burden of the design, construction, and finance of maintenance facilities (i.e., non-core business) may be the most effective overall procurement strategy from a cost and schedule standpoint. Fluor-Balfour Beatty's recommendation for the train and infrastructure maintenance facility is to include such within the scope of the civil infrastructure design and build works. If the trains are procured by the Authority, we recommend that the vehicle maintenance facility be provided to a core-and-shell level so the train manufacturer can fit out the area with its own equipment and train maintenance needs.

A co-located maintenance facility for both the IOS infrastructure and the rolling stock means a more efficient approach to the cost of providing those facilities compared with individual developments. It is likely that the maintenance needs will mandate more than one location. While the train maintenance facility may be sufficient in one location, civil maintenance will need more than one location. The IOS Developer should fully complete the maintenance facility for the IOS.

The rolling stock maintenance facility may be used for assembly; if so, the rolling stock provider should develop and own the facility. To the greatest extent possible, civil and train maintenance should share the same property to avoid duplication of sidings, spur, and utility needs.

Stations

We agree with the Authority that the design and construction of the platforms are best included in the IOS development scope of work.

The communications and signal control equipment is provided under the IOS scope and placed into part of the station building provided by others. This is a schedule risk as this equipment is needed at the start of commissioning and testing. This schedule risk potentially impinges on the proper start-up, testing, commissioning, and safety case development.

We recommend that the housing for the IOS control room, systems, and equipment be provided by the IOS Developer thus eliminating this critical interface risk. The systems buildings and the stations can and should share the same plot of land.

Operations Considerations

There are various methods to incorporate operations into the project design construction and commissioning. They are presented in order of most efficient with less risk to the owner:

- One method is to include operations (by the developer within the P3 procurement). By incorporating operations under the P3 project, the Authority would ensure seamless transition from the design-build period into operations. This method would also promote integration of operationally efficient characteristics into the project design.

- The second alternative is for the Authority to appoint the operator concurrently with the P3 procurement. As with the engagement of the rolling stock provider, it will be necessary for the DBFM Developer to coordinate with the preferred operator prior to bid to facilitate the full integration of the train schedules and operating procedures. Fluor-Balfour Beatty envisages including the Authority's train operator as part of the design process. This method has interface issues that would need to have a clear resolution process.
- A third alternative is for the Authority to use the "shadow operator" as the operations representative during the design and construction phase. This may provide the proper perspective to the design-build team during design and initial construction. The long-term operator will be tasked with accepting the results of the shadow operator decisions. Start-up of the system should include the long-term operator. This alternative has even greater risk for interface issues and potential change management by the long-term operator.

4. *What is the appropriate contract term for the potential DBFM contract? Will extending or reducing the contract term allow for more appropriate sharing of risk with the private sector? If the Respondent recommends a different delivery model, what would be the appropriate term for that/those contract(s)?*

Contract Term for Potential DBFM Contract

The optimal DBFM contract term would take into consideration a design-build period commensurate with the scope of work and a maintenance period that incentivizes sustainable and quality design. More precisely, the construction period (5 to 7 years most likely) plus a maintenance period of 25 to 30 years makes sense providing the time periods are coordinated with the longest amortization schedule for the last tranche of financing used during the construction phase.

This recommendation is based on the addendum instructions to assume Cap-and-Trade is extended and remains a source of long-term funding for availability payments. Consideration should also be given to the likely sources of financing and the time limitations and associated costs therein. For example, Private Activity Bonds have a requirement that 95 percent of the bond proceeds be expended within a 5-year period from the date of issue. More broadly, the cost of carrying interest and financing costs over a prolonged construction period can be punitive.

Consideration of the capacity of the construction market should be made. This project lies in non-urban areas for the most part, and skilled labor in sufficient quantities to maintain the schedule may be an issue. The duration of design and construction should match the capacity of the market or the cost may rise to import and house sufficient trades persons.

The maintenance period should be determined with consideration of the following:

- We recommend that an appropriate maintenance period should place some asset replacement responsibility on the Developer so that asset life and replacement are given adequate whole-life consideration throughout the system lifecycle, inclusive of design consideration, construction quality, and maintenance standards.
- At the same time, defining an extremely long maintenance period may prompt developers and maintenance contractors to build in significant contingency due to the uncertainty associated with maintaining an asset over 40 years or more.

