

Kiewit Corporation

Expression of Interest for the Delivery of an Initial Operating Segment

RFEI HSR#15-02

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September 28, 2015



California High-Speed Rail Authority
770 L Street, Suite 620 MS 2
Sacramento, CA 95814
Attn: Rebecca Harnagel

RE: California High-Speed Rail Authority Request for Expressions of Interest for the Delivery of an Initial Operating Segment RFEI HSR#15-02

Dear Ms. Harnagel,

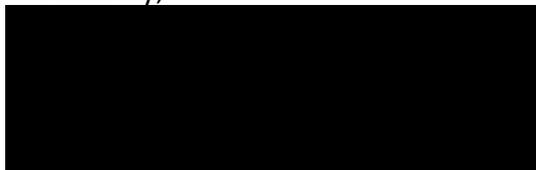
Kiewit Development Company, Mass. Electric Construction Co. and Kiewit Infrastructure West Co. are pleased to submit this response to the Request for Expressions of Interest (RFEI) issued by the California High-Speed Rail Authority (the Authority) for the delivery of an Initial Operating Segment (IOS).

We are subsidiaries of Kiewit Corporation, one of the largest and most highly regarded construction and engineering organizations in North America. Kiewit operates through a network of district and area offices located throughout the United States. Kiewit has vast experience with a wide range of alternative project delivery methods such as Public-Private Partnership (P3) and Design-Build (DB). In fact, we deliver approximately 75% of our work to clients through alternative delivery methods.

We collectively specialize in rail, electrical overhead contact (OCS) and traction power systems (TPS), highway, bridge, maintenance operations, and other related infrastructure and public works programs. Accordingly, our response contains practical information gleaned from our extensive experience in the alternative delivery and rail sectors. We believe that our experience and insight can help the Authority move the planning and development efforts for California's high-speed rail system forward and ultimately help ensure its success.

We look forward to scheduling a one-on-one meeting to discuss further details and procurement strategies. Please contact me should you require any additional information.

Sincerely,



James Geer
Vice President, Kiewit Development Company
(402) 943-1405 / james.geer@kiewit.com



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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.

We are not responding to this RFEI as a member of a team; however, we will partner with other market leaders once the delivery method and associated scope of the work are determined to respond to any requests for qualification and requests for proposal issued by the Authority.

Heavy Civil and Rail Experience -

Kiewit is one of the largest and most trusted contracting organizations in North America, with more than 130 years of construction experience, 70 years of rail construction experience, and an extensive resume of



successful rail projects. A Fortune 250 company with revenues of over \$10 billion, Kiewit opened our first office in California in 1944 and has been building projects in California for the last seven decades. Our projects in California have included rail, transportation, water and wastewater, power, and commercial facilities.

We offer a one stop shop for our client's needs by integrating the services of our subsidiary Mass. Electric Construction Co. (MEC) with Kiewit's engineering, heavy civil and track building groups. Kiewit has successfully delivered rail projects across North America, under DB and engineering, procurement and construction (EPC) delivery models. We are leaders in the construction of rail lines and rail yards, specializing in systems, civil, track installation, and O&M. Our experience allows us to provide clients with designs optimized for constructability, quality and safety based on accurate construction estimates from real-world production data. Kiewit, in cooperation with MEC, is one of the premier rail builders in the U.S., having completed more than \$12 billion in rail projects in the last 10 years alone. Kiewit and MEC combine our expertise by integrating our project teams, providing our clients with:

- Visible success
- Clear communication
- Expedited schedules
- Reduced risk



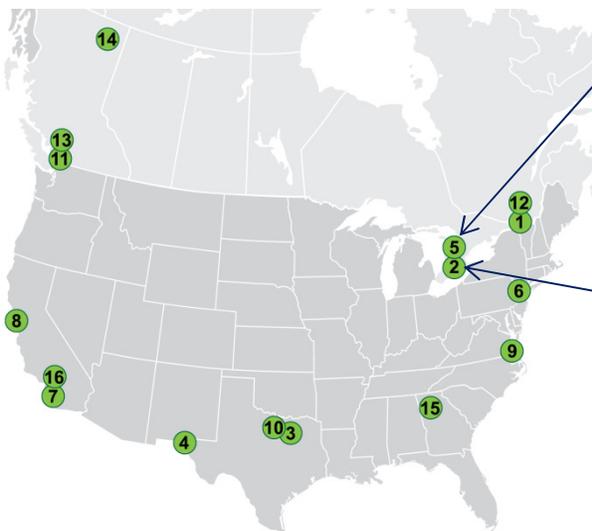
- Increased quality of construction

Our effectiveness and range of services ultimately leads to overall project cost reduction, as shown by our successful delivery of projects for clients in California, including LACMTA, SCRRRA, VTA, BART, CALTRAIN, CALTRANS, SACRT and SANDAG. Our experience includes heavy civil, including bridge, tunneling, viaducts, rail and systems, for cities and agencies that serve urban populations across the U.S.