Balancing these two objectives, our recommended initial maintenance period for the DBFM contract is 25 to 30 years.

Contract Term for Potential DBFM Contract – IOS-South

Period Description	Authority 2014 Business Plan Estimate	Recommended Term (Years)
Design-Build	2017 to 2022	5-7
Maintenance		25-30
DBFM Contract		30-37

Contract Term for Potential DBFM Contract – IOS-North

Period Description	Authority 2014 Business Plan Estimate	Term (Years)
Design-Build	2021 to 2026	5-7
Maintenance		25-30
DBFM Contract		30-37

Term Adjustment

Increasing the Term

Design-Build Period. The term needs to be representative of the appropriate time to design and construct the work, providing a high degree of certainty with respect to revenue service commencement. As noted above, we recommend scoping segments such that the expected design-build period(s) would be in the 5- to 7-year range. At this stage, building billions of rail and civil infrastructure in 4 to 5 years is difficult when one considers the location and the number of skilled trades persons required. Right-of-way and environmental approvals should be in place to allow unfettered access for design and construction. Although increasing the design-build period(s) would not necessarily allocate risk differently, it would have potential financial implications (e.g., cost of carried interest, restrictions on use of PABs).

Maintenance Period. Increasing the proposed 25- to 30-year maintenance term would result in progressively increased allocation of risk to the private sector and in less competition and greater costs. Although there are several U.S. P3 projects with operations and maintenance periods in excess of 50 years, these tend to be toll road precedents – with the longer terms provided to enable concessionaires to cope with the financial uncertainties (and potentially enjoy the upside) of toll revenue transactions. For availability payment projects, such as the ones proposed here, the upside potentials for the Developer and the maintenance contractor are largely capped. However, the potential downside in terms of 30-year pricing risk is significant. A maintenance term in excess of 30 years would be unnecessary and would cause the Developer and maintenance contractor to price unknowns and uncertainty in the cost of the project

Decreasing the Term

Design-Build Period. A design-build period that is too short will cause the design-build contractor to include overtime costs, acceleration costs, and contingencies to cover the cost of financing or penalties until the work is complete.

Maintenance Period. Decreasing the proposed term would provide moderate decreased sharing of risk for the private sector as:

- The pricing risk associated with annual maintenance cost over a 25-year period would be reduced.
- If the maintenance period is too short, the Developer may select project components with a life expectancy to match the shorter term thus causing the Authority to have higher replacement costs after the end maintenance period. The lower asset replacement (renewal) costs would be lower

during the maintenance term thus reducing the cost of the IOS but increasing the post maintenance costs.

5. *What is the appropriate contract size for this type of contract? What are the advantages and disadvantages of procuring a contract of this size and magnitude? Do you think that both project scopes should be combined into a single DBFM contract?*

Contract Size

The largest P3 project to reach financial close in North America is the Eglington Cross Town LRT in Toronto, Ontario. The value of that transaction was US$4.07 billion. The largest P3 project to reach financial close in the world is the high-speed rail Tours-Bordeaux project. The value of that transaction was US$8.5 billion. An important feature in these very large P3s was the full backstop of the governments overseeing these developments. Lenders and sponsors are particularly watchful for these attributes. It is clear that California High Speed Rail could easily be the largest P3 development in the world.

Our team believes the right size of the project has the following features:

- Gets the test track up and running
- Sized to provide healthy competition
- Provides standard systems for the entire planned route such as controls, communication and signal systems
- Includes the buildout of a maintenance facility
- Sized so that the market is not overwhelmed with Cap-and-Trade financed bonds. Cap-and-Trade is a new frontier for the financial markets, and the quantity issued may affect the market's appetite resulting in higher interest rates.