P3 Project Experience - Kiewit was an early adopter of the P3 model having participated as a developer and equity investor on the SR-91 Express Lanes project in Orange County. Building on that early success, Kiewit Development Company (KDC) has developed a multi-faceted business presence across North America, with an experienced staff of management, technical, asset management and transactional legal experts dedicated to delivering innovative alternative delivery solutions.

KDC's success is based on trust that has been built with government officials, project stakeholders and the financial community. KDC has provided options and solutions for many clients and has established working relationships with the nation's leading and most respected infrastructure funds, lenders, underwriters and financial advisors. As a recognized leader in alternative contracting delivery methods, KDC combines extraordinary financial credibility and extensive resources with a creative, solution-oriented approach.

In the last five years alone, Kiewit has pursued over 34 P3 projects with an aggregate capital cost of more than \$30 billion as a developer, equity investor, DB contractor, and/or O&M service provider and raised over \$10 billion in debt and committed over \$185 million in equity.



Waterloo LRT Phase 1 In May of 2014, Kiewit successfully achieved financial close on a \$521 million light rail transit 30-year DBFOM project in Waterloo, Ontario. On this project, Kiewit is a joint and several member of a fully integrated design build joint venture as well as an equity investor.

East Rail Maintenance Facility In March of 2015, Kiewit successfully achieved financial close on a \$345 million rail maintenance facility 30-year DBFOM project in Whitby, Ontario. On this project, Kiewit is a joint and several member of a fully integrated design build joint venture as well as an equity investor.



Project Name	Procurement Model	Status
1 Pointe-Saint-Charles Commuter Rail Maintenance Facility	DBFM	Under Construction
2 East Rail Maintenance Facility	DBFM	Under Construction
3 SH 183	DBM	Under Construction
4 Loop 375	DBM	Under Construction
5 Waterloo LRT Phase 1	DBFOM	Under Construction
6 Goethals Bridge	DBFOM	Under Construction
7 Carlsbad Seawater Desalination Plant	DBFOM	Under Construction
8 Presidio Parkway	DBFOM	Operations
9 Midtown Tunnel	DBFOM	Under Construction
10 DFW Connector	DBM	Operations
11 Port Mann/ Highway 1	DB (procured as P3)	Operations
12 Autoroute 25	DBFOM	Operations
13 Sea-to-Sky Highway	DBFO	Operations
14 Sierra Yoyo Desan Road	DBFM	Operations
15 Northwest Corridor (I-75/I-575) Project	PDA	N/A
16 SR-91 Express Lanes	DBFOM	Operations

We have consistently undertaken and managed cost, technical and schedule risk associated with P3 projects, and we bring value to our clients through our proven ability to deliver large, complex construction projects on time and on budget. Our participation in all facets of P3 delivery aligns the interests of the team to deliver optimal value to our clients.



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.

We are interested in both IOS-North and IOS-South scopes. Our preferred role and level of participation will be determined once the scope and commercial terms for each project are identified.

To position the delivery of these projects to meet the goals of the Authority, a concession approach is supported. The use of this delivery model will align the interests of the parties. The private sector financial investment that is fundamental with this approach allows for greater control and responsibilities. This drives innovation and provides more certainty with cost and schedule risk. Delivery of the IOS-South and IOS-North scope needs to take into account integration issues. Future systems operations are a crucial element and continuity is required between power, systems and equipment. Contract size considerations are discussed in our response to Question 5 on pages 9-10.

We recommend that Construction Package 5 follow the procurement model used for Construction Packages 1, 2-3, and 4 (DB). An immediate procurement of CP5 would provide the Authority time to appropriately develop a strategy for delivering the remainder of the initial operating segment.

Using the DB delivery model for CP5 has several benefits including:

- Scope would be of sufficient size to solicit maximum competition
- Funding for the scope is aligned with the Authority's budget over the short term
- The "backbone" can be made operational to advance the program and begin testing

The details of how we would approach each project scope is provided below.

Traction Power Including OCS (TES) – The Traction Power System can be sourced via multiple options depending on the RFP requirements. Each option would provide a fully integrated and cost effective solution meeting all performance and life cycle requirements. Options include:



- Complete TES package, with or without design, from a single supplier
- Individual systems (TPS or OCS), with or without design, from individual suppliers
- Design completed by the DBFM and components sourced from multiple suppliers

Systems – Ideally, the best alternative for the systems elements is to source a complete systems package, but there is also the ability to source individual subsystems and incorporate them into the system. There are numerous full service HSR experienced options available depending on whether they team up with a DBFM or stand alone, however if no full service option is available our team is capable of sourcing the individual subsystems and integrating them into a fully functional system.