Creating an initial operating system to start generating revenue is a clear and logical goal. There are many ways to divide the work to bring private investment into the project. Grouping civil, structures and track with communications and signaling and traction power makes for a $16 billion project for the IOS-South and a $12.5 billion project for the IOS-North. Civil structures (tunnels, bridges and viaducts) make up the largest share of this work. This logical combination of work makes for a record transaction. The Authority needs a sophisticated and experienced developer, such as Fluor-Balfour Beatty, which has the relationships to bring other successful partners into the development to match the expertise with the scope of the services we provide.

Advantages

The advantages of procuring a contract of the right size and magnitude include:

- Financeability
- Accelerated delivery of the system
- Draws the large, well-structured and -financed proposers to respond to the procurement request
- Single point of contact for the system has many advantages such as lower interface risk and lower Authority administration costs.
- Brings maintenance considerations into the design of the project
- Transfers risk to the private sector

- This integrated approach yields advantages in schedule and interface coordination
- Allows a wider scope for phasing the design and construction works for best efficiency
- Economies of scale

Combining IOS Packages

Combining IOS packages would most likely require a developer delivery model. The Authority would hire a developer to manage the development process and bring private source sponsors in as the development process advances. The segments would be financed in tranches as the segments are readied for development. Each segment may have different investors and contractors to spread the risk and investment across the market.

This model would reduce the number of staff at the Authority level. The developer would be fee paid for the development services. The developer may be allowed to participate in the DBFOM of the components in addition to the fee paid development services.

6. *Does the scope of work for each project expand or limit the teaming capabilities? Does it increase or reduce competition?*

Teaming Capability and Competition

We believe that adequate competition will exist as the project size grows. Where does that size begin to limit competition? We have some thoughts on who can compete at the various levels ranging up to the $12.5 billion for the IOS-North and will discuss them at our one-on-one meeting.

Including rolling stock in the IOS would exacerbate the challenge of maintaining competition. There are a limited number of qualified suppliers. They also are exclusive in a P3 pursuit.

Larger scope will lead to teams with more partners and the added difficulty of assembling a complementary team of well-qualified companies with a proven record of working together.

Integration and Interface Risk – Existing Civil and Structural Work

One of the interface risks is the work under contract now. Construction packages one through four will be accepted by the P3 team. To secure the most completive pricing, the Authority should strive to have these conditions available at the start of design.

- Completed construction
- Well-documented as-built records
- Access to quality and test results
- Access by the preferred proponent for nondestructive testing of the work provided by others
- Requirement for a formal inspection and handover to the P3 team
- Provision of enough information to the proponents at the bid phase to allow factual estimating thus reducing contingency

Since the P3 team will be responsible for the maintenance of this work by others, this regimen is very important.

Responses to Funding and Financing Questions

7. Given the delivery approach and available funding sources, do you foresee any issues with raising the necessary financing to fund the IOS-South project scope? IOS-North project scope? Both? What are the limiting factors to the amount of financing that could be raised?

Available Funding Sources

The Authority has identified three primary sources of funding for the program:

- Federal grants: $3 billion, all of which has already been committed to CP1, CP2-3, and CP4;
- Proposition 1A funds: $9.95 billion of bonding capacity, of which $4 billion would appear to remain available; and
- Cap-and-Trade (C&T) Proceeds, with annual program proceeds starting at $500 million in FY15/16.

To leverage these funding sources, the Authority and private developer would have several financing alternatives available:

- Equity
- 144A Issues
- Private Placement
- Private Activity Bonds (PABs)
- Commercial Bank Debt
- TIFIA Loan
- RRIF Loan

There is significant capacity to finance large P3 projects such as the ones contemplated by the Authority. The true question then is whether the available funding sources are sufficient to support the requisite capital expenditures and associated financing. Either of the Initial Operating Segments would represent the largest P3 procurements in North America if not the world. Although the Authority has significant resources at its disposal, raising this amount of capital will certainly present a challenge, particularly given that lenders and investors have limited experience with the primary source for long-term capital repayment – C&T Proceeds.

In our view, the uncertainty with respect to C&T revenue projections and, more broadly, C&T legislative extension present the most limiting factors to raising financing. We have assumed the stipulation from the Authority that C&T will be extended in our observations and recommendations herein. We will be pleased to share our viewpoint on the indicative amount of financing capacity given this assumption at our one-on-one meeting.

Several strategies we would recommend to facilitate program financing and continue momentum within the overall program include:

Applying for PAB, TIFIA, and RRIF Allocations

These sources of financing will provide the lowest cost of capital to the project, and we would recommend that the Authority initiate the process to obtain allocations if it has not already done so.

Shortlisting Experienced and Creditworthy Developers

In addition to the credit quality of the repayment stream, lenders will also look to the creditworthiness of the design-build and maintenance contractors as well as the Developer's demonstrated success with executing and operating U.S. P3 projects.

The creditworthiness of the maintenance contractor(s) will be especially important to lenders because of the high operational gearing in the structure. The project also includes taking on the preparatory works that are currently being completed. This coupled with the potential for milestone payments and the complex nature of the operations means that the long-term financing piece will have a high operational gearing (i.e., the ratio of operating costs to the long-term financing is very high). This can be structured around, typically by reducing the gearing and providing a greater amount of equity buffer. There is a concern, however, given the size of this project that doing so will put strain on equity capacity and could turn off certain equity investors, which may have an adverse impact on the price. The level of additional equity buffer required by lenders will be impacted by the quality of the maintenance contractor and their security – the better quality the maintenance provider, the less equity buffer required and the less strain placed on the capacity of the equity market.

Instituting a Development Agreement with Market-Tested Risk Profile

Several Development Agreement frameworks have been established in the U.S. P3 market. In our experience, the Development Agreements that adhere to the principle that risks are allocated to the party(ies) best suited to address such risk are the ones that achieve the most efficiencies and reach the most expedient financial close.

Segregating IOS-North and IOS-South into Smaller Segments

As contemplated, the IOS-North or IOS-South would represent the largest P3 procured in North America. Although there is certainly value in procuring one or two mega-projects, there may also be scheduling and competitive efficiencies achieved by segregating the IOS-North and/or IOS-South into smaller segments. As noted above, the capital markets are not experienced in raising financing based on C&T revenues and may well approach the underwriting cautiously. Further segmenting one of the Initial Operating Segments and procuring an initial P3 on a smaller scale may facilitate the first C&T backed financing, enable the project to go to market sooner, and enable the Authority to maintain momentum with the overall program. We welcome the opportunity as to how the IOS could be further segmented at the one-on-one meeting.

Utilizing C&T Proceeds and Proposition 1A to Maximize Short-Term Payments

Applying the majority of C&T Proceeds and Proposition 1A bond proceeds towards short-term milestone/progress payments would reduce long-term financing needs thus imparting the efficiencies, risk transfer and whole-lifecycle cost benefits of a DBFM model, while reducing the amount of funding financed with higher cost private capital. We would suggest sizing aggregate milestone payments such that the ultimate long-term project financing requirement is in the $1-to-$3 billion range – with the higher range assuming that TIFIA and/or RRIF financing make up a significant part of the project financing structure.

We note that initial feedback from the capital markets suggests that the limited track record of California C&T auctions may well result in conservative leveraging of this revenue source (i.e., relatively high levels of coverage may be necessary). As a result, the initial C&T-backed financing may result in significant levels of "free cash" that may be applied towards milestone payments for additional works and/or procurements. In other words, the projected C&T revenue stream may be optimized by applying a higher percentage of the stream towards short-term milestone payments and a smaller percentage towards long-term capital repayment.

8. *What changes, if any, would you recommend be made to the existing funding sources? What impact would these changes have on raising financing?*

The RFEI suggests that Cap-and-Trade Proceeds will serve as the primary long-term funding source for financing repayment. Since the first auction in 2012, the C&T program has demonstrated itself to be a success, and the dramatic expansion of revenues as the program encompassed distributors of transportation, and natural gas and other fuels in 2015 has bolstered the viability of the C&T program as a major funding source for the high-speed rail program. As noted above, however, the novelty of this revenue stream may present challenges to raising financing on the most efficient basis. To counter these challenges, several changes that the Authority might consider include:

Explicit Extension of C&T Legislation

The initial feedback from the capital markets is that an explicit extension of C&T legislation, detailing the nature of future auctions (e.g., amount, allocation, and schedule of allowances, setting of minimum and maximum pricing thresholds) will be necessary in order to arrange a long-term financing. We understand this is in the works with the Legislature.