- Communications – Sourced as part of a complete Signaling/Communications Package or individually if needed.
- Signaling – Sourced as part of a complete Signaling/Communications Package or individually if needed.
- Operational Control Center (OCC) – This would be sourced with the Signaling System
- Local Operational Control Center – This would be sourced with the Signaling System
- Warning Systems – The headend of this system would be sourced with the Communications System while the field is purchased based on individual components
- Supervisory Control and Data Acquisition System (SCADA) – The headend of this system would be sourced with the Communications System.
- Closed Circuit Television (CCTV) System – The headend equipment is best sourced with the Communications System while the field is purchased based on individual components.
- Direct Line Phone System – The headend equipment is best sourced with the Communications System while the field is purchased based on individual components.

Passenger Information System – The headend equipment is best sourced with the Communications System while the field is purchased based on individual components.

With respect to TES, Systems and Passenger Information System, our approach would not vary between IOS-North, IOS-South and CP5, if procured separately. However, with respect to civil work, IOS-South is more complicated with the need for much more tunneling work in remote areas. There are very few qualified contractors able to perform the work of this size and complexity. In comparison to IOS-South's complexity, IOS-North is a more traditional heavy civil project. Additionally, by focusing first on IOS North allows for connectivity into a downtown hub using existing rail infrastructure and the terminal station currently under construction. If both projects were combined, it may limit competition by introducing the specialized tunneling work that would not exist in large part in the IOS-North project.



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.*

Yes, the proposed delivery strategy of combining civil works, track, traction power, and infrastructure is likely to yield innovation that will minimize whole-life costs and accelerate schedule because of the holistic approach to project design. We recommend using a delivery strategy that allows for the “backbone” to be completed under a DB procurement model, for CP5, and focusing on IOS-North first.

However, we anticipate interface and integration challenges with respect to work designed and built by others. If maintenance of existing assets is transferred, Developers and lenders will require indemnities from the Authority with respect to such assets, which will reduce true risk transfer. Our capacity to take responsibility for the maintenance and performance of existing assets will be dependent on our ability to rely on Asset Condition, Quality and Acceptance Reports backed by proper indemnity/warranty obligations by the Authority and those that built the work.

Schedule Innovation – In single component procurements, innovation is limited to that component. The combination of multiple components into a single project allows the team to balance different solutions, from different components, off of each other yielding a more cost and schedule effective project. A component that is more costly with a better schedule or life cycle costs can be balanced off a component with the opposite effects may yield the lowest cost to the project. This strategy also provides an incentive for the delivery team to better schedule the work flow reducing float between components, better sequencing of activities to take advantage of improved productivity, resulting in an earlier delivery. In a single component project the delivery team has little incentive to allow other contractors into their work area early.

Cost/Life Cycle Innovation – If the Authority takes a true alternative delivery approach and provides appropriate performance criteria, we believe that there are significant opportunities to incorporate innovative ideas that will have positive impacts on life cycle, reduce schedule durations and lower costs. The more specificity that is prescribed in the RFP, the fewer options the private sector will have to innovate which will ultimately results in higher costs for the Authority.



Performance based criteria starts with design requirements. The design should clearly establish functional requirements for the overall system performance. Contract documents should be developed to complement and refined operations requirements and environmental documents. Examples of functional requirements include:

- Number of trains per hour (maximum capacity)
- Preferred schedule
- Amount of operational recovery to support the operations to get back on (recover) schedule after an unplanned event
- Normal operating procedures
- Emergency operating procedures
- Maximum speed

On a recent pursuit our team was able to identify solutions that would reduce construction, maintenance and life cycle costs 10 – 20% on the Traction Power and Overhead Contact Systems. However, the owner utilized a very prescriptive based specification and advanced design which resulted in a small fraction of these cost savings being implemented.

2. Does the delivery strategy adequately transfer the integration and interface risks associated with delivering and operating a high-speed rail system? What are the key risks that will be borne by the State if such risk transfer is not affected? What are the key risks that are most appropriate to transfer to the private sector?

We believe that the proposed models can adequately address the technological Integration/Interface Risks associated with a high speed rail project. However, there is concern on whether complete performance risk along the “existing corridors” (Caltrain and CP1-4) could be transferred. As with any project that has multiple parties the contract documents must expressly address the responsibilities of all parties and contain complete and accurate performance and interface requirements.