Authorization to Pledge C&T Revenues

The allocation of 25 percent of auction proceeds provides a significant source of revenues for high-speed rail. It is not entirely clear, however, that the Authority has the unfettered right to pledge such revenues as security for a project financing. As contractors, investors, and lenders will require such a pledge, the Authority should be granted the explicit right to pledge the revenue allocation to support payment obligations to these parties.

Restrictions on C&T Allocation Reduction or Revision

Although federal constitutional protections may provide vested contractual rights, the revised legislation would ideally have language prohibiting the Legislature or the California Air Resources Board (ARB) from changing the C&T auction system and/or the allocation of funds. Such language would facilitate a financing in that it would grant pledgees an impairment of contract claim if a party attempted to change the funding stream in the future.

Utilization of Proposition 1A Proceeds for DBFM

As suggested in the RFEI, the Authority might consider committing Prop 1A funds to the DBFM projects while allocating C&T Proceeds to the ongoing Central Valley projects (CP1, CP2-3, and CP4). In this way, Prop 1A funds (with the broadest acceptance in the capital markets) are preserved for the privately financed projects while C&T Proceeds are used as quickly as possible on a pay-as-you-go approach.

Proposition 1A Takeout of C&T Financing

We understand the urgency with initiating the procurement of the next phase and continuing the momentum of the overall program. We also appreciate that, if a significant amount of project financing is to be backed by C&T revenues, the procurement initiation of the next phase may precede or coincide with legislative process to extend C&T (necessary to enable a C&T-backed financing). As such, proposers may be tasked with arranging financing without a clear picture as to the ultimate quantum and stability of the repayment source. A potential solution to this challenge may be to solicit C&T financing but with a Proposition 1A backstop in which Proposition 1A funds would be used to take out the C&T financing under certain conditions (e.g., failure to extend C&T, extension of C&T on less robust terms).

Pledging Proposition 1A funds to serve as a backstop takeout of a C&T financing would accelerate the procurement by enabling the Authority to go to market with the funding it currently has. It would also buy the C&T program time to develop a track record and credibility in the capital markets such that a C&T-backed refinancing or extended amortization schedule could be arranged, thus preserving Proposition 1A bonding capacity for future capital needs.

California State Backstop

Absent a pledge of Proposition 1A proceeds to backstop a C&T financing, the Authority might investigate whether the State of California would backstop/insure the C&T Proceeds pledge in the event of:

- Suspension of the C&T auction – as permitted under Assembly Bill 32 (Part 7 Section 38599(a))
- Cancelation/termination/reduction of the C&T Program
- Adverse change to the C&T auction process (e.g., ARB increase in free allowances)

C&T Reserve Funding

To enhance the credit profile of the C&T revenue stream, it may be beneficial to establish a reserve fund for use in the event of volatility in the C&T auction market. This reserve could be funded via the 25 percent C&T allocation to HSR, or if the legislation permits, from the broader C&T revenue stream. As an alternative credit enhancing measure, legislative approval permitting, a California State obligation to backfill the C&T reserve fund might be considered.

9. Given the delivery approach and available funding sources, is an availability payment mechanism appropriate? Could financing be raised based on future revenue and ridership (i.e., a revenue concession)? Would a revenue concession delivery strategy better achieve the Authority's objectives?

Very few high-speed rail schemes, outside of extremely densely populated areas such as Japan, employ farebox as the principal revenue stream for project financings. Although one of the most recent HSR precedents, the Tours-Bordeaux HSR P3, had an element of farebox revenue financing, the vast majority of the financing was enhanced via French government and/or existing operator guaranties. We understand that the Authority is looking primarily to procure this as DBFM availability-based concession with the operations procured via a separate contract enabling a single operator to run the whole system. It would appear appropriate, therefore, that any farebox revenues should be used to pay for the operation of the asset. Any funds in excess of that requirement can be used by the Authority as funding for the availability payment; to achieve efficient financing, however, this should be secured by C&T proceeds and other potential sources of funding that have suitable tenor and risk characteristics.