Rolling Stock – Not having the rolling stock as part of the contract will allow CAHSR to procure vehicles based on pure rolling stock requirements, allowing it to select rolling stock based thereon. The Authority will need to provide complete performance and characteristics of the rolling stock (including dynamic envelope, platform/door interfaces, current draw under various acceleration modes, EMI, service and emergency braking parameters and aerodynamics) to bidders and clearly communicate interface and integration requirements and expectations. Delivery dates to support testing and integration of a test track for testing the vehicles will need to be planned in the delivery schedule.

Signals – Having a single signal system span the entire length of the project reduces the



interface and integration concerns. For Construction Packages 1 to 4, system-wide infrastructure will need to be built to install the signaling and communications systems, regardless of the delivery model selected. The Authority will need to provide accurate and detailed as-built documentation as part of the RFP for such work. On the IOS-North option there will be a concern about integrating with the existing signal systems on Caltrain and UPRR alignments and other operators on the Caltrain corridor. The Authority will need to provide complete as-built information on the Caltrain corridor and all trains that have access thereto.

Traction Power Systems (TPS) – TPS integration is very limited and is more about communications between TPS facilities, 25KV electricity knows no difference. We see no integration concerns on the IOS-South Option. On the North option the DBFM will be required to integrate with the existing system on the Caltrain Corridor and that is easily mitigated with the provision of the as-built documentation and interface requirements (communication protocols, operating scenarios, control center interfaces, EMI, etc.).

OCS – The integration of OCS across multiple procurements is not an issue as it is a function of physical concerns that are easily documented by as-built drawings as would be required for the tie-in at San Jose Diridon. The procurement of the OCS as a single package eliminates this. The OCS performance on Construction Packages 1 to 4 will be dependent on the placement of poles on the existing aerial structures and bridges. If these are not properly spaced the DBFM may not be able to meet the performance requirements. There would also be a potential concern on whether the existing foundations are sized to handle the OCS load to be placed thereon. The delivery team will need to advance the OCS design pre-bid to evaluate this risk or the Authority will need to maintain responsibility therefore.

Track – Similar to OCS, installation of track is a physical interface/integration issue. The delivery team is going to be responsible for ride quality and therefore will need to be guaranteed that quality and performance of the substructure delivered under Construction Packages 1 to 4 will meet contract requirements. The delivery team may need to perform testing to accept the transfer of responsibility of the existing infrastructure or the Authority can maintain responsibility.

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?

We do not support the inclusion of rolling stock or train operations into the scope of work for each project. These are areas that can be procured and integrated into the CAHSR system more efficiently than if included in the scope of work for each project. The inclusion of rolling stock



into the scope of work complicates the teaming and selection process and, in our opinion, provides the Authority with a less desirable end product.

The limited number of HSR experienced operators allows for the teams that are formed early to have an advantage leaving second and third choices for the rest of the field. Additionally, in a head to head competition, we believe that rolling stock providers and operators can be much more aggressive in pricing if they are separately procured as they are no longer “hidden” beneath a mega pursuit.

Stations could be added into the scope of work, but the unique and local nature of station design might impact project completion.

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)?

A long-term Availability Payment concession will encourage the private sector to focus on the whole life stream of services and costs for the duration of the contract. The concessionaire will have the ability and incentive to transfer monies between capital and operational budgets with the objective of optimizing the whole life cost. A term of 30 to 35 years is typical and has the following benefits:

- Common period familiar to long-term debt providers on P3 projects
- Consistency with other P3 projects for system turnover to owners and associated life-cycle risk
- Alignment with rolling stock and major systems overhaul and replacement

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?

Large scale projects often contain a greater number of risks, the management of which may be beyond what the private sector can accept. As such, while a proper allocation of risks and unknowns is important in any procurement, an inappropriate allocation may result in lack of interest from teams, even after being shortlisted (given opportunity costs and limited resources). Also to consider with respect to contract size are teaming capabilities and competition, further discussed in our response to question 6 below.



Our experience indicates that the optimum contract size range of most successful large scale P3s falls in the \$1 billion - \$2 billion range with a maximum cap of \$4 billion. The range is highly dependent on a number of factors, including sizing of construction milestone and/or completion payments, certainty of the revenue stream during operations and financing limits imposed by lenders (such as leverage, coverage, and amortization requirements). Please see our responses to the Funding and Financing Questions on pages 12-18 which provide further perspectives on project finance limitations and considerations that also impact contract size. The recommended range is a widely accepted market norm.

Participating in alternative delivery procurements of large scale projects often carries a large cost to teams in preparing proposals. Of particular concern to the private sector, for such projects, is the amount of any stipend available to unsuccessful teams. We view the availability of an appropriately sized stipend to be indicative of the Authority's "skin in the game" which is crucial to encourage private sector participation resulting in greater competition.

Given our reasons above, we do not think that both project scopes should be combined into a single DBFM contract.