When we consider the financing challenges that are detailed in our responses to questions 7 and 8, simplifying payment streams and credit stories for lenders and equity providers is recommended to achieve the best value for money solution. We recommend farebox be saved exclusively for the train operations.

For this project, we believe that an availability payment structure is suitable. A revenue payment structure does not meet the Authority's needs with regards to control over the asset because it does not offer an equitable risk allocation between public and private sector and it will put strain on an already challenging finance structure.

10. Based on the Authority's capital, operating, and lifecycle costs from its 2014 Business Plan, describe how the preferred delivery model could reduce costs, schedule, or both. Please provide examples, where possible, of analogous projects and their cost and/or schedule savings from such delivery models.

The preferred delivery model proposed by Fluor-Balfour Beatty for the IOS is:

- Civil infrastructure excluding the work contracted under CP1-4, track and ballast, the traction power system, communications network, and signaling system
- Design, build, finance, and maintain under a concession agreement
- 30 to 37 years including design construction and maintenance
- Fluor-Balfour Beatty is supportive of any contract value the Authority wishes to procure subject to the demonstrable ability to pay the resulting annual availability payments.

From the perspective of the whole system and achieving appropriate savings for procurement, Fluor-Balfour Beatty offers the following initiatives to reduce costs and schedule and to mitigate risk across the completion of the San Francisco to Anaheim network:

- A single rolling stock provider – Fluor-Balfour Beatty suggests that the procurement of the rolling stock is through one contract with an initial supply and the option for a future supply subject to confirmation by the Authority. This means the competitive procurement applies to the future needs as well as the initial needs for rolling stock, locking in the competitive pricing pending future option by the Authority.
- The selection and procurement of the rolling stock by the Authority are a critical milestone to allow IOS developers to ensure the design of the infrastructure and the interface with the trainsets will operate properly together. The timing of the appointment of the rolling stock provider relative to the P3 Developer in the procurement process is vital. Ideally, the rolling stock provider will be appointed by the Authority concurrently with the issue of the RFP for the P3 project to allow discussion between the design-builder and the rolling stock provider to ensure compatibility and key interfaces are understood and accommodated in the design development. This approach will minimize much of the integration risk for the Authority.
- Indeed, should the Authority wish to, Fluor-Balfour Beatty will take on the rolling stock provision as part of the P3 project, which completely removes the integration risk from the public sector.
- The signaling, communications and traction power systems will require plant housings at locations along the route. Fluor-Balfour Beatty recommends that these facilities are included as part of the scope so that the suitable accommodation is provided by the same entity as is providing the systems.
- Fluor-Balfour Beatty believes that the best value and risk transfer is achieved through having one organization provide one set of systems for the whole network, thus avoiding multiple interface and multiple compatibility issues including:
  - Track
  - Traction power
  - Signaling
  - Communications

This goal can be achieved through an incremental pricing mechanic that defines two segments to complete the whole of Phase 1:

- 'First IOS' is the segment currently under consideration.
- 'Network Completion' is the remaining scope to complete the full service between San Francisco and Anaheim.

Under incremental pricing, proponents are required to:

- Provide firm proposals for the First IOS segment that can be taken through to financial close as currently envisioned
- At the same time provide a future commitment and mechanism for agreeing the future cost for the Network Completion segment based on the competitive pricing of the First IOS on a transparent, open-book basis, exercisable at some date in the future at the option of the Authority and when funds are available.

Using this methodology means the full scope of the project has been procured in competition and that there is a very clear mechanism for building up a cost for the completion of Phase 1 based on the elemental pricing for the First IOS.

This methodology has been used previously on Balfour Beatty Investments' M25 DBFO project to widen the London orbital motorway in the U.K. where the initial upgraded sections were priced and committed at bid stage with the later upgraded sections being priced on an open-book basis for commencement following the 2012 London Olympics. This is a mechanic that Fluor-Balfour Beatty would be keen to replicate for the completion of Phase 1 for the California High Speed Rail System.

Costs Impacts

The preferred delivery model positively impacts the total project whole-life costs as follows:

- Transfers more interfaces to the Developer with the associated risks.
- Provides greater scope for innovation across more interface elements.
- The design-build agreement between the design-builder and the Developer encourages overlap of the design and construction works promoting innovation, a fully integrated schedule, and a value engineered solution thus minimizing cost and aiding to accelerate the construction completion schedule and start of revenue service.
- Maintenance responsibility over the contract term would cause the Developer to include the maintenance team in the design aspects of the project to balance whole-life maintenance costs with capital costs. This would lead to a lower annual availability payment.
- Maintenance responsibility would cause the maintenance team to have a robust and engaged transition from construction to operations and additionally for the maintainer to be actively involved in the construction, commissioning, and test running of the IOS before completion, meaning there is a confident transition to operational maintenance and thorough understanding of the scope, infrastructure, and equipment to be maintained.
- A reasonable maintenance term balanced with an effective handback regime and the appropriate discount rate for the maintenance period costs would cause the Developer to build a cost model that balances first costs with maintenance costs and renewal costs for the most effective net present value.
- A P3 procurement model enables competitive private-sector financing and investment.

- Provides a maintenance term that encourages lifecycle cost decisions rather than first cost decisions.

Both the design and construction and the maintenance and renewals cost is fixed at the time the Developer submits proposals and is confirmed at Financial Close. Since there would be few circumstances where the costs can increase means P3 would deliver cost certainty to the Authority.

Schedule Impacts

The preferred delivery model positively impacts the project schedule as follows:

- Coordination of design and construction priorities promotes schedule efficiencies and faster construction.
- The number of interfaces within the preferred scope provides better coordination and lower risk to the Authority.
- The design and construction schedule within the Developer's proposals is effectively 'guaranteed' through a significant incentive to complete on time or early. Historically, completion dates within a P3 form of contract have been met giving confidence of the date for revenue service

Analogous Projects

Both Fluor and Balfour Beatty have completed a number of significant high-speed rail projects throughout the world. Completion of these projects comes with learning the lessons of these specific procurements and projects:

High Speed Line (HSL) – South, The Netherlands (completed)

Description: 62-mile, high-speed rail system from Schiphol Airport to the Belgium border, via Rotterdam.

Procurement Approach:

Asset	Scope	Procurement Method
Civil Assets	6 Civil Packages (1 major tunnel package)	Bid-Build Design-Build
Systems Assets	Track, Traction Power, Signaling, Communication, Tunnel MEP	P3 Design-Build-Maintain (25 years)
Rolling Stock	Vehicles	Supply

Note: Civil Assets and Rolling Stock maintained by Owner. Operations by Owner.

Cost and Schedule Benefits:

- Procurement strategy spread the civil work among several contractors performing the work in parallel – cost and schedule benefits were achieved.
- Combined all railway infrastructure for the full length of the system (including interface responsibility to existing railway systems at each end of the project) under one procurement – cost and schedule
- Competitively procured the rolling stock direct to vehicle suppliers – cost

Denver Eagle, Denver, Colorado (under construction)

Description: 36- mile commuter rail start-up system from downtown Denver Union Station to the Denver International Airport, South Westminster, and Ward Road, Arora.

Procurement Approach:

Asset	Scope	Procurement Method	Est. Value
Civil, Systems, Rolling Stock Assets	Complete transit system inclusive of rolling stock, dispatching and security facilities and maintenance facility	P3 Design-Build-Operate-Maintain (29 years)	$3 billion

Cost and Schedule Benefits:

- Competitive procurement for a complete commuter rail system – cost and schedule

Eglington Light Rail, Toronto, Ontario, Canada (under construction)

Description: Extension of the Toronto light rail system

Procurement Approach:

Asset	Scope	Procurement Method	Est. Value
Civil Assets	Excluding tunneling	Design-Build-Finance-Maintain	US$4 billion
Systems Assets	Included in the above	Design-Build-Finance-Maintain	
Rolling Stock	By the Authority	By the Authority	

Cost and Schedule Benefits:

- Competitive procure the tunnel work

11. How does this compare to separately procuring each high-speed rail component (i.e., separate contracts for civil works, rail, systems, power separately)? Please discuss design/construction costs, operating/maintenance/lifecycle costs, and schedule implications.