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

The contract size for these projects will likely limit the number of potential teams that have the financial strength and ability to backstop performance, including the ability to provide a security package, which ultimately reduces competition. The list below provides a more fulsome list of reasons why a larger scope is likely to limit teaming opportunities:

- Financial strength required
- Cost and risk allocation
- Technical know-how / technology
- Rail / Systems / Civil Experience
- Understanding of regulatory environment
- Labor, equipment, material constraints
- Availability / Capacity of Subcontractor community

For some of the team roles, there are few companies that have the relevant experience and interest to participate. It will be important to balance the needs to encourage competition and foster innovation for such roles. For example, with respect to IOS-South, there are very few firms that have the technical experience and capability to deliver the expected tunneling work.

We understand the Authority's goals for the program including having a "best in class"



transportation option and focusing on a “partnering” model, which includes:

1. Working close with design, build, O&M, and life cycle teams
2. Supporting local jobs and local contractors
3. Understanding the compliance and regulatory environment

Due to the high cost of a DBFM contract pursuit, most companies would be unwilling to dedicate the needed resources unless a shortlist of the three most highly qualified teams is established. We support a shortlist of three teams.



Funding and Financing Questions

Introduction: Our Project Funding Understanding and Assumptions

As per the Authority’s 2014 Business Plan (dated April 30, 2014) and the “Answers to Frequently Asked Questions, RFEI HSR #15-02” document (released August 11, 2015) our understanding of the sources and uses of funds for IOS-North and IOS-South (each, and together, the Projects) and the various other assumptions we have made in responding to this RFEI are outlined below.

Uses of Funds \$ Billion	IOS - North		IOS – South	
	2013\$	YOE	2013\$	YOE
Planning Environmental, and ROW	4.12	4.82	4.14	4.57
Stations and Rolling Stock	2.46	2.92	2.16	2.51
Civil Works	14.80	18.08	18.06	20.40
Infrastructure	3.33	4.16	3.42	5.05
Unallocated Contingency	0.88	1.09	0.90	1.05
Subtotal	25.59	31.07	28.68	33.58
Less: FCS (Civil Works)	(3.55)	(3.83)	(3.55)	(3.83)
Total	22.04	27.24	25.13	29.75

Sources of Funds

Funds available to the Projects include \$4.1 billion in uncommitted Proposition 1A bond proceeds available to the Authority and an ongoing payment derived from proceeds from the Cap-and-Trade (C&T) program, the C&T Proceeds, estimated to be \$500 million in FY15/16.

Assumptions

In addition to the above we have made the following assumptions:

- The Authority’s Federal grants (\$3.2 billion) and most of the Proposition 1A bond proceeds (\$5.9 billion) are unavailable for the Projects as these funds have been committed already to Construction Packages 1-4 in the Central Valley
- The C&T Proceeds payments of \$500 million per year are to continue through to FY 2050
- The Authority currently has no access to funds raised under Federal credit enhancement programs such as the Transportation Infrastructure Finance and Innovation Act (TIFIA), Private Activity Bonds (PABs), and Railroad Rehabilitation & Improvement Financing (RRIF)
- Revenues from operations of the Projects will be available to pay for operating and maintenance costs and any remaining revenues will be available to repay private financing raised for the Projects



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?

Given the proposed delivery approach and available funding sources, we believe there are a number of concerns which the Authority must address. The table below outlines some of the more material issues and related limiting factors in respect of the Projects.

Item	Issue	Limiting Factor
Authority Sources of Funds		
Proposition 1A bond proceeds	Only a portion of this source is committed to the Projects and it is uncertain if this portion has been appropriated.	Understanding of appropriations and relevant governmental approvals is crucial to determine the exact private financing requirements of the Projects and to generate sufficient private sector participants' interest.
C&T Proceeds	C&T Proceeds will likely be used to repay the private capital financing raised for the Projects, however the proceeds themselves are dependent on the C&T Program and the stability of this payment source is uncertain.	<p>The use of the C&T Proceeds as a repayment source for the Projects is likely to raise significant financiers concerns in respect of revenue fluctuations depending on the level of capping and the availability of funds given that annual appropriation is politically driven and subject to change. Significant levels of due diligence will be required in respect of the political and appropriation risk elements related to these payments (statutory powers to implement and dedicate C&T Proceeds, priority of payment versus other commitments, fund disbursement process, legislative or executive branch ability to change program funding and divert funds to other uses, potential commoditization of valuation of credits causing proceed from future sales to erode, ability to pay outstanding debt in events of default or termination).</p> <p>To ensure there is sufficient appetite by financiers to invest in and/or lend to the Projects, availability payments received as part of the Projects' contractual structure (which are dependent on the C&T Program) must be stable and/or guaranteed/back stopped by the Authority, or most likely the State of California or another governmental entity of strong credit</p>