Comparison to Separate Asset Procurements

General

When the public sector retains the interface risk between separately procured elements, the public sector retains the risk of cost increases and schedule overruns. These overruns can arise from:

- Late completion of a previous element.
- Inadequate design coordination, definition, or incompatibility between elements.
- Failures of individual elements impacting other elements.
- In a traditional design-bid-build procurement where the public sector retains full design responsibility and risk.
- Delays and costs associated with specific aspects of the testing and commissioning works not within the responsibility of the party testing and commissioning.
- Public sector inevitably becoming involved in defending and managing contractor claims arising from the interfaces.

The public sector will bear the responsibility for the resources to procure multiple packages together with the associate administrative and coordination burden.

Design/Construction Costs

The issues surrounding separate procurements in the context of the design and construction costs include:

- The Authority is responsible for designing and managing the interfaces, including the resolution of those issues. This has a high potential to increase costs and schedule.
- The Authority owns the system integration risk, that is the risk that the railway infrastructure and the rolling stock operate properly on the network, and in particular the management and risk associated with system commissioning and revenue service commencement.

Operating/Maintenance/Lifecycle Costs

The benefits of long-term contracts including maintenance of the network to a defined standard and to include major renewals are lost, meaning:

- Opportunity for technical whole-life cost input from actual construction contractors during the design process is not available if bid-build procurements are adopted, leading to design and construction works that do not fully embrace the whole-life solution resulting in potentially inefficient and more expensive maintenance regimes and renewal cycles
- Inefficient maintenance regimes and more frequent renewal works disrupting the operational service due to the downtime required.
- Authority has no certainty over the long-term costs to maintain and carry out renewals during the life of the project.

Schedule Implications

- The Authority retains the risk of construction and commissioning delays associated with the completion of preceding works under separate contracts, which can lead to significant cost and schedule overruns.
- The ability to gain maximum schedule benefit from overlapping and prioritizing design elements with construction is not achieved, which leads to a longer overall construction period, thus pushing the start of revenue service back in time.

12. For each project, are there any technical changes to the respective scope of work that would yield cost savings and/or schedule acceleration while still achieving the Authority's objectives? If so, please describe.

Fluor-Balfour Beatty has considered the response to this question under two broad headings:

- Risk transfer. Reviewing the risk transfer in the context of cost savings and schedule acceleration
- Scope. Changes in scope that improve the economics of the project and offer opportunities for schedule acceleration

Risk Transfer

Defects in the completed sections of CP1-4. The standard of design and construction work for sections CP1-4 (procured separately) may lead to defects in the completed works that are 'incorporated' into the project, causing unplanned maintenance costs and unavailability deductions. This is likely to be a difficult risk for lenders and for the Developer to absorb without some form of cap or sharing of liability. The Authority may wish to consider ultimately retaining some or all of the latent defects risk for these sections as a value for money proposition.

Scope Changes

Maintenance facilities. A co-located maintenance facility or facilities for the infrastructure maintenance by the Developer and for the rolling stock maintenance offers economies of scale if these facilities are included in the scope of the IOS project. While the Developer will fully fit out the infrastructure maintenance facility, the rolling stock maintenance facility can be designed and constructed to a shell and core specification (or alternatively fully fitted out if the requirements are known as a result of early procurement of the rolling stock provider covered in Question 3 response of this document). This means design aesthetics would be consistent and the Authority would receive the benefit of economies of scale in construction costs.

Rolling stock. Fluor-Balfour Beatty has suggested through this document that there is a critical path that runs through the rolling stock procurement and the ability of the Developer to fully take onboard the integration risk for the system. From our experience, the incorporation of the rolling stock into the project scope is beneficial to the schedule by allowing the appropriate level of interaction between the systems designers and the rolling stock market and provider, allowing the design development schedule to be accelerated for the overall benefit of completing Phase 1 of the California High Speed Rail System.