		quality.
Operating Revenues	The current assumption that revenues from operations of the Projects will be available to pay for operating and maintenance costs of the Projects raises concerns regarding revenue risk.	Operating revenues for the Projects are affected by factors beyond the control of the private sector (lower ridership volumes, competitive pricing pressure, macroeconomic trends, etc.). However, under the currently proposed structure outlined by the Authority, the repayment of private capital will be directly dependent on these operating revenues, and it will be in jeopardy of non-repayment. In order to ensure sufficient appetite by financiers and attractiveness to equity investors and developers, revenues should not be tied to operational results and instead be availability based.
Project(s) Contractual Considerations		
Scope	The current complexity of the proposed scope of the Projects will introduce structural limitations to the private financing raised for the Projects.	The complex technical requirements of the Projects coupled with the required interfaces with existing Construction Packages, a rolling stock provider, an operator and an unfamiliar authority/client, will be a key concern for financiers and will thus impact the credit of the Projects (and thus the gearing and related coverage ratios as well as the quantum of funds that can be raised). Clarity on the final scope of the Projects is crucial to determine the correct structure of the financing to be raised for the Projects and the composition of financiers to provide such financing.
Size	The size of the private financing anticipated for the Projects is extremely large and unprecedented in the US P3 market.	The quantum of financing that can be raised by the private sector is highly dependent on the structure of the government funding (for instance, using progress payments or final completion payments will drive the need for short term capital versus long term capital, thus tapping into different financier classes and market capacities), and the direct (Federal grants) or indirect government support (TIFIA allocations, PABs, RRIF, tax-exempt status for various components) for the Projects. Clarity on the final structure of project funding will be a key factor in the ability to finance the Projects from debt or equity sources, both in terms of size and availability of capital and the competitiveness of the eventual financing solution.



Term	An operating period of more than 30 years can be challenging.	Longer operating terms might require the introduction of refinancing risk to private financings (which may not be available for the full term of the Projects) and the inefficient pricing of operations and maintenance and lifecycle costs over the longer timeframe. A 30-year operating period is in line with US project finance market expectations.
Other	Numerous other contractual considerations will have an impact on the availability of funding sources for the Projects.	Many factors will affect the attractiveness of the Projects to potential financiers and availability of funding for the Projects including proper risk allocation across scope elements, handling of interface risk amongst the various Projects' stakeholders, performance and compliance provisions of the Projects' construction and operations specifications, stability of the Projects' revenues (aforementioned), the amount of public funding in the form of ongoing milestone or progress payments from the Authority, other government credit enhancements, the strength of the Authority's credit, appropriation provisions and compensation on termination provisions. Further clarity on these various factors is crucial for the ability to raise sufficient and competitively structured funds to finance the Projects.

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

Estimated Financing Needs

Assuming an availability payment procurement for the Projects utilizing all the C&T Proceeds (\$500 million per year, available through FY 2050) to service and repay private sector financing raised for the Projects, our conservative assumptions and preliminary modelling estimates suggest that based on the available funds, the private sector would be able to service raised financing up to a portion of \$6 -8 billion of the capital costs of the Projects. In addition, the Authority also has access to government funding committed for the Projects of \$4.1 billion, which funding can be used as progress payments to decrease the need of private financing. Note that operating revenues resulting from ridership / fare collections have not been included in these calculations, as per the Authority's assumptions that these funds will be used to cover operating costs and expenses. Combining the two capital sources aforementioned, the total estimated capital cost of the Projects, which could be financed given the proposed structure, is



at most \$12 billion. This figure is significantly below the IOS-North and IOS-South capital cost estimates of approximately \$22 billion and \$25 billion, respectively. Also note that the ability to service raised financing does not mean that such a large financing amount could in fact be raised for the Projects, which we believe is well in excess of the US project finance market financing capacity.

If the Authority wishes to procure the Projects at their current scope and size, the Authority will likely need to secure an approximate additional \$10 billion for IOS-North, \$13 billion for IOS-South or \$23 billion for both Projects. As a note, such additional funding must be serviced come from other sources (see below options) and cannot rely on C&T Proceeds (which would be dedicated to servicing a portion of the debt already) or any private sector financing (which would already utilize the bank, bond and equity capital markets to raise the initial financing for the Projects). As well, please note the figures discussed above are approximations only at this time.

Changes to Funding Sources

We recommend the Authority to engage its financial advisor to conduct a detailed analysis on the financial feasibility of the Projects. In the interim, we recommend the following actions with regards to the different potential funding sources.

Source of Funds	Recommendation	Impact
Proposition 1A bond proceeds	Increase and appropriate for Projects and seek other dedicated state dedicated funding sources	Both increases government funding and reduces private sector financing needs to help make the Projects more financeable
Federal grants	Increase and appropriate for Projects	Both increases government funding and reduces private sector financing needs to help make the Projects more financeable
C&T Proceeds	Increase allocation and guarantee payment stream to backstop availability payments for the Projects	Both increases government funding and increases private sector participants' appetite for the Projects and capital market capacity as well as ensures a more competitive structuring and financing costs for the Projects
TIFIA, PABS, RRIF	Apply for TIFIA as soon as possible	Reduces the blended financing cost for private sector capital thus increasing private sector capacity for the Projects
Operating Revenues	Guarantee operating revenues through service level payments as is typical in other availability based P3	Increases private sector participants' appetite for the Projects and capital market capacity as well as ensures a



	rail projects or at the least, guarantee the capital payment component of the payment stream dedicated to the repayment of private sector financing	more competitive structuring and financing costs for the Projects
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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?

We believe the availability payment mechanism/model is the most appropriate structure for the Projects as it brings the most value for money to the authority, ensures competitive tension and access to a deep capital market for private financings and best aligns the private sector incentives with the Authority’s objectives.

First, the availability payment model brings the most value for money to the Authority. ‘Revenue Risk’ (or revenue concession) procurement models often result in higher financing costs when compared to availability payment models. Due to the existence of revenue risk, investors’ returns are subject to volatility and the risk of non-repayment of capital. As a result, most investors increase their return expectations for revenue risk projects to compensate themselves for the added risk they are taking on. Similarly, project lenders look to protect the servicing and repayment of their debt and are thus more likely to require lower gearing ratios and higher minimum coverage ratios when structuring the financing package as well as higher spread pricing to compensate themselves for the added risk inherent in revenue risk projects. Combined, these factors result in a significantly higher weighted average cost of capital for revenue risk projects, which will inevitably be reflected in higher costs to the Authority over the Project’s life and a less attractive bid price for the Projects.

Second, the availability payment model ensures the right competitive tension and access to capital market capacity during the Projects’ procurement process. The trend away from revenue risk transactions is demonstrated by the steep growth both nationally and internationally in the availability payment structure P3 model, which indicates that the availability payment model represents a more attractive opportunity for both the public and private sectors. Not all project finance developers and equity investors are interested in taking revenue risk, thus a project with revenue risk elements is likely to see less interest, lower levels of competition and reduced pricing tension and innovation. Similarly, many bank and bond financiers shy away from revenue risk transactions which they view as too risky or beyond the mandates of their respective institutions. As a result, it is likely that a revenue risk transaction



will have access to a smaller portion of the private financing capital markets and suffer from reduced market appetite and capacity. Given the proposed size of the Projects, it may not be possible to obtain the required quantum of committed financing for the Projects should a revenue risk model be chosen.

Third, the availability payment model aligns the incentives of the private sector with the Authority's objectives. Transferring revenue risk to the private sector skews the concessionaire's focus towards the maximization of revenues and profit and away from ensuring the availability of the asset and providing the mandated safe and reliable service to the public. Such unintended incentives would be directly in contrast to the Authority's objectives.

As aforementioned, we believe the availability payment mechanism to be the most appropriate mechanism for the Project and to better achieve the Authority's objectives when compared to a revenue risk project with financing based on future revenue and ridership.



Technical Questions

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.

As described earlier, our preferred delivery model for CP5 is DB. Some of the benefits of using a DB delivery model for track and systems include:

- fully integrated solution which includes systems and track,
- ability to optimize design given focus on both systems and track,
- schedule benefit of concurrent construction and design,
- smaller more efficient teams relative to overall project cost

One major advantage of an alternative delivery model is the ability to provide an owner with a single source of responsibility for all aspects of a project. The Authority can have a single company they can hold accountable – no questions and no finger pointing. By building a collaborative team that includes developers, lenders, engineers, builders, subcontractors and suppliers, the delivery team can ensure the owner's goals are met.

One significant advantage of a P3 delivery model is that by involving lenders in the proposal development process, a disciplined date and cost certain proposal with a full accounting of risks is developed through the participation of lenders' legal counsel, lenders' technical advisors and rating agencies. Early involvement of the lenders and advisors ultimately streamlines the process to achieving financial close in a timely manner.

A fully integrated delivery team can also significantly reduce the amount of time from the inception of the project to its completion. An integrated team reduces rework and redesign during the construction period and optimize operational lifecycle performance. By overlapping the design and construction stages, significant schedule savings can be generated.

Many times the cost of a project is driven by subcontractors and suppliers. In comparison to traditional project deliveries, whereby their involvement is not solicited until plans are complete, as a part of the delivery team, their input is provided during the proposal phase and can be incorporated into the design to benefit the project. By involving subcontractors early in the process, it is possible to collaboratively determine which activities are likely to impact the critical path to determine the appropriate level of self-performance.

Schedule and cost benefits can be achieved by adopting an alternative project delivery approach where a basic set of performance criteria are established and the delivery team is



allowed to provide a solution free of restrictive constraints or processes/procedures that increase cost and schedule without adding value. Examples include:

- Contract specified staffing requirements with extensive past experience requirements, i.e. having a PE requirement for the construction manager
- Having an overly redundant quality verification program, i.e. requiring QA/QC, Self-Certification, Verification & Validation and Independent Check Engineer/Independent Site Engineer
- Over prescriptive specifications for means and methods, i.e. foundations shall be Cast in Drill Holes

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.

The assembling of a team is a long process between multiple players each trying to assemble the team that it thinks has the best opportunity to win the project based on the award criteria in the RFP. Team members are chosen based on the RFP scope of work, experience requirements/needs and the ability to provide a low cost solution. The larger and/or more complex the scope of work, the more team members required and, on average, the lower quality of the team’s average.

The vertical stacking of components has the benefit of providing fully integrated solutions from the DBFM contractor where all the parts and pieces work together. The downside is that the team is scored based on its proposal which, the highest scoring proposal may consist of systems/solutions that meet the RFP requirements, but individually may not be highest quality, most efficient or effective solution.

The horizontal procurement of components increases the integration, interface and coordination requirements for CAHSR and the individual contractors, but should result in the highest scoring (and in theory highest quality) solution for each individual component which also provides CAHSR better control on the individual components.

Focus Area	Vertical Solution	Horizontal Solution
Procurement Costs	Procurement costs need to be evaluated at the program level. Depending on how well the procurement is managed, either solution may be more cost effective. The lower construction, O&M and Life Cycle costs of the horizontal solution need to be offset by increased procurement costs for the owner to determine the most cost effective approach.	
Design Costs	Higher as each project has	Lower costs due to repetitive functions



	multiple disciplines working on smaller portions.	
Construction Costs	Multiple vertical procurements will reduce the efficiency of the individual specialty component construction costs and adds complexity to the D-B to manage.	Competition on individual components results in lower costs. Increased productivity leads to lower costs. Less risk associated with a single component. Higher coordination and integration costs (procurement costs).
O&M	More costly to provide O&M on smaller/shorter areas.	More cost effective to provide O&M on larger/longer areas.
Life Cycle	Higher costs due to smaller footprint for components. Selection of key components more based on costs and schedule than life cycle. Individual component evaluation lost within the structure of the D-B.	Selection criteria based on individual components results in higher quality and better life cycle costs. Also provide a single source over a longer area requiring less spare parts and consistent maintenance plans.
Schedule	Reduced schedule as a result of shifting responsibility to the D-B Contractor.	Increased schedule due to the scheduling constraints associated with multiple contracts

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.

By utilizing a procurement model that leverages the alternative delivery method by providing minimum performance criteria, we believe that there are significant opportunities to incorporate innovative ideas that will allow us to optimize the long term life cycle performance for the selected project, reduce schedule durations and lower overall costs. Our experience indicates that RFPs with more specificity often result in fewer opportunities for the design-build contractor to incorporate innovations resulting in higher costs for the owners and end users. As described in the Project Approach section above, outcome and performance based specifications provide opportunities to innovate.

Provided below are some specific examples that are likely to yield cost savings and/or schedule acceleration while still achieving the Authority's objectives.

- Contract Provisions
 - ROW – allowing work to be phased when ROW program is fragmented
 - Third Parties / Utilities – having MoUs and IGAs are in place prior to contract



- execution
- Geotech – preparing a baseline report prior to procurement
 - Existing Infrastructure – preparing a baseline report prior to procurement
 - Use of off the shelf rolling stock design
 - Allowing rolling stock supplier to provide Train Control System
 - Coordination with Infrastructure Provider
 - Procuring manageable segments of track to build track and systems
 - Having an appropriate acceptance and turn over process
 - Coordinating installation of OCS foundations and electrical/systems infrastructure (i.e. ductbanks, pads for substations, etc.)
 - Coordination with rolling stock supplier
 - Rolling Stock/Rail interface (super elevation, curve radius, turnouts)
 - Rolling Stock/Structure (dynamic envelope)
 - Traction Power Requirements (load flow, pantograph interface)
 - Train Control Requirements (safe braking)
 - Integration, test and start-up

With respect to the procurement phase, when measuring the quality of team experience, direct HSR experience should not be pre-requisite if teams can demonstrate an ability to deliver the scope of the project pursuant to technical requirements.